

OneStor® SP-3584 Installation & User Guide

Part No. 83-00007099-10-01

Revision B

June 2017

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.

Revision B

June 2017

Part No. 83-00007099-10-01

Acknowledgments

OneStor® is a registered trademark of Seagate Technology PLC.

Other names and brands may be the property of others.

Contents

Preface	vii
1 Safety	1
1.1 Introduction	1
1.2 Damage	1
1.3 Handling	1
1.4 Operation	2
1.5 Electrical Safety	3
1.6 Rack System Safety Precautions	4
1.7 ESD Precautions	5
1.8 Regional Safety	5
2 System Overview	7
2.1 The OneStor SP-3584	7
2.2 The Enclosure Core Product	9
2.3 Enclosure Chassis	10
2.3.1 Drawers	11
2.3.2 Disk Drives in Carriers (DDICs)	12
2.3.3 Operator's Panel	13
2.4 Power Supply Unit (PSU)	15
2.5 Cooling Module	16
2.5.1 System Airflow	17
2.6 SBB I/O Module	17
2.7 Enclosure Management	18
3 Installation	19
3.1 Preparation	19
3.1.1 ESD Precautions	19
3.1.2 Site Requirements	19
3.1.3 Unpacking the System	20
3.2 Installation	21
3.2.1 Installing the Rail Kit	21
3.2.2 Inserting Modules	23
3.3 Power Cord Connection	24
3.4 Grounding Checks	24
3.5 System Configurations	24
3.6 Data Security	27
4 Operation	29
4.1 Before You Begin	29
4.2 Power On	29
4.3 Ops Panel LEDs	30
4.4 Unit Identification Number	31
4.4.1 How To Set the Unit Identification Number	31
4.4.2 Other Uses	32
4.5 Power Down	32
4.6 Locking Drawers	32

- 5 Troubleshooting 33**
 - 5.1 Overview 33
 - 5.2 Initial Start-Up Problems 33
 - 5.2.1 *Power Fault* 33
 - 5.2.2 *Host Computer Does Not Recognize Enclosure* 33
 - 5.3 LEDs 34
 - 5.3.1 *PSU LEDs* 34
 - 5.3.2 *Cooling Module LEDs* 35
 - 5.3.3 *Operator's Panel LEDs* 36
 - 5.3.4 *Drawer LEDs* 37
 - 5.3.5 *Disk Drive in Carrier (DDIC) LED* 38
 - 5.3.6 *SBB I/O Module LEDs* 39
 - 5.4 Thermal Sensors 40
 - 5.5 Troubleshooting 40
 - 5.5.1 *Thermal Monitoring and Control* 41
 - 5.5.2 *Thermal Alarm* 41
 - 5.6 Dealing with Hardware Faults 42
 - 5.7 Firmware Updates 42
 - 5.7.1 *PSU Firmware Programming Failure* 42
- 6 Module Replacement 43**
 - 6.1 Overview 43
 - 6.1.1 *Continuous Operation During Replacement* 43
 - 6.1.2 *Field Replaceable Units (FRUs)* 43
 - 6.2 General Procedures 44
 - 6.2.1 *Opening a Drawer* 44
 - 6.2.2 *Closing a Drawer* 45
 - 6.3 Replacing a Disk Drive in Carrier (DDIC) 46
 - 6.3.1 *Removing a DDIC* 46
 - 6.3.2 *Inserting a DDIC* 48
 - 6.4 Replacing a Cooling Module 49
 - 6.4.1 *Removing a Cooling Module* 49
 - 6.4.2 *Inserting a Cooling Module* 51
 - 6.5 Replacing a Power Supply Unit (PSU) 51
 - 6.5.1 *Removing a PSU* 51
 - 6.5.2 *Inserting a PSU* 52
 - 6.6 Replacing an SBB I/O Module 53
 - 6.6.1 *Removing an SBB I/O Module* 53
 - 6.6.2 *Inserting an SBB I/O Module* 55
- A Technical Specifications 57**
 - A.1 Dimensions 57
 - A.2 Weights 57
 - A.3 Components (Fully Populated) 58
 - A.4 Thermal 58
 - A.5 Temperature and Humidity 58
 - A.6 Cooling Modules 58
 - A.7 SBB I/O Modules 59
 - A.8 Power Supply Unit 59
 - A.9 Supported Drives 59
 - A.10 Shock and Vibration Tolerance 60

B Standards and Regulations 61

B.1 EMC Qualification 61

B.1.1 Conducted Emission Limit Levels 61

B.1.2 Radiated Emissions Limit Levels 61

B.1.3 Harmonics 62

B.1.4 Flicker 62

B.1.5 Immunity Limit levels 62

B.2 Safety 62

B.3 Environmental and Recycling 62

B.3.1 RoHS and JIG A 62

B.3.2 WEEE 63

B.3.3 REACH 63

B.3.4 China RoHS 64

B.3.5 EuP Directive 65

B.3.6 Packaging 65

B.4 Acoustics 65

B.5 AC Power Cords 65

B.6 Potential for Radio Frequency Interference 66

C Glossary 67

D Index 69

Preface

This user guide gives you step-by-step instructions on how to install, configure and connect a OneStor SP-3584 storage enclosure system to your host computer system, and on how to use and maintain the system.

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 with the technical training and experience necessary to service the system safely. This person must be aware of all hazards involved in performing service tasks, and must take measures to minimize risks to themselves and other people.
- **User/Operator:** Any user of the system other than a service person.

Related Documentation

- OneStor SP-3584 Quick Installation Guide (part number 1007708).
- OneStor SP-3584 HotSwap Side Card Quick Installation Guide (part number 0984199).

Revision History

Date	Description of Change
June, 2017	Revised rail-kit adjustment range.
May, 2017	First issue.

Chapter 1

Safety

1.1 Introduction



Caution

This equipment must be used in the manner specified in this document and any relating documentation. Failure to do this may bypass the protection provided by the equipment.

1.2 Damage

If you think the equipment has become damaged in any way, remove all external cords and cables, and contact your equipment supplier.

1.3 Handling



Caution

A fully configured OneStor SP-3584 enclosure weighs up to 135kg (298lb) depending on drive type. An unpopulated enclosure weighs 46kg (101lb). Use appropriate lifting methods.



> 128 kg (282.2 lbs.)

Figure 1-1 Lifting Hazard Label

Before lifting the enclosure:

- Unplug all cords and cables from the enclosure.
- Remove all DDIC modules from both drawers and make sure the drawers are closed firmly and locked shut (see 4.6, “Locking Drawers”, on page 32).

It is recommended that a minimum of three people lift the enclosure using the lifting straps supplied with the enclosure.

Do not lift the enclosure by the handles on the power supply units, cooling modules or I/O modules – they are not designed to take the weight.

Do not lift the enclosure higher than 20U. Use mechanical assistance to lift above this height.

1.4 Operation

Important All rear modules are part of the fire enclosure and must only be removed when a replacement can be immediately inserted.

Important The enclosure will not receive sufficient airflow or cooling if it is operated with any of the rear modules missing. It is essential that every module bay is filled either with a module or a blank module.

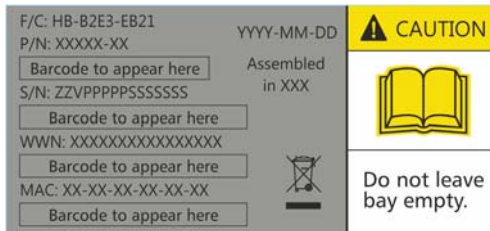


Figure 1-2 Module Bay Caution Label (1)



Figure 1-3 Module Bay Caution Label (2)

Replace any defective module with a fully operational unit as soon as possible. Do not remove cooling modules, PSUs or SBB I/O modules unless you have a replacement model of the correct type ready for insertion.



Caution

To prevent overturning, drawer interlocks stop users from opening both drawers at the same time. Do not attempt to force open a drawer when the other drawer in the enclosure is already open. In a rack containing more than one enclosure, do not open more than one drawer per rack at a time.



Caution *Operating temperatures inside the enclosure drawers can reach up to 60°C. Take care when opening drawers and removing drive carriers.*



Figure 1-4 Hot Surface Warning Label



Caution *Due to product acoustics it is recommended that users wear ear protection for any prolonged exposure.*



Figure 1-5 PSU Warning Label

Before removing a module, disconnect all power cords and cables.

Open drawers must not be used to support any other equipment.



Figure 1-6 Drawer Caution Label

1.5 Electrical Safety

The enclosure must only be operated from a power supply input voltage range of 200 to 240 VAC, 50 to 60 Hz.

A suitable power source with electrical overload protection must be provided in order to meet the requirements in the technical specification.

All power supply cords must have a safe electrical ground connection. Check the connection to ground of the enclosure before you switch on the power supply.

Important **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.



Warning **When powered by multiple AC sources, disconnect all supply power for complete isolation.**



Warning **Do not remove covers from the enclosure or any of the modules – there is a danger of electric shock inside. Do not attempt to disassemble the rear sub-chassis from the enclosure. Return any damaged components to your supplier for repair.**



Caution *The PSUs contain double pole/neutral fusing. Ensure that your electrical installation can support this.*

Important **The optional RJ45 socket on the I/O module is for Ethernet connection only and must not be connected to a telecommunications network.**

1.6 Rack System Safety Precautions

The enclosure must be mounted in a rack before use.

The rack must be capable of supporting the total weight of the installed enclosure(s). A fully populated enclosure weighs up to 135kg (298lb). 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. When removing enclosures, empty from the top down.



Warning **The enclosure must only be mounted into a rack using the supplied rail kit. Due to its weight and length, the enclosure must not be flange mounted.**

Before mounting the enclosure, remove all DDIC modules from both drawers and make sure the drawers are closed firmly and locked shut. Do not try to lift the enclosure by yourself (see section [1.3, “Handling”, on page 1](#)).



Warning **Never move more than one enclosure out of the rack at any one time: there is a danger of the rack falling over.**

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

The minimum open area for the rack doors is 70%.

The rack design should take into consideration the maximum operating ambient temperature for the enclosure, which is 35°C.

The rack must 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 ground for each enclosure, and for the rack.

Each PSU in each enclosure has an ground leakage current of 1.6mA. The design of the electrical distribution system must take into consideration the total ground leakage current from all the PSUs in all the enclosures. The rack must be labelled with the words: "HIGH LEAKAGE CURRENT. Ground connection essential before connecting supply."

The rack must meet the safety requirements of UL 60950-1 and IEC 60950-1.

1.7 ESD Precautions

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

1.8 Regional Safety

For North American use, the branch circuit must be rated for 20A.

This equipment is suitable for connection to an IT power system (Norway).

Chapter 2

System Overview

2.1 The OneStor SP-3584

The OneStor SP-3584 storage system is shown in [Figure 2-1](#) and [Figure 2-2](#). It is housed in a 5U chassis containing two drawers of 42 drives each (84 drives in total).



Figure 2-1 OneStor SP-3584 Enclosure – Front View

The system uses 3.5" or 2.5" SAS drives. 2.5" drives require a 3.5" adapter. Each drive is hot-pluggable and can be replaced on site.

The OneStor SP-3584 is designed for high availability, with no single point of failure for data or power. The IT modules comply with the Storage Bridge Bay (SBB) v2.1 specification, which specifies interconnects, power budgets, power rails, mechanical and thermal form factors and footprints.

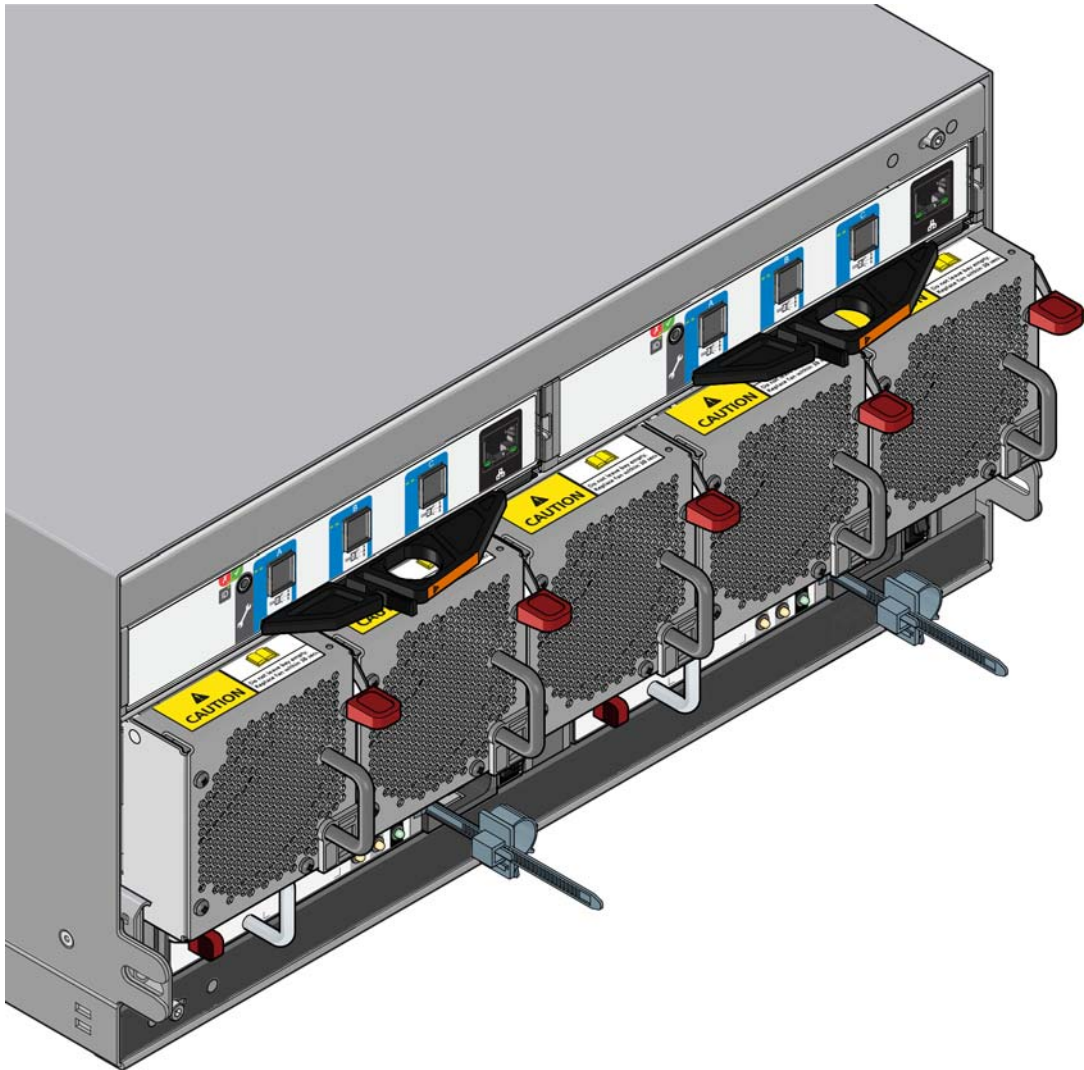


Figure 2-2 OneStor SP-3584 Enclosure – Rear View

2.2 The Enclosure Core Product

The OneStor 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:
 - Two sliding drawers containing Disk Drive In Carrier (DDIC) modules.
 - An operator's (ops) panel.
 - A front bezel.
 - A midplane PCB into which other components connect.
- Two Power Supply Units (PSUs).
- Five cooling modules.
- Two SBB I/O modules.
- Up to 84 Disk Drive In Carrier (DDIC) modules with drives installed.
- A rail kit for rack mounting.

Important To ensure correct airflow and cooling, all PSU bays and cooling module bays must contain a functioning unit. If the enclosure is run with a single SBB I/O module, the other I/O module bay must be filled with a blank module.

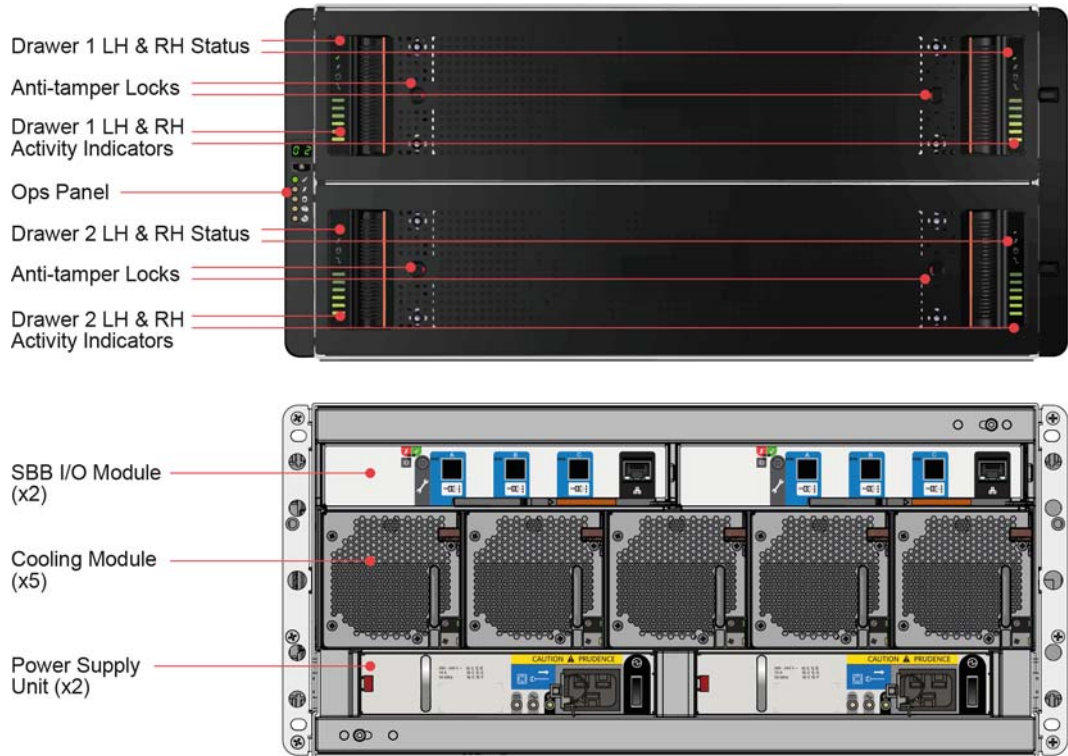


Figure 2–3 Module Locations

2.3 Enclosure Chassis

The chassis consists of a sheet metal enclosure assembly with an integrated midplane PCB, module runner system and two drawers for drive modules.

The chassis has a 19 inch rack mounting that enables it to be installed on to standard 19 inch racks and uses 5 EIA units of rack space (8.75 inches; 222mm).

Each drawer contains 42 bays for Disk Drives in Carriers (DDICs). DDICs are top-mounted into the drawers.

At the rear, the chassis assembly can accept two PSUs, two SBB I/O modules and five cooling modules.

2.3.1 Drawers

Each drawer contains 42 slots, each of which will accept a single DDIC containing a 3.5” drive or a 2.5” drive with an adapter.

Opening a drawer does not interrupt the functioning of the system, and DDICs can be hot-swapped while the enclosure continues to operate. However, drawers must not be left open for longer than two minutes, otherwise airflow and cooling will be compromised.

The drawer is designed to support its own weight, plus the weight of any drives, when fully open.

Safety features:

- To reduce the possibility of toppling, only one drawer can be open at any one time.
- The drawer locks into place when opened all the way. To reduce pinching hazards, two latches must be released before the drawer can be pushed back in.

Power and data are sent via three baseplanes and two sideplanes. The sideplanes ensure redundant power and signal paths to each drive.

Each drawer can be locked shut by turning both anti-tamper locks clockwise using a screwdriver with a Torx T20 bit (see [Figure 2-3 on page 10](#)). Each side of each drawer has a series of status LEDs, shown in [Figure 2-4](#).

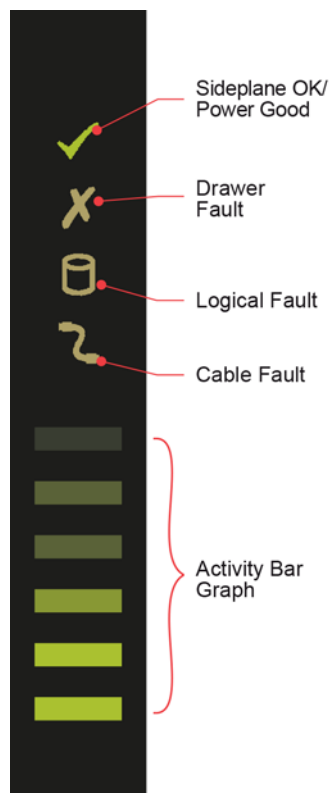


Figure 2-4 Drawer LEDs

Important During normal operation, drawers must be kept shut to ensure correct airflow and cooling.

2.3.2 Disk Drives in Carriers (DDICs)

Each drive is housed in a carrier (see [Figure 2-5](#)) that enables secure insertion of the drive into the drawer and contains the appropriate SAS carrier transition card.

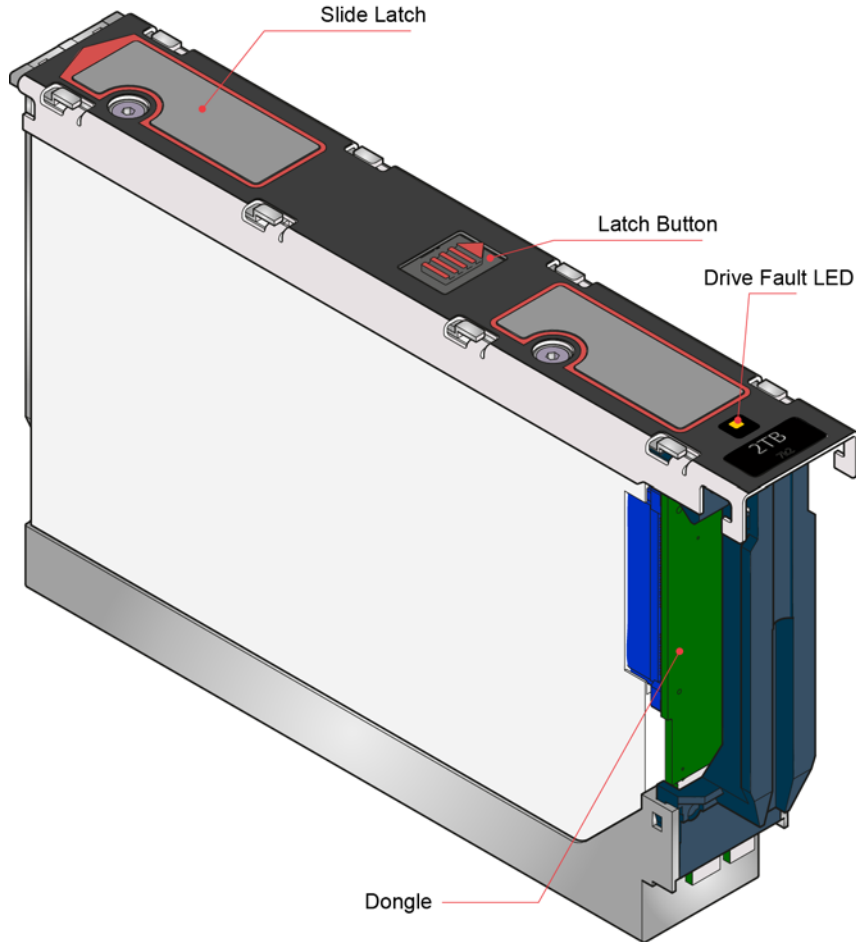


Figure 2-5 A Disk Drive In Carrier (DDIC)

The following hard disk drives are supported:

- 3.5" 7200rpm, or slower, 6G or 12G SAS drive.
- 2.5" 10000rpm, or slower, 6G or 12G SAS drive with 3.5" adapter.

Contact your storage vendor for details of other hard disk drives that are available for use in the OneStor SP-3584 storage system.

The following solid state drives are supported:

- 3.5" 6G or 12G SAS solid state drive.
- 2.5" 6G or 12G SAS solid state drive with 3.5" adapter.

Hard drives and solid state drives can be mixed in the same drawer. However, hard drives connected to the same baseplane must have the same speed.

The drive carrier has a single amber LED which is lit when the drive has a fault.

Note The SP-3584 enclosure is not compatible with DDICs intended for the previous generation SP-2584 enclosure. A keying mechanism will prevent insertion.

2.3.3 Operator's Panel

The front of the enclosure features an operator's (ops) panel (shown in [Figure 2–6](#)) on the left-hand side which contains the following:

- Unit Identification Display.
- Mute/Input button.
- Power On/Standby LED (green/amber).
- Module Fault LED (amber).
- Logical Status LED (amber).
- Drawer 1 Fault LED (amber).
- Drawer 2 Fault LED (amber).

The ops panel is an integral part of the chassis, and is not replaceable on site.

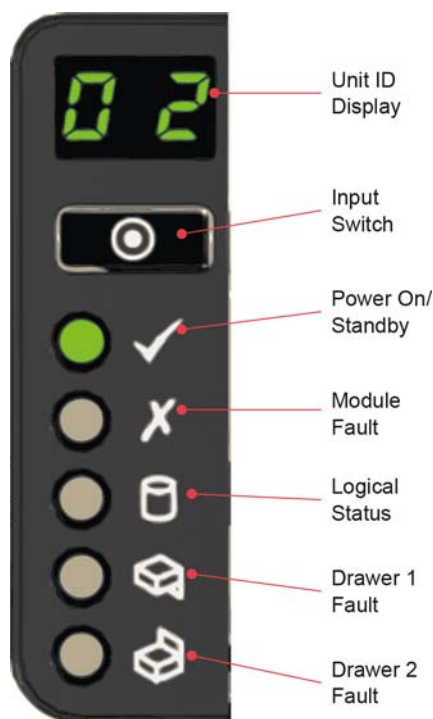


Figure 2–6 Enclosure Operator's Panel

2.3.3.1 Unit Identification Display

A numerical display whose primary function is to display the enclosure unit identification number. This can be helpful when setting up and maintaining multiple enclosure systems.

However, a VPD (Vital Product Data) option allows the unit identification display to be configured for other purposes. The display will be on by default, and display a value of 0. See [section 4.4, “Unit Identification Number”, on page 31](#).

2.3.3.2 Input Switch

Used to set the unit identification display (see section 4.4.1, “[How To Set the Unit Identification Number](#)”, on page 31).

2.3.3.3 Power On/Standby LED (Green/Amber)

Shows amber when the system is in standby (not operational). Shows green when the system is on (operational).

2.3.3.4 Module Fault LED (Amber)

Shows amber when there is a system hardware fault. Additionally, an LED may be lit on a PSU, drawer, DDIC, cooling module or I/O module that helps you identify which component is at fault.

2.3.3.5 Logical Status LED (Amber)

Indicates 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. It is usually associated with a disk drive and LEDs at each disk drive position help you identify the drive affected.

2.3.3.6 Drawer Fault LEDs (Amber)

Indicates a drive, cable or sideplane fault in the drawer indicated.

2.4 Power Supply Unit (PSU)

Power is provided by two 2214W PSUs, as shown in [Figure 2-7](#). These require an input of 200 to 240VAC at 50 to 60Hz.

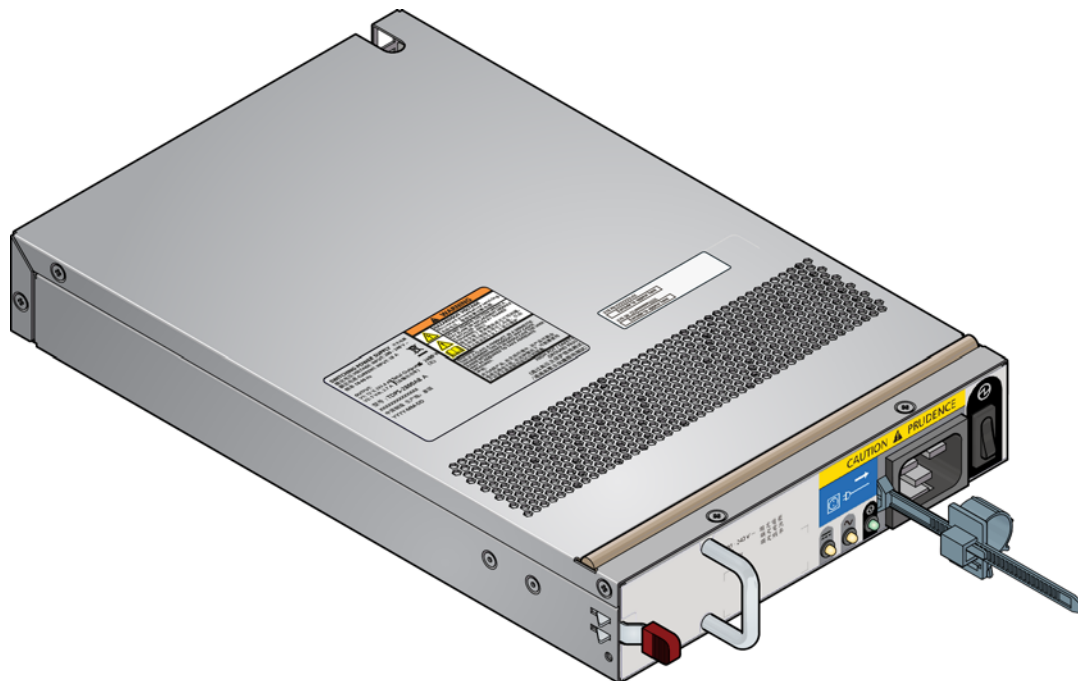


Figure 2-7 2214W PSU

Dual PSUs provide redundant power for the system: if one PSU fails, the other will keep the system running while you replace the faulty module. The PSUs are hot-swappable. Replacement of a PSU can be performed while the enclosure is running, but the procedure must be completed within two minutes of the removal of the defective PSU. Ensure you have a replacement PSU before you remove the defective PSU.

The enclosure chassis is keyed to prevent PSUs from being inserted upside down.

The back of the PSU has a power switch, three status LEDs and a socket for the power cord (see [Figure 2-8](#)).

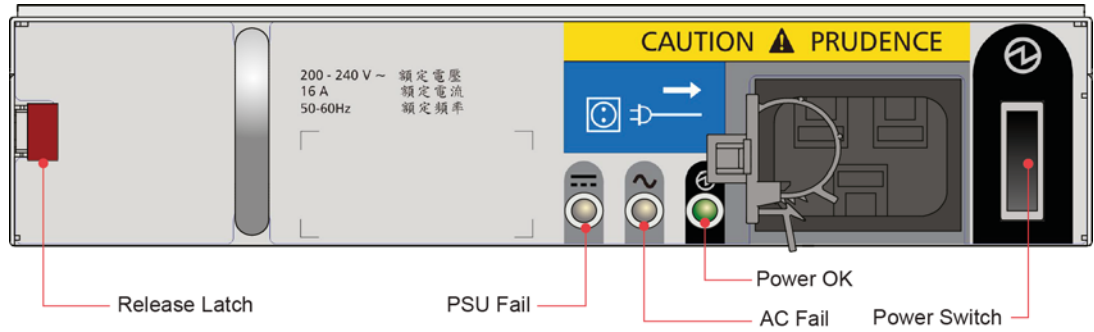


Figure 2-8 PSU LEDs

2.5 Cooling Module

The five cooling modules at the rear of the enclosure maintain all system components below their maximum temperature, assuming the ambient temperature is below 35°C.

The speed of the fans in the cooling modules is controlled by the SBB I/O modules. Section [2.5.1, “System Airflow”, on page 17](#) describes the system airflow.

Cooling modules can be hot-swapped while the enclosure is still running, assuming that only one module is removed at a time and the swap takes no longer than two minutes. Ensure you have a replacement cooling module before you remove the defective cooling module.

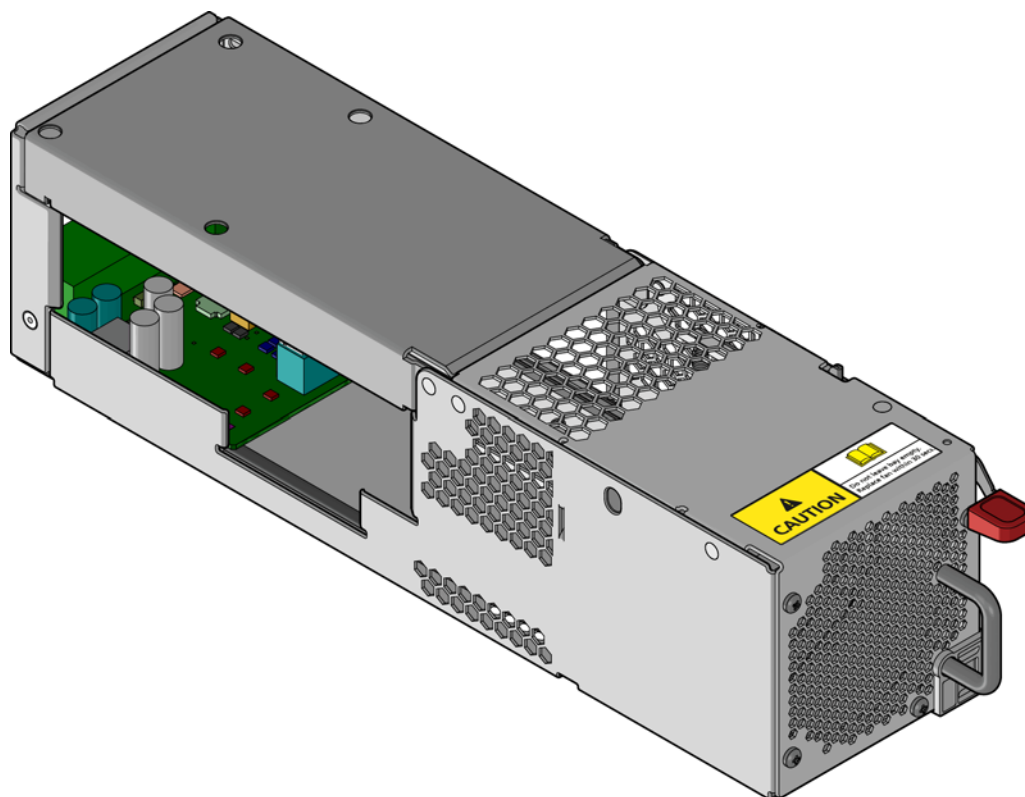


Figure 2–9 Cooling Module

2.5.1 System Airflow

The system must be operated with low pressure rear exhaust installation. Back pressure created by the rack doors and obstacles is not to exceed 5 pascals (0.5mm water gauge). The cooling system provides sufficient capacity to ensure that maximum temperatures are not exceeded.

The minimum open area for the rack doors is 70%.

2.6 SBB I/O Module

The OneStor platform has a variety of SBB I/O module options. Refer to the specific I/O module documentation for details.

All SBB I/O modules are mechanically and electrically compliant to the SBB V2.1 specification.

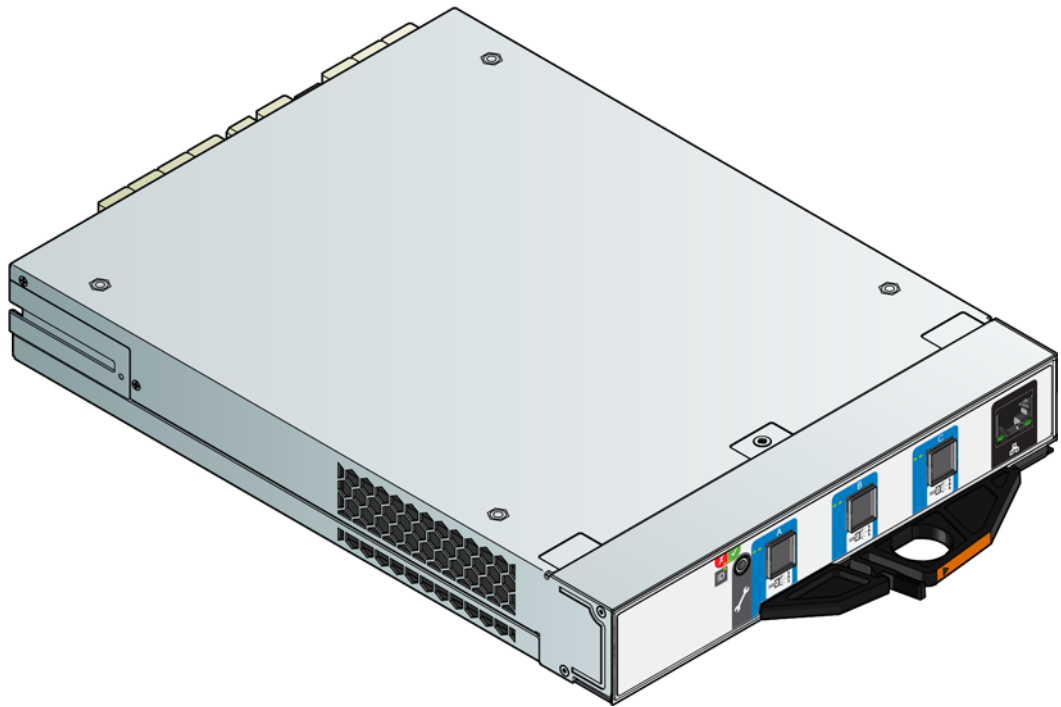


Figure 2–10 12Gb/s SAS EBOD Module (other I/O modules are available)

The system can operate with one or two modules. If the enclosure is run with a single module, the other I/O module bay must be filled with a blank module. The presence of I/O modules is checked when the power is switched on. The enclosure will not power up if there are no I/O modules present. An alarm occurs when incompatible configurations are detected.

The enclosure chassis is keyed to prevent I/O modules from being inserted upside down.

2.7 Enclosure Management

SBB I/O modules actively manage the enclosure. If one of the modules fails in a two module system, the other module will continue to operate.

If you require more details about enclosure management contact your storage vendor.

Chapter 3

Installation

3.1 Preparation

- Important** Before attempting to install the system, read the safety chapter starting [on page 1](#).
- Important** The enclosure must be mounted in a rack before use.
- Important** Only service personnel should install the system.

3.1.1 ESD Precautions

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

3.1.2 Site Requirements

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

- Standard power from an independent source or a rack power distribution unit with a UPS.
- Host computer with the correct firmware, BIOS and drivers. Contact your supplier for the correct software levels.

Before setting up your enclosure ensure you have the following:

- SAS HBA.
- Mini SAS HD to host cable.
- Power cord.
- Rack kit.

Refer to your supplier for a list of qualified accessories for use with the enclosure.

The accessory box contains the power cords and other ordered accessories.

3.1.3 Unpacking the System

- 1 Position the shipping case within 2m (6 feet) of the site where you intend to use your storage system.
- 2 Inspect the packaging for crushes, cuts, water damage or any other evidence of mishandling during transit. If there is any damage, photograph the packaging for future reference before opening.
- 3 Remove the packaging as shown in [Figure 3–1](#).

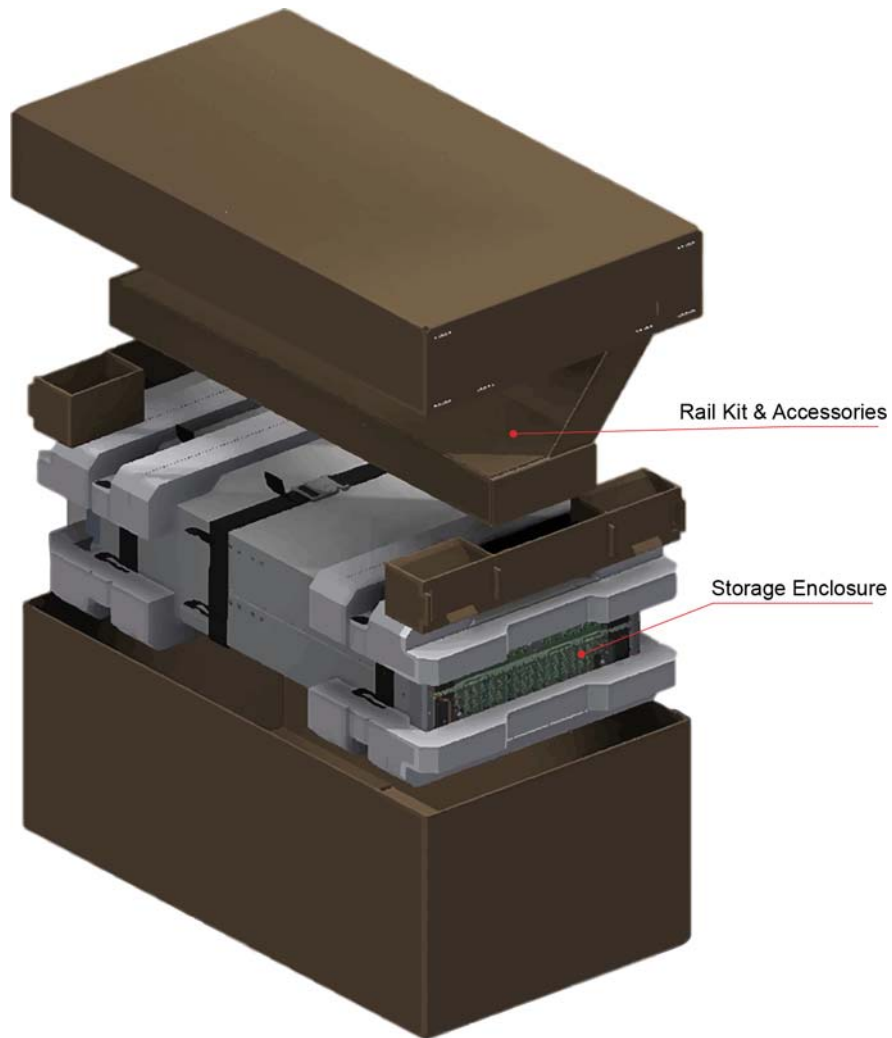


Figure 3–1 Unpacking the System

3.2 Installation

3.2.1 Installing the Rail Kit

**Caution**

An unpopulated enclosure can weigh up to 46kg (101lb). Do not try to lift it by yourself.

Due to the weight of the enclosure, install it without the drive carriers.

The adjustment range of the rail kit, from the inside of the front post to the inside of the rear post is 713mm to 884mm. This suits a one meter deep rack within Rack Specification IEC 60297.

- 1 To facilitate access, remove the door from the rack.
- 2 Ensure the pre-assembled rails are at their shortest length.
- 3 Locate the rail location pins inside the front of the rack and extend the length of the rail assembly to enable the rear location pins to locate. Ensure the pins are fully located in the square or round holes in the rack posts (see [Figure 3-2](#)).

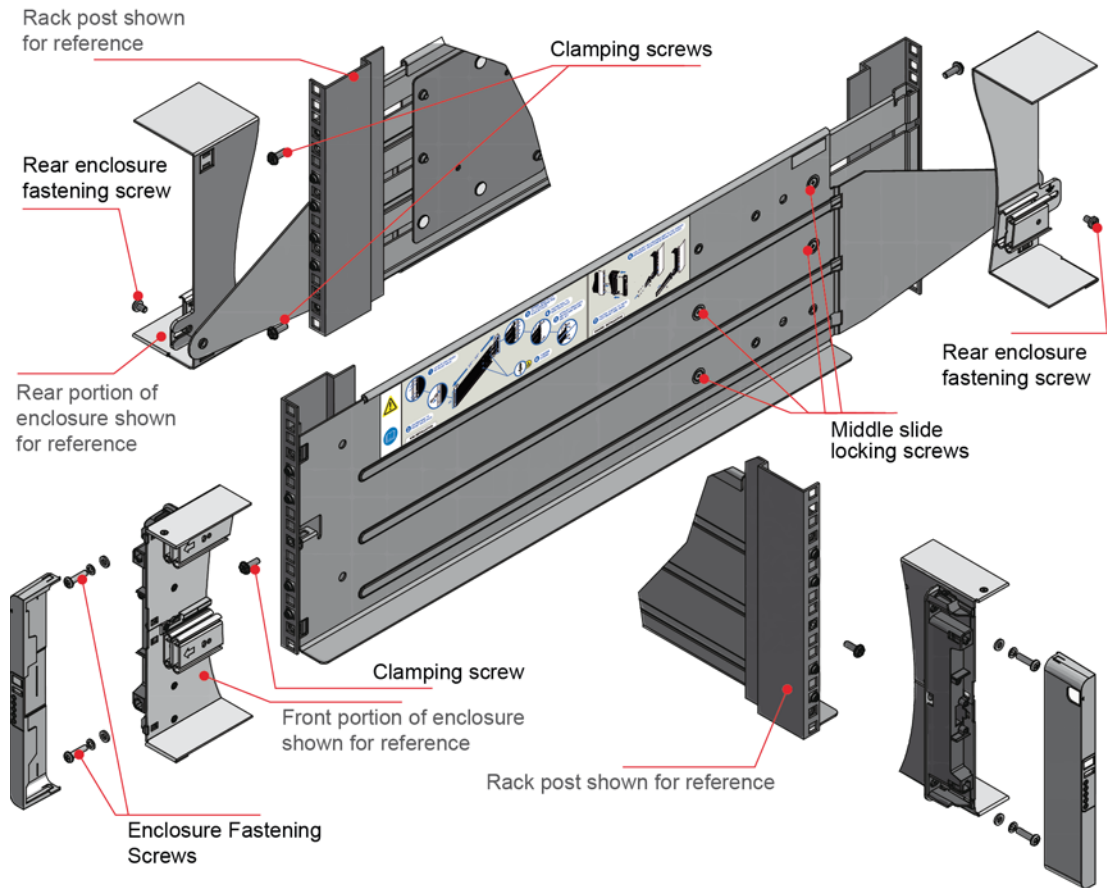


Figure 3–2 Mounting the System into a Rack (left hand rail only shown for clarity)

- 4 Fully tighten all clamping screws and middle slide locking screws.
- 5 Ensure the rear spacer clips (x4) are fitted tight to the edge of the rack post.
- 6 Slide the enclosure fully home on its rails.
- 7 Fasten the front of the enclosure using the enclosure fastening screws (x4) as shown in [Figure 3–2](#).
- 8 Fix the rear of the enclosure to the hold down bracket with the rear enclosure fixing screws (x2).

Note Use the long or short hold down bracket depending on the distance from the rack post to the enclosure hold down slot. Ensure the sliding nut is at the rear of the slot prior to fitting the bracket to the post, then slide the nut along the slot to enable the rear enclosure fastening screw to be fitted.

Note For rack depths where the rack posts are behind the enclosure hold down slots:

- 1 Swap the left and right hold down brackets.
- 2 Insert the long flange between the rack post and chassis side (see [Figure 3–3](#)).
- 3 The sliding nut head must always face away from the enclosure, whichever configuration is used.

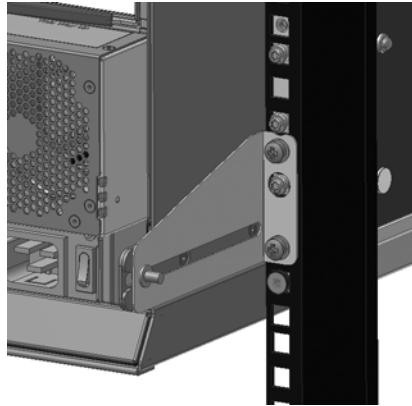


Figure 3-3 Rear Enclosure Mounting



Caution

Use only the power cords supplied or cords that match the specification in [section B.5 on page 65](#).



Warning

Once the enclosure is installed in the rack, dispose of the lifting straps. Due to the difficulty in attaching the straps once the enclosure is installed in the rack, the straps are not suitable for removing the enclosure from the rack.

3.2.2 Inserting Modules

Insert all of the modules and Disk Drives in Carriers (DDICs) by referring the following instructions:

- [Section 6.4.2, “Inserting a Cooling Module”, on page 51.](#)
- [Section 6.5.2, “Inserting a PSU”, on page 52.](#)
- [Section 6.6.2, “Inserting an SBB I/O Module”, on page 55.](#)
- [Section 6.3.2, “Inserting a DDIC”, on page 48.](#)

3.3 Power Cord Connection

Important When more than one PSU is fitted, connect each PSU to separate and independent supplies to guarantee redundancy.



Caution

Always remove the power connections before you remove the PSU from the enclosure.

3.4 Grounding Checks

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



Warning

If one or more 5U enclosures go into a rack, the importance of the ground connection to the rack increases, because the rack will have a larger “EARTH LEAKAGE CURRENT” (“TOUCH CURRENT”).

Examine the ground connection to the rack before the switch on: an electrical engineer who is qualified to the appropriate local and national standards must do the examination.

See [1.5, “Electrical Safety”, on page 3](#) for more information.

3.5 System Configurations

Note Configuration details in this section are for a typical 5U84 enclosure.

The basic configuration is a single OneStor® enclosure connected to a single host bus adapter (HBA).

Multiple enclosures may be connected together using SAS patch cables, up to a maximum of 4 enclosures.

See [Figure 3–4, “Valid Configuration”, on page 25](#) for an example of how to correctly connect multiple enclosures.

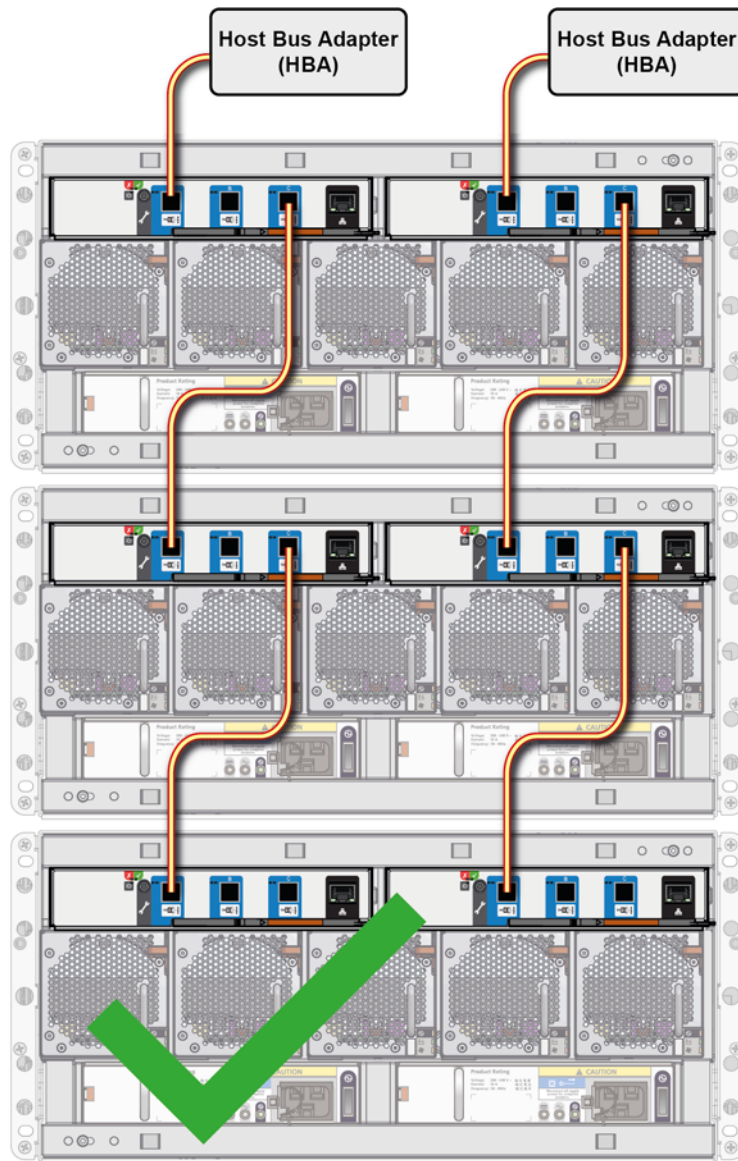


Figure 3-4 Valid Configuration

Important When connecting enclosures you must ensure that you do not create loops either within an I/O module (see [Figure 3-5](#)), or between I/O modules in the same enclosure (see [Figure 3-6](#)). You must also ensure that you do not create loops when connecting I/O modules on different enclosures (see [Figure 3-7](#)).

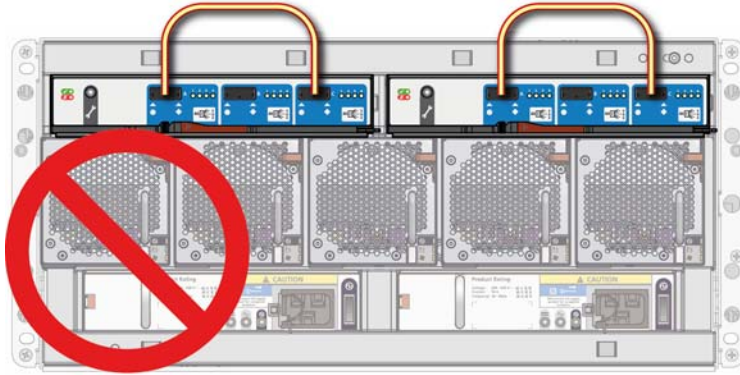


Figure 3-5 Invalid Configuration: I/O Module Connected Back to Itself

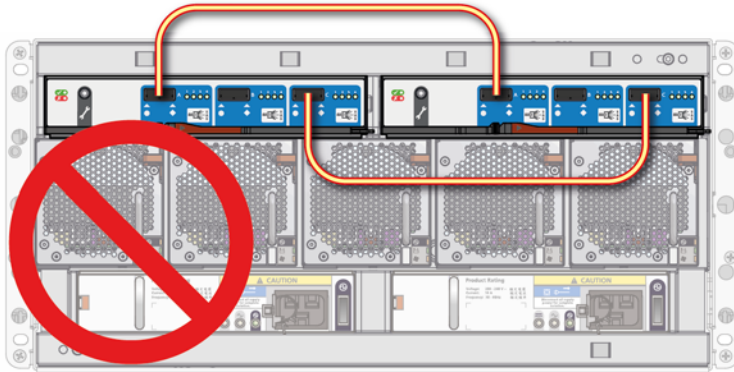


Figure 3-6 Invalid Configuration: Loops Created Between I/O Modules in the Same Enclosure

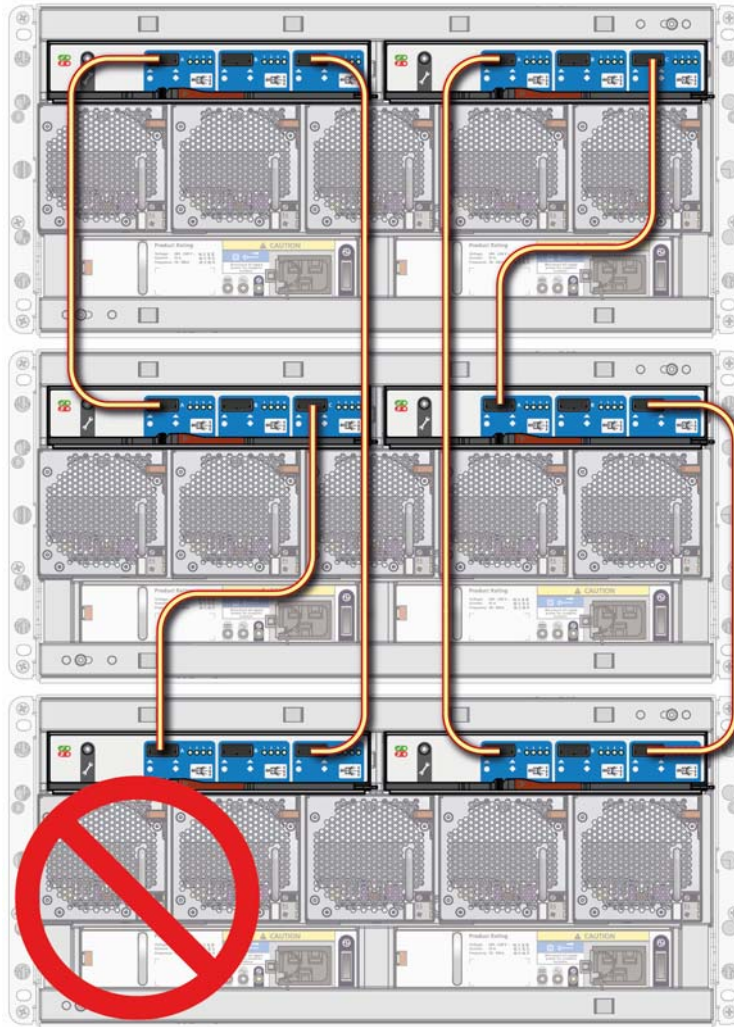


Figure 3-7 Invalid Configuration: Loops Created Between Enclosures

3.6 Data Security

- Power down your host computer and all attached peripheral devices before beginning installation.
- Each enclosure contains up to 84 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.

Chapter 4

Operation

4.1 Before You Begin

Before you power up the enclosure make sure that all the modules are firmly seated in their correct bays.

4.2 Power On



Caution

Do not operate the enclosure system until the ambient temperature is within the specified operating range (see section A.5, “Temperature and Humidity”, on page 58). If the drives have been recently installed, make sure they have had time to adjust to the environmental conditions.

- 1 Connect the power cables to the PSU(s) – see [Figure 4-1](#).
- 2 Move all PSU power switches to the “on” position.
- 3 The system power LED on the ops panel should be lit green and the disk drive motors should start.

Important **If mains power is lost for any reason, the system will re-start automatically when power is restored.**

Note See section 4.3, “Ops Panel LEDs”, on page 30 for details of the ops panel LEDs and related fault conditions.

Care should be taken when turning on/off PSUs. The following points should be considered when turning PSUs on/off.

- Remove the AC cord before inserting or removing a PSU.
- Turn off the PSU switch before inserting or removing the AC cord.

- Allow 15 seconds between turning the PSU off and back on again.
- Allow 15 seconds between turning one PSU in the system on and the other PSU off.
- Never turn off a PSU whilst any amber LED is lit on the partner PSU.
- The enclosure must be left in a powered state for 30 seconds following resumption from standby before the enclosure can be placed into standby again.

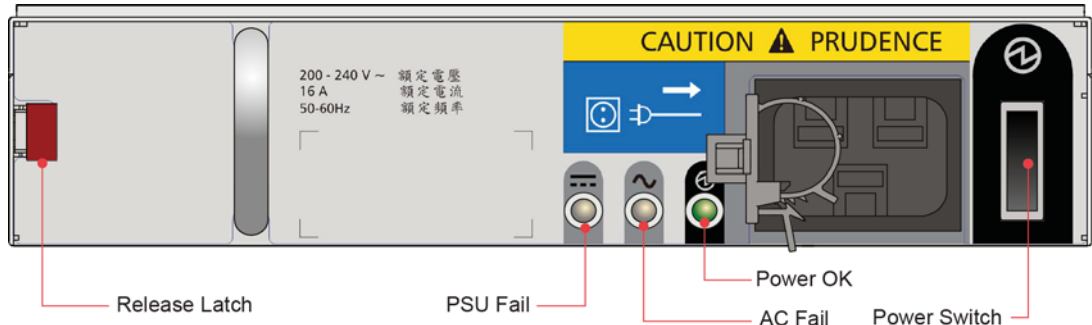


Figure 4-1 PSU Power Switch and LEDs

4.3 Ops Panel LEDs

Table 4-1 describes the ops panel LED fault and status conditions. Figure 4-2 shows the panel layout. Please refer to section on page 35 for details of any fault indication.

Table 4-1 Ops Panel LEDs

LED	Status
Power On/Standby	Constant green: power is on Constant amber: system is in standby (not operational)
Module Fault	Constant or flashing amber: fault
Logical Status	Constant or flashing amber: fault
Drawer 1/2 Fault	Constant amber: fault in drive, cable or sideplane for specified drawer

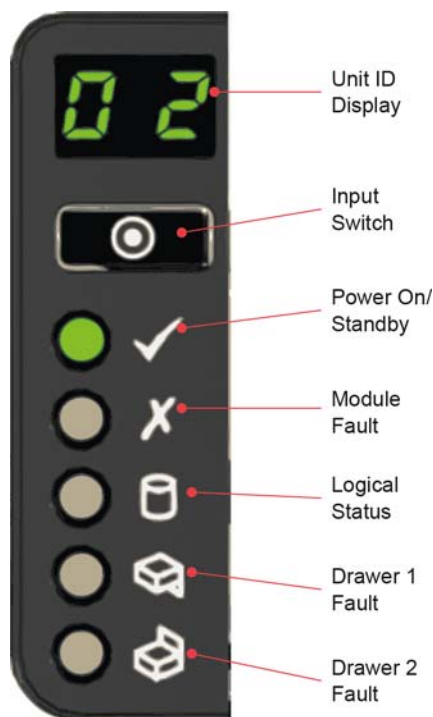


Figure 4-2 Ops Panel LEDs

4.4 Unit Identification Number

4.4.1 How To Set the Unit Identification Number

The unit identification number is not set before the first system power on. The display is set to “00” (flashing). The enclosure continues to power up even if the unit identification number is not set.

To set the unit identification number:

- 1 Press and hold the Input switch on the ops panel for a period of five seconds. The left-hand digit flashes.
- 2 Press and release the Input switch to increment the number until the required digit is reached.
- 3 Press and hold the Input switch for a period of five seconds. The right-hand digit flashes.
- 4 Press and release the Input switch to increment the number until the required digit is reached.
- 5 Press and hold the Input switch for a period of five seconds to finish setting the number.

Values of “01” to “99” are valid.

Once a unit identification number is set, it is stored in the midplane VPD by the Enclosure Management software and will appear when the enclosure is next powered on. In a situation where the VPD cannot be read, or where there is no enclosure management (no SBB I/O modules, or a single module with management failure) the enclosure will display “00”.

4.4.2 Other Uses

The unit identification number can also be use for:

- Error codes.
- Unit location identifier – This function sets the display to flash (3 seconds on, 1 second off) until it is stopped, either through SES or by pressing the Input switch.

The unit identification number may be set via other methods - contact your storage vendor for details. As above, the new setting will only be applied after a power cycle. All other functionality shall remain the same as described above.

4.5 Power Down

For modules with RAID controllers, you must shutdown the application (contact your storage vendor for details on how to do this) and then turn off the power.

For modules with EBOD controllers, switch off all installed PSUs by moving the power switches to the “Off” position (see [Figure 4-1 on page 30](#)).

4.6 Locking Drawers

A drawer can be locked shut by using a screwdriver with a Torx T20 bit to rotate both anti-tamper locks until the red arrows point away from the center of the enclosure. See [Figure 4-3](#).



Figure 4-3 Anti-tamper Locks

Chapter 5

Troubleshooting

5.1 Overview

The OneStor SP-3584 enclosure system includes a Storage Enclosure Processor (SEP) and associated monitoring and control logic to enable it to diagnose problems within the enclosure's power, cooling, PSU and drive systems.

5.2 Initial Start-Up Problems

5.2.1 Power Fault

Ensure that you have wired up the enclosure system correctly and that mains power is present. Call your supplier for replacements if:

- Cords are missing or damaged.
- Plugs are incorrect.
- Cords are too short.

5.2.2 Host Computer Does Not Recognize Enclosure

- 1 Check that the interface cables from the enclosure to the host computer are fitted correctly.
- 2 Check that drive carrier modules have been correctly installed (see section [6.3, “Replacing a Disk Drive in Carrier \(DDIC\)”](#), on page 46).
- 3 Check any visible SAS indicators on the I/O module and HBA (see [5.3.6, “SBB I/O Module LEDs”](#), on page 39).
- 4 Check the HBA BIOS for SAS/SATA target visibility (refer to your HBA documentation for details).

- 5 Verify that the device driver for the operating system has been installed correctly.

5.3 LEDs

LED colors are used consistently throughout the enclosure and its components for indicating status:

- Green – good or positive indication.
- Flashing green/amber – non-critical condition.
- Amber – fault.

Note When the enclosure is powered on, all LEDs are lit for a short period to ensure that they are working. This does not indicate a fault unless the LEDs remain lit after a few seconds.

5.3.1 PSU LEDs

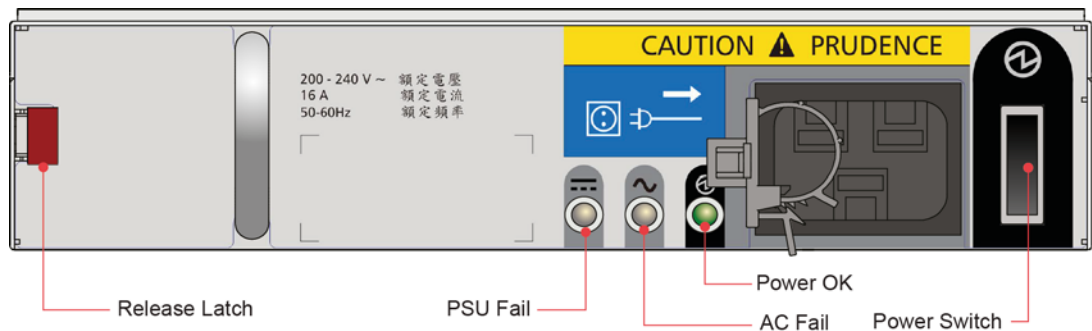


Figure 5–1 PSU LEDs

Table 5–1 PSU LED States

PSU Fail (Amber)	AC Missing (Amber)	Power (Green)	Status
Off	Off	Off	No AC power to either PSU.
On	On	Off	PSU present, but not supplying power <i>or</i> PSU alert state (usually due to critical temperature).
Off	Off	On	Mains AC present, switch on. This PSU is providing power.
Off	Off	Flashing	AC power present, PSU in standby (other PSU is providing power).
Flashing	Flashing	Off	PSU firmware download.
Off	On	Off	AC power missing, PSU in standby (other PSU is providing power).
On	On	On	GEM software has lost communication with the PSU.
On	–	Off	PSU has failed. Follow the procedure in section 6.5, “Replacing a Power Supply Unit (PSU)”, on page 51.

5.3.2 Cooling Module LEDs

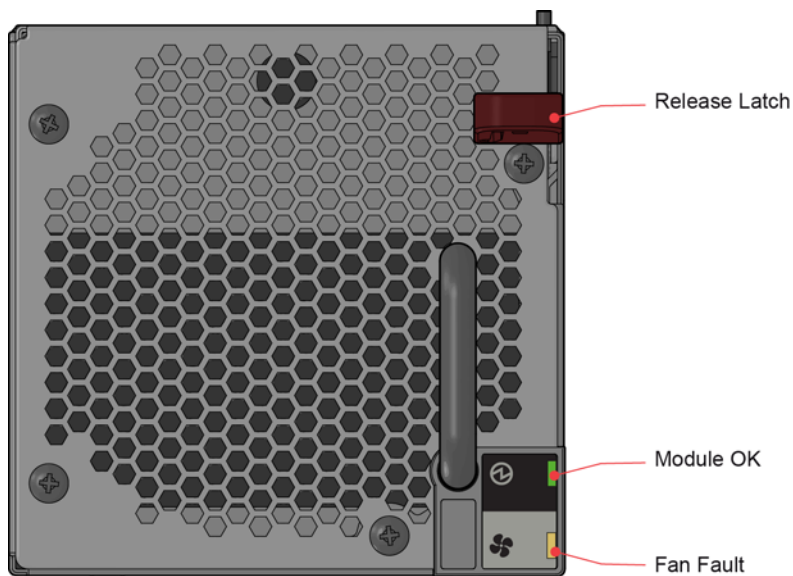


Figure 5–2 Cooling Module LEDs

Table 5–2 Cooling Module LED Descriptions

LED	Description
Module OK	Constant green indicates that the fan is working correctly. Off means the fan has failed. Follow the procedure in section 6.4, “Replacing a Cooling Module” , on page 49.
Fan Fault	Amber indicates that a fan has failed. Follow the procedure in section 6.4, “Replacing a Cooling Module” , on page 49.

5.3.3 Operator’s Panel LEDs

The operator’s (ops) panel (see [Figure 5–3](#)) displays the aggregated status of all the modules.

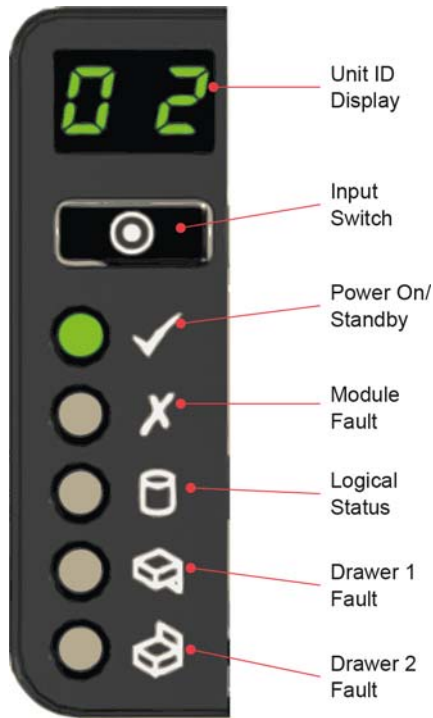


Figure 5–3 Ops Panel LEDs

Table 5–3 Ops Panel LED Descriptions

Display/LED	Description
Unit Identification Display	Usually shows the identification number for the enclosure, but can be used for other purposes.
Power On/Standby LED	Amber if the system is in standby. Green if the system has full power.
Module Fault LED	Amber indicates a fault in a PSU, cooling module or SBB I/O module. Check the drawer LEDs to see if a drive fault is indicated (see section 5.3.4, “Drawer LEDs”, on page 37).
Logical Status LED	Amber indicates a fault from something other than GEM (usually a disk drive fault, or an HBA, or an internal or external RAID controller). Check the drawer LEDs to see if a drive fault is indicated (see section 5.3.4, “Drawer LEDs”, on page 37).
Drawer 1 Fault LED	Amber if there is a drive, cable or sideplane fault in drawer 1. Open the drawer and check the disk drive LEDs for faults.
Drawer 2 Fault LED	Amber if there is a drive, cable or sideplane fault in drawer 2. Open the drawer and check the disk drive LEDs for faults.

5.3.4 Drawer LEDs

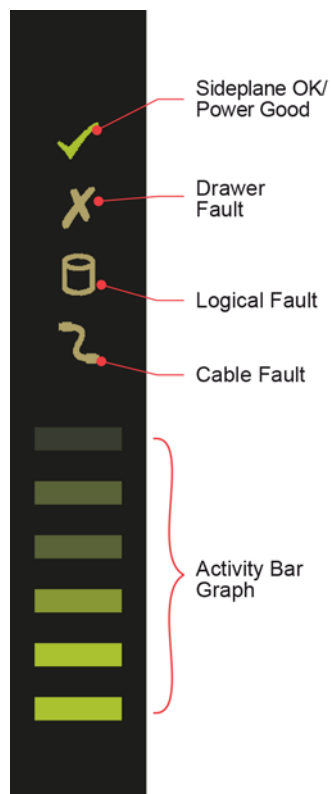


Figure 5-4 Drawer LEDs

Table 5-4 Drawer LED Descriptions

LED	Description
Sideplane OK/Power Good	Green if the sideplane card is working and there are no power problems.
Drawer Fault	Amber if a drawer component has failed. If it is a drive that has failed, an amber LED will be lit on the failed drive and you should follow the procedure in section 6.3, “Replacing a Disk Drive in Carrier (DDIC)”, on page 46 to replace the drive. If the drives are OK, contact your storage vendor to identify the failure.
Logical Fault	Amber if there is a drive fault. Flashes amber if one or more arrays are in an impacted state.
Cable Fault	Amber if the cabling between the drawer and the back of the enclosure has failed. Contact your storage vendor to resolve the problem.
Activity Bar Graph	Shows the amount of data I/O from zero segments lit (no I/O) to all six segments lit (maximum I/O).

5.3.5 Disk Drive in Carrier (DDIC) LED

Each disk drive has a single amber drive fault LED as shown in [Figure 5-5](#). When lit, this indicates a drive failure – the drive should be replaced as soon as possible using the procedure described in section 6.3, “Replacing a Disk Drive in Carrier (DDIC)”, on page 46.

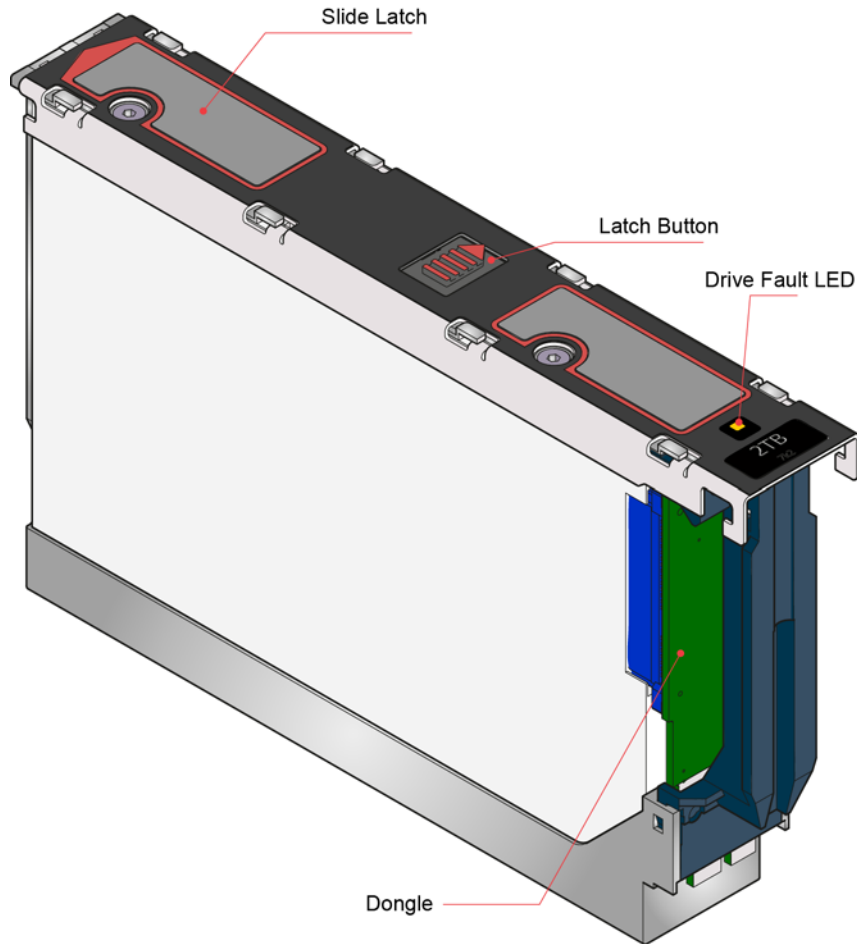


Figure 5-5 Drive Fault LED

5.3.6 SBB I/O Module LEDs

The LEDs on the SBB I/O module will depend on the type of module in use. LEDs for a common I/O module (the 12Gb/s SAS EBOD) are shown in Figure 5-6 and described below.

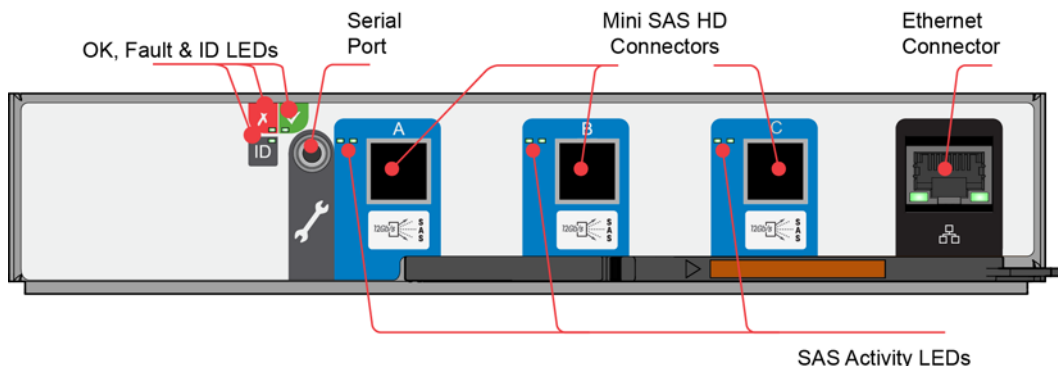


Figure 5-6 12Gb/s SAS EBOD I/O Module LEDs

Table 5-5 12Gb/s SAS EBOD I/O Module LED Descriptions

LED	Description
I/O Module Status	Constant green if the I/O module is operating correctly.
I/O Module Fault	Constant amber if the I/O module is faulty. For replacement procedure see section 6.6, “Replacing an SBB I/O Module”, on page 53.
I/O Module Identity (ID)	Blinking blue if host has set identify for canister via SES.
External Host Port Fault	Constant amber indicates that there is a critical fault, a fault causing operation of the cable to cease, or fail to start (for example, over current trip). Flashing amber indicates that there is a non-critical fault - a fault which does not cause the connection to cease operation (for example, not all links established).
External Host Port Activity	Constant green indicates that there is a host port connection but no activity. Flashing green indicates that there is a host port connection, and data is being transferred.

5.4 Thermal Sensors

Thermal sensors throughout the enclosure and its components monitor the thermal health of the storage system. Exceeding the limits of critical values will cause the Over-temperature alarm to occur (see [Table 5-6](#)).

5.5 Troubleshooting

The following sections describe problems that can occur with your OneStor SP-3584 and some possible solutions. For all of the problems listed in [Table 5-6](#), the module fault LED on the ops panel (see [Figure 2-6 on page 13](#)) will light amber to indicate a fault. All alarms will also report via SES.

Table 5-6 Alarm Conditions

Status	Severity
PSU alert – loss of DC power from a single PSU	Fault – loss of redundancy
Cooling module fan failure	Fault – loss of redundancy
SBB I/O module detected PSU fault	Fault
PSU removed	Configuration error
Enclosure configuration error (VPD)	Fault – critical
Low temperature warning	Warning
High temperature warning	Warning
Over-temperature alarm	Fault – critical
Under-temperature alarm	Fault – critical
I ² C bus failure	Fault – loss of redundancy
Ops panel communication error (I ² C)	Fault – critical
RAID error	Fault – critical
SBB I/O module fault	Fault – critical
SBB I/O module removed	Warning
Drive power control fault	Warning – no loss of drive power
Drive power control fault	Fault – critical: loss of drive power
Insufficient power available	Warning

For details on how to remove and replace a module see Chapter 6, “[Module Replacement](#)”, on page 43.

5.5.1 Thermal Monitoring and Control

The OneStor enclosure system 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 the front to the rear of the enclosure.

Symptom	Cause	Action
<p>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.</p> <p>Note: This is not a fault condition.</p>	<p>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.</p> <p>Note: This threshold changes according to the number of drives and power supplies fitted.</p>	<ol style="list-style-type: none"> 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. 2 Check for restrictions due to dust build-up. Clean as appropriate. 3 Check for excessive re-circulation of heated air from rear to the front. Use of the enclosure in a fully enclosed rack is not recommended. 4 Check that all blank modules are in place. 5 Reduce the ambient temperature.

5.5.2 Thermal Alarm

Symptom	Cause	Action
<ol style="list-style-type: none"> 1 Ops panel module fault LED is amber. 	<p>The internal temperature has exceeded a pre-set threshold.</p>	<ol style="list-style-type: none"> 1 Check that the local ambient environment temperature is below the specification (see section A.5, “Temperature and Humidity”, on page 58). 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 of the enclosure in a fully enclosed rack is not recommended. 5 If possible shutdown the enclosure and investigate the problem before continuing.

5.6 Dealing with Hardware Faults

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

- Important** If the enclosure is powered on and you remove a module, replace it immediately. If the system is used with any modules missing for more than a few seconds, the enclosure can begin to overheat, causing power failure and data loss. Such action will invalidate the warranty.
- Important** Observe all conventional ESD precautions when handling OneStor modules and components. Avoid contact with midplane components and module connectors, etc.

5.7 Firmware Updates

Information about updating the firmware in this product is supplied separately. Please contact your supplier for details.

5.7.1 PSU Firmware Programming Failure

If a PSU's firmware is being programmed and the download fails, the PSU LEDs will flash.

- Important** If the PSU programming fails, the PSU can be reprogrammed but it must not be moved between bays. If the PSU is moved it must be returned to the original bay before reprogramming can occur.

Chapter 6

Module Replacement

6.1 Overview

Important When you replace a module, you must never leave an empty bay in the rear of the enclosure. Always have available a replacement or blank module before removing the old module. ESD Precautions

Important It is recommended that you fit and check a suitable anti-static wrist or ankle strap and observe all conventional ESD precautions when handling OneStor plug-in modules and components. Avoid contact with midplane and sideplane components, and module connectors.

6.1.1 Continuous Operation During Replacement

Your hardware or software enclosure management application determines the capability of replacing a failed disk without loss of access to any file system on the enclosure. Enclosure access and use during this period is uninterrupted. If an enclosure contains two PSUs, one of them can maintain power to the system while the other is replaced.

6.1.2 Field Replaceable Units (FRUs)

The following components can be hot-swapped by the user in the field without removing the enclosure from its rack:

- PSU (part number 0948719).
- Cooling module (part number 0998648).
- DDICs (part number depends on drive selection).
- SBB I/O module (part number depends on module type).

The drawer sideplanes can be hot-swapped in the field. Replacement of the sideplanes requires a special tool and should be carried out by service personnel only. Refer to the OneStor SP-3584 Hot Swap Side Card Quick Installation Guide for full instructions.

6.2 General Procedures

6.2.1 Opening a Drawer

- 1 Make sure the anti-tamper locks are not engaged. The red arrows on the locks will point inwards if the locks are disengaged (see [Figure 6-1](#)). Unlock them if necessary by rotating them counterclockwise using a screwdriver with a torx T20 bit.



Figure 6-1 Anti-tamper Locks (shown disengaged)

- 2 Push the drawer latches inward and hold them (see [Figure 6-2](#)).
- 3 Pull the drawer all the way out until it locks open.

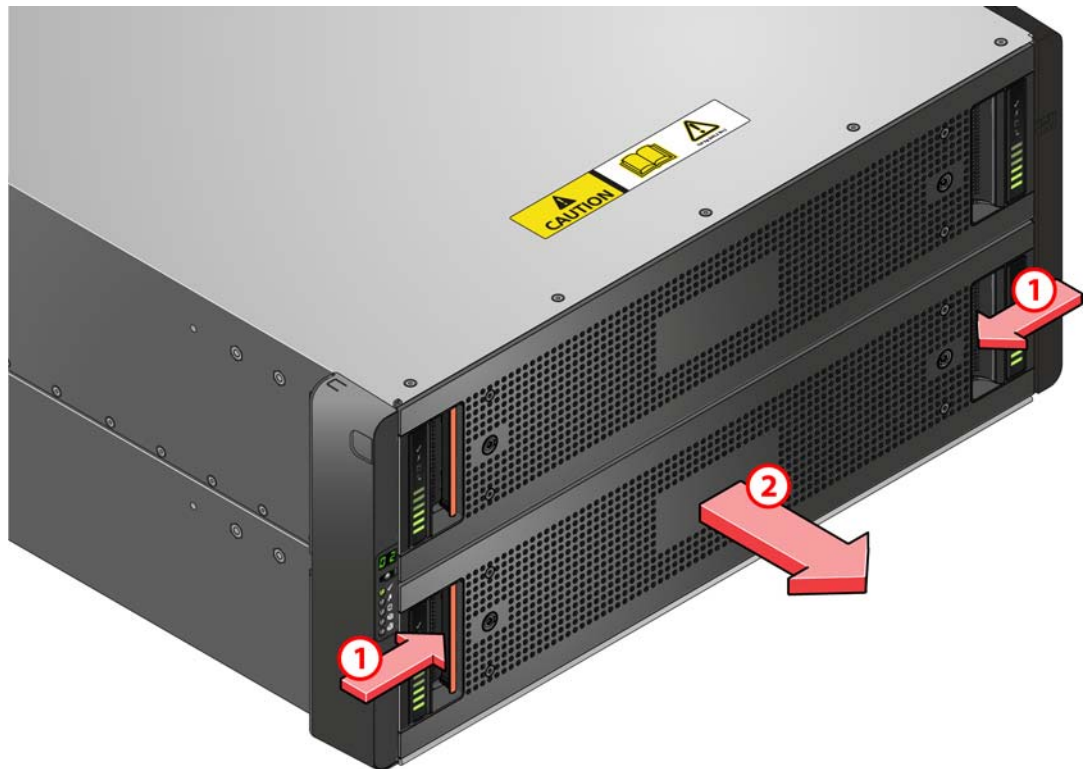


Figure 6–2 Opening the Bottom Drawer

Important The drawer must not be left open for more than two minutes while the enclosure is powered.

6.2.2 Closing a Drawer

- 1 Press and hold both of the latches on the sides of the drawer (see [Figure 6–3](#)).
- 2 Push the drawer in slightly.
- 3 Release the latches.
- 4 Push the drawer all the way back into the enclosure, making sure it clicks home.

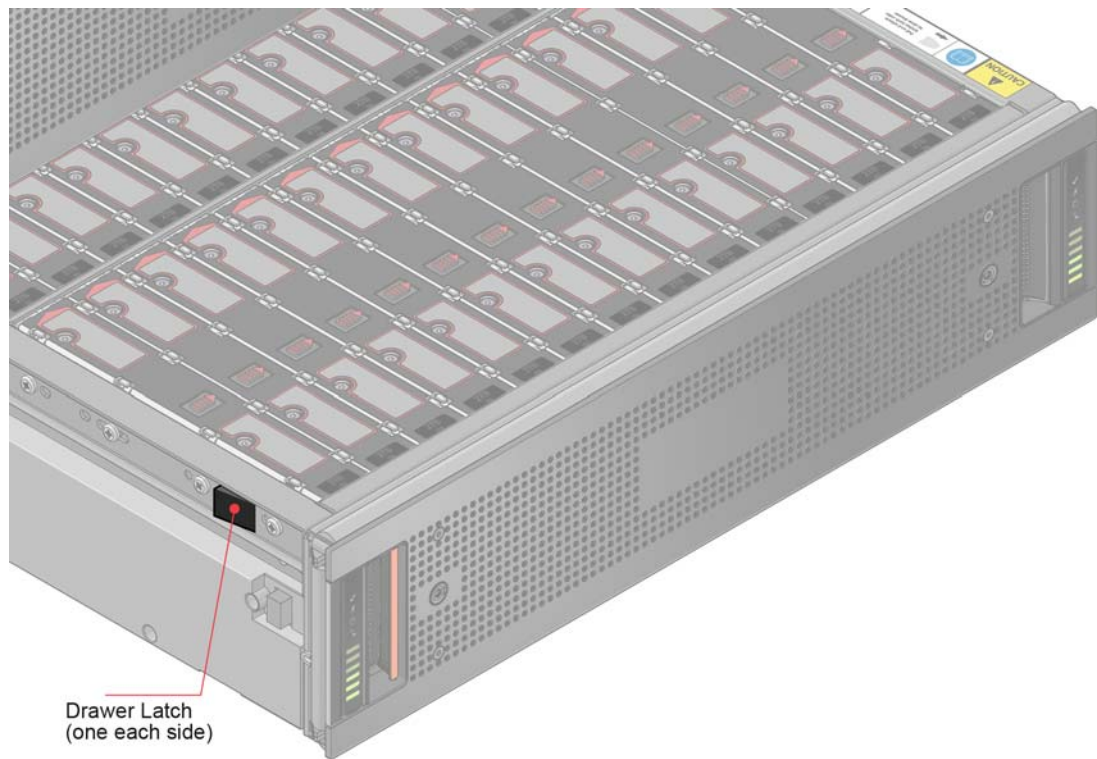


Figure 6–3 Drawer Latches

6.3 Replacing a Disk Drive in Carrier (DDIC)

6.3.1 Removing a DDIC

- 1 Identify which drawer contains the drive to be replaced. If the drive number is known, the plan in [Figure 6–4](#) can be used. If the drive has failed, the drive fault LED will be lit amber on the relevant drawer.

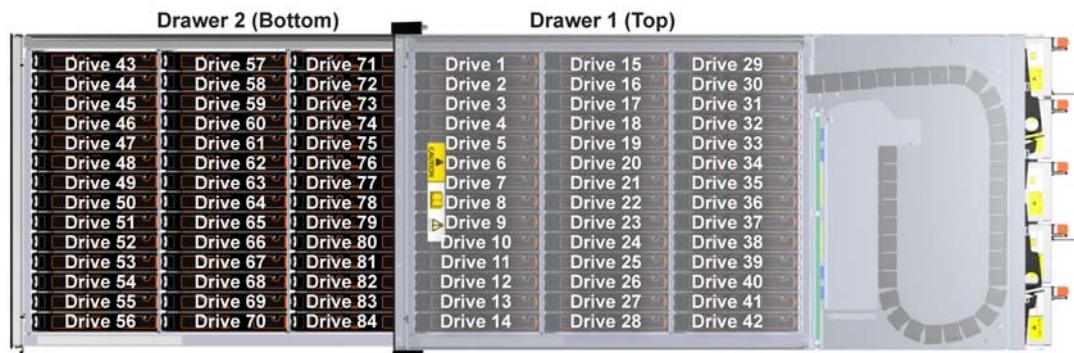


Figure 6-4 Drive Location Plan

- 2 Open the relevant drawer using the instructions in section 6.2.1, “Opening a Drawer”, on page 44.
- 3 Locate the drive to be replaced, either by using the drive plan (see [Figure 6-4](#)) or by looking for the amber LED on the drive that indicates a fault.
- 4 Push the drive carrier latch in the direction shown in [Figure 6-5](#) to unlock the drive.

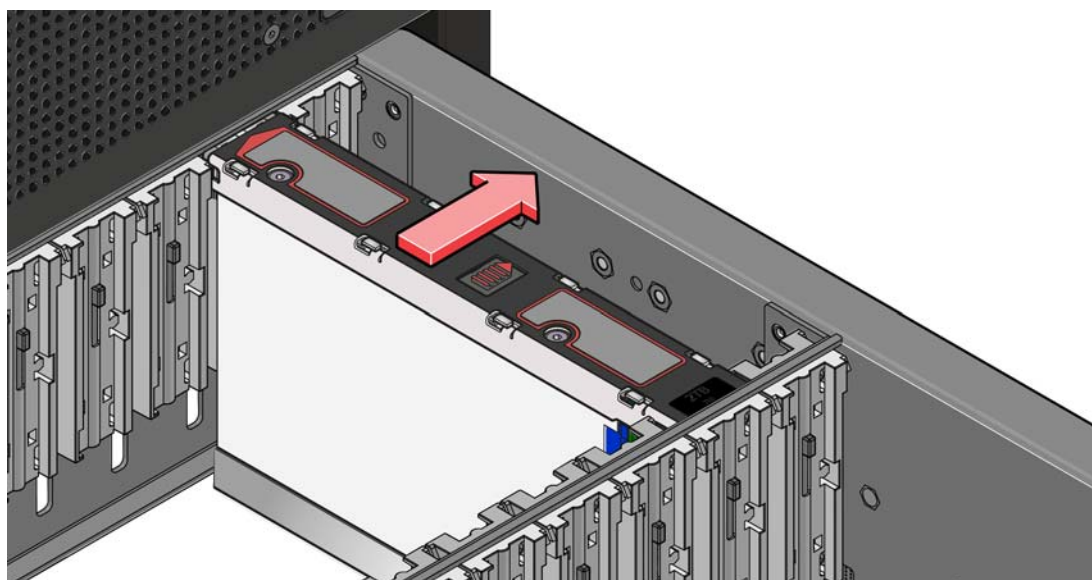


Figure 6-5 Removing a DDIC

- 5 Pull the drive upwards and out of the drawer.

Important If you are not going to replace the drive immediately, close the drawer (see section 6.2.2, “Closing a Drawer”, on page 45) so that correct airflow and cooling are maintained in the enclosure.

6.3.2 Inserting a DDIC

Important Failed drives must be replaced with approved drives. Contact your storage vendor for details.

- 1 If the relevant drawer is not already open, open it using the instructions in section 6.2.1, “Opening a Drawer”, on page 44.
- 2 Lower the DDIC into the slot, with the drive capacity label facing towards you, as shown in Figure 6-6.
- 3 Push the DDIC downwards and hold it down while sliding the drive carrier plate in the direction shown in Figure 6-6. This locks the drive in place.

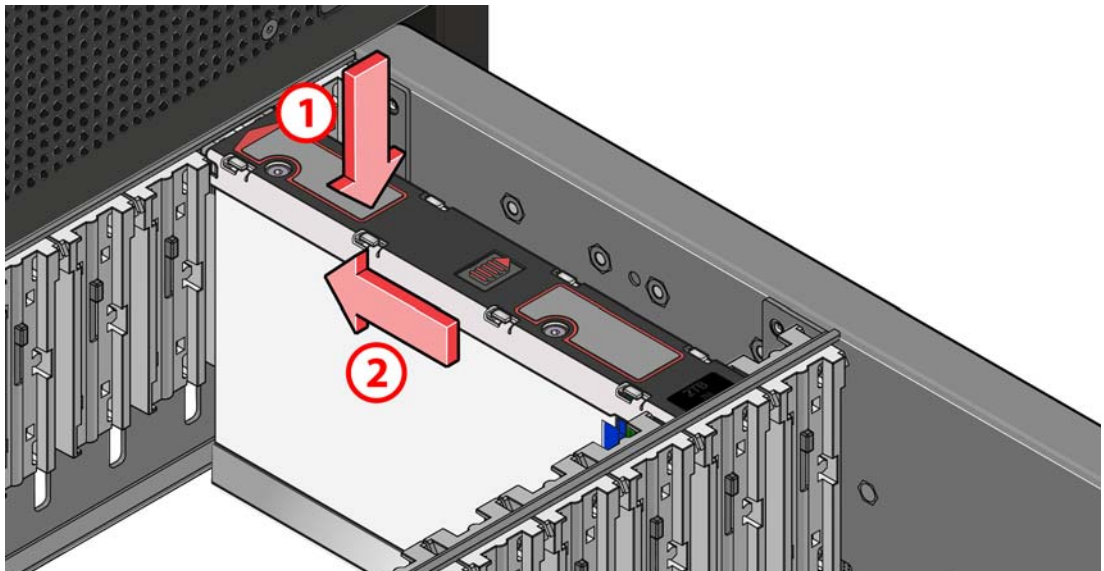


Figure 6-6 Installing a DDIC Drive

- 4 Check that the release latch has returned to its locked position, as shown in Figure 6-7.

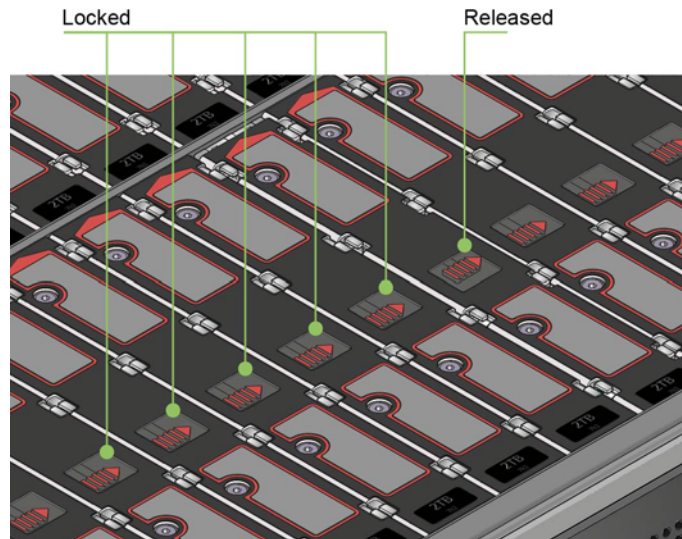


Figure 6-7 Latch Position of a Correctly Inserted Drive

- 5 Close the drawer using the instructions in section 6.2.2, “Closing a Drawer”, on page 45.

Note The drawers must be populated with drives in whole rows at a time (there are 3 rows of 14 drives per drawer). The minimum number of drives in an enclosure is 14, the number of rows must not differ by more than 1 between top and bottom drawers and the rows should be populated from the front to the rear of the enclosure.

Note The SP-3584 enclosure is not compatible DDICs intended for the previous generation SP-2584 enclosure. A keying mechanism will prevent insertion.

6.4 Replacing a Cooling Module

6.4.1 Removing a Cooling Module

Important Before removing a module, make sure you have a replacement module to insert.

- 1 Identify the cooling module to be removed. If the module has failed, the fan fault LED will be lit amber (see Figure 6-8).

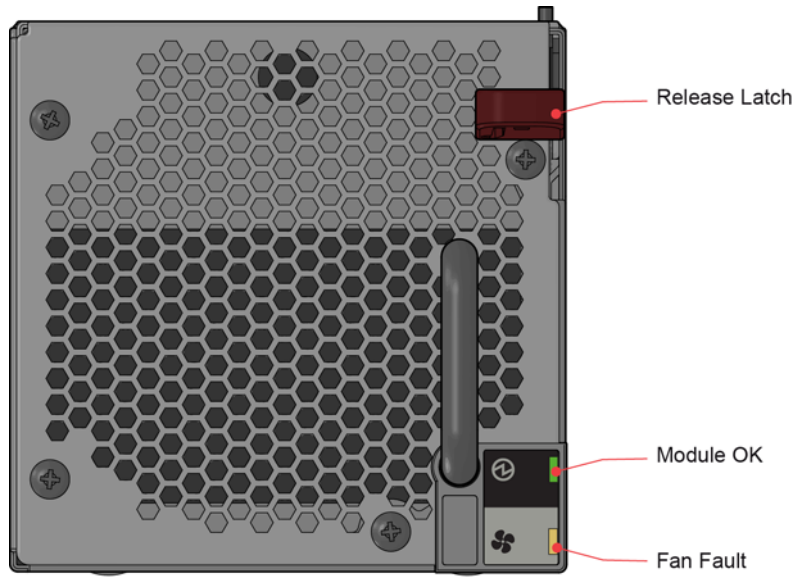


Figure 6-8 Cooling Module LEDs

- 2 As shown in [Figure 6-9](#) and [Figure 6-10](#), push down and hold the black release latch (1) and pull the module out by its handle (2).

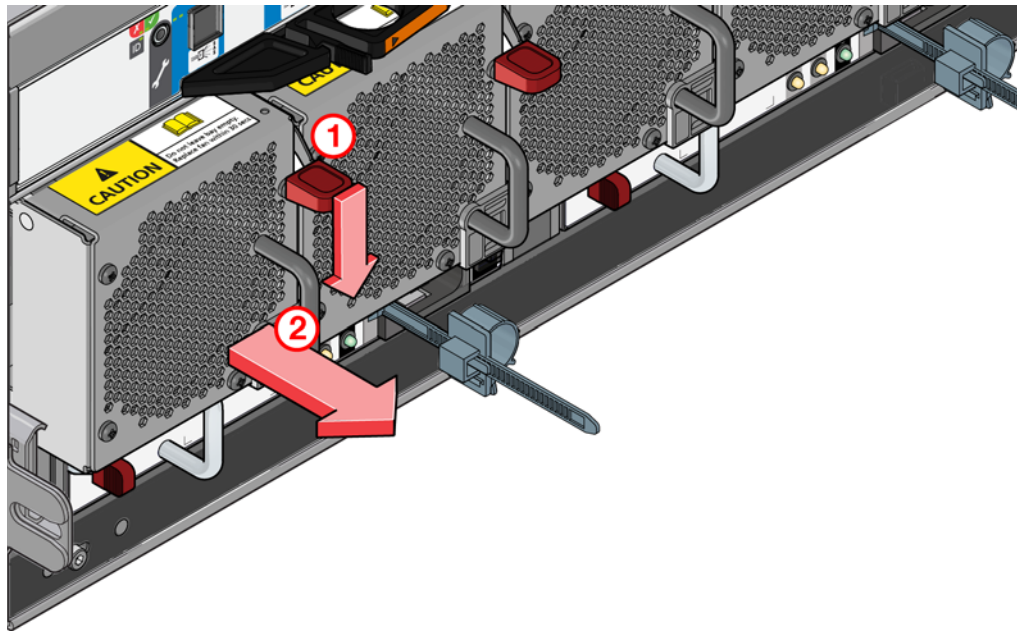


Figure 6-9 Removing a Cooling Module (1)

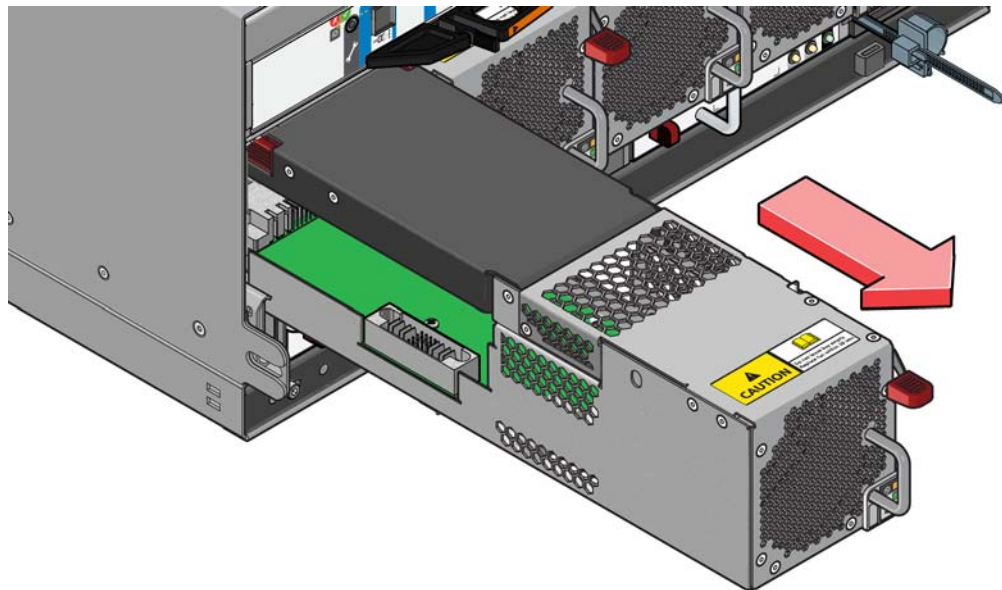


Figure 6-10 Removing a Cooling Module (2)

Important The cooling module bay must not be empty for more than two minutes while the enclosure is powered.

6.4.2 Inserting a Cooling Module

- 1 Rotate the cooling module so that the black release latch and handle are on the right-hand side.
- 2 Slide the cooling module into its slot until the latch clicks home. The enclosure will automatically detect and make use of the new unit.

6.5 Replacing a Power Supply Unit (PSU)

6.5.1 Removing a PSU

Important Before removing a PSU, make sure you have a replacement module to insert.

- 1 Identify the PSU to be removed using appropriate fault reporting software.
- 2 As shown in [Figure 6-11](#) and [Figure 6-12](#), push the red release latch to the right and hold it (1), then pull the module out by its handle (2).

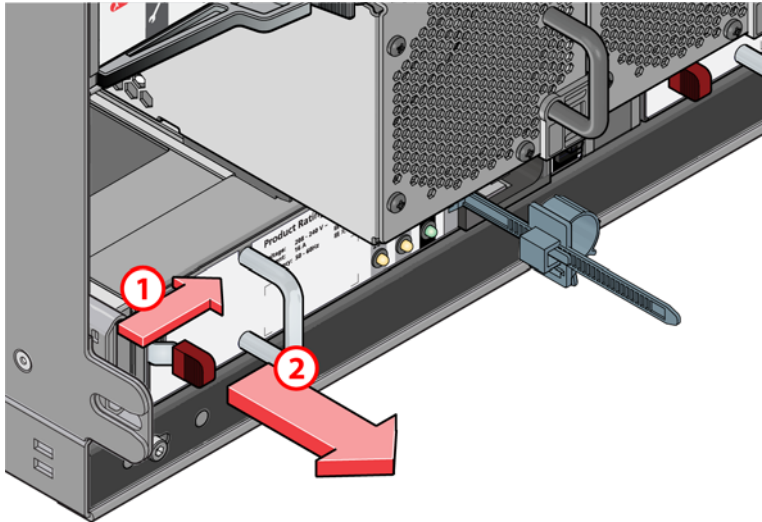


Figure 6–11 Removing a PSU Module (1)

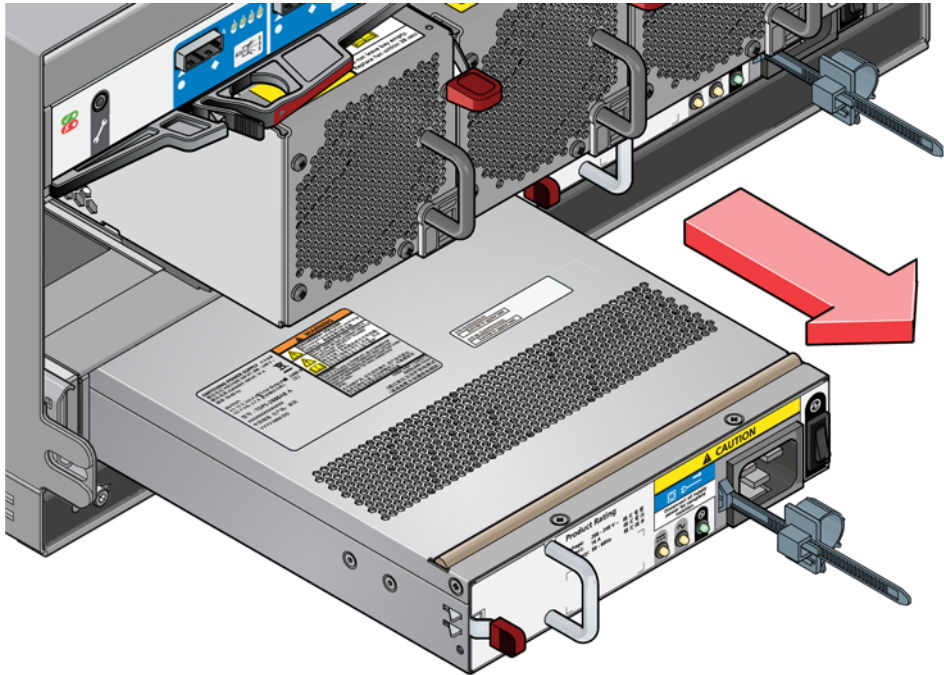


Figure 6–12 Removing a PSU Module (2)

Important The PSU module bay must not be empty for more than two minutes while the enclosure is powered.

6.5.2 Inserting a PSU

- 1 Rotate the PSU so that the red release latch and handle are on the left-hand side.

- Slide the PSU into its slot until the latch clicks home. The enclosure will automatically detect the new unit.

6.6 Replacing an SBB I/O Module

Important Before removing an SBB I/O module, make sure you have a replacement module to insert.

Note A variety of I/O modules can be used in the enclosure. These procedures show a 12Gb/s SAS EBOD I/O module.

6.6.1 Removing an SBB I/O Module

- Identify the SBB I/O module to be removed. If the module has failed, the fault LED will be lit amber (see [Figure 6–13](#)).
- Make a note of the locations of the cables before removing them from the I/O module.

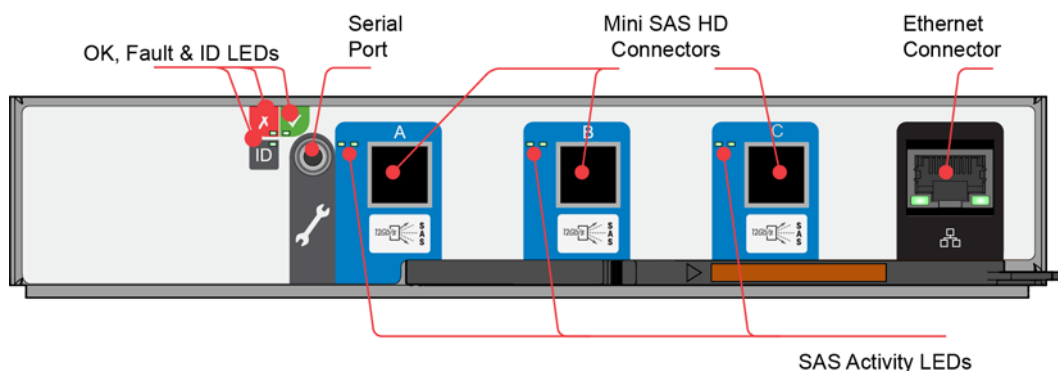


Figure 6–13 SBB I/O Module LEDs (12Gb/s SAS EBOD module shown)

- As shown in [Figure 6–14](#) and [Figure 6–15](#), pinch the latch on the module and pull the handle towards you (1). This will lever the module out of its connector on the midplane.
- Pull the module out of the enclosure (2).

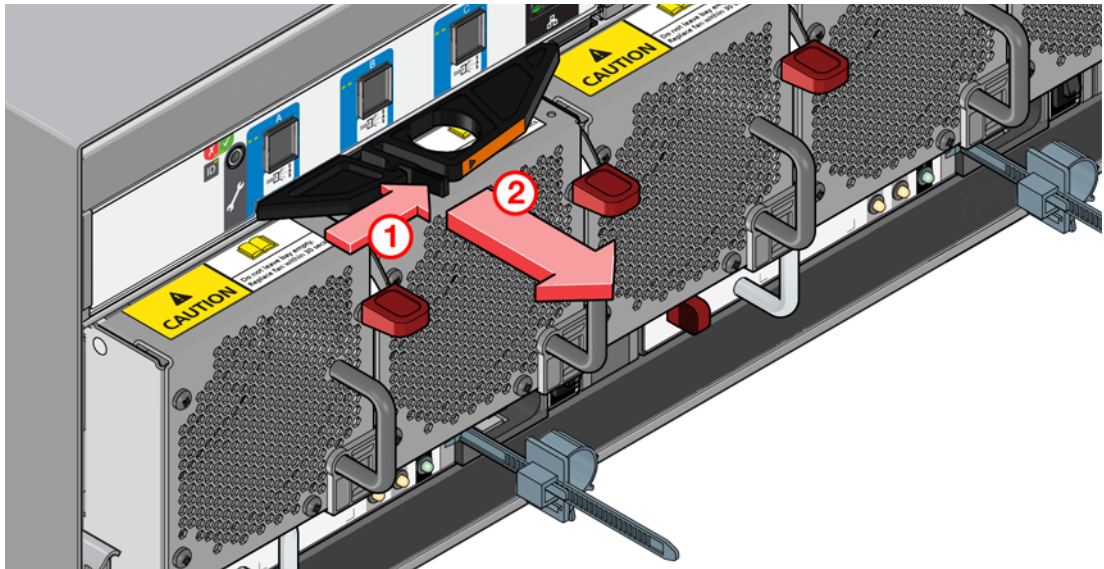


Figure 6–14 Removing an I/O Module (1)

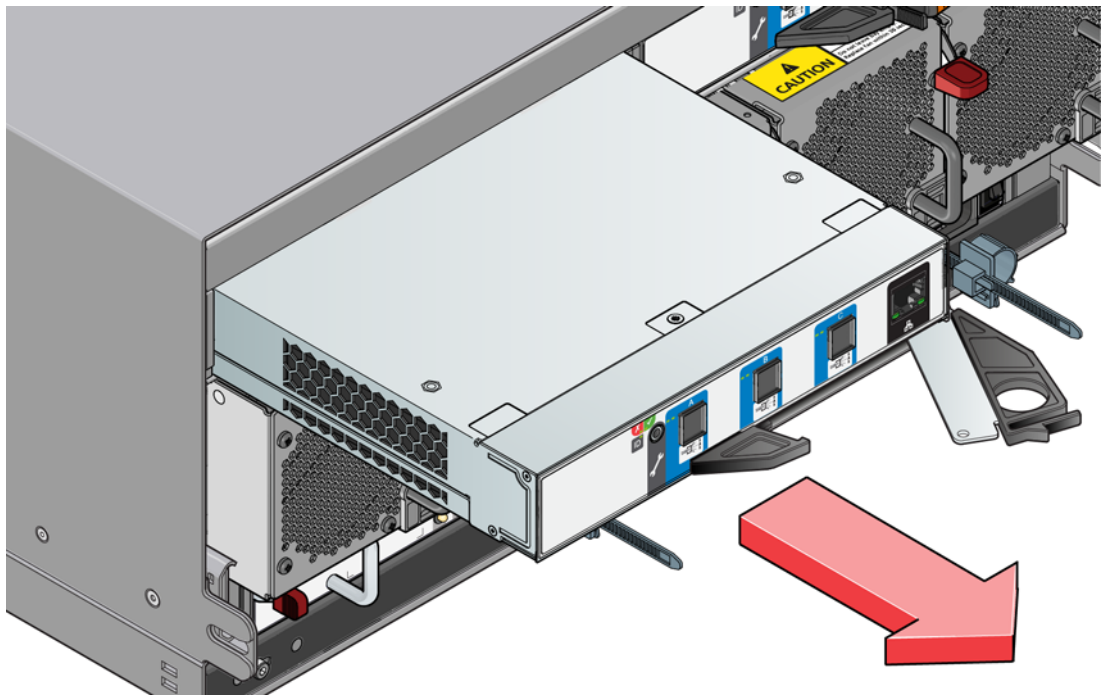


Figure 6–15 Removing an I/O Module (2)

Important The SBB I/O module bay must not be empty for more than two minutes while the enclosure is powered.

6.6.2 Inserting an SBB I/O Module

- 1 Rotate the SBB I/O module so that the release latch is at the bottom.
- 2 Open the release latch and rotate it to its most open position (as shown in [Figure 6-15](#)).
- 3 Slide the I/O module into its slot until it will go no further and the handle has started to close.
- 4 Close the latch until it clicks home. This will lever the module home into its connector on the midplane. The enclosure will automatically detect the new unit.
- 5 Connect the cables to the new module (if necessary, refer to the note you made before you removed the cables from the defective I/O module).

Appendix A

Technical Specifications

A.1 Dimensions

Table A-1 Enclosure Dimensions

	Millimeters	Inches
Height (enclosure, overall)	222.3	8.75
Width across mounting flange	482.6	19
Depth from rear of front flanges to rear extremity of chassis	915	36

A.2 Weights

All weights are approximate.

	Kilograms	Pounds
Fully populated enclosure	135	298
Drive carrier	0.8	1.8
PSU	2.7	6
Cooling module	1.4	3

A.3 Components (Fully Populated)

Drawers	2
Disk Drives In Carriers (DDICs)	84
SBB I/O modules	2
PSUs	2
Cooling modules	5

A.4 Thermal

Thermal sensors	2 per sideplane (2 sideplanes per drawer) 2 per drawer baseplane (front) 1 per drawer baseplane (middle/rear) 2 per power supply Number in SBB I/O module is dependent on module type
Airflow with all fans running	120 litres/second maximum

A.5 Temperature and Humidity

Table A-2 Temperature and Humidity Limits

	Operating	Non-operating
Temperature range	5°C to 35°C	-40°C to 70°C
Relative humidity	20%rh to 80%rh non-condensing	5%rh to 100%rh non-condensing
Maximum wet bulb	28°C	29°C

A.6 Cooling Modules

Cooling fans	2 stacked fans: 80x80x38mm
---------------------	----------------------------

A.7 SBB I/O Modules

A separate specification exists for each SBB I/O module.

A.8 Power Supply Unit

Output power	2214W maximum continuous output power at high line voltage
Voltage	+12V at 183A (2196W) +5V standby voltage at 2.7A
Input voltage range	200 to 240VAC
Input frequency	50 to 60Hz
Power factor correction	>0.95 @ 100% load
Efficiency	81% at 10% load 89% at 20% load 93% at 50% load 90% at 100% load
Holdup time	15ms from ACOKn high to rails out of regulation (see SBB v2.1 specification)
Mains inlet connector	IEC60320 C20 with cable retention
Weight	3kg

A.9 Supported Drives

The following drives are supported.

Hard Disk Drives (HDD)	3.5" 7200rpm or slower 6 or 12Gb/s SAS drive 2.5" 10000rpm or slower 6 or 12Gb/s SAS drive with 3.5" adapter
Solid State Drives (SSD)	3.5" 6 or 12Gb/s SAS solid state drive 2.5" 6 or 12Gb/s SAS solid state drive with 3.5" adapter
All Drives	Contact your storage vendor for details of other hard disk drives that are available for use in the OneStor SP-3584 storage system.

A.10 Shock and Vibration Tolerance

Operational vibration	0.21g RMS, 5 to 500Hz random with $\leq 10\%$ throughput loss
Operational shock	5g 10ms $\frac{1}{2}$ sine
Relocation vibration (non-operational)	0.3g, 2 to 200 to 2Hz swept sine
Non-operational vibration	1.04g RMS, 2 to 200Hz random
Non-operational shock	30g 10ms $\frac{1}{2}$ sine (Z axis)
	20G 10ms $\frac{1}{2}$ sine (X and Y axis)

Appendix B

Standards and Regulations

The OneStor SP-3584 is designed to comply with the standards and regulations enumerated in sections below. This includes any sample units.

B.1 EMC Qualification

OneStor SP-3584 carries EMC approval for the following territories:

- Australia/New Zealand.
- Canada.
- European Union.
- Japan (VCCI V-2).
- Korea (KN32/KN35).
- Taiwan (CNS 13438-2006).
- United States of America.

B.1.1 Conducted Emission Limit Levels

OneStor SP-3584 complies with the following EMC conducted emission limit standards:

- EN 55032:2012/AC: 2013/CISPR 32:2015-Class A.
- United States FCC CFR47 Part 15: Radio Frequency Devices, Subpart B: Unintentional Radiators, Class A.

Class A labeling is used.

B.1.2 Radiated Emissions Limit Levels

OneStor SP-3584 complies with the following EMC radiated emission limit standards:

- EN 55032:2012/AC: 2013/CISPR 32:2015-Class A.
- Individual shelves and towers comply with United States FCC CFR47 Part 15: Radio Frequency Devices, Subpart B: Unintentional Radiators, Class A.

Class A labeling is used.

B.1.3 Harmonics

EMC harmonics are in accordance with EN 61000-3-2:2014.

B.1.4 Flicker

EMC flicker is in accordance with EN 61000-3-3:2013.

B.1.5 Immunity Limit levels

EMC Immunity is in accordance with European standard EN55024:2010/CISPR24:2010.

B.2 Safety

OneStor SP-3584 is approved as safe for use in the following territories:

- Canada.
- European Union.
- United States of America.

Product Type Safety approval: UL, cUL, and CE.

The enclosure meets the requirements of the latest applicable editions of the following standards:

- EN 60950-1.
- IEC 60950-1.
- UL 60950-1.
- CAN/CSA-C22.2 No. 60950-1-07.

A CB report to the latest applicable edition of standard IEC 60950-1 is available for the power and cooling module and product type. The CB report has also been written with consideration to the latest applicable edition of the standard EN 60950-1, and includes the national differences for all countries in the CB scheme.

CCC applies to power and cooling modules only as FRUs.

The OneStor SP-3584 enclosure meets the fire enclosure standards set out in the latest applicable edition of the UL 60950-1.

B.3 Environmental and Recycling

B.3.1 RoHS and JIG A

The OneStor SP-3584 is manufactured from RoHS compliant materials and components, in accordance with EU Directives 2002/95/EC and 2011/65/EU.

Additionally, OneStor SP-3584 does not contain any substances or materials listed in Annex A of Joint Industry Guide JIG-101, Material Composition Declaration for Electronic Products (also known as 'JIG A Materials').

B.3.2 WEEE

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

The OneStor SP-3584 is designed to be compliant with EU directive 2012/19/EU, and is designed to minimize recycling costs.

Hazardous substances (including those not covered by EU directive 2011/65/EU and JIG A, section 8.3.1 have generally been avoided. Where used, the design makes them easy to separate out.

The documentation includes a Recycling Procedure for the product.

All plastic parts have been identified in accordance with ISO 1043 and ISO 11469.

The OneStor SP-3584 labeling includes the WEEE symbol:

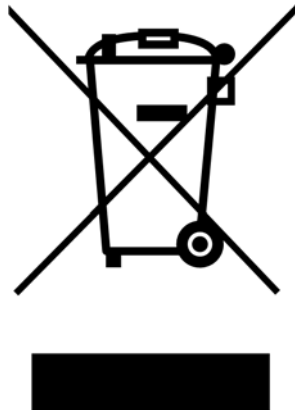


Figure B-1 The WEEE Symbol

B.3.3 REACH

OneStor SP-3584 does not contain any of the 'Substances of Very High Concern' (SVHCs) as detailed in the European Chemical Agency's document Candidate Lists of SVHCs for Authorization.

B.3.4 China RoHS

OneStor SP-3584 complies with the Phase II China RoHS requirements for self-declaration and labeling. Seagate intends that OneStor SP-3584 shall be compliant with the Phase II China RoHS requirements for testing and certification when these are finalized.

The OneStor SP-3584 labeling includes the correct Environment Friendly Use Period (EFUP) symbol, and the packaging includes the correct recycling mark.

B.3.4.1 SSD and HDD

中国限制危险物品的指令

China RoHS 2 refers to the Ministry of Industry and Information Technology Order No. 32 effective July 1, 2016 titled Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products. To comply with China RoHS 2, we have determined this product’s Environmental Protection Use Period (EPUP) in accordance with the Marking for the Restricted Use of Hazardous Substances in Electronic and Electrical Products, SJT 11364-2014, and the appropriate markings are listed on the product label. The following table contains information mandated by SJT 11364-2014.

中国限制危险物品的指令

该产品具有20年的环境保护使用周期（EPUP）。下表包含了中国“电子产品所导致的污染的控制的记号要求”所指定的信息。

Name of Parts 部件名称	Toxic or Hazardous Substances or Elements 有毒有害物质或元素					
	Lead 铅 (Pb)	Mercury 汞 (Hg)	Cadmium 镉 (Cd)	Hexavalent Chromium 六价铬 (Cr6+)	Polybrominated Diphenyl 多溴联苯 (PBB)	Polybrominated Diphenyl Ether 多溴二苯醚 (PBDE)
PCBA	X	0	0	0	0	0
Chassis	X	0	0	0	0	0

O: indicates that said hazardous substances contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.

“O”表示该部件（于同类物品程度上）所含的危险和有毒物质低于中国RoHS MCV标准所定义的门槛值。

X: indicates that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirements of GB/T 26572.

“X”表示该部件（于同类物品程度上）所含的危险和有毒物质超出中国RoHS MCV标准所定义的门槛值。

B.3.5 EuP Directive

OneStor SP-3584 is not yet required to comply with the Environmentally Friendly Design of Energy Using Products (EuP) directive. This directive aims to reduce the amount of energy used during the whole of the product lifecycle: manufacture, use and end of life.

OneStor SP-3584 has been designed to comply with this directive in the future. An Environmental Impact Assessment (EIA) has been completed to provide information to support future compliance.

B.3.6 Packaging

OneStor SP-3584 complies with the Packaging (Essential Requirements) Regulations 2003.

The design minimizes the amount of packaging used, and the packaging is designed for reuse, recovery or recycling, to reduce the environmental impact of packaging waste.

B.4 Acoustics

OneStor SP-3584 produces an operating sound power of $\leq L_{wAd} 8.2$ Bels (re 1pW) at an ambient temperature of 23°C.

B.5 AC Power Cords

If supplying your own power cord, you must ensure that the following specifications are met:

1 United States of America

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

Cord type	SJT or SVT, 12 AWG minimum, 3 conductor.
Plug (AC source)	IEC 320 C20, 250V, 20A <i>or</i> a suitable plug rated 250V, 20A.
Socket (PSU socket)	IEC 320 C19, 250V, 20A.

2 Europe & Others

General requirements:-

Cord type	Harmonized, H05-VVF-3G2.5.
Plug (AC source)	IEC 320 C20, 250V, 16A <i>or</i> a suitable plug rated 250V, 16A.
Socket (PSU socket)	IEC 320 C19, 250V, 16A.

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.

B.6 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.

Appendix C

Glossary

Baseplane One of three PCBs in the drawer, parallel to the front bezel, that provide connections for the DDICs.

DDIC Disk Drive In Carrier.

GEM Generic Enclosure Management – the software that controls all programmable components in the enclosure.

IATA International Air Transport Association.

Midplane A PCB in the middle of the enclosure into which the PSUs, cooling modules, SBB I/O modules and drawer cables are connected.

PSU Power Supply Unit.

SAS Serial Attached SCSI (Small Computer System Interface).

SATA Serial ATA (Advanced Technology Attachment).

SBB Storage Bridge Bay – An enclosure specification by the SBB Working Group (www.sbbwg.org).

Sideplane One of two PCBs in the drawer, running down each side, that provides connections from the baseplane to the rest of the enclosure.

U The Electronic Industries Association (EIA) measurement unit for the height of equipment in a 19" rack. 1U is 1.75 inches (44.45mm).

VPD Vital Product Data.

Index

numerics

- 19 inch Rack mounting features 10
- 5U84 enclosure 24

a

- Alarm Conditions 40
- Alarm Interpretation 40
- anti-static wrist or ankle strap 5, 19, 43

b

- Bay 29

c

- Chassis 10
- Continuous Operation During Replacement 43
- Cooling Module 16

d

- Drawer Fault LED 14
- Drive Carrier Module 9, 33
- Drive Carrier Module Faults 42
- Drive Carrier Module LEDs 37

e

- Enclosure Chassis 9
- Enclosure Management 18, 43
- Enclosure Management system 14
- Enclosure Services Processor 33
- ESD precautions 19, 42, 43

f

- Field Replaceable Units 43

h

- Hardware Faults 42
- HBA 14, 24, 33
- HBA BIOS 33

- Host Bus Adapter 24

i

- I/O Module 9, 14, 16
- Initial Start-up Problems 33
- Input Switch 14

l

- LED 34
- LED, PSU 34
- Logical Status LED 14

m

- Midplane 9, 10, 42
- Module Fault LED 14

o

- OneStor design concept 9
- Operator's Panel 9, 13, 36
- Operator's Panel LEDs 29, 30, 35

p

- plug-in module 9
- Power Down 32
- Power Supply Unit 15
- Problems at Initial Start-up 33
- PSU 14, 15, 24
- PSU LED States 34

r

- Rack Mounting Rail Kit 9

s

- SAS indicators 33
- SAS patch cable 24
- SBB 16, 17
- SBB I/O Module 17, 18
- Standby Power 14

System Configurations	24
System Power On/Standby LED	14

t

Thermal Alarm	41
Thermal Monitoring and Control	41
Troubleshooting	40

u

Unit Identification Display	13
-----------------------------	----

v

Visible and Audible Alarms	13
VPD	13