# 12BIG RACK SERIAL 2 USER MANUAL

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# PREFACE

## WHAT IS IN THIS GUIDE

This user guide gives you step-by-step instructions on how to install, configure and connect a LaCie 12big Rack Serial 2 system 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 storage appliance products. If you do not have these skills, or are not confident with the instructions in this guide, do not proceed with the installation.

## QUALIFIED PERSONNEL

The personnel referred to within this document are defined as follows:

- Service Person: A person having appropriate technical training and experience necessary to be aware of hazards to which that person may be exposed in performing a task and of measures to minimize the risks to that person or other persons.
- User/Operator: Any person other than a Service Person.

## TERMS AND ABBREVIATIONS

| CLI | Common Line Interface | PDU | Power Distribution Unit |
|------|------------------------------------|--------|---------------------------------------------------|
| PSU | Power Supply Unit | EEPROM | Electrically Erasable Programmable Read-Only Memory |
| RAID | Redundant Arrays of Inexpensive Disks | EM | Enclosure Management |
| PCM | Power Cooling Module | ESD | Electro-Static Discharge |
| SAS | Serial Attached SCSI | ESI | Enclosure Services Interface Processor |
| SATA | Serial ATA | SBB | Storage Bridge Bay |
| SCSI | Small Computer System Interface | I2C | Inter-Integrated Circuit |
| SEP | Storage Enclosure Processor | SES | SCSI Enclosure Services |
| LED | Light-Emitting Diode | SFF | Small Form Factor |
| UPS | Universal Power Supply | PCB | Printed Circuit Board |
| VPD | Vital Product Data | | |

# 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:** Fully assembled LaCie 12big Rack Serial 2 enclosures can weigh up to 26kg (77.2lb). Do not try to lift the enclosure by yourself.

- A safe lifting height is 20U.
- Before moving the enclosure always remove the Power Cooling Modules (PCMs) to minimize weight.
- Do not lift the enclosure by the handles on the PCMs, they are not designed to take the weight.

## SAFETY

- The enclosure must only be operated from a power supply input voltage range of 100 - 240 VAC, 50 - 60 Hz.
- Provide a suitable power source with electrical overload protection to meet the requirements laid down in the technical specification.
- A safe electrical earth connection must be provided to the power supply cord. Check the grounding of the enclosure before applying power.

> **Important info:** The enclosure must be grounded before applying power.

- The plug on the power supply cord is used as the main disconnect device. Ensure that the socket outlets are located near the equipment and are easily accessible.
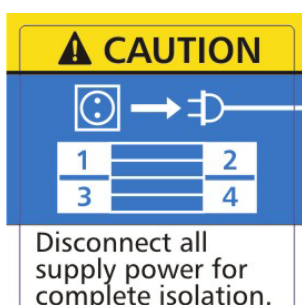


*Power Cooling Module*

*Warning Label*

- A faulty PCM must be replaced with a fully operational PCM w

ithin 24 hours. Please refer to [Environment](). Do not remove a fa

ulty PCM unless you have a replacement model of the correct t

ype ready for insertion.

- Before removal/replacement of a P

PCM disconnect supply power from the PCM to be replaced.

- When bifurcated power cords ("Y" leads) are used, these cords

must only be connected to a supply range of 200-240V AC.

## Equipment Handling Precautions

**Caution:** 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 only be run with all modules in place.
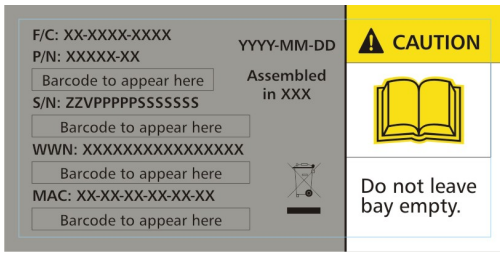


*Module Bay Caution Label*

**Caution:** Operation of the enclosure with ANY drive carrier 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 enclosure system. Dummy drive carrier modules must be fitted to unused drive bays.

# RACK SYSTEM SAFETY PRECAUTIONS

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

- The rack construction must be capable of supporting the total weight of the installed enclosure(s). The design should incorporate stabilizing features suitable to prevent the rack from tipping or being pushed over during installation or in normal use.
- When loading a rack with enclosures, fill the rack from the bottom up and empty from the top down.
- Always remove all PCMs, to minimize weight, before loading the enclosure into a rack.
- Do not try to lift the enclosure by yourself.

> **Caution:** To avoid danger of the rack toppling over, under no circumstances should more than one enclosure be drawn out of the cabinet at any one time.

- 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]).
- The rack design should take into consideration the maximum operating ambient temperature for the enclosure, which is 40°C.
- 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. When addressing these concerns consideration should be given to the electrical power consumption rating shown on the nameplate.
- The electrical distribution system must provide a reliable earth for each enclosure and the rack.
- Each PCM in each enclosure has an earth leakage current of 1.0mA. The design of the electrical distribution system must take into consideration the total earth leakage current from all the PCMs in all the enclosures. The rack will require labelling with "HIGH LEAKAGE CURRENT. 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.

# SYSTEM OVERVIEW

## LACIE 12BIG RACK SERIAL 2 ENCLOSURE

The LaCie 12big Rack Serial 2 design concept is based on an enclosure subsystem together with a set of plug-in modules. A typical enclosure system (as supplied) comprises:

- An Enclosure Chassis comprising:
  - A Midplane PCB
  - An integral, front flange mounted Operator's (Ops) Panel
- Up to two 580W, 100-240V AC Power Cooling Modules (PCMs), (see Figure 2–4)
- Up to two SBB compliant I/0 modules
- Up to 12 Drive Carrier Modules with drives installed.

> **Note:** Dummy Drive Carrier Modules must be fitted in all unused drive bays.

- Rail Kit for rack mounting.

> **Note:** Module and major component locations of the enclosure are shown in Figure 2–1.
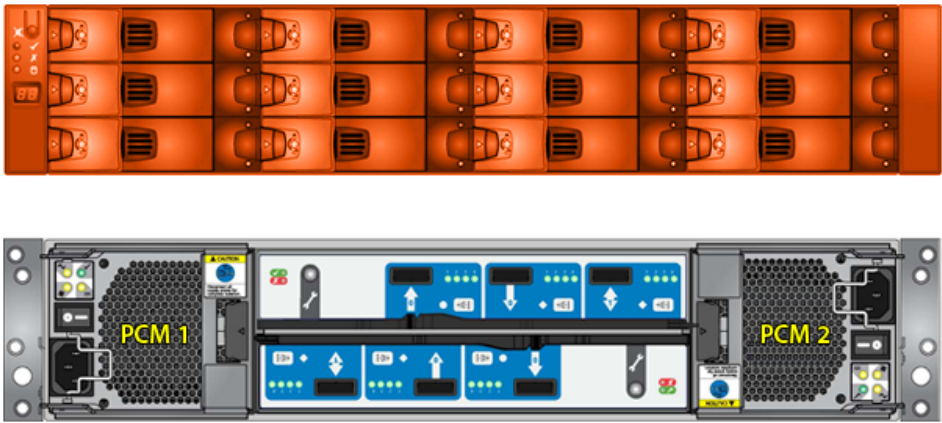


**Figure 2-1 - Module Locations**

# Enclosure Chassis

The Chassis consists of a sheet metal enclosure assembly containing an integrated Midplane PCB and module runner system.

- The chassis is fitted with 19 inch Rack mounting features which enables it to be fitted to standard 19 inch racks and uses 2 EIA units of rack space (i.e. 3.5" high).
- The Midplane PCB provides up to 12 x 3Gb/s SAS Drive connections (SFF8482).
- There are up to 12 drive bays at the front of the enclosure, in horizontal orientation. Each drive bay accommodates a plug-in Drive Carrier Module which can house 12 x 3.5-inch form factor drives horizontally.

> **Note:** A Bay is defined as the space required to house a single 5/8" high disk drive in its carrier module.

- At the rear, the chassis assembly accommodates up to 2 PCMs and up to 2 SBB Modules.
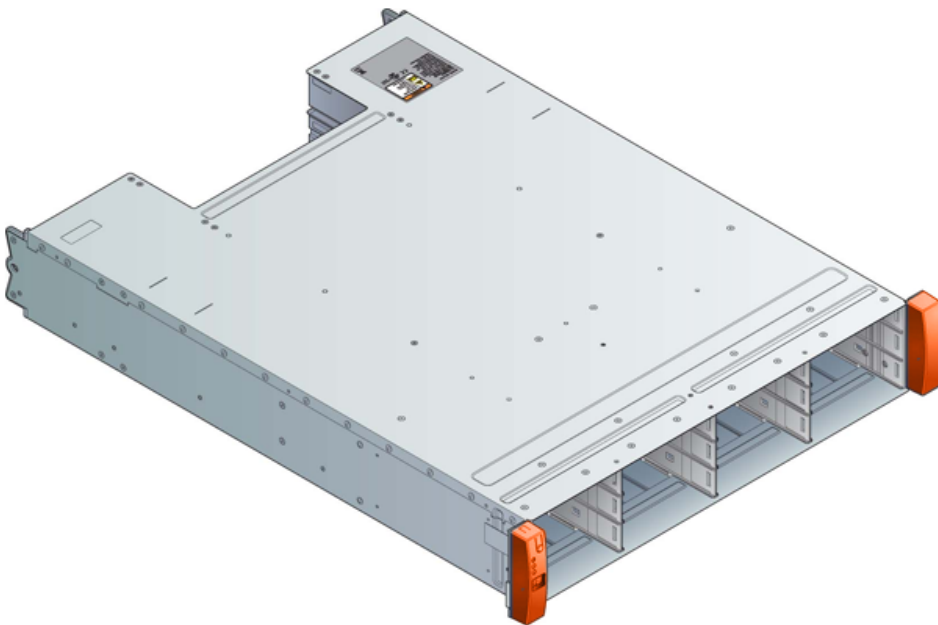
*Figure 2-2 - Enclosure Chassis*

# OPERATOR (OPS) PANEL

The enclosure front panel incorporates an Operator's (Ops) Panel, shown in Figure 2–3, housed on the left hand mounting flange and connected to the Midplane via a flexible cable. The Ops Panel is a passive component, controlled from the midplane and with all its functions driven from the I/O modules.

> **Important:** The Ops Panel is an integral part of the enclosure chassis assembly and is not field replaceable.

This assembly provides the following functions:

- Mute/Input Button
- System Power LED (Green/Amber)
- Module Fault LED (Amber)
- Logical Status LED (Amber)
- Unit Identification LED Display (dual 7 segment LED display)
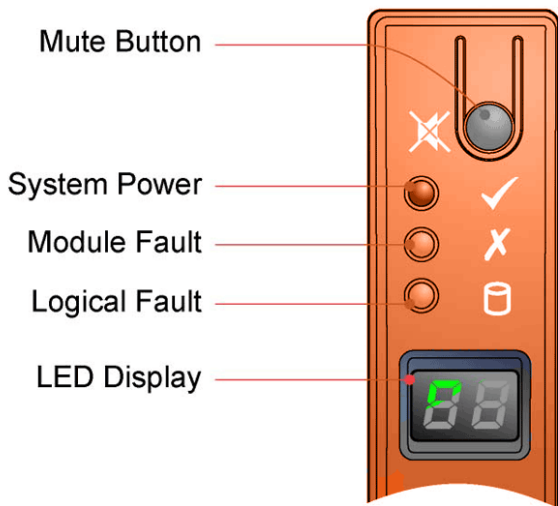- Audible Alarm
- Thermal Sensor



*Figure 2-3 - Enclosure Front Operator's Panel*

## Mute/Input Button

Used in the setting of the Unit Identification display. Also used to transition Alarm state S1 to Alarm state S2/S3 depending on VPD setup (please refer to Table 5–5 for details of the alarm states).

## System Power On/Standby LED (Green/Amber)

This LED shows Amber when Standby Power ONLY is available. It is Green when system power is available.

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## Module Fault LED (Amber)

The module fault LED is illuminated when there is a system hardware fault. It may be associated with a fault LED on a PCM or I/O Module which helps the user to identify the component that has a fault.

## Logical Status LED (Amber)

The Logical Status LED provides indication of a change of status or fault from something other than the Enclosure Management (EM) system. This may be from an Internal or External RAID controller or HBA and communicated to the enclosure (normally via SES). It is usually associated with a disk drive and LEDs at each disk drive position helps the user to identify the drive affected.

## Unit Identification Display

The Unit Identification Display is a dual seven segment display that can be used to provide feedback to the user. Its primary usage is to display an Enclosure Unit Identification Number to assist users in setting up and maintaining multiple enclosure systems.

The Unit Identification Display is configured via a VPD option. By default the display will be OFF, and the dual seven segment display will be OFF. If the VPD selects use of the display, the seven segment display will be ON and display the number stored in VPD.

## Audible Alarm

Audible alarm which is activated by the LaCie 12big Rack Serial 2 firmware for a variety of situations. Please refer to Troubleshooting for more information.

## Thermal Sensor

The ambient thermal sensor provides input to the enclosure about the external operating ambient temperature. This device is a remote sensor to a thermal sensor mounted on the enclosure midplane. It also provides presence detection for the Ops Panel.

**Note:** Please refer to Ops Panel LEDs for a description of the LED and switch functions.

# POWER COOLING MODULE

AC-DC Power is provided by up to four commercial 580 W auto-ranging Power Cooling Modules (PCMs) with integrated axial cooling fans, up to 2 in each module. Fan speed is controlled from the SBB I/O Modules.The system airflow is described in System Airflow.

