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TECHNICAL BRIEF: 4BIG RACK OFFICE RAID



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TECHNICAL BRIEF: 4BIG RACK OFFICE RAID

This Technical Brief is a valuable resource to learn how the RAID (Redundant Array of Independent/Inexpensive Disks) for your LaCie professional server is configured. In the pages that follow, you will find detailed information on how the RAID array on your LaCie 4big Rack Office will appear and how best to manage it.

ADMINISTRATOR

In order to review, confirm, or redefine the software settings on your LaCie professional server, you must have Administrative rights to the device.

RAID

An early question when first integrating a server is:

What type of RAID array(s) will provide the best data protection and performance?

LaCie understands that the response is a fine balance between storage capacity and the needs of an office. The 4big Rack Office RAID has been implemented using Windows® Home Server 2011 for optimal performance and security in most business environments:

- Mirroring (RAID 1): Data is copied to two or more drives in a mirrored set. Should a single disk fail, data will be available to users on the network. Mirroring provides solid data protection though storage capacity and performance will be reduced. A minimum of two disks are required to create a mirror.
- RAID 5: Data is written across all disks using parity blocks. Similar to RAID 1, data integrity is maintained even if one drive fails. However, RAID 5 offers a more efficient use of storage capacity and enhanced performance when compared with RAID 1. Your LaCie professional server must have at least three hard drives to configure RAID 5.

For a full explanation of RAID, please see our [White Paper](#).

Important info: Revising and building RAID arrays will delete all data stored on the hard drives.

LACIE RAID CONFIGURATIONS AND WINDOWS® BACKUP

LaCie recommends backing up all data, including files stored on traditional backup servers such as the 4big Rack Office. The 4big Rack Office has a helpful wizard to configure automated backups from your server to desktop attached storage (DAS). A DAS can connect to one of the USB 2.0 ports found on the rear of the server. In most instances, businesses and IT professionals have considered their unique environment for backing up data so this Technical Brief will not offer additional details on the logistical requirements for maintaining data in one or more sites.

However, it is important to note the limitations for backing up data beyond a fixed storage capacity. Please keep in mind that the Windows Backup Wizard will not allow you to backup data from a volume that is **greater than**

2TB. Since the majority of businesses and IT professionals take advantage of commercial and private backup solutions, the default RAID configurations found in this Technical Brief include volumes greater than 2TB. If you do not have an alternative backup solution for your 4big Rack Office and would like to use the wizard, please see [RAID - Creating Multiple Volumes \(Optional\)](#).

For further information on the 2TB volume limitation with the Windows Backup Wizard, please see the links below:

[Repartition a hard drive on the server](#)

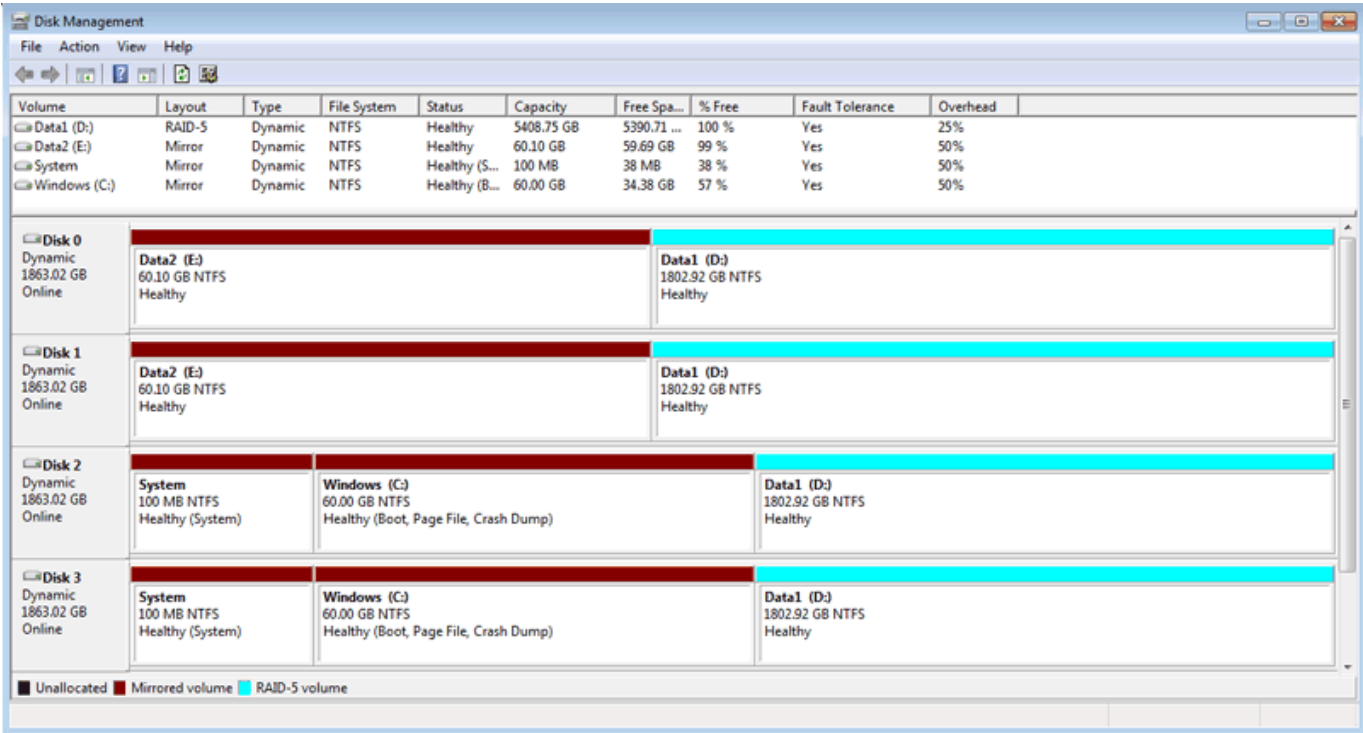
WINDOWS DISK NUMBERING

The 4big Rack Office uses Windows Disk Management to configure RAID for its four disks. To properly manage the disks, Windows must assign numbers to the physical disks.

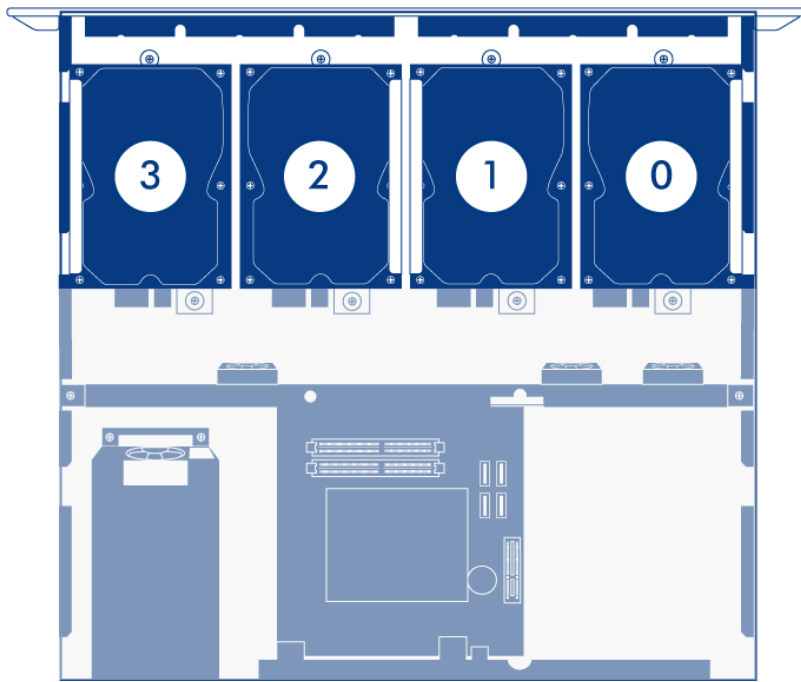
Note: To best demonstrate disk numbering, this section uses the default configuration of a 4big Rack Office.

DISK NUMBERING: WINDOWS DISK MANAGEMENT

The screenshot below of Windows Disk Management shows a standard RAID configuration with four disks.



The illustration below shows how Windows Disk Management numbers correlate with the physical placement of the disks in the 4big Rack Office enclosure.



Please note that each disk takes part in two RAID configurations. For example, approximately 60GB of Disk 2 is part of a mirror that runs the Windows operating system. The remainder of Disk 2 is also one of four drives that make up the Data1 volume, a RAID 5 array.

Disk Numbering and a Missing Disk

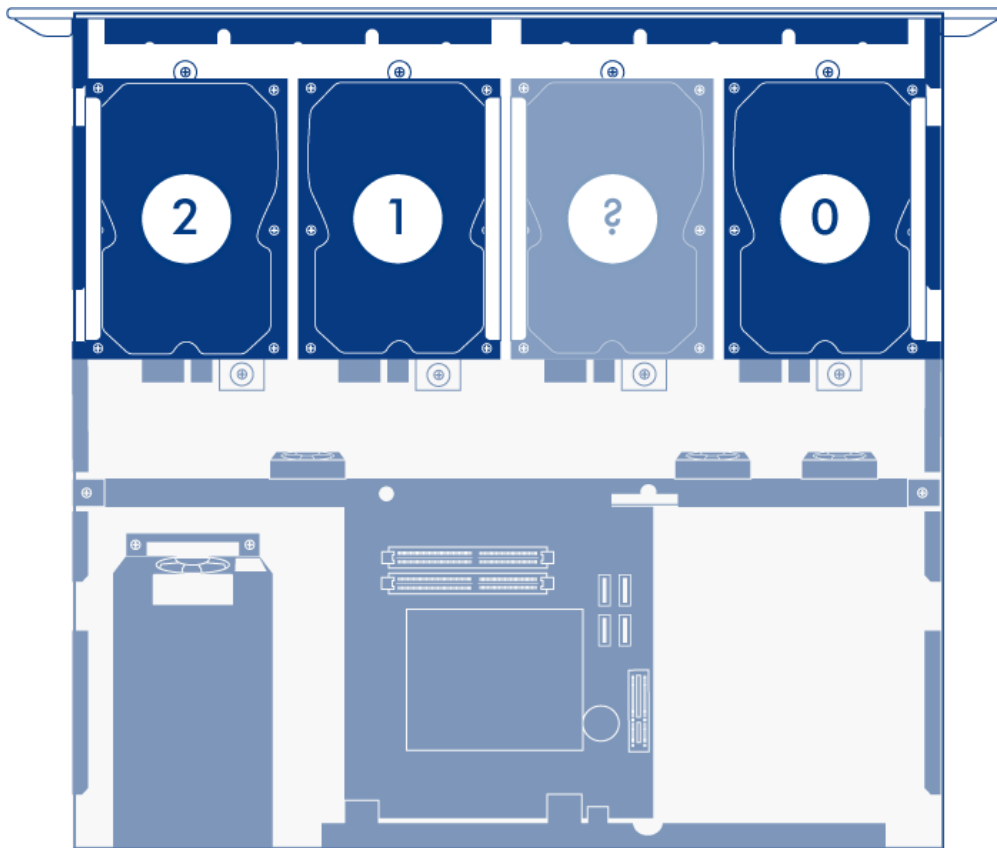
During standard operation, the numbering will not change. However, if a disk should fail, the default disk numbering could become confused, especially if the 4big Rack Office is restarted while a disk is marked as *Missing*. A missing disk could indicate:

- A disk physically removed from its slot
- Disk failure

For example, if Disk 1 has been physically removed from its slot or it is no longer recognized, Disk Management will remove it from the list. Disk Management will note that the hard drive is *Missing*. The other three disks will maintain their default number assignments since the 4big Rack Office has not been restarted. If the system restarts before the Missing disk has been repaired, Windows will reassign numbers to the remaining disks based upon their physical order.

In our example, Disk 1 was removed from its slot, becoming the Missing disk in Windows Disk Management. If the 4big Rack Office is restarted with an empty slot or the disk is not recognized, Windows will assign new numbers to certain drives:

- Disk 0 remains Disk 0
- Disk 2 becomes Disk 1
- Disk 3 becomes Disk 2



The Missing disk will remain on the list until it is manually removed from Windows Disk Management.

RAID - FOUR-DISK SERVER

For your convenience, the 4big Rack Office RAID is preconfigured for use following the hardware and software installations recommended by the [4big Rack Office User Manual](#) and [Technical Brief: Getting Started](#). While it is possible to format and create alternative RAID arrays, LaCie highly recommends maintaining the default mirroring and RAID 5 for optimal protection of your data.

Important info on RAID 0: Please note that selecting a RAID 0 array may offer slight speed advantages but data will not be duplicated across both volumes as with mirroring. Users risk losing data if one of the disks should fail in a RAID 0 array.

4BIG RACK OFFICE RAID CONFIGURATION

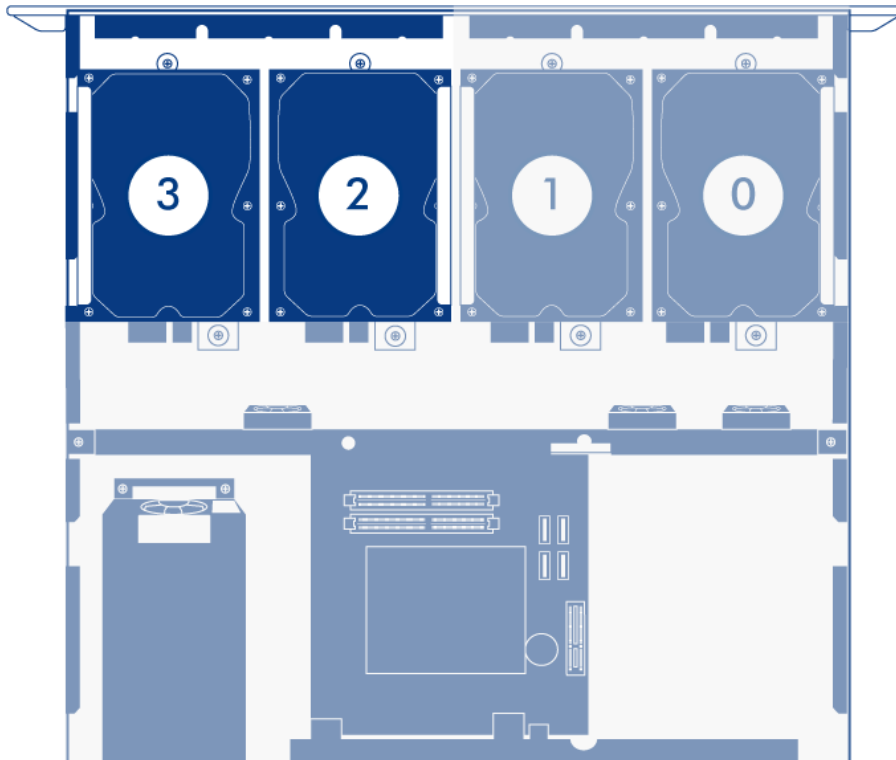
Refer to the table below for details on how the RAID is configured on the 4big Rack Office. Please note:

- The **Windows (C: drive)** partition is reserved for the Windows operating system.
- The **Data1 (D: drive)** has the greatest capacity which makes it ideal for the bulk of your Shared Folders (for further details on Shared Folders, please read LaCie's [tech-brief-shared-folders](#)).
- The **Data2 (E: drive)** may be used for a page* file to enhance server performance as well as a limited amount of Shared Folders.

