

## Table of Contents

<b>1. System Overview.....</b>	<b>7</b>
1.1. LaCie 12big Rack Fibre RAID Enclosure.....	7
1.2. LaCie 12big Rack Fibre expansion Enclosure.....	7
1.3. Enclosure Chassis.....	8
1.3.1. Enclosure Drive Slots.....	9
1.3.2. Operator's Panel.....	9
1.3.3. Alarms (Audible and Visible).....	10
1.4. The Plug-in Modules.....	12
1.4.1. Power Supply Module.....	12
1.4.1.1. Dual Power Supply Operation.....	13
1.4.2. Cooling Fan Module.....	13
1.4.3. RAID Controller Module.....	15
1.4.3.1. Battery Module.....	18
1.4.3.2. Fibre Channel Interface.....	18
1.4.3.3. StorView Management Software.....	19
1.4.4. Disk I/O Module.....	19
1.4.5. Drive Carrier Module.....	21
1.4.5.1. Drive Status LEDs.....	22
1.4.5.2. Anti-tamper Locks.....	23
1.4.5.3. MUX Transition Cards.....	23
1.4.5.4. Dummy Carrier Modules.....	23
1.4.6. Blank Modules.....	24
<b>2. Getting Started.....</b>	<b>25</b>
2.1. Introduction.....	25
2.2. Planning Your Installation.....	25
2.3. Enclosure Installation Procedures.....	26
2.3.1. Preparation of Site and Host Server.....	26
2.3.1.1. Time-Out Issues.....	26
2.3.2. Rack Installation Pre-Requisites.....	26
2.3.2.1. Rack Mounting Rail Kit.....	26
2.3.3. Unpacking the Enclosure System.....	27
2.3.4. Rack Installation Procedure.....	27
2.3.4.1. Installation Procedure.....	27
2.4. Module Removal & Installation.....	30
2.4.1. Power Supply Module.....	30
2.4.1.1. Removing the Power Supply Module.....	30
2.4.1.2. Installing the Power Supply Module.....	30
2.4.2. Cooling Fan Module.....	31
2.4.2.1. Removing the Cooling Fan Module.....	31
2.4.3. Installing the Cooling Fan Module.....	32
2.4.4. RAID Controller Module.....	33
2.4.4.1. Removing the RAID Controller Module.....	33
2.4.4.2. Installing the RAID Controller Module.....	34
2.4.5. Disk I/O Module.....	35
2.4.5.1. Removing the Disk I/O Module.....	35
2.4.5.2. Installing the Disk I/O Module.....	36
2.4.6. Drive Carrier Module.....	37
2.4.6.1. Removing the Drive Carrier Module.....	37
2.4.6.2. Installing a Drive Carrier Module.....	38
2.4.6.3. Engaging the Anti-tamper Locks.....	39

2.4.7. SFP Transceiver Installation.....	39
2.5. Cabling the Enclosures.....	40
2.6. Cabling Multiple Enclosures.....	42
2.7. Ethernet Connection.....	42
2.8. Drive Slot Arrangement .....	42
2.8.1. Drive Location Rules .....	43
2.8.2. Drive Start.....	43
2.9. AC Power Cord Connection.....	43
2.10. Grounding Checks.....	44
2.11. Management Interfaces .....	44
2.11.1. StorView Storage Management Software.....	44
<b>3. Operation .....</b>	<b>45</b>
3.1. Before You Begin.....	45
3.2. Power On .....	45
3.3. Starting the Drives.....	46
3.3.1. Disk Drive LEDs.....	46
3.4. Starting StorView.....	46
3.5. Embedded StorView Initial Setup .....	46
3.5.1. Setting up the Embedded StorView Module: Microsoft Windows .....	47
3.5.2. Setting up the Embedded StorView Module: Linux.....	48
3.5.3. Setting up the Embedded StorView Module: Mac.....	49
3.6. Power Down.....	50
<b>4. Troubleshooting &amp; Problem Solving .....</b>	<b>51</b>
4.1. Overview .....	51
4.1.1. Troubleshooting using StorView .....	51
4.1.2. Initial Start-up Problems .....	51
4.1.2.1. Faulty Connections .....	51
4.1.2.2. Alarm Sounds On Power Up.....	52
4.1.2.3. Controller OK LED Not Illuminated .....	52
4.1.2.4. Host Computer Does Not Recognized Enclosure .....	52
4.2. Status Indicators (LEDs).....	53
4.2.1. Power Supply Module LEDs .....	53
4.2.2. Cooling Fan Module LED.....	54
4.2.3. OPS Panel LEDs .....	54
4.2.4. Alarms (Audible and Visible) .....	55
4.2.5. RAID Controller Module LEDs.....	57
4.2.6. Disk I/O Module LEDs .....	58
4.2.7. Drive Status LEDs.....	58
4.2.8. SCSI Enclosure Services (SES) .....	59
4.3. Audible Alarm .....	59
4.3.1. Audible Alarm Mute.....	59
4.3.1.1. LED Test Mode .....	59
4.4. Troubleshooting.....	60
4.4.1. OPS Panel System Faults .....	60
4.4.2. OPS Panel Logical Faults .....	60
4.4.3. Thermal Control .....	61
4.4.4. Thermal Alarm .....	61
4.4.5. Thermal Warnings .....	62
4.4.6. Firmware Updates .....	62
<b>5. Module Removal and Replacement .....</b>	<b>63</b>
5.1. Dealing with Hardware Faults .....	63
5.2. Continuous Operation During Replacement.....	63
5.2.1. OPS Panel .....	63

5.3. Replacing a Module .....	64
5.3.1. Power Supply Modules .....	64
5.3.1.1. Removing the Power Supply Module .....	64
5.3.1.2. Installing the Power Supply Module .....	65
5.3.2. Cooling Fan Module .....	65
5.3.2.1. Removing the Cooling Fan Module .....	65
5.3.2.2. Installing the Cooling Fan Module .....	66
5.3.3. RAID Controller Module .....	66
5.3.3.1. Removing the RAID Controller Module .....	66
5.3.3.2. Installing the RAID Controller Module .....	67
5.3.4. Disk I/O Module .....	68
5.3.4.1. Removing the Disk I/O Module .....	68
5.3.4.2. Installing the Disk I/O Module .....	69
5.3.5. Removal and Installation of the Blank Module .....	69
5.3.5.1. Removal .....	69
5.3.5.2. Installation .....	70
5.3.6. Replacing a Battery Module .....	70
5.3.6.1. Removing the Battery Module .....	70
5.3.6.2. Installing the Battery Module .....	70
5.3.7. Replacing SFP Transceivers .....	71
5.3.7.1. Removing the SFP Transceiver .....	71
5.3.7.2. Installing the SFP Transceiver .....	71
5.3.8. Replacing a Drive Carrier Module .....	72
5.3.8.1. Removing the Drive Carrier Module .....	72
5.3.8.2. Installing a Drive Carrier Module .....	73
5.3.9. Engaging the Anti-tamper Locks .....	74
5.3.9.1. Activating the Locks .....	74
5.3.10. Dummy Drive Carrier Module Replacement .....	74
5.4. Replacement Parts and Ancillary Items .....	75
<b>6. Appendix A: Technical Specifications .....</b>	<b>76</b>
6.1. Dimensions .....	76
6.2. Weight .....	76
6.3. AC Power (350W PSU) .....	76
6.4. Current Consumption .....	77
6.5. Environment .....	77
6.6. RAID Controller Module Specification .....	78
6.7. Disk I/O Module Specification .....	78
6.8. Drive Carrier Module Specification .....	79
<b>7. Appendix B: Standards &amp; Regulations .....</b>	<b>80</b>
7.1. International Standards .....	80
7.2. Potential for Radio Frequency Interference .....	80
7.3. European Regulations .....	81
7.4. Power Supply Safety and EMC Compliance .....	81
7.5. AC Power Cords .....	81
7.6. EMC Precautions .....	82
7.7. ESD Precautions .....	82
7.8. Recycling of Waste Electrical and Electronic Equipment (WEEE) .....	82
<b>8. Contacting Customer Support .....</b>	<b>83</b>
8.1. LaCie Technical Support Contacts .....	83
<b>9. Warranty Information .....</b>	<b>84</b>

## Notices

The information in this document is subject to change without notice.

While every effort has been made to ensure that all information in this document is accurate, the Authors accept no liability for any errors that may arise.

No part of this document may be transmitted or copied in any form, or by any means, for any purpose, without the written permission of the Authors.

Issue 3.0 January 30, 2009 Part No. 0092271-03A

## Acknowledgments

All names, brands, products or services are trademarks or registered trademarks of their respective companies.

## What is in this guide

This user guide gives you step-by-step instructions on how to install, configure and connect the LaCie 12big Rack Fibre RAID and LaCie 12big Rack Fibre expansion storage solution to your host computer system, and how to use and maintain the system.

## Who should use this guide

This user guide assumes that you have a working knowledge of the Fibre Channel Arbitrated Loop (FC-AL) and SAS or SATA environments into which you are installing the LaCie 12big Rack Fibre RAID and LaCie 12big Rack Fibre expansion storage solutions. If you do not have these skills, or are not confident with the instructions in this guide, request assistance to proceed with the installation.

---

## Safety Guidelines

### Safe Handling

**CAUTION:** If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In order to comply with applicable safety, emission and thermal requirements, no covers should be removed and all bays must be populated with plug-in modules. The system must not be run without all modules in place.

Permanently unplug the enclosure before you move it, or if you think that it has become damaged in any way.

**CAUTION:** A 12big enclosure can weigh up to 32 kg (70.4 lb.). Do not try to lift it by yourself.

Do not lift the enclosure by the handles on the power supplies, as they are not designed to support that weight.

### Safety

- ◆ 12big enclosures must only be operated from a power supply input voltage range of 100-240 V, 50-60 Hz.
- ◆ The plugs on the power supply cord are used as the main disconnect device. Ensure that the socket outlets are located near the equipment and are easily accessible.
- ◆ The wiring installation must provide a disconnect device close to the equipment.
- ◆ The equipment must be operated with two working power supply modules.
- ◆ To prevent overheating, do not operate the enclosure with one power supply removed for more than 30 minutes.

- ◆ When powered by multiple AC sources, disconnect all source power for complete isolation.
- ◆ The power connection should always be disconnected prior to removal of the power supply module from the enclosure.
- ◆ A safe electrical ground (earth) connection must be provided to the power cords. Check the grounding of the enclosure before applying power.
- ◆ Provide a suitable power source with electrical overload protection to meet the requirements listed in the technical specification.

**CAUTION:** Do not remove the covers from the power supply module. Danger of electric shock inside. Return the power supply module to your supplier for repair.

- ◆ Unplug the enclosure if you think that it has become damaged in any way and before you move it.
- ◆ A 12big enclosure can weigh up to 32 kg (70.4 lb.). Do not try to lift it by yourself.
- ◆ Do not lift a 12big enclosure by the handles of the Power Supply modules. They are not designed to support the weight of the enclosure.
- ◆ In order to comply with applicable safety, emission and thermal requirements, no covers should be removed and all bays must have the correct plug-in modules installed.

### Equipment Handling Precautions

- ◆ All plug-in modules are part of the fire enclosure and must only be removed when a replacement can be immediately added. The system must not be operated without all modules in place.

- ◆ Do not operate with Drive Carrier modules missing.
- ◆ Drive spin down time is approximately 30 seconds. Allow the drives to spin down before removing them.

### Battery Safety

The RAID Controller Backup Battery uses a Lithium-ion battery pack which is user replaceable, please refer to section [5.3.6. Replacing a Battery Module](#). Warning There is a danger of explosion if the battery is disposed of improperly. Dispose of used batteries in accordance with the manufacturer's instructions and national regulations.

### Class 1 Laser Product

The LaCie 12big Rack Fibre RAID Controllers are supplied with optical SFP Transceiver modules. They contain a laser that complies with Laser Class 1, US 21 CFR (J) & EN 60825-1, UL (NRTL) and TUV.

**IMPORTANT NOTE:** The optical modules provided and installed by the end user, must be a UL (or other North American NRTL) RECOGNIZED COMPONENT, must be approved by TUV (or other European Product safety test house) and the laser in the module must comply with Laser Class 1, US 21 CFR (J) & EN 60825-1.

### Rack System Precautions

The following safety requirements must be considered when the enclosure is mounted in a rack.

- ◆ The rack design should incorporate stabilizing features suitable to prevent the rack from tipping or being pushed over during installation or in normal use.

- ◆ Do not slide more than one enclosure out of the rack at one time to avoid the danger of the rack toppling over.
  - ◆ Always remove all modules and drives to minimize weight before loading chassis into a rack.
  - ◆ When loading a rack with the units, fill the rack from the bottom up and empty from the top down.
  - ◆ System must be operated with low pressure rear exhaust installation (back pressure created by rack doors and obstacles not to exceed 5 pascals (0.5 mm water gauge)).
  - ◆ The rack design should take into consideration the maximum operating ambient temperature for the unit, which is 40°C (104°F) when two power supply modules are fitted.
  - ◆ The rack should have a safe electrical distribution system. It must provide overcurrent protection for the enclosure and must not be overloaded by the total number of enclosures installed in the rack. Consideration of the chassis nameplate rating should be used when addressing these concerns.
  - ◆ The electrical distribution system must provide a reliable earth for each unit and the rack.
  - ◆ Each power supply in each enclosure has an ground (earth) leakage current of < 1.5 mA maximum at 60 Hz, 264V per power supply. The design of the electrical distribution system must take into consideration the total ground (earth) leakage current from all the power supplies in all the enclosures. The rack will require labelling with "HIGH LEAKAGE CURRENT. Ground (earth) connection essential before connecting supply."
  - ◆ The rack when configured with the enclosures must meet the safety requirements of UL 60950-1 and IEC 60950-1/EN 60950-1.
- before beginning installation.
- ◆ Each enclosure contains up to 12 removable disk drive modules. Disk drives are fragile, handle them with care and keep them away from strong magnetic fields.
  - ◆ All the supplied plug-in modules, dummy carriers and blank modules must be in place for the air to flow correctly around the enclosure and also to complete the internal circuitry.
  - ◆ If the subsystem is used with plug-in modules, dummy carriers or blank modules missing for more than a few minutes, the enclosure may overheat, causing power failure and data loss. Such use may also invalidate the warranty.
  - ◆ If you remove a drive module, replace it immediately. If the drive module is faulty, replace it with one of the same type and capacity.
  - ◆ Ensure that all disk drives are removed from the enclosure before attempting to man-handle or move the rack installation.
  - ◆ Do not abandon your backup routines. No system is completely infallible.

---

## Special Tools and Equipment

There are no special tools required but in order to complete the assembly of some configurations you may need the following:

- ◆ Anti-tamper lock key for drive carrier modules (one key is included with your enclosure).
  - ◆ Standard screwdrivers and wrenches.
- 

---

## Data Security

- ◆ Power down your host computer and all attached peripheral devices

# 1. System Overview

## 1.1. LaCie 12big Rack Fibre RAID Enclosure

The LaCie 12big Rack Fibre RAID enclosure is a 2U (rack space) disk drive enclosure, housing twelve low profile (1 inch high), 3.5 inch form factor SATA or SAS disk drives and up to two FC-SAS RAID Controllers.

The front of the enclosure contains 12 drive slots, each of which accommodates a plug-in Drive Carrier module. There is also an operators panel that provides status LEDs and an alarm silence button.

At the rear, the 12big chassis assembly contains five plug-in module bays that house the two Power Supply modules, a Cooling Fan module and two RAID Controller modules.

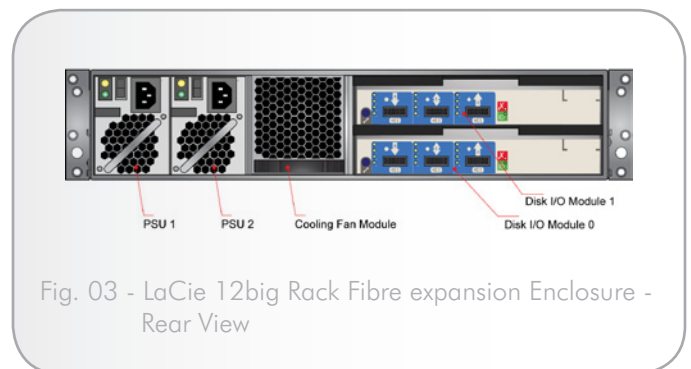
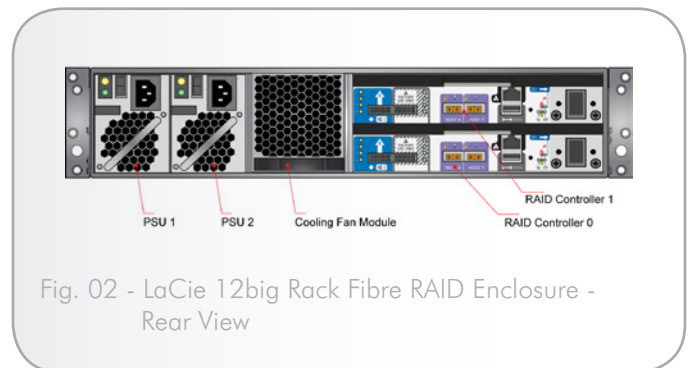
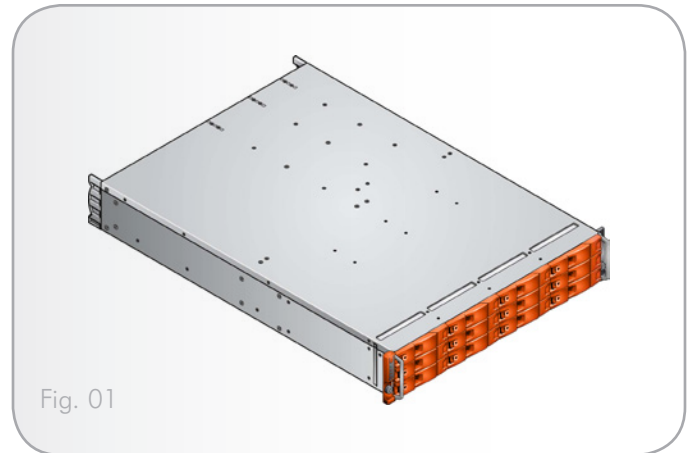
## 1.2. LaCie 12big Rack Fibre expansion Enclosure

The LaCie 12big Rack Fibre expansion enclosure is nearly identical to the RAID enclosure except Disk I/O modules replace the RAID Controllers.

Expanding the number of disk drives up to sixty (60) is achieved by connecting one to four LaCie 12big Rack Fibre expansion enclosures to the RAID enclosure.

If you are using exclusively SAS disk drives, you can expand up to 96 disk drives for a total of seven expansion enclosures plus one RAID enclosure. However, if you are using exclusively SATA disk drives or a mixture of SAS and SATA disk drives, you are limited to 60 drives in a total of four expansion enclosures and one RAID enclosure.

The enclosures are interconnected using mini-SAS patch cables from the LaCie 12big Rack Fibre RAID Controllers to the first LaCie 12big Rack Fibre expansion enclosure Disk I/O modules. Then the remaining expansion enclosures are connected from one set of Disk I/O modules to the next enclosure's Disk I/O modules, again using mini-SAS patch cables. For details on cabling the enclosures refer to sections [2.5. Cabling the Enclosures](#) and section [2.6. Cabling Multiple Enclosures](#).



## 1.3. Enclosure Chassis

The chassis concept is based on an enclosure subsystem together with a set of plug-in modules. The LaCie 12big Rack Fibre RAID enclosure as supplied consists of:

- ◆ Chassis and backplane with integral (front panel mounted) OPS panel (See [Fig. 05](#)).
- ◆ Up to twelve (12) Drive Carrier Modules can be installed (See [Fig. 16](#)), using either SAS or SATA disk drives.

---

**NOTE:** Dummy Carriers modules must be installed in all unused drive slots to maintain airflow, please refer to [1.4.5.4. Dummy Carrier Modules](#).

---

- ◆ Two plug-in Power Supply modules: 100-240V AC, 350W (See [Fig. 06](#)).
- ◆ One plug-in Cooling Fan module (See [Fig. 08](#)).
- ◆ Two plug-in RAID Controller modules. (See [Fig. 10](#)), incorporating StorView Storage Management Software on an Embedded Module.

---

**NOTE:** If only one RAID Controller module is installed, then a Blank module must be installed in the unused bay. The RAID Controller module should be installed in Bay 0 and the blank in Bay 1 (where Bay 0 is the lower and Bay 1 is the upper bay, see [Fig. 02](#)).

---

- ◆ The chassis is fitted with 19 inch Rack mounting features which enable it to be fitted to standard 19 inch racks and uses 2 EIA units of rack space (i.e. 3.5" high).

The LaCie 12big Rack Fibre expansion enclosure as supplied consists of:

- ◆ Chassis and backplane with integral (front panel mounted) OPS panel (See [Fig. 05](#)).
- ◆ Up to twelve (12) Drive Carrier modules (See [Fig. 16](#)), using either SAS or SATA disk drives.

---

**NOTE:** Dummy Carriers modules must be installed in all unused drive slots to maintain airflow, please refer to section [1.4.5.4. Dummy Carrier Modules](#).

---

- ◆ Two plug-in Power Supply modules: 100-240V AC, 350W (See [Fig. 06](#)).
- ◆ One plug-in Cooling Fan module (see [Fig. 08](#)).
- ◆ Two Disk I/O modules (see [Fig. 16](#)).

---

**NOTE:** If only one Disk I/O module is installed then a Blank module must be installed in the unused bay. The Disk I/O module should be installed in Bay 0 and the blank in Bay 1 ([Fig. 03](#)).

---

- ◆ The chassis is fitted with 19 inch Rack mounting features which enable it to be fitted to standard 19 inch racks and uses 2 EIA units of rack space (i.e. 3.5" high).
-



### 1.3.1. Enclosure Drive Slots

The chassis assembly contains 12 drive slots located at the front, each of which accommodates the appropriate plug-in drive carrier module. A drive slot is defined as the space required to house a single 1.0" high 3.5 inch disk drive in its carrier module. The 12 drive slots are arranged in 3 rows of 4 columns.

The drive slots are identified as indicated in [Fig. 04](#).

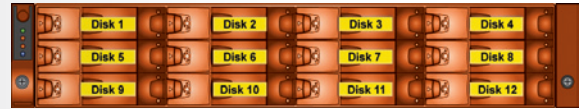


Fig. 04 - RAID & expansion Enclosure Front View - Drive Slots

### 1.3.2. Operator's Panel

The 12big enclosure front panel incorporates an Operator's (OPS) panel with four LEDs, see [Fig. 05](#). The OPS panel provides the user a superficial view of the operational status of the enclosure components. Please refer to [Table 10 - OPS Panel LED States](#) and [4.2.3. OPS Panel LEDs](#) for details of the LED status conditions.

**NOTE:** The OPS panel is an integral part of the chassis and can only be replaced with a replacement enclosure.

Pressing the Alarm Mute button when no error or critical conditions are occurring will start an LED selftest. Pressing the button again will stop the self-test, or if an error condition occurs while the self-test is on-going the test will terminate.

**NOTE:** The RAID enclosure requires holding the mute button depressed for 4 seconds before the self test begins, and approximately 2 seconds to stop the test. The expansion enclosure will enter the self test by just pressing the button momentarily and will stop the test as well by just touching the button momentarily as well.

During the self-test you will initially hear two beeps followed by illumination of the System Fault, Logical Fault, and Box Identify LEDs. The Drive Carrier lower Fault LEDs (amber) will flash continuously during the test.

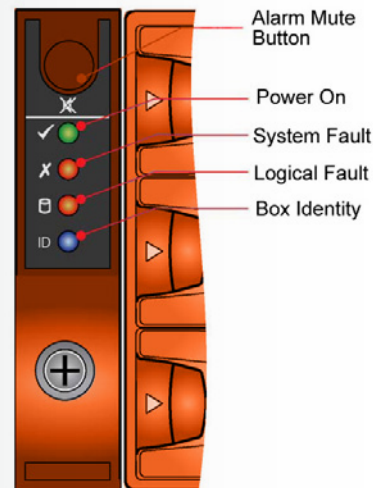


Fig. 05 - OPS Panel

### 1.3.3. Alarms (Audible and Visible)

Table 01 - OPS Panel LED States

OPS Panel LEDs				Other Associated LEDs or Alarms	State Description
Power On (Green/Amber)	System Fault (Amber)	Logical Fault (Amber)	Box Identify (Blue)		
ON	OFF	OFF	X		Aux present, overall power failed or switched off.
ON	ON	ON	ON	Single beep, two double beep	OPS Panel power on (5s) test state
ON	OFF	X	X		Power On, all functions good
ON	ON	X	X	PSU Fault LED or Cooling Module Fault LED	Any PSU Fault or Fan Fault Over or Under temperature
ON	ON	X	X	RAID Controller Fault LED on lower controller	ESI processor/RAID Controller 0 failed
ON	ON	X	X	RAID Controller Fault LED on upper controller	ESI processor/RAID Controller 1 failed
ON	Flashing	X	X	RAID Controller Fault LED	Unknown (invalid or mixed) module type installed, or  12C Bus Failure (inter ESI processor).
ON	Flashing	X	X	PSU Removed	PSU removed when two were present at Start of Day
ON	X	OFF	X		Power On, all functions good
ON	X	ON	X	Array in failed or degraded state	Drive failure has occurred causing loss of availability or redundancy.
ON	X	Flashing	X	Arrays in impacted state	Arrays performing background function
X	X	X	ON		SES controlled enclosure identify.

continued on the next page >>

12big enclosures include an Audible Alarm which indicates when a fault state is present. The following conditions will activate the Audible Alarm:

- ◆ Fan Fault or Failure (single or dual)
- ◆ Voltage Out Of Range
- ◆ Over Temperature
- ◆ Thermal Overrun
- ◆ System Fault
- ◆ Logical Fault
- ◆ Power Supply Fault
- ◆ Removal Of One Power Supply module

When the audible alarm sounds, it may be muted by pressing the Alarm Mute push-button which is incorporated in the enclosure front panel.