PCM voltage operating ranges are nominally 100V - 240V AC. A typical PCM is shown in Figure 2–4. Each PCM incorporates an AC mains power input switch and the following status indicators:

- Power LED (Green)
- AC Fail LED (Amber)
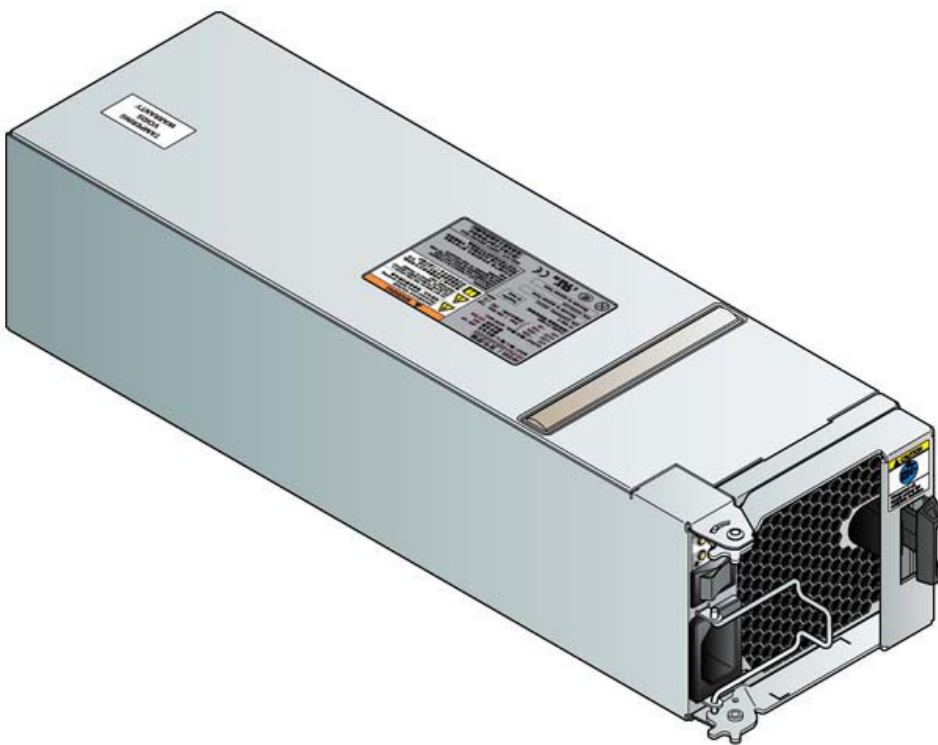- PCM Fail LED (Amber)
- AMD Fail LED (Amber)



*Figure 2-4 - Power Cooling Module*

## Cooling Module

The Power Cooling Module has been designed such that the PCM element is separate from the Cooling control and status element. Therefore, the same module can be used for a Cooling only module if the PCM element is not fitted inside the PCM canister.

## Multiple PCMs

The LaCie 12big Rack Serial 2 includes two PCMs in an enclosure. Multiple PCMs provide redundant power control for the system so that if one PCM fails the other(s) maintains the power supply and enclosure operation is not affected while you replace the faulty module.

PCMs are hot-pluggable and replacement should only take a few minutes to perform but must be completed within 10 minutes from removal of the failed PCM.

> **Important:** 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 populated before operating the enclosure system.

## System Airflow

The system airflow is from the front to the rear of the enclosure, shown below.

- Cooling airflow passes between drives and through, over and under the Multiplan to the central plenum.
- The PCMs pull air from the plenum and from the I/O Module.
- Airflow exits at the rear of the power/cooling module.

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)). The cooling system provides sufficient capacity to ensure that drive maximum temperatures (shown below) are not exceeded:

- Up to 200W combined I/O Module power:
  - 40°C ambient with one Fan failed at 7,000 ft.
  - 35°C ambient with one Fan failed at 10,000 ft.
- Up to 400W combined I/O Module power:
  - 35°C ambient at 7,000 ft.
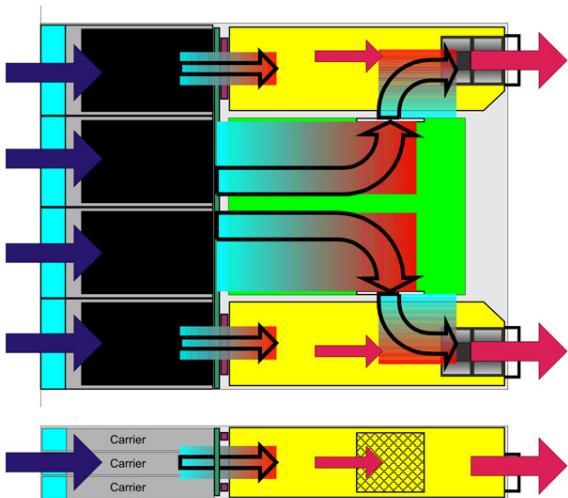  - 30°C ambient at 10,000 ft.



*Figure 2-5 - System Airflow*

# SBB I/O MODULE

> **Note:** Each of the various SBB modules offered with the LaCie 12big Rack Serial 2 platform have their own specification. For more details on a specific module please refer to the SBB I/O Module Installation Guide.

LaCie 12big Rack Serial 2 enclosure systems include up to 2 x I/O Modules: 2 x SBB compliant Interface Slots. Blank modules must be fitted in all unused SBB slots.

The SBB modules are mechanically and electrically compliant to the latest SBB V2 specification.

The system can operate from one module with a module blank providing airflow control in the other slot, or from two modules. Module presence are checked against the start of day configuration to determine invalid configuration conditions.

Each SBB I/O Module includes an EEPROM connected to the SBB I2C bus that contains VPD data describing the function and capability of the SBB module. In this way the SBB modules can discover the type and capabilities of the partner SBB module(s) and vice versa within the enclosure. Incompatible configurations will result in an enclosure system alarm.
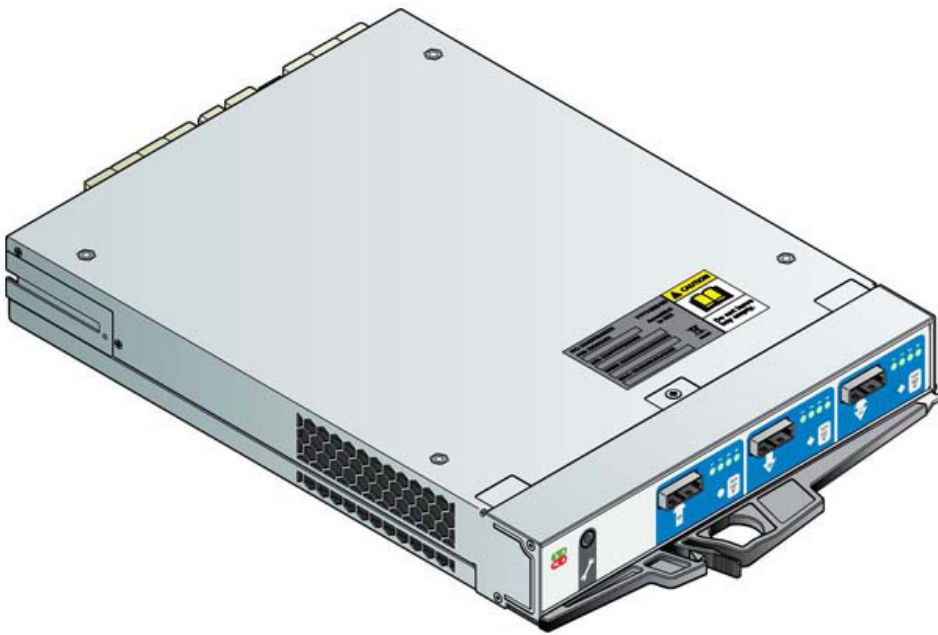


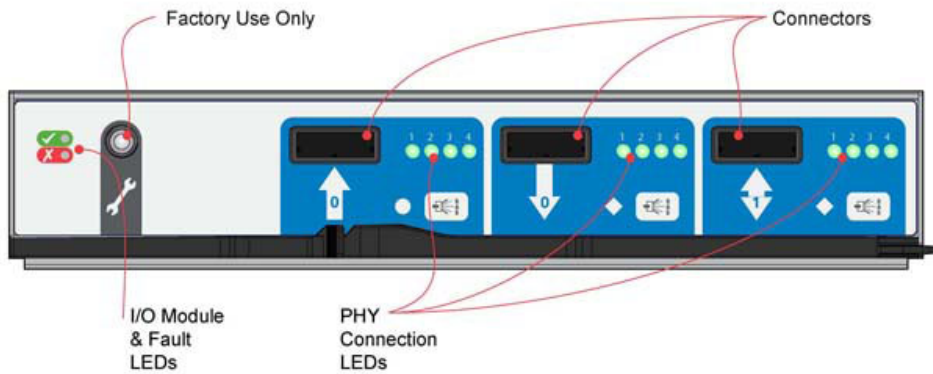*Figure 2-6 - Typical SBB I/O Module*

*Figure 2–7 - SBB I/O Module Connectors and Indicators (viewed from rear of enclosure)*

## I/O Module LEDs

Each I/O module, (Interface or Auxiliary slot), has the following LEDs on the rear faceplate:

- Fault (Amber) to indicate a faulty module. This LED is driven either from a failure detected within the faulty module or by a fault detected by its partner module via cross-over connection provided by the Midplane.
- I/O Module: Green when OK, flashing green indicates a VPD error.
- Host Port Activity: Green Activity, flashing green indicates No Activity

## Blank I/O Modules

Blank I/O Modules are provided and must be fitted in any vacant I/O 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.

## DRIVE CARRIER MODULE

The Drive Carrier Module comprises a hard disk mounted in a carrier.

Each drive bay will house a single Low Profile 1.0 inch high, 3.5 inch form factor disk drive in its carrier. Drives are fitted horizontally.

Each disk drive is enclosed in a sheet steel carrier which provides excellent thermal conduction, radio frequency and electro-magnetic induction protection and affords the drive maximum physical protection.

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

- Camming of carrier into and out of drive bays.
- Positive 'spring loading' of the drive/Midplane connector.

The carrier supports the following interfaces:

- Dual path direct dock Serial Attached SCSI, or

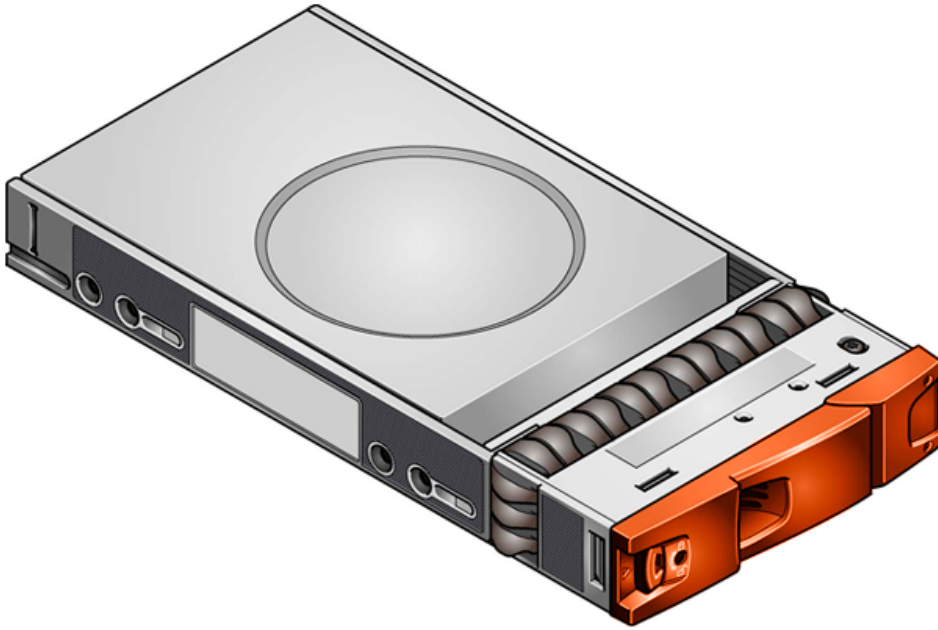- Dual path SATA via a carrier mounted Transition Card.



*Figure 2–8 - 3.5" Drive Carrier Module*

## Drive Status Indicators

Disk drive status is monitored by a Green LED and an Amber LED mounted on the front of each Drive Carrier Module, under ESI processor control, shown in Figure 2–9. Please refer to Drive Carrier Module LEDs for a description of the LED states.

## Anti-tamper Locks

Anti-tamper locks are fitted in the drive carrier handles (Figure 2–9) and are accessed through the small cutout in the latch section of the handle.These are provided to disable the normal 'pinch' latch action of the carrier handle.
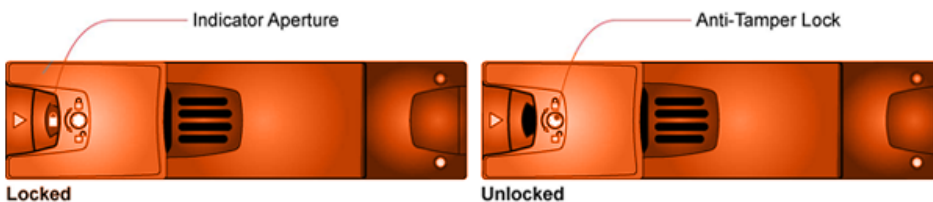


*Figure 2–9 - Anti-tamper Lock*

## Transition Card

The carrier supports a Transition Card positioned between the drive and the Midplane and mounted in the drive carrier. It is mounted vertically in drive carriers.

For Serial ATA use, a Transition Card is attached to the rear of each drive with a SATA connector. A SAS connector is provided for insertion of the drive assembly into the Midplane. Dual path operation of SATA drives is accomplished via an active-active multiplexer device on the Transition Card.

The Transition Card has the following features:

- SAS(STP) to SATA interface
- Active/Active Port selection
- Industry standard SAS connector
- Hot plug support with current inrush limiting (Drive Power Control)
- Proven robust connector interface for multiple insert/extract cycles.
- Upgrade path to Drive Power Control on MicroDongle

## Dummy Drive Carrier Modules

Dummy Drive Carrier Modules are provided for fitting in all unused drive bays. They are designed as integral drive module front caps with handles and must be fitted to all unused drive bays to maintain a balanced airflow.

# ENCLOSURE MANAGEMENT

The Enclosure is actively managed by the various SBB I/O Modules. Management is performed by the modules in the Interface card slots as these have all the required connections. Each module may contain a SAS expander with associated Enclosure Management Processor (ESI). ESI is also referred to as Storage Enclosure Processor (SEP).

If there is an SBB I/O Module and an Auxiliary I/O Module then the enclosure management may be via SES from the Auxiliary module to an SES target on the SBB I/O Module in the Interface Card slot.

The SEP housed in the SBB modules will interface to the enclosure through dedicated control lines, SGPIO or $I^2C$ to the components of the enclosure. The SEP will provide information using SCSI Enclosure Services (SES) ANSI standard through a SES target in a host SAS expander, or alternatively by another target device, dependent upon the module type in use. Note that each IO module contains independent SES targets. If one of the SES targets fails, the other will continue to function.

SES control and monitoring of other functions of the specific interface module type installed will vary according to functions provided and can be found in the module specification or the SES Interface specification appropriate to that module type.

# INSTALLATION

## INTRODUCTION

In this chapter, you are shown how to plan and install your LaCie 12big Rack Serial 2 into an industry standard 19 inch rack cabinet.

> **Caution:** When connecting up the LaCie 12big Rack Serial 2, use only the power cords supplied or cords which match the specification quoted in AC Power Cords.

## PLANNING YOUR INSTALLATION

Before you begin installation you should become familiar with the configuration requirements of your LaCie 12big Rack Serial 2. The correct locations of each of the plug-in modules are shown in Figure 3-1.

> **Important info:** Installation procedures should be performed by Service Personnel Only.
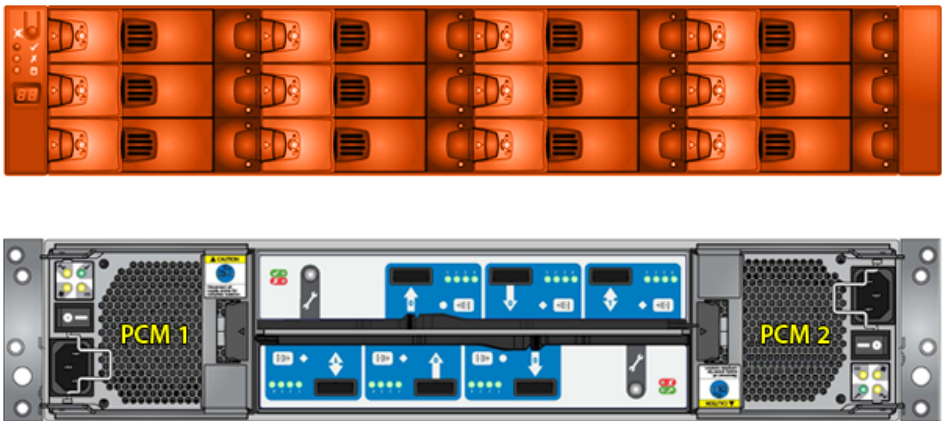


*Figure 3-1 - Module Locations*

# ENCLOSURE INSTALLATION PRE-REQUISITES

LaCie 12big Rack Serial 2 enclosures are supplied and delivered fully populated with drive carrier modules pre-installed.

> **Caution:** The LaCie 12big Rack Serial 2 Enclosure with all its component parts installed is too heavy for a single person to easily install into a rack cabinet.
>
> Ensure that you have fitted and checked a suitable anti-static wrist or ankle strap and observe all conventional ESD precautions when handling LaCie 12big Rack Serial 2 modules and components. Avoid contact with Midplane, Motherboard and module connectors, etc.

Critical pre-requisite requirements and good handling practices are highlighted in the following installation procedures. We encourage you to follow these procedures to ensure that a successful installation is achieved in the easiest manner.

## Preparation of Site and Host Server

Before you begin, make sure that the site where you intend to set up and use your LaCie 12big Rack Serial 2 storage system has the following:

- Standard AC power from an independent source or a rack Power Distribution Unit with a UPS (Universal Power Supply).
- Host computer with the correct software, BIOS and drives. contact your supplier for the correct software levels.
- Before setting up your enclosure ensure you have the following:
  - SAS HBA
  - Mini-SAS to Host Cable
  - Power Cord
  - Rail Kit (if installing within a rack)

Please refer to your supplier for a list of qualified accessories for use with the enclosure. The Accessories Box contains the power cords and other accessories.

## Unpacking the Enclosure System

1. Inspect the packaging for crushes, cuts, water damage or any other evidence of mishandling during transit. If any damage appears present, for future reference, photograph the packaging before opening.
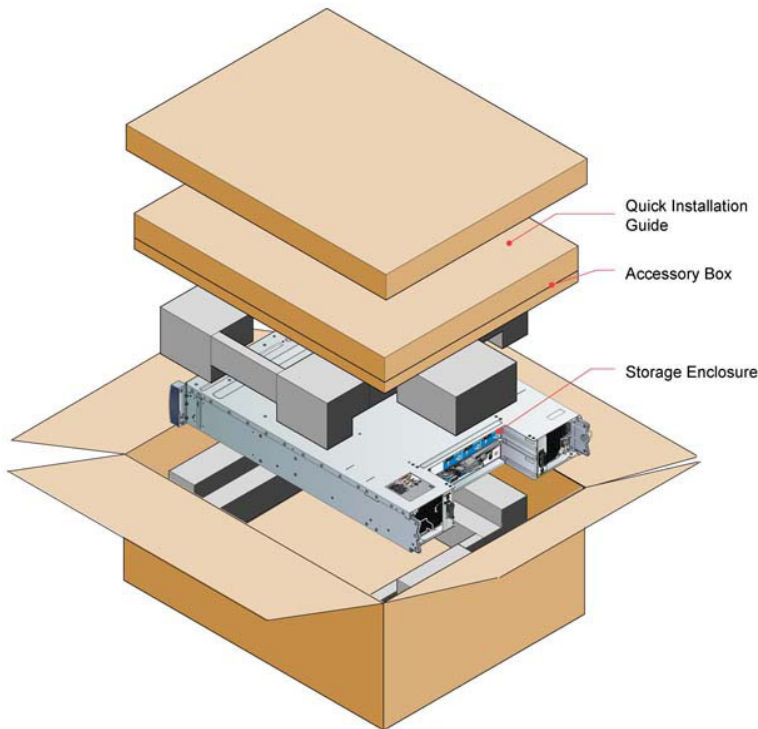2. The unpacking procedure is shown in Figure 3-2.



*Figure 3-2 - Unpacking an Enclosure System*

## Planning and Configuring Your Installation

Before you begin installation you should become familiar with the configuration requirements of your LaCie 12big Rack Serial 2. Please refer to Planning Your Installation for information on your overall system configurations.

When planning your system configuration, please remember that all LaCie 12big Rack Serial 2 enclosure drive bays must be filled with a Drive Carrier Module or a Dummy Drive Carrier Module, no bays should be left completely empty.

## 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 (not supplied):

- Flat blade screwdriver
- Torx driver (for drive module locks)

## Rack Installation Pre-Requisites

The LaCie 12big Rack Serial 2 Enclosure is designed for installation into an industry standard 19 inch cabinet capable of holding such enclosures.

- Minimum depth 707mm (27.83 inches) from rack posts to maximum extremity of enclosure (excludes rear cabling).
- Weight: up to 26kg (57lb), dependent upon configuration, per enclosure.
- A minimum gap of 25mm (1inch) clearance between the rack cover and front of drawer; and 50mm (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 (0.5mm water gauge).

**Caution:** Operation of the LaCie 12big Rack Serial 2 with ANY modules missing will disrupt the airflow and the drives will not receive sufficient cooling. It is ESSENTIAL that all apertures are populated before operating the enclosure system. Dummy Drive Carriers and Blank Modules are available for this purpose.

## RACK MOUNTING RAIL KIT

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

Please contact your supplier to ensure suitable mount rails are available for the rack you are using.

# ENCLOSURE INSTALLATION

1. Remove the Rack Mounting Rail Kit from the Accessories Box and check for damage.
2. Attach left and right chassis slides to the enclosure sides using 8 M3 x 4 buttonhead screws (see Figure 3-3).
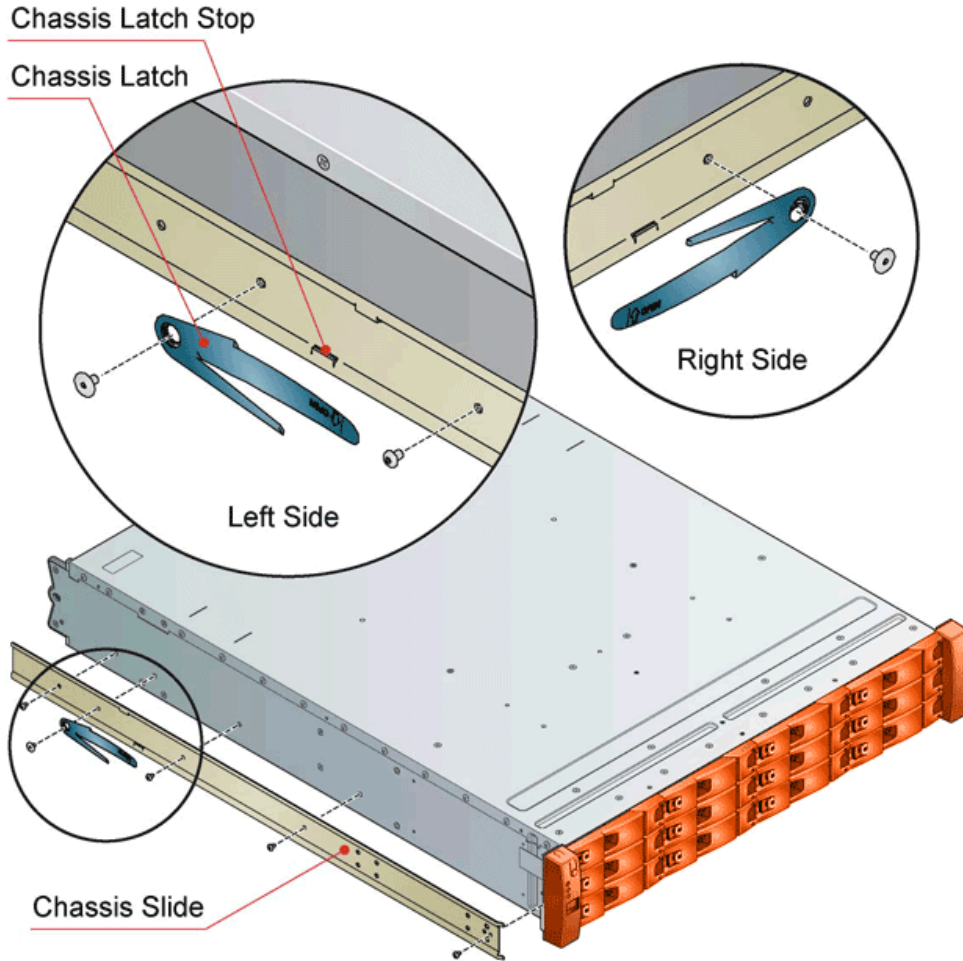


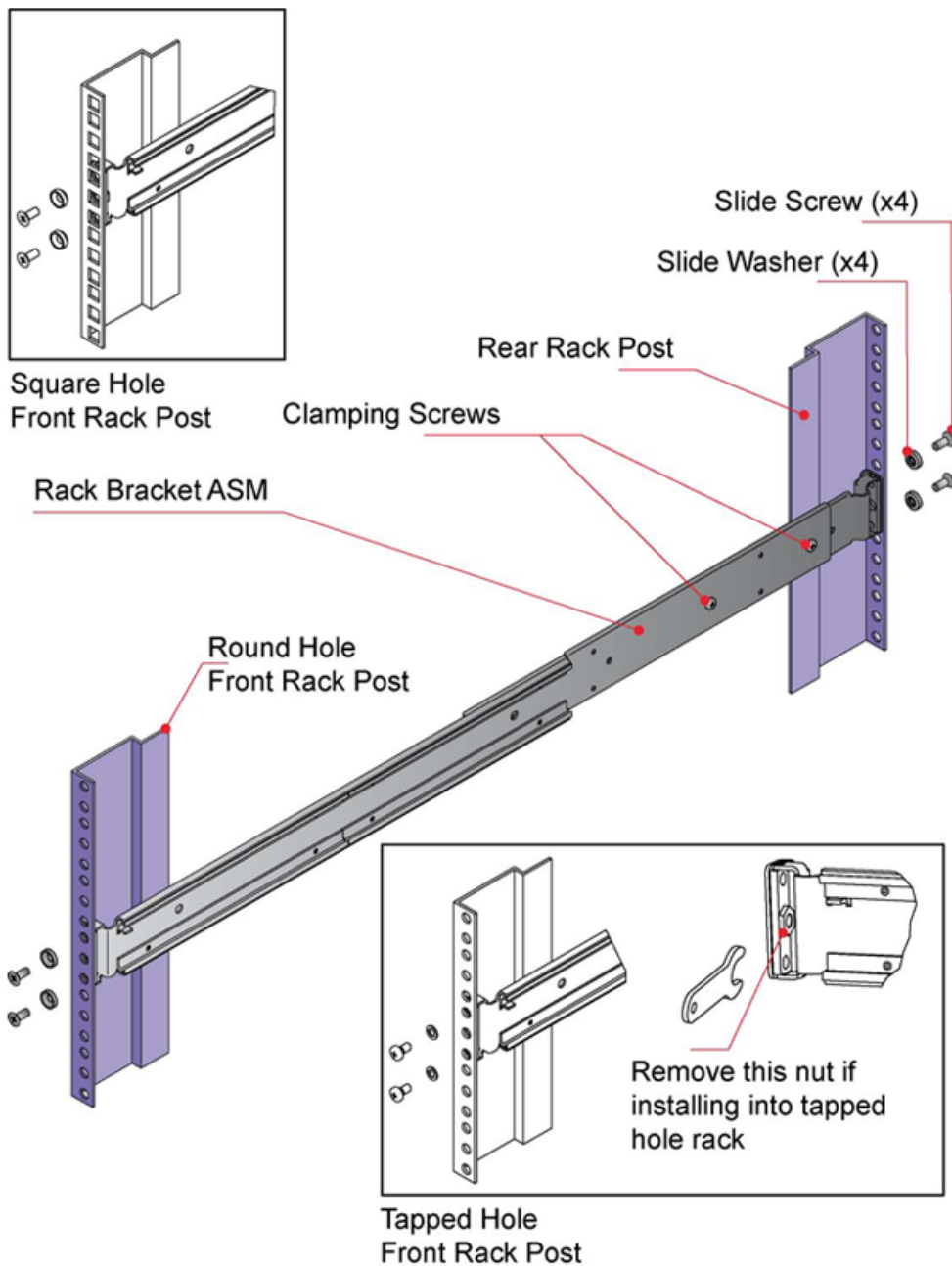**Figure 3-3 - Securing Chassis Slides to Enclosure**

**Figure 3-4 - Securing Brackets to Rail**

3. Assemble the left and right chassis latches using the special chassis latch screws. Ensure the latch is orientated as shown in Figure 3-12, with the spring arm located against its stop. On the right hand side this is at the top, on the left at the bottom.
4. Assemble the rack brackets to the rack posts as follows (see Figure 3-13):
    1. Position the location pin at the rear of the rail into a rear rack post hole. Attach the bracket to the rear rack post using the washers and screws supplied. The screws should be left loose.
    2. Extend rail to fit between the front and rear rack posts.
    3. Attach the bracket to the front rack post using the washers and screws supplied. The screws should be left loose.
    4. Tighten the two clamping screws located along the inside of the rear section of the rack bracket.
5. Mount the enclosure into the rack as follows:
    1. Lift the enclosure and align it with the rack rails.
    2. Carefully insert the chassis slides into the rack rails and push fully home.
    3. Tighten the rear rack bracket mounting screws.
    4. Withdraw enclosure until it reaches the hard stops (approximately 400mm) and tighten the front rack

bracket mounting screws.
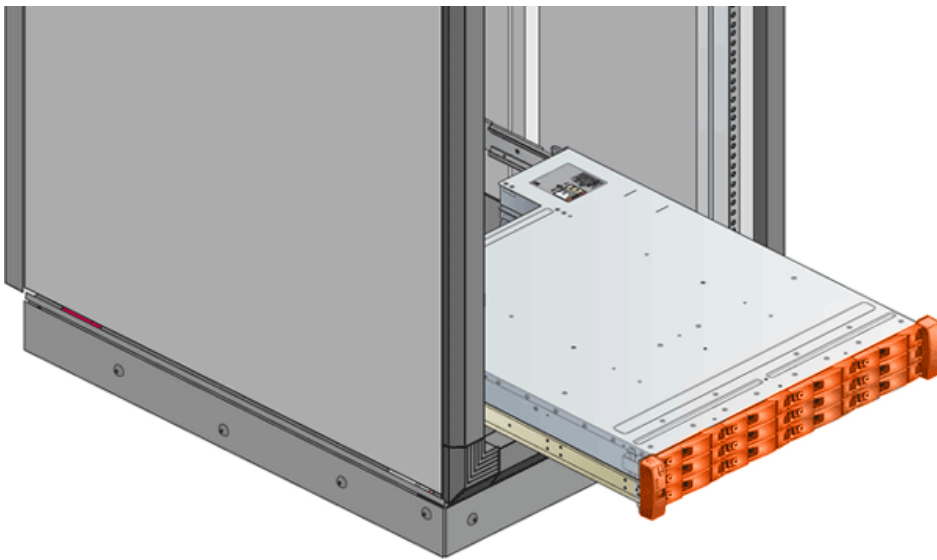
5. Return the enclosure to the fully home position.



*Figure 3-5 - Mounting a LaCie 12big Rack Serial 2 System in a Rack*

## MODULE INSTALLATION

LaCie 12big Rack Serial 2 enclosures are supplied and delivered populated with Midplane PCB and all plug-in modules installed. For information on removal/replacement of plug-in modules, please refer to Troubleshooting and Problem Solving.

### Dummy Drive Carrier Modules

Dummy Drive Carrier Modules must be fitted in all unused drive bays to maintain a balanced airflow.

### Blank Modules

Blank PCM or I/O Modules must be fitted in any vacant I/O Module bays respectively at the rear of the enclosure to maintain airflow and ensure correct operation.

**Important info:** Operation of the LaCie 12big Rack Serial 2 with ANY modules missing will disrupt the airflow and the drives will not receive sufficient cooling.

# POWER CORD CONNECTION

## Parts Check List

▪ Power cords to requisite local standards.

## Procedure

1. Connect the power cord(s) to the Power Distribution Unit(s) (PDUs) (see Figure 3-6).

> **Important info:** When more than one PCM is fitted, to ensure redundancy all power cords must be connected to separate and independent supplies.
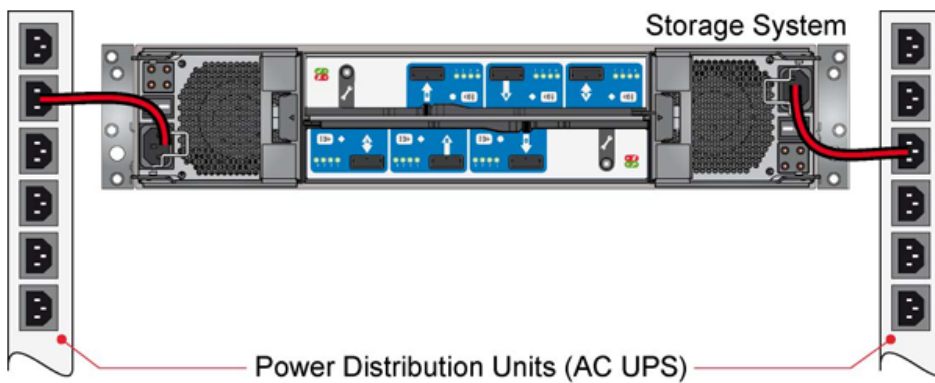


*Figure 3-6 - AC Power Cable Connections to PCMs*

> **Caution:** The power connections must always be disconnected prior to removal of the Power Cooling Module from the enclosure.
>
> When bifurcated power cords ("Y" leads) are used, these cords must only be connected to a supply range of 200-240 VAC.

# SYSTEM CONFIGURATIONS

The basic configuration is a single LaCie 12big Rack Serial 2 enclosure connected to a single Host Bus Adaptor (HBA).

> **Important info:** Connections can be made up to a maximum of 8 enclosures.

Before setting up your enclosure please ensure that you have the following:

- SAS HBA
- Mini-SAS to Host Cable
- Power Cable
- Rack Mounting Rail Kit (if installing within a rack)

Please refer to your supplier for a list of qualified accessories for use with LaCie 12big Rack Serial 2 enclosures. Multiple enclosures may be connected together using SAS patch cables, up to a maximum of 4 enclosures. There are three main expansion configurations:

- Single Host, Single Connection, shown in Figure 3-7
  - Single SBB module
  - Supports SAS or SATA drives
  - Expansion up to 96 drives
- Dual Host, Single Connection
  - Dual SBB module
  - Supports SAS or SATA drives (with dongle)
  - Expansion up to 96 drives
- Dual Host, Dual Connection, shown in Figure 3-8
  - Dual SBB module
  - Supports SAS or SATA drives (with dongle)
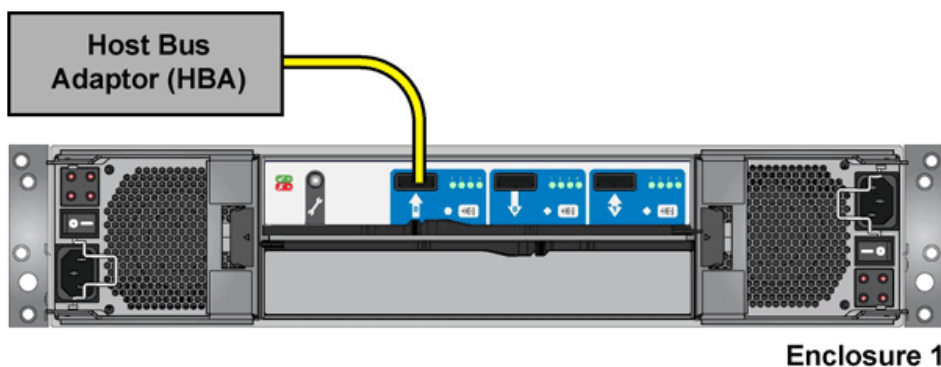  - Expansion up to 96 drives



Enclosure 1

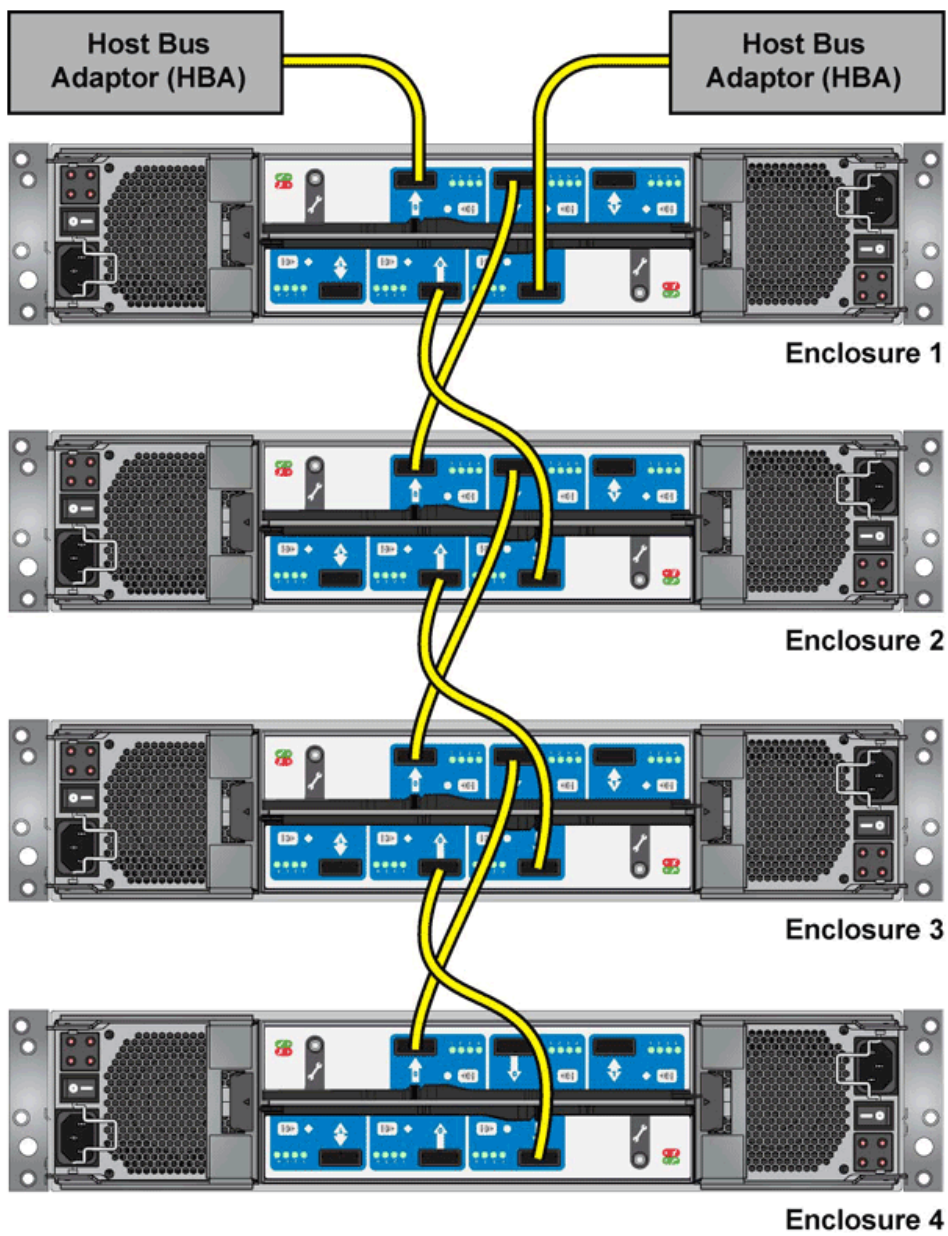**Figure 3-7 - Single Host - Single Enclosure**



**Figure 3-8 - Dual Host - Multiple Enclosures**

**Important info:** In order to use the 12big Rack Serial 2 as an expansion to the 12big Rack Network, internal firmware needs to be updated. On the included CD, run "UpgradeSerial2ForNetwork.bat" located in the **Applications** folder. This batch file will update firmware on up to three expansions connected to the RAID controller. Please wait until the process is finished and all chassis have rebooted.

During this process, you may receive one or several "Event Notification Application" errors. Simply acknowledge the errors by clicking **OK**. They are due to the flashing process and enclosure reboot and have no effect on the status of the host connection.
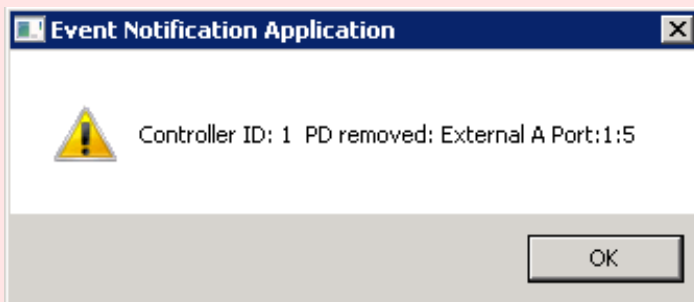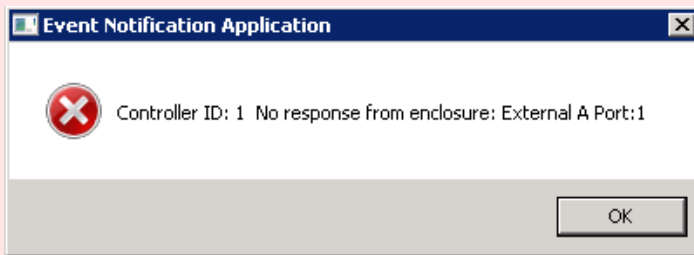




# GROUNDING CHECKS

The product must only be connected to a power source that has a safety electrical earth connection.

The earth connection to the rack must be checked before switching on, by an electrical engineer who is qualified to the appropriate local and National standards to perform the check.

# DATA SECURITY

- Power down your host computer and all attached peripheral devices 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 must be in place for the air to flow correctly around the enclosure and also to complete the internal circuitry.
- If the enclosure system is used with modules missing for more than a few minutes, the enclosure can overheat, causing power failure and data loss. Such use may also invalidate the warranty.
- If you remove a drive module, replace it immediately. If it is faulty, replace it with a drive module of the same type and capacity.
- Ensure that all disk drives are removed from the enclosure before attempting to manhandle or move the rack installation.
- Do not abandon your backup routines.

# OPERATION

## BEFORE YOU BEGIN

Before powering up your LaCie 12big Rack Serial 2 please ensure that all the modules are firmly seated in their correct bays.

## POWER ON

**Caution:** Do not operate the enclosure system 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.

Follow the procedure below to Power On the enclosure.

1. Power On the system by connecting the power cables to the PDU and moving the PCM switch (Figure 4-1) to the ON position
2. The System Power LED on the Ops Panel should be lit (Green) when the enclosure power is activated (and the disk drive motors should start).

**Important info:** If mains power is lost for any reason, on restoration of power the system will re-start automatically.

**Note:** Please refer to Table 5-2 for details of the Ops Panel LEDs and related fault conditions.

### Power Cooling Module LEDs

The PCM incorporates the following LEDs:

| PSU OK: | Green |
|---|---|
| AC Input Fail: | Amber |
| Fan Fail: | Amber |
| DC Output Fail: | Amber |

PCM LEDs and switches are shown in Figure 4-1.
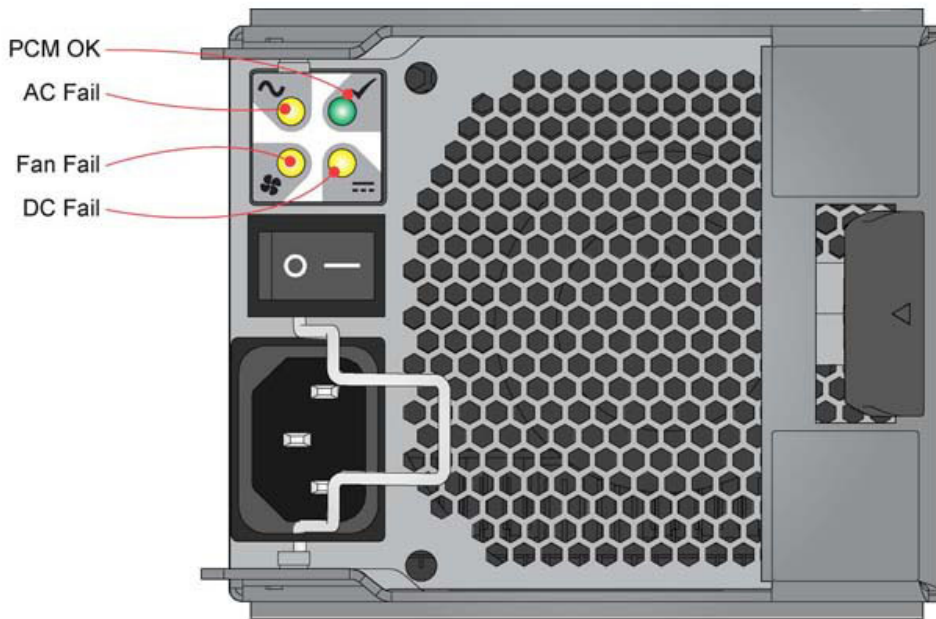
*Figure 4-1 - PCM LEDs*

## OPS PANEL LEDS

The Ops Panel LEDs fault and status conditions are described in Table 4-1 and shown in Figure 4-2. Please refer to Table 5-2 for details of any fault indication.

**Table 4-1: Ops Panel LEDs**

| LEDs | Status |
|------|--------|
| System Power | Constant Green: good or positive indication<br>Constant Amber: fault present |
| Module Fault | Constant or Flashing Amber: fault present |
| Logical Fault | Constant or Flashing Amber: fault present |

*Figure 4-2: Ops Panel LEDs*
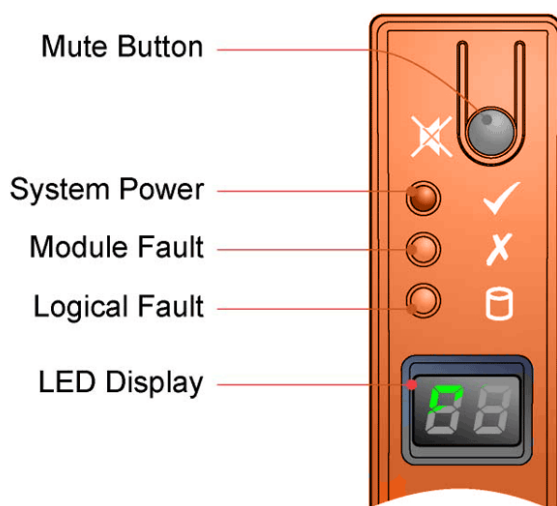
# SETTING THE UNIT IDENTIFICATION NUMBER

## First Set

At first system power on, the Unit Identification Number is not set. The enclosure management system will recognize this and set the display to "00" and flash the digits at 1Hz. The system will delay power up until the Unit Identification Number is set.

1. To set the number, press and hold the Mute switch, which will stop the first digit (left hand digit) flashing and start incrementing the number by 1 every 2 seconds. When the first required number is reached, release the switch for 5 seconds, at which point the first number is locked and the second number may be set.
2. To change the second digit (right hand digit), press and hold the switch again to achieve the desired number, otherwise if there is no action for 5 seconds the enclosure management system will select "0".

   The values "01" to "99" will be valid. Value "00" is reserved and will cause the system to interrupt the power up until set.

   The value "00" will be the default Power On value. Once an enclosure Unit Identification Number is set, it will be stored in the midplane VPD by the Enclosure Management software. On future power cycles, midplane logic will initially set "00" on the display whilst the enclosure management software reads the setting from the VPD. Software will then set the display to the correct value, or halt boot if it is not set or "00". In a situation where there is no enclosure management (no I/O modules, or single module with management failure) the enclosure will display "00".

## Re-set

Re-setting the number is similar to the first set above, with the exception that the user must press and hold the switch for 5 seconds in the first instance to enter the setting mode. On entering this mode the display will flash the current Unit Identification Number setting. A single press (<2 seconds) of the Mute switch will retain the existing setting without increment. The enclosure will ONLY accept the new Unit Identification Number following an Enclosure Power Cycle, hence if the number set on the display is DIFFERENT from that loaded at Start of Day the enclosure will flash both the Module Fault LED and the Logical Status LED, and set alarm state S1 until the enclosure is power cycled.

## Software/SES

The enclosure Unit Identification Number may be read and set via CLI and SES. As above, the new setting will only be applied after a power cycle. All other functionality shall remain the same as described above.

# STARTING THE DRIVES

Unless otherwise selected during installation, all drives in the enclosure should automatically start their motors. If this has not occurred one of the following conditions may exist:

- There may be a power problem (an alarm and power fault indication would normally be active).
- If there is only one PCM present in a 12 drive enclosure, the drive motors will spin up in a delayed sequence.

## Disk Drive LEDs

Each Drive Carrier Module incorporates two LEDs, Upper (Green) and Lower (Amber), shown in Figure 2-9.

- In normal operation the Green LED will be ON and will flicker as the drive operates
- In normal operation the Amber LED state will be:
  - OFF if there is no drive present,
  - OFF as the drive operates, and
  - ON if there is a drive fault present.

## Engaging the Drive Module 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.

### Activating the Locks

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

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

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

> **Note:** A drive carrier cannot be installed if its anti-tamper lock is activated outside the enclosure.
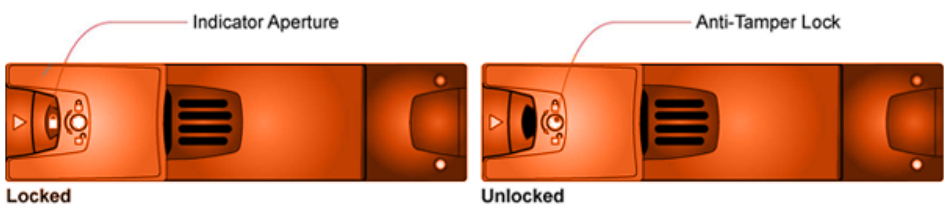


*Figure 4-3 - Activating the Anti-tamper Lock*

# POWER DOWN

To power the enclosure system down, either switch off the Power Cooling Module(s) installed in the enclosure by moving the PCM switch (Figure 4-1) to the OFF position. or remove AC mains at the power source.

# TROUBLESHOOTING AND PROBLEM SOLVING

## OVERVIEW

The LaCie 12big Rack Serial 2 includes an Enclosure Services Processor and associated monitoring and control logic to enable it to diagnose problems within the enclosure's power, cooling and drive systems.

The sensors for power and cooling conditions are housed within the PCMs. There is independent monitoring for each module.

## Initial Start-up Problems

### Faulty Cords

First check that you have wired up the enclosure system correctly. Then, if:

- cords are missing or damaged
- plugs are incorrect
- cords are too short

Call your supplier for replacements.

### Alarm Sounds On Power Up

Please refer to Troubleshooting.

### Computer Doesn't Recognize the LaCie 12big Rack Serial 2

1. Check that the interface cables from the LaCie 12big Rack Serial 2 to the host computer are fitted correctly.
2. Check that the LEDs on all installed drive carrier modules are illuminated (Amber). Note that the drive LEDs will not be lit during drive spinup.
3. Check that Drive Carrier Modules have been correctly installed.
4. Check any visible SAS indicators.
5. Check HBA BIOS for SAS/SATA target visibility.
6. Verify operating system driver installation.

# LEDS

Green LEDs are always used for good or positive indication, flashing Green/Amber if non-critical conditions exist. Red or Amber LEDs indicate there is a critical fault present within the module.

## Power Cooling Module LEDs

Under Normal conditions the bi-color Power On LEDs (Figure 4–1) will be illuminated constant GREEN. When a fault occurs the Power On LEDs will be illuminated constant RED.

**Table 5–1: PCM LED States**

| PCM OK (Green) | Fan Fail (Amber) | AC Fail (Amber) | DC Fail (Amber) | Status |
|---|---|---|---|---|
| OFF | OFF | OFF | OFF | No AC (any PCM) |
| OFF | OFF | ON | ON | No AC (this PCM only) |
| ON | OFF | ON | ON | AC present PCM On OK |
| OFF | ON | OFF | OFF | PCM Fan Fail |
| OFF | ON | ON | ON | PCM fault (over amp, over voltage, over current) |
| FLASHING | OFF | OFF | OFF | Standby mode |
| OFF | FLASHING | FLASHING | FLASHING | PCM firmware download |

# Ops Panel LEDs

The Ops Panel (Figure 4–2) displays the aggregated status of all the modules. The Ops Panel LEDs are defined in Table 5–2.

> **Note:** The Ops Panel is supplied as an integral part of the enclosure core product and is not user replaceable.

**Table 5–2: Ops Panel LED States**

| System Power (Green/Amber) | Module Fault (Amber) | Logical Fault (Amber) | LED Display | Associated LEDs/Alarms | Status |
|---|---|---|---|---|---|
| ON | OFF | OFF | X | | Aux present, overall power failed or switched off |
| ON | ON | X | X | Single beep, then double beep | Ops Panel Power On (5s), test state |
| ON | OFF | OFF | X | | Power On, all functions good |
| ON | ON | X | X | PCM Fault LEDs, Fan Fault LEDs | Any PCM fault, Fan fault, over or under temp. |
| ON | ON | X | X | SBB Module LEDs | Any SBB Module fault |
| ON | ON | X | X | | Enclosure logical fault |
| ON | Flash | X | X | Module state LED on SBB module | Unknown (invalid or mixed) SBB module type installed, DC bus failure (inter SBB comms) LaCie 12big Rack Serial 2 VPD configuration error |
| ON | Flash | X | X | PCM Fault LEDs, Fan Fault LEDs | Unknown (invalid or mixed) PCM type installed or DC bus failure (PCM comms) |
| ON | X | ON | X | Array in failed or degraded state | drive failure has occurred causing loss of availability or redundancy |
| ON | X | Flash | X | Array in impacted state | Arrays operating background function |
| ON | Flash | Flash | X | SES state S! | Enclosure ID setting different from Start of Day |
| X | X | X | Flash | | SES controlled Enclosure ID or Invalid ID selected |

KEY: X = Disregard.

# Drive Carrier Module LEDs

Disk drive status is monitored by a GREEN LED and an AMBER LED mounted on the front of each Drive Carrier Module, shown in Figure 5–1 and Figure 5–2. The LED conditions are defined in Table 5–3.

- In normal operation the Green LED will be ON and will flicker as the drive operates
- In normal operation the Amber LED state will be:
  - OFF if there is no drive present,
  - OFF as the drive operates, and
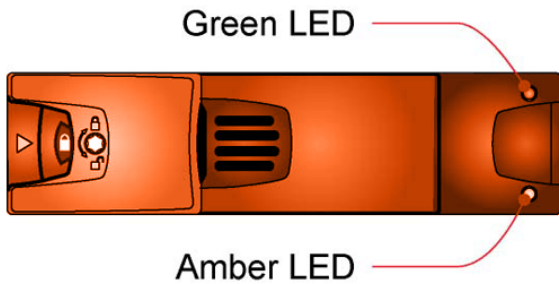  - ON if there is a drive fault present.



*Figure 5-1 - Drive Carrier LEDs*

**Table 5–3: Drive LED States**

| Green Drive LED | Amber Drive LED | Associated Ops Panel LED | Status |
|---|---|---|---|
| OFF | OFF | None | No drive installed |
| On/Blink/Off with activity or start up | X | None | Drive installed and operational |
| ON | Flash 1s On/1s Off | None | SES device identity set |
| ON | ON | Logical Fault (Amber) | SES device fault bit set |
| OFF | ON | Module Fault (Amber) | Power control circuit failure |
| ON | Flash 3s On/1s Off | Logical Fault (Amber) | Failed disk array |

KEY: X = Disregard.

**Important info:** Dummy Drive Carrier Modules must be fitted to all unused drive bays to maintain a balanced air flow.

## I/O Module LEDs

I/O Module faults are indicated by the Amber Fault LED on the module faceplate. VPD errors are indicated by the Module OK LED flashing Green. Host port connections are monitored by Green Activity LEDs. LED states are shown in Table 5–4.

**Table 5–4: I/O Module LED States**

| I/O Module OK (Green) | I/O Module Fault (Amber) | Host Port Activity (Green) | Status |
|---|---|---|---|
| ON | OFF | X | I/O Module OK |
| OFF | ON | X | I/O Module Fault |
| X | X | OFF | No Host Port Connection |
| X | X | ON | Host Port Connection - No Activity |
| X | X | Flashing | Host Port Connection - Activity |
| Flashing | X | X | I/O Module VPD Error |

KEY: X = Disregard.

## AUDIBLE ALARM

An Audible Alarm is located on the Ops Panel and is activated by the LaCie 12big Rack Serial 2 firmware for a variety of situations.

**Table 5–5: Alarm States**

| Alarm State | Action | Action with Mute Button Pressed |
|---|---|---|
| S0 | Normal Mode: Silent | Bleep twice |
| S1 | Fault Mode: 1s on/1s off | Transition to S2 or S3, (see Notes) |
| S2 | Remind Mode: Intermittent Bleep | None |
| S3 | Muted Mode: Silent | None |
| S4 | Critical Fault Mode: Continuous Alarm | None: Mute not active |

**Notes:**

1 When in state S1, If Mute is not pressed after 2 minutes, automatically transition state S2 or S3, (VPD setup option).
2 Alarm states S1 to S4 return to S0 upon cessation of fault.
3 Critical Fault state S4 can be entered from any other state.

The Audible Alarm can be muted by pressing the Mute button on the Ops Panel.

Please refer to troubleshooting for more information.

# TROUBLESHOOTING

The following sections describe common problems, with possible solutions, which can occur with your LaCie 12big Rack Serial 2.

For details on how to remove and replace a module see Module Removal and Replacement.

**Table 5–6: Alarm Conditions**

| Status | Severity | Alarm | Ops Panel LED |
|---|---|---|---|
| PCM Alert – Loss of DC power from a single PCM | Fault – No Loss of Redundancy | S1 | Module Fault |
| PCM Alert – Loss of DC power from a single PCM | Fault – Loss of Redundancy | S1 | Module Fault |
| PCM Fan Fail | Fault – Loss of Redundancy | S1 | Module Fault |
| SBB Module detected PCM Fault | Fault | S1 | Module Fault |
| PCM Removed | Configuration Error | None | Module Fault |
| Enclosure Configuration Error (VPD) | Fault – Critical | S1 | Module Fault |
| Low Warning Temperature Alert | Warning | S1 | Module Fault |
| High Warning Temperature Alert | Warning | S1 | Module Fault |
| Over Temperature Alarm | Fault – Critical | S4 | Module Fault |
| I2C Bus failure | Fault – Loss of Redundancy | S1 | Module Fault |
| Ops Panel Communication Error (I2C) | Critical Fault | S1 | Module Fault |
| Raid Error | Fault – Critical | S1 | Module Fault |
| SBB Interface Module Fault | Fault – Critical | S1 | Module Fault |
| SBB Interface Module Fault – No functioning modules remaining | Fault – Critical | S4 | Module Fault |
| SBB Interface Module Removed | Warning | None | Module Fault |
| Drive Power Control Fault | Warning – No loss of drive power | S1 | Module Fault |
| Drive Power Control Fault | Fault – Critical – loss of drive power | S1 | Module Fault |
| Drive Removed | Warning | None | Insufficient Power Available |
| Warning | None | Module Fault | |

## System Faults

| Symptom | Cause | Action |
| --- | --- | --- |
| Audible alarm sound | Internal fault detected (e.g. failure of an internal communications path) | Check for other AMBER LED indications on the PCMs. If there is a PCM error present there may be a communications problem with that PCM. Remove and then re-fit the PCM, if the problem persists then change the PCM. |

## Power Cooling Module Faults

| Symptom | Cause | Action |
| --- | --- | --- |
| 1 Ops Panel Module Fault LED amber<br>2 Audible alarm sounding.<br>3 Fan Fail LED is illuminated on PCM | 1 Any power fault.<br>2 A thermal condition which could cause PCM overheating.<br>3 A fan failure. | 1 Check AC mains connections to PCM is live.<br>2 Disconnect the PCM from mains power and remove the PCM. Re-install: if problem persists, replace PCM.<br>3 Reduce the ambient temperature. |

## Thermal Monitoring and Control

The LaCie 12big Rack Serial 2 uses extensive thermal monitoring and takes a number of actions to ensure component temperatures are kept low and also to minimize acoustic noise. Air flow is from front to rear of the enclosure.

| Symptom | Cause | Action |
| --- | --- | --- |
| If the ambient air is below 25 °C and the fans are observed to increase in speed then some restriction on airflow may be causing additional internal temperature rise.<br>Note: This is not a fault condition. | The first stage in the thermal control process is for the fans to automatically increase in speed when a thermal threshold is reached. This may be caused by higher ambient temperatures in the local environment and may be perfectly normal.<br>Note: This threshold changes according to the number of drives and power supplies fitted. | 1 Check the installation for any airflow restrictions at either the front or rear of the enclosure. A minimum gap of 25mm at the front and 50mm at the rear is recommended.<br>2 Check for restrictions due to dust build-up; clean as appropriate.<br>3 Check for excessive re-circulation of heated air from rear to the front, use in a fully enclosed rack installation is not recommended.<br>4 Check that all blank modules are in place.<br>5 Reduce the ambient temperature. |

## Thermal Alarm

| Symptom | Cause | Action |
|---|---|---|
| 1 Ops Panel Module Fault LED amber. 2 An amber LED on one or more PCMs. | If the internal temperature measured in the airflow through the enclosure exceeds a pre-set threshold a thermal alarm will sound. | 1 Check local ambient environment temperature is below the upper 35°C specification. 2 Check the installation for any airflow restrictions at either the front or rear of the enclosure. A minimum gap of 25mm at the front and 50mm at the rear is recommended. 3 Check for restrictions due to dust build-up, clean as appropriate. 4 Check for excessive re-circulation of heated air from rear to the front, use in a fully enclosed rack installation is not recommended. 5 If possible shutdown the enclosure and investigate the problem before continuing. |

# PCM FIRMWARE PROGRAMMING FAILURE

If a PCM is being firmware programmed and the download fails then the PCM fans will go to full speed and the PCM LEDs will flash as follows:

- Power LED: Green
- AC Fail LED: Amber
- PCM Fail LED: Amber
- AMD Fail LED: Amber

> **Important info:** In this situation (where PCM programming has failed) the PCM can be reprogrammed but it must not be moved between bays. If the PCM is moved it must be returned to the original bay before reprogramming can take place.

# DEALING WITH HARDWARE FAULTS

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

**Caution:** If the LaCie 12big Rack Serial 2 is powered up and you remove any module, replace it immediately. If the system is used with any modules missing for more than a few minutes, the enclosure can overheat, causing power failure and data loss. Such action will invalidate the warranty.

- Replace a faulty drive with a drive of the same type and equivalent or greater capacity.
- All drive bays must be fitted with a Drive Carrier Module or a Dummy Carrier Module in order to maintain a balanced air flow.
- All the supplied plug-in power supply units, electronics modules and blank modules must be in place for the air to flow correctly around the cabinet.

**Caution:** Observe all conventional ESD precautions when handling LaCie 12big Rack Serial 2 modules and components. Avoid contact with Midplane components and module connectors, etc.

# CONTINUOUS OPERATION DURING REPLACEMENT

Your hardware or management software Enclosure Management application will determine the capability of replacing a failed disk without loss of access to any filles system on the enclosure. Enclosure access and use during this period is uninterrupted.

If an enclosure contains two or more PCMs, they can maintain power to the system while a faulty PCM is replaced.

# MODULE REMOVAL AND REPLACEMENT

## OVERVIEW

The LaCie 12big Rack Serial 2 includes an Enclosure Services Processor and associated monitoring and control logic to enable it to diagnose problems within the enclosure's power, cooling and drive systems.

**Caution:** Whenever replacing a module NEVER leave an EMPTY bay in the rear of the enclosure, obtain a replacement or blank module before removing the problem part.

## 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 LaCie 12big Rack Serial 2 plug-in modules and components. Avoid contact with Midplane components and module connectors, etc.

## REPLACING POWER COOLING MODULES

**Note:** The Power Cooling Module (PCM) is hot-swappable and therefore removal/replacement may be performed by the user.

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

### Removing a Power Cooling Module

**Caution:** Prior to removing the PCM, please disconnect the power from the PCM, by either the mains switch (where present) or by physically removing the power source in order to ensure that your system has warning of an imminent power shutdown. A faulty PCM must be replaced by a fully operational PCM within 24 hours.

1. Ensure that you identify the faulty PCM correctly.
2. Switch off and disconnect the power supply cord.

3. Grasp the latch and the side of the PCM handle between thumb and forefinger, squeeze together and open the handle to cam the PCM out of the enclosure (see Figure 6-1).
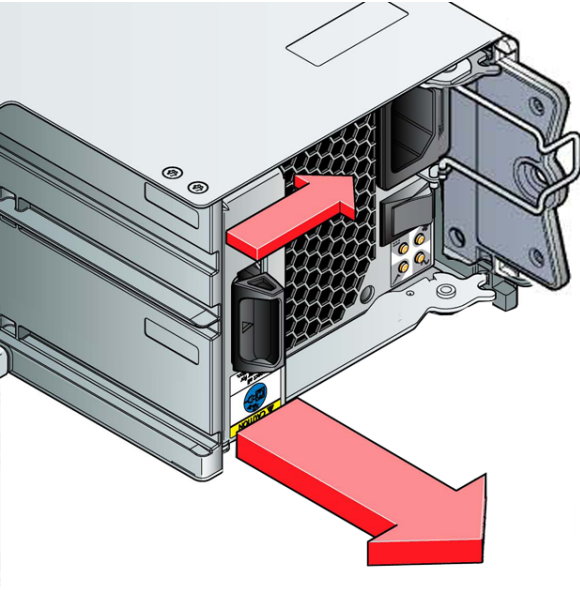


**Figure 6-1 - Removing a PCM (1)**

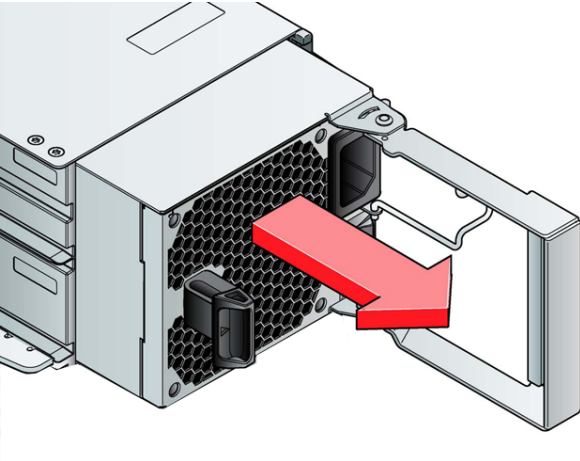4. Grip the handle and withdraw the PCM. (Figure 6-2).



**Figure 6-2 - Removing a PCM (2)**

# Installing a Power Cooling Module

**Parts Check List**

- 580W AC PCM

> **Important info:** 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 enclosure system.

> **Caution:** Do not remove covers from the PCMs. Danger of electric shock inside. Return the PCM to your supplier for repair.
>
> Handle the PCM carefully and avoid damaging the connector pins. Do not install the PCM if any pins appear to be bent.

1. Check for damage, especially to all connectors.
2. With the PCM handle in the open position, slide the module into the enclosure (Figure 6-3).
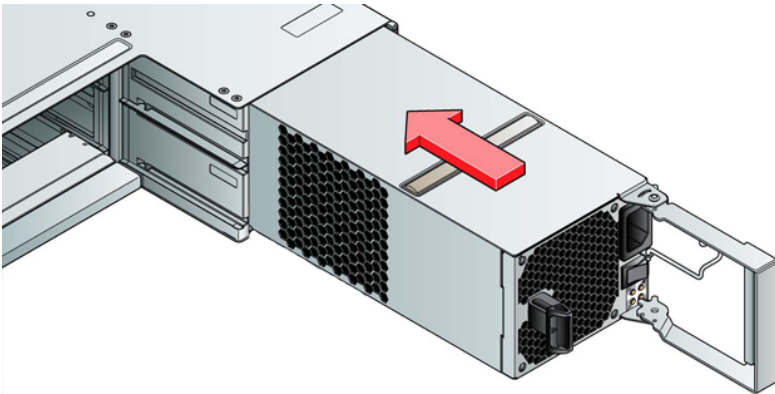
**Figure 6-3 - Installing a PCM (1)**

3. Cam the module home by manually closing the PCM handle. A click should be heard as the handle latch engages (see Figure 6-4).
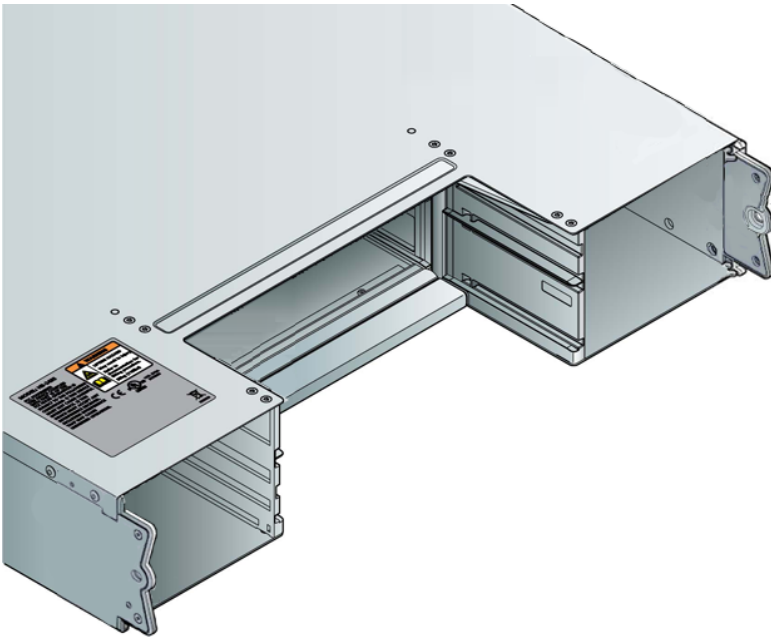
**Figure 6-4 - Installing a PCM (2)**

4. Connect the power cables to the power source and to the PCM.

5. Secure the strain relief bales.

# REPLACING DRIVE CARRIER MODULES

**Caution:** Observe all conventional ESD precautions when handling LaCie 12big Rack Serial 2 modules and components. Avoid contact with Midplane components and module connectors, etc.

## Removing a Drive Carrier Module

Drive spin down: Damage can occur to a drive if it is removed while still spinning. If possible use the operating system to spin down the drives prior to removal. If this is not possible we recommend that you perform ALL steps of the following procedure to ensure that the drive has stopped prior to removal.

1. If the anti-tamper lock has been activated, de-activate by locating the key into its socket and rotating it in an anti-clockwise direction until the indicator is no longer visible in the aperture beside the key.
2. Release the carrier handle, by pressing the latch in the handle towards the handle hinge (i.e. towards the front of the enclosure), see Figure 6-5).
3. Gently withdraw the Drive Carrier Module approximately 1 inch (25mm), and wait 30 seconds (see Figure 6-6).
4. Withdraw the module from the drive bay.

**Caution:** Dummy Drive Carrier Modules MUST be fitted to ALL unused drive bays.There will be inadequate drive cooling if any are left open.
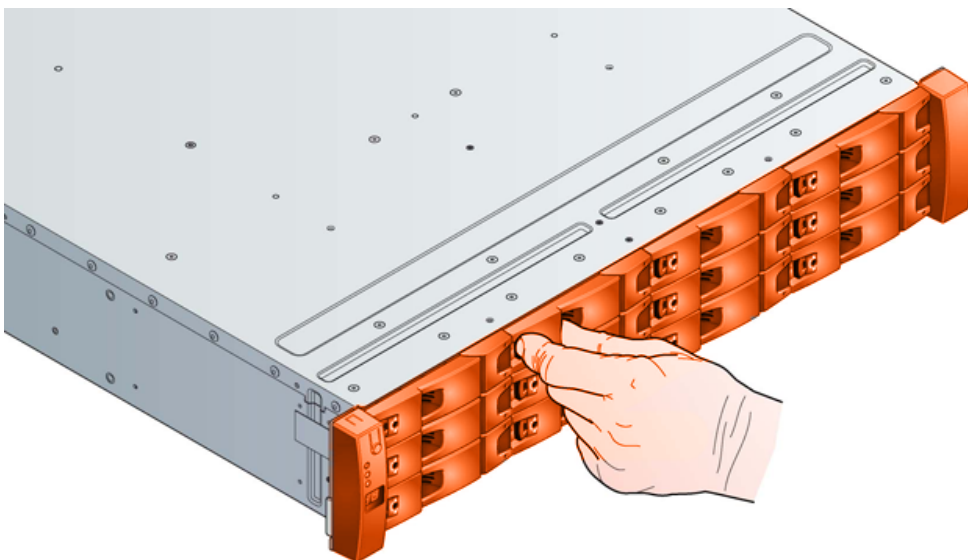


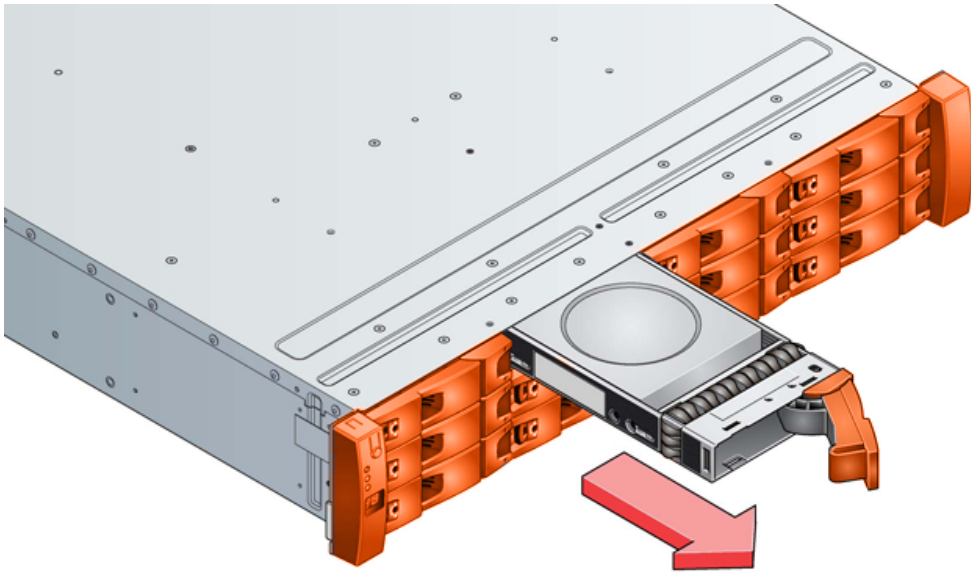*Figure 6-5 - Removing a Drive Carrier Module (1)*

*Figure 6-6 - Removing a Drive Carrier Module (2)*

# Installing a Drive Carrier Module

**Important info:** A Drive Carrier Module cannot be installed if its anti-tamper lock is activated outside the enclosure. Please refer to Removing a Drive Carrier Module for the de-activation procedure.

**Parts Check List**

- 3.5" Drive Carrier Module

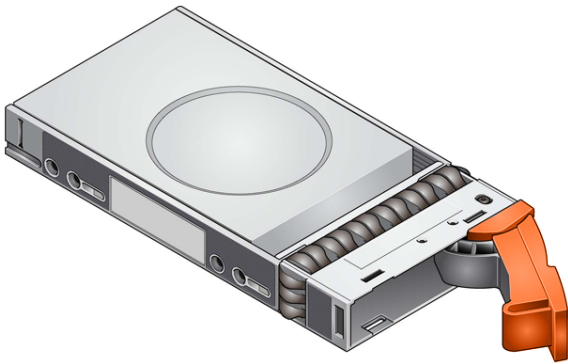1. Release the drive carrier handle, by depressing the latch in the handle (see Figure 6-7).



**Figure 6-7 - Installing a Drive Carrier Module (1)**

2. Insert the Drive Carrier Module into the enclosure (Figure 6-8). **Important:** Ensure that the drive carrier is orientated so that the drive is uppermost and the handle opens from the left, as shown in Figure 6-8.
3. Slide the drive carrier, gently, all the way into the enclosure.
4. Cam the drive carrier home - the camming foot on the base of the carrier will engage into a slot in the enclosure. Continue to push firmly until the handle fully engages. A click should be heard as the latch engages and holds the handle closed.

**Caution:** Ensure that all drive carriers are fully engaged in the enclosure by firmly pushing each one home into the slot, as shown in Figure 6-9.
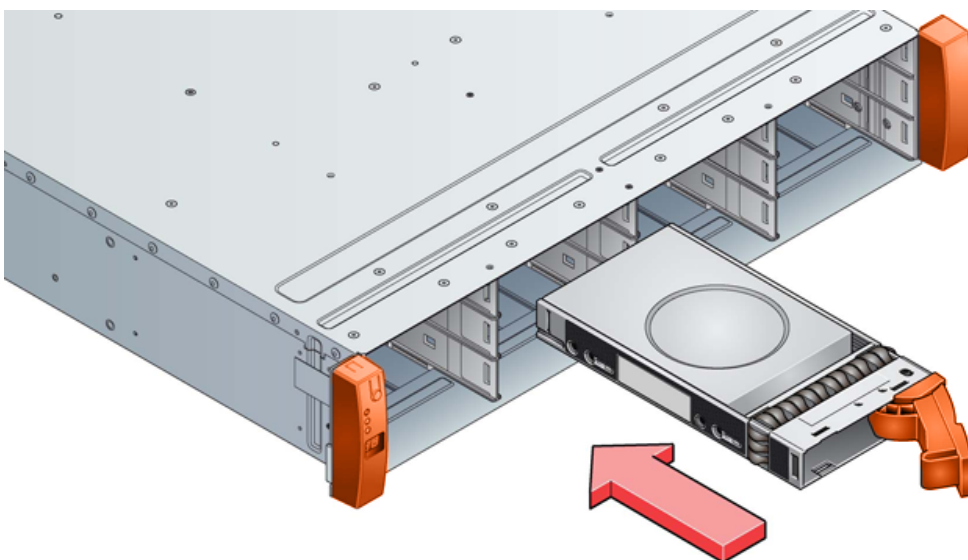
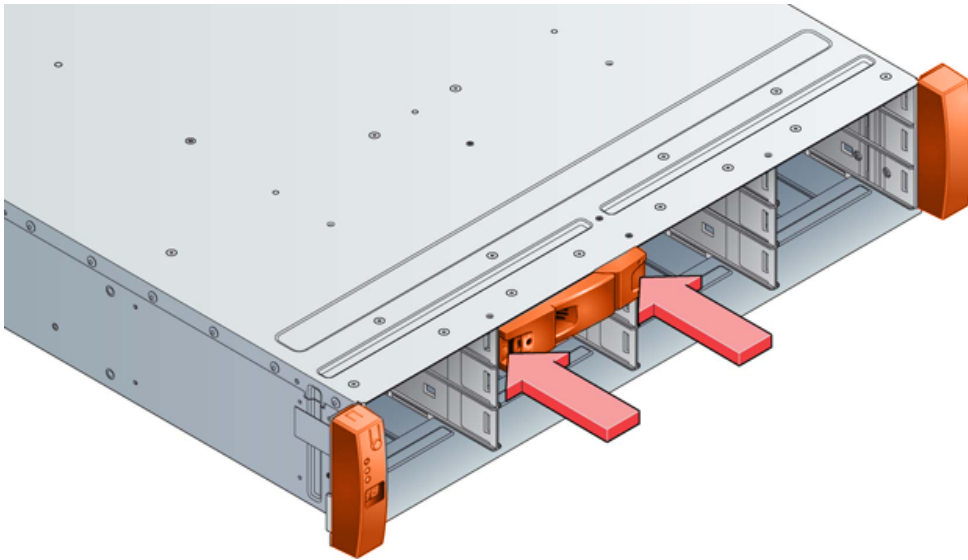

*Figure 6-8 - Installing a Drive Carrier Module (2)*

*Figure 6-9 - Engaging a Drive Carrier Module in an Enclosure*

## Activating the Anti-tamper Locks

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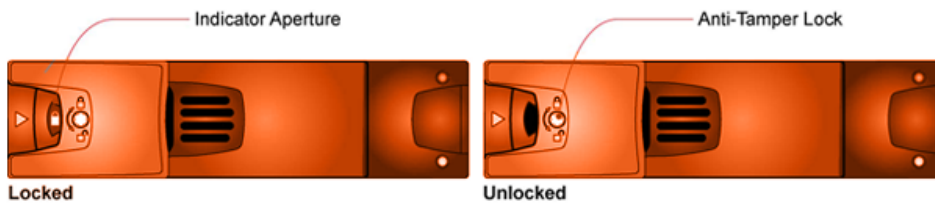4. Remove the key.



*Figure 6-10 - Activating the Anti-tamper Lock*

## Dummy Carrier Module Removal/Replacement

Dummy Drive Carrier Modules are removed and replaced in the enclosure simply by pulling the module out of the enclosure or pushing it into place.

# REPLACING I/O MODULES

**Note:** The I/O Module is hot-swappable and therefore removal/replacement may be performed by the user.

**Important info:** This section provides only general guidelines on I/O Module replacement, please refer to the SBB I/O Module Installation Guide (P/N xxxxx-01) for more detailed procedures. However, the information included here is adequate for the fitting of Blank I/O Modules.

**Caution:** Blank I/O Modules MUST be fitted in all unused slots, there will be inadequate enclosure cooling if the slot is left open.

## Removing an I/O Module

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

1. Grasp the module latch between the thumb and forefinger and squeeze them together to release the latch.
2. Pull the latch outward to cam the module out of the enclosure (Figure 6-11).
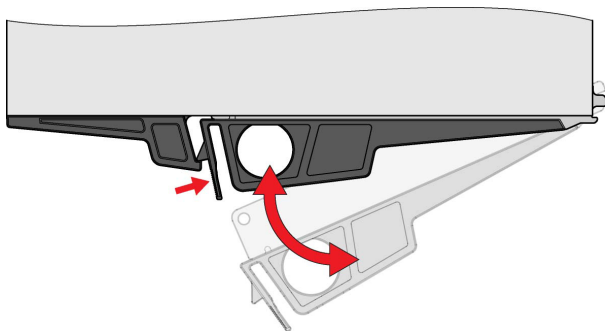3. Grip the latch handles and withdraw the module (Figure 6-12).



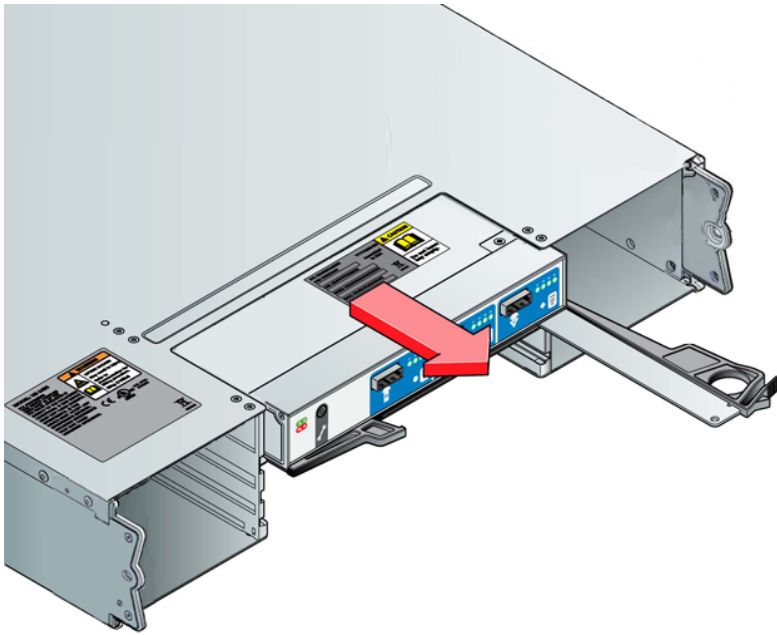***Figure 6-11: I/O Module Latch Operation***

*Figure 6-12: Removing an I/O Module*

## Installing an I/O Module

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

1. Check for damage, especially to the interface connector - do not install if the pins are bent.
2. With the latches in the open position (see Figure 6-13), slide the module into the enclosure until the latches engage automatically.
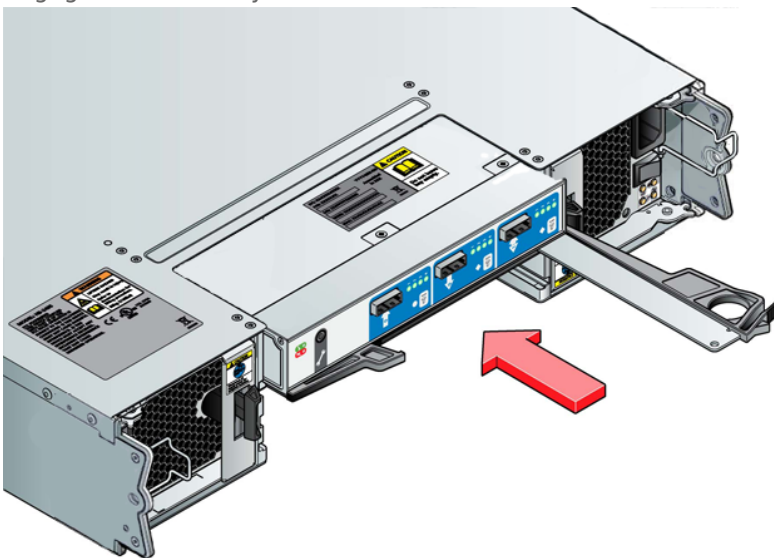


**Figure 6-13 - Installing an I/O Module**

3. Cam the module home by manually closing the latches.
4. A click should be heard as the latches engage.

**Note:** The I/O module will take up to 1 minute to re-initialize after re-cabling.

# TECHNICAL SPECIFICATIONS

## DIMENSIONS

| Component | inches | millimeters |
|---|---|---|
| Height (enclosure, overall) | 3.46 | 87.9 |
| Width across mounting flange | 19.01 | 483 |
| Width across body of enclosure | 17.44 | 443 |
| Depth from front mounting flange to extremity of enclosure body | 22.71 | 576.8 |
| Depth from Ops Panel to furthest extremity of enclosure | 24.79 | 629.6 |
| Depth from front mounting flange to furthest extremity of enclosure | 23.74 | 602.9 |

## WEIGHTS

| Component | Weight (kg) | Weight (lb.) |
|---|---|---|
| Enclosure (empty) | 4.8 | 10.56 |
| Drive Carrier | 0.9 | 1.98 |
| Dummy Drive Carrier | 0.05 | 0.11 |
| PCM | 2.7 | 5.94 |
| I/O Module | 1.5 | 3.3 |
| Blank I/O Module | 0.5 | 1.1 |
| Enclosure (Fully Populated) Total Weight (maximum) | 26 | 57.2 |

## ENVIRONMENT

**Table A–1: Ambient Temperature and Humidity**

| | Temperature Range | Relative Humidity | Max. Wet Bulb |
|---|---|---|---|
| Operational | 5°C to 40°C | 8% to 80% non-condensing | 23°C |
| Non-Operational | 1°C to +50°C | 8% to 80% non-condensing | 27°C |
| Storage | 1°C to +60°C | 5% to 80% non-condensing | 29°C |
| Shipping | -40°C to +60°C | 5% to 100% non-precipitating | 29°C |

| 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 10,000ft) |
| Altitude, Non-Operational | -305 to 12,192m (-1000 to 40,000ft) |
| Shock, Operational | Vertical axis 5g peak 1/2 sine, 10ms |
| Shock, Non-Operational | 20g 10ms 1/2 sine (test w drives)<br>30g 10ms 1/2 sine (test w/o drives) |
| Vibration, Operational | 0.21grms 5-500 Hz Random |
| Vibration, Non-Operational | 0.8grms 2-200 Hz Random (test w drives)<br>1.04grms 2-200 Hz Random (test w/o drives) |
| Vibration, Relocation | 0.15g 2-200 Hz sine (test w drives)<br>0.3g 2-200 Hz sine (test w/o drives) |
| Acoustics | Sound Power<br>• SATA Drives: Less than 6.8 B Lwa - idle @ 20°C ambient<br>• SAS Drives: TBD |
| Orientation & Mounting<br>• Rack Rails<br>• Rack Characteristics | 19" Rack mount (2EIA Units)<br>To fit 800mm depth racks compliant with the SSI Server Rack Specification<br>Back pressure not exceeding 5 pascals (0.5mm water gauge) |

## POWER COOLING MODULE (2 X 580W)

| Dimensions | 84.3mm High x 104.5mm wide x 340.8mm Long (3.32in x 4.11in x 37.03in) |
|---|---|
| Maximum Output Power | 580 W |
| Voltage Range | 100 - 240 VAC Rated |
| Frequency | 50/60 Hz |
| Voltage Range Selection | Auto Ranging: 90 - 264 VAC, 47/63Hz |
| Maximum Inrush Current | 20A |
| Power Factor Correction | ≥95% @ nominal input voltage |
| Harmonics | Meets EN61000-3-2 |
| Output | +5 V @: 42A, +12 V:@ 36A, +5 V standby voltage @ 2 A |
| Operating Temperature | 0° to 57°C |
| Hot Pluggable | |
| Switches & LEDs | AC Mains Switch and four status indicator LEDs |
| Enclosure Cooling | Dual axial cooling fans with variable fan speed control |

# DRIVE CARRIER MODULE

> **Important info:** Disk drives must be UL approved. Operating the LaCie 12big Rack Serial 2 with non-approved drives may invalidate the warranty.

## Drive Carrier

| Module Dimensions | Height 26.6 mm Width 106.5 mm Depth 220.2 mm |
|---|---|
| Weight | 0.8 kg (1.0" 300Gb drive) |
| Operating Temperature | 5° C to 35° C |
| Power Dissipation | 18 Watts maximum |

### Drives

- 3.0Gb/s direct dock SAS (up to 15000 rpm)
- 3.0Gb/s dual path SATA (up to 7200 rpm) via Active/Active SATA Transition Card

# I/O MODULES

Please refer to the SBB I/O Module Installation Guide (P/N xxxxx-01) for technical details of available I/O Modules.

# STANDARDS AND REGULATIONS

## INTERNATIONAL STANDARDS

The LaCie 12big Rack Serial 2 complies with the requirements of the following agencies and standards:

- CE to EN 60950-1
- CB report to IEC 60950-1
- UL & cUL to UL 60950-1

## POTENTIAL FOR RADIO FREQUENCY INTERFERENCE

**USA Federal Communications Commission (FCC)**

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.

## 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.

## 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 LaCie 12big Rack Serial 2 plug-in modules and components. Avoid contact with Midplane components and module connectors, etc.

# SAFETY COMPLIANCE

| System Product Type Approval | UL, cUL, CE |
|---|---|
| Safety Compliance | UL 60950; IEC 60950; EN 60950 |

# EMC COMPLIANCE

| Conducted Emissions Limit Levels | CFR47 Part 15B Class A<br>EN55022 Class A<br>CISPR Class A |
|---|---|
| Radiated Emissions Limit Levels | CFR47 Part 15B Class A<br>EN55022 Class A<br>CISPR Class A |
| Harmonics and Flicker | EN61000-3-2/3 |
| Immunity Limit Levels | EN55024 |

**Note:** The cable must not have a connection to a common ground/earth point.

# AC POWER CORDS

**1 United States of America**

Must be NRTL LISTED (National Recognized Test Laboratory, e.g. UL)

| Cord type | SV or SVT, 18 AWG minimum, 3 conductor, 2.0M max length. |
|---|---|
| Plug | NEMA 5-15P grounding-type attachment plug rated 120V 10A;<br>or<br>IEC 320 C14, 250V, 10A.<br>Socket IEC 320, C-13, 250V, 10A. |

**2 Europe & Others**

General requirements:

| Cord type | Harmonized, H05-VVF-3G1.0 |
|---|---|
| Socket | IEC 320, C-13, 250V, 10A. |

**Important:** 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.

# RECYCLING OF WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE)

At the end of the products 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/Xyratex for a copy of the Recycling Procedures applicable to your product.

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

# LABEL PLACEMENT

## CHASSIS LABELS

The labels on the chassis provide important information required for the identification of parts.
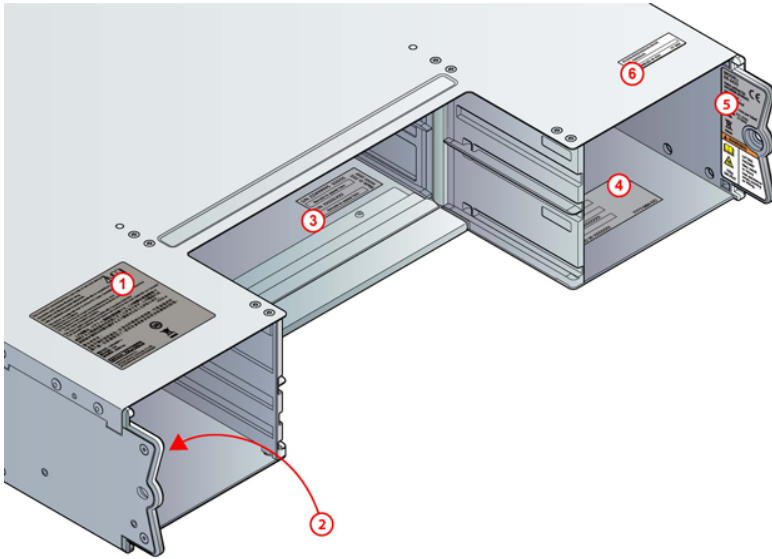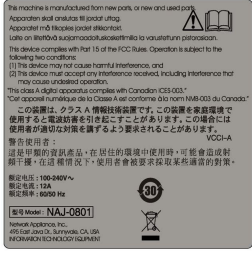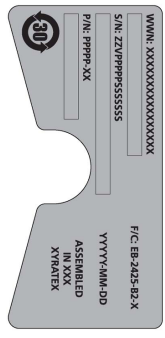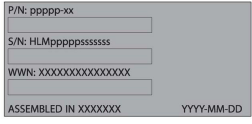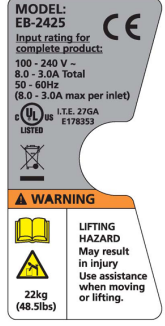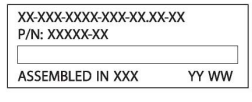


*Figure C-1 - LaCie 12big Rack Serial 2 Chassis Label Locations*

Table C–1, "Chassis Labels" identifies the chassis labels.

**Table C–1: Chassis Labels**

| Label | Purpose |
|---|---|
| 1 | Provides Standards information |
| 2 | D/Serialization label. The information detailed on the label is used to uniquely identify a specific configured chassis/shelf. |
| 3 | Base label. Identifies base unit component levels. |
| 4 | Provides component and assembly information at manufacturing level 2. |
| 5 | Warning label. |
| 6 | Configuration label. Uniquely identifies the HLA (High Level Assembly) final configuration. |