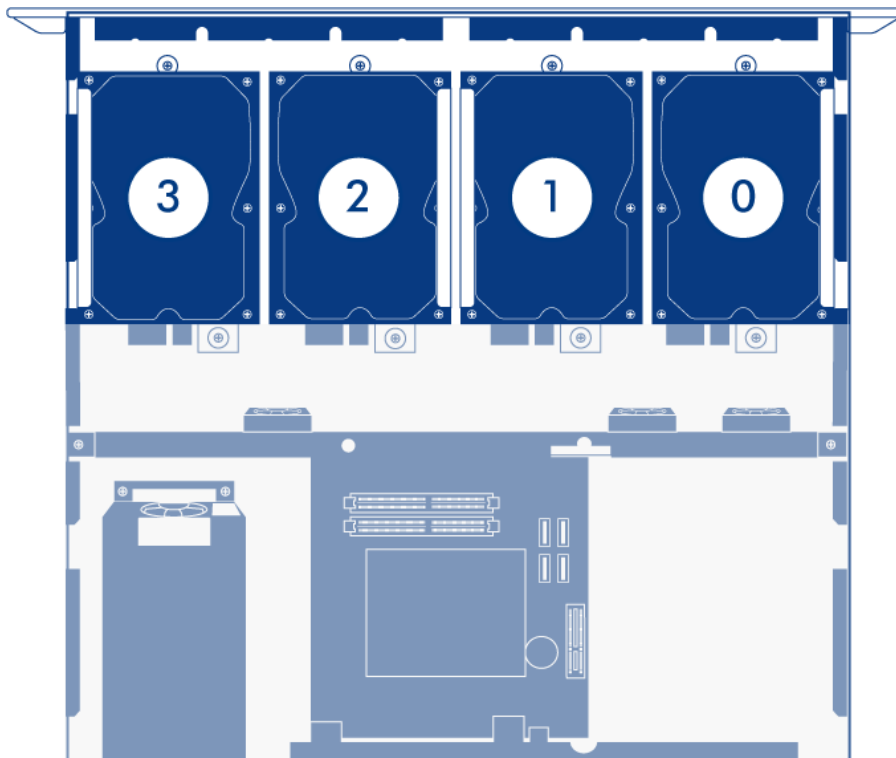
Volume	Disks and RAID Level	Usage	Notes
Windows (C: drive)	2 Disks Mirror (RAID 1)	Server performance is optimized when the operating system is run from a dedicated volume. Storing data on the system volume will impact server performance. Page file* (optional)	A Mirror offers redundancy, duplicating each file on the two disks that make up the volume. If one disk should fail, the system data will be available on its mirrored drive.
Data1 (D: drive)	4 Disks RAID 5	The Data1 volume should be used to create Shared Folders for data.	RAID 5 requires three or more disks. RAID 5 offers improved storage capacity. While mirroring has an overhead of 50% storage capacity due to file duplication, RAID 5 parity on a server with four disks has approximately 25% overhead. This means that close to 75% of the total capacity is available for storing data.
Data2 (E: drive)	2 Disks Mirror (RAID 1)	The Data2 volume can be used for the page file* (optional) and to host a limited amount of Shared Folders. Write the page* file to this volume to extend the server's physical memory.	If one disk should fail, the data will be available on its mirrored drive.

*A page file is used by the Windows operating system to temporarily increase the available memory. It can be created on the Windows volume or the Data2 volume.

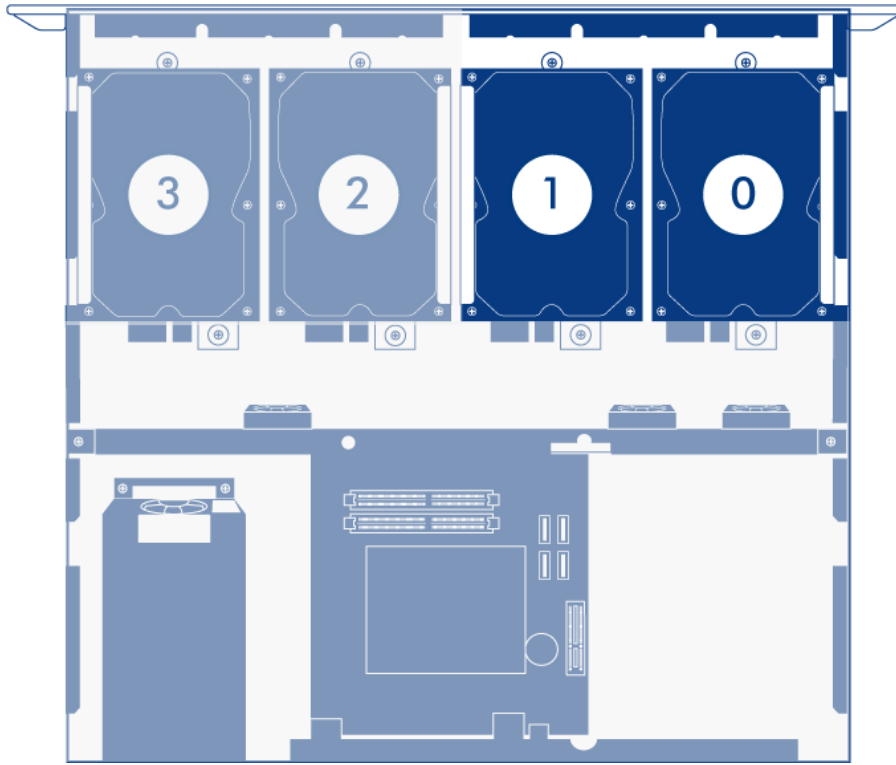
For a graphical representation, please see the examples below:



Windows System Mirror (C:)



Data1 RAID 5 (D:)



Data2 Mirror (E:)

Important info: Mirroring and RAID 5 provide solid protection if one drive in their respective arrays should encounter problems. However, LaCie highly recommends backing up the data stored on your professional server regularly in order to guard against worst case scenarios (i.e. accidental data deletion, malicious programs, viruses, etc.). LaCie professional servers include USB 2.0 ports to attach desktop drives for use as backup storage. You can also backup your data to another server on the network.

RAID - CREATING MULTIPLE VOLUMES (OPTIONAL)

Administrators who wish to use Windows Backup with the 4big Rack Office should follow the instructions in this section to create partitions that do not exceed 2TB. To revise the default RAID configuration, the Data1 [D:] volume will be deleted in order to create multiple volumes. Please note that all data stored on Data1 [D:] will also be deleted. **You must back up all data stored on Data1 [D:] before deleting it.**

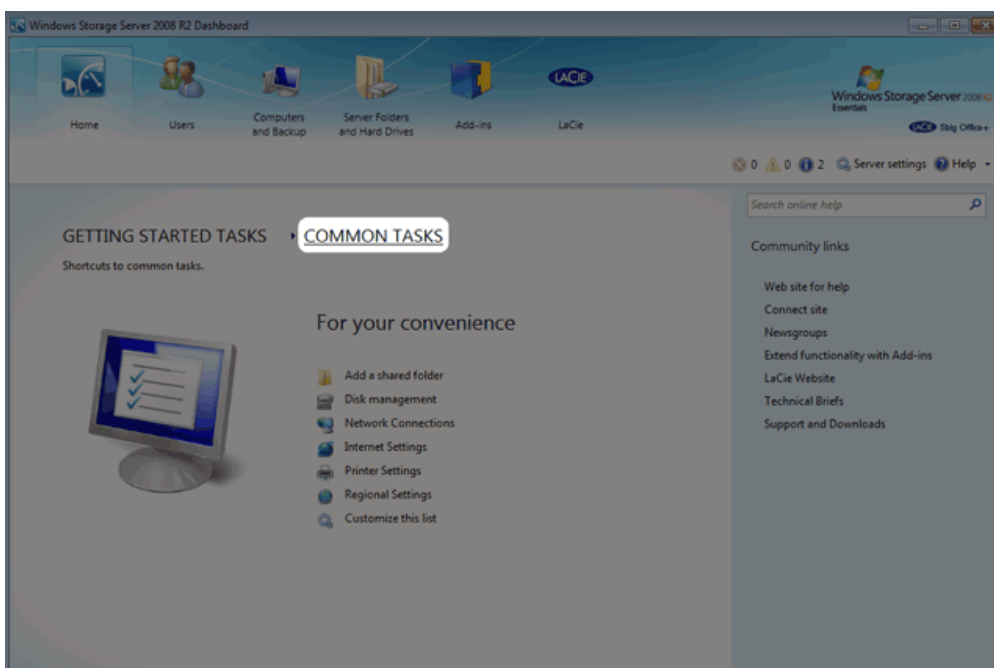
Note: The following instructions use the LaCie 5big Office/Office+ with five drives. While your RAID configuration may not exactly match the screenshots below, you can still use the instructions as a guide to delete existing volumes and create new partitions.

DELETE AN EXISTING RAID VOLUME

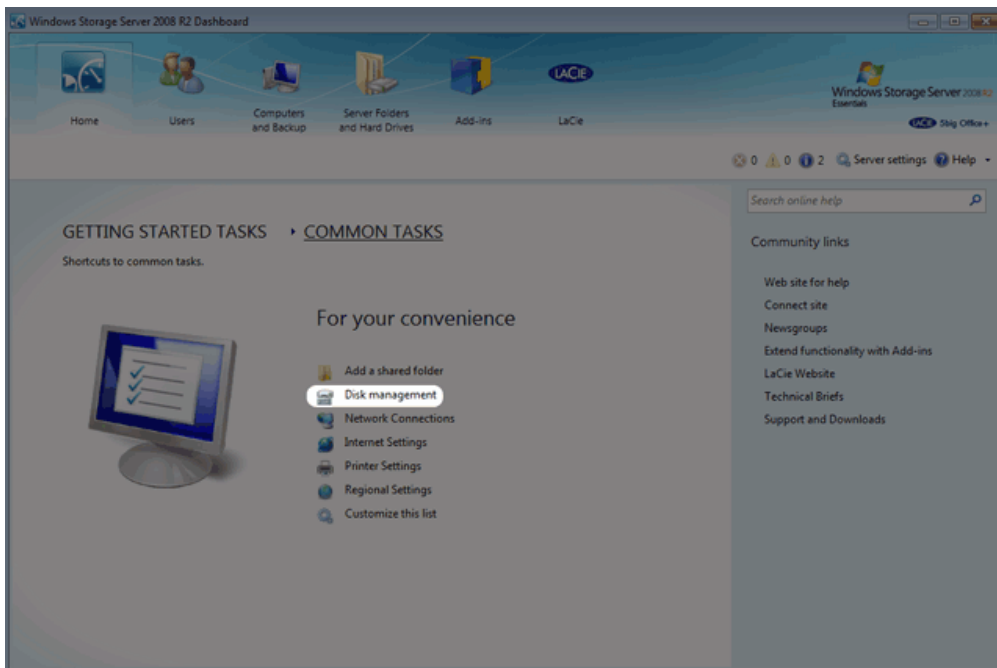
Important info: Deleting volumes and creating RAID arrays are data destructive operations. Please make certain that all data has been backed up and that all Shared Folders have been moved to other volumes before performing either operation.

Use Disk Management to delete a volume:

1. Launch the Dashboard from a Windows workstation on the same network as your LaCie 5big Office/Office+ or 4big Rack Office. **Start > All Programs > Windows Home Server 2011/Windows Storage Server 2008 R2 > Windows Home Server 2011 Dashboard/Windows Storage Server 2008 R2 Dashboard**
2. Select the **Home** tab.
3. Click once on **COMMON TASKS**.



4. Click once on **Disk Management**.



5. The screenshot below shows the default RAID configuration for a 5big Office/Office+ with five hard drives. Before creating volumes that do not surpass 2TB, we will delete the largest partition, Data [D].

Disk 0 Dynamic 931.51 GB Online	System 100 MB NTFS Healthy (System)	Windows (C:) 60.00 GB NTFS Healthy (Boot, Page File, Crash Dump)	Data (D:) 871.41 GB NTFS Healthy
Disk 1 Dynamic 931.51 GB Online	System 100 MB NTFS Healthy (System)	Windows (C:) 60.00 GB NTFS Healthy (Boot, Page File, Crash Dump)	Data (D:) 871.41 GB NTFS Healthy
Disk 2 Dynamic 931.51 GB Online	Data 2 (E:) 60.10 GB NTFS Healthy	Data (D:) 871.41 GB NTFS Healthy	
Disk 3 Dynamic 931.51 GB Online	Data 2 (E:) 60.10 GB NTFS Healthy	Data (D:) 871.41 GB NTFS Healthy	
Disk 4 Dynamic 931.51 GB Online	Data 2 (E:) 60.10 GB NTFS Healthy	Data (D:) 871.41 GB NTFS Healthy	

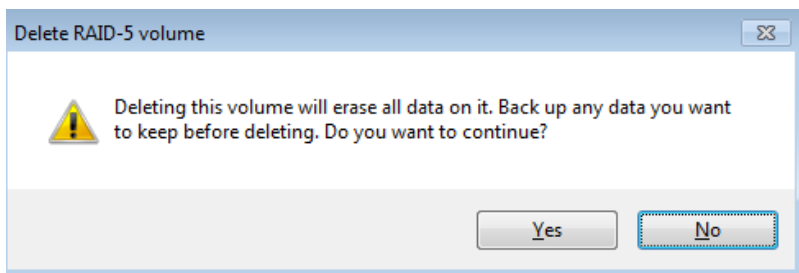
■ Unallocated ■ Mirrored volume ■ RAID-5 volume

6. Right click on the Data1 [D:] volume. You may right click on any of its five disks. Select **Delete Volume...**

Disk 0 Dynamic 931.51 GB Online	System 100 MB NTFS Healthy (System)	Windows (C:) 60.00 GB NTFS Healthy (Boot, Page File, Crash Dump)	Data (D:) 871.41 GB NTFS Healthy
Disk 1 Dynamic 931.51 GB Online	System 100 MB NTFS Healthy (System)	Windows (C:) 60.00 GB NTFS Healthy (Boot, Page File, Crash Dump)	Data (D:) 871.41 GB NTFS Healthy
Disk 2 Dynamic 931.51 GB Online	Data 2 (E:) 60.10 GB NTFS Healthy	Data (D:) 871.41 GB NTFS Healthy	
Disk 3 Dynamic 931.51 GB Online	Data 2 (E:) 60.10 GB NTFS Healthy	Data (D:) 871.41 GB NTFS Healthy	
Disk 4 Dynamic 931.51 GB Online	Data 2 (E:) 60.10 GB NTFS Healthy	Data (D:) 871.41 GB NTFS Healthy	

■ Unallocated ■ Mirrored volume ■ RAID-5 volume

7. If you have backed up all data and moved all Shared Folders stored on Data1 [D:], click **Yes**.



8. The volume Data1 [D:] has been deleted.

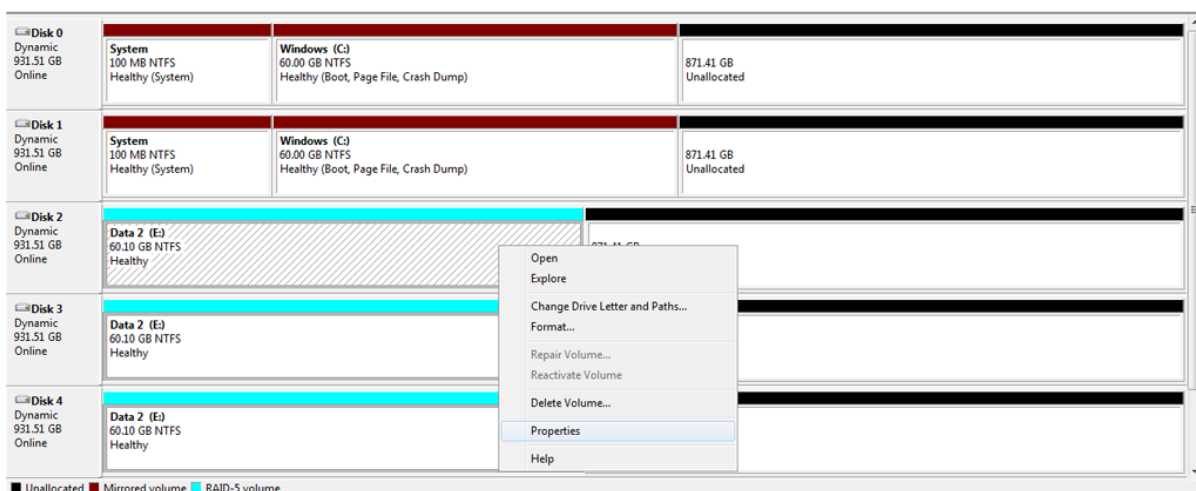
OPTIONAL NAME CHANGE

Adjusting the size and order of the partitions will add more volumes to Disk Management. Consequently, the disks will no longer appear in the same order as the default RAID configuration. For organizational purposes, it may be easier to change the name and letter of Data2 [E:] so that the Data drives are listed in numerical order in Disk Management, from left to right. This step is optional and may be skipped.

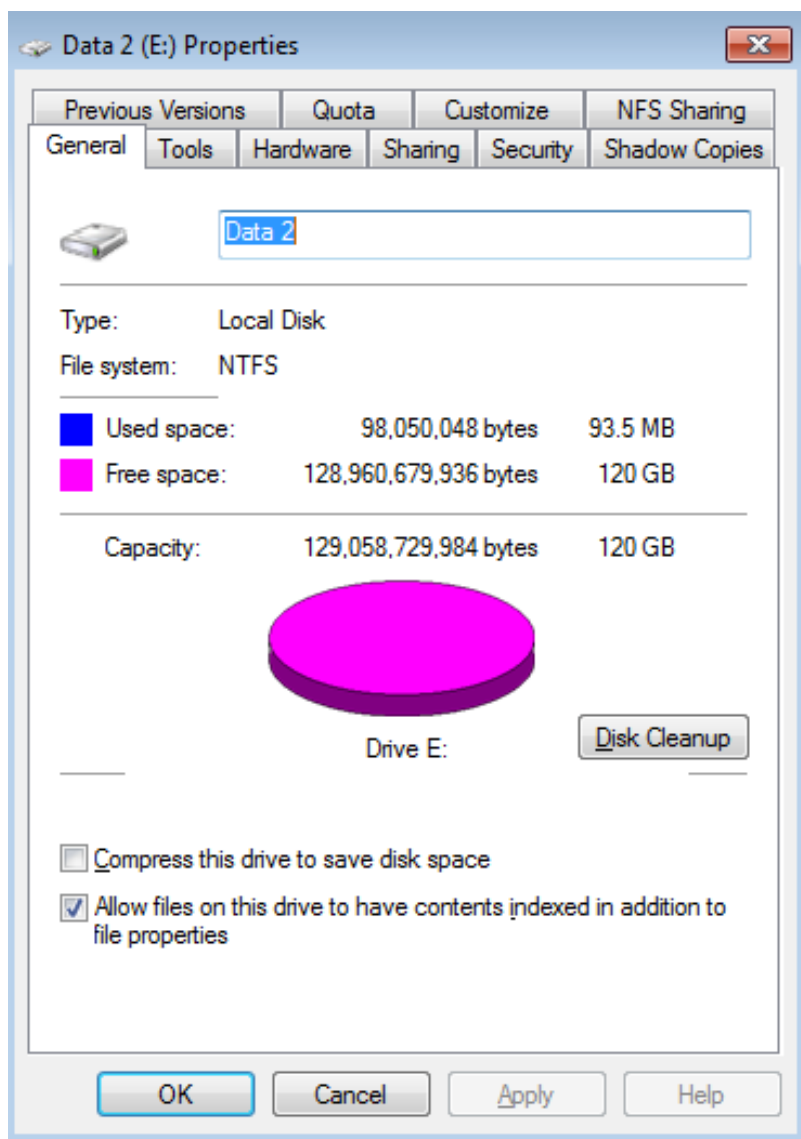
Important info: Editing the name of the volume will have little effect upon the links to Shared Folders on the server. However, changing the drive letter of a volume will require that you revise the location of Shared Folders on the server.

To change the name and volume letter:

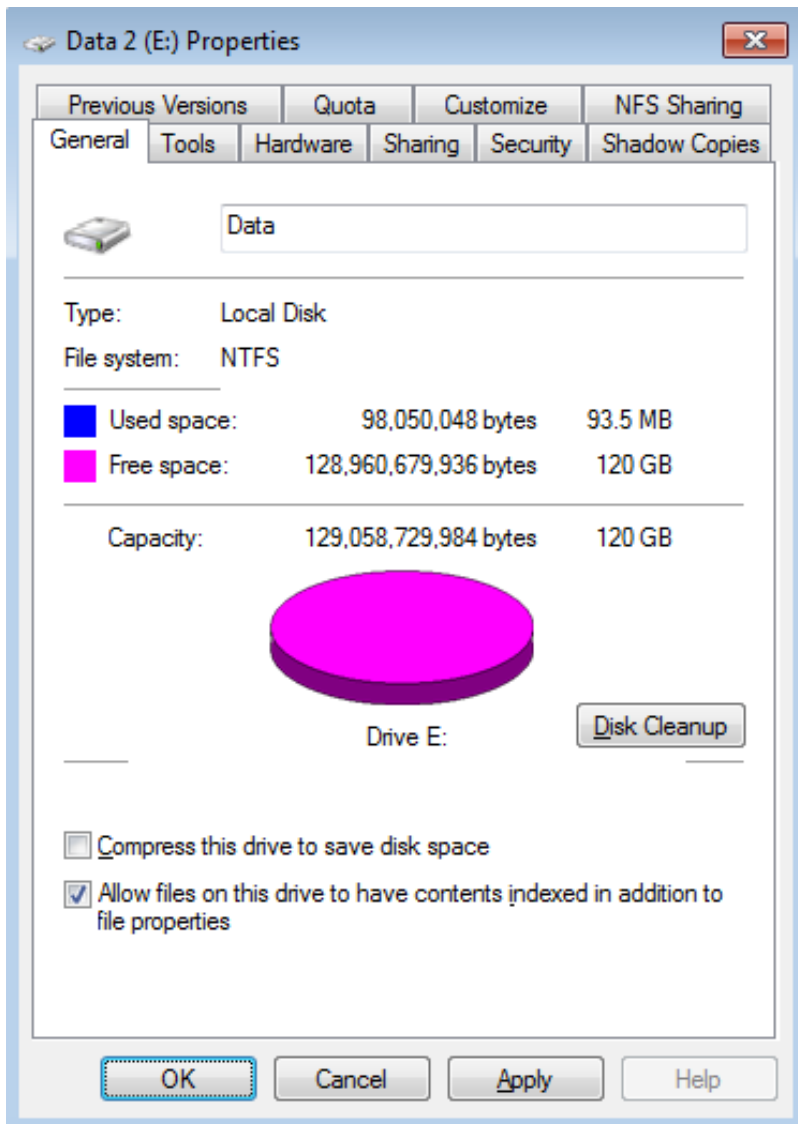
1. Right click on any drive in the Data2 [E:] volume. Select **Properties**.



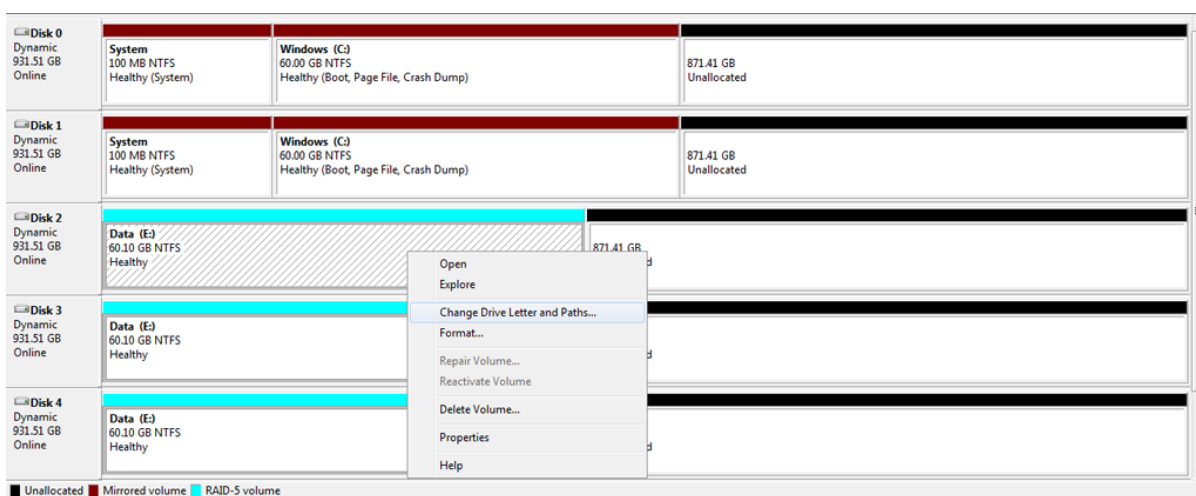
2. The name of the volume, **Data2**, is highlighted in the *General* tab.



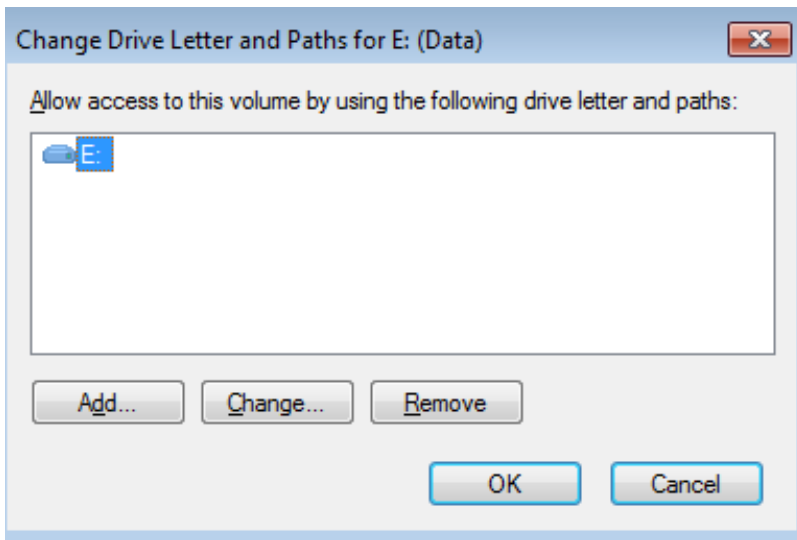
3. In this example, we are changing the name from **Data2** to **Data1**. You may use any name that suits your environment. Click **OK**.



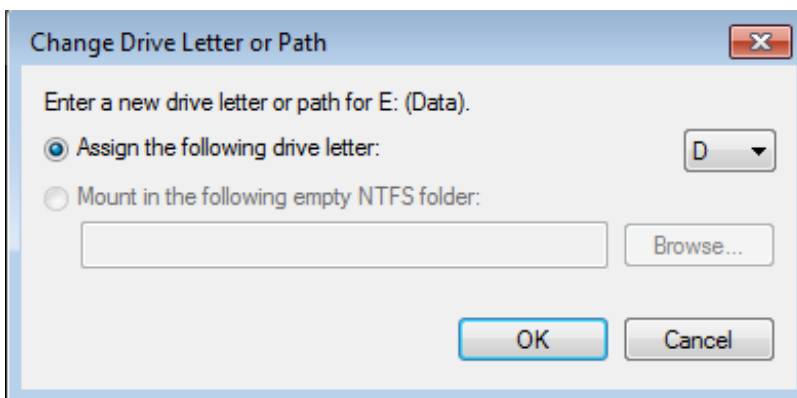
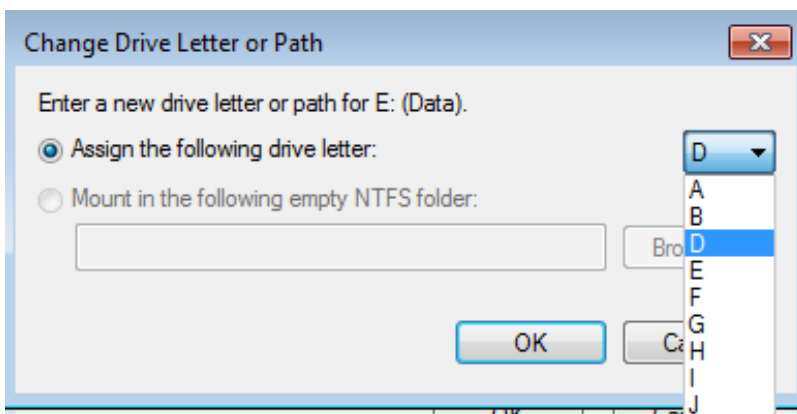
4. Right click on any drive in the new Data2 [E:] volume. Select **Change Drive Letter and Paths...**



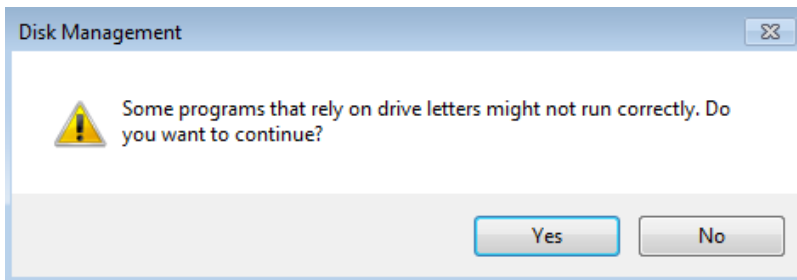
5. In the pop-up window, click on **Change...**



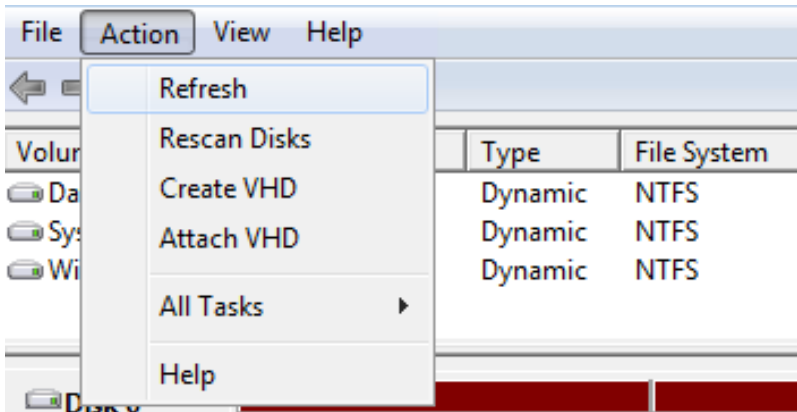
6. Click on the pulldown menu to choose the next letter in alphabetical order. In this case, **D**. Click **OK**.



7. Click **Yes** at the prompt.



8. If the change in letter assignment does not take effect immediately, go to the the pulldown menu at the top of Disk Management to select **Action > Refresh**.



9. The volume should now be listed as *Data1 [D:]*.

CREATING MULTIPLE RAID 5 VOLUMES

In this example using the 5big Office/Office+, there are five disks and we do not want any of the volumes to exceed 2TB (2TB = 2000000MB). RAID 5 remains an optimal solution to protect data while maintaining a high percentage of the available storage. Before configuring the RAID 5 volumes, we must know the amount of storage to assign each disk in the array. To determine the capacity in MB, use the following formula:

2000000MB/N-1 (*N* equals the number of disks.)

5big Office/Office+: $2000000/(5-1) = 2000000/4 = 500000$

4big Rack Office: $2000000/(4-1) = 2000000/3 = 666000$ (Do not round up to 667000 as it will create volumes larger than 2TB).

Technical note: We have used a denominator of *N-1* since RAID 5 uses one disk for parity. This will offer 80% capacity in a five disk array and 75% capacity in a four disk array.

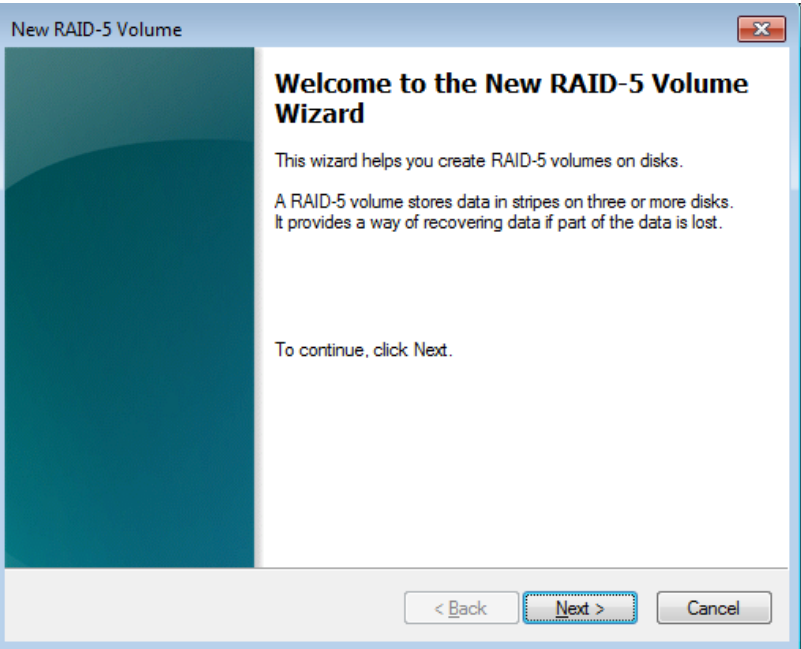
Follow the directions below to create the volumes.

1. The example below shows a five-disk array (5big Office/5big Office+) with the operating system mirrored on Disks 0 and 1. Due to the operating system, right clicking on Disk 0 or Disk 1 will not give us the option to create a RAID 5 volume. Therefore, the example demonstrates a right click on an **Unallocated** partition on Disk 2 to select **New RAID-5 Volume....** Right clicking on Disk 3 or Disk 4 would work as well. The 4big Rack

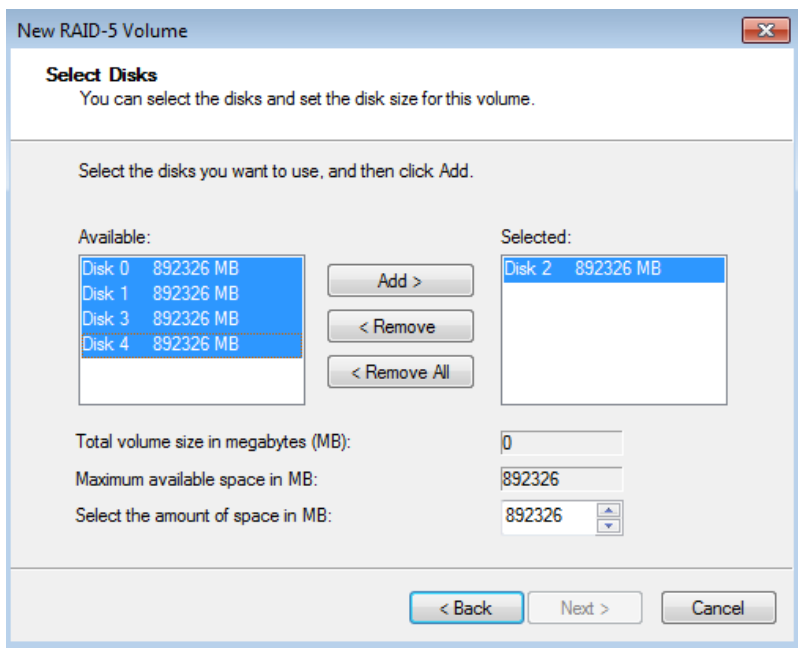
Office operating system is mirrored on Disks 2 and 3. Therefore, right click on the **Unallocated** partitions on Disk 0 or Disk 1 when creating RAID 5 volumes on the 4big Rack Office.



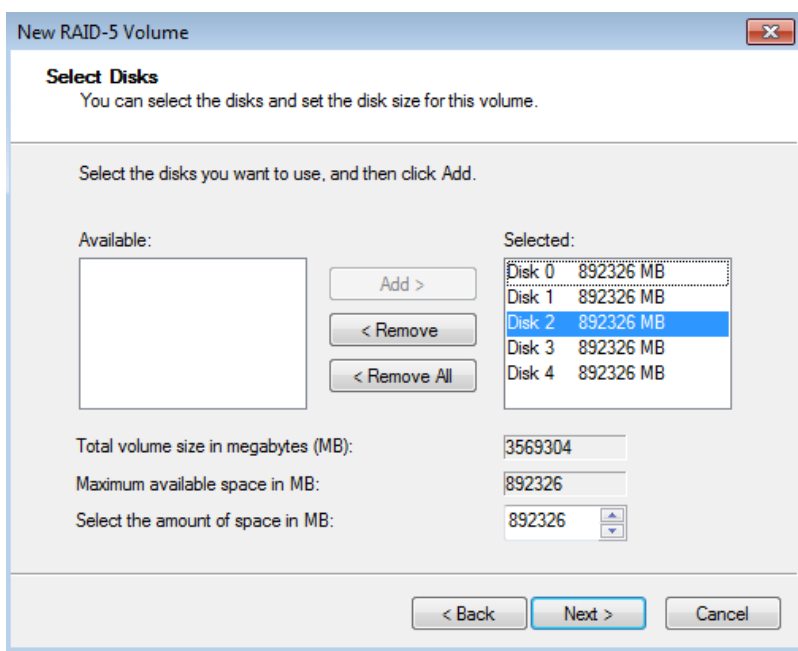
2. The *New RAID-5 Volume Wizard* will appear. Click **Next**.



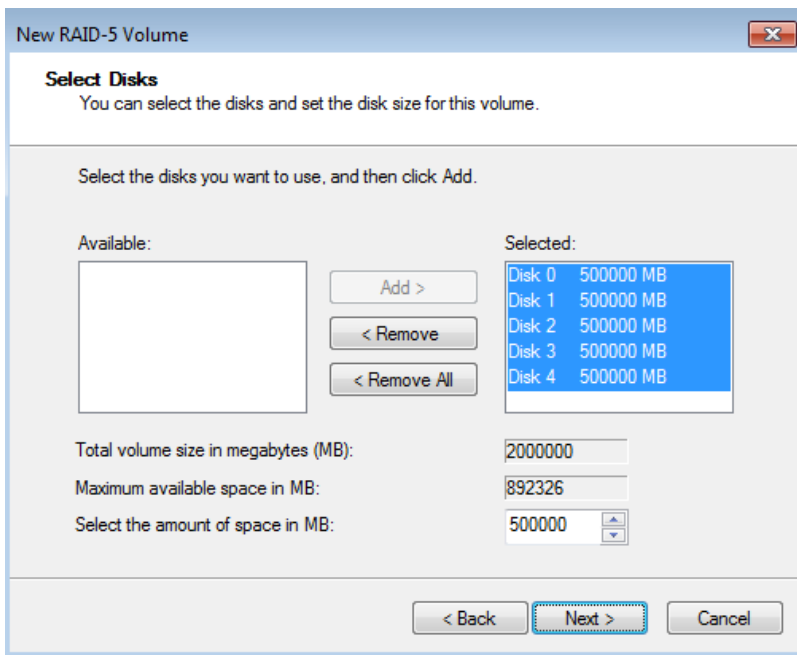
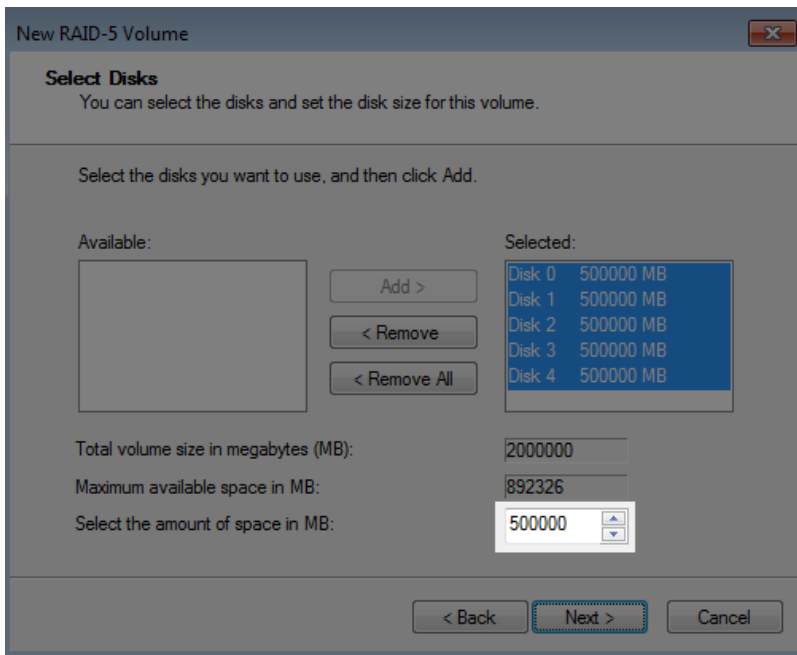
3. Select all the disks listed under *Available*.



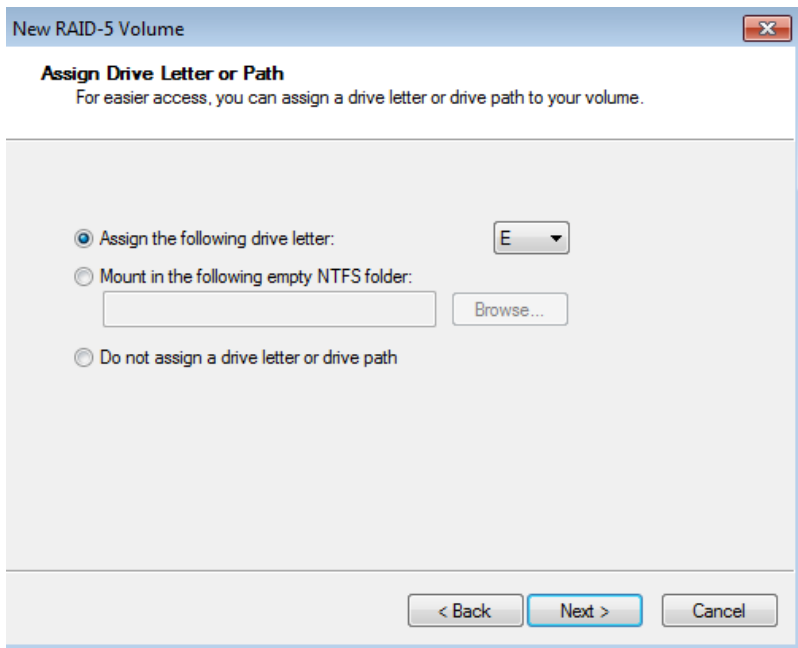
- Click **Add**. All the disks will be moved to the column *Selected*.



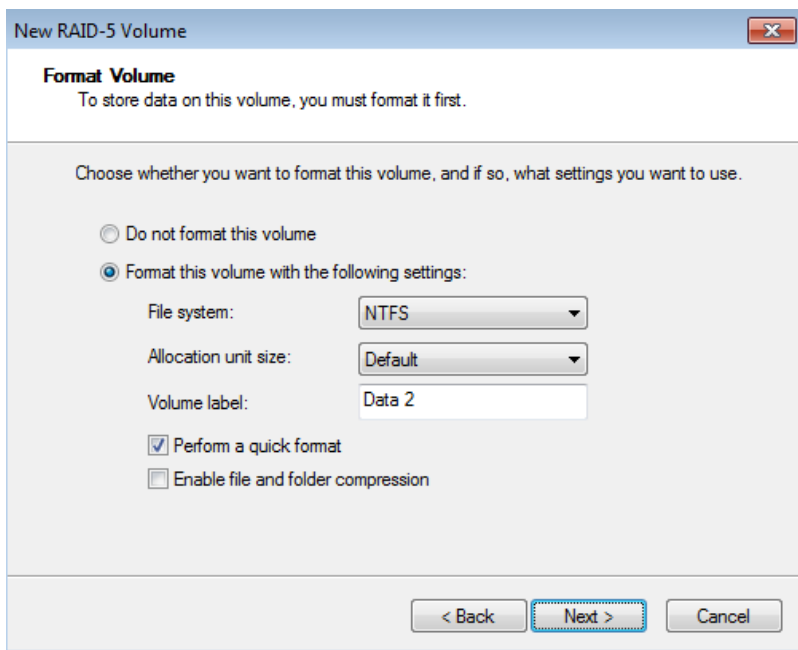
- In the field for **Select the amount of space in MB**, type **500000** on a 5big Office/Office+ and **666000** on a 4big Rack Office.



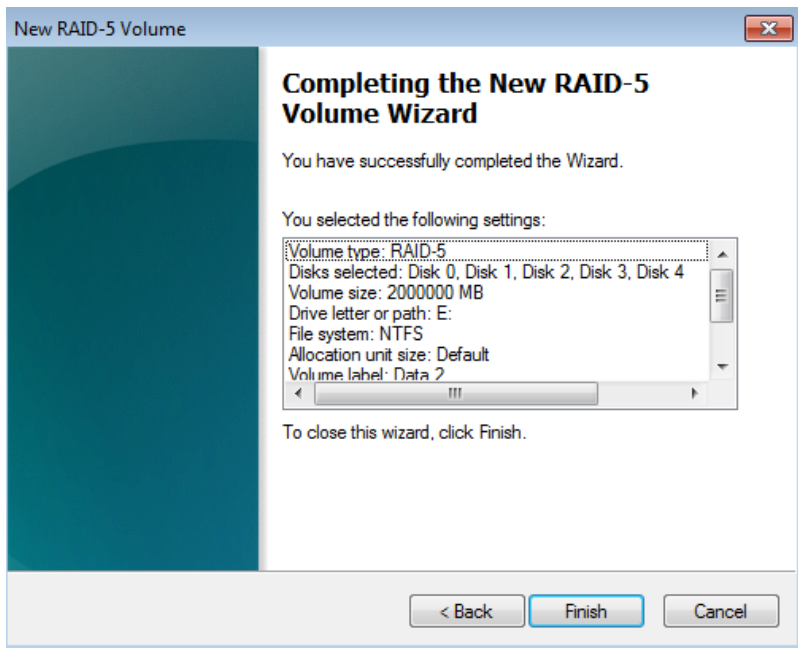
6. Click **Next**.
7. Assign a drive letter. In this example, we have selected the next letter in alphabetical order, "E".



8. You may name the volume. In this example, we have named the volume *Data 2* or *Data2*. LaCie recommends keeping the defaults *NTFS* (file system) and *Perform a quick format*. Click **Next**.

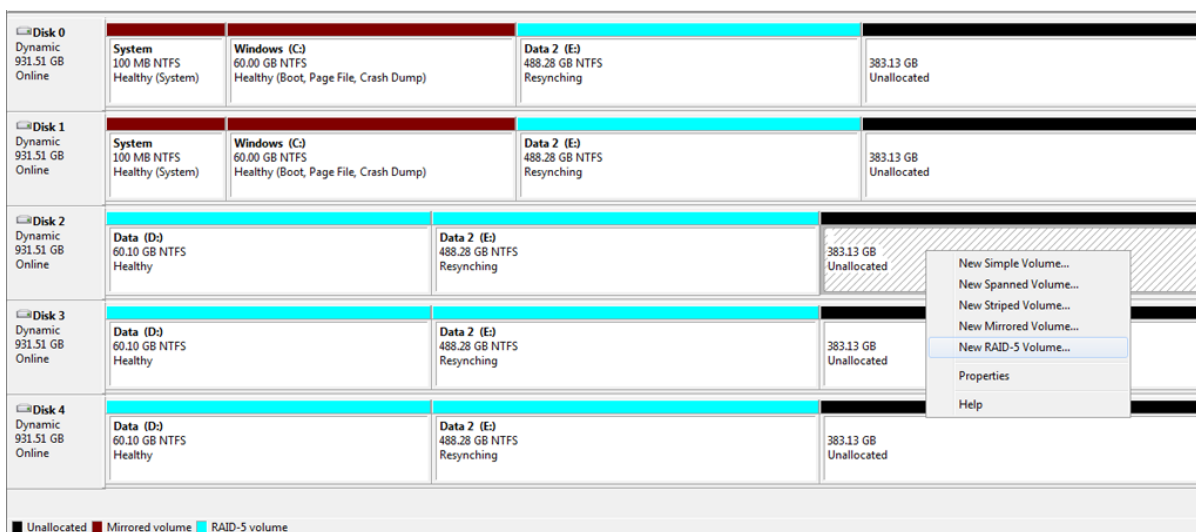


9. Review your choices then click **Finish**.



You may create the next RAID 5 volume while *Data 2* is resynching:

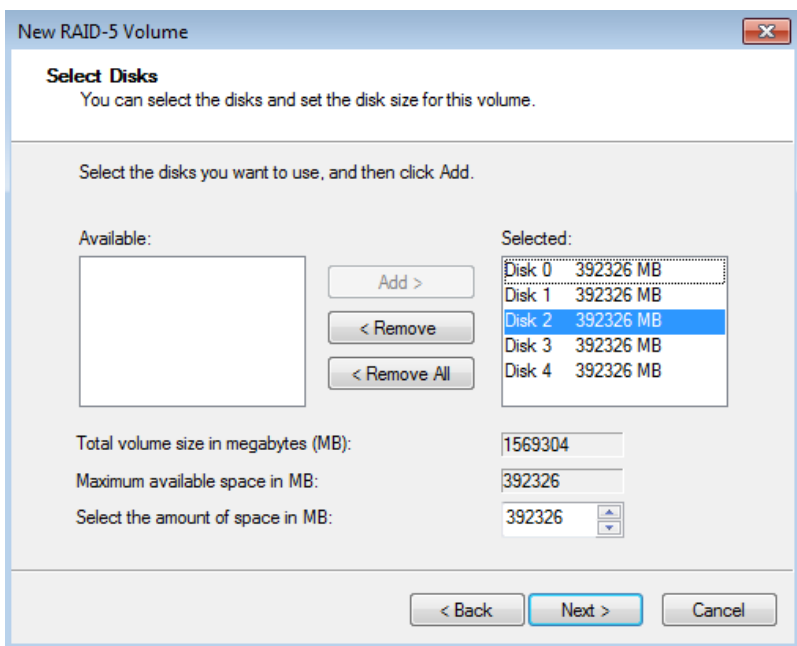
1. Right click on the **Unallocated** partition for Disk 2, Disk 3, or Disk 4 on a 5big. On a 4big Rack Office, click on Disk 0 or Disk 1. Select **New RAID-5 Volume...**



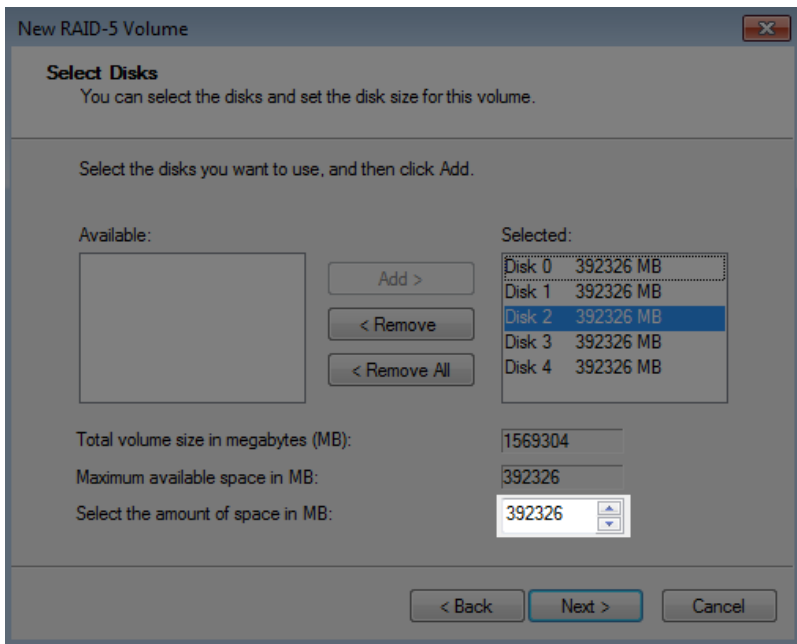
2. The *New RAID-5 Volume Wizard* will appear. Click **Next**.



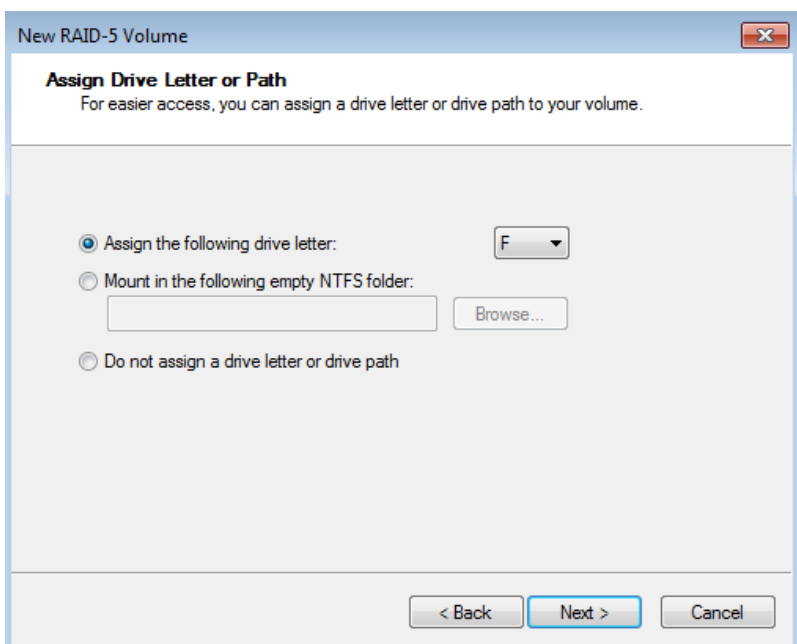
3. Select all the disks listed under *Available* and click **Add**. All the disks will be moved to the *Selected* column.



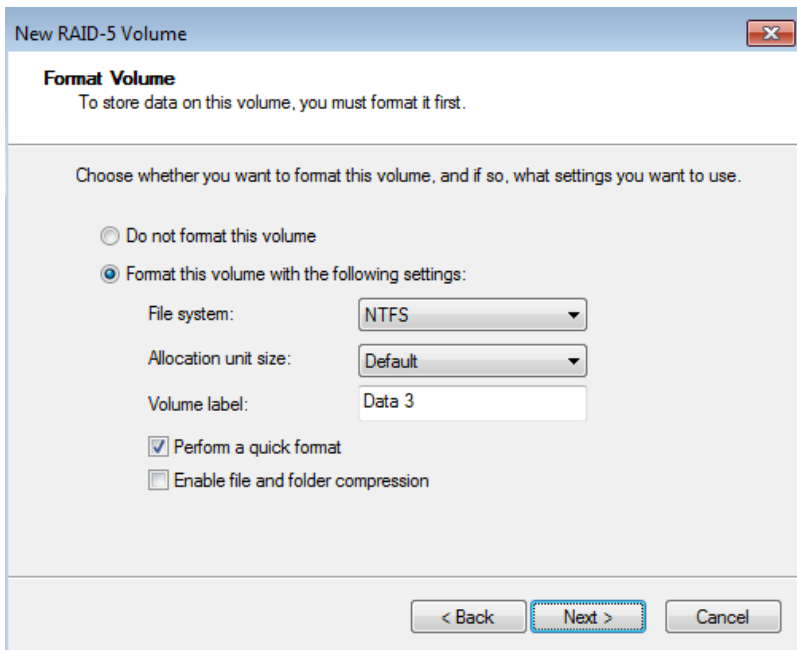
4. Please make certain that the amount of space assigned to each disk does not exceed 500000 on a 5big Office/Office+ and 666000 on a 4big Rack Office. Click **Next** to move to the next step.



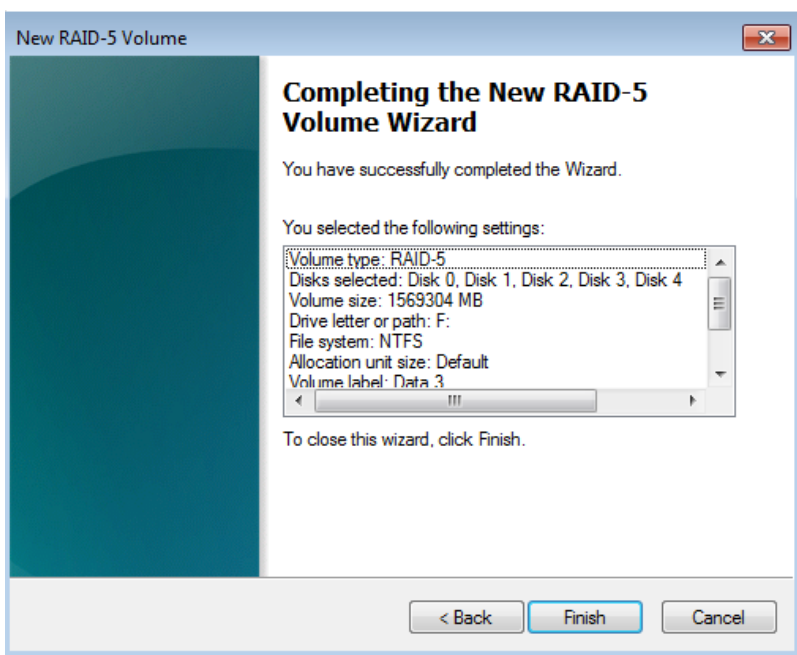
5. Assign a drive letter. In this example, we have selected the next letter in alphabetical order, "F".



6. You may name the volume. In this example, we have named the volume *Data 3* or *Data3*. LaCie recommends keeping the defaults *NTFS* (file system) and *Perform a quick format*. Click **Next**.



7. Review your choices then click **Finish**.



Note on Shared Folders: Data2 [E:] and Data3 [F:] offer more capacity than the Windows Mirror and Data [D:] volumes. LaCie recommends using Data 2 and Data 3 for your Shared Folders.

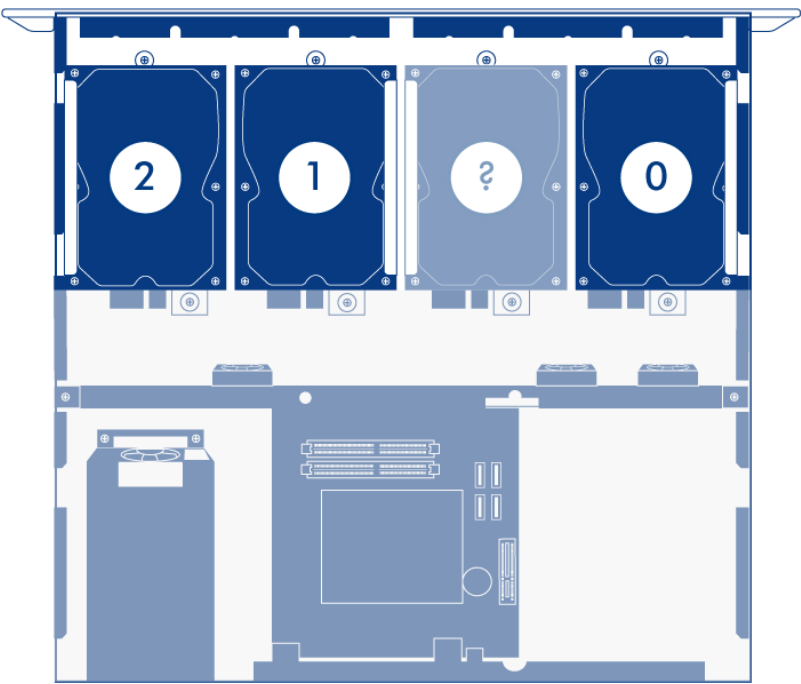
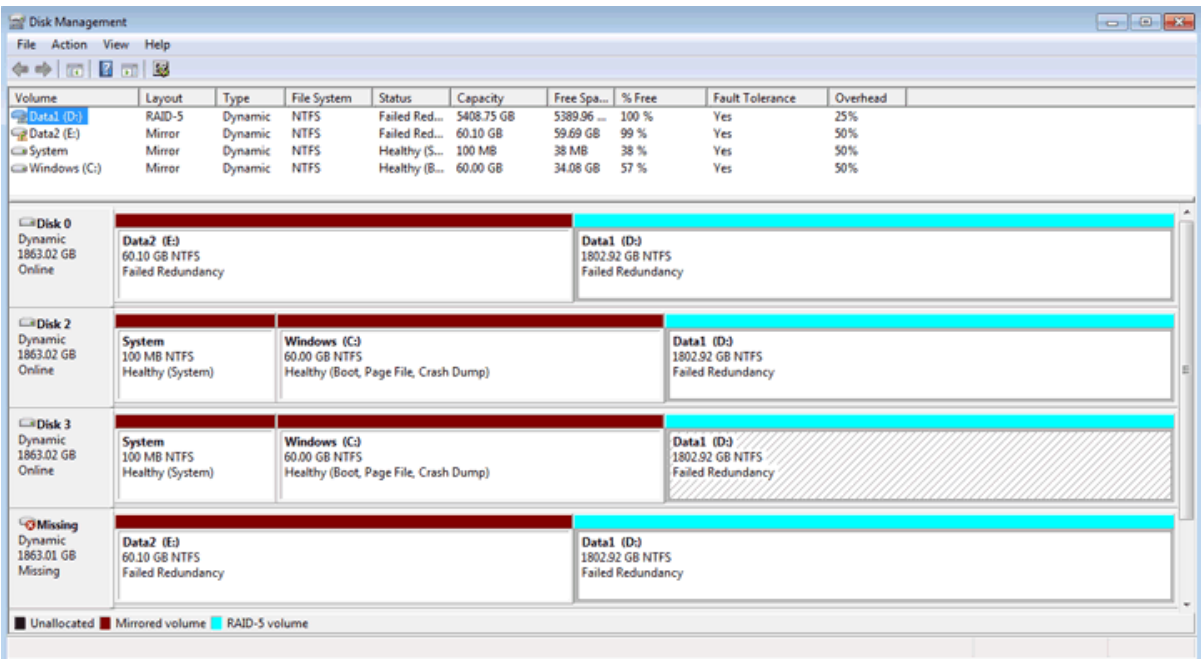
Note: Please keep the following in mind as Mirrored and/or RAID 5 volumes resync:

- Rebooting the server while Disk Management is Resynching a Mirrored or RAID 5 volume will not harm the configuration or its data. However, since the process was interrupted, Disk Management will restart the resync at 0% once the server has rebooted.
- Due to the capacity of the RAID 5 volume, rebooting while a resync is in progress could extend the operation for many hours.
- Users can access a volume during a resync, including reading files, writing files, or moving Shared Folders. However, performance will be degraded while Windows is resynching Mirrored and/or RAID 5 volumes.

REPAIRING RAID CONFIGURATIONS

In the event that an individual hard disk fails in the 4big Rack Office, contact your LaCie reseller or LaCie Customer Support for technical assistance. If the server is within the warranty period, please use the replacement hard drive provided by LaCie.

In the example below, Disk 1 is Missing and both the Mirrored and RAID 5 arrays have *Failed Redundancy*.



Once the disk has been replaced, please make certain to repair the RAID arrays in the following order:

1. Mirror (Data2 in this example but the same order is in effect if one of the Disk 3 in the System Mirror fails.)

2. RAID 5

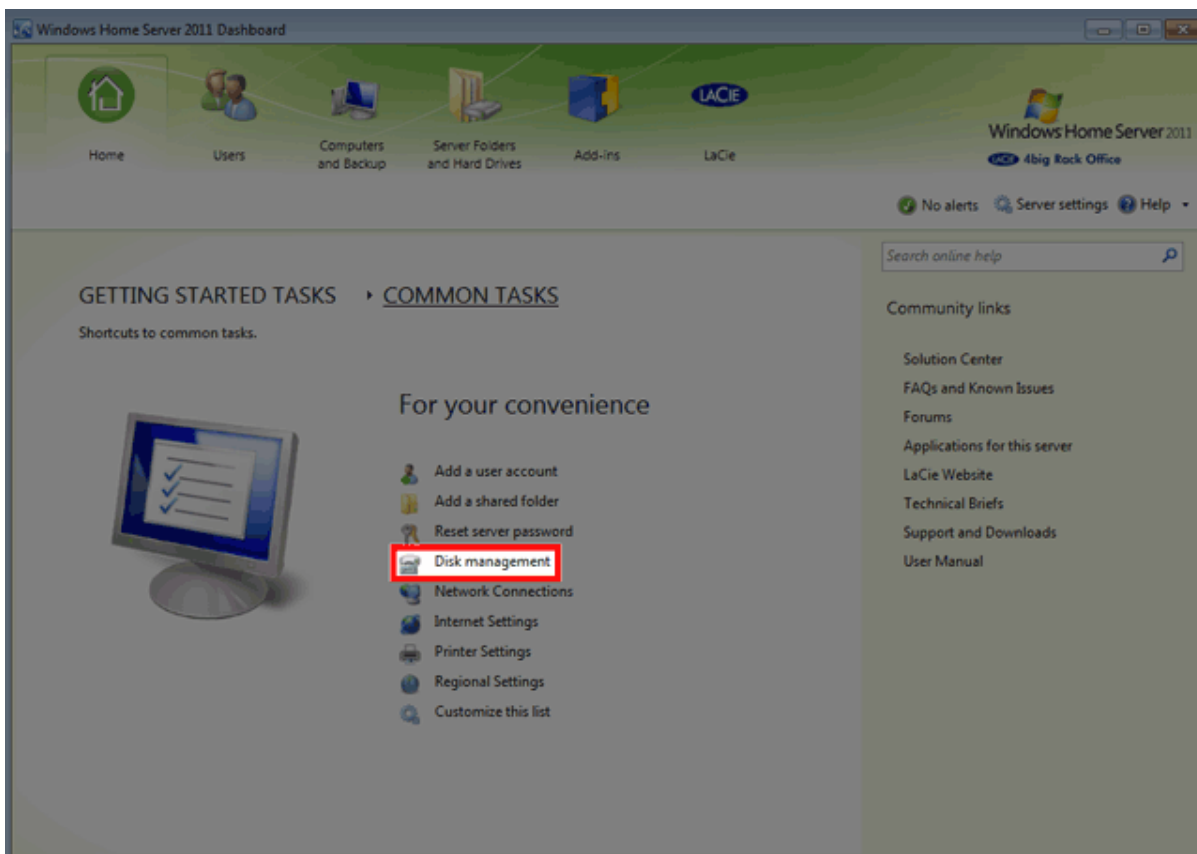
Important info on Disk 2 failure: If Disk 0, Disk 1, or Disk 3 must be replaced, please continue with the instructions in [Repair the Mirror Array](#). If Disk 2 has failed, please see [Disk 2 Failure and Boot Order](#).

REPAIR THE MIRROR ARRAY

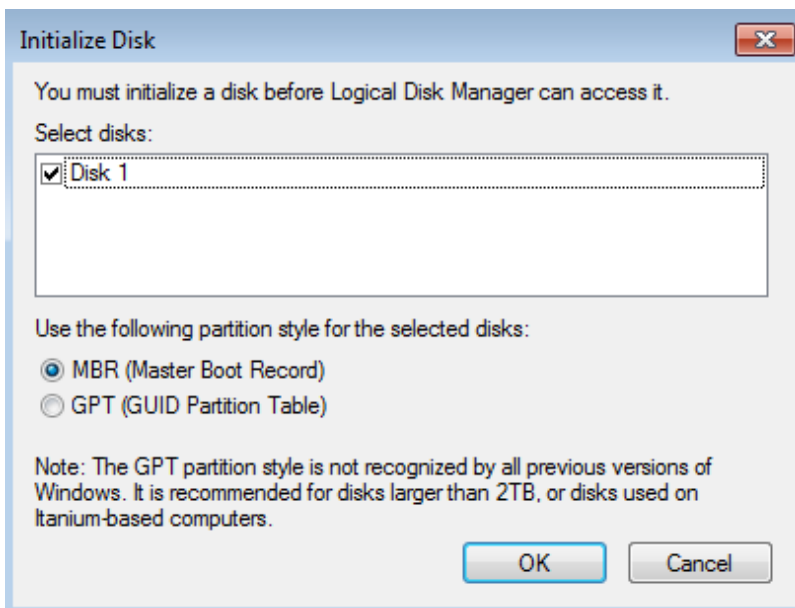
The steps below will illustrate how to repair Mirrored and RAID 5 arrays following disk failure. The two partitions from the failed hard drive, Disk 1 in this example, are used for both Mirrored and RAID 5 arrays.

Note: Please wait until you have received and installed the replacement disk before attempting to repair the RAID.

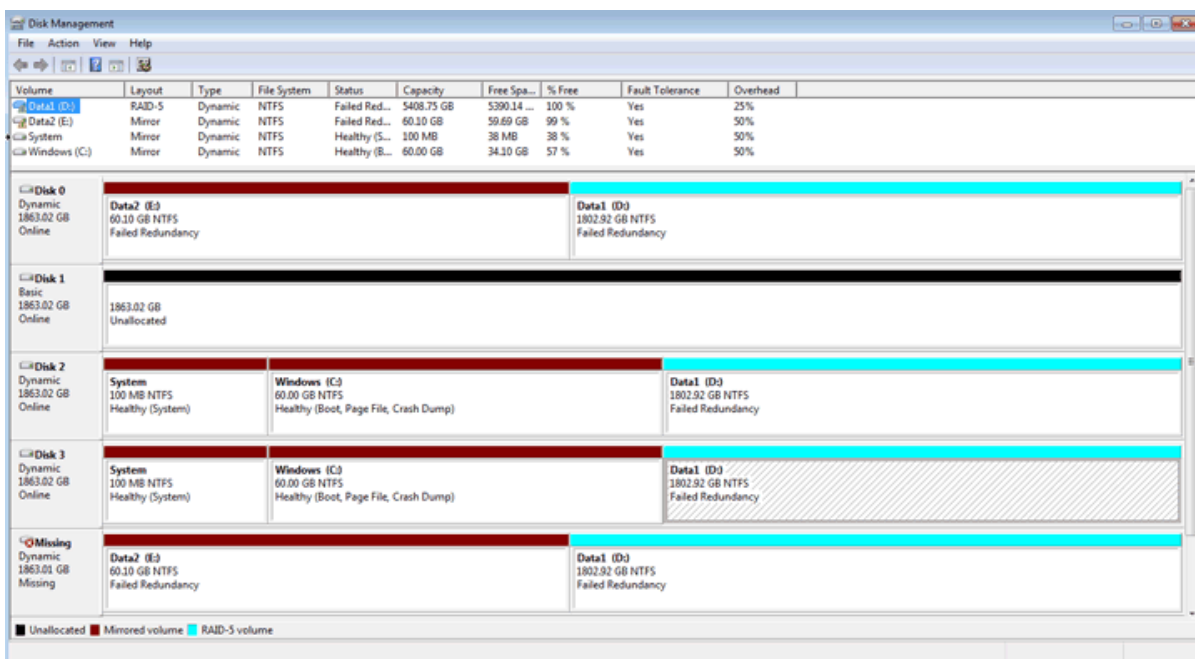
1. Remove the failed Disk 1 and insert the replacement. See the [Hardware Maintenance](#) section of the 4big Rack Office User Manual for instructions on adding new drives. Please make certain that you replace the correct drive.
2. Power on the server. It may take 5 to 10 minutes for the server to be ready.
3. Launch the Dashboard from a Windows workstation on the same network as your LaCie 4big Rack Office.
Start > All Programs > Windows Home Server 2011 > Windows Home Server 2011 Dashboard
4. Select the **Home** tab.
5. Click once on **COMMON TASKS**.
6. Click once on **Disk Management**.



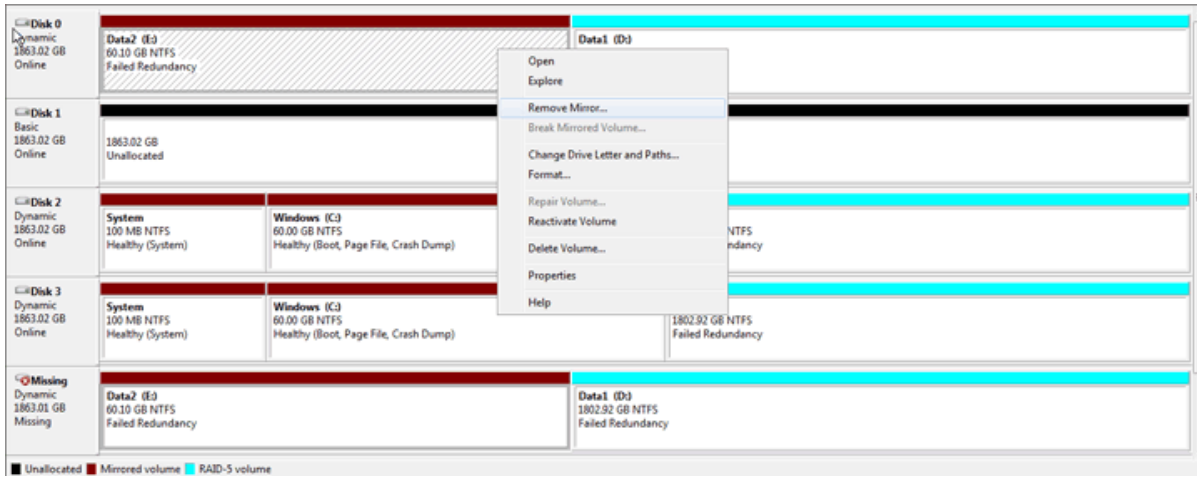
7. Upon launch Disk Management will prompt you to initialize the drive. LaCie recommends initializing the disk as MBR to match the default configuration. Click “OK” to continue.



8. The replacement disk is listed as *Unallocated*.

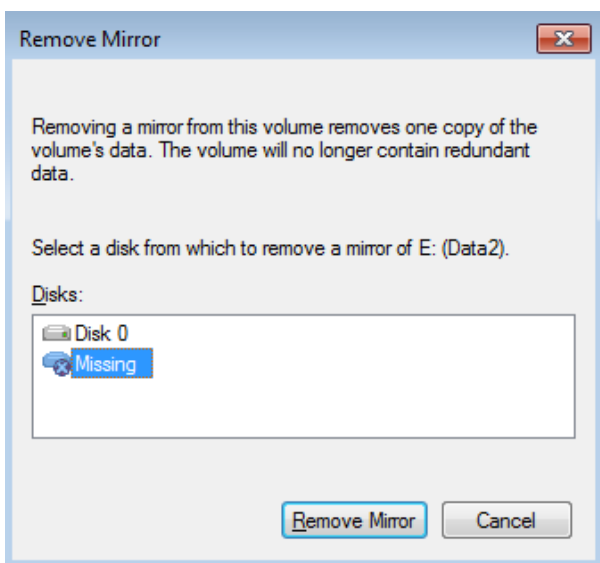


9. The mirror must be broken before rebuilding it with the replacement disk. Right-click on the **Data2** volume to select **Remove Mirror...** Please note that the same procedure should be followed if one of the disks in the System mirror has failed.

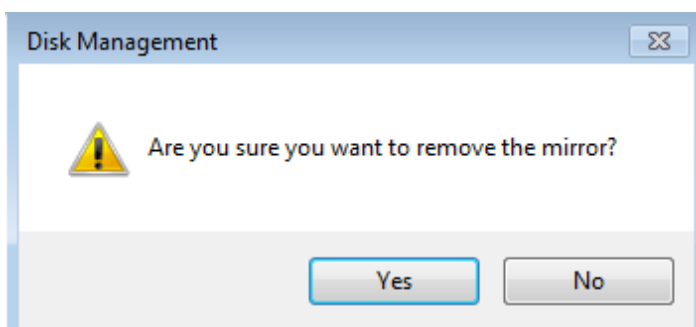


Mirror - Data2

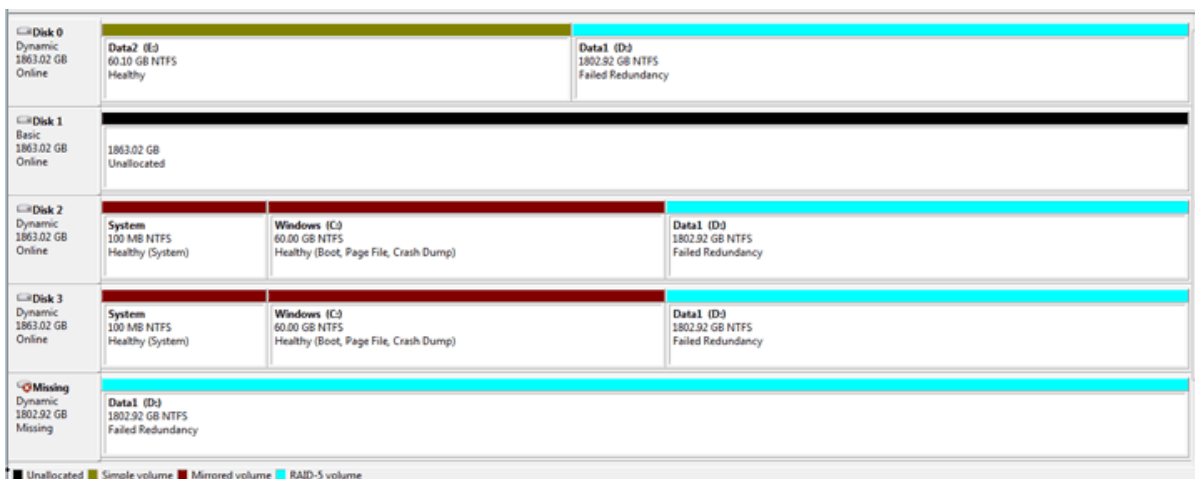
10. In the *Remove Mirror* pop-up window, select **Missing**. Click **Remove Mirror**.



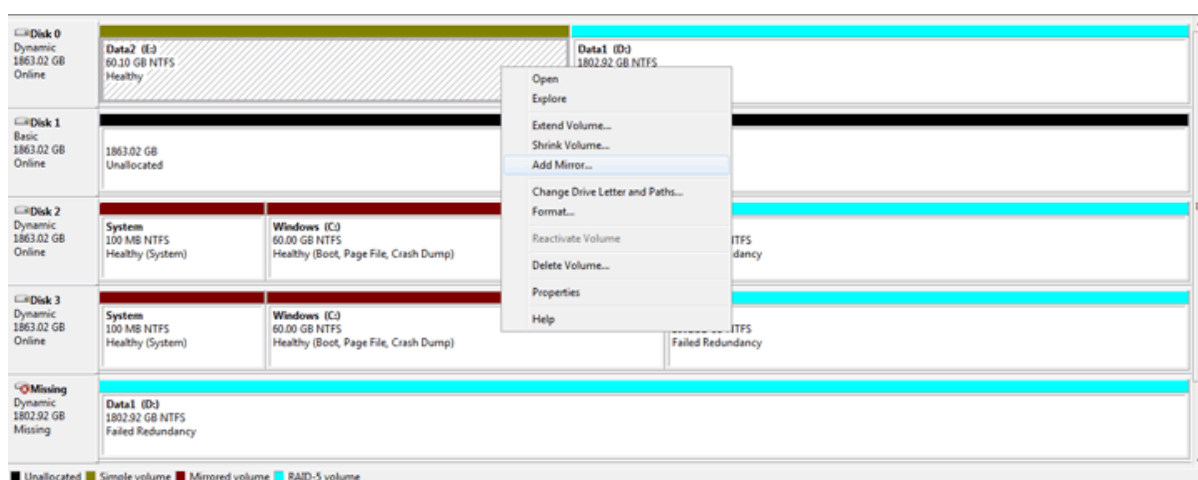
11. Click **Yes** at the Disk Management prompt.



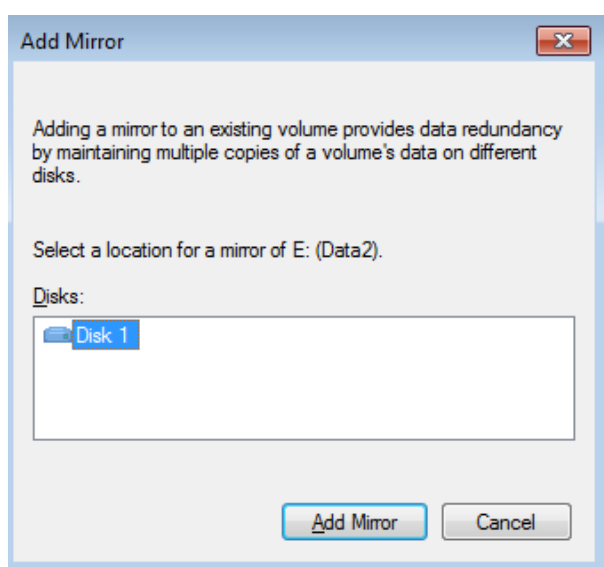
12. The mirror has been successfully removed.



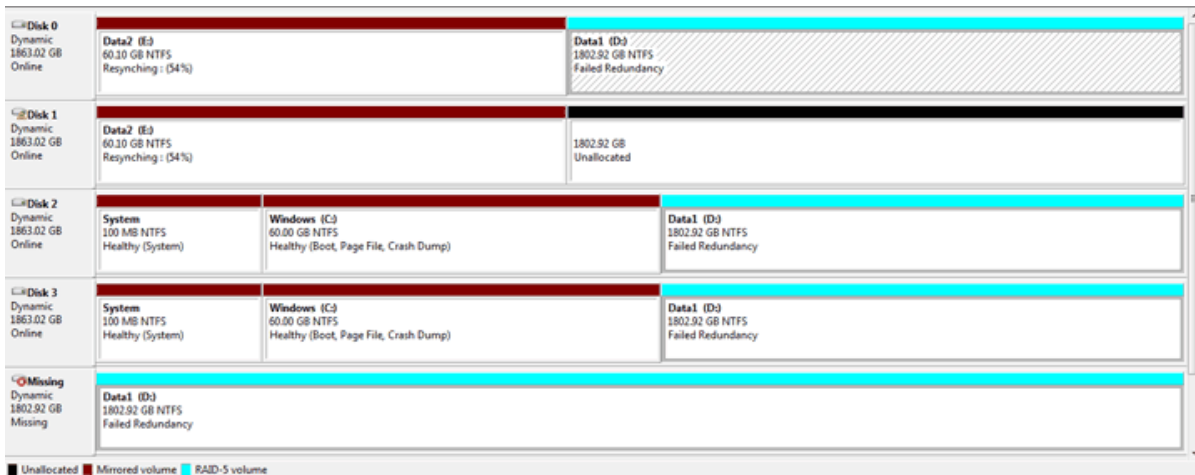
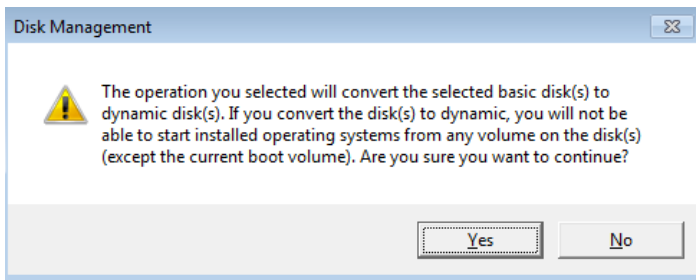
13. Right click on the **Data2** partition to select **Add Mirror...**



14. From the *Add Mirror* pop-up window, select your replacement disk (in this example, **Disk 1**). Click **Add Mirror**.



15. Click **Yes** at the Disk Management pop-up window. The Mirror will begin the resynching operation.

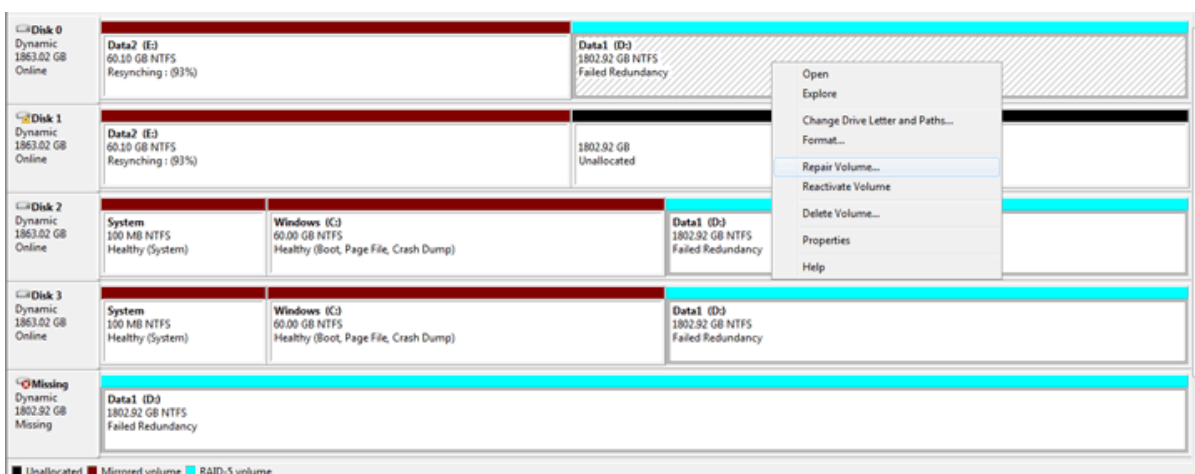


16. Go to [Repair the RAID 5 Array](#) to continue. You may repair the RAID 5 array while the Mirror is resynching.

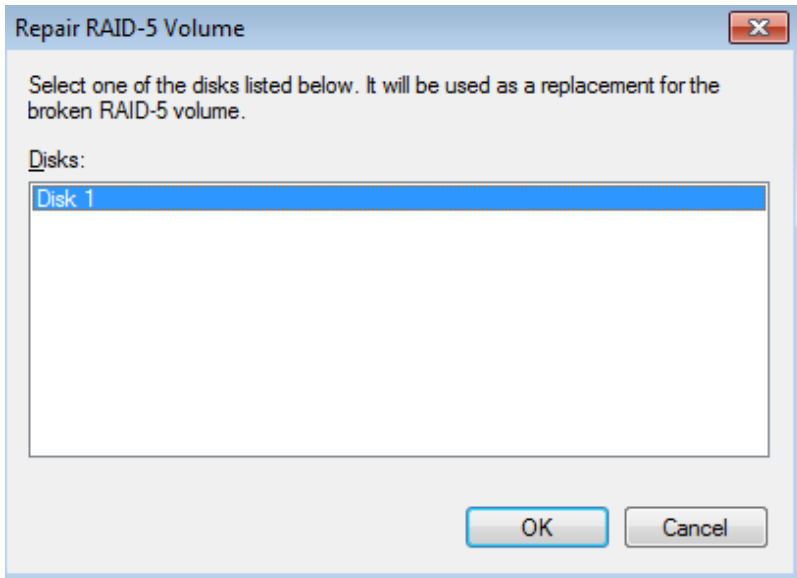
Repair the RAID 5 array

Please follow the instructions in [Repair the Mirror Array](#) before attempting the steps below.

1. Right click on any volume in the RAID 5 array except for the *Missing* disk. Select **Repair volume**.



2. In the *Repair RAID-5 Volume* window, choose the disk to repair the Data1 volume (in our example, **Disk 1**). Click **OK**. In most instances, the Data1 volume will start resynching (See [Plex Error When Resynching RAID 5](#) if you receive a *plex* error.) Please be patient since the repair might take more than 40 hours depending upon the type of drive used. While there may be a slight reduction in performance, you may use the RAID 5 array while it is resynching.



GETTING HELP

If you are having problems with your LaCie product, consult the table below for a list of available resources.

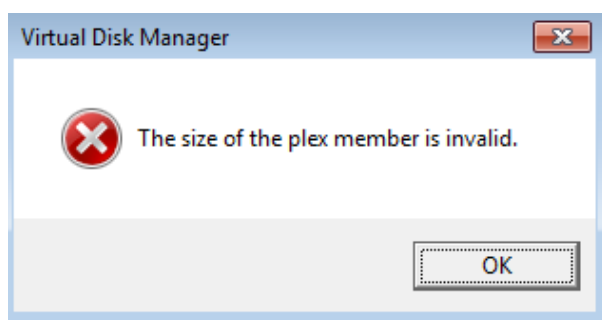
Order	Source	Description	Location
1	Quick Install Guide	Concise steps to follow for getting your product up and running	Printed and included in the product box, or download PDF from the product page
2	Support Pages	Includes interactive troubleshooting topics for most common problems	www.lacie.com/support/ , select your product, then click the "Troubleshooting" tab
3	Customer Support	Create an account on lacie.com , register your product, and fill out a support ticket	Create an account here: www.lacie.com/us/mystuff/login.htm?logout&rtn=mystuff

Note: LaCie is dedicated to providing high quality products that enrich the lives of our customers. To help LaCie offer the best customer support, we encourage you to create an account and [Register](#) your product. You can give us important feedback as well as receive updated information on your LaCie device.

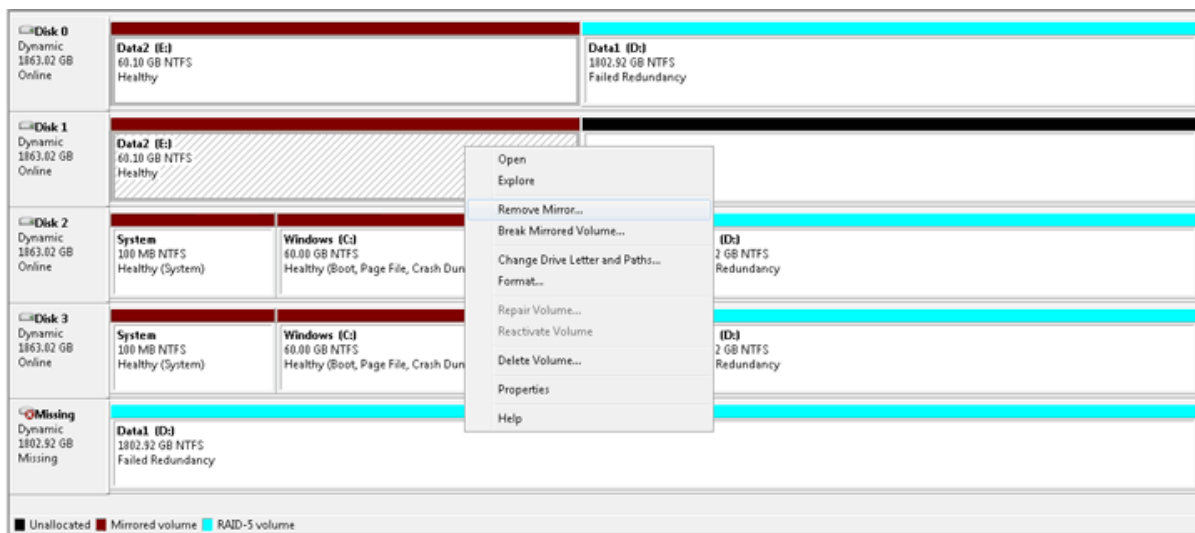
You may encounter errors when attempting to repair or reconfigure your LaCie 4big Rack Office RAID configuration. Please see the troubleshooting tips below.

Q: Why do I receive a Plex Error when I try to start resynching the RAID 5 array?

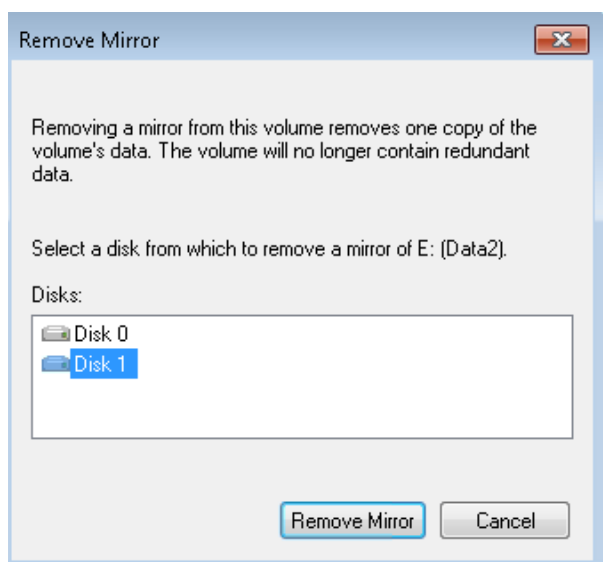
A: While attempting to resynch the RAID 5 array, Windows may experience an error due to a slight difference in partition size. Please follow the directions below to correct the problem.



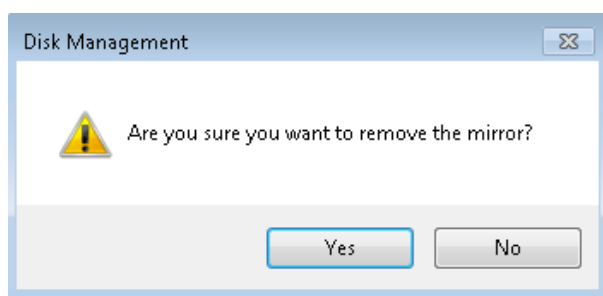
1. Though it was just created, you must remove the Data2 Mirror to correct for the difference in partition size. Right click on Disk 0 or Disk 1 to select **Remove Mirror...**



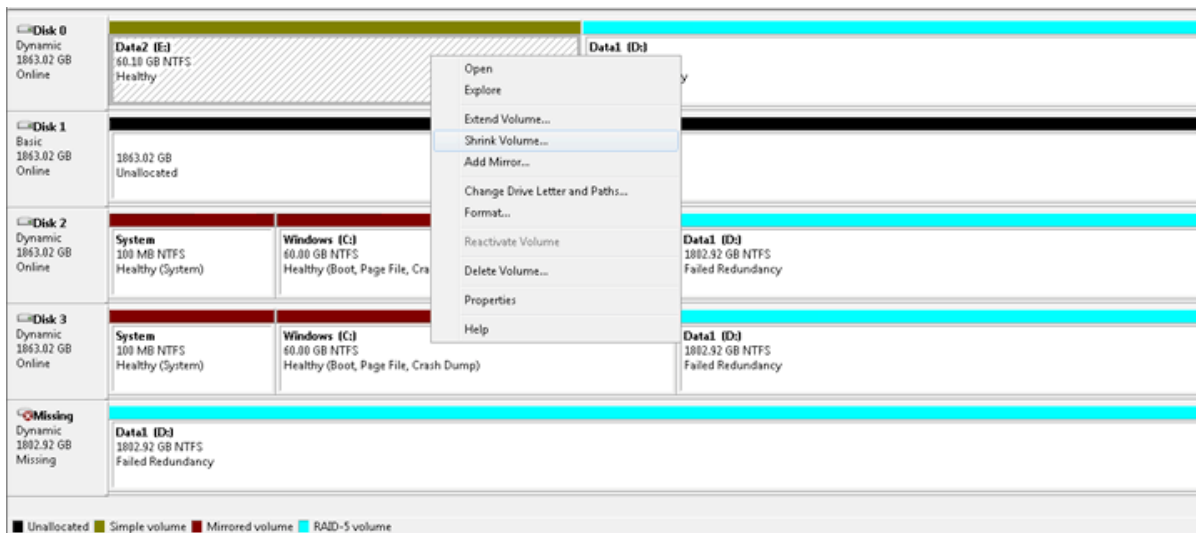
2. Select **Disk 1** and click **Remove Mirror**.



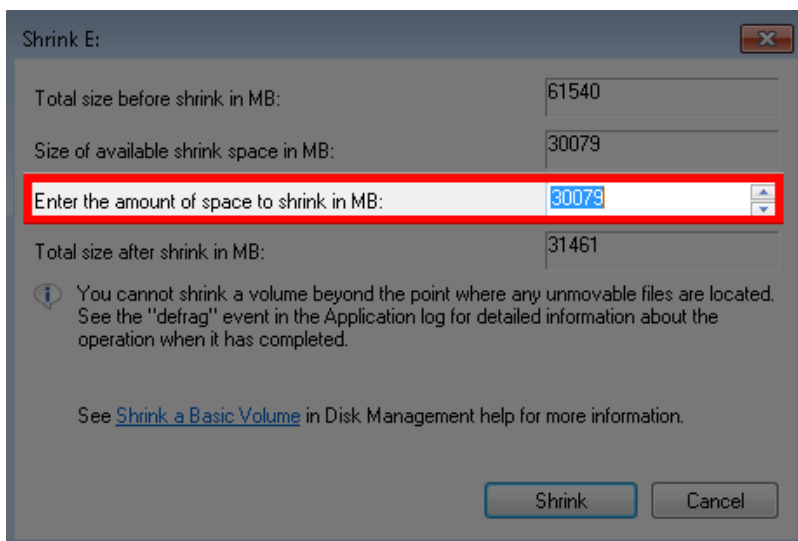
3. Click **Yes** at the prompt.



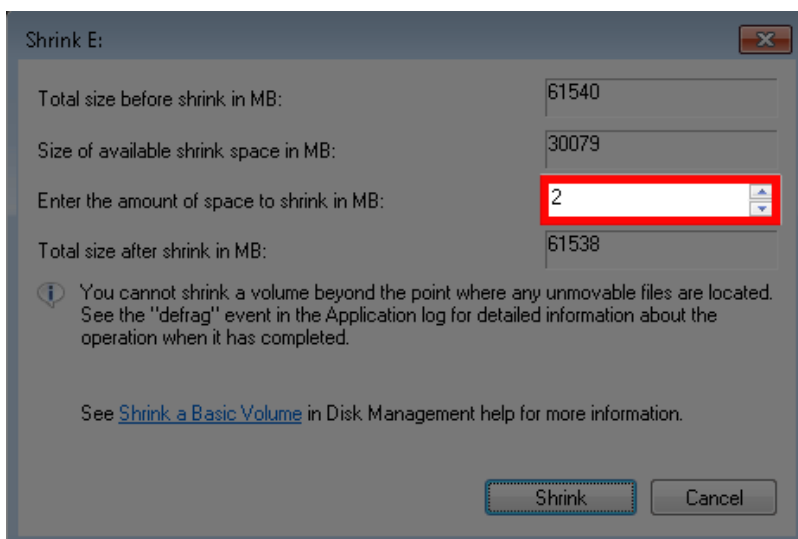
4. With the mirror removed, right click on the Data2 partition on Disk 0 then select **Shrink Volume...**



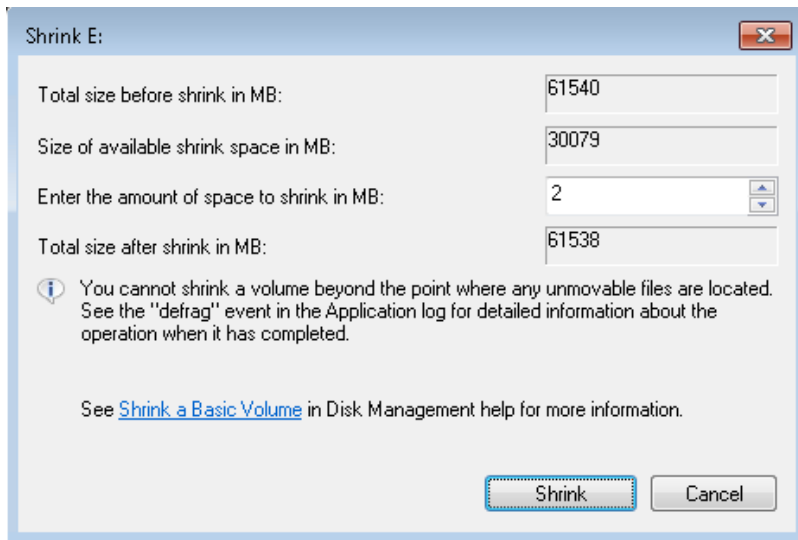
- Please note the field *Enter the amount of space to shrink in MB*. The default size is the entire partition. **Do not select the default as it will delete existing media.**



- In the field for *Enter the amount of space to shrink in MB*, please type 2.



7. Click **Shrink**.

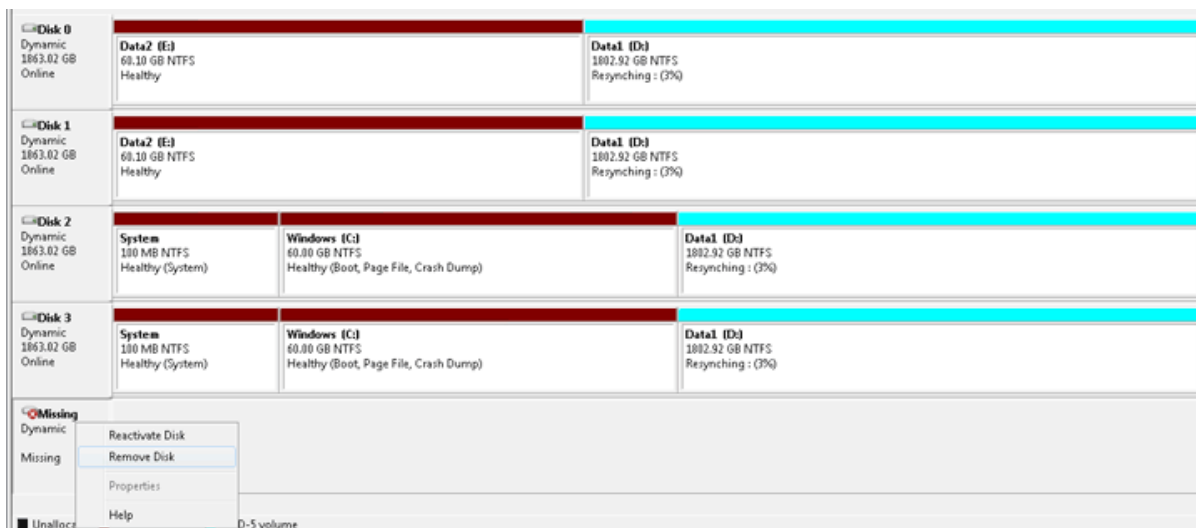


8. Return to [Repair the Mirror Array](#) to begin repairing the RAID arrays.

Q: I have finished repairing my RAID but the Missing Disk is still listed in Windows Disk Management. How do I remove it from the list?




Disk Management must be told to remove the *Missing* disk once resynching has begun. Follow the easy steps below to delete the *Missing* disk from the list of drives.

1. The *Missing* disk may still be listed as a member of the Data1 volume in Disk Management.
2. Go to the **Action** pulldown menu and choose **Refresh (Action > Refresh)** to refresh the list of drives. If the *Missing* disk is still listed as Data1, exit and relaunch Disk Management.
3. While the Missing disk is on the list of disks, it should no longer take part in the Data1 volume.
4. Right click on **Missing** to select **Remove Disk**.



5. The *Missing* disk should now be removed from the **Disk Management** list.

Disk 0 Dynamic 1863.02 GB Online	Data2 (E:) 68.18 GB NTFS Healthy	Data1 (D:) 1802.92 GB NTFS Resynchronizing : (3%)
Disk 1 Dynamic 1863.02 GB Online	Data2 (E:) 68.18 GB NTFS Healthy	Data1 (D:) 1802.92 GB NTFS Resynchronizing : (3%)
Disk 2 Dynamic 1863.02 GB Online	System 100 MB NTFS Healthy (System)	Windows (C:) 60.80 GB NTFS Healthy (Boot, Page File, Crash Dump)
Disk 3 Dynamic 1863.02 GB Online	System 100 MB NTFS Healthy (System)	Data1 (D:) 1802.92 GB NTFS Resynchronizing : (3%)

 Unallocated
  Mirrored volume
  RAID-5 volume

Q: How do I adjust the BIOS if Disk 2 fails?

A: By default, the Windows operating system is installed on Disk 2 while Disk 3 acts as the mirrored volume. Therefore, the 4big Rack Office will boot from Disk 2 each time it is powered on and restarted. If Disk 2 fails, the BIOS cannot find the a proper boot disk if the server is restarted. To resolve the matter, please follow the directions below to adjust the boot order in the BIOS.



1. Please attach a VGA monitor, a USB mouse, and a USB keyboard to the back of the 4big Rack Office. For details on where to attach peripherals, please see the [Introduction](#).
2. Boot or restart the server then prepare for the prompt to press F8 to enter the BIOS.
3. The BIOS will prompt you to select a boot disk. Please choose the second SATA device and click on the **ENTER** key.



4. At the Windows boot menu, use your keyboard arrow to choose the *secondary plex* before using your **ENTER** key.



5. If you have already installed your replacement disk, please go to [Repair the Mirror Array](#) to rebuild the RAID arrays.

PRECAUTIONS

Caution: It is essential that you use only the power supply that shipped with your product, since it is a shielded-type power cord that meets FCC emission limits as well as to prevent interference to the nearby radio and television reception.

Caution: Modifications not authorized by the manufacturer may void the user's authority to operate this device.

Important info: Any loss, corruption or destruction of data while using a LaCie drive is the sole responsibility of the user, and under no circumstances will LaCie be held liable for the recovery or restoration of this data. To help prevent the loss of your data, LaCie highly recommends that you keep TWO copies of your data; one copy on your external hard disk, for instance, and a second copy either on your internal hard disk, another external hard disk or some other form of removable storage media. If you would like more information on backup, please refer to our website.

Important info: 1TB (Terabyte) = 1,000GB. 1GB = 1000MB. 1MB = 1,000,000 Bytes. Total accessible capacity varies depending upon operating environment (typically up to 10% less per TB).

HEALTH AND SAFETY PRECAUTIONS

- Only qualified persons are authorized to carry out maintenance on this device.
- Read this User Manual carefully and follow the correct procedure when setting up the device.
- Do not open a disk drive or attempt to disassemble or modify it. Never insert any metallic object into the drive to avoid any risk of electrical shock, fire, short-circuiting or dangerous emissions. The disk drives shipped with your LaCie device contain no user-serviceable parts. If it appears to be malfunctioning, have it inspected by a qualified LaCie Technical Support representative.
- Never expose your device to rain, or use it near water, or in damp or wet conditions. Never place objects containing liquids on the LaCie device, as they may spill into its openings. Doing so increases the risk of electrical shock, short-circuiting, fire or personal injury.
- Make sure that the computer and LaCie device are electrically grounded. If the devices are not grounded, there is an increased risk of electrical shock.

GENERAL USE PRECAUTIONS

- Power requirements 100-240 V~, 50-60 Hz, (supply voltage fluctuations not exceeding $\pm 10\%$ of the nominal and transient over-voltages according to over-voltage category II).
- Do not expose the LaCie device to temperatures outside the range of 5° C to 30° C (41° F to 86° F); or to operational humidity beyond 10-80%, non-condensing, or non-operating humidity beyond 10-90%, non-condensing. Doing so may damage the LaCie device or disfigure its casing. Avoid placing your LaCie device near a source of heat or exposing it to sunlight (even through a window). Inversely, placing your LaCie device in an environment that is too cold may damage the unit.
- Rated cooling for altitudes up to 2000 meters.
- If your drive features a power cable, always unplug it from the electrical outlet if there is a risk of lightning or if it will be unused for an extended period of time. Otherwise, there is an increased risk of electrical shock, short-circuiting or fire.
- Use only the power supply shipped with the device (if applicable).
- Do not use the LaCie device near other electrical appliances such as televisions, radios or speakers. Doing so may cause interference which will adversely affect the operation of the other products.
- Do not place the LaCie device near sources of magnetic interference, such as computer displays, televisions or speakers. Magnetic interference can affect the operation and stability of your LaCie device.
- Never use excessive force on your LaCie device. If you detect a problem, consult the troubleshooting section in this manual.
- Protect your LaCie device from excessive exposure to dust during use or storage. Dust can build up inside the device, increasing the risk of damage or malfunction.
- Never use benzene, paint thinners, detergent or other chemical products to clean the outside of the LaCie device. Such products will disfigure and discolor the casing. Instead, use a soft, dry cloth to wipe the device.

WARRANTY INFORMATION

LaCie offers first-rate service and support through our generous three-tiered warranty policy. Our 1-, 2-, 3-, and 5-year policies include comprehensive, complimentary web-based resources, expert in-house technical support, and worldwide repair and/or replacement coverage. To benefit from this warranty, please contact LaCie Support at www.lacie.com/us/support where you can find online support and contact information. You may also contact representatives at the original point of purchase who will be able to help guide you.

Standard warranties vary depending on the product. To verify your product's warranty status and to see which standard warranty is included with your product, type in your product's serial number at www.lacie.com/us/support. If no warranty is listed under your product's name, this means that the warranty has expired.

WARRANTY UPGRADES

If you wish to extend your warranty coverage, you can purchase Silver, Gold, or Platinum Care or Advanced Exchange. For details, see www.lacie.com/warranties.

LEGAL INFORMATION

A standard LaCie limited warranty is included with all products. Please read the terms and conditions below.

LaCie Limited Warranty Policy

LaCie ("LaCie") warrants, to the original purchaser, that this equipment shall be free of defects in materials and workmanship for a period of one (1), two (2), three (3), or five (5) years, depending on the model, from LaCie's date of original shipment when the equipment is used normally and is properly serviced when needed. If you discover a defect covered by the warranty set forth above, your sole and exclusive remedy will be for LaCie, in its sole discretion to (i) repair or replace the product at no charge to you; or, if a repaired unit or replacement product is not available, (ii) to refund the current market value of your product. You acknowledge and agree that replacement product, at the sole option of LaCie, may be a new product or a remanufactured product. In order to receive the remedy set forth above, you must return the product during the warranty period and include with each returned product (i) a copy of your original purchase invoice to verify your warranty; (ii) a Return Material Authorization number; (iii) your name, address and telephone number; (iv) a copy of the bill of sale bearing the appropriate LaCie serial numbers as proof of date of original retail purchase; and (v) a description of the problem. The customer must pay all transportation costs for a returned product. The product will need to be returned to LaCie within the country of original retail purchase. This warranty applies only to hardware products; LaCie software, media, and manuals are licensed and warranted pursuant to separate written agreement. This warranty does not apply if the product has been misused or has been damaged by accident, abuse, misuse, or misapplication; if it has been modified without permission of LaCie; or if any LaCie serial number has been removed or defaced. If a customer has purchased a LaCie Advance Care Option (ACO) to go with this equipment, the ACO shall be valid for three (3) years from activation.

EXCEPT FOR THE LIMITED WARRANTY SET FORTH ABOVE, ALL PRODUCTS ARE SOLD “AS IS” AND LACIE EXPRESSLY DISCLAIMS ALL WARRANTIES OF ANY KIND, WHETHER EXPRESS, IMPLIED OR STATUTORY, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY, NONINFRINGEMENT AND FITNESS FOR A PARTICULAR PURPOSE. WITHOUT FURTHER LIMITING THE GENERALITY OF THE FOREGOING, DOES NOT WARRANT (1) THE PERFORMANCE OR RESULTS OBTAINED FROM USING THIS PRODUCT, (2) THAT THE PRODUCT IS APPROPRIATE FOR THE CUSTOMER'S PURPOSES, (3) THE MANUAL IS ERROR FREE, OR (4) THAT NO DATA WILL BE LOST WHILE USING THE PRODUCT. THE ENTIRE RISK AS TO THE RESULTS AND PERFORMANCE IS ASSUMED BY THE CUSTOMER. THE WARRANTY AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHERS, ORAL OR WRITTEN, EXPRESS OR IMPLIED.

EXCLUSIONS AND LIMITATIONS

This Limited Warranty applies only to hardware products manufactured by or for LaCie that can be identified by the “LaCie” trademark, trade name, or logo affixed to them. The Limited Warranty does not apply to any non-LaCie hardware products or any software, even if packaged or sold with LaCie hardware. Manufacturers, suppliers, or publishers, other than LaCie, may provide their own warranties to the end user purchaser, but LaCie, in so far as permitted by law, provides their products “as is”. Software distributed by LaCie with or without the LaCie brand name (including, but not limited to system software) is not covered under this Limited Warranty. Refer to the licensing agreement accompanying the software for details of your rights with respect to its use.

LaCie does not warrant that the operation of the product will be uninterrupted or error-free. LaCie is not responsible for damage arising from failure to follow instructions relating to the product's use. This warranty does not apply: (a) to consumable parts, unless damage has occurred due to a defect in materials or workmanship; (b) to cosmetic damage, including but not limited to scratches, dents and broken plastic on ports; © to damage caused by use with non-LaCie products; (d) to damage caused by accident, abuse, misuse, flood, fire, earthquake or other external causes; (e) to damage caused by operating the product outside the permitted or intended uses described by LaCie; (f) to damage caused by service (including upgrades and expansions) performed by anyone who is not a representative of LaCie or a LaCie Authorized Service Provider; (g) to a product or part that has been modified to alter functionality or capability without the written permission of LaCie; or (h) if any LaCie serial number on the product has been removed or defaced.

No LaCie dealer, agent, or employee is authorized to make any modification, extension, or addition to this warranty.

Any loss, corruption or destruction of data while using a LaCie drive is the sole responsibility of the user, and under no circumstances will LaCie be held liable for the recovery or restoration of this data. To help prevent the loss of your data, LaCie highly recommends that you keep TWO copies of your data; one copy on your external hard disk, for instance, and a second copy either on your internal hard disk, another external hard disk or some other form of removable storage media. LaCie offers a complete line of CD and DVD drives. If you would like more information on backup, please refer to our website.

LACIE IS NOT RESPONSIBLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY, OR UNDER ANY LEGAL THEORY, INCLUDING LOST PROFITS, DOWNTIME, GOODWILL, DAMAGE TO OR REPLACEMENT OF EQUIPMENT AND PROPERTY, AND ANY COSTS OF RECOVERING, REPROGRAMMING, OR REPRODUCING ANY PROGRAM OR DATA STORED IN OR USED WITH LACIE PRODUCTS EVEN IF IT HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Some states do not allow the exclusion or limitation of implied warranties or liability for incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may have other rights, which vary from state to state.

Your opening of your package, your use of the product, or your return of the enclosed Registration Card acknowledges that you have read and agree to the terms of this Agreement. You further agree that it is the complete and exclusive state of the agreement between us and supersedes any proposal or prior agreement, oral or written, and any other communications between us relating to the subject matter of this Agreement.

Read carefully all information related to warranty and precautions of use of your new LaCie product in the user manual.

For products purchased in the United States, you may contact LaCie at 7555 Tech Center Drive, Tigard, Oregon 97223 USA. Email: sales@lacie.com. Website: www.lacie.com. Customer service: 503-844-4503.

Service DOA

On rare occasions, a newly purchased LaCie product may be delivered in non-working order. We are working to avoid these issues, but unfortunately, these situations may arise from time to time. Within the 15 calendar days of purchase, should you experience an issue with your new LaCie product, we ask you to return the product to the place where it was originally bought. You will be required to give a proof of purchase.

Customer Warning

Please be sure to back up your data before returning your drive to LaCie for repair. LaCie cannot under any circumstances guarantee the integrity of data remaining on a returned drive. We make no provisions for data recovery and cannot be held liable for any data loss on drives or media returned to LaCie.

All products returned to LaCie must be securely packaged in their original box and shipped with postage prepaid, except for Products registered under the Advance Care Option.

NOTE TO AUSTRALIAN CUSTOMERS

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

Contact us:

LaCie Australia, 6/151 Beauchamp Rd, Matraville NSW 2036 AUSTRALIA

Phone: 02 8063 3711

Email: info.au@lacie.com

For fast technical support, create a support ticket after registering your product at www.lacie.com/au/register.

LEGAL INFO

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FEDERAL COMMUNICATION COMMISSION INTERFERENCE STATEMENT

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

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

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Important info: FCC Radiation Exposure Statement: This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. The availability of some specific channels and/or operational frequency bands are country dependent and are

firmware programmed at the factory to match the intended destination. The firmware setting is not accessible by the end user.

WEEE



This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designed collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service, or the shop where you purchased the product.

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This list of licenses can evolve over time and can be found on the user interface under the heading "Credits."

CANADA COMPLIANCE STATEMENT

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

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

JAPAN COMPLIANCE STATEMENT

This is a Class B product based on the standard of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If this is used near a radio/TV receiver, it may cause radio interference. Install the equipment according to the manual. This statement does not apply to the LaCie CloudBox.

MANUFACTURER'S DECLARATION FOR CE CERTIFICATION



We, LaCie, solemnly declare that this product conforms to the following European standards:
Electromagnetic Compatibility Directive (2004/108/EC); Low-Voltage Directive: 2006/95/EC