Some critical error conditions such as: enclosure temperature exceeded upper limit, more than one fan failure, and controller temperature failure, the alarm will sound continuously. You cannot mute these alarms.

Some conditions that are not as critical will provide an intermittent alarm. These conditions would include: component removed, temperature increasing, array drive member faults, etc. The alarms under these conditions can be muted.

---

## 1.4. The Plug-in Modules

An 12big enclosure requires the following modules for normal operation:

- ◆ (2) 350W AC Power Supply modules.
- ◆ (1) Cooling Fan module.
- ◆ LaCie 12big Rack Fibre: (1 or 2) RAID Controller modules (Blank module required in single controller configurations).  
OR
- ◆ LaCie 12big Rack Fibre expansion: (2) Disk I/O modules.
- ◆ (1 to 12) Drive Carrier modules with either SAS or SATA disk drives.
- ◆ Dummy Carrier modules, as required for empty drive slots.

**NOTE:** No slot should be left empty. Dummy Carrier modules and/or blank modules must be installed in all unoccupied slots or bays.

### 1.4.1. Power Supply Module

**CAUTION:** To prevent overheating do not operate the enclosure with one power supply removed for more than 30 minutes.

Two 100 - 240V 350W power supply modules are supplied installed at the rear of the enclosure as part of the enclosure core product. The power supply provides an N+1 redundant configuration. If one power supply fails, the system will continue to operate normally on the remaining supply, until the failed module is replaced. They feature an ON/OFF switch so that the power supply can be shut down without having to remove the power cable.

Power supply voltage operating ranges are nominally 115V or 230V, selected automatically.

**NOTE:** When inserting a power supply module into a operating enclosure with data I/O in progress, smoothly insert the module into the open bay and secure the latch. Harshly inserting the module could possibly cause drives to temporarily go offline which could affect ongoing data I/O operations.

Two LEDs mounted on the rear panel of the power supply module (see [Fig. 06](#)) indicate the status of the module. The table below ([Table 02 - Power Supply LEDs](#)) describes the LEDs and the meaning of each.

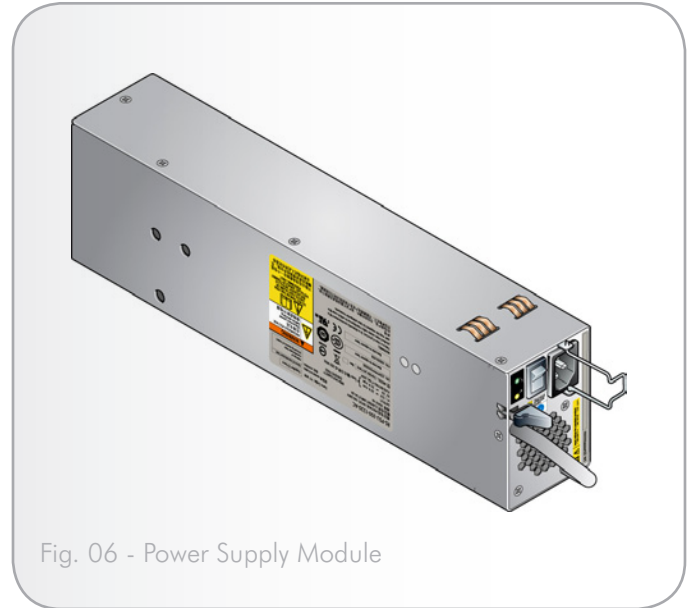


Fig. 06 - Power Supply Module

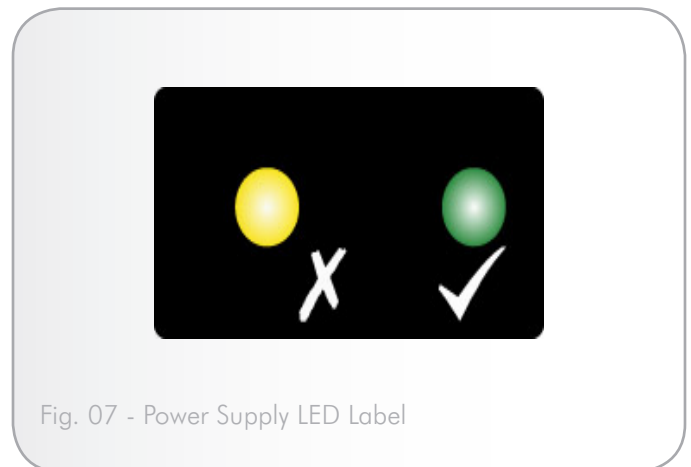


Fig. 07 - Power Supply LED Label

continued on the next page >>

Table 02 - Power Supply LEDs

Power On & OK (Green)	Module Fault (Amber)	Status
OFF	OFF	No AC power source is being supplied to either power supply.
OFF	ON	No AC power source is being supplied to this power supply.  OR The power cord is attached to the power source, but the power supply switch is in the OFF position.  OR Power supply fault is occurring such as over-temperature warning, over-voltage warning, over-current warning, or a power supply fan has failed.
ON	OFF	AC power source is present, the power supply is on and operating normally.

#### 1.4.1.1. Dual Power Supply Operation

The 12big enclosure must always be operated with two power supply modules installed. The two power supply modules operate together so that if one fails the other maintains the power to the enclosure while you replace the faulty module. While operating on a single power supply, if that power supply fails the system will lose power and data may be lost.

Module replacement should only take a few minutes to perform, but must be completed within 30 minutes from removal of the failed module to prevent overheating.

#### 1.4.2. Cooling Fan Module

The Cooling Fan module provides system cooling and thermal monitoring.

System airflow is from the front to back of the enclosure: cooling air passes over drives and through the midplane to a central plenum, then the fans pull air from the plenum and from the I/O modules and exhaust the air at the rear of the enclosure.

**NOTE:** During the power up sequence, the Cooling Fan Module Fault LED will be illuminated until the RAID Controllers have completed their boot up cycle. This also applies to the expansion enclosure except in this case the Disk I/O modules must complete their boot cycle before LED is extinguished.

**NOTE:** The system must be operated with low pressure rear exhaust installation (back pressure created by rack doors and obstacles not to exceed 5 pascals (0.5mm water gauge)).

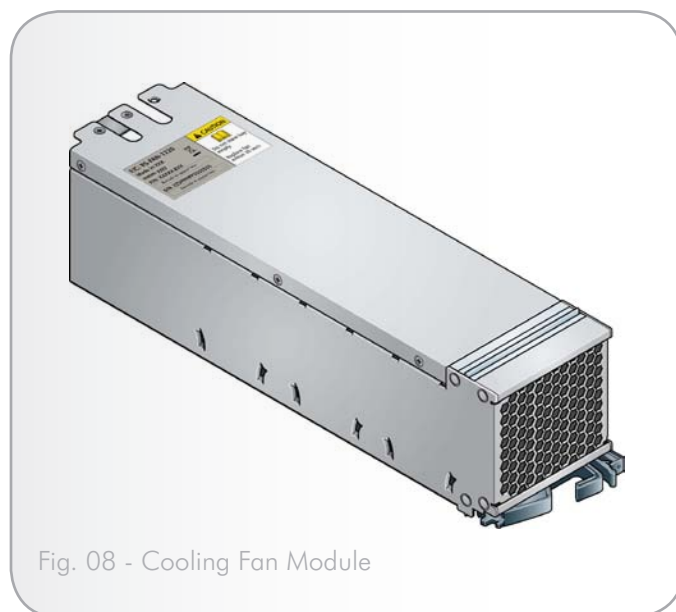


Fig. 08 - Cooling Fan Module

The Cooling Fan module incorporates an amber Fault LED. The states are described below.

Table 03 - Cooling Fan Module Fault LED

Fault LED (Amber)	Status
OFF	Fan OK.
ON	One or more fans have failed.  OR The RAID Controller or Disk I/O module has not completed the boot sequence.

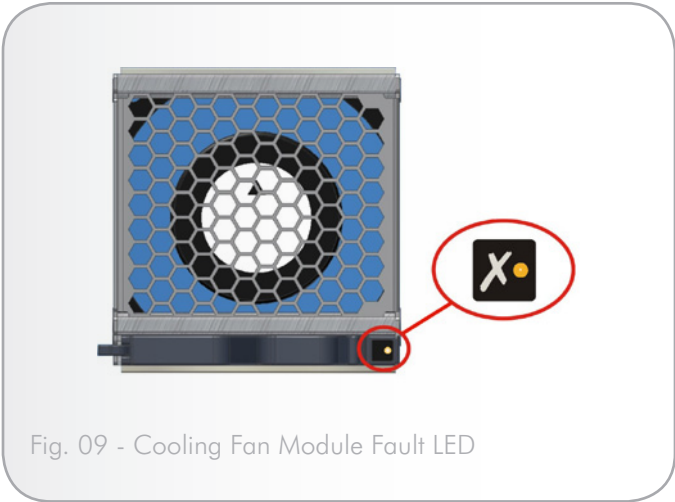


Fig. 09 - Cooling Fan Module Fault LED

### 1.4.3. RAID Controller Module

One or two RAID Controller modules (according to customer configuration) are supplied mounted in the rear of the enclosure as part of the LaCie 12big Rack Fibre enclosure core product.

---

**IMPORTANT INFO:** Do not mix RAID Controller modules and Disk I/O modules in the same enclosure. Disk I/O modules are only installed in the expansion enclosure and RAID Controllers modules are only installed in the RAID enclosure.

---

The plug-in RAID Controller provides an external fibre channel (FC) cable interface for the host computer system, SAS interface for the expansion enclosure Disk I/O modules, an out-of-band Ethernet interface for Embedded StorView, and an out-of-band RS232 VT-100 interface for the controller firmware configuration software.

The controller's internal processor monitors conditions on each disk drive port. It provides an enclosure management interface to devices on the backplane, power supplies, cooling fan module, partner RAID Controller module, and OPS panel that monitors internal functions. When the enclosure is supplied with dual controllers, these processors operate in an active-active configuration to allow failover and failback.

The RAID Controller uses the latest technology providing support for Native Command Queuing (NCQ). NCQ provides an increase in performance of SATA disk drives by allowing the individual disk to internally optimize the order in which received read and write commands are executed. This can reduce the amount of unnecessary going back-and-forth of the drive's heads, resulting in increased performance. The controllers also support a set of performance tuning features like writeback cache management, overload performance management, synchronized cache flush, target command thread balancing and sequential write optimization. Description and use of these performance features are found in the StorView Storage Management Software User Guide and in the RAID Configuration Utility User Guide.

The controller supports either 1 GB or 2 GB cache memory sizes. SATA disk drives are supported using an Active-Active Transition cards, see [1.4.5.3. MUX Transition Cards](#).

The RAID Controller incorporates LED status indicators, shown in [Fig. 11](#) and detailed in [Table 04 - RAID Controller Module - Icon & LED Status Indicators](#).

The RAID Controller module has the following external ports:

- ◆ Two external fiber channel "Host" ports that allow for installation of Small Form-Factor Pluggable (SFP) modules, with auto-bypass at the output. Either or both of these SFP ports can be used to provide connection to the host HBAs via Fibre Channel cables. Each host port operates at 4 Gbits/ sec., giving an effective speed of 8 Gbits/sec. These ports are also

backwards compatible with 2 Gbits/sec. and 1 Gbps hosts. The Host Port Status LED will be illuminated steady when there is no I/O activity and will flash indicating I/O activity. A separate status LED is provided for each of the three operational speeds. If the LED is extinguished, an invalid link is indicated.

- ◆ A SAS expansion port provides for expanding the number of drives up to a maximum of 96 SAS disk drives using seven LaCie 12big Rack Fibre expansion enclosures, or a maximum of 60 SATA or SAS/SATA mix disk drives using four LaCie 12big Rack Fibre expansion enclosures, all of which are connected via the 4port mini-SAS connector using dual cabling. The SAS expansion port operates at 3 Gbits/sec. and has four LEDs adjacent to the connector that indicate the status of each lane.
- ◆ An RJ45 10/100BaseT Ethernet port allows the controller to be connected to a network to enable out-of-band management and monitoring using the embedded StorView software.

---

**IMPORTANT INFO:** Only shielded Cat 5 (or better) cables should be used for connection to the Ethernet port for EMC conformance.

---

- ◆ A RS232 serial port provides an alternative VT-100 user interface to the RAID Controller's RAID Configuration Utility software for additional out-of-band management and monitoring.

---

**NOTE:** The RS232 port is similar in appearance to a USB port, though it is not a USB port. It requires a special cable and users should NOT attach a USB cable to this port.

---

continued on the next page >>

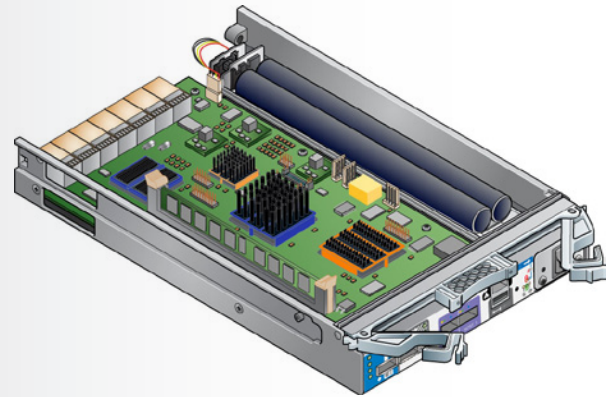


Fig. 10 - RAID Controller Module

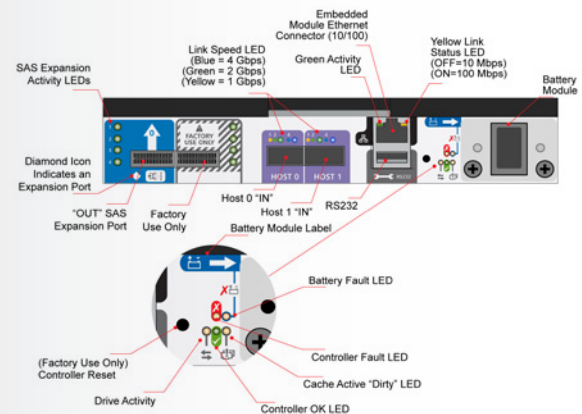





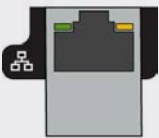
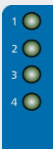
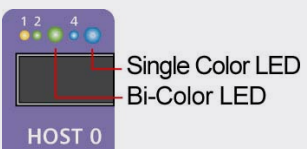


Fig. 11 - RAID Controller Module Front Panel



The following table provides a description of the RAID Controller's LED indicators:

Table 04 - RAID Controller Module - Icon & LED Status Indicators

Icon/LED	Description
 Battery Fault	<p>This LED appears between the controller's Ethernet port and the backup battery module.</p> <ul style="list-style-type: none"> <li>◆ Illuminated - Backup battery has low voltage, has experienced a timeout on charge indicating a faulty battery, or has experienced a fault in the charging circuitry.</li> </ul>
 Cache Active	<p>This LED appears between the controller's Ethernet port and the backup battery module.</p> <ul style="list-style-type: none"> <li>◆ Illuminated - RAID Controller cache has data saved in memory but not written to the disk array.</li> </ul>
 Controller Activity on Drives	<p>This LED appears between the controller's Ethernet port and the backup battery module.</p> <ul style="list-style-type: none"> <li>◆ Illuminated - RAID Controller has activity on the disk drives.</li> </ul>
 Controller OK	<p>This LED appears between the controller's Ethernet port and the backup battery module.</p> <ul style="list-style-type: none"> <li>◆ Illuminated Green - RAID Controller operation is normal.</li> </ul>
 Controller Fault	<p>This LED appears between the controller's Ethernet port and the backup battery module.</p> <ul style="list-style-type: none"> <li>◆ Illuminated Amber - RAID Controller fault has occurred or the controller is booting.</li> </ul>
 Ethernet Status	<p>These LEDs appear above the controller's Ethernet port.</p> <ul style="list-style-type: none"> <li>◆ Right Side Yellow - Ethernet port speed. When illuminated, it indicates the port is running at 100 Mbps and when the LED is off the port is running at 10 Mbps.</li> <li>◆ Left Side Green - Ethernet port has a link connection and link activity.</li> </ul>
 SAS Lane	<p>These LEDs appear adjacent to the SAS connector lanes.</p> <ul style="list-style-type: none"> <li>◆ ON - Ready, no traffic.</li> <li>◆ FLASHING - Active, I/O traffic.</li> <li>◆ ALL FLASHING - Fault condition or rebooting.</li> <li>◆ OFF - Not ready, no power.</li> </ul>
 FC Host Port Status	<p>These LEDs appear above the controller's Fibre Channel port.</p> <ul style="list-style-type: none"> <li>◆ Blue = 4 Gbps</li> <li>◆ Green = 2 Gbps</li> <li>◆ Yellow = 1 Gbps – Steady when no activity but valid signal. <ul style="list-style-type: none"> <li>– Flashing to indicate activity.</li> <li>– All LEDs flashing indicates no valid signal.</li> </ul> </li> </ul>

#### 1.4.3.1. Battery Module

The RAID Controller module assembly includes a removable battery module, located as shown in [Fig. 10](#). The battery module contains a replaceable Lithium-ion battery pack, see [Fig. 12](#). The battery pack provides protection of the cache contents if the AC power fails.

When the controller is powered on, it checks to determine if a battery module is present. If none is found it assumes a battery module is not installed and is not required. Therefore, no fault indication occurs for a missing battery at power up. Otherwise, if the battery is removed or experiences a fault condition a Fault LED will illuminate and a software event will occur.

Please refer to section [5.3.6. Replacing a Battery Module](#) for removal and replacement procedures.

#### 1.4.3.2. Fibre Channel Interface

The RAID Controller module provides two Fibre Channel SFP interface connections. The controller uses two SFP cages to capture the removable SFP transceiver optical modules. These connections are labeled Host 0 and Host 1. Contact your supplier for a list of qualified optical SFPs.

Each connection is bi-directional between the Fibre Channel host side interface and the drives. The drives will not be presented to the Host until they are configured into disk arrays and logical drives, then mapped by the controller.

---

**NOTE:** There are no external terminators required with Fibre Channel architecture.

---

Each RAID Controller module supports up to two independent Host Bus Adapters or switch port connections. Some typical configurations utilizing two RAID Controller modules and either one or two HBAs are shown in section [2.5. Cabling the Enclosures](#).

---

**IMPORTANT INFO:** Optical SFP modules must be UL (or other North American NRTL) RECOGNIZED COMPONENT and the laser in the module must comply with Laser Class 1, US 21 CFR (J) and EN 60825-1.

---

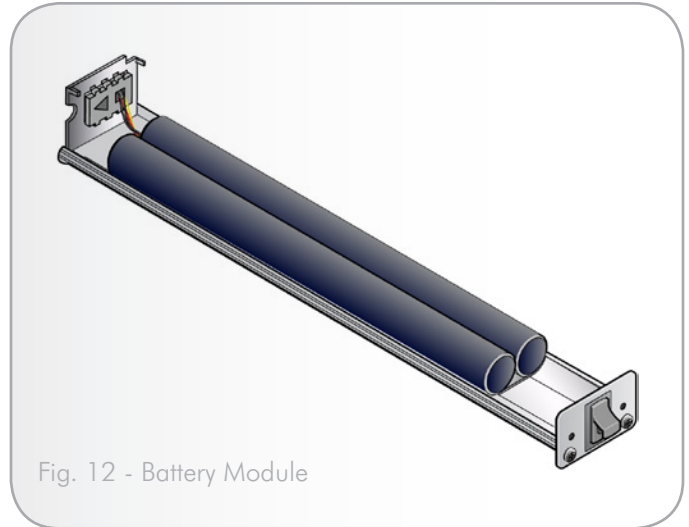


Fig. 12 - Battery Module

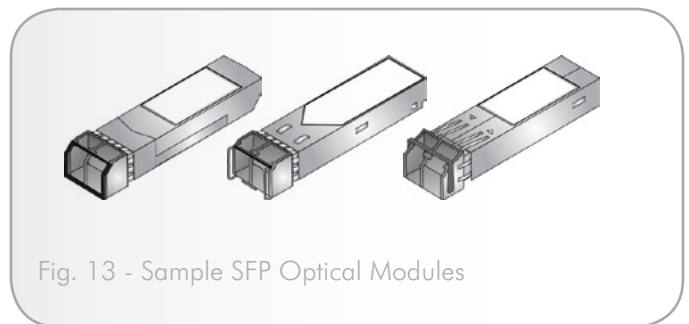


Fig. 13 - Sample SFP Optical Modules

### 1.4.3.3. StorView Management Software

The StorView Storage Management software which is embedded in the RAID Controller module is a full-featured graphical HTML-based software suite designed to configure, manage and monitor the LaCie 12big Rack Fibre Storage Solution. The module is supplied configured with a base IP address to allow the user to connect and access the controller's embedded StorView software. Please refer to section 3.4. [Starting StorView](#) for further information and the StorView Storage Management Software RAID Module User Manual.

### 1.4.4. Disk I/O Module

The LaCie 12big Rack Fibre expansion enclosure houses one or two Disk I/O modules. They provide the drive expansion for the RAID enclosure. When expanding the storage system, you may add up to four or seven expansion enclosures depending on the type of disk drive. This will give you a total of either five or eight enclosures including the RAID enclosure. A fully loaded system will support a total of 96 SAS disk drives or 60 SATA or SAS/SATA mixed disk drives.

---

**IMPORTANT INFO:** Do not mix Disk I/O modules and RAID Controller modules in the same enclosure.

---

Processors on the Disk I/O modules provide enclosure management and an interface to the devices on the backplane, power supplies, Disk I/O modules and OPS panel, which monitors the internal functions. These Disk I/O module processors operate in a master-slave configuration to allow for failover.

The enclosure may be configured with either one or two modules. If only one Disk I/O module is installed, a blank module must be installed in the unused bay. When installing a single module, install the module into the lower bay and a blank plate into the upper bay.

Each SAS connector has four LEDs adjacent to the connector. The LEDs indicate status or I/O activity on that specific SAS port lane. The module also has a Fault and ID LEDs. Refer to the table on the next page for details on these LEDs.

[continued on the next page >>](#)

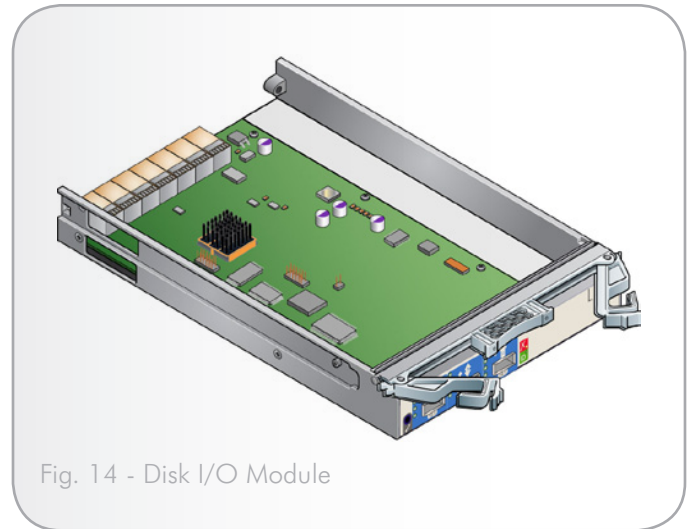


Fig. 14 - Disk I/O Module

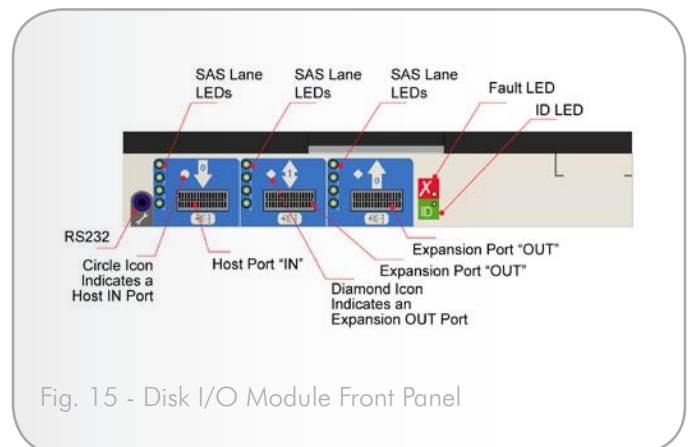
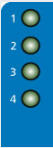




Fig. 15 - Disk I/O Module Front Panel

The white diamond icon with arrow pointing away from the connector indicates an expansion out port, and a white circle icon with an arrow pointing towards the connector indicates a host in port.

Table 05 - Disk I/O Module LEDs

LED	State	Description
<div>SAS Lane</div> 	ON	Ready, no traffic.
	FLASHING	Active, I/O traffic.
	ALL FLASHING	Fault condition or rebooting.
	OFF	Not ready, no power.
<div>Fault LED</div> 	ON	A module fault condition.
	OFF	Module is operating normally.
<div>ID LED</div> 	ON	Identifies the module with the fault condition.
	OFF	Module is operating normally.

**NOTE:** The “OUT” port on the RAID Controller or Disk I/O module connects to the “IN” port on the Disk I/O module in the next LaCie 12big Rack Fibre expansion enclosure, in a multiple enclosure configurations. Please refer to section [2.6. Cabling Multiple Enclosures](#) for more information on cabling the enclosure expansion.

#### 1.4.5. Drive Carrier Module

The Drive Carrier module comprise a hard disk mounted in a carrier. Each drive slot will house a single Low Profile 1.0 inch high, 3.5 inch form factor disk drive in its carrier. The carrier has mounting locations for SAS or SATA drives.

The front cap also supports an ergonomic handle which provides the following functions:

- ◆ Inserting and removal of drive carrier into and out of drive slots.
- ◆ Positive spring loading of the drive/backplane connector.
- ◆ An anti-tamper lock operated by a torx socket type key.
- ◆ A set of Drive Status LEDs

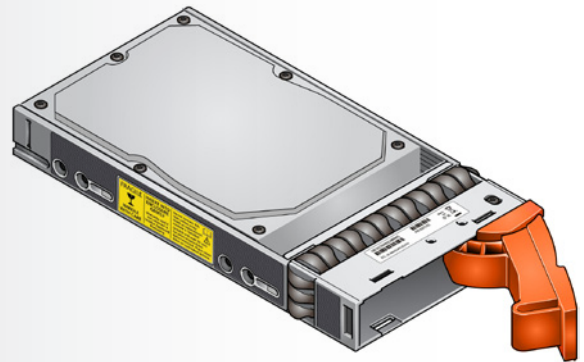


Fig. 16 - Drive Carrier Module With SAS Disk Drive

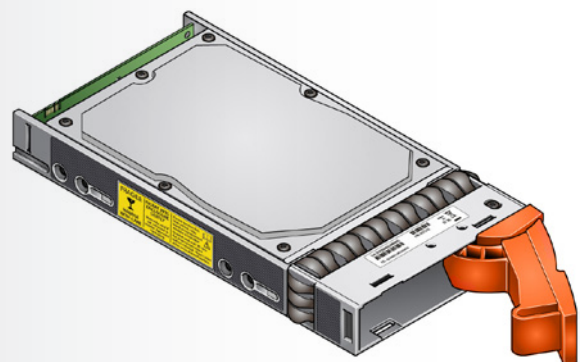


Fig. 17 - Drive Carrier Module With SATA Disk Drive

1.4.5.1. Drive Status LEDs

Each drive carrier incorporates two LEDs, an upper (Green) and lower (Amber) LED. In normal operation the green LED will be ON steady and will flash OFF as the drive operates indicating I/O activity.

The amber LED will only be ON if there is a drive fault. If the green LED is OFF when the amber LED is ON, a power control circuit failure is indicated.

Disk drive status is monitored and the status displayed via the green and amber LEDs mounted on the front of each Drive Carrier module. They provide the following indications:

Table 06 - Drive Status LED Functions

Green LED	Amber LED	Description
OFF	OFF	No Drive installed or blank module installed.
ON	OFF	Drive installed, powered ON, and operational.
FLASHING	FLASHING	Conditions: <ul style="list-style-type: none"><li>◆ Drive locating (user initiated)</li><li>◆ Drive is in a critical array</li><li>◆ Drives are members of a failed array</li><li>◆ Drive in an array and the array is in rebuild mode</li></ul>
OFF	ON	Drive slot fault. There is a power fault on this drive slot.
ON	ON	Drive fault. The drive is inserted but is not communicating, which is indicative of a drive failure.

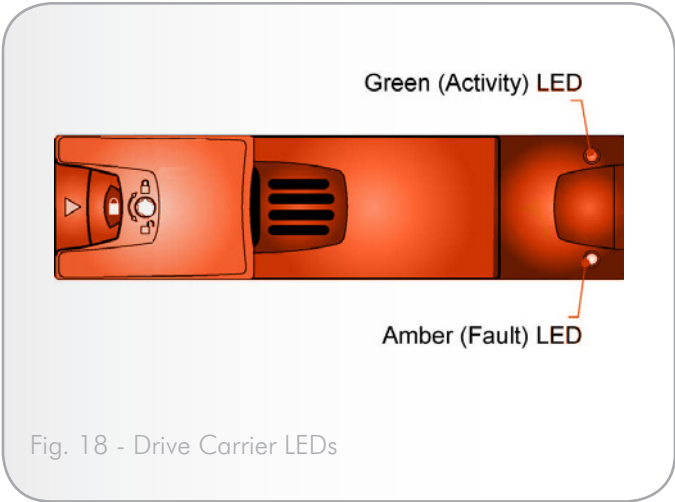


Fig. 18 - Drive Carrier LEDs

#### 1.4.5.2. Anti-tamper Locks

Anti-tamper locks are a part of the drive carrier handles (Fig. 19) and are accessed through the small cutout in the latch section of the handle. These are provided to disable the latch action of the handle.

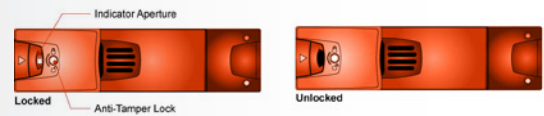


Fig. 19 - Anti-Tamper Lock

#### 1.4.5.3. MUX Transition Cards

SATA disk drive carriers are installed using an Active-Active (A/A) MUX Transition card, sometimes referred to as a dongle. The MUX Transition card is installed on the disk drive interface, and provides an interface to the drive plane. The Active-Active MUX Transition card allows both controllers to see each drive at the same time, therefore there is no concept of ownership.

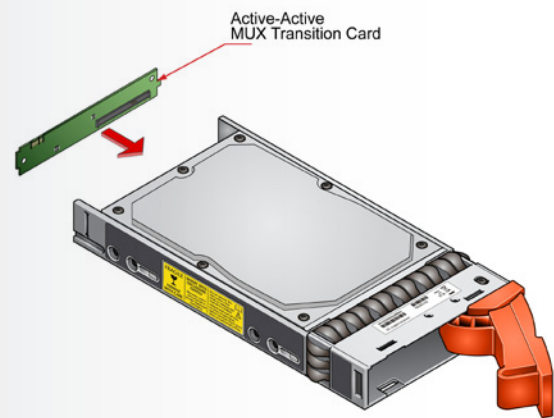


Fig. 20 - Drive Carrier Module with SATA Disk Drive and Active-Active MUX Transition Card

#### 1.4.5.4. Dummy Carrier Modules

Dummy Carrier modules are provided for installing in all unused drive slots. They are designed as integral drive module front cap and must be installed in all unused drive slots to maintain a balanced airflow.

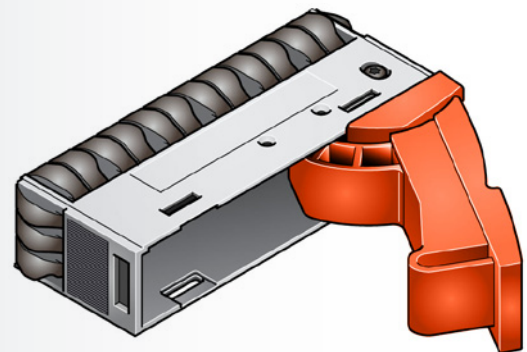


Fig. 21 - Dummy Drive Carrier Module

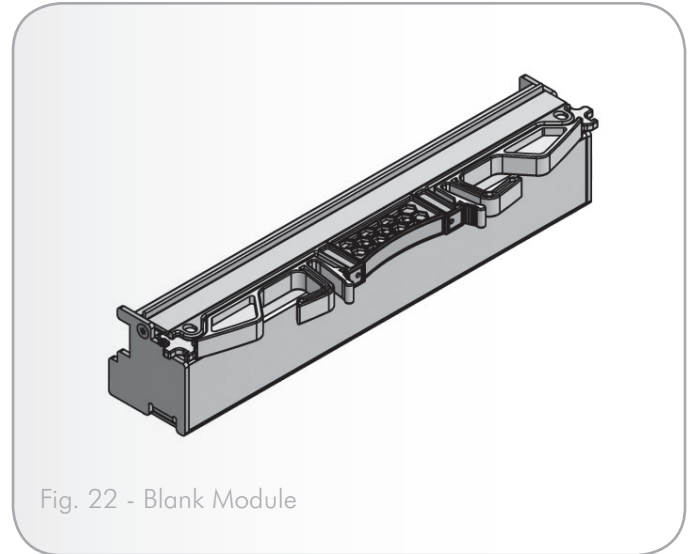
#### 1.4.6. Blank Modules

When only one RAID Controller module is installed (LaCie 12big Rack Fibre) or only one Disk I/O module installed (LaCie 12big Rack Fibre expansion), a Blank module must be installed in the vacant module bay at the rear of the enclosure to maintain airflow and ensure correct operation.

---

**CAUTION:** Operation of the enclosure with ANY modules missing will disrupt the airflow and the drives will not receive sufficient cooling. It is ESSENTIAL that all apertures are filled before operating the LaCie 12big Rack Fibre and LaCie 12big Rack Fibre expansion storage systems.

---





## 2. Getting Started

### 2.1. Introduction

In this chapter, you are shown how to install your 12big enclosure into an industry standard 19-inch rack cabinet, and install the plug-in modules and cable the enclosures for the desired configuration.

**CAUTION:** Use only the power cords supplied or those which match the specification quoted in section 7.5. AC Power Cords.

### 2.2. Planning Your Installation

Before you begin installation you should become familiar with the configuration requirements of your system and the correct positions of each of the plug-in modules.

Table 07 - Enclosure System Configuration

Module	Location
Drive Slots	ALL drive slots must have a drive carrier module or dummy drive carrier module installed; no drive slot should be empty.
Power Supply Modules	Two power supply modules must be installed. Full power redundancy is provided from one power supply while a faulty module is replaced. Install the power supply modules in the furthest two left hand rear bays.
Cooling Fan Module	Install in the rear center bay.
RAID Module (LaCie 12big Rack Fibre)	Two RAID Controller modules or one RAID Controller module plus one blank module can be installed. The modules are installed horizontally (stacked above each other) in the furthest right hand rear bays.
Disk I/O Module (LaCie 12big Rack Fibre expansion)	Two Disk I/O modules, or one Disk I/O module plus one blank module can be installed. The modules are installed horizontally (stacked above each other) in the furthest right hand rear bays.

**CAUTION:** Blank modules or Dummy Carrier modules MUST be installed in ALL unused bays or slots, otherwise there will be inadequate cooling if any are left open.

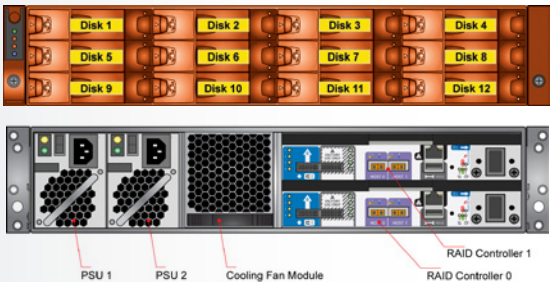


Fig. 23 - 12big fibre Enclosure Module Locations

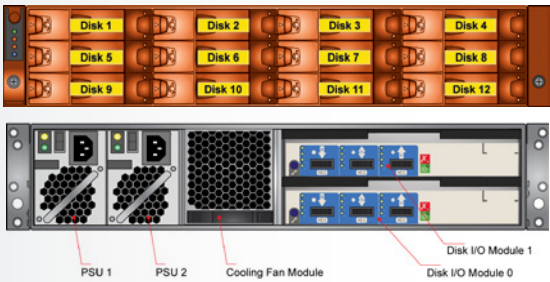


Fig. 24 - Expansion Enclosure Module Locations

## 2.3. Enclosure Installation Procedures

The following procedures describe the installation of an enclosure and highlights any critical corequisite requirements and good handling practices which we encourage you to follow so as to ensure that a successful installation is achieved in the safest manner.

---

**CAUTION:** Ensure that you have installed and checked a suitable anti-static wrist or ankle strap and observe all conventional ESD (electrostatic discharge) precautions when handling modules and components. Avoid contact with backplane components and module connectors, etc.

---

### 2.3.1. Preparation of Site and Host Server

Before you begin, make sure that the site where you intend to set up and use your 12big storage system has the following:

- ◆ Standard AC power from an independent source or a rack Power Distribution Unit with a UPS.
- ◆ A host computer with a standard FC HBA (host bus adaptor) with the latest BIOS and drivers. Follow the instructions provided with your HBA and install the HBA and its driver software.

---

**NOTE:** For Microsoft Windows Servers - Insert the Software and Manuals Disc, click the Pseudo LUN Driver (INF) button and following the on-screen installation instructions.

---

#### 2.3.1.1. Time-Out Issues

In many cases to resolve long time out issues with the host operating system, you will need to make adjustments to the SCSI time out registry values. For the most general cases a time-out value between 60 and 120 seconds should be fine, however in heavier workload cases a higher value 240 seconds should be set. For Windows platforms, the default is 60 seconds:

`HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services/Disk/TimeOutValue`

### 2.3.2. Rack Installation Pre-Requisites

The LaCie 12big Rack Fibre and LaCie 12big Rack Fibre expansion enclosure is designed for installation into an industry standard 19-inch cabinet capable of holding the unit.

- ◆ Minimum depth 700 mm (27.6 inches) from front flange to rear metalwork (excludes rear cabling).

- ◆ Weight: up to 32 kg (70 lb.) dependent upon configuration per enclosure.
- ◆ A minimum gap of 25 mm (1 inch) clearance between the rack cover and front of drawer; and 50 mm (2 inches) rear clearance between rear of drawer and rear of rack is recommended in order to maintain the correct air flow around the enclosure.
- ◆ The rack should present a maximum back pressure of 5 pascals (0.5 mm water gauge).

---

#### 2.3.2.1. Rack Mounting Rail Kit

A set of mounting rails is available for use in 19-inch rack cabinets ([Fig. 25](#)). These rails have been designed and tested to handle the maximum enclosure weight and to ensure that multiple 12big enclosures may be installed without loss of space within the rack. Use of other mounting hardware may cause some loss of rack space.

---

### 2.3.3. Unpacking the Enclosure System

The package contents and unpacking procedure are illustrated below. The Accessory Box contains the AC power cord(s), anti-tamper lock key, the Software and Manuals disc, and the adjustable rail slides and hardware parts for mounting in the rack cabinet.

### 2.3.4. Rack Installation Procedure

#### 2.3.4.1. Installation Procedure

**CAUTION:** Observe all conventional ESD precautions when handling LaCie 12big Rack Fibre and LaCie 12big Rack Fibre expansion modules and components. Avoid contact with backplane components and module connectors, etc.

**IMPORTANT INFO:** The enclosure when fully populated is very heavy (32 kg (70.4 lb.)). It is recommended that you use an assistant during the installation.

1. Remove the accessory kit and upper foam inserts from the shipping carton.
2. Using an assistant, lift the enclosure from the carton and place it on a stable surface. Remove the protective plastic wrapping and inspect for any obvious damage.
3. Remove the plug-in modules. This includes the disk drives, power supply modules, cooling fan module, and RAID Controller modules or Disk I/O modules (depending on which enclosure type). Refer to section [2.4. Module Removal & Installation](#) for instructions to remove the plug-in modules.

**NOTE:** You do not need to re-install the disk drives in the exact same order as they were shipped. However, if you have a mixture of SATA and SAS disk drives, ensure that you re-install the drives using the same drive type in each column. You cannot mix SATA and SAS drives in a vertical column of drive slots.

4. Place the empty enclosure chassis on a stable work surface.
5. Attach the left and right chassis slides to the enclosure sides using a total of 6 M3 x 4 button head screws (see [Fig. 26](#)), three each side. The front portion of the chassis slide has two tangs which insert into holes on the forward edge of the side panel.
6. Assemble the left and right chassis latches using the chassis latch screws. Ensure that the latch is orientated as shown in [Fig. 26](#), with the spring arm located against its stop. On the right hand this is at the top, on the left it is at the bottom.

continued on the next page >>

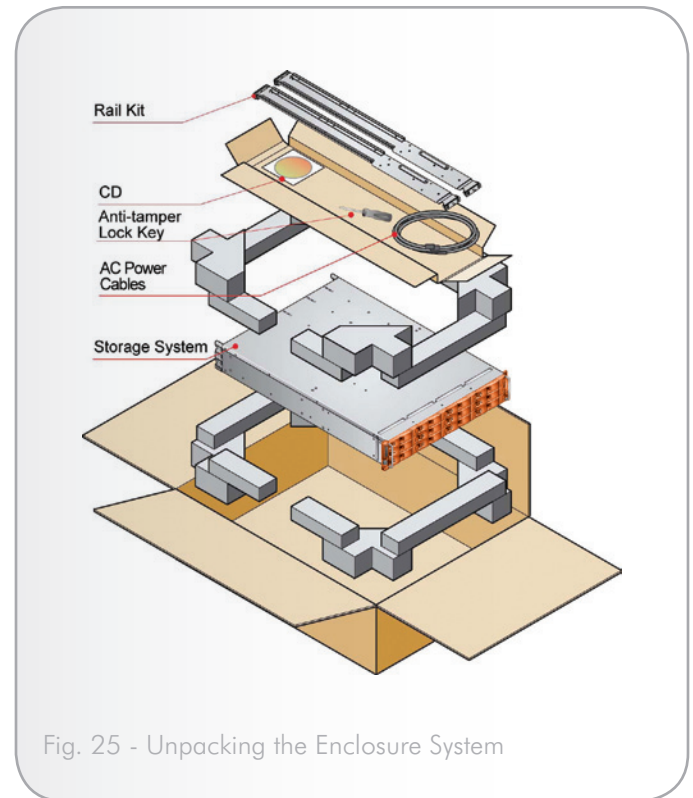


Fig. 25 - Unpacking the Enclosure System

7. Assemble the rack brackets to the rack posts as follows. The brackets are universal and will fit either side. (refer to [Fig. 27](#)):
  - a. Locate the guide pin at the rear of each bracket and insert the pin into a rear rack post hole.
  - b. Attach the bracket to the rear rack post using the washers and screws supplied. The screws
    - c. should be left loose.
    - d. b Extend the rail to fit between the rack posts.
    - e. c Attach the bracket to the front rack post using the washers and screws supplied. The screws
      - f. should be left loose.
    - g. d Tighten the two clamping screws located along the inside of the rear section of the rack bracket.

[continued on the next page >>](#)

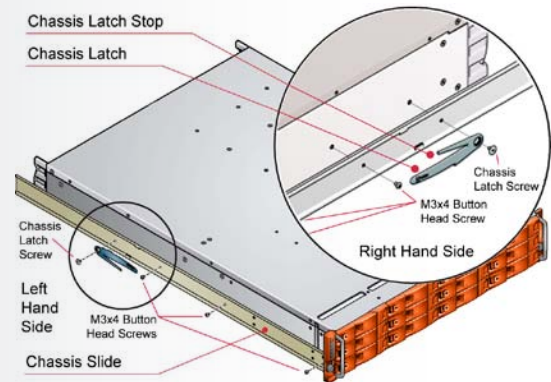


Fig. 26 - Securing Chassis Slides to Enclosure

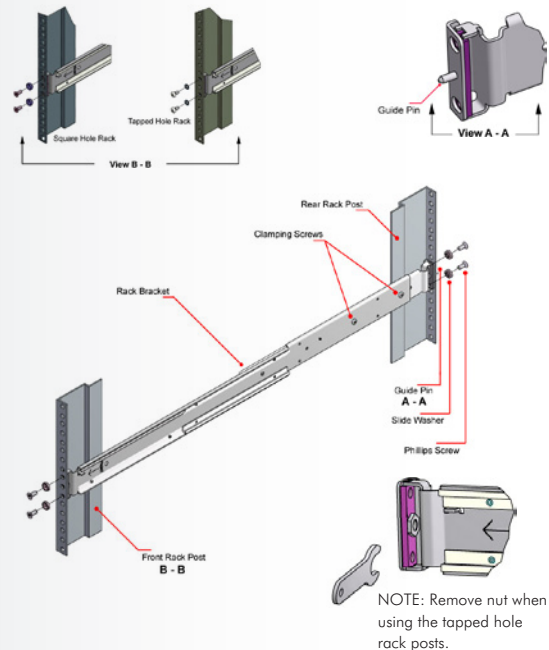


Fig. 27 - Securing Chassis Slides to Enclosure - Left Hand Assembly Shown

8. Mount the enclosure in the rack as follows (refer to [Fig. 28](#)):
  - a. Using an assistant, lift the enclosure aligning it with the rack rails and carefully insert the chassis slides into the rack rails.
  - b. Push the enclosure completely into the rack cabinet.
  - c. Tighten the rear rack bracket mounting screws. (Previously left loose.)
  - d. Withdraw the enclosure until it reaches the hard stops (approximately 400 mm (15.75 inches)).
  - e. Tighten the front rack bracket mounting screws, again, previously left loose.
  - f. Push the enclosure completely into the rack cabinet and attach to the front of the rack using the captive fasteners on the front flanges (located just outside of the handles).
9. Refer to section [2.4. Module Removal & Installation](#) for procedures to install the plug-in modules removed in preparation for the installation, then continue with section [2.4.6. Drive Carrier Module](#) to complete the installation.

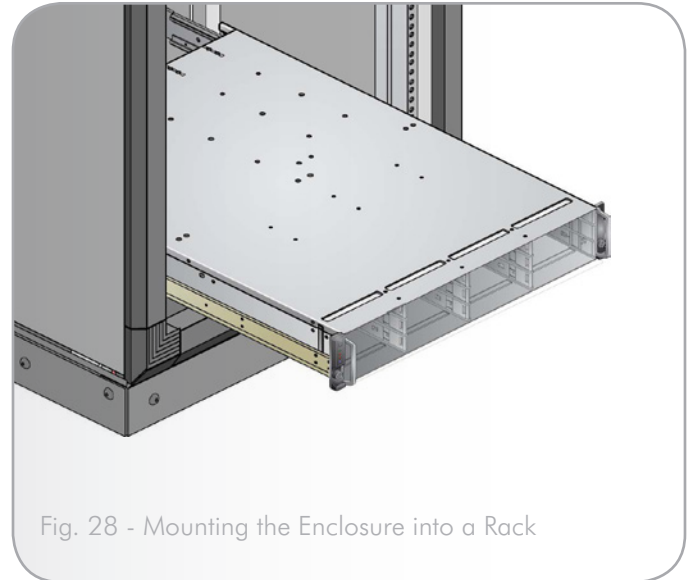


Fig. 28 - Mounting the Enclosure into a Rack

## 2.4. Module Removal & Installation

The LaCie 12big Rack Fibre and LaCie 12big Rack Fibre expansion enclosure is supplied fully populated with all plug-in modules installed. However, during installation it is strongly recommended to remove the plug-in modules in order to lighten the enclosure while the rail assemblies are installed and the enclosure installed into the rack cabinet. Afterwards, re-install the plug-in modules. The removal and installation procedures for each plug-in module are provided in this section.

### 2.4.1. Power Supply Module

#### 2.4.1.1. Removing the Power Supply Module

1. Push the latch, above the power supply handle, to the right, then grip the handle and pull the module out of the enclosure.

---

**CAUTION:** Do not remove the covers from the power supply. Danger of electric shock inside.

---

#### 2.4.1.2. Installing the Power Supply Module

1. Check for damage, especially to the rear connector on the power supply.

---

**CAUTION:** Handle the module carefully and avoid damaging the connector pins. Do not install the module if any pins appear to be bent.

---

2. Slide the module into the enclosure ([Fig. 30](#)).
  3. Continue to push the module until it fully seats. A click should be heard as the handle latch engages.
- 

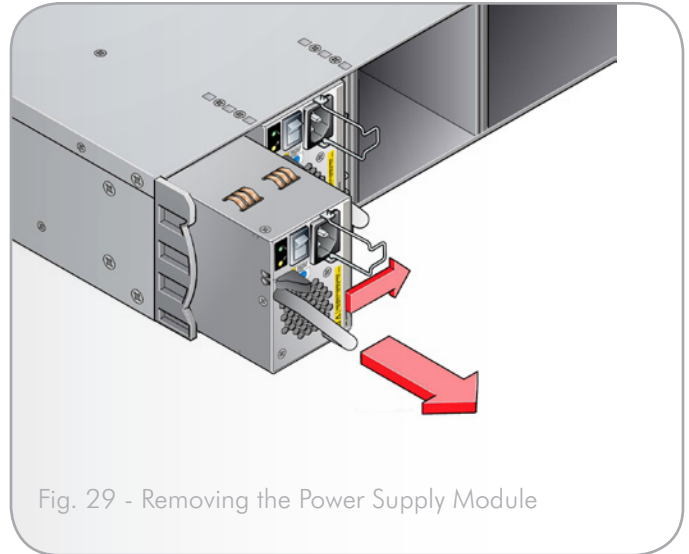


Fig. 29 - Removing the Power Supply Module

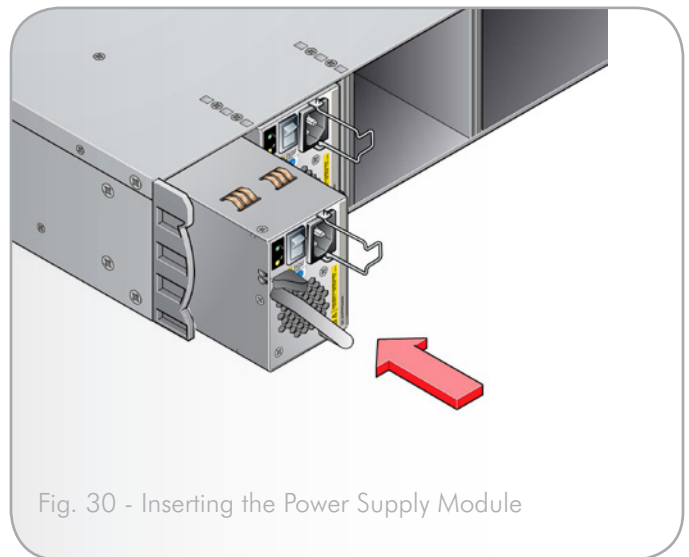


Fig. 30 - Inserting the Power Supply Module

## 2.4.2. Cooling Fan Module

### 2.4.2.1. Removing the Cooling Fan Module

1. Grasp the latch ([Fig. 31](#)) between your thumb and forefinger. Squeeze your thumb and forefinger together to release the latch.
2. Pull the latch outward to eject the module out of the enclosure.
3. Withdraw the cooling fan module completely from the enclosure.

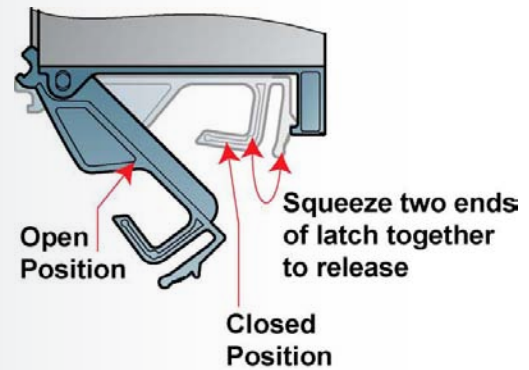


Fig. 31 - Cooling Fan Module Latch Operation

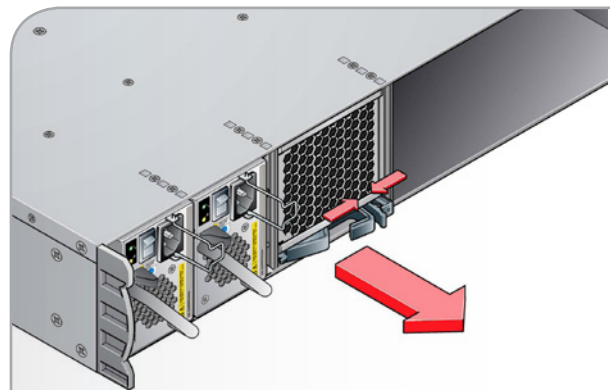


Fig. 32 - Removing the Cooling Fan Module



### 2.4.3. Installing the Cooling Fan Module

1. Check for damage, especially to the rear connector on the module.

---

**CAUTION:** Handle the module carefully and avoid damaging the connector pins. Do not install the module if any pins appear to be bent.

---

2. With the latch in the open position, slide the module into the enclosure until the latch engages.
  3. Secure the module by manually closing the latch. A click should be heard as the latch engages.
- 

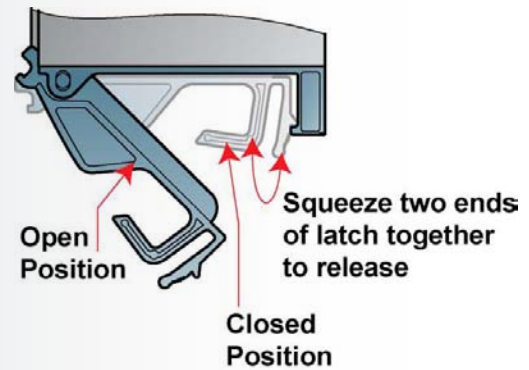


Fig. 33 - Cooling Fan Module Latch Operation

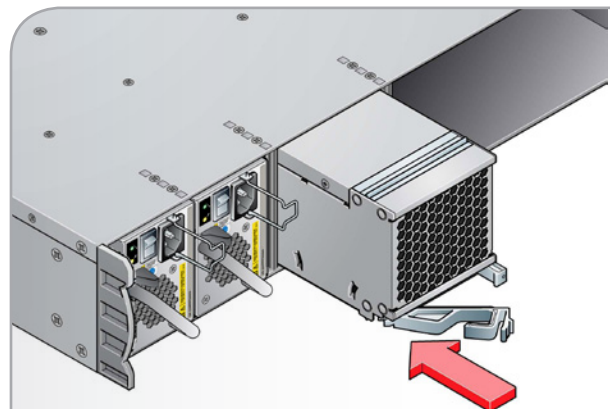


Fig. 34 - Inserting the Cooling Fan Module



## 2.4.4. RAID Controller Module

### 2.4.4.1. Removing the RAID Controller Module

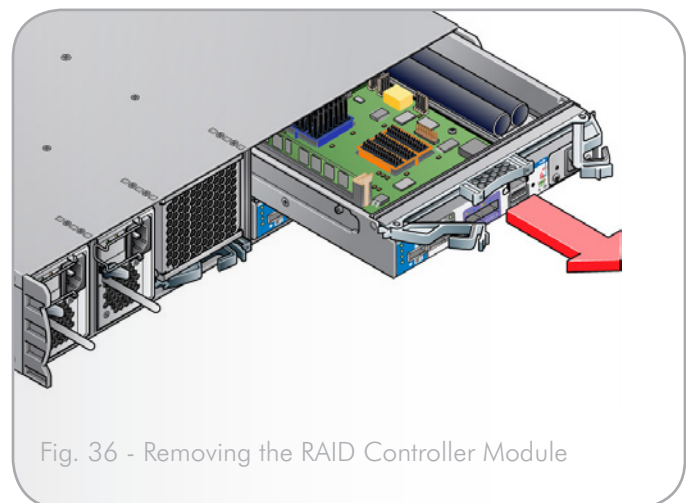
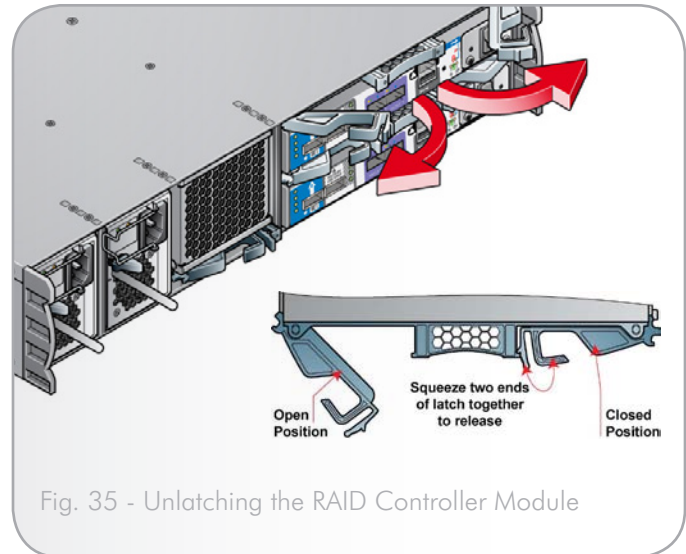
1. Using two hands, grasp each latch between your thumb and forefinger of each hand. Squeeze your thumbs and forefingers together to release the latches.

---

**CAUTION:** Handle the module carefully and avoid damaging the connector pins. Do not install the module if any pins appear to be bent.

---

2. Pull the latches outward to eject the module out of the enclosure ([Fig. 35](#)).
  3. Grip the latches as handles and withdraw the RAID Controller module ([Fig. 36](#)).
- 



#### 2.4.4.2. Installing the RAID Controller Module

The RAID Controller modules are installed into the bays located on the right hand side. If only one controller is installed, start with the lowest bay and install a blank module in the upper bay.

1. Check for damage, especially to the interface connector.

---

**CAUTION:** Handle the module carefully and avoid damaging the connector pins. Do not install the module if any pins appear to be bent.

---

2. With the latches in the open position (see Fig. 37), slide the controller module into the enclosure until the latches engage.
  3. Secure the module by manually closing the latches. A click should be heard as the latches engage.
- 

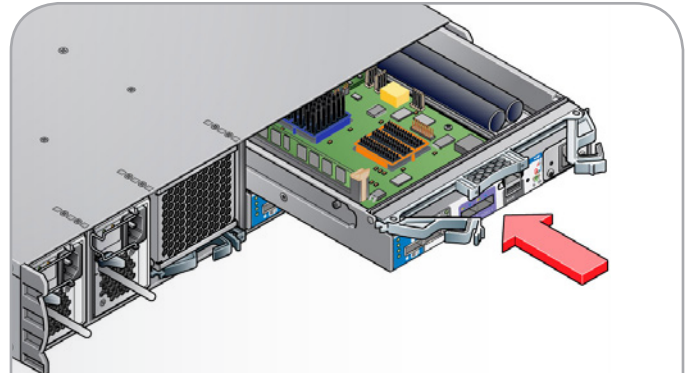


Fig. 37 - Inserting the RAID Controller Module

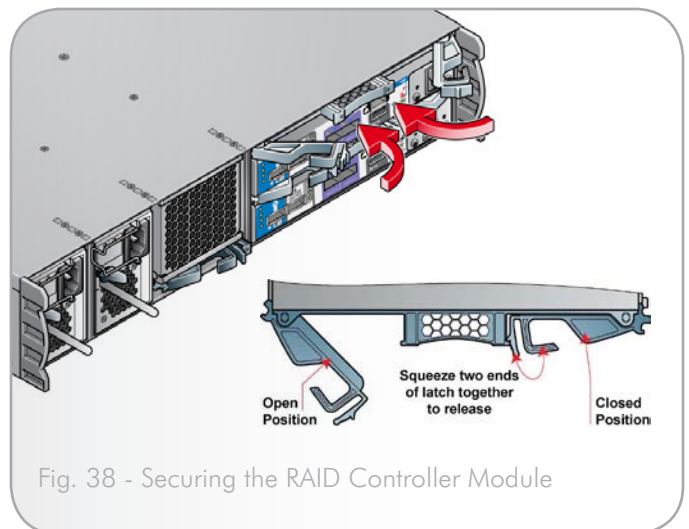


Fig. 38 - Securing the RAID Controller Module

## 2.4.5. Disk I/O Module

### 2.4.5.1. Removing the Disk I/O Module

1. Using two hands, grasp each latch between your thumb and forefinger of each hand. Squeeze your thumbs and forefingers together to release the latches.
2. Pull the latches outward to eject the module out of the enclosure ([Fig. 39](#)).
3. Grip the latches as handles and withdraw the module from the enclosure ([Fig. 40](#)).

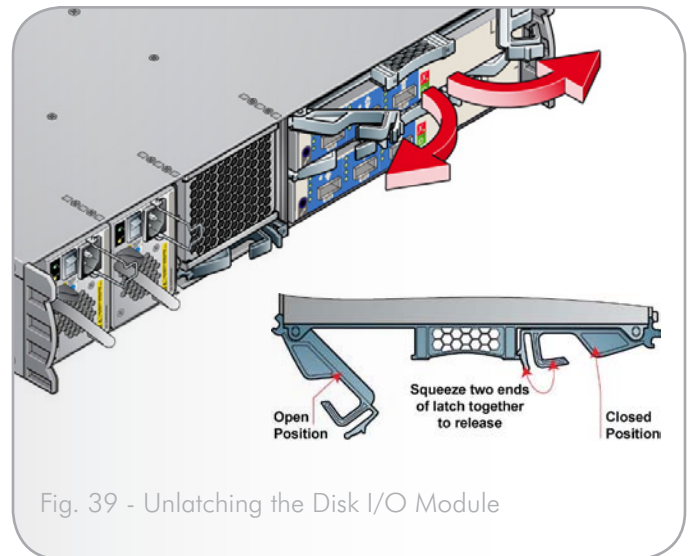


Fig. 39 - Unlatching the Disk I/O Module

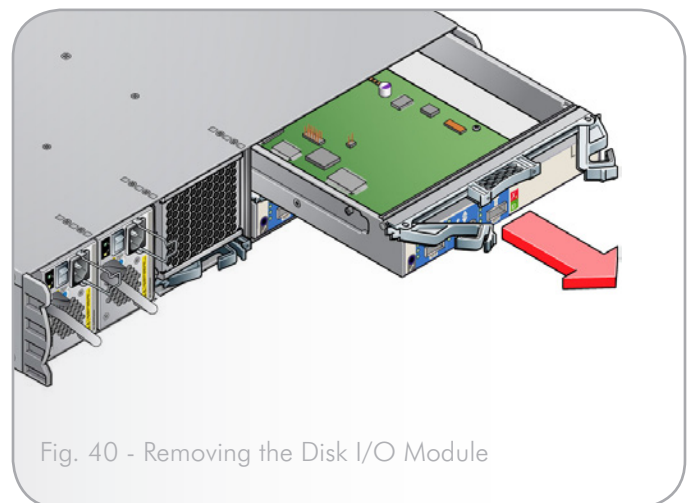


Fig. 40 - Removing the Disk I/O Module

#### 2.4.5.2. Installing the Disk I/O Module

Disk I/O modules are installed into the bays located on the right hand side. If only one is installed, start with the lowest bay and install a blank module in the upper bay.

1. Check for damage, especially to the interface connector.

---

**CAUTION:** Handle the module carefully and avoid damaging the connector pins. Do not install the module if any pins appear to be bent.

---

2. With the latches in the open position (see [Fig. 41](#)), slide the Disk I/O module into the enclosure until the latches engage.
  3. Secure the module by manually closing the latches. A click should be heard as the latches engage.
- 

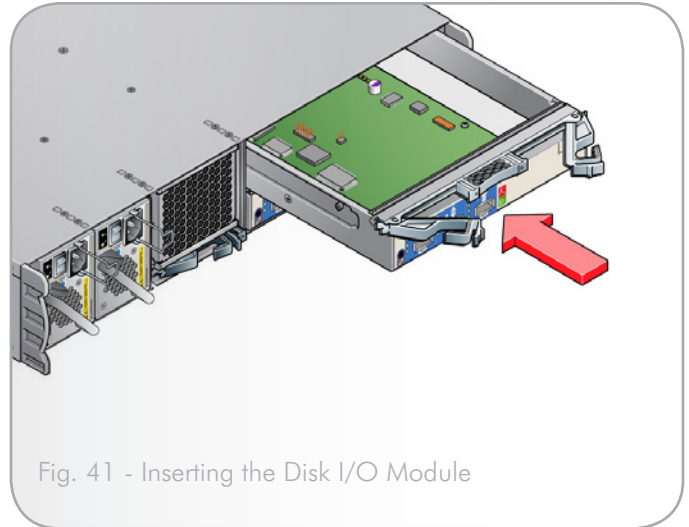


Fig. 41 - Inserting the Disk I/O Module

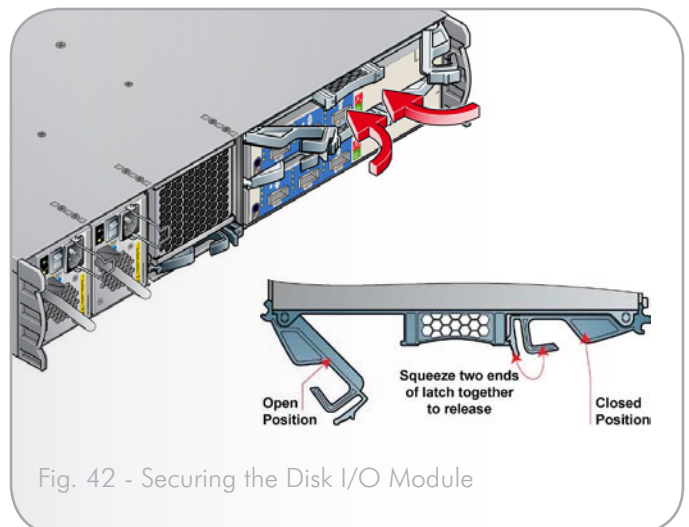


Fig. 42 - Securing the Disk I/O Module

## 2.4.6. Drive Carrier Module

Disk drives are shipped installed in the enclosure with the anti-tamper locks engaged. To ensure the drives are installed correctly and follow the prescribed rules, refer to section [2.8.1. Drive Location Rules](#).

### 2.4.6.1. Removing the Drive Carrier Module

1. If the anti-tamper lock is engaged, carefully insert the lock key provided into the cutout in the handle and into its socket.
2. Rotate the key in a counter-clockwise direction until the “red” indicator is not visible in the aperture beside the key.
3. Release the Drive Carrier module handle, by pressing the latch in the handle with your finger and rotating the handle towards the right ([Fig. 45](#)).
4. Gently withdraw the Drive Carrier module from the drive slot.
5. Repeat for the remaining disk drives.

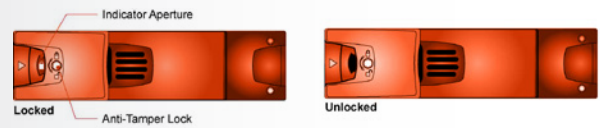


Fig. 43 - De-activating the Anti-tamper Lock

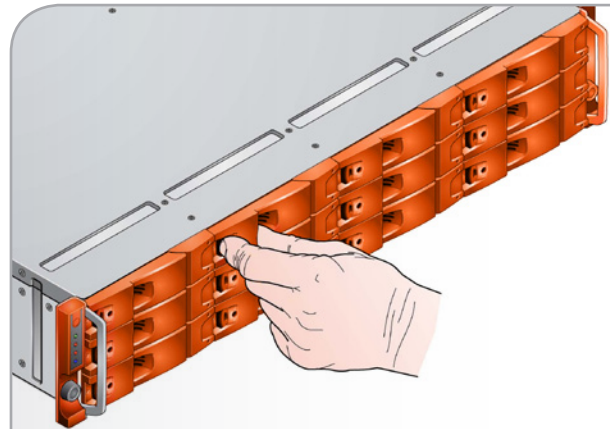


Fig. 44 - Unlatching a Drive Carrier Module

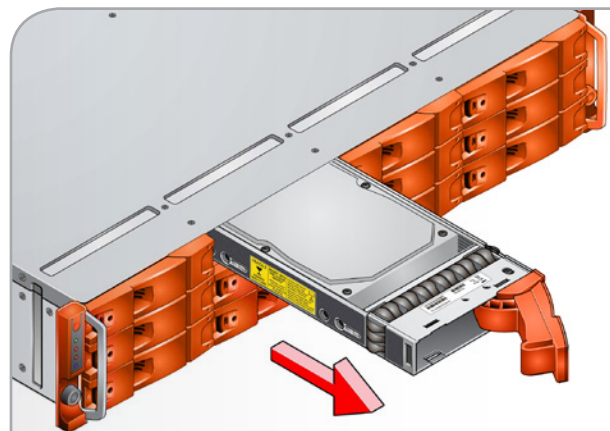


Fig. 45 - Removing a Drive Carrier Module

#### 2.4.6.2. Installing a Drive Carrier Module

**CAUTION:** All drive slots must be fitted with Drive Carrier modules or Dummy Carrier modules to maintain a balanced air flow.

**IMPORTANT INFO:** Ensure that the carrier is orientated so that the drive handle opens to the right.

1. Release the carrier handle, by pressing the latch with your finger and rotating the handle towards the right.
2. Insert the Drive Carrier module into an empty drive slot in the enclosure.
3. Slide the Drive Carrier module, gently, all the way into the enclosure until it stops and seat it by pressing with your thumb on the left edge of the module ([Fig. 47](#)).
4. Secure the drive carrier by closing the handle until it fully engages. A click should be heard as the latch engages and holds the handle closed ([Fig. 48](#)).

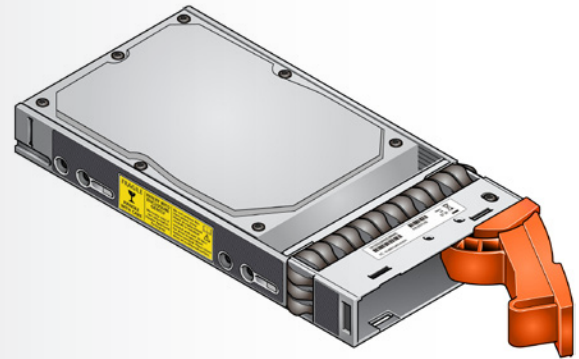


Fig. 46 - Drive Carrier Module with Handle Released

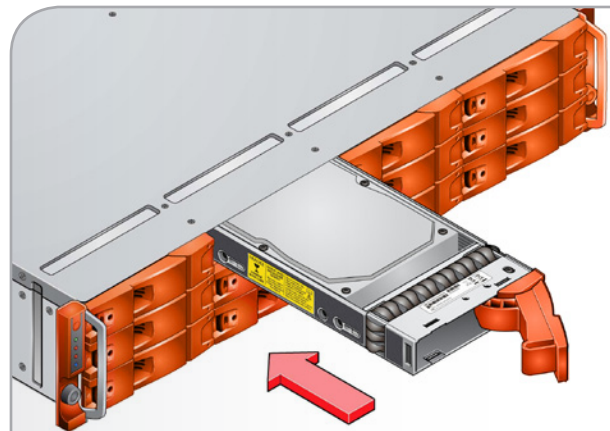


Fig. 47 - Inserting the Drive Carrier Module

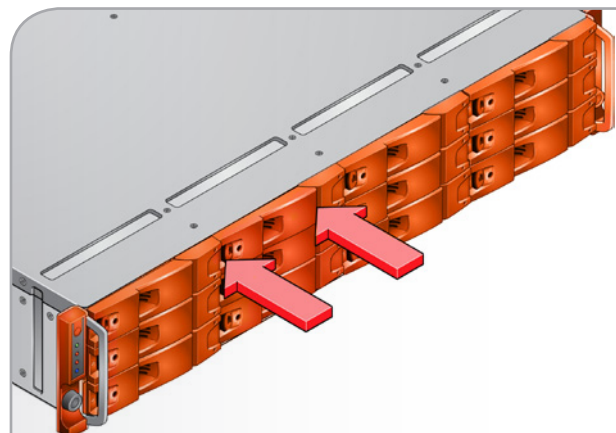


Fig. 48 - Securing the Drive Carrier Module



#### 2.4.6.3. Engaging the Anti-tamper Locks

The anti-tamper locks are fitted in the Drive Carrier handles and are accessed through the small cutout in the latch section of the handle. Drives are supplied with the locks set in the locked position.

1. Carefully insert the lock key provided into the cutout in the handle and into its socket.
2. Rotate the key in a clockwise direction until the “red” indicator is visible in the aperture beside the key.
3. Remove the key.

#### 2.4.7. SFP Transceiver Installation

1. Remove the dust cover from each of the SFP slots to be populated on the RAID Controller module.
2. Insert the SFP Transceiver into the SFP cage and push to seat it. Ensure the ejector is positioned to its stored location.
3. Connect your fiber channel data cables as needed. Refer to section [2.5. Cabling the Enclosures](#).

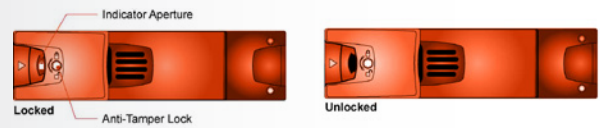


Fig. 49 - Activating the Anti-tamper Lock

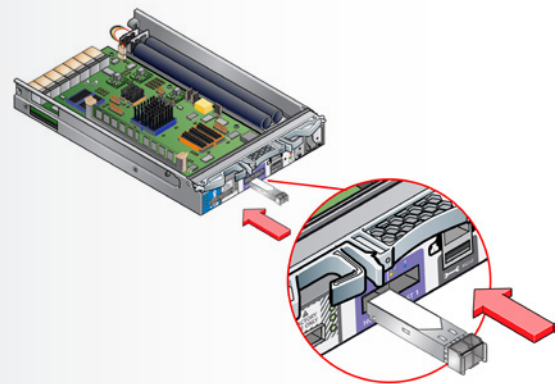


Fig. 50 - Installing the SFP Transceivers

## 2.5. Cabling the Enclosures

On the following pages there are illustrated examples of the supported cabling configurations.

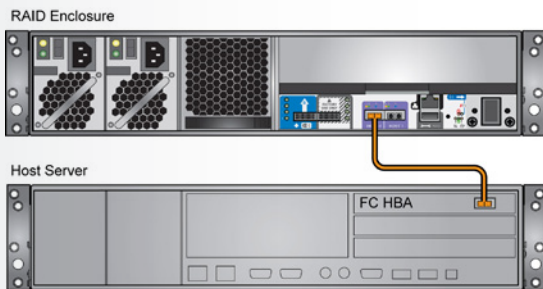


Fig. 51 - Single Host, Single HBA and Single Controller Connection

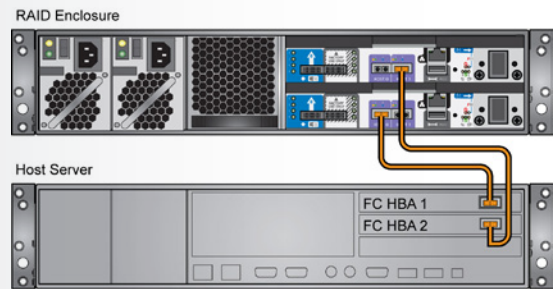


Fig. 53 - Single Host, Dual HBAs, and Dual Controller Connections

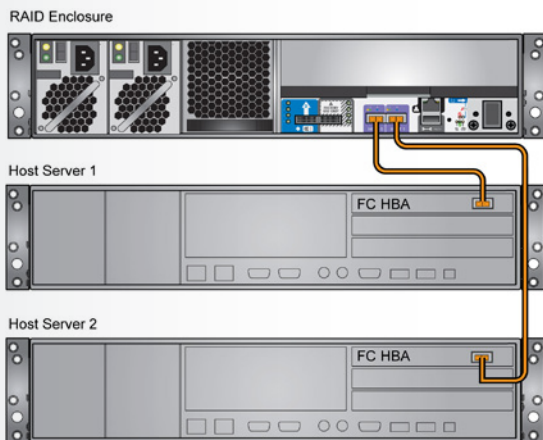


Fig. 52 - Dual Host, Single HBA, and Single Controller Connections

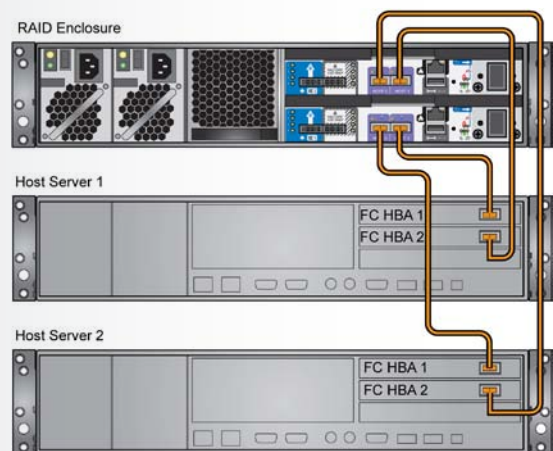


Fig. 54 - Dual Hosts, Dual HBAs, and Dual Controller Connections

[continued on the next page >>](#)



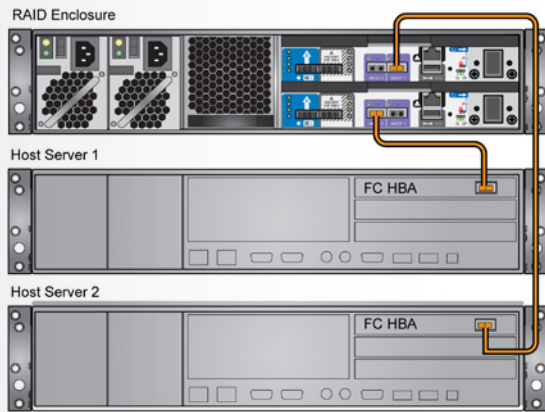


Fig. 55 - Dual Host, Single HBAs, and Dual Controller Connections

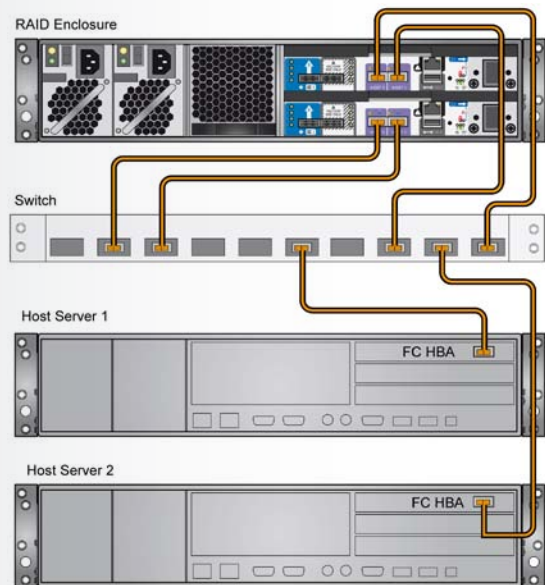


Fig. 56 - Dual Host, Single HBAs, and Dual Controller Connections (Switch)

## 2.6. Cabling Multiple Enclosures

Additional expansion enclosures, e.g. LaCie 12big Rack Fibre expansion, can be connected to a LaCie 12big Rack Fibre RAID enclosure to increase the number of drives to the maximum of 96 for SAS drives only and 60 with SATA or SAS/SATA mix. Multiple enclosures are connected together using mini-SAS patch cables, 0.5M, 1M, 2M, and 5M length cables are supported. A typical two expansion enclosure configuration is shown in [Fig. 57](#). To expand the illustrated example to the maximum number supported, continue to add LaCie 12big Rack Fibre expansion enclosures and cable them in the same manner as indicated.

## 2.7. Ethernet Connection

The controller can be connected to the network for out-of-band management and monitoring via the RJ45 10/100 BaseT Ethernet port using the embedded StorView Management module and software.

Ensure that the host computer is connected either directly to or via a switched LAN to the Ethernet port on the RAID Controller using a shielded Cat 5 cable.

---

**IMPORTANT INFO:** Only a shielded Cat 5 (or better) cable should be used for connection to the Ethernet port for EMC conformance.

---

## 2.8. Drive Slot Arrangement

Each enclosure has twelve drives which are referenced by their location as shown below. Drives are numbered by their slot.

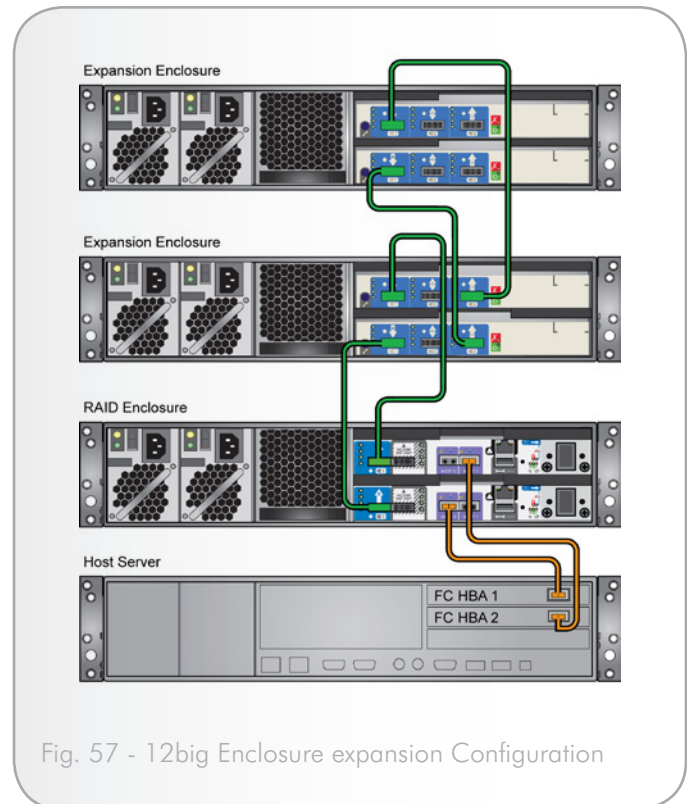


Fig. 57 - 12big Enclosure expansion Configuration

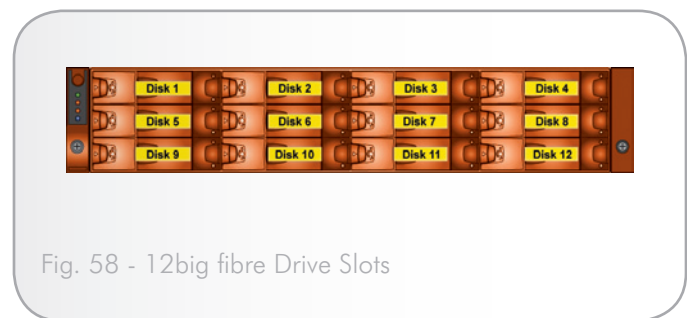


Fig. 58 - 12big fibre Drive Slots

### 2.8.1. Drive Location Rules

The 12big enclosure supports two different types of disk drives, SAS and SATA. In order to allow optimal configurations to be built, the following should be observed:

- ◆ Different drive types (i.e. SAS and SATA) cannot be mixed in the same column. You must populate a column using all the same drive types. (Fig. 59)
- ◆ For optimum performance drives should be populated in the following sequence order (Fig. 59):
  - Slots 2, 6 and 10 initially,
  - followed by slots 3, 7, 11
  - then slots 1, 5, 9
  - and finally slots 4, 8, 12

### 2.8.2. Drive Start

When power is applied to the power supplies, all drives will start immediately.

## 2.9. AC Power Cord Connection

1. Attach the power cords to the power supply modules, Lift the bale up, insert the power cord and place the bale over and onto the cord. Repeat for the other power supply.
2. Attach the power cord to the Power Distribution Unit (Fig. 61) in the rack or other power source.

**CAUTION:** Before applying power, carry out the grounding checks detailed in section 2.10. *Grounding Checks*.

**CAUTION:** The power connections must always be disconnected prior to removal of the Power Supply module from the enclosure.

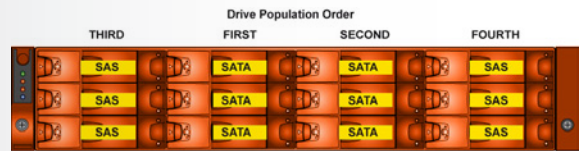


Fig. 59 - Drive Slots Population Order (Drive types [SAS/ SATA] shown are examples only)

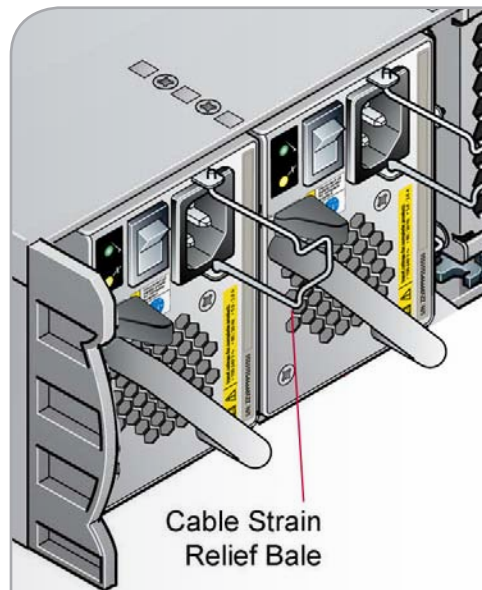


Fig. 60 - Cable Strain Relief Bales

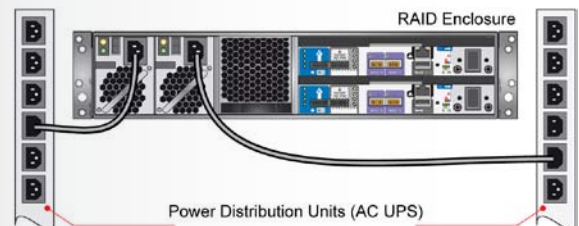


Fig. 61 - Power Cord Connections

## 2.10. Grounding Checks

Perform these checks to ensure that a safe grounding system is provided.

- ◆ If a Rack Distribution System is being used.
  - Ensure power is removed from the rack.
  - Connect the LaCie 12big Rack Fibre and LaCie 12big Rack Fibre expansion power cord to the rack distribution and the enclosure.
- ◆ If a direct connection is made with the LaCie 12big Rack Fibre and LaCie 12big Rack Fibre expansion power cord, ensure that it is connected to the enclosure.

---

**CAUTION:** Some electrical circuits could be damaged if external signal cables or power control cables are present during the grounding checks.

---

- ◆ Check for continuity between the earth pin of the IEC 320 connector on one of the Power Supply modules and any exposed metal surface of the LaCie 12big Rack Fibre and LaCie 12big Rack Fibre expansion enclosure.
- 

Servers installed on the same local and external subnet networks. It

incorporates a web server, Apache 2.0, that provides the interface between the StorView Server and GUI. During installation the web server is automatically configured. Please refer to the StorView

Storage Management Software RAID Module User Guide included on your disc.

---

## 2.11. Management Interfaces

The following software tools are provided and used to configure, manage and monitor the LaCie 12big Rack Fibre and LaCie 12big Rack Fibre expansion Storage Solution.

---

### 2.11.1. StorView Storage Management Software

StorView Storage Management software is a full-featured graphical HTML-based software suite designed to configure, manage and monitor the Storage Systems.

StorView provides the centralized local and remote management tool to control primary storage assets vital to ensuring maximum data reliability, network up-time, and system serviceability. It also allows you to manage and monitor the storage system from a host running StorView locally and from a web browser across the Internet or an intranet.

StorView Storage Management software comprise the StorView Server which runs as a background service and is responsible for managing the installed modules and a HTML-based front end interface which is accessed using a web browser.

The StorView Server discovers system storage devices, manages and distributes message logs, and communicates with other StorView

## 3. Operation

### 3.1. Before You Begin

Before powering up the LaCie 12big Rack Fibre and LaCie 12big Rack Fibre expansion enclosure please ensure that all the modules are firmly seated in their correct bays or slots.

### 3.2. Power On

**CAUTION:** Do not operate this equipment until the ambient temperature is within the specified operating range. If the drives have been recently installed ensure they have had time to acclimatize before operating them. Refer to section [6.5. Environment](#).

**NOTE:** Please refer to section [4.2.3. OPS Panel LEDs](#) for details of the OPS panel LEDs and related fault conditions.

1. Ensure that power is applied to the power distribution units.
2. Apply AC power to the enclosure(s). Press the power supply switches to the ON position. Repeat for each power supply module.
3. All LEDs on the OPS panel should be illuminated when the enclosure power is activated.

During startup, the System Fault LED will flash for a second then go out, the remaining LEDs will continue to stay illuminated until the system comes ready. Then with all systems normal, only the Power On LED will remain illuminated.

**NOTE:** The exception to the above LED states would be if only one power supply is working or one fan has failed, then the System Fault LED will remain illuminated or a fault with a disk array or logical drive, and impacted array will cause the Logical Fault LED to remain illuminated.

4. Power on your host system.

**IMPORTANT INFO:** If power is lost for any reason, upon restoration of power the enclosure will re-start automatically. Under normal conditions the Power On LED should be illuminated green on the Power Supply modules. While the RAID Controllers and Disk I/O modules (if used) complete their boot sequence, the Cooling Fan Fault LED will be illuminated.

### 3.3. Starting the Drives

The drives in the RAID enclosure will automatically start and begin to spin up when power is applied to the enclosure.

If this does not occur, one of the following conditions may exist:

- ◆ There may be a power problem (note an alarm and Power Fault LED are active).
- ◆ A defective disk drive.

---

#### 3.3.1. Disk Drive LEDs

Each drive carrier incorporates two indicators, an upper (GREEN) and lower (AMBER).

- ◆ In normal operation the green LED will be ON and will flicker as the drive operates.
- ◆ The amber LED will be OFF In normal operation. It will only be ON if there is a drive fault, during drive spin up, and during drive identification.
- ◆ If the green LED is OFF when the amber LED is ON, a power control circuit failure is indicated.

---

### 3.4. Starting StorView

When the RAID Controller starts up, the embedded StorView software will examine the user Preferences Settings to determine if a configured IP address exists. If one is defined, it will initialize the network interface using that IP address. In the event an IP address is not defined, it attempts to get a DHCP IP address. You may need to contact your network administrator for the IP address assigned by the DHCP server. To identify the new IP address lease, one can look for 'esv0' or 'esv1' in your DHCP Manager software. If the address was not previously assigned, refer to the "Initial Setup" section below for instructions.

---

### 3.5. Embedded StorView Initial Setup

If this is the first startup of the embedded StorView module, you will need to configure the network settings for each embedded module on each RAID Controller. Both a Windows based wizard or a Linux command line interface configuration tool is provided. Refer to [3.5.1. Setting up the Embedded StorView Module: Microsoft Windows](#), [3.5.2. Setting up the Embedded StorView Module: Linux](#), or [3.5.3. Setting up the Embedded StorView Module: Mac](#).

The StorView embedded module supports both DHCP and manual

network settings. By default the embedded module will look for a DHCP server to obtain an IP address. If one is not found, it will search to determine if an IP address had been previously assigned. If an address was not previously assigned, then the system defaults to an IP address of:

- 10.1.1.5 for the lower RAID Controller (Controller 0)
- 10.1.1.6 for the upper RAID Controller (Controller 1)
- 10.1.1.7 if an error is detected
- Subnet Mask is 255.0.0.0

A tool is provided to configure new embedded modules. From Windows platforms it is accessed via the embedded link on the disc navigation menu and on Linux it is accessed via a command line executable.

When the embedded StorView Setup program is run, it will broadcast UDP packets and any embedded StorView module will reply with UDP packets containing their information. A list of "uninitialized" systems is displayed. Uninitialized systems are those which have not had the default user name and password changed. Even if a configuration is created with arrays and logical drives but the login name and password have not been changed, it will still be considered an uninitialized system. During the process of configuring an embedded module, you will be required to enter a "new" password and confirm that password. The default login is "admin" and default password is "password."

The embedded module is identified by its MAC and IP address. It may be more helpful during setup to configure one embedded module at a time. You will find the MAC and IP address by accessing the VT-100 RAID Configuration Utility, selecting **Diagnostics** then choosing **StorView Embedded Module Support**. Select **Enter StorView Embedded Module Menu Mode** and choose **View Network Settings**.

---



### 3.5.1. Setting up the Embedded StorView Module: Microsoft Windows

1. Insert the Software and Manuals CD into your CD drive. the autorun program will automatically start the navigation menu
2. Click the LaCie Discovery Agent to begin the configuration.
3. You are presented with a Welcome screen with instructions to proceed. Review the information.
4. Click the Next button and the wizard will begin searching for Embedded StorView Modules.

Those Embedded Modules with their default passwords intact are considered an Uninitialized System and will be displayed with their MAC address in the Uninitialized Systems window (Fig. 64).

5. From the Uninitialized Systems screen, select the MAC address of the Embedded Module you wish to configure.

If you wish to use a DHCP server to assign your IP address, click the check box "Use DHCP."

If you wish to manually configure your network setting, enter the correction information in the appropriate fields.

Enter a "new" password and enter the new password confirmation. Click the Configure button.

continued on the next page >>

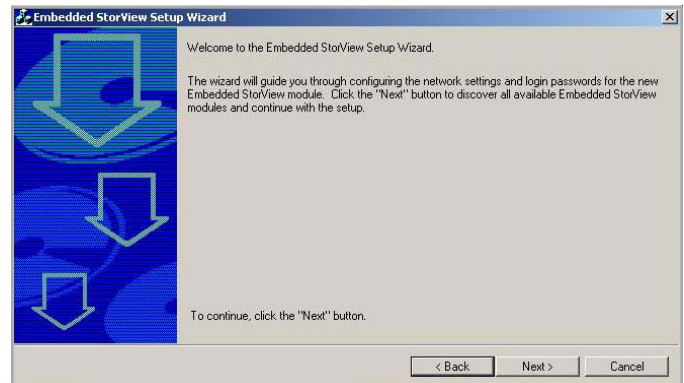


Fig. 62 - Welcome Screen

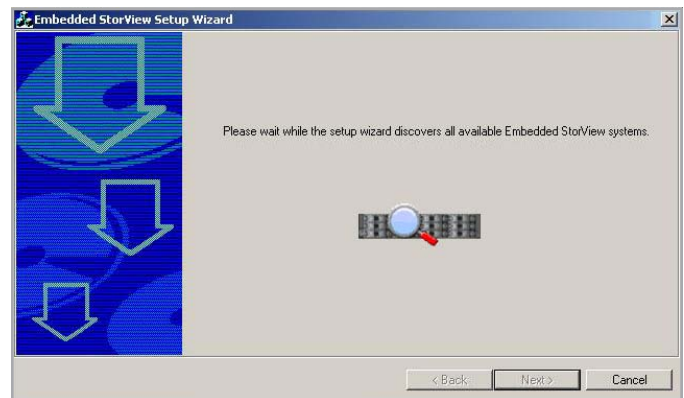


Fig. 63 - Search Screen

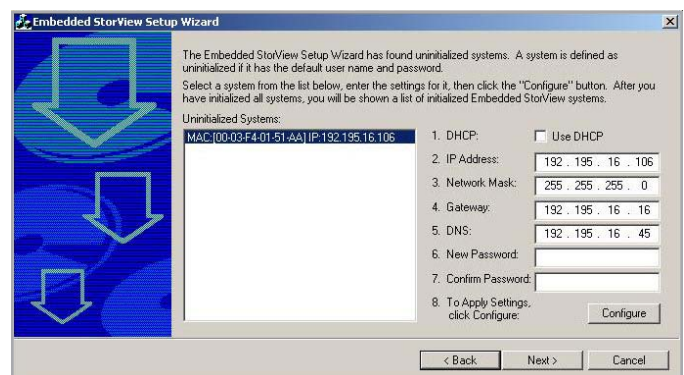


Fig. 64 - Uninitialized Systems Screen

- If you have additional Uninitialized Systems, select the next MAC address and choose the appropriate settings from the previous step.

Once you have completed configuring all the Uninitialized Systems and have clicked the Configure button, the wizard will display a popup message indicating all systems have been configured. It will then re-scan for any Uninitialized Systems and if none are found, you will be taken to the Initialized Systems screen (Fig. 65).

However, if you wish to only configure one Uninitialized System, the one you are configuring, and choose not to configure any other discovered Uninitialized System, click the Next button. The following prompt will appear. Click the YES button to continue or NO to cancel and return to the Uninitialized Systems screen.

**NOTE:** If someone plugs in a uninitialized module system to the network (same subnet mask) during the time of the rescan or resets a system's password back to the defaults, you will be taken to the Uninitialized System screen again.

- Select the MAC address of the Initialized System you wish to start and click the Launch button.
- Your default web browser will open with a login screen. Enter the login name and password, then click OK. StorView will open in the browser at the Main screen.

**NOTE:** If you are finished starting up Embedded Modules, be sure to select the active Embedded StorView Setup Wizard window in the Windows Task Bar and click the Close button.

### 3.5.2. Setting up the Embedded StorView Module: Linux

- Log in as "root."
- Insert the Software & Manuals Disc into your CD drive.
- Change directories to the software location. Type:  
`cd [CDROM mount point path]/software/storview/embedded`
- Execute the Embedded StorView Setup Tool. From the command prompt, type:  
`./esvsetupcl-linux`  
Embedded StorView Setup Tool. v1.0  
Entering Menu Mode.
- Follow the on screen prompts. When requested, enter the default login information:  
Login: `admin`  
Password: `password`
- At the conclusion of the setup you will be instructed on how to proceed.



Fig. 65 - Request to Proceed Window



Fig. 66 - Initialized Systems Screen



### 3.5.3. Setting up the Embedded StorView Module: Mac

StorView is started by launching your web browser and entering the IP address of the local host or the embedded module followed by ":9292." For more information, refer to the StorView Storage Management Software User Manual.

Also, for information regarding Secure Web Proxy, refer to the StorView Storage Management Software User Manual.

1. Directly connect the Ethernet cable from the host computer's Ethernet port to the Ethernet port of the lower controller on the 12big fibre. You can use either a straight or crossed RJ45 cable.
2. Open a Safari browser window (Fig. 67).
3. In the address field, type in the following (Fig. 68):  
<http://10.1.1.5:9292>
4. login: [admin](#)  
password: [password](#)
5. Wait for a few seconds to be directed to the embedded Storeview module and to start managing your storage (Fig. 70).
6. Access the embedded StorView GUI.
7. You are now connected to the embedded Storeview GUI (Fig. 71).

From this page, you can set a fixed IP address, which will allow you to monitor your storage from any workstation located on your LAN by entering the fixed IP address together with the 9292 port number.

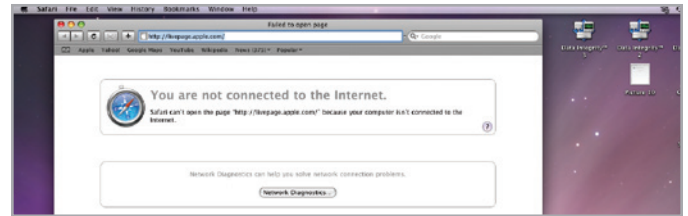


Fig. 67 - Mac Screen: New Browser Window

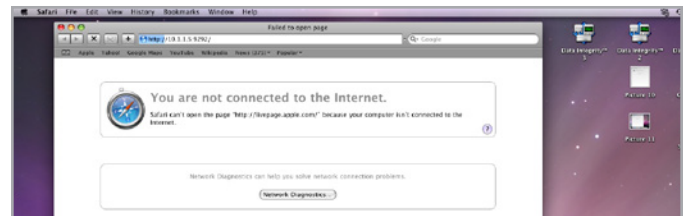


Fig. 68 - Mac Screen: Entering IP Address

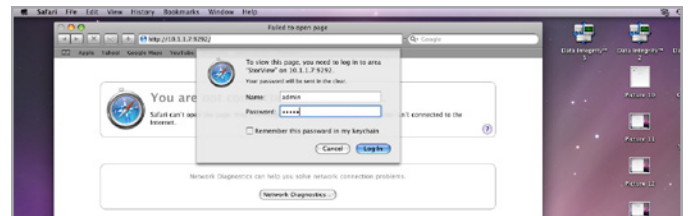


Fig. 69 - Mac Screen: Logging In

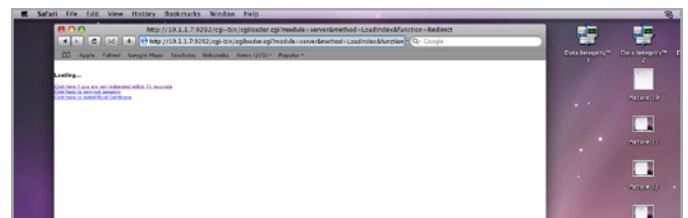


Fig. 70 - Mac screen: Loading

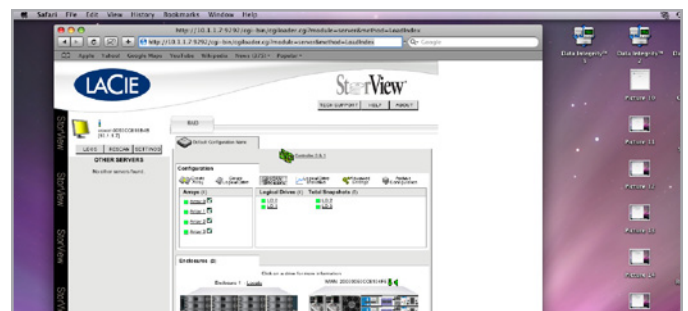


Fig. 71 - Mac Screen: Logged In

### 3.6. Power Down

The enclosure can be powered down at any time and if writeback cache contents are present, the contents will be preserved by the internal backup battery. However, you should not power down the RAID Controller(s) if there is I/O activity in progress.

If the enclosure is left in powered off state for an extended period, the batteries will discharge and the cached data will be lost. If the backup battery is allowed to discharge, upon power up the writeback cache will be disabled; however once the battery is recharged, writeback cache is automatically reenabled.

To ensure that the cache is flushed to disks, stop all host I/O operations from the applications. Allow sufficient time for the controller to write the cache data to the drives. This will prevent the battery from being discharged.

1. From the StorView main screen, click the Controller icon. The Controller Information screen appears, where you will click the Shutdown button under that controller's column. If dual controllers are in use or installed be sure to click the Shutdown button under each controller. This will provide a graceful shutdown for the RAID Controllers.

---

**NOTE:** You may also perform a graceful shutdown of the controllers from the VT-100 RAID Configuration Utility. As both interfaces support this feature.

---

2. Once the system has completed its shutdown, power down the enclosures by switching the power supply switches to the OFF position. To completely isolate power from the enclosure, disconnect the power cords.
-

## 4. Troubleshooting & Problem Solving

### 4.1. Overview

LaCie 12big Rack Fibre and LaCie 12big Rack Fibre expansion enclosures include a processor, and associated monitoring and control logic to enable them to diagnose problems within the enclosure's power, cooling, RAID Controller or Disk I/O modules, and drive systems. If a fault is indicated on the OPS panel, please refer to Table 5–3 for descriptions of each LED and the possible causes.

---

#### 4.1.1. Troubleshooting using StorView

The StorView Storage Management software is a great tool that can be used to select and determine whether a component or subcomponent is faulty or a configuration has an issue. This information is displayed in a couple ways:

- ◆ The graphical interface depicts real-world representations of the enclosures, components, arrays, logical drives, etc.
- ◆ The event log provides a plain language interpretation of events that have or are occurring, which helps identify and isolate problems.
- ◆ Mouse over information, by positioning the mouse pointer over a component of the interface, it will indicate status and relevant data.

Refer to the StorView Storage Management Software - RAID Module user guide for more details. The Events chapter provides a list of each event categorized by the general type and sorted by the ID number of the event. For each event, it then provides a possible reason for the concern and possible solutions.

---

#### 4.1.2. Initial Start-up Problems

##### 4.1.2.1. Faulty Connections

First check that you have cabled the subsystem correctly. Then, if a power cord or host cable is missing or damaged contact your supplier for a replacement.

---

#### 4.1.2.2. Alarm Sounds On Power Up

Please refer to Section [4.3. Audible Alarm](#).

#### 4.1.2.3. Controller OK LED Not Illuminated

If the controller is not completing its boot sequence, consider the suggestions below to remedy the situation: (Symptoms of failing to boot are: monitoring the boot sequence via the VT-100 interface shows the process halted, OPS panel Blue Identity LED still illuminated, and cooling fan motors will remain at the highest speed and do not step down to a lower RPM.)

- ◆ Check that the cables are properly connected.
- ◆ Try power cycling the RAID Controller by removing and re-inserting the suspect controller.
- ◆ If the “Fault LED” is also illuminated, there are a few steps you may take to attempt to diagnose the problem:
  - Connect the serial communication cable from the Controller’s RS232 port and to your host COM port or terminal. From a terminal window, access the RAID Configuration Utility software and examine the boot sequence for possible errors. Refer to the VT-100 RAID Configuration Utility User Guide.
- ◆ If all the LEDs on the RAID Controller are illuminated the controller has most likely failed. Contact your supplier for technical support.
- ◆ If you are still unable to capture and examine the boot sequence to determine the cause, contact your supplier for technical support and/or a possible replacement.

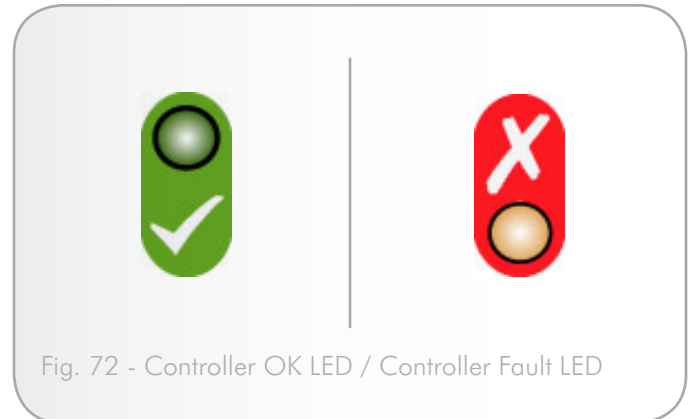


Fig. 72 - Controller OK LED / Controller Fault LED

#### 4.1.2.4. Host Computer Does Not Recognized Enclosure

1. Check that the interface cables from the RAID Controller to the host computer are installed correctly.
2. Check that all drive carrier modules have been correctly installed and that the LEDs on all installed drive carrier modules are illuminated green.
3. Check that there is a valid FC-AL signal present at the controller’s connector by observing the state of Link Speed LEDs: Blue = 4 Gbps, Green = 2 Gbps, and Yellow = 1 Gbps (see [Fig. 11](#)).

The LED will be steady when there is a valid signal but no I/O activity and will flash when there is I/O activity. The LED will be extinguished when there is no valid signal.

4. Check that the maximum cable length have not been exceeded. The fibre channel cable supported lengths are 2m, 3m, 5m, 50m. The mini-SAS cables supported lengths are .5m, 1m, 2m, and 5m.

## 4.2. Status Indicators (LEDs)

- ◆ LEDs flashing green or flashing amber indicate that non-critical conditions exist.
- ◆ Steady amber LEDs indicate there is a critical fault present within the module.

### 4.2.1. Power Supply Module LEDs

The Power Supply module LED states are detailed in the table below.

- ◆ Under normal conditions the Power On LED should be illuminated steady green.
- ◆ If a problem is detected in the module, a steady amber Fault LED will be illuminated.

Table 08 - Power Supply LEDs

Power On LED (Green)	Module Fault LED (Amber)	Status
OFF	OFF	No AC power source is being supplied to either power supply.
OFF	ON	No AC power source is being supplied to this power supply.  OR  The power cord is attached to the power source, but the power supply switch is in the OFF position.  OR  Power supply fault is occurring such as over-temperature warning, over-voltage warning, over-current warning, or a power supply fan has failed.
ON	OFF	AC power source is present, the power supply is on and operating normally.
ON	ON	A fan fault in the power supply has occurred.

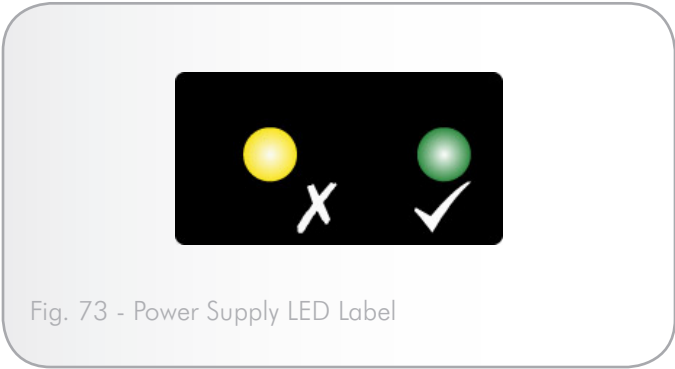


Fig. 73 - Power Supply LED Label

4.2.2. Cooling Fan Module LED

The Cooling Fan module incorporates an amber Fault LED, described in the table below.

**NOTE:** During the power up sequence, the Cooling Fan Module Fault LED will be illuminated until the RAID

Controllers have completed their boot up cycle. This also applies to the expansion enclosure except in this case the Disk I/O modules must complete their boot cycle before LED is extinguished.

Table 09 - Cooling Fan Module Fault LED

Fault LED (Amber)	Status
OFF	Fan OK.
ON	One or more fans have failed.  OR  The RAID Controller or Disk I/O module has not completed the boot sequence.

4.2.3. OPS Panel LEDs

The OPS panel displays the aggregate status of all the modules.

**NOTE:** The OPS panel is supplied as an integral part of the enclosure core product and is not user replaceable.

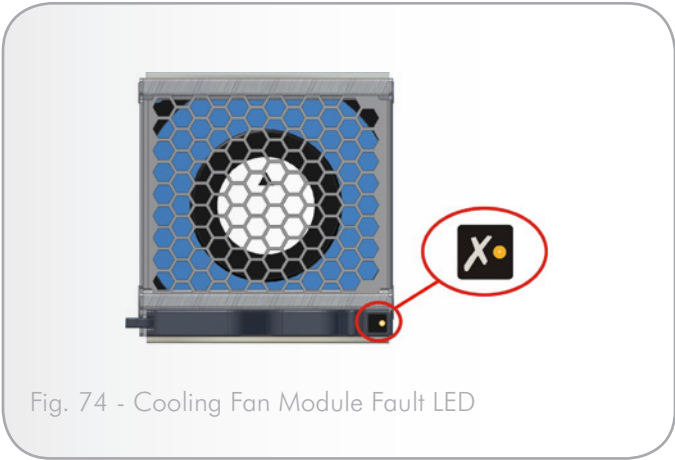


Fig. 74 - Cooling Fan Module Fault LED

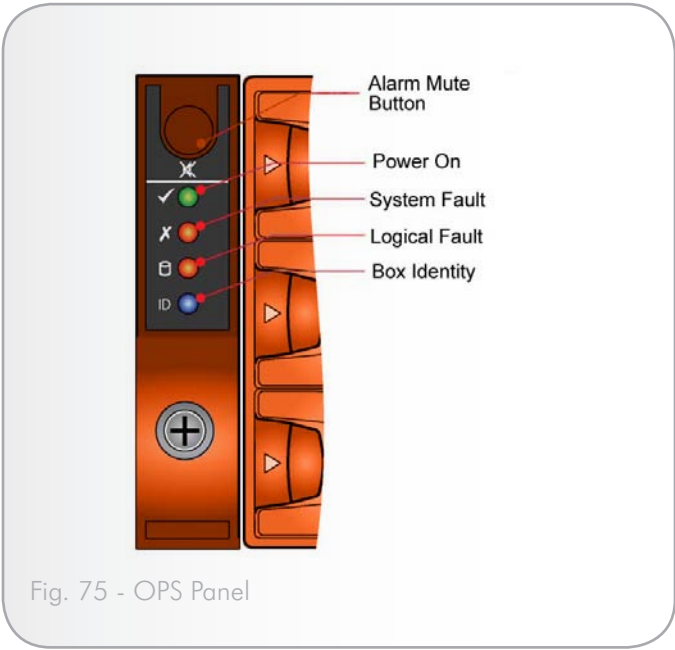


Fig. 75 - OPS Panel

#### 4.2.4. Alarms (Audible and Visible)

Table 10 - OPS Panel LED States

OPS Panel LEDs				Other Associated LEDs or Alarms	State Description
Power On (Green/ Amber)	System Fault (Amber)	Logical Fault (Amber)	Box Identify (Blue)		
ON	OFF	OFF	X		Aux present, overall power failed or switched off.
ON	ON	ON	ON	Single beep, two double beep	OPS Panel power on (5s) test state
ON	OFF	X	X		Power On, all functions good
ON	ON	X	X	PSU Fault LED or Cooling Module Fault LED	Any PSU Fault or Fan Fault Over or Under temperature
ON	ON	X	X	RAID Controller Fault LED on lower controller	ESI processor/RAID Controller 0 failed
ON	ON	X	X	RAID Controller Fault LED on upper controller	ESI processor/RAID Controller 1 failed
ON	Flashing	X	X	RAID Controller Fault LED	Unknown (invalid or mixed) module type installed, or  12C Bus Failure (inter ESI processor).
ON	Flashing	X	X	PSU Removed	PSU removed when two were present at Start of Day
ON	X	OFF	X		Power On, all functions good
ON	X	ON	X	Array in failed or degraded state	Drive failure has occurred causing loss of availability or redundancy.
ON	X	Flashing	X	Arrays in impacted state	Arrays performing background function
X	X	X	ON		SES controlled enclosure identify.

continued on the next page >>

12big enclosures include an Audible Alarm which indicates when a fault state is present. The following conditions will activate the Audible Alarm:

- ◆ Fan Fault or Failure (single or dual)
- ◆ Voltage Out Of Range
- ◆ Over Temperature
- ◆ Thermal Overrun
- ◆ System Fault
- ◆ Logical Fault
- ◆ Power Supply Fault
- ◆ Removal Of One Power Supply module

When the audible alarm sounds, it may be muted by pressing the Alarm Mute push-button which is incorporated in the enclosure front panel.

Some critical error conditions such as: enclosure temperature exceeded upper limit, more than one fan failure, and controller temperature failure, the alarm will sound continuously. You cannot mute these alarms.




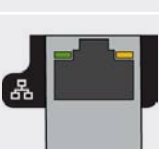
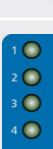
Some conditions that are not as critical will provide an intermittent alarm. These conditions would include: component removed, temperature increasing, array drive member faults, etc. The alarms under these conditions can be muted.

---






#### 4.2.5. RAID Controller Module LEDs

Table 11 - RAID Controller Module - Icon & LED Status Indicators

Icon/LED	Description
 Battery Fault	<p>This LED appears between the controller's Ethernet port and the backup battery module.</p> <ul style="list-style-type: none"> <li>◆ Illuminated - Backup battery has low voltage, has experienced a timeout on charge indicating a faulty battery, or has experienced a fault in the charging circuitry.</li> </ul>
 Cache Active	<p>This LED appears between the controller's Ethernet port and the backup battery module.</p> <ul style="list-style-type: none"> <li>◆ Illuminated - RAID Controller cache has data saved in memory but not written to the disk array.</li> </ul>
 Controller Activity on Drives	<p>This LED appears between the controller's Ethernet port and the backup battery module.</p> <ul style="list-style-type: none"> <li>◆ Illuminated - RAID Controller has activity on the disk drives.</li> </ul>
 Controller OK	<p>This LED appears between the controller's Ethernet port and the backup battery module.</p> <ul style="list-style-type: none"> <li>◆ Illuminated Green - RAID Controller operation is normal.</li> </ul>
 Controller Fault	<p>This LED appears between the controller's Ethernet port and the backup battery module.</p> <ul style="list-style-type: none"> <li>◆ Illuminated Amber - RAID Controller fault has occurred or the controller is booting.</li> </ul>
 Ethernet Status	<p>These LEDs appear above the controller's Ethernet port.</p> <ul style="list-style-type: none"> <li>◆ Right Side Yellow - Ethernet port speed. When illuminated, it indicates the port is running at 100 Mbps and when the LED is off the port is running at 10 Mbps.</li> <li>◆ Left Side Green - Ethernet port has a link connection and link activity.</li> </ul>
 SAS Lane	<p>These LEDs appear adjacent to the SAS connector lanes.</p> <ul style="list-style-type: none"> <li>◆ ON - Ready, no traffic.</li> <li>◆ FLASHING - Active, I/O traffic.</li> <li>◆ ALL FLASHING - Fault condition or rebooting.</li> <li>◆ OFF - Not ready, no power.</li> </ul>
 FC Host Port Status	<p>These LEDs appear above the controller's Fibre Channel port.</p> <ul style="list-style-type: none"> <li>◆ Blue = 4 Gbps</li> <li>◆ Green = 2 Gbps</li> <li>◆ Yellow = 1 Gbps – Steady when no activity but valid signal. <ul style="list-style-type: none"> <li>– Flashing to indicate activity.</li> <li>– All LEDs flashing indicates no valid signal.</li> </ul> </li> </ul>

#### 4.2.6. Disk I/O Module LEDs

Table 12 - Disk I/O Module LEDs

LED	State	Description
	ON	Ready, no traffic.
	FLASHING	Active, I/O traffic.
	ALL FLASHING	Fault condition or rebooting.
	OFF	Not ready, no power.
	ON	A module fault condition.
	OFF	Module is operating normally.
	ON	Identifies the module with the fault condition.
	OFF	Module is operating normally.

#### 4.2.7. Drive Status LEDs

Disk drive status is determined by a green and an amber LED mounted on the front of each Drive Carrier module. Refer to the table below for status indications:

Table 13 - Drive Status LED Functions

Green LED	Amber LED	Description
OFF	OFF	No Drive installed or blank module installed.
ON	OFF	Drive installed, powered ON, and operational.
FLASHING	FLASHING	Conditions: <ul style="list-style-type: none"><li>◆ Drive locating (user initiated)</li><li>◆ Drive is in a critical array</li><li>◆ Drives are members of a failed array</li><li>◆ Drive in an array and the array is in rebuild mode</li></ul>
OFF	ON	Drive slot fault. There is a power fault on this drive slot.
ON	ON	Drive fault. The drive is inserted but is not communicating, which is indicative of a drive failure.

#### 4.2.8. SCSI Enclosure Services (SES)

SCSI Enclosure Services (SES) forms the primary route to accessing the enclosure's status, diagnostic, and control capabilities.

This information is transferred in-band over the SAS topology. The enclosure presents a SCSI Target on the topology to which a subset of SCSI SPC commands can be directed. SES consists of a series of numbered "pages" with static and dynamic status coming from the enclosure and control information written to the enclosure. SES pages are transferred through use of the SCSI SPC Send and Receive diagnostic commands.

- ◆ SES Status Pages 0 and 1 are read to determine the page information available and how to interpret it. Page 0 has a list of supported SES pages. Page 1 contains "inquiry" type data (product strings etc.) and a list of the number and type of standard elements that are supported (e.g. disk drive/power supply/SAS expander). This information would normally be polled at the start of the day.
- ◆ SES Status Page 2 is the main source of enclosure status information which would be regularly polled, for example at 10 second intervals.  
  
The type of information available would be disk drive presence and drive fault LED status, power supply status, fan status, temperature, expander status.
- ◆ SES Control Page 2 provides a mechanism for control of some of the enclosures resources, for example turning the audible alarm on or flashing the drive fault LEDs.
- ◆ SES Status Page 0x0A provides additional information, for example drive SAS Addresses.
- ◆ SES Status Page 0x0E provides a mechanism to download new firmware to the enclosure.

StorView uses SES as its mechanism for obtaining enclosure information.

- ◆ Power Supply Fault
- ◆ Removal of a Power Supply Module

#### 4.3.1. Audible Alarm Mute

When the Audible Alarm sounds, it may be muted by pressing the Alarm Mute push-button located on the enclosure front panel. Automatic muting will take place after two minutes if the mute switch is not manually operated.

When the alarm is muted it will continue to sound with short intermittent beeps to indicate that a problem still exists, It will be silenced when all problems are cleared. (See also section [4.4.5. Thermal Warnings.](#))

##### 4.3.1.1. LED Test Mode

The Alarm Mute push-button can also be used to activate the self-test feature for the LEDs on the OPS panel.

Pressing the Alarm Mute button when no error or critical conditions are occurring will start an LED selftest.

Pressing the button again will stop the self-test, or if an error condition occurs while the self-test is on-going the test will terminate.

---

**NOTE:** The RAID enclosure requires holding the mute button for 4 seconds before the self test begins, and approximately two seconds to stop the test. The expansion enclosure will enter the self test by just pressing the button momentarily and will stop the test as well by just touching the button momentarily as well.

---

During the self-test you will initially hear two beeps followed by illumination of the System Fault, Logical Fault, and Box Identify LEDs. The Drive Carrier lower Fault LEDs (amber) will flash continuously during the test.

---

### 4.3. Audible Alarm

The enclosure includes an Audible Alarm which indicates when a fault condition is present. The following conditions will activate the Audible Alarm:

- ◆ Fan Fault or Failure
- ◆ Voltage Out of Range
- ◆ Over or Under Temperature Condition
- ◆ Thermal Overrun
- ◆ System Fault
- ◆ Logical Fault

## 4.4. Troubleshooting

The following sections describe problems, with possible solutions, which can occur with your 12big fibre and LaCie 12big Rack Fibre expansion storage solution.

### 4.4.1. OPS Panel System Faults

Symptom	Cause	Action
<ol style="list-style-type: none"> <li>1. The SYSTEM FAULT LED is flashing AMBER on the OPS panel.</li> <li>2. Audible alarm sounding</li> </ol>	<p>The ESI processor has detected an internal fault or failure:</p> <ul style="list-style-type: none"> <li>◆ Power supply module.</li> <li>◆ Single cooling fan fail.</li> <li>◆ RAID Controller or Disk I/O module, if an array exists with a drive fault.</li> <li>◆ A temperature warning condition.</li> </ul>	<p>Replace the faulty module:</p> <ul style="list-style-type: none"> <li>◆ Power Supply module.</li> <li>◆ Cooling Fan module.</li> <li>◆ RAID Controller or Disk I/O module.</li> </ul> <p>Correct the thermal issue:</p> <ul style="list-style-type: none"> <li>◆ Clear vents.</li> <li>◆ Correct ambient temperature problems.</li> </ul>
<ol style="list-style-type: none"> <li>1. The SYSTEM FAULT LED is steady AMBER on the OPS panel.</li> <li>2. Audible Alarm sounding.</li> </ol>	<p>The ESI processor has detected an internal fault or failure:</p> <ul style="list-style-type: none"> <li>◆ Dual cooling fan fail.</li> <li>◆ A temperature critical condition.</li> </ul>	<p>Replace the faulty module:</p> <ul style="list-style-type: none"> <li>◆ Cooling Fan module.</li> </ul> <p>Correct the thermal issue:</p> <ul style="list-style-type: none"> <li>◆ Clear vents.</li> <li>◆ Correct ambient temperature problems.</li> </ul>

**NOTE:** See also Section [4.4.5. Thermal Warnings](#).

### 4.4.2. OPS Panel Logical Faults

**CAUTION:** To prevent overheating do not operate the enclosure with one power supply removed for more than 30 minutes.

Symptom	Cause	Action
<ol style="list-style-type: none"> <li>1. OPS panel LOGICAL FAULT LED is illuminated AMBER.</li> <li>2. Audible alarm sounding.</li> </ol>	<p>Disk drive that is a member of an array has failed. The failed drive will have it's Drive Fault LED is illuminated steady.</p>	<p>Replace the faulty disk drive and rebuild the array. Once the array has returned to a fault tolerant state, the LED will be extinguished.</p>
<ol style="list-style-type: none"> <li>1. OPS panel LOGICAL FAULT LED is slowly flashing AMBER.</li> </ol>	<p>Disk drive that is a member of an impacted array, or is in a rebuild operation. Drive Fault LEDs will be flashing as well.</p>	<p>Once the array has returned to a fault tolerant state, the LED will be extinguished.</p>

### 4.4.3. Thermal Control

LaCie 12big Rack Fibre and LaCie 12big Rack Fibre expansion enclosures use extensive thermal monitoring and take a number of actions to ensure component temperatures are kept low and also to minimize acoustic noise.

Symptom	Cause	Action
<p>1. If the ambient air is cool (below 25°C (77°F)) and the fans are observed to increase in speed then some restriction on airflow may be causing additional internal temperature rise.</p> <hr/> <p><b>NOTE:</b> This is not a fault condition.</p> <hr/>	<p>The first stage in the thermal control process is for the fans to automatically increase in speed when a temperature threshold is reached. This may be caused by higher ambient temperatures in the local environment and may be perfectly normal.</p> <hr/> <p><b>NOTE:</b> These thresholds are determined according to the number of drives and power supplies installed.</p> <hr/>	<ol style="list-style-type: none"> <li>1. Check the installation for any airflow restrictions at either the front or rear of the enclosure. A minimum gap of 25 mm (1-inch) at the front and 50 mm (2 inches) at the rear is recommended.</li> <li>2. Check for restrictions due to dust build-up, clean as appropriate.</li> <li>3. Check for excessive re-circulation of heated air from rear to the front. Use in a fully enclosed rack installation is not recommended.</li> <li>4. Check that all blank modules are in place.</li> <li>5. Reduce the ambient temperature.</li> </ol>

### 4.4.4. Thermal Alarm

Symptom	Cause	Action
<ul style="list-style-type: none"> <li>◆ OPS panel SYSTEM FAULT LED is ON or Flashing.</li> <li>◆ A Power Supply module Fault LED is illuminated on one or more power supply modules.</li> <li>◆ Audible alarm sounding.</li> <li>◆ Air temperature exiting power supply is above 55°C (131°F).</li> </ul>	<ul style="list-style-type: none"> <li>◆ If the internal temperature measured in the airflow through the enclosure exceeds a pre-set threshold a thermal alarm will sound.</li> <li>◆ Single or dual cooling fan module failure.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Check that the local ambient environment temperature is below the 40°C (104°F) specification.</li> <li>◆ Check the installation for any airflow restrictions at either the front or rear of the enclosure. A minimum gap of 25 mm (1 inch) at the front and 50 mm (2 inches) at the rear is recommended.</li> <li>◆ Check for restrictions due to dust build-up, clean as necessary.</li> <li>◆ Check for excessive re-circulation of heated air from rear to the front.</li> <li>◆ Replace Cooling Fan module.</li> <li>◆ If possible shutdown the enclosure and investigate the problem before continuing.</li> </ul>

#### 4.4.5. Thermal Warnings

Symptom	Cause	Action
<ul style="list-style-type: none"> <li>◆ OPS panel SYSTEM FAULT LED is illuminated.</li> <li>◆ Audible alarm sounds continuously and cannot be muted.</li> </ul>	<p>Enclosure temperature is at a higher threshold than the Thermal Alarm (which should already have been activated).</p> <p>One or both fans have failed.</p>	<ol style="list-style-type: none"> <li>1. Check for airflow restrictions.</li> <li>2. Check power supply module faults.</li> <li>3. Check cooling fan module operation.</li> <li>4. Check for excessive ambient temperatures.</li> <li>5. Turn the power Off to the enclosure, replace any faulty module.</li> </ol>

#### 4.4.6. Firmware Updates

Periodically, updates to RAID Controller, Disk I/O module and disk drive firmware programs are updated. Refer to the StorView Storage Management Software RAID Module user guide and/or the VT-100 RAID Configuration Utility User Guide for details on updating firmware.

## 5. Module Removal and Replacement

### 5.1. Dealing with Hardware Faults

Ensure that you have obtained a replacement module of the same type as the failed module before removing that faulty module.

**CAUTION:** If your LaCie 12big Rack Fibre and LaCie 12big Rack Fibre expansion enclosure is powered up and you remove any module, replace it immediately. If the enclosure is used with plug-in modules, dummy carriers or blank modules missing for more than a few minutes, the enclosure can overheat causing power failure and data loss. Such use will invalidate the warranty.

- ◆ Replace a faulty drive with a drive of the same type, and equal or greater capacity. For SATA drives, the A/A MUX Transition card must be installed.
- ◆ All drive slots must have either a Drive Carrier or Dummy Carrier module installed in order to maintain a balanced air flow.
- ◆ All of the supplied plug-in power supply modules, electronics modules, dummy carriers and blank modules must be in place for the air to flow correctly around the cabinet.

### 5.2. Continuous Operation During Replacement

Depending on how the LaCie 12big Rack Fibre and LaCie 12big Rack Fibre expansion enclosure is configured, if a disk drive fails, it can normally be replaced without interrupting the operation of the system. This is also known as hot swappable components.

In addition, each enclosure contains two power supply modules, either power supply can maintain power to the subsystem while the other is replaced.

**CAUTION:** To prevent overheating do not operate the enclosure with one power supply removed for more than 30 minutes.

**IMPORTANT INFO:** The fans within the cooling fan module are not user replaceable, in the event of a cooling fan failure, the complete cooling fan module must be replaced.

**NOTE:** When inserting a power supply module into a operating enclosure with data I/O in progress, smoothly insert the module into the open bay and secure the latch. Harshly inserting the module

could possibly cause drives to temporarily go offline which could affect ongoing data I/O operations.

#### 5.2.1. OPS Panel

**IMPORTANT INFO:** The OPS Panel is an integral part of the enclosure chassis and can only be replaced by replacing the whole enclosure.

## 5.3. Replacing a Module

**CAUTION:** Whenever replacing a module NEVER leave an EMPTY space in the rear of the enclosure, obtain a replacement before removing the problem part.

**CAUTION:** Observe all conventional ESD (electrostatic discharge) precautions when handling 12big fibre and LaCie 12big Rack Fibre expansion modules and components. Avoid contact with backplane components and module connectors.

### 5.3.1. Power Supply Modules

**CAUTION:** The LaCie 12big Rack Fibre and LaCie 12big Rack Fibre expansion enclosure must only be operated with two power supply modules installed.

#### 5.3.1.1. Removing the Power Supply Module

**CAUTION:** Do not remove the faulty power supply module unless you have a replacement of the correct type ready for insertion.

**CAUTION:** To prevent overheating do not operate the enclosure with one power supply removed for more than 30 minutes.

There should always be two power supplies installed, the N+1 power system design allows your system to continue working while replacing the faulty module.

1. Make sure you identify the faulty power supply module correctly from the two modules installed. The amber Fault LED on the defective power supply should be illuminated.
2. Place the switch to the OFF position on the power supply and disconnect the power cord. If necessary for safety purposes and isolation, remove the power source to that supply side.
3. Push the latch on the power supply handle to the right (*Fig. 76*), then grip the handle and pull the module out of the enclosure.

**CAUTION:** Do not remove the covers from the power supply. Danger of electric shock inside. Return the power supply to your supplier for repair.

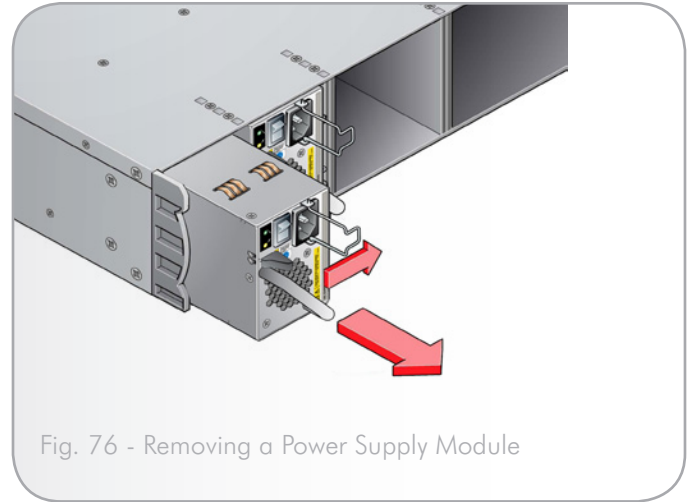


Fig. 76 - Removing a Power Supply Module



### 5.3.1.2. Installing the Power Supply Module

1. Check for damage, especially to the rear connector on the power supply.

---

**CAUTION:** Handle the module carefully and avoid damaging the connector pins. Do not install the module if any pins appear to be bent.

---

2. Slide the module into the enclosure (Fig. 77).
3. Continue to push the module until it fully seats. A click should be heard as the handle latch engages.
4. Connect the power supply cords from the power source to the power supply and secure with the strain relief bale. Position the switch to the ON position.

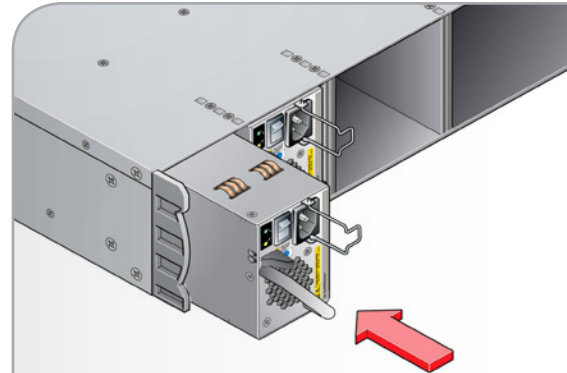


Fig. 77 - Inserting a Power Supply Module

### 5.3.2. Cooling Fan Module

#### 5.3.2.1. Removing the Cooling Fan Module

---

**CAUTION:** Do not remove this module unless a replacement can be immediately added. The enclosure must not be operated without all modules in place.

---

1. Grasp the latch between your thumb and forefinger. Squeeze your thumb and forefinger together to release the latch.
2. Pull the latch outward to eject the module out of the enclosure.
3. Withdraw the cooling fan module completely from the enclosure.

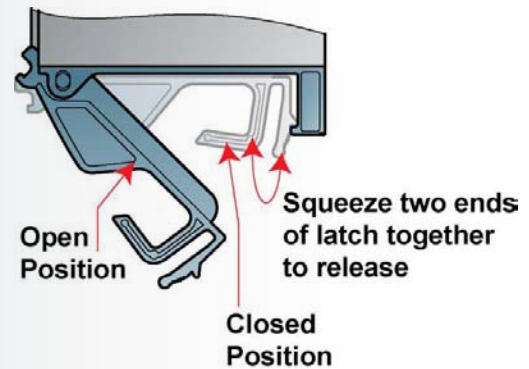


Fig. 78 - Cooling Fan Module Latch Operation

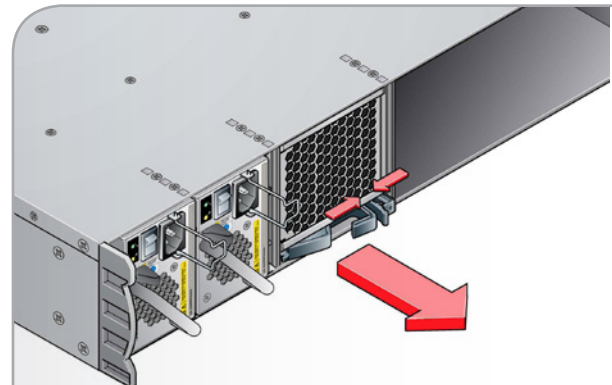


Fig. 79 - Removing the Cooling Fan Module

### 5.3.2.2. Installing the Cooling Fan Module

1. Check for damage, especially to the rear connector on the module.

**CAUTION:** Handle the module carefully and avoid damaging the connector pins. Do not install the module if any pins appear to be bent.

2. With the latch in the open position (see Fig. 80), slide the module into the enclosure until the latch engages.
3. Secure the module by manually closing the latch by pressing the latch until it locks. A click should be heard as the module latch engage. The module should be fully seated.

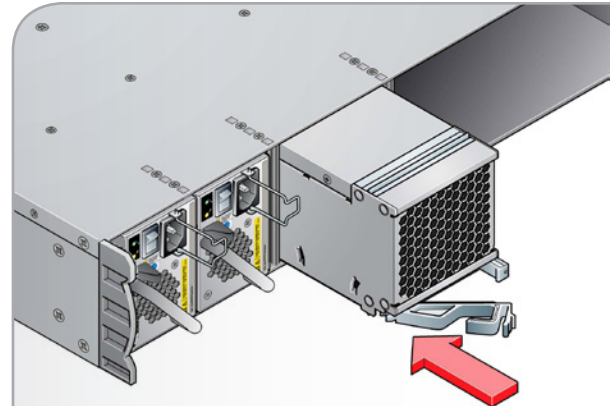


Fig. 80 - Inserting the Cooling Fan Module

### 5.3.3. RAID Controller Module

#### 5.3.3.1. Removing the RAID Controller Module

**CAUTION:** Do not remove this module unless a replacement can be immediately added. The enclosure must not be operated without all modules in place.

1. If the RAID Controller to be replaced has not already been shut-down, execute a shutdown from the software interface.

**NOTE:** A multipath failover software is recommended to be installed, configured, and operational. The preferred software product is StorView Path Manager.

If this is a Active-Active or dual controller configuration, upon successful shutdown, the controller will have failed over to its partner controller and the Controller Fault LED will be illuminated on the shutdown controller.

If this is a Stand-Alone or single controller configuration, you must shut-down the controller. Upon successful shutdown, the Controller OK LED will still be illuminated. Verify successful shutdown of a single controller by loss of communication with the VT-100 software utility, loss of I/O activity, or StorView loss of communication with the enclosure.

2. Using two hands, grasp each latch between your thumb and forefinger of each hand. Squeeze your thumbs and forefingers together to release the latches.
3. Pull the latches outward to eject the module out of the enclosure (Fig. 81).
4. Using the latches as handles and withdraw the RAID Controller module (Fig. 82).

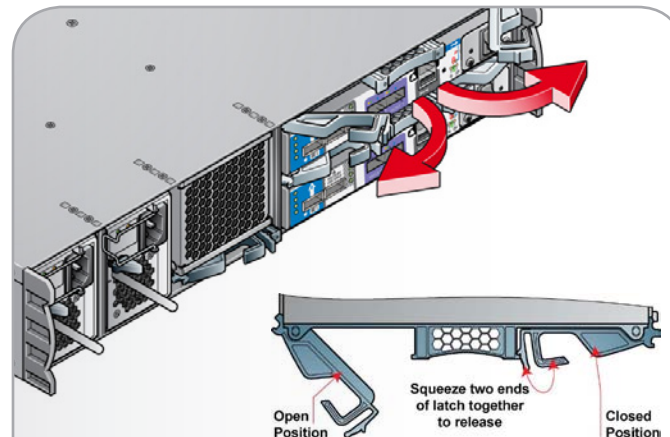


Fig. 81 - Unlatching the RAID Controller Module

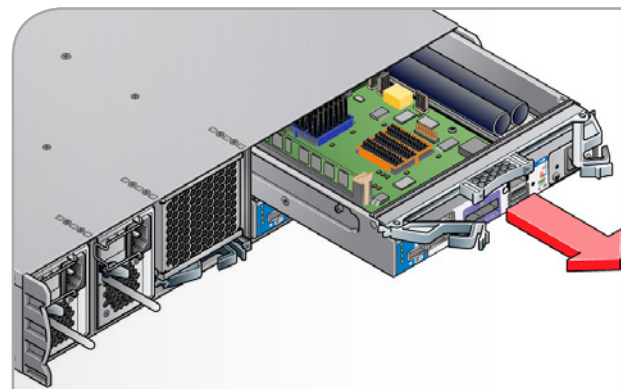


Fig. 82 - Removing the RAID Controller Module

### 5.3.3.2. Installing the RAID Controller Module

The RAID Controller modules are installed from the rear into the bays located on the right hand side. If only one is installed, start with the lowest slot and install a Blank module in the upper slot.

If you are replacing a RAID Controller in a live environment, upon completing step 3, the controller will automatically start up. If the controller is part of a Active-Active configuration, after start up, it will automatically synchronize its firmware with the firmware on the working controller.

1. Check for damage, especially to the interface connector.

---

**CAUTION:** Handle the module carefully and avoid damaging the connector pins. Do not install the module if any pins appear to be bent.

---

2. With the latches in the open position (see Fig. 83), slide the controller module into the enclosure until the latches engage.
3. Secure the module by manually closing the latches (see Fig. 84). A click should be heard as each latch is engaged.

---

**NOTE:** When replacing the RAID Controller, be aware that it has a default IP address assigned. If you are using Embedded StorView and a static IP address, then you will need to set the IP address. Refer to the VT- 100 RAID Configuration Utility User Guide in the Diagnostics chapter.

---

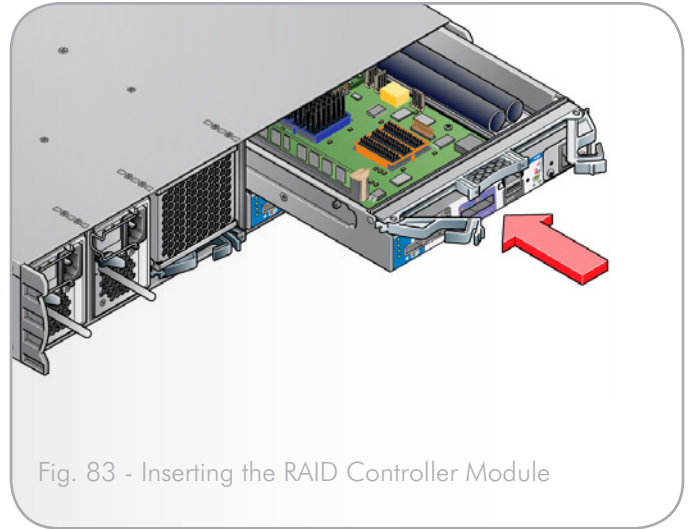


Fig. 83 - Inserting the RAID Controller Module

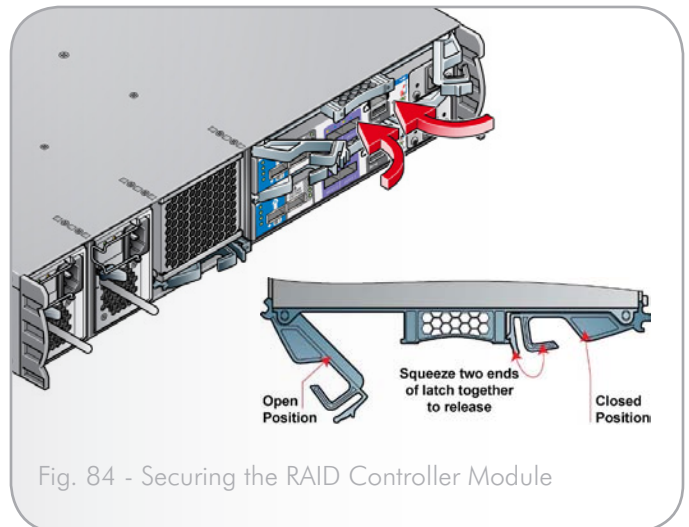


Fig. 84 - Securing the RAID Controller Module

### 5.3.4. Disk I/O Module

#### 5.3.4.1. Removing the Disk I/O Module

**CAUTION:** Do not remove this module unless a replacement can be immediately added. The system must not be operated without all modules in place.

**NOTE:** A multipath failover software is recommended to be installed, configured, and operational. The preferred software product is StorView Path Manager.

1. If the Disk I/O module is to be replaced in a live environment, shutdown the RAID Controller that is connected to the Disk I/O module you wish to remove. Use StorView or the VT-100 software to shut down the RAID Controller.

This action will cause the controller to failover, as well as the path to failover protecting access to the data and maintaining continuous I/O operations. Otherwise, by just pulling a Disk I/O module in a live environment may cause unwanted array failure and I/O issues.

2. Using two hands, grasp each latch between your thumb and forefinger of each hand. Squeeze your thumbs and forefingers together to release the latches.
3. Pull the latches outward to eject the module out of the enclosure ([Fig. 85](#)).
4. Using the latches as handles and withdraw the module ([Fig. 86](#)).

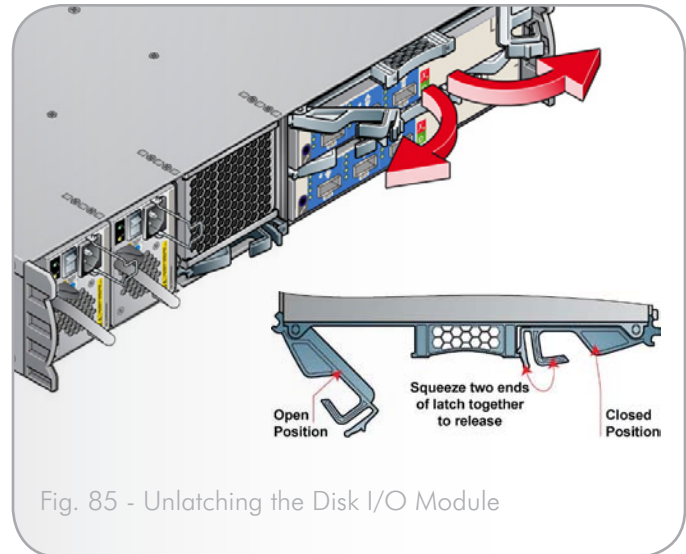


Fig. 85 - Unlatching the Disk I/O Module

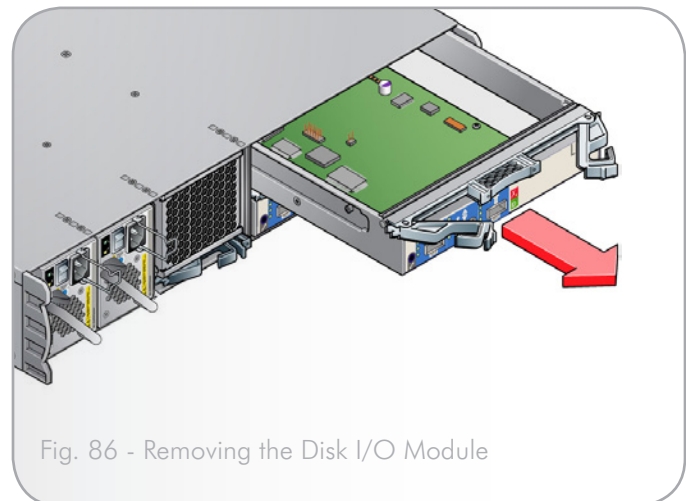


Fig. 86 - Removing the Disk I/O Module

#### 5.3.4.2. Installing the Disk I/O Module

Disk I/O modules are installed into the bays located on the right hand side. If only one is installed, start with the lowest bay and install a blank module in the upper bay.

1. Check for damage, especially to the interface connector.

---

**CAUTION:** Handle the module carefully and avoid damaging the connector pins. Do not install the module if any pins appear to be bent.

---

2. With the latches in the open position (see Fig. 87), slide the Disk I/O module into the enclosure until the latches engage automatically.
3. Secure the module by manually closing the latches. A click should be heard as the latches engage.
4. If the attached RAID Controller was shutdown, open the latches on the controller to slightly eject it, then re-insert the controller and secure the latches. This will cause the RAID Controller to restart.
5. All operations should return to normal once the controller is booted and fail back has been accomplished.

---

#### 5.3.5. Removal and Installation of the Blank Module

---

**CAUTION:** If only one RAID Controller module is installed, a blank module **MUST** be installed in the unused bays. Otherwise there will be inadequate drive cooling if the bay is left open.

---

##### 5.3.5.1. Removal

1. Using two hands, grasp each latch between your thumb and forefinger of each hand. Squeeze your thumbs and forefingers together to release the latches.
  2. Pull the latches outward to eject the module out of the enclosure (Fig. 89).
  3. Using the latches as handles and withdraw from the module.
- 

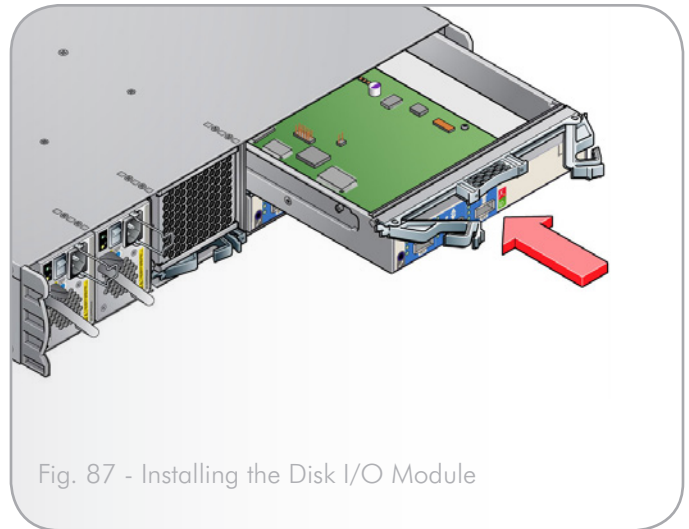


Fig. 87 - Installing the Disk I/O Module

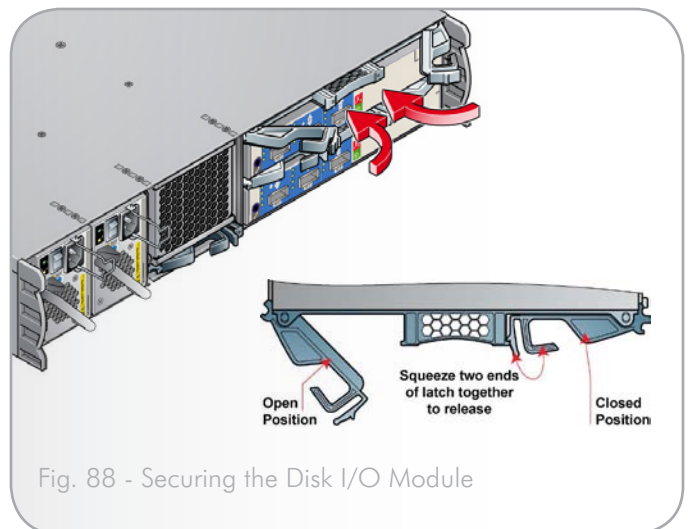


Fig. 88 - Securing the Disk I/O Module

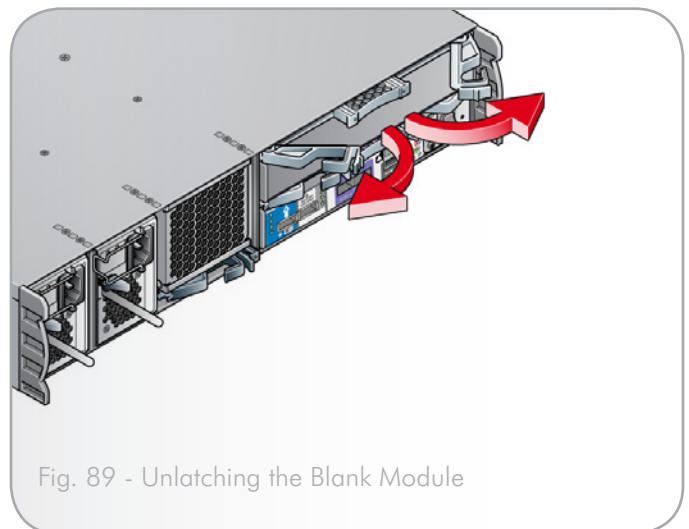


Fig. 89 - Unlatching the Blank Module



#### 5.3.5.2. Installation

1. With the latches in the open position (see [Fig. 90](#)), place the blank module into the enclosure open bay and press in until the latches engage.
2. Secure the module by manually closing the latches. A click should be heard as each latch is engaged.

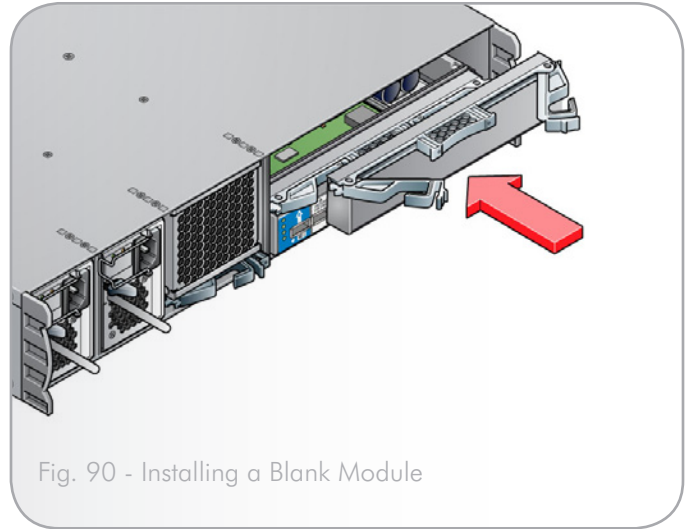


Fig. 90 - Installing a Blank Module

#### 5.3.6. Replacing a Battery Module

**CAUTION:** There is a danger of explosion if the battery is disposed of improperly. Dispose of used batteries in accordance with the manufacturer's instructions and national regulations.

##### 5.3.6.1. Removing the Battery Module

1. Operate the release latch by pressing down and pull the battery module out of the controller module.

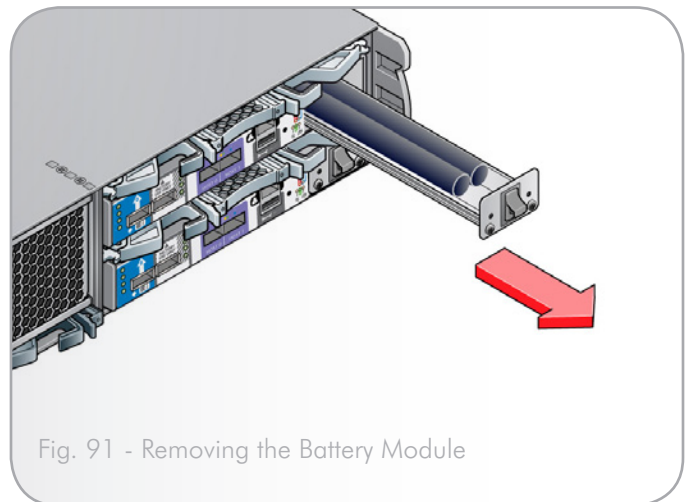


Fig. 91 - Removing the Battery Module

##### 5.3.6.2. Installing the Battery Module

1. Check for damage, do not install if there are any obvious signs of damage.
2. Slide the battery module into the slot on the right hand side of the controller module. The battery module is fully secured when it reaches its fully seated position and the latch resets.

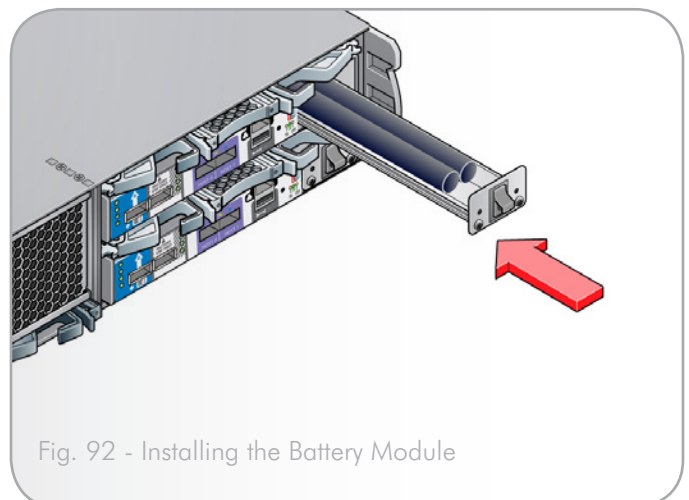


Fig. 92 - Installing the Battery Module

### 5.3.7. Replacing SFP Transceivers

#### 5.3.7.1. Removing the SFP Transceiver

1. Locate the defective SFP Transceiver on the specific RAID Controller.
2. Rotate the ejector downward and pull the transceiver from the controller.
3. Install a dust cover protector if a replacement SFP Transceiver is not being installed.

---

#### 5.3.7.2. Installing the SFP Transceiver

4. Remove the dust cover from the transceiver module.
  5. Ensure the ejector is positioned to its stored location.
  6. Insert the SFP Transceiver into the SFP cage and push to seat it.
  7. Connect your fiber channel data cables as needed. Refer to section [2.5. Cabling the Enclosures](#).
- 

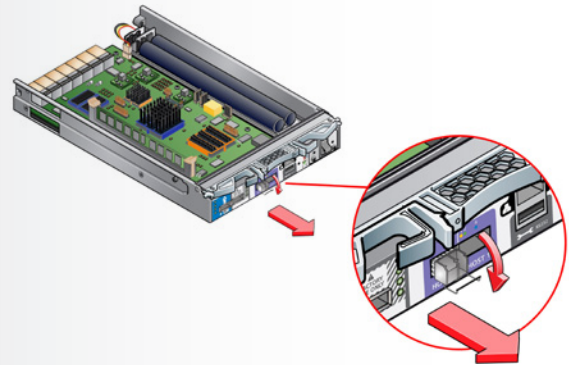


Fig. 93 - Removing the SFP Transceivers

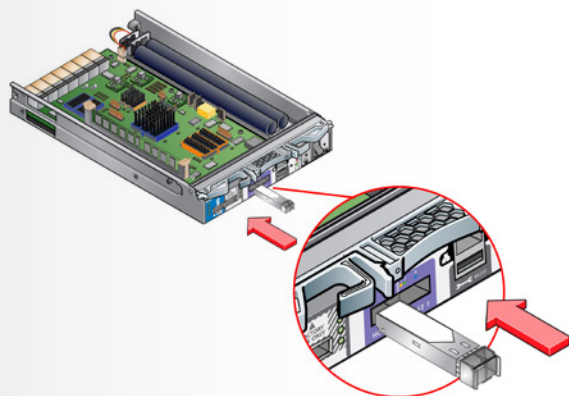


Fig. 94 - Installing the SFP Transceivers

### 5.3.8. Replacing a Drive Carrier Module

**CAUTION:** Observe all conventional ESD precautions when handling disk drives. Avoid contact with backplane components and module connectors.

#### 5.3.8.1. Removing the Drive Carrier Module

**CAUTION:** Drive spin down Damage can occur to a drive if it is removed while still spinning, we recommend that you perform ALL steps of the following procedure to ensure that the drive has stopped prior to removal. See step 4 in the procedure below.

1. If the anti-tamper lock is engaged, carefully insert the lock key provided into the cutout in the handle and into its socket.
2. Rotate the key in a counter-clockwise direction until the “red” indicator is not visible in the aperture beside the key.
3. Release the carrier handle, by pressing the latch in the handle with your finger and rotating the handle towards the right (Fig. 96).
4. Gently withdraw the Drive Carrier module approximately 25mm (1-inch) and wait 30 seconds for the drive to spin down.
5. Continue to withdraw the module from the drive slot.

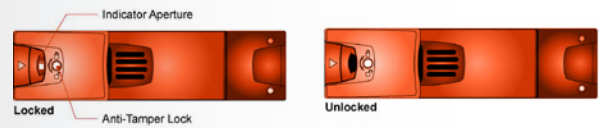


Fig. 95 - De-activating the Anti-tamper Lock

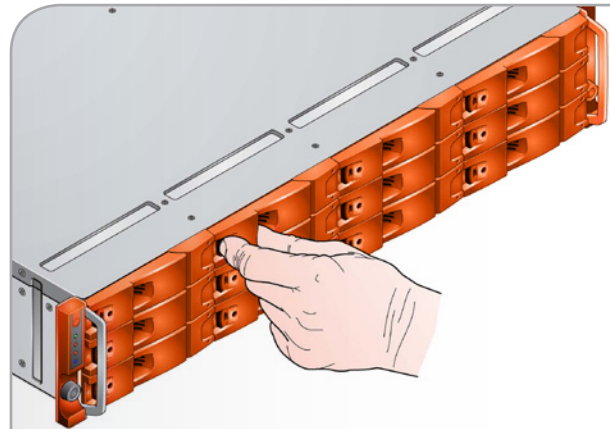


Fig. 96 - Unlatching a Drive Carrier Module

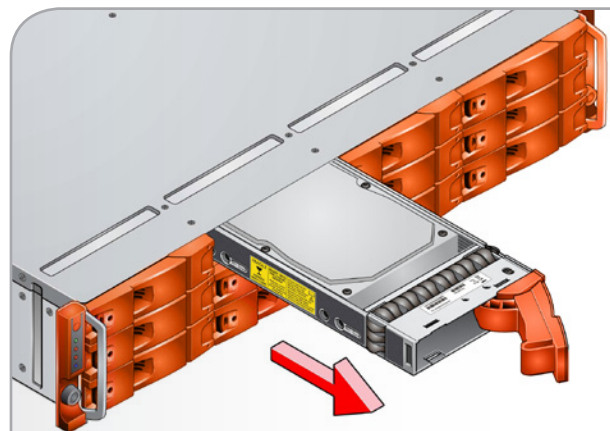


Fig. 97 - Removing a Drive Carrier Module



### 5.3.8.2. Installing a Drive Carrier Module

**CAUTION:** All drive slots must have Drive Carrier modules or Dummy Carrier modules installed to maintain a balanced air flow.

**IMPORTANT INFO:** Ensure that the carrier is orientated so that the drive handle opens from the left.

1. Release the carrier handle, by pressing the latch in the handle with your finger and rotating the handle towards the right ([Fig. 98](#)).
2. Insert the carrier into the enclosure.
3. Slide the drive carrier, gently, all the way into the enclosure until it is stopped by the camming lever on the right of the carrier ([Fig. 99](#)).
4. Secure the drive carrier by closing the handle until it fully engages. A click should be heard as the latch engages and holds the handle closed ([Fig. 100](#)).

**NOTE:** If the anti-tamper locks were activated before removal, please refer to section [5.3.9. Engaging the Anti-tamper Locks](#).

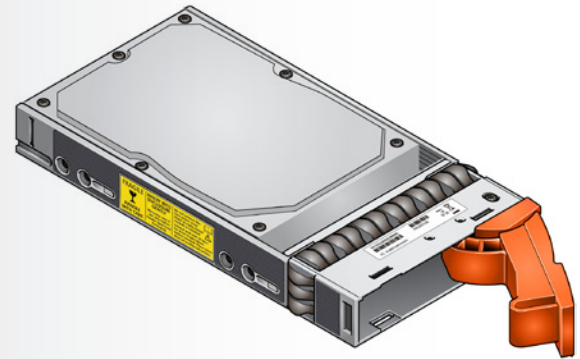


Fig. 98 - Drive Carrier Module with Handle Released

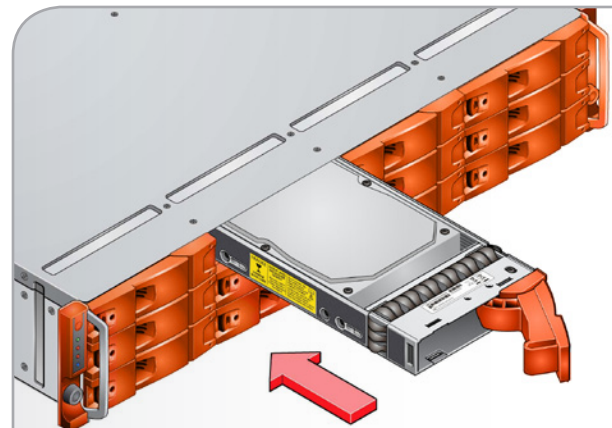


Fig. 99 - Inserting the Drive Carrier Module

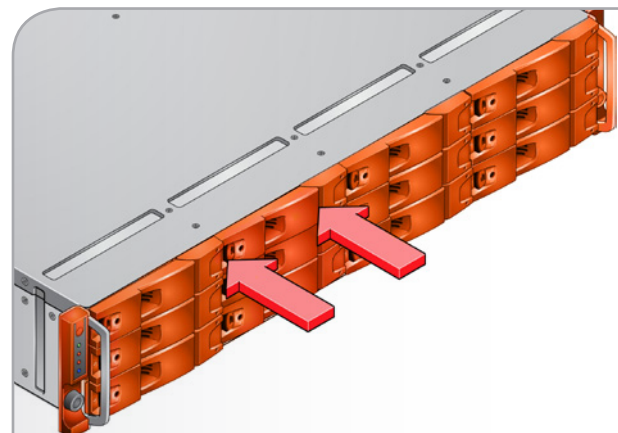


Fig. 100 - Securing the Drive Carrier Module

### 5.3.9. Engaging the Anti-tamper Locks

The anti-tamper locks are fitted in the Drive Carrier handles and are accessed through the small cutout in the latch section of the handle. Drives are supplied with the locks set in the locked position.

#### 5.3.9.1. Activating the Locks

1. Carefully insert the lock key provided into the cutout in the handle and into its socket.
2. Rotate the key in a clockwise direction until the “red” indicator is visible in the aperture beside the key.
3. Remove the key.

De-activation is the reverse of this procedure, that is:

- ◆ Rotate the key in an counter-clockwise direction until the indicator is no longer visible in the aperture beside the key.

### 5.3.10. Dummy Drive Carrier Module Replacement

Dummy drive carrier modules are removed and installed in the enclosure simply by pulling the module out of the enclosure or pushing it into place.

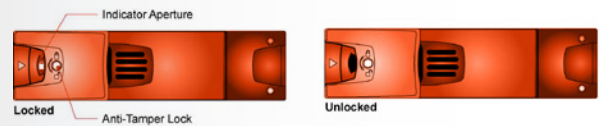


Fig. 101 - Activating the Anti-tamper Lock

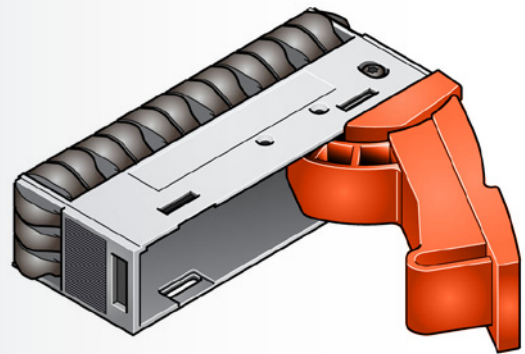


Fig. 102 - Dummy Drive Carrier Module

## 5.4. Replacement Parts and Ancillary Items

The following Field Replaceable Units (FRUs) are available for LaCie 12big Rack Fibre and 12big expansion Storage Systems:

- ◆ Chassis including Backplane and integrated OPS panel
- ◆ 350W AC Power Supply Module (Hot Swappable)
- ◆ Drive Carrier module (Hot Swappable)
- ◆ RAID Controller module (1024Mb or 2048Mb DDR2 SDRAM) (Hot Swappable)
- ◆ Cooling Fan module (Hot Swappable)
- ◆ Battery module (Hot Swappable)
- ◆ Dummy Drive Carrier Module (Hot Swappable)
- ◆ Blank I/O module (Hot Swappable)
- ◆ Disk I/O module (Hot Swappable)
- ◆ SFP Transceiver module, optical (Hot Swappable)
- ◆ Cables:
  - FC - FC optical cables
  - RS232 cable
  - Shielded Ethernet cable
  - Mini-SAS cables
  - SATA cables
- ◆ Power cords (Country specific)
- ◆ All documentation
- ◆ Keys, Anti-tamper Lock (for Drive Carrier modules)

Contact your supplier for specific module part numbers.

---

## 6. Appendix A: Technical Specifications

### 6.1. Dimensions

Enclosure	Inches	mm
Height	3.46	87.9
Width across mounting flange	19.0	483
Width across body of enclosure	17.6	447
Depth from flange to rear of enclosure body	21.65	550
Depth from flange to maximum extremity of enclosure (rear hold down)	22.72	577
Depth from flange to furthest extremity at front of unit	1.44	36.5

It is recommended that a rack with a depth of no less than 700 mm (27.55 inches) is used with this product.

### 6.2. Weight

Maximum Configuration	32 kg (70.4 lb)
Empty Enclosure	9 kg (19.8 lb)

### 6.3. AC Power (350W PSU)

Voltage Range	100-240V AC Rated
Frequency	50/60 Hz
Inrush Current	<30A @ 230V AC
Power Factor	>0.98
Harmonics	Meets EN61000-3-2

## 6.4. Current Consumption

Current consumption of enclosure with twelve SAS drives running I/O, powered by a single PSU with extended power lead between PSU and I/O backplane and with two controllers installed at IDLE and ACTIVE operation.

Voltage Rail	IDLE		ACTIVE	
	Average	Peak	Average	Peak
5 V	11.51 A	13.2 A	13.53 A	15.7 A
12 V	12.29 A	15.1 A	13.17 A	20.1 A

## 6.5. Environment

Current consumption of enclosure with twelve SAS drives running I/O, powered by a single PSU with extended power lead between PSU and I/O backplane and with two controllers installed at IDLE and ACTIVE operation.

	Temperature Range	Relative Humidity	Max. Wet Bulb
Operational	5°C to 40°C (41°F to 104°F)	8% to 80% non-condensing	23°C (74°F)
Non-Operational	1°C to 50°C (34°F to 122°F)	8% to 80% non-condensing	27°C (80°F)
Storage	1°C to 60°C (34°F to 140°F)	8% to 80% non-condensing	29°C (84°F)
Shipping	-40°C to 60°C (-40°F to 140°F)	5% to 100% non-precipitating	29°C (84°F)

Airflow	System must be operated with low pressure rear exhaust installation. (Back pressure created by rack doors and obstacles not to exceed 5 pascals (0.5mm water gauge)).
Altitude, Operational	0 to 3045 m (0 to 10,000 ft.)
Altitude, Non-Operational	-305 to 12,192 m (-1000 to 40,000 ft.)
Shock, Operational	Vertical axis 5g peak 1/2 sine, 10 ms
Shock, Non-Operational	30g 10 ms 1/2 sine
Vibration, Operational	0.21grms 5-500 Hz Random
Vibration, Non-Operational	1.04grms 2-200 Hz Random
Vibration, Relocation	0.3g 2-200 Hz sine
Acoustics	Sound Power Operating: Less than 58 dB LwA measured at 23°C (74°F). Sound Pressure Operating: Less than 6.8 Bels LwA measured at 23°C (73°F).
Orientation & Mounting	19" Rack mount (2 EIA Units)

Rack Rails	To fit 800 mm (31.50 inches) depth Racks compliant with IEC 297
Rack Characteristics	Back pressure not exceeding 5 pascals (0.5mm water gauge)
Safety & Approvals (pending)	CE, UL, GS, and BSMI EN 60950-1, IEC 60950-1, UL 60950-1
EMC	EN55022 (CISPR - A), FCC A and VCCI

## 6.6. RAID Controller Module Specification

Dimensions (internal)	103 mm x 267 mm (4 inches x 10.5 inches) – component board area: 103 mm x 240 mm (4 inches x 9.5 inches).
Speed	<ul style="list-style-type: none"> <li>◆ Host Ports: two 4 Gbit/sec. Fibre Channel, also supporting 2 Gbit/sec. and 1 Gbit/sec. mode.</li> <li>◆ Drive Ports: 3 Gbit/sec. SAS, creates connections to a single domain of 12 drives.</li> </ul>
Mounting	Rear, horizontal
Connectors	<ul style="list-style-type: none"> <li>◆ (2) SFP connectors for Host 0 and Host 1 Ports, to accommodate optical interconnects (LC to LC cable).</li> <li>◆ (1) 4 Lane SAS expansion port.</li> <li>◆ (1) RJ45, 10/100BaseT Ethernet port.</li> <li>◆ (1) RS232 port.</li> </ul>
Power	Consumption 40 watts.

## 6.7. Disk I/O Module Specification

Dimensions (internal)	103 mm x 267 mm (4 inches x 10.5 inches) – component board area: 103 mm x 240 mm (4 inches x 9.5 inches).
Connectors	<ul style="list-style-type: none"> <li>◆ (1) 4 Lane SAS Host Port (IN):</li> <li>◆ (1) 4 Lane SAS expansion Port (OUT):</li> </ul>
Mounting	Rear, horizontal

## 6.8. Drive Carrier Module Specification

**IMPORTANT:** Operating LaCie 12big Rack Fibre and LaCie 12big Rack Fibre expansion enclosures with non-approved drives may invalidate the warranty. Please contact your supplier for details of approved drives.

Module Dimensions	<ul style="list-style-type: none"><li>◆ Height 27.05 mm (1.06 inches)</li><li>◆ Width 106.55 mm (4.19 inches)</li><li>◆ Depth 209.55 mm (8.25 inches)</li></ul>
Weight	<ul style="list-style-type: none"><li>◆ 0.16 kg (.362 lb.) (carrier)</li><li>◆ 0.86 kg (1.91 lb) w/750 GB drive installed.</li></ul>
Operating Temperature	5°C to 40°C (41°F to 104°F)  When installed in an 12big system enclosure with dual power supply modules.
Power Dissipation	18.5 watts maximum

## 7. Appendix B: Standards & Regulations

### 7.1. International Standards

The LaCie 12big Rack Fibre and LaCie 12big Rack Fibre expansion storage system complies with the requirements of the following agencies and standards:

- ◆ CE to EN60950-1
- ◆ UL 60950-1
- ◆ GS to EN60950-1
- ◆ VCCI
- ◆ BSMI

### 7.2. Potential for Radio Frequency Interference

#### USA Federal Communications Commission (FCC)

**NOTE:** This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. The supplier is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment.

Unauthorized changes or modifications could void the user’s authority to operate the 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.

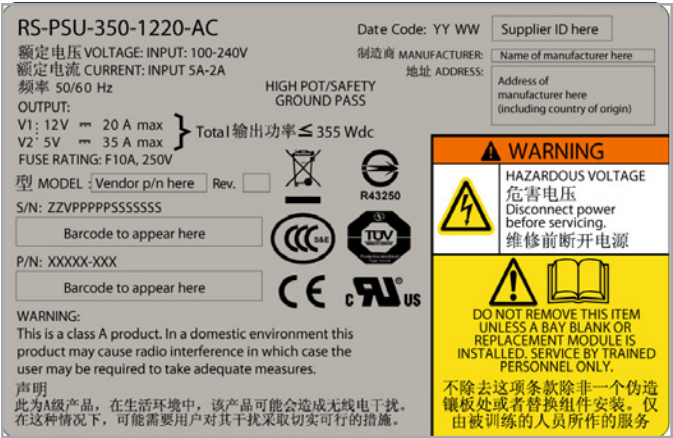


Fig. 103 - 12big Chassis Agency Label FCC - VCCI



### 7.3. European Regulations

This equipment complies with European Regulations EN 55022 Class A: Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment and EN50082-1: Generic Immunity.

### 7.4. Power Supply Safety and EMC Compliance

Safety Compliance	UL 60950-1
	IEC 60950-1
	EN 60950-1
EMC Compliance	CFR47 Part 15B Class A
	EN55022
	EN55024

### 7.5. AC Power Cords

**IMPORTANT INFO:** The plug and the complete power cord assembly must meet the standards appropriate to the country, and must have safety approvals acceptable in that country.

United States	
Cord Type	SV or SVT, 18 AWG minimum, 3 conductor - 4.5 meters maximum length.
Plug	NEMA 5-15P grounding-type attachment plug rated 120V 10A; or IEC 320 C14, 250V, 10A.
Socket	IEC 320 C-13, 250V, 10A.
Europe and Others	
Cord Type	Harmonized, H05-VVF-3G1.0.
Socket	IEC 320 C-13, 250V, 10A.

## 7.6. EMC Precautions

If passive copper cables are connected, the cable must not have a connection to a common ground/earth point.

---

## 7.7. ESD Precautions

---

**CAUTION:** It is recommended that you fit and check a suitable anti-static wrist or ankle strap and observe all conventional ESD precautions when handling 12big plug-in modules and components. Avoid contact with backplane components and module connectors, etc.

---

## 7.8. Recycling of Waste Electrical and Electronic Equipment (WEEE)

At the end of the product's life, all scrap/waste electrical and electronic equipment should be recycled in accordance with National regulations applicable to the handling of hazardous/toxic electrical and electronic waste materials.

Please contact your supplier for a copy of the Recycling Procedures applicable to your product.

---

**CAUTION:** There is a danger of explosion if the battery is disposed of improperly. Dispose of used batteries in accordance with the manufacturer's instructions and national regulations.

---

**IMPORTANT INFO:** Observe all applicable safety precautions, e.g. weight restrictions, handling batteries and lasers etc., detailed in the preceding paragraphs when dismantling and disposing of this equipment.

---

## 8. Contacting Customer Support

### 8.1. LaCie Technical Support Contacts

LaCie Asia, Singapore, and Hong Kong Contact us at: <a href="http://www.lacie.com/asia/contact/">http://www.lacie.com/asia/contact/</a>	LaCie Australia Contact us at: <a href="http://www.lacie.com/au/contact/">http://www.lacie.com/au/contact/</a>
LaCie Belgium Contact us at: <a href="http://www.lacie.com/be/contact/">http://www.lacie.com/be/contact/</a> (Français)	LaCie Canada Contact us at: <a href="http://www.lacie.com/caen/contact/">http://www.lacie.com/caen/contact/</a> (English)
LaCie Denmark Contact us at: <a href="http://www.lacie.com/dk/contact">http://www.lacie.com/dk/contact</a>	LaCie Finland Contact us at: <a href="http://www.lacie.com/fi/contact/">http://www.lacie.com/fi/contact/</a>
LaCie France Contact us at: <a href="http://www.lacie.com/fr/contact/">http://www.lacie.com/fr/contact/</a>	LaCie Germany Contact us at: <a href="http://www.lacie.com/de/contact/">http://www.lacie.com/de/contact/</a>
LaCie Italy Contact us at: <a href="http://www.lacie.com/it/contact/">http://www.lacie.com/it/contact/</a>	LaCie Japan Contact us at: <a href="http://www.lacie.com/jp/contact/">http://www.lacie.com/jp/contact/</a>
LaCie Netherlands Contact us at: <a href="http://www.lacie.com/nl/contact/">http://www.lacie.com/nl/contact/</a>	LaCie Norway Contact us at: <a href="http://www.lacie.com/no/contact/">http://www.lacie.com/no/contact/</a>
LaCie Spain Contact us at: <a href="http://www.lacie.com/es/contact/">http://www.lacie.com/es/contact/</a>	LaCie Sweden Contact us at: <a href="http://www.lacie.com/se/contact">http://www.lacie.com/se/contact</a>
LaCie Switzerland Contact us at: <a href="http://www.lacie.com/chfr/contact/">http://www.lacie.com/chfr/contact/</a> (Français)	LaCie United Kingdom Contact us at: <a href="http://www.lacie.com/uk/contact/">http://www.lacie.com/uk/contact/</a>
LaCie Ireland Contact us at: <a href="http://www.lacie.com/ie/contact/">http://www.lacie.com/ie/contact/</a>	LaCie USA Contact us at: <a href="http://www.lacie.com/contact/">http://www.lacie.com/contact/</a>
LaCie International Contact us at: <a href="http://www.lacie.com/intl/contact/">http://www.lacie.com/intl/contact/</a>	

## 9. Warranty Information

LaCie warrants your drive against any defect in material and workmanship, under normal use, for the period designated on your warranty certificate. In the event this product is found to be defective within the warranty period, LaCie will, at its option, repair or replace the defective drive. This warranty is void if:

- ◆ The drive was operated/stored in abnormal use or maintenance conditions;
- ◆ The drive is repaired, modified or altered, unless such repair, modification or alteration is expressly authorized in writing by LaCie;
- ◆ The drive was subjected to abuse, neglect, lightning strike, electrical fault, improper packaging or accident;
- ◆ The drive was installed improperly;
- ◆ The serial number of the drive is defaced or missing;
- ◆ The broken part is a replacement part such as a pickup tray, etc.
- ◆ The tamper seal on the drive casing is broken.

LaCie and its suppliers accept no liability for any loss of data during the use of this device, or for any of the problems caused as a result.

LaCie will not, under any circumstances, be liable for direct, special or consequential damages such as, but not limited to, damage or loss of property or equipment, loss of profits or revenues, cost of replacement goods, or expense or inconvenience caused by service interruptions.

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.

Under no circumstances will any person be entitled to any sum greater than the purchase price paid for the drive.

To obtain warranty service, call LaCie Technical Support. You will be asked to provide your LaCie product's serial number, and you may be asked to furnish proof of purchase to confirm that the drive is still under warranty.

All drives returned to LaCie must be securely packaged in their original box and shipped with postage prepaid.

---

**IMPORTANT INFO:** Register online for free technical support:  
[www.lacie.com/register](http://www.lacie.com/register)

---