EonStor GS 3060L
Hardware Manual

Infortrend®

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Safety precaution

Read these instructions carefully before you install, operate, or transport the Infortrend storage systems and expansion systems.

Energy hazards precaution

This equipment is intended to be used in a restricted access location, like a computer room. Only allow access to SERVICE PERSONS or users who have been instructed about the metal chassis of the equipment, which may have hazardous energy that service persons must pay attention or take special protection before touching it. Also, the access is through the use of a key or security identity system. Only the authorized and well-trained personnel can access the restricted access location.

Installation and operation

- Install the rack cabinet and the associated equipment at a site where the ambient temperature (special room cooling equipment may be required) stays lower than 40°C.

- Install the power source socket outlet near the enclosure where it is easily accessible and ground the rack cabinet.

- Secure airflow clearance inside and around the rack cabinet.

  - Secure an 18 to 20 cm clearance on the rear side.

  - Do not cover the enclosure openings.

  - Route the cables inside the rack cabinet.

  - Do not leave drive bays empty as it will affect airflow efficiency.

- Secure each enclosure module using its retention screws.

- Place power cords and other cables away from foot traffic. Do not place items on top of power cords and ensure they do not rest against data cables.

- Install all modules to the enclosure before turning on the systems.

- Ensure that the correct power range is tested before turning on.

- DO NOT remove the covers or replaceable modules if they are not faulty.

- If the system is used for a long period of time, disconnect it from the power outlet to avoid transient over-voltage.

- For power source redundancy, please make sure that the two PSUs are plugged into two different power sources (i.e. different circuit breakers).

Service and maintenance

- Keep the faulty module in place until you have a replacement unit; an empty module greatly affects the airflow efficiency within the enclosure.

- During service operation, place the enclosure on a soft and clean surface to prevent exterior damage. Do not place tools or other items on top.

- When transporting the enclosure, repackage all disk drives separately in the original package foam blocks. Replaceable modules can stay in the enclosure if you are using the original package; if not, repackage them separately as well.

- Disconnect the power cords before servicing or cleaning the enclosure.

- Use a slightly moistened paper sheet or cloth for cleaning. Avoid using liquid or sprayed detergent.

- When replacing components, insert them as gently as possible while assuring full engagement. Vibration and shock can easily damage hard drives.

- Only qualified service personnel should open the enclosure.

- Contact service personnel if any of the following situations occurs:

  - The power cord or plug is damaged.

  - The enclosure has been exposed to moisture.

  - The system has not been working properly.

  - The enclosure was dropped against a hard surface.

  - The enclosure shows obvious signs of breakage.

- To move the enclosure, more than one person might be necessary due to its weight. Drives should be removed from the enclosure beforehand.

Important notice

The use of Infortrend certified components is strongly recommended to ensure compatibility, quality, and normal operation with your Infortrend products. Please contact your distributor for a list of Infortrend certified components (e.g. SFP, SFP+, HBA card, iSCSI cable, FC cable, memory module, etc.).

ESD precautions

- Handle the modules by their retention screws, ejector levers, or the module's metal frame/faceplate only. Avoid touching the PCB boards or connector pins.

- Use a grounded wrist strap and an anti-static work pad to discharge static electricity when installing or operating the enclosure.

- Avoid dust, debris, carpets, plastic, vinyl, and Styrofoam in your work area.

- Do not remove any module or component from its anti-static bag before installation takes place.

- Drives must not be stacked on top of each other without their protective drive trays. Even when drives are fixed in the drive trays, contacting the exposed PCB or rear-side interface may damage the drives.

About this manual

The manual introduces hardware components of EonStor GS 3060L storage system and expansion enclosures. It also describes how to install, monitor, and maintain them.

- For non-serviceable components, please contact our support sites.

- Firmware operation: Consult the Firmware User Manual on the CD-ROM.

- EonOne software: Consult the EonOne User Manual on the CD-ROM.

Revision history

Version	Date	Description
1.0	June 2017	Initial release
1.1	October 2018	- Added section **Managing the system cables** - Added section **Setting up the rack space requirement** - Fixed bugs throughout the content

Hardware specifications

Specification summary

Form factor	4U 60-bay EonStor GS 3060L
Controller	Dual redundant controllers
Cache memory	- 16 GB DDR4 (4 x 4 GB) - 32 GB DDR4 (4 x 8 GB) - 64 GB DDR4 (4 x 16 GB) - 128 GB DDR4 (4 x 32 GB) - 256 GB DDR4 (4 x 64 GB) **Note: The installed default memory varies by model, region, and other factors. Contact your local sales representative for details.**
Host ports	**Onboard Gb/s ports:** - 4 x 1 Gb/s iSCSI ports (2 per controller) - 4 x 10 Gb/s iSCSI ports (2 per controller) **More host options:** - 8 x 12 Gb/s SAS ports (4 per controller) - 8 x 10 Gb/s iSCSI ports/ RJ-45 (4 per controller) - 8 x 10 Gb/s Fibre Channel ports (4 per controller)* - 8 x 56 Gb/s Infiniband ports (4 per controller) - 16 x 1 Gb/s iSCSI ports (8 per controller) - 16 x 8 Gb/s Fibre Channel ports (8 per controller)* - 16 x 10 Gb/s FCoE ports (8 per controller) *** Supports point-to-point and switch mode**
Cache backup technique	Super capacitor + Flash module
Drive connectivity	12 Gb/s SAS connectivity
Maximum number of drives	- System: 60 - Expansion: 900
Drive advanced features	S.M.A.R.T. support, automatic bad sector reassignment, dedicated bandwidth to each connected drive
Supported drives	2.5-inch SAS SSD 2.5-inch SATA SSD 2.5-inch 100000 RPM SAS HDD 3.5-inch 7200 RPM Nearline SAS HDD 3.5-inch 7200 RPM SATA HDD **NOTE: Refer to the Compatibility Matrix for the latest compatibility details.**

RAID functionality	Global, dedicated, or enclosure hot spare
	RAID level supported: 0, 1 (0 + 1), 3, 5, 6, 10, 30 60
	Online expansion:
	- Adding new drives
	- Copying and replacing drives of larger capacity
	RAID migration:
	- Configurable stripe size and write policy per system
	- Intelligent drive handling
	  • In degraded mode: skips irreparable blocks to continue rebuild
	  • In normal operation: data-block verification and repair

(See next page)

Specification summary

Supported protocols	**File level protocol** - CIFS/SMB - AFP - NFS - FTP - FXP -WebDAV **Block level protocol** - FC - FCoE - iSCSI - InfiniBand - SAS **Object protocol** - RESTful API
Cloud gateway	- Amazon S3 - Microsoft Azure - Google Cloud Platform - Alibaba AliCloud - OpenStack
Data protection and service	Thin provisioning SED (self-encrypting drives) SSD cache* Automated storage tiering* Remote replication*: Synchronous or asynchronous for both block level and file level Location replication**: Snapshot, volume copy/mirror *** Optional** **** Available with Standard license and optional Advanced license**
Availability and reliability	- Redundant, hot-swappable hardware modules - CacheSafe technology - Multipathing support (MPIO) - Device mapper support
Management	- Web-based EonOne management software - Automated cache flush and caching mode operation per enclosure status - Module status LED indicators: component presence detection and thermal sensors via I2C bus - Storage Resource Management to analyze history records of resource usage - Automated repeatable management tasks by flexible workflow
OS support	- Windows® Server 2008/R2* - Windows® Server 2012/R2* - Windows® Server 2016* - Red Hat® Enterprise Linux® - SUSE® Linux® Enterprise - Sun® Solaris™

(See next page)

Specification summary

OS support	- MacOS® X - HP-UX - IBM® AIX® - VMware®** - Citrix® XenServer® *** Includes Hyper-V** **** NFS protocol running on VMware environment is not supported currently** **Note: Contact your local sales representative for the latest OS support details.**
Service and support	Standard services: - 3-year limited hardware/software warranty - 8 x 5 phone, web, and email support Upgraded/extended services: - Replacement of part dispatch on the next business day (up to 5 years) - Advanced service of 24/7 phone, web, email support, and on site diagnostics on the next business day - Premium service of 24/7 phone, web, email support, and on site diagnostics in 4 hours **Note: The upgraded/extended services are optional and vary by region.**
Power	- Power supply: 2 x Redundant/hot-swappable 1200 W - AC voltage: 100 - 127 VAC/12.47A, 200 - 240 VAC/7.08A with PFC (auto-switching) - Frequency: 47 - 63 Hz
Environment	**Temperature:** - Operating: 0°C - 40°C without BBU/CBM, 0°C - 35°C with BBU/CBM - Non-operating: -40°C - 60°C **Altitude:** - Sea level to 3660 m (12,000 ft.) operating/sea level to 12,192 m (40,000 ft.) non-operating - Relative humidity: 5% - 95% non-condensing, operating and non-operating
Environment	**Shock (half-sine):** - Operating: 5G, half-sine, 11 ms pulse width - Non-operating: 15G, half-sine, 11 ms pulse width **Vibration:** **(Random)** - Operating: 5 Hz - 500 Hz, 0.25 G_{rms}, X/Y/Z, 30 min - Non-operating: 15 Hz - 500 Hz, 1.0 G_{rms}, X/Y/Z, 30 min **(Sine)** - Operating: 5 Hz - 500 Hz, 0.2 G_{rms}, X/Y/Z Sine, 30 min - Non-operating: 5 Hz - 500 Hz, 1.0 G_{rms}, X/Y/Z Sine, 30 min **Acoustic:** 65 dBA boundary, 60 dBA normal

(see next page)

Specification summary

Regulations	Safety: UL, BSMI, CB, EAC Electromagnetic compatibility: CE, BSMI, FCC, KC
Weight (without HDD)	19.18 kg/42.28 lbs
Dimension	448 mm x 176 mm x 840 mm **Notes:** **• The dimensions do not include chassis ears/protrusions.** **• The dimension order is W x H x D.**
Package dimension	620 mm x 460 mm x 1140 mm **Note: The dimension order is W x H x D.**
Access right management	User account management Group management Folder management - Folder and subfolder access control Folder quota Comprehensive access control action items - All controls, Read, Read and Run, Modify, List Support Windows Active Directory Authentication - Domain Users Login via CIFS/SMB, AFP, FTP, and file explorer LDAP on Linux
Notification	Various event notification methods including email and SNMP trap.
Network configuration	- IPv6 support - Fixed or dynamic address - Dual Gigabit Ethernet with Jumbo Frame - Port trunking, NIC teaming, Link aggregation (IEEE 802.3ad) - DHCP client - MPIO, MC/S support
Green design	80 PLUS-certified power supplies delivering more than 80% energy efficiency Intelligent multi-level drive spin-down

NOTE: For the expansion enclosures, please refer to the data sheet or download it from our official website.
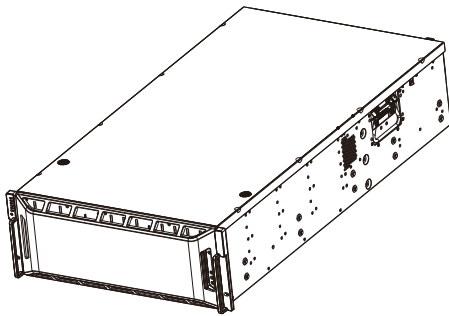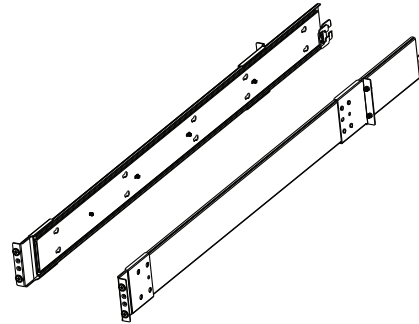
Package contents

Check the unpacking list for the complete list of contents and exact quantity of the components of your system.

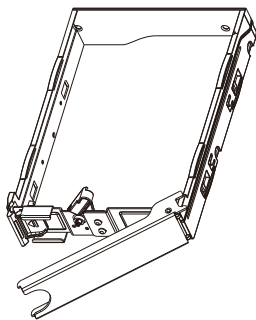**NOTE:** The contents and quantity may vary depending on the system model and order requests.

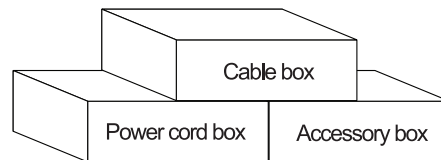
System package

Enclosure chassis

Rackmount slide kit

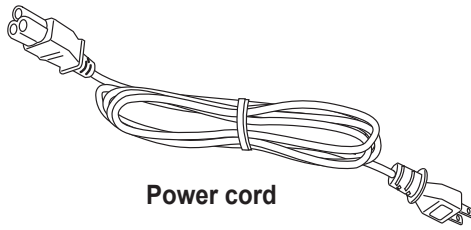**HDD tray**

Cable box

Power cord box | Accessory box

Power cord, cable, and accessory boxes

Unpacking list and China RoHS compliance documentation

Power cord, cable, and accessory boxes

Power cord
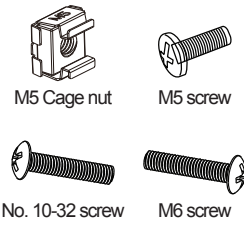
M5 Cage nut   M5 screw

No. 10-32 screw   M6 screw

**Mounting enclosure
screws and nuts**
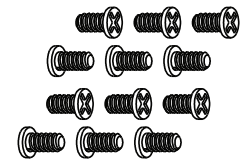
3.5-inch HDD screws

2.5-inch HDD screws
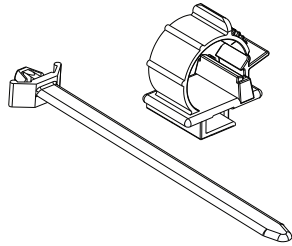
Power cord clamp set

SAS cable

Software CD

Infortrend
RAID
Quick Configuration Guide

Infortrend
Quick Installation Guide
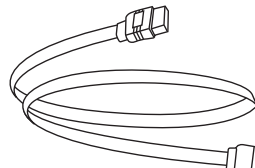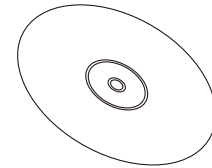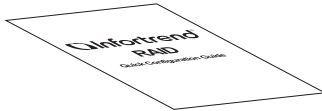
Quick configuration guide

Quick installation guide

Pre-installed components

PSU
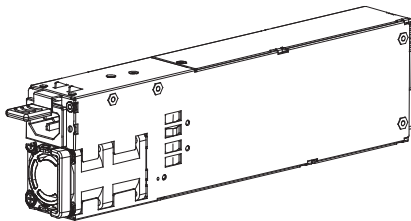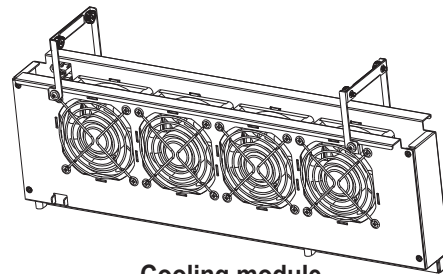
Cooling module
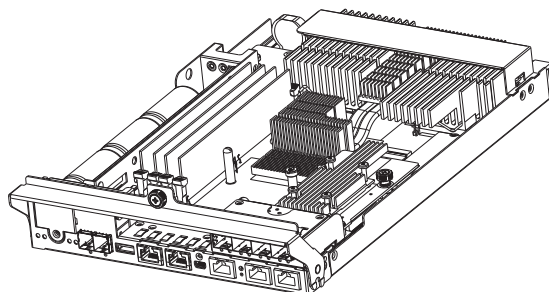
Controller module

Rackmount kit contents
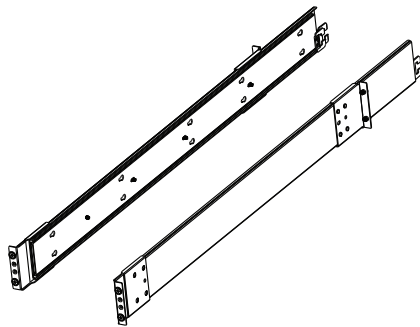
2 x Rackmount slide rails (left and right)
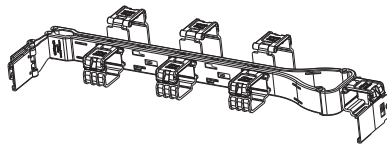
Cable management arm
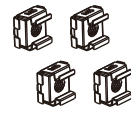
4 x Cage nuts
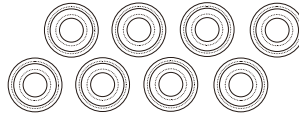
8 x 5.1 mm Washers
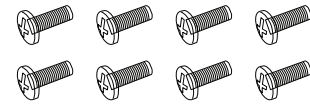
8 x 10 mm M5 screws

Adjuster pillars
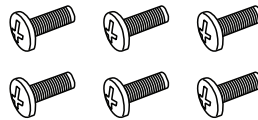
6 x 6 mm M4 screws

8 x Screws

NOTE: See section **2.2.2 Installing the rackmount slide kit** for the types of mounting kit and the exact package contents.

Product introduction

This chapter introduces the look and feel of EonStor GS 3060L system, features, and the supported components.

1.1   Overview

This manual introduces EonStor GS 3060L system that supports 3 Gbps, 6 Gpbs, and 12 Gbps SAS hard drives. This system is designed to utilize 2.5-inch and 3.5-inch hard drives. Drive capacity can be expanded by attaching expansion hard drive enclosures.
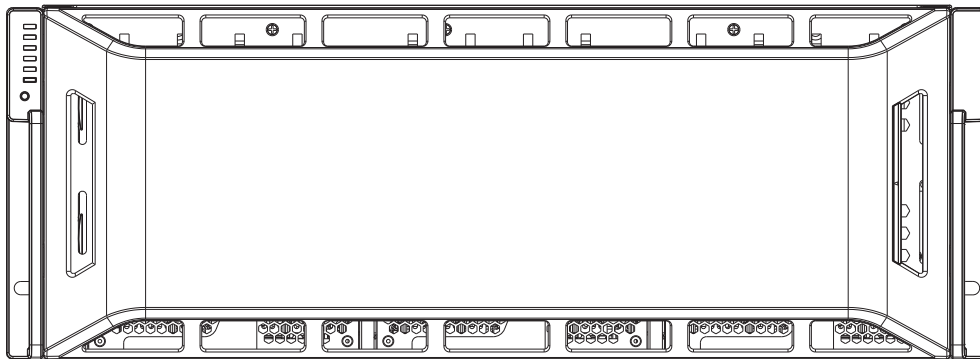
1.1.1   Major components

> **NOTE:** Upon receiving the system, check the package contents and compare them to the **Unpacking List**. If one or more of the modules are missing, please contact your system vendor.

Controller and interface

The system has controllers, and each controller comes with pre-installed DIMM modules. It also has a CBM (cache backup module), a module that has a super capacitor and an FBM (flash backup module). With the CBM, the cached data is quickly distributed to the FBM to save the data permanently with the support of the super capacitor if power outage occurs. With the super capacitor's fast-charging feature, it can distribute a fair supply of power to the controller, so the controller can save cache data to the FBM immediately and permanently.

Also, the embedded firmware features earth-friendly and smart algorithms that you can use to customize your system's hardware settings such as power-saving modes, variable fan speeds, and exiled drive handling.

Expansion controller and interface

The expansion enclosure is managed by expander controllers that distribute data flow to individual disk drives and report operating status through a proprietary enclosure service via in-band protocols. The enclosure, along with other expansion systems, connects to a SAN system and serves as a building block of a scalable configuration.

For supported protocols, the firmware supports communications with enclosure devices, SAS/SATA disk drives, and SAN system that features SAS expansion ports.

For physical connection, the SAS interface provides easy cabling routes via mini-SAS connectors. With the backplane-adapting SAS or SATA drives, the system can support enterprise-class SAS, Near-line SAS, and cost-effective SATA-II or SATA-III hard drives or SSDs. This connection is ideal for adding large capacity storages to a storage pool.

Power supply unit with built-in cooling module

Each PSU has a built-in cooling fan to protect the system from overheating, and at the same time, provide constant power to the system.

The cooling module is a redundant cooling type located at the center of the enclosure, which independently ventilates the system and keep the operating procedures under optimal condition.

1.2 Chassis

This section describes the front and rear panels of EonStor GS 3060L's rugged storage chassis. This chassis are designed to allow installation to the rack or a cabinet.

1.2.1 Front panel
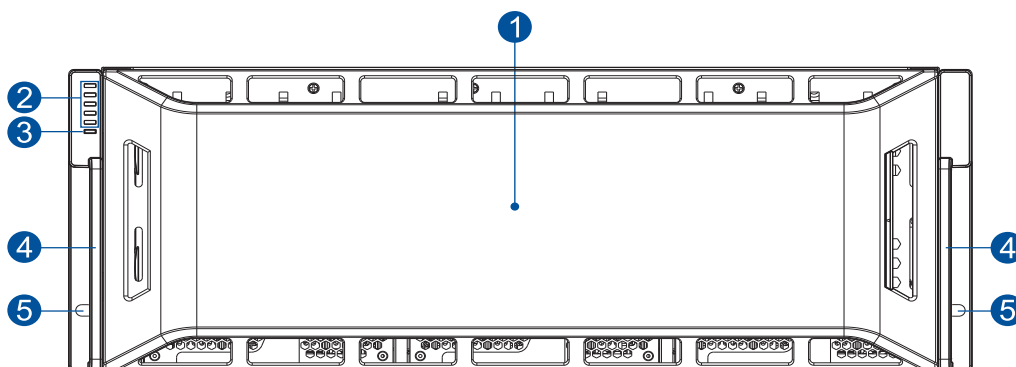
Number	Part	Description
❶	System cover	This cover hides the fans of the system.
❷	LED panel	LED panel has service, power, cooling fan, thermal, and system LEDs.
❸	Mute button/ Service LED	This button mutes the alarm while the embedded Service LED notifies you that the system requires service.
❹	Handles	These handles allow you to push/pull the enclosure to/from the cabinet installed in the slide rail rackmount system.
❺	Rackmount holes	These holes secure the enclosure to the rackmount system with the mounting screws.

1.2.2   Rear panel
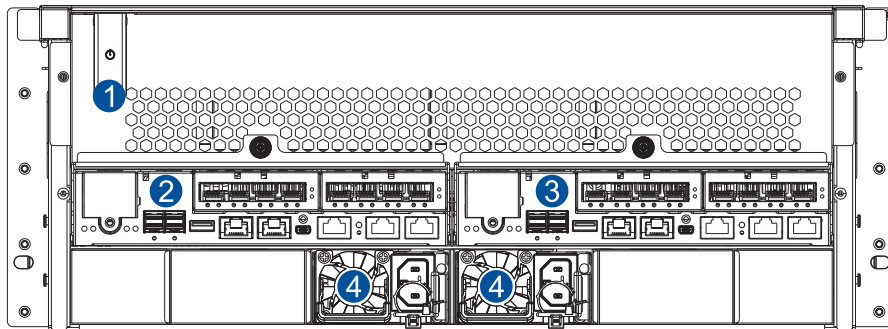
Number	Part	Description
1	Power button	This button allows you to turn ON/OFF your storage system.
2	Controller A	This controller module contains the SAS expansion board which distributes I/O functions to and from the managing RAID system. This also handles the status of the components via the SAS links with the RAID system.
3	Controller B or dummy cage	This part contains the second controller for dual-controller expansion. For single-controller expansion, this contains a dummy cage.
4	PSU	These hot-swappable PSUs provide power to the system and each PSU has a fan.

WARNING! DO NOT remove the redundant components without a replacement on hand.

1.2.3　Internal backplane

The internal backplane is a circuit board that separates the front and rear parts of the chassis. This provides logic level signals and low voltage power paths. The thermal sensors and I^{2}C devices are embedded to detect system temperatures and PSU operating status. This board is comprised of non user-serviceable components.

WARNING!

- Accessing the backplane board may lead to serious damage to the system.

- Physical contact with the backplane board may cause electrocution.

1.3　Front panel components

This section describes the components of GS system's front panel components.

1.3.1　LED and buttons panel

The LEDs on this panel allow you to know your system's current status when turned on, while the button has a specific function that you can set.
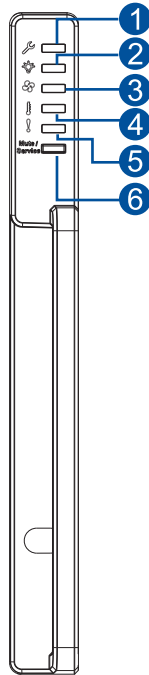
Number	Part	Description
1	Service LED	This LED provides the status when the system requires service or currently in service.
2	Power LED	This LED provides the status of the system's power.
3	Cooling module status LED	This LED provides the cooling module's status.
4	Temperature status LED	This LED provides the system's temperature status.
5	System fault LED	This LED provides the system's operation status.
6	Mute button/ Service LED	This button mutes the alarm while the embedded Service LED notifies you that the system requires service.

1.4　Rear panel components

This section describes the components of GS 3060L system's rear panel components.

1.4.1　Controller module interface

The I/O interfaces of the controller module allow you to connect to other devices and the LEDs allow you to know the status of your controller.
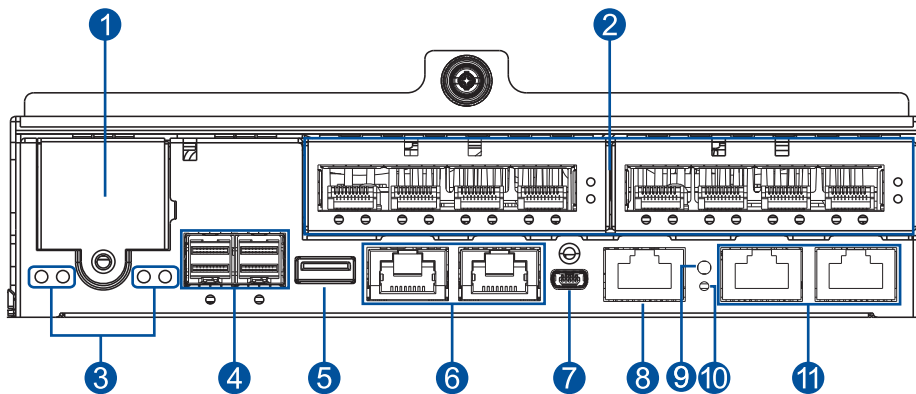
Number	Part
❶	CBM (Cache Backup Module)
❷	Host board slots (optional)
❸	Controller status LEDs
❹	SAS expansion ports
❺	USB service port
❻	iSCSI 10 G ports
❼	Mini USB port (console)
❽	Ethernet management port
❾	Restore Default button
❿	Restore Default LED
⓫	iSCSI 1 G ports

WARNING! The EonStor controller module is built of sensitive and non-replaceable components. When replacing the controller module, you can only remove it from the enclosure when you already have the replacement. Unnecessary tampering may damage the controller.

IMPORTANT! The host boards are add-on components. When installing a host board for the first time, insert it on the left slot (HB1).

NOTES:

- The Ethernet management port only supports 100 Mb and 1 Gb speeds.

- For more information about super capacitor and flash backup module, see section **1.4.4 Super capacitor and flash backup module**.

1.4.2   Controller module interfaces of the JBOD models

The expansion controller contains a circuit board within a metal canister, integrated with the hot-swap docking connectors at the backend. Two SAS wide ports on the interface faceplate connect to a managing GS system or other expansion systems.
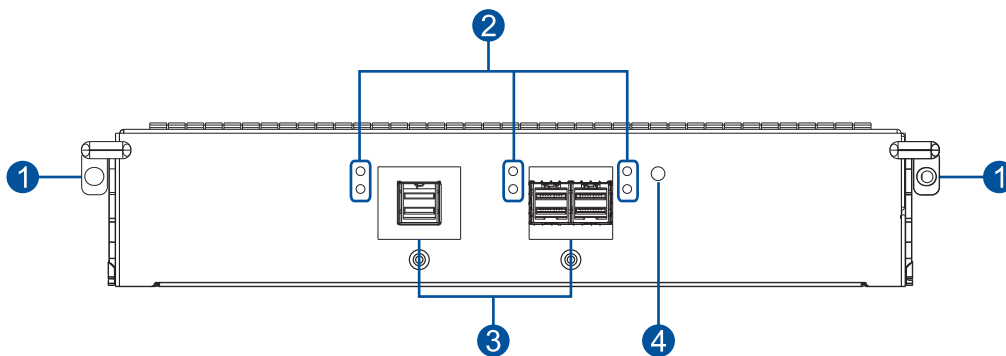
Number	Part
1	Extraction levers/screw holes
2	SAS expansion port status LEDs
3	SAS expansion ports
4	Controller status LED

WARNING! You can only remove the controller when you already have the replacement. The GS controller is built of sensitive components. Unnecessary tampering may damage the controller.

1.4.3   PSUs and cooling modules

The GS 3060L system has redundant, hot-swappable PSUs that provide power and built with a cooling fan that helps with the airflow, providing an efficient ventilation.

PSU
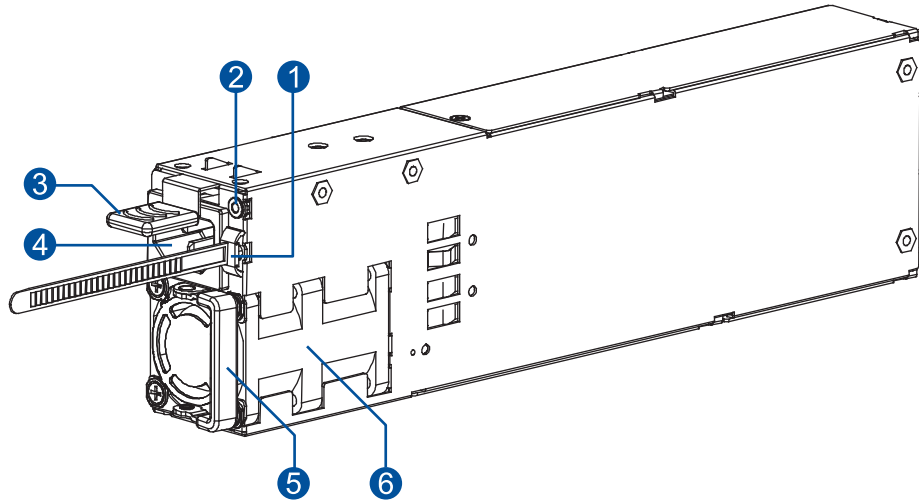
Number	Part
1	Mounting hole (with a mounted cable tie)
2	PSU status LED
3	Retention lever
4	Power socket
5	Extraction handle
6	Cooling module

Cooling module

The cooling module has four fans that help with the ventilation inside the chassis.
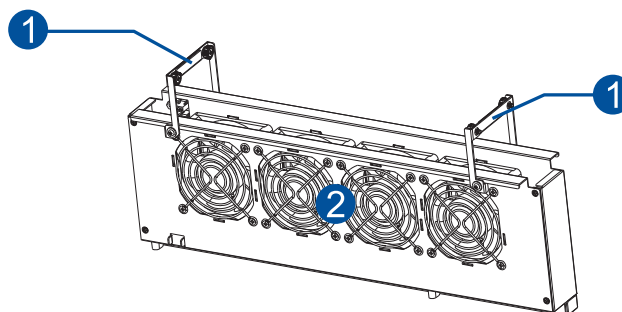
Number	Part
1	Extraction handles
2	Cooling fans

When the cooling modules operate under normal conditions, the cooling fans run at a low speed. The cooling fans raise their rotation speed to increase the airflow under the following conditions:

- Component failure: If the cooling module, PSU, or temperature failed.

- Elevated temperature: If the temperature breaches the upper threshold set for any of the interior temperature sensors.

During the initialization stage, the cooling fans operate at a high speed. The speed is lowered when the initialization is completed and no errors are detected.

NOTES:

- The PSUs have specific installation orientations for left and right cooling module slots. Refer to the label at the back of the expansion.

- There are two upper temperature thresholds: one for event notification and the other for triggering high fan rotation speed. You can change the preset values for event notification using the firmware-embedded configuration utility. Refer to the firmware operation manual for details.

WARNING!

- If any of the LEDs lights up in red, please contact your local vendor to request for a replacement immediately.

- When removing the system cooling module, pull the module for about 3 inches then wait for at least 10 seconds before removing the whole module from the enclosure.

- DO NOT run the system with faulty cooling module(s) as it may cause disruption of the airflow resulting in overheating.

CAUTION! Keep your body away from the moving parts of the system.

1.4.4   Super capacitor and flash backup module

The GS 3060L system also has a CBM (Cache Backup Module), which is comprised of a super capacitor and flash backup module, installed in the controller. The super capacitor stores cached data to the flash backup module permanently in case of power interruption or outage.
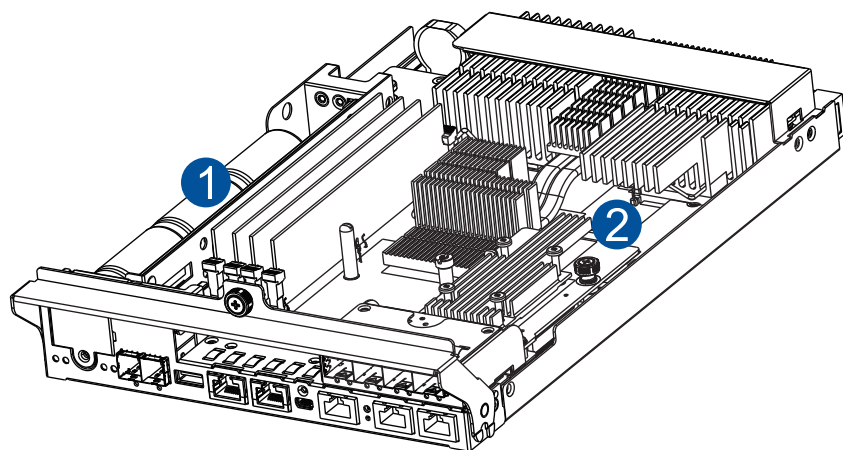
NOTE: The super capacitor is partially charged when shipped. When you turn ON the system, the super capacitor will charge to its full capacity for a few minutes. If it is not charging, there may be a problem. Contact your system vendor immediately. You can also check the status of the super capacitor via EonOne or the firmware. Refer to the manuals for more details.

1.5   System monitoring features

This section describes the different types of system monitoring features that provide the operating status of each component.

1.5.1   Expansion enclosure support

Monitoring system

A managing GS system is aware of the status of connected expansion system's components such as:

- Expander controller (presence, voltage, and thermal readings)
- PSU
- Cooling module
- Enclosure thermal sensor
- Service (the Service LED signals the specific enclosure)
- Hard disk drives

Expansion system identifier

The managing system sets off the alarm and delivers the warning messages if there is a conflict between the expansion systems.

If more than one expansion system is connected to the managing GS system, each needs a unique enclosure ID set using the rotary switch on the LED panel. For example, the firmware automatically disconnects the second expansion system if it is connected online and comes with an ID identical to the first expansion system.

> **NOTE:** The expansion system IDs are numbers 1 to 15. For more details, see section **2.3.6 Expansion connections**.

Cooling module speed adjustment

If any of the detected temperature readings breaches the temperature threshold, the firmware running on the managing GS system automatically increases the rotation speed of all cooling fans.

Expansion enclosure status monitoring

When connecting with expansion systems, you can acquire the component status with other enclosures via a propriety enclosure monitoring service using the in-band connectivity. No additional management connection is required.

I²C bus

The detection circuitry and temperature sensors are interfaced via a non-user-serviceable I²C bus. When the expansion systems are connected to GS controllers, the component status is reported through in-band protocols over expansion links, which is managed by a proprietary enclosure service.

Firmware (FW) and EonOne

- **Firmware:** The firmware (FW) is preloaded and is used to configure the system. Access the FW via a terminal emulation program running on a management computer connected to the system's serial port.
- **EonOne:** EonOne is another browser-based GUI (graphic user interface) software that you can install into a local or remote computer and access via the network. The managing system communicates with the array via connection of the existing host links or the Ethernet link to the array's Ethernet port.

1.5.2   Audible alarms

The system comes with audible alarms that are triggered when certain active components fail or when specific controller or system thresholds exceed. Whenever you hear an audible alarm, you must determine the cause and solve the problem immediately.

Event notification messages indicate the completion or status of array configuration tasks and are always accompanied by two or three successive and prolonged beeps. You can turn off the alarm using the mute button on the front panel.

WARNING! Failure to respond when an audible alarm is set off can lead to permanent damage to the system. When you hear an audible alarm, solve the problem immediately.

1.6   Hot-swappable components

The system has a number of hot-swappable parts that you can change while the system is still online without affecting its operational integrity.

These hot-swappable components are user-maintained:

- PSU

- Hard disk drive

- Controller modules

- Cooling module

IMPORTANT! Only remove these hot-swappable components when replacement is needed.

NOTE: A normal airflow ensures sufficient cooling of the system and this can only be attained when all components are properly installed. Remember to only remove the failed component if there is already a replacement. For more information on replacing hot-swappable components, see chapter **System maintenance**.

Hardware installation 2

This chapter describes installing the modular components such as hard drives, cards, and other optional installation or connections such as expansions and rackmount.

2.1   Installation prerequisites

Take note of the following installation prerequisites before you start with the installation:

- **Static-free installation environment**

    Install the system in a static-free environment to minimize the possibility of ESD (electrostatic discharge) damage.

- **Component check**

    Before the installation, ensure that you received all required components by verifying the package contents with the **Unpacking List** document. This document is included in the package. If there are items missing and/or damaged, contact your vendor for a replacement.

- **Hard drives**

    The SAS/SATA drives are purchased separately and must be available before the system installation.

- **Memory modules**

    If you want to change the pre-installed DIMM modules, ensure that they are compatible and purchased from a qualified vendor. Contact your vendor for the list of compatible DIMMs.

- **Cables**

    All cables that connect the system to the hosts are purchased separately. Contact your vendor for the list of compatible cables.

- **Rackmount equipment**

    The rack slide rails are optional accessories. If you need to install it, see section **2.2.2 Installing the rackmount slide kit**.

    > **IMPORTANT!** Install the system first to the rack or cabinet before installing the hard drives into the system.

Ensure that you are familiar with the exact position of each plug-in module and interface connector. Also, ensure to handle the cables with care when connecting between systems installed in the rack with a correct routing paths carefully planned. DO NOT bend or twist the cables as this may cause emission interference and accidental cable disconnection.

2.2   Installation procedures

This section details the installation procedures of the system, its components, and connections between equipment. The installation procedures in this section are in order, so it is strongly recommended that you follow the said order to reduce the time consumed during installation and prevent installation mistakes, technical mishaps, or physical injuries.

2.2.1   Unpacking the system

When your system package has arrived, check and confirm if the contents of your package are complete by referring to the **Unpacking List** document, which is bundled with in your package.

Accessory box contents

This box contains the following:

- Serial port cable
- Screws
- Quick installation guide
- Support CD (EonOne Management software and manual, firmware operation manual)
- Product utility CD (Hardware manual)

Pre-installed components

Below are the components that are pre-installed in the system:

- Controllers
- LED front panels
- PSUs including the cooling modules
- DIMM modules
- CBM (cache backup module)
- Host board/s

Components that need user installation

You must do the following installation:

- Assembling of the system to the rack/cabinet
- Assembling the hard drives to the hard drive tray
- Cabling in between systems

> **NOTE:** To install the system to the rack/cabinet, see section **2.2.2 Installing the rackmount slide kit**.

2.2.2   Installing the rackmount slide kit

This section details the overview of the rackmount slide kit, its assembly, and installation with the storage system.

> **IMPORTANT!** Please contact our technical support team if you need further help in installing your system/enclosure to the rack.

> **NOTE:** You can also watch this YouTube video on assembling the rackmount kit and installing the system to the rackmount.

Preparing the user-provided tools

Before assembling the slide rail kit, you must prepare the following tools:

- 1 x Medium-sized Phillips screwdriver

- 1 x Small-sized Phillips screwdriver

- 1 x Medium-sized flat blade screwdriver

Setting up the rack space requirement

GS 3060L's enclosure requires a suggested approximate space at the front and rear of the rack. The space on the front panel is based on the enclosure's length and the needed space to fit a person who services the rack equipment. The space on the rear panel must answer to the technician's need when servicing the parts of the system's rear panel.

IMPORTANT!

- Ensure that the depth of the rack is enough for the enclosure and cable management arm.

- Due to the enclosure's heavy weight and top disk insert design, we recommend to have 3 persons installing the enclosure, starting from the lower position.

Space requirement specification

Space specification	Measurement
Minimum front space	1220 mm (48 inches)
Minimum rear space	560 mm (22 inches)

Enclosure space requirement
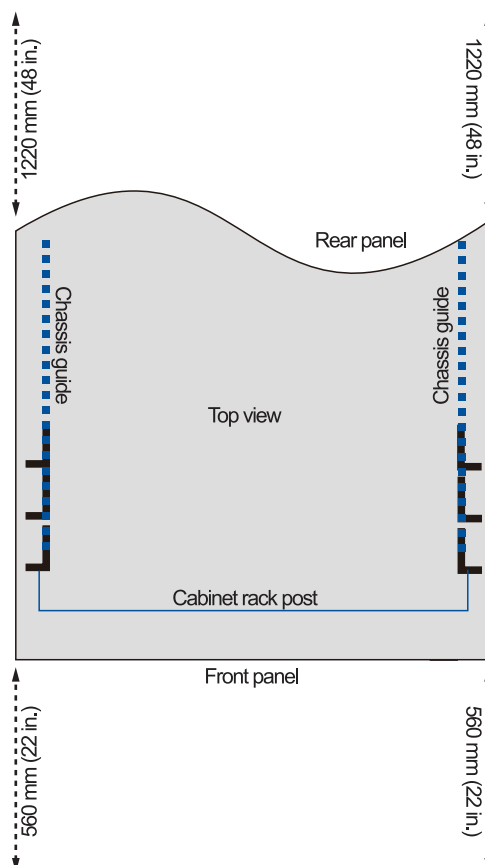
Rackmount slide kit contents

Check your rackmount slide kit for the following contents.
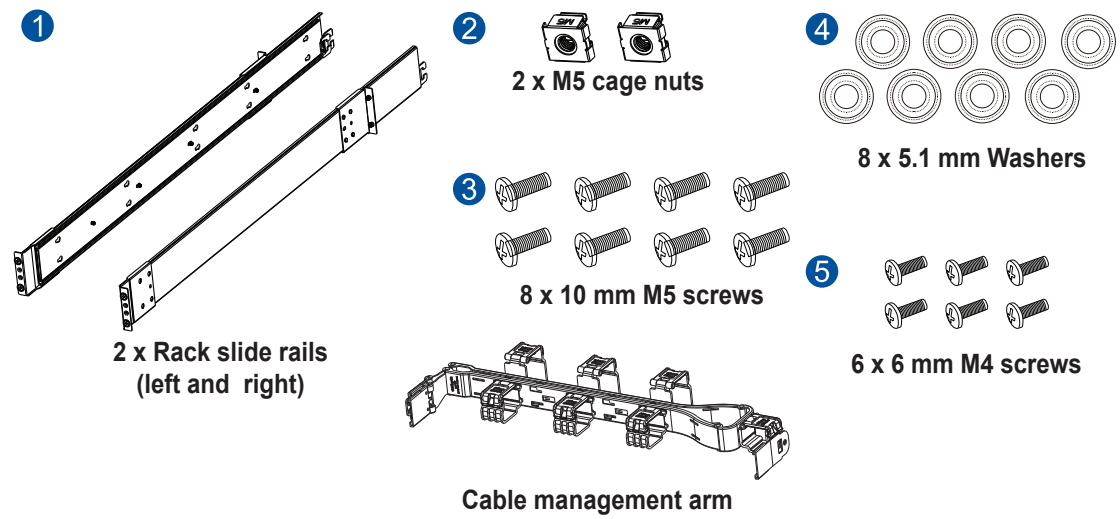

1 **2 x Rack slide rails (left and right)**

2 **2 x M5 cage nuts**

3 **8 x 10 mm M5 screws**

4 **8 x 5.1 mm Washers**

5 **6 x 6 mm M4 screws**

Cable management arm

NOTE: The rack slide rail is assembled together with the enclosure slide rail.

Adjuster pillars

Check your adjuster pillars kit for the following contents.

1 **2 x 50 mm Adjuster pillars (left and right)**

2 **8 x Screws**

3 **2 x M5 Cage nuts**
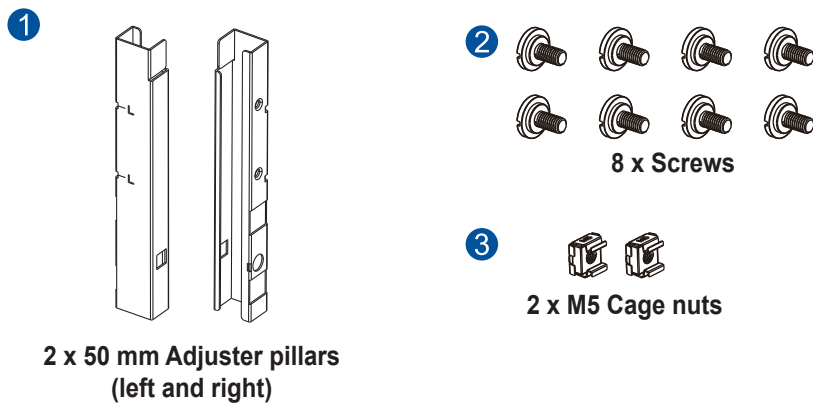
NOTE: The adjuster pillar kit is only needed if the rear end of your system protrudes at the rear end of the cabinet.

Assembling the rackmount slide kit

To assemble the rackmount slide kit:
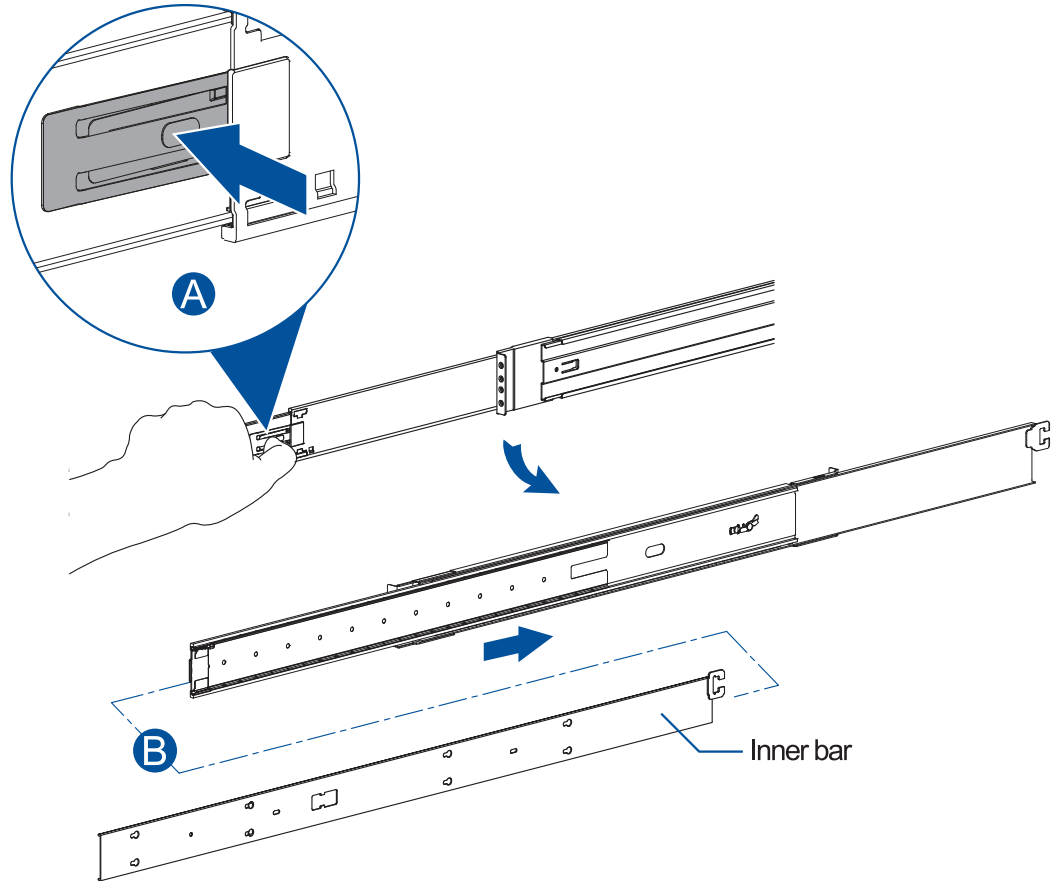
1. Press the release button (A) then remove the inner bar (B) from the slide rail.

Inner bar

2. Move the lever to the right side (follow the direction of the engraved arrow), then compress the remaining bars of the slide rail.
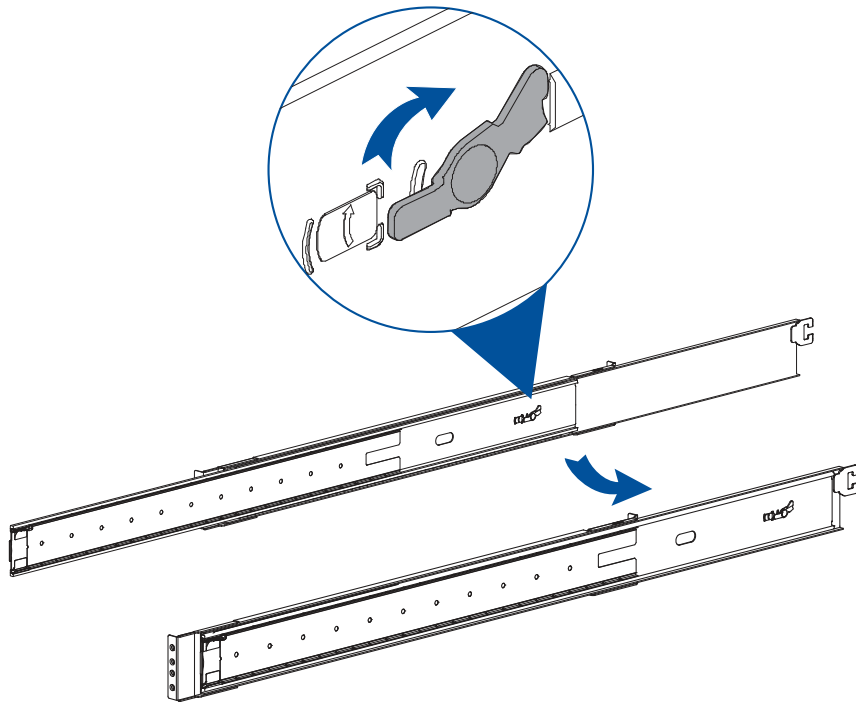
3. Determine the location where you want to install the slide rails to the rack posts.

4. Attach the slide rails to the rack posts using eight 10 mm M5 screws and washers, four for front posts and the other four for rear posts.

Installing the cable management arm to the rackmount

The cable management arm allows you to keep the cables in place for a clutter-free rackmount system.
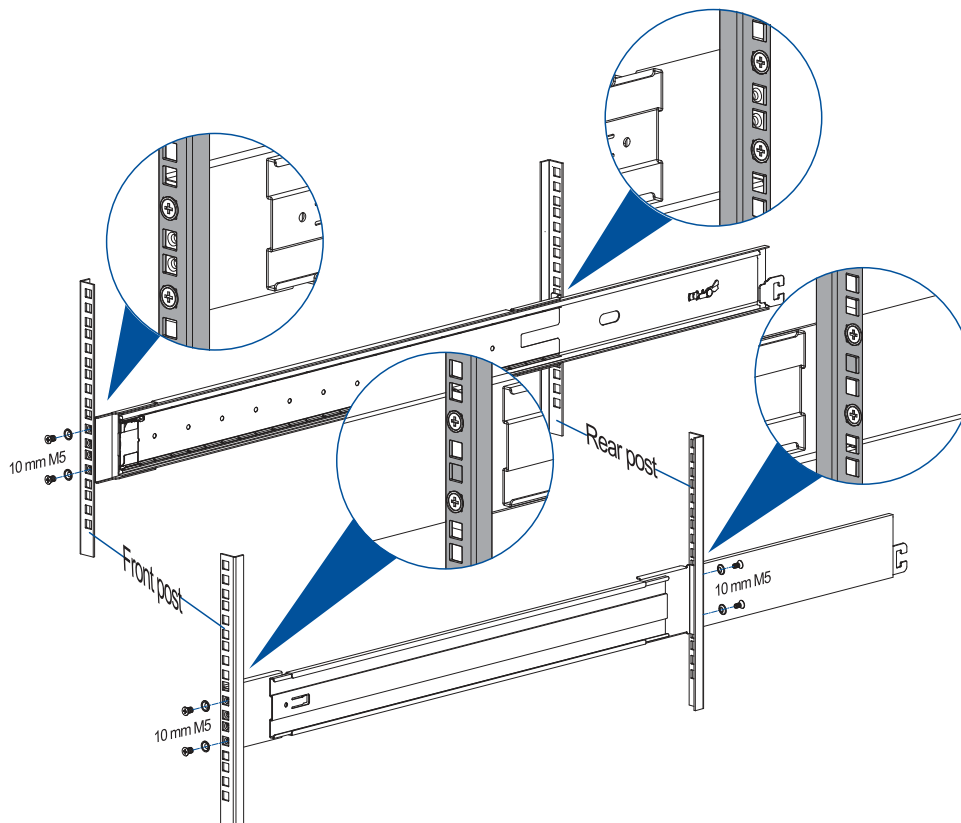
To install the cable management bar:

1. From the cable management arm, push the button near the latch at each end of the arm, then rotate the latch shield in a 180° angle.

Latch shield

Latch button
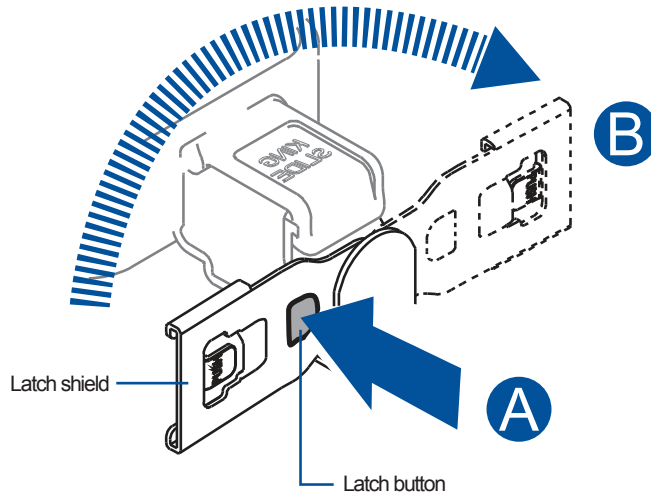
2. Connect the latches of the cable management arm to the latches of the slide rails.

Inner rail latch

Outer rail latch

Outer/inner latch shields

Inner rail latch

Cable clamps

Cable clamps

Outer rail latch

Inner latch shield
Outer latch shield
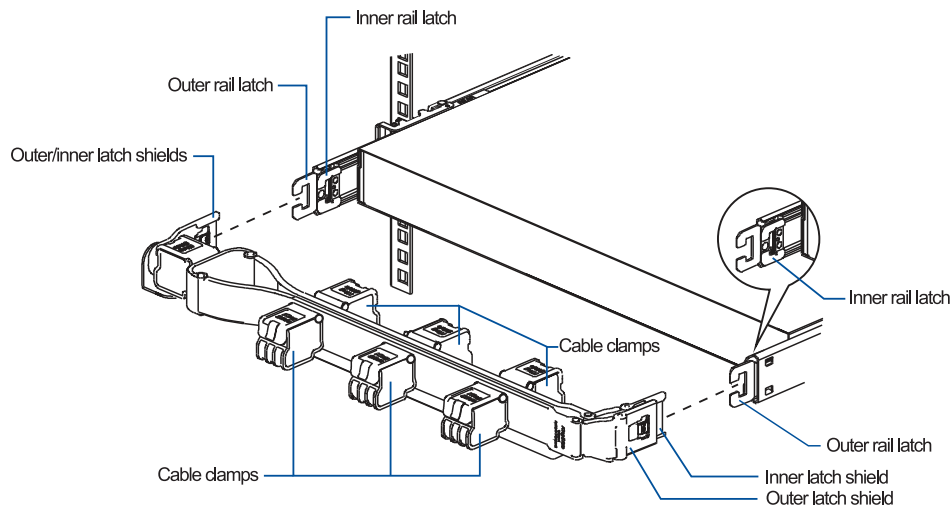
a. Connect the inner latch shield of the cable management arm to the inner latch of the inner slide rail. Do this on both sides of the arm and rails.
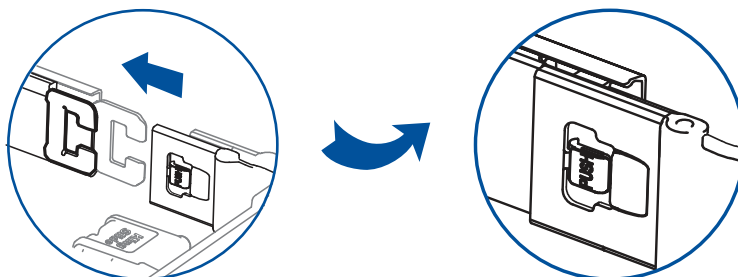
b. Connect the outer latch shield of the cable management arm to the outer latch of the outer slide rail. Do this on both sides of the arm and rails.

If you need to move the cable clamp to another position, do the following steps:

1. Push the latch to release the cable clamp from the cable management arm.
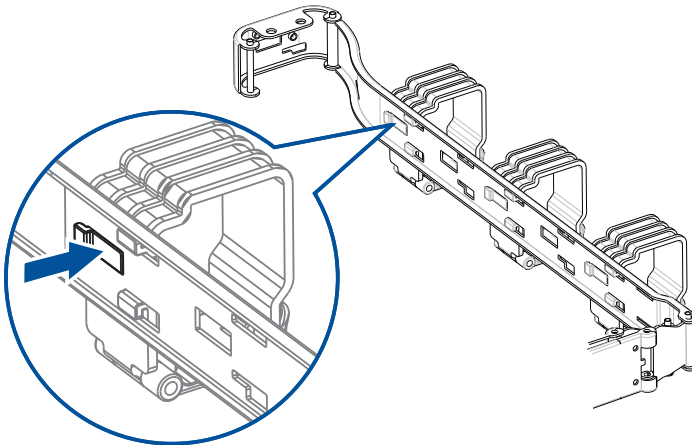
2. Move the clamp to the bigger hole of the notch, then pull to remove it from the locking holes.
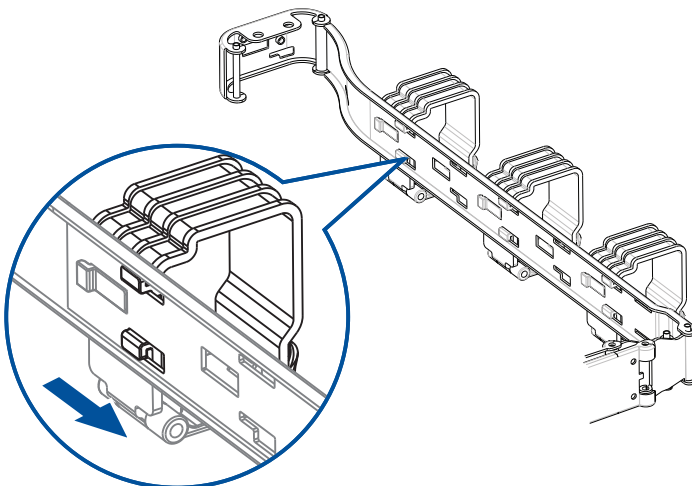
2. Align the clamp's latches to the notches of the cable management arm, then slide the clamp to the narrow hole of the notch until it snaps in place.
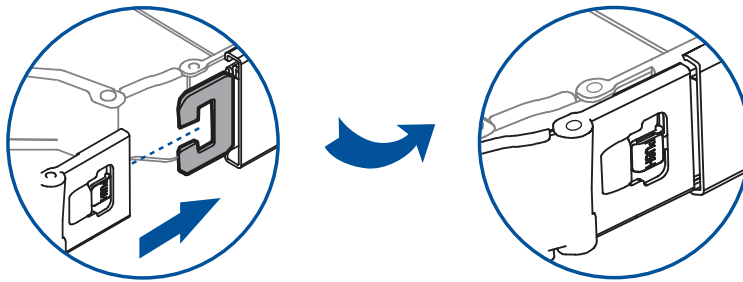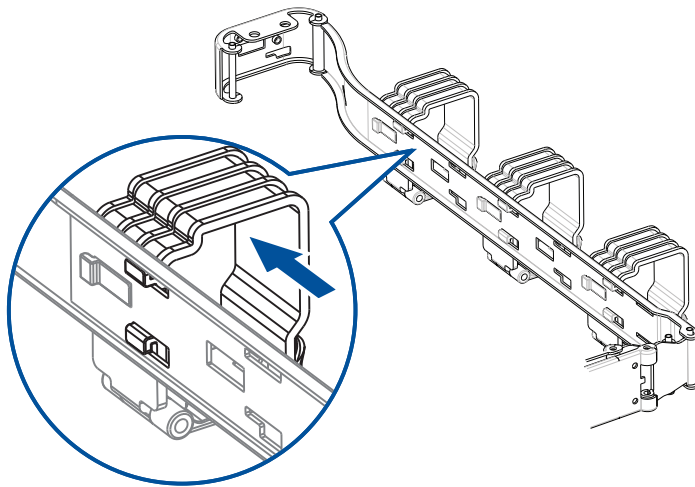

Installing the adjuster pillars

Due to the measurement of GS 3060L's enclosure and the selected position where to secure the front rack posts on the chassis guide, you may be required to install the adjuster pillars so that the rear end of the enclosure will not protrude on the rear end of the cabinet.

Cabinet structure
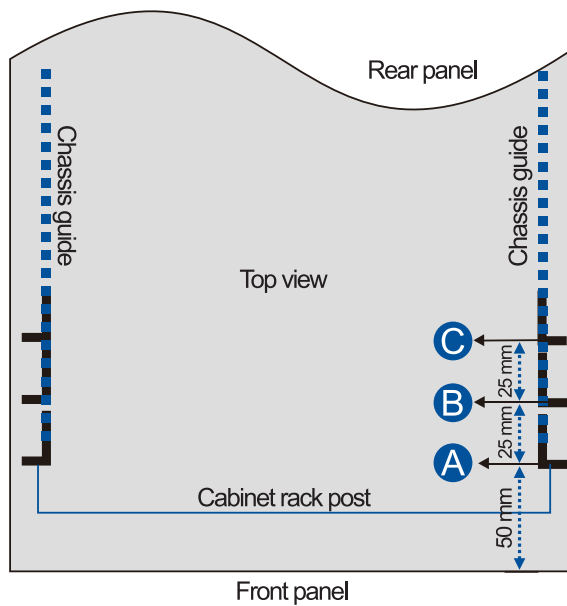
Rack post position		A	B	C
Adjuster pillar type	25 mm Adjuster pillar	✘	✔	✘
	50 mm Adjuster pillar	✘	✘	✔

The illustration and the table above show the generic structure of the cabinet and the position of the adjuster pillars according to its measurement. Refer to the above information when installing the adjuster pillars to the rack posts.

Take note of the following table information:

- Position **A** : No need to install the adjuster pillars.

- Position **B** : Install the 25 mm adjuster pillars.

- Position **C** : Install the 50 mm adjuster pillars.

> **NOTE:** The rackmount installation positions follows the rackmount service chassis standards of SSI (Server System Infrastructure).

To install the adjuster pillars:

1. Check the unit boundary on the front rack posts.
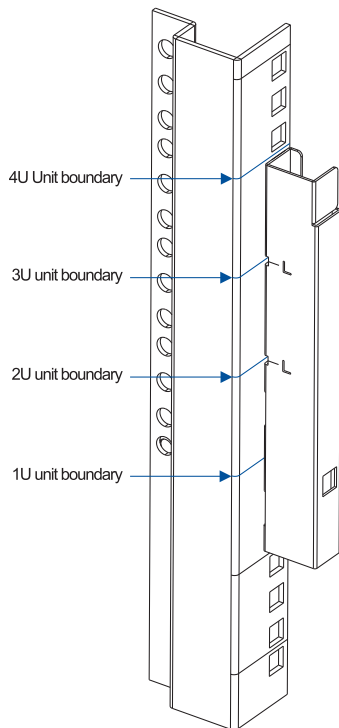
2. Orient the left and right adjuster pillars at 2U/3U position on the rack posts, then secure them with the bundled screws.

Right adjuster pillar

Left adjuster pillar
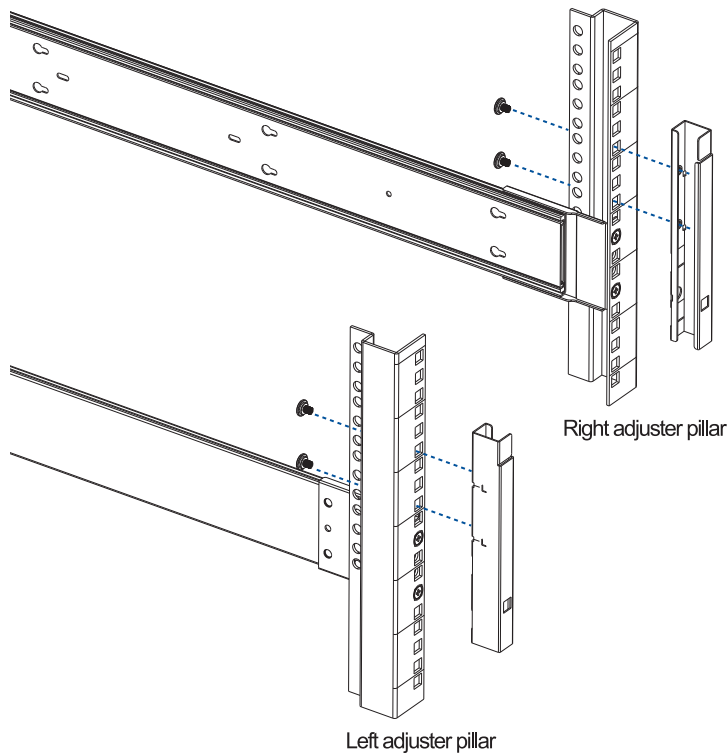
3. Insert the two bundled cage nuts into the cage nut holes on the adjuster pillars.
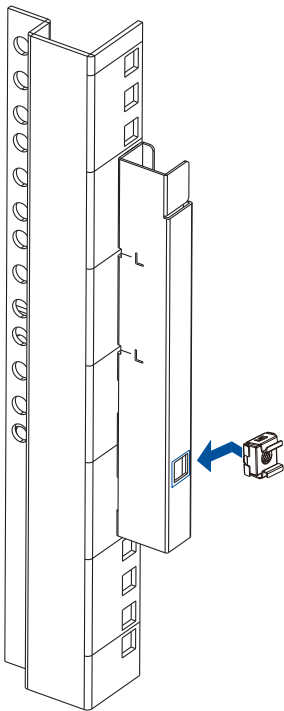
When the enclosure is already assembled to the cabinet, you can proceed to the next installation procedures of other components.

Installing the chassis to the assembled rackmount

To install the chassis to the assembled rackmount:

1. For the inner bars that you removed from the slide rails, install them to the sides of the enclosure:

   a. Align and fit the inner bar's sockets to the four hinges of the enclosure, then slide it to the back of the enclosure. Do the same for the other side.
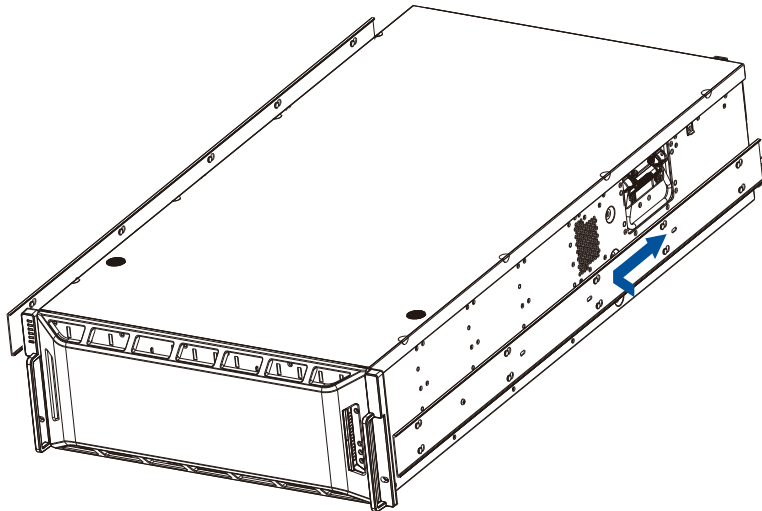
   b. Use two 6 mm M4 screws to secure the inner bars to the sides of the enclosure.
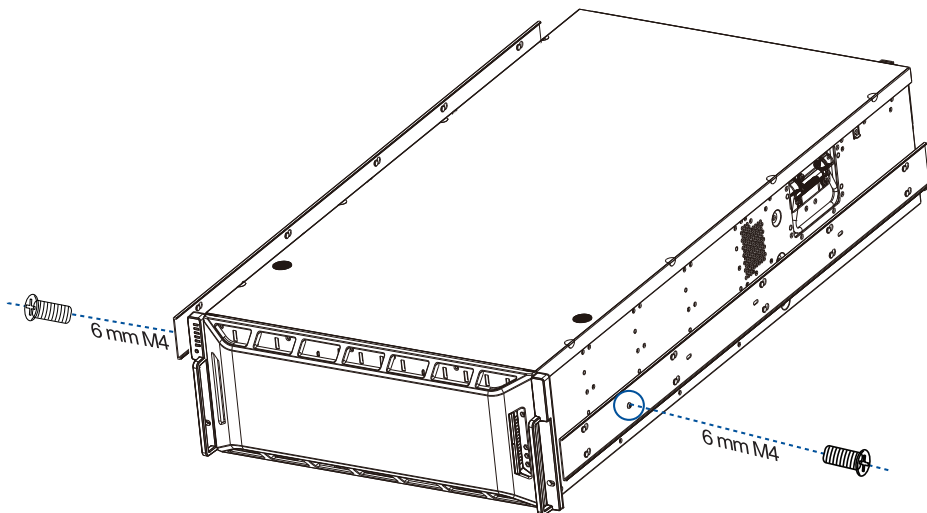
2. Extend the middle slide rails (A), then align them to the installed inner bars and insert the whole enclosure to the rack (B).

Middle slide rail

Middle slide rail
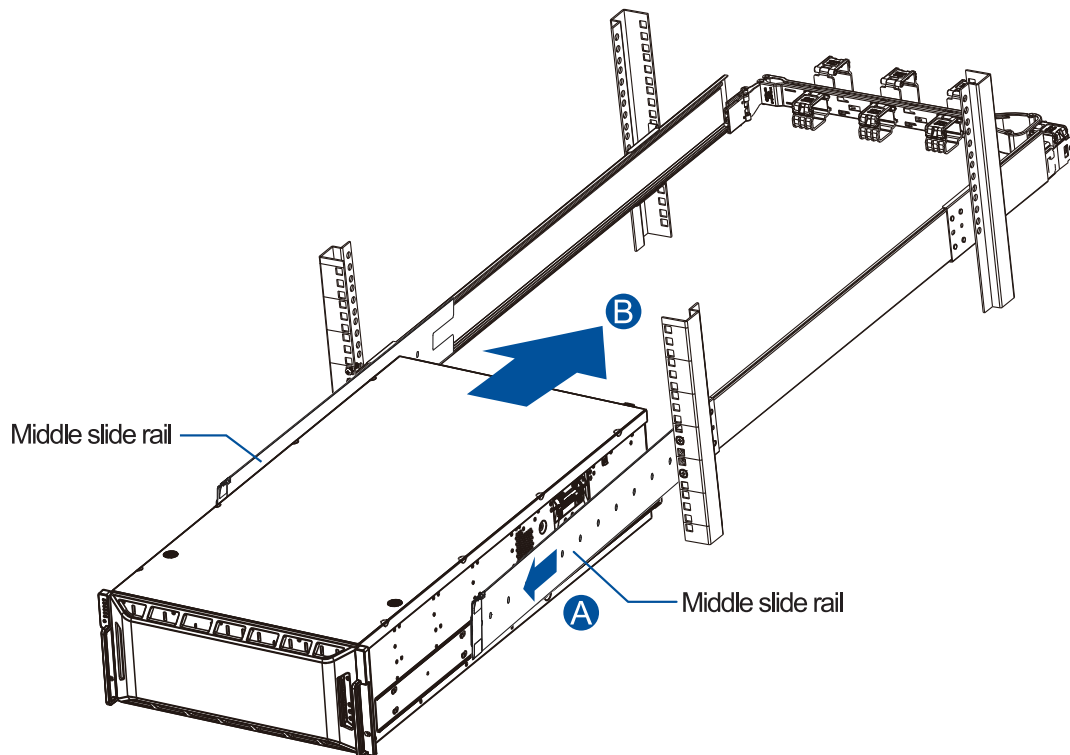
IMPORTANT! Due to the weight of the enclosure, we recommend you to ask assistance from at least 3 persons to install the enclosure to the rack.

3. Use two 20 mm M5 screws to fasten the enclosure to the front rack posts.
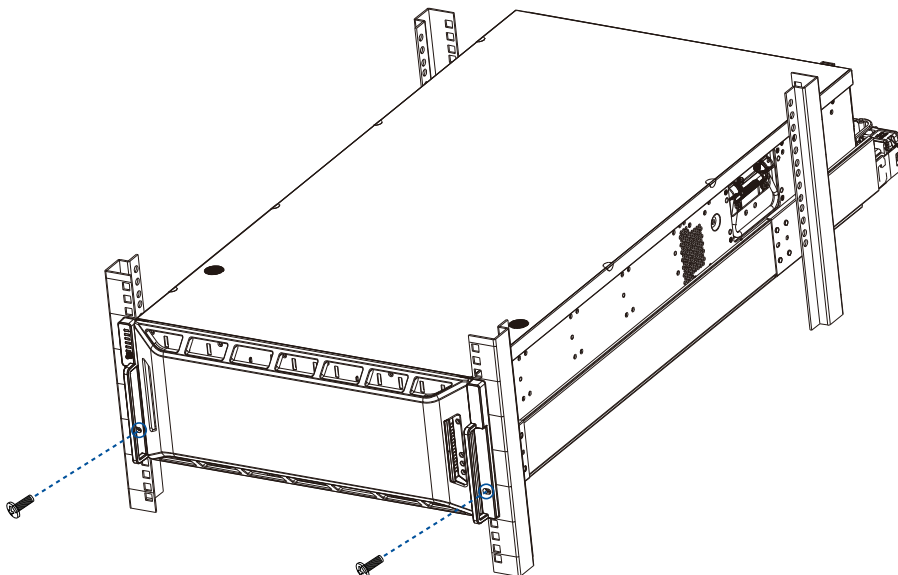
NOTE: If the rack posts have unthreaded mounting holes, insert two M5 cage nuts to the said holes then use the M5 screws to secure the enclosure to the rack.

2.2.3   Installing the hard drives

This section gives you an overview of the hard drive requirements, installation, and important notices that you must take note.

NOTE: The hard drives are purchased separately.

IMPORTANT!

- Ensure to install the enclosure to the rack first before installing the hard drives to the enclosure's drive bay.

- You must install at least four (4) hard drives for RAID 5 configuration or five (5) hard drives for RAID 6 configuration to create an initial volume.

Hard drive installation prerequisites

When purchasing hard drives, ensure to consider the following factors:

- **Capacity (Mb/Gb)**

  Purchase the hard drives that have the same capacity. This SAN storage uses the *least common denominator* approach, which means that the maximum capacity used in each drive to create a RAID array is the maximum capacity of the smallest drive. We strongly suggest to use large storage capacity hard drives.

  IMPORTANT!

  - The hard drives may carry different block numbers, which means that the capacity may not be the same even if they are of the same model with the same rate capacity made by the same manufacturer.

  - When configuring the hard drives into a RAID array, you can use a smaller capacity as the *maximum disk capacity* in every hard drive. For configuration options, refer to the interface-specific firmware manual that came with your enclosure.

- **Profile**

  The drive trays and bays of the system are designed for 2.5-inch or 3.5-inch hard drives, depending on your EonStor GS storage system.

- **Drive type**

  The system uses 6 Gbps SAS, 12 Gbps SAS, and near-line SAS and SATA 3G/6G 2.5-inch and 3.5-inch hard drives.

  IMPORTANT!

  - Ensure that you purchase the correct hard drives.

  - If you prefer using SATA hard drives in the attached expansions, ensure that you purchase MUX kits.

SAS and SATA interfaces

The SAS interface features a dual-ported connectivity with pins on both sides of its connector while the SATA drives have only one port. kit.

Keying notch

Data port

Power connector

SAS interface

Data port

Power connector

SATA interface
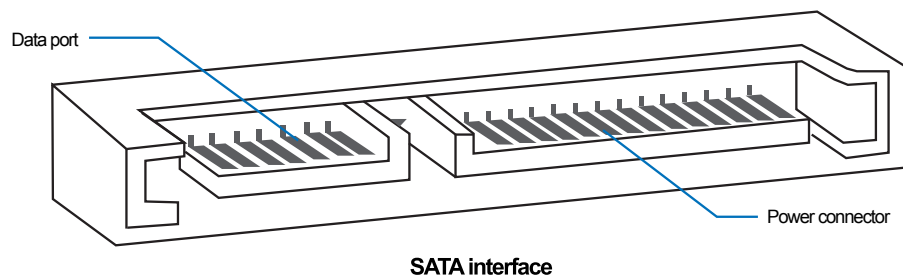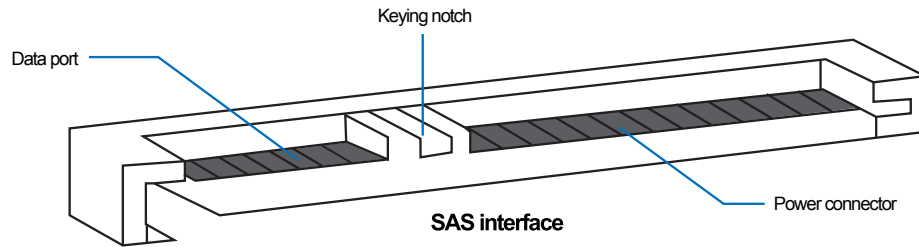
IMPORTANT!

- ONLY install the drive trays to the system if the system is already mounted to the rack. If the hard drives are installed to the system before mounting to the rack, the system will be heavy to mount and possible impact during installation may damage the hard drives.

- Handle the disk drives with extreme care and observe all ESD prevention procedures when installing the hard drives.

- ONLY use the screws that are bundled in the system package. Securing the drives with longer screws may damage them.

Hard drive designation

Get to know the exact order of the hard drives to avoid removing the wrong drives out of the enclosure.

Rear of the enclosure
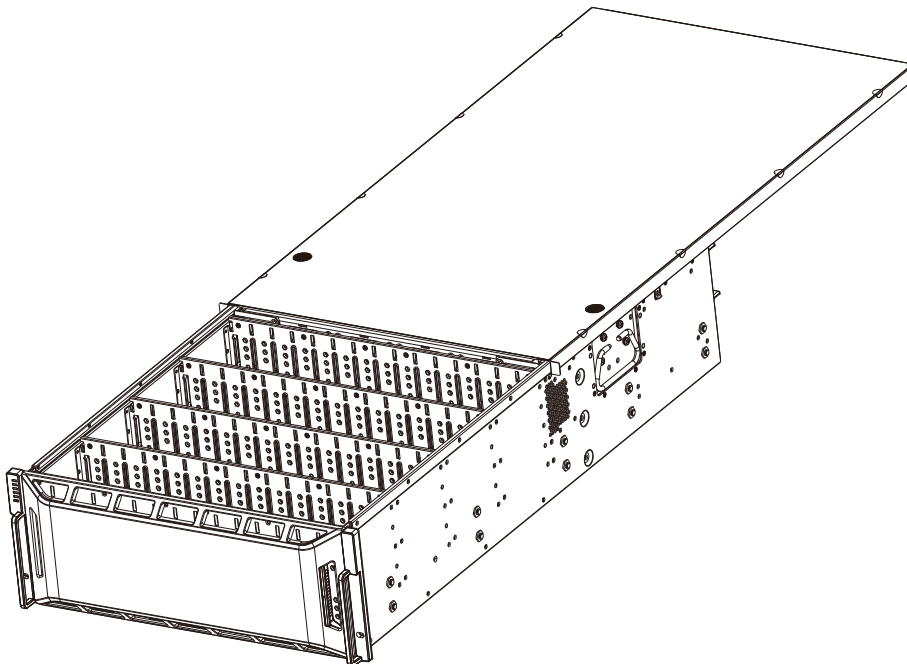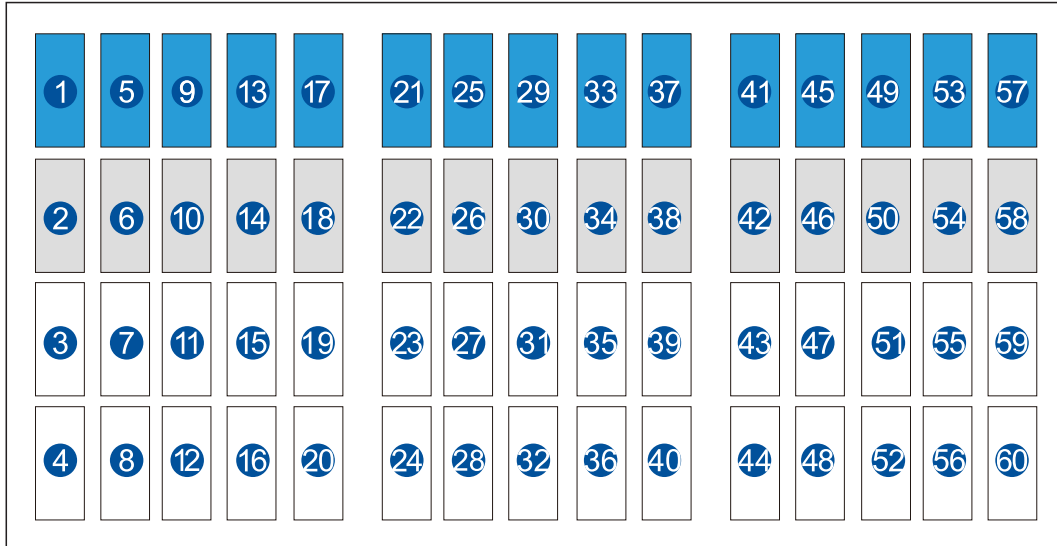
IMPORTANT!

- The hard drive slots marked in blue belong to the initial set.

- The hard drive slots marked in gray are the in-line/parallel set.

- It is strongly recommended to install at least 12 hard drives into the in-line/parallel set (gray-marked slots). To install more drives, use the blue slots and ensure that you install in the correct drive order.

Installing the hard drive into the drive tray and enclosure

To install the hard drive into the drive tray and enclosure, follow the steps below:

1. Push the release button to the left, then lift the drive tray to remove it from the enclosure.

Release button

Handle plate
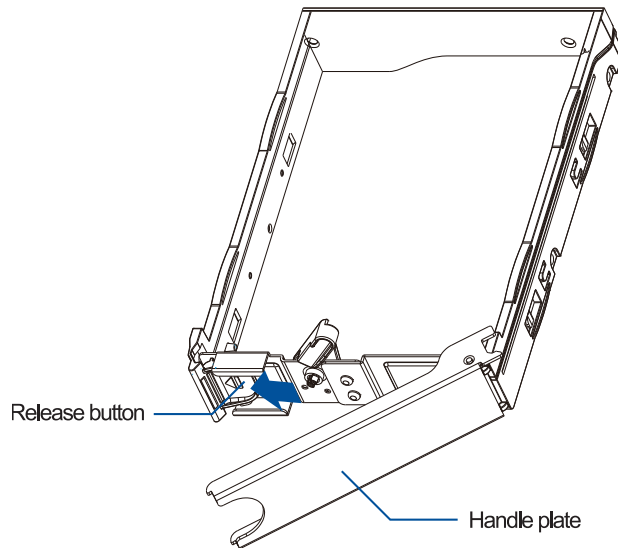
2. Move the tray lever to the left to unlock the sides.

Tray lever
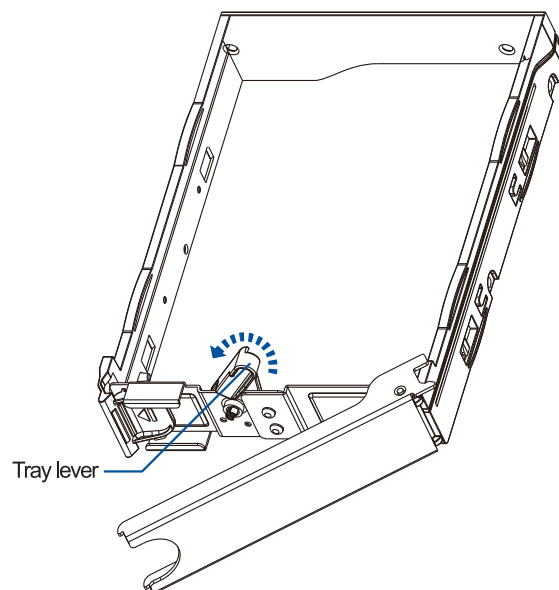
3.	Pull both sides to widen the tray.
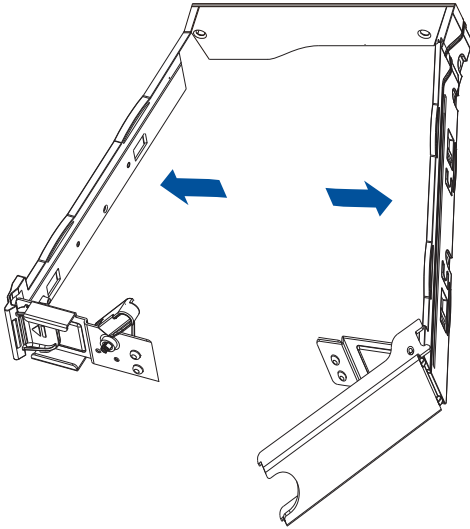
4.	Insert the hard drive into the tray.

	•	For the 2.5-inch hard drive, secure the drive first to the inner tray using the two bundled screws, then orient its screw holes to the main drive tray's pins on the sides.
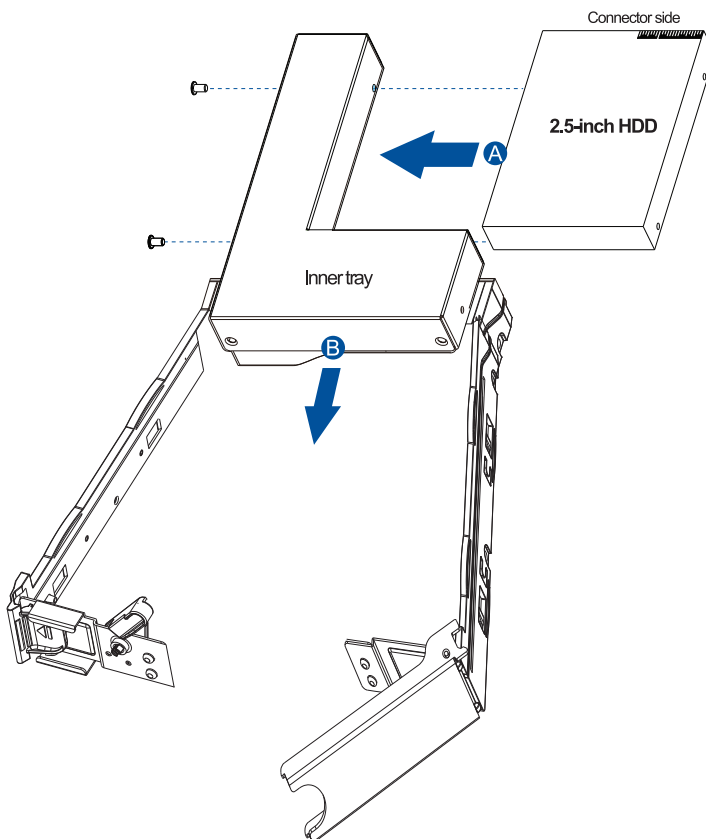
• For the 3.5-inch hard drive, orient the drive to the drive tray's two pins on its sides.

3.5-inch HDD
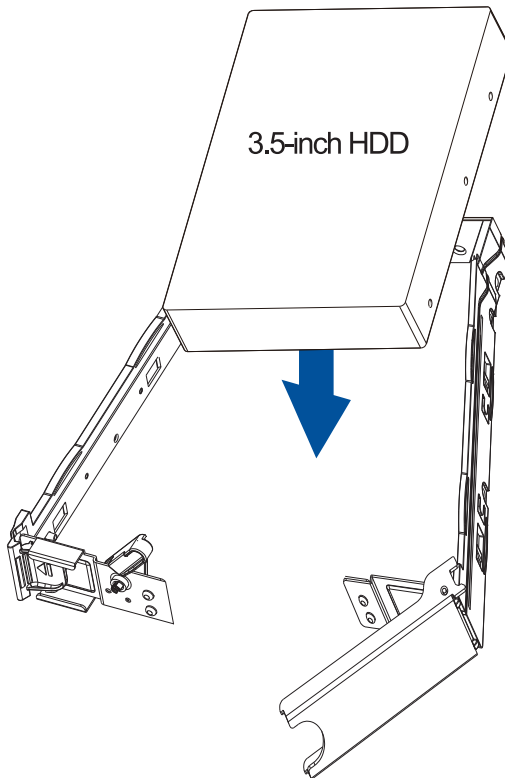
5. Snap back the sides of the tray to its original position.

• For the 2.5-inch drive, secure the hard drive and tray assembly with the bundled screws (A), then move the tray lever to the right (B). Keep the handle plate open (C).

HDD
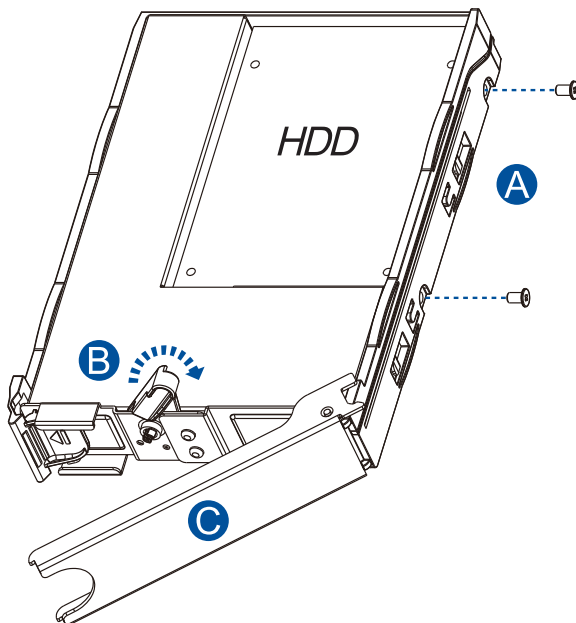
- For the 3.5-inch drive, secure the side to the hard drive with the release button first (A), then the side with the handle plate (B), and move the tray lever to the left (C). Keep the handle plate open.
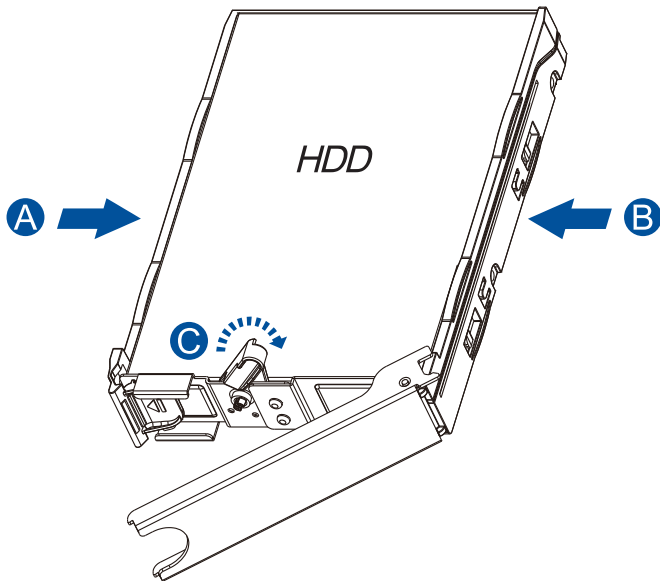
> **IMPORTANT!** Ensure that the drives are secured to the drive trays before installing the assembly to the enclosure.

6. On the enclosure, push the two release buttons (A) then gently slide the top cover backward (B).
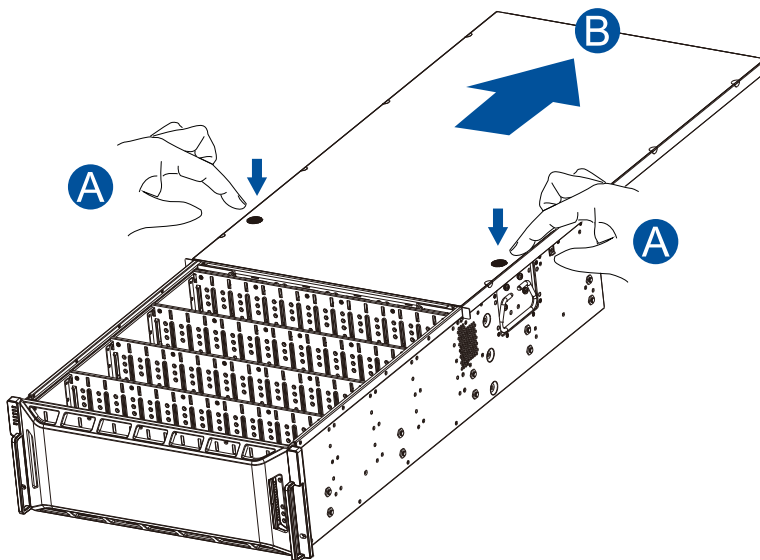
> **NOTE:** You cannot totally remove the cover from the enclosure.

7. Install the hard drive and tray assembly to the hard drive slot of the enclosure with the handle bar open, then push the hard drive to connect with the enclosure.
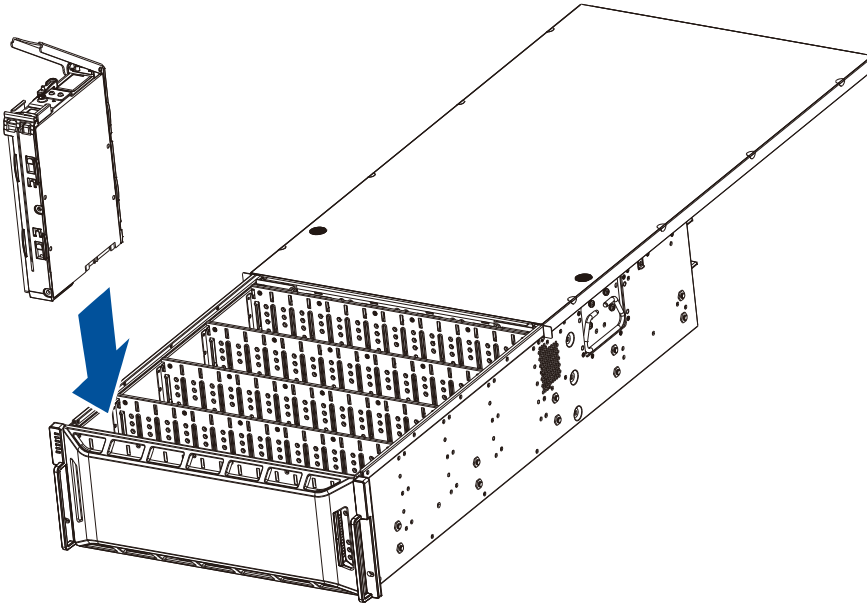
IMPORTANT! Ensure that the handle plate is clamped on the hard drive.

8. After installing the drives, slide back the top cover until it snaps with the front panel and the release buttons are in its original position when the cover is closed.
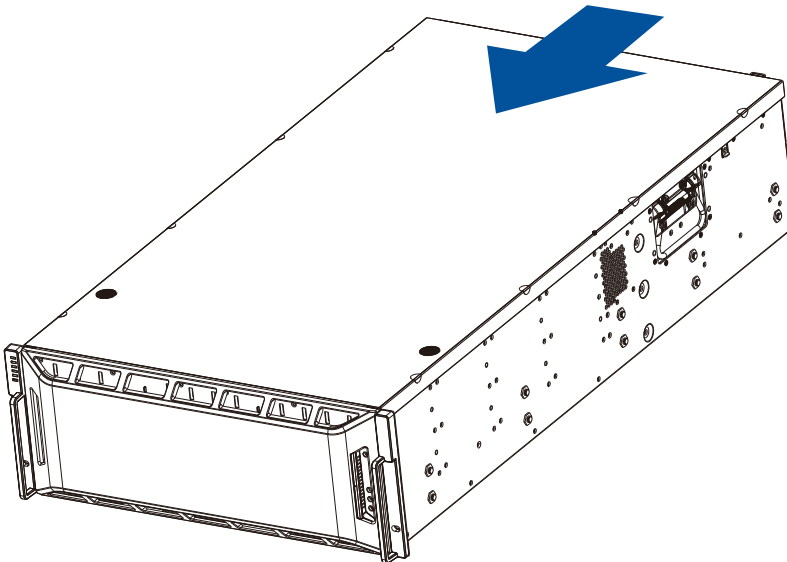
2.2.4   Installing the controller

To install the controller:

1.   Shut down your system.

2.   Unfasten the retention screw on the dummy controller.
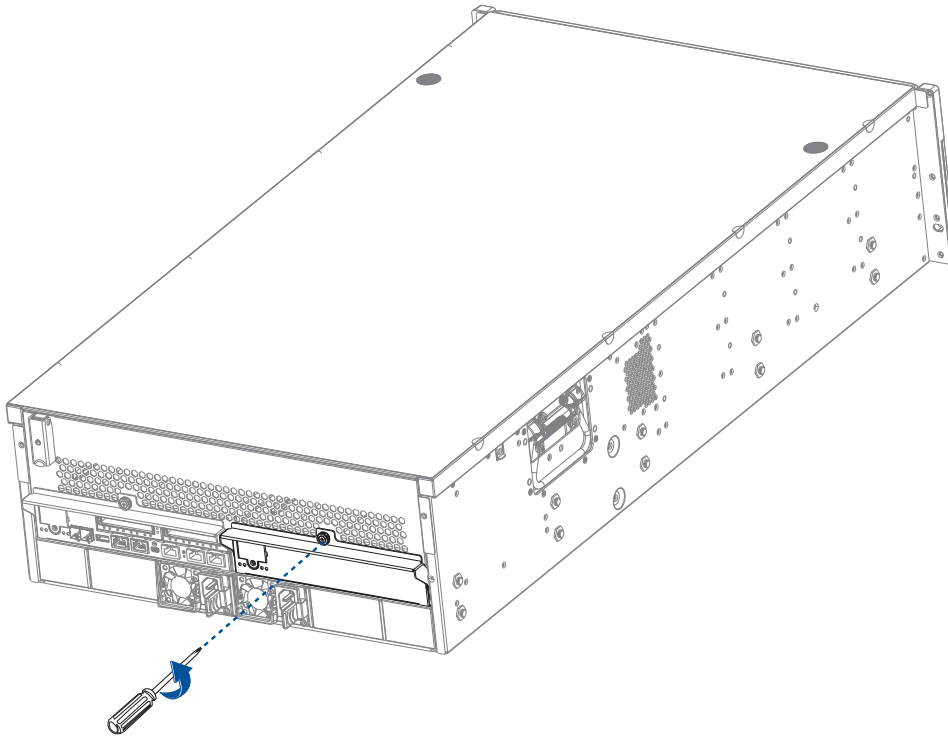
3.   Hold the rim then pull the controller out of the enclosure.
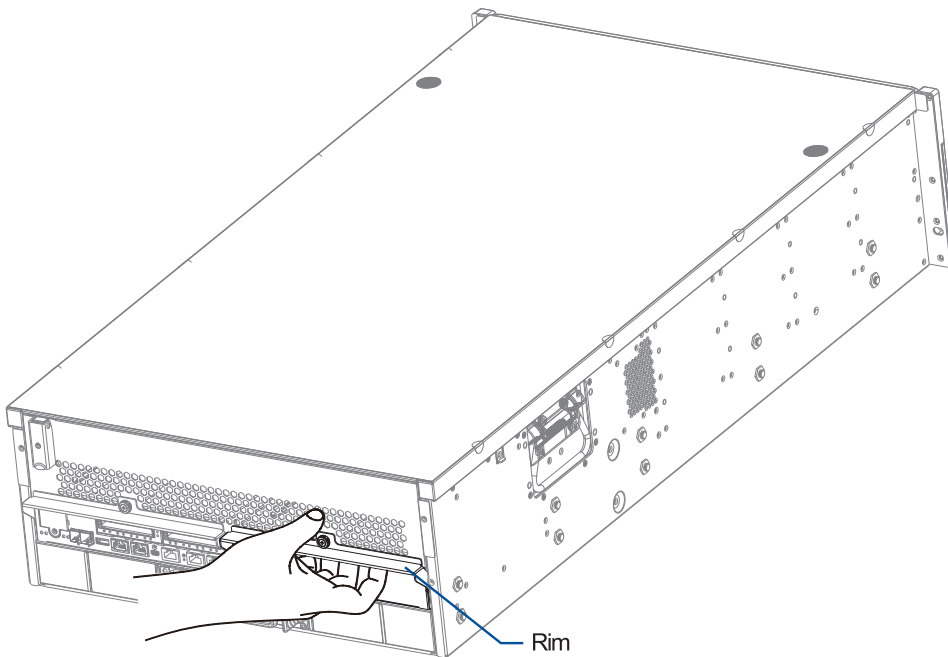
Rim

4. Insert the controller carefully into the module slot. When you feel a contact resistance, push the controller with a small but careful force, then secure the controller to the enclosure with the retention screw you removed in step 2.
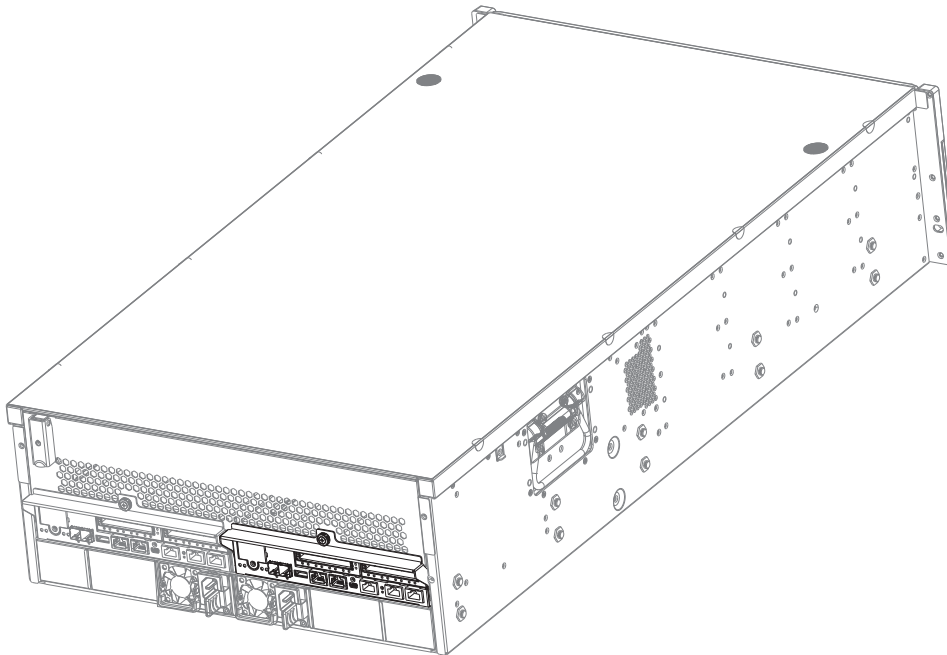
2.2.5   Installing the host boards

NOTES:

- A downtime may occur when upgrading the controller/host board.

- To add or replace a host board, the firmware automatically restores the default factory settings of your system.

To install a host board:

1. Shut down your system and remove the controller from the enclosure.

    NOTE: See section **2.2.4 Installing the controller** for details.

2. Remove the screws that secure the dummy covers to the enclosure.
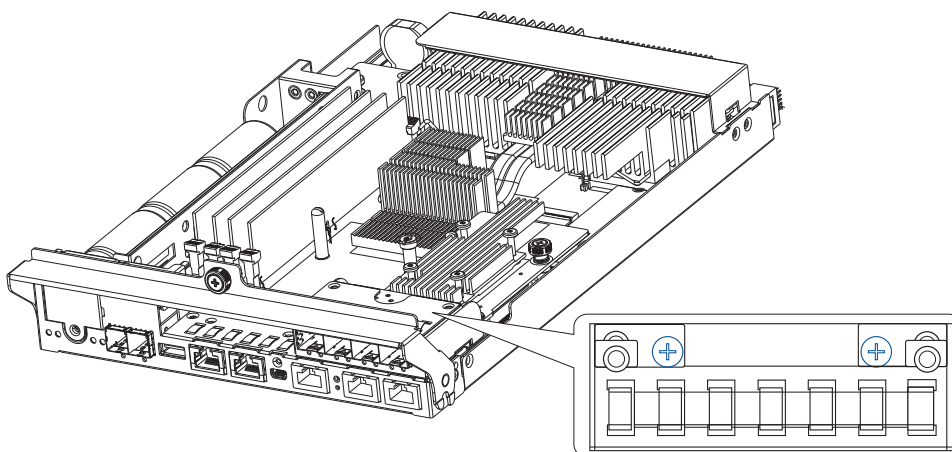
3. Orient the new host board to the controller's guide pin, place it carefully, then tighten the thumb screw to secure in place.

Thumb screw

Guide pin
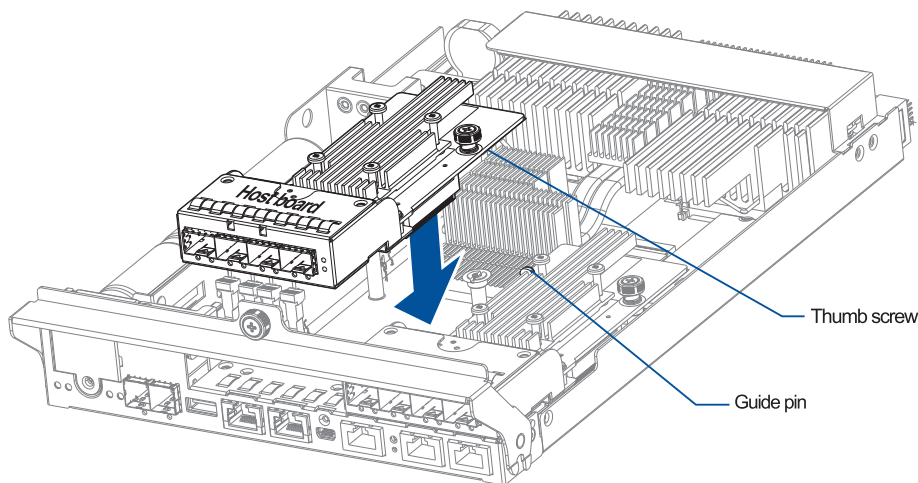
4. Insert the controller carefully into the module slot. When you feel a contact resistance, push the controller with a small but careful force, then secure the controller to the enclosure with the retention screw.

2.3 Connections

This section details the connection procedures of GS system to the expansions, power source, connection status, topologies, and other connection configurations.

2.3.1 General considerations in connecting devices

When selecting the number of hard drives to assemble a logical drive, the host channel bandwidth and the performance of each drive must be considered. It is a good practice that you calculate the performance against the host port bandwidth when designing an application topology.

For example, if eight drives are included in a logical drive and is associated with a host ID (LUN mapping), the combined performance of this logical drive must estimate the channel bandwidth. If two 6-drive logical arrays are associated with two IDs residing in a single host channel, there may be a trade-off with the performance.

If your system comes with a total of eight or more host ports, we recommend that you use more disk drives to an expansion so that you can create a host-port that corresponds to 6-member logical drives (RAID 5) or 8-member logical drives (RAID 6). These logical drives bring up the bandwidth of each host.

You must also take note of these considerations:

- A spare drive that carries no data stripes and does not contribute to disk-level performance. For performance data information of your hard drive, refer to its documentation.

- Disk drives in the same logical array must have the same capacity, but it is preferred that all drives in the chassis have the same capacity.

- Disk drives in the same logical drive must have the same capacity, but it is preferred that all disk drives in a chassis have the same capacity. Tiered storage configuration is supported in this setup. However, you must not include both SAS and SATA drives in a logical drive.

- A spare drive must have a minimum capacity equivalent to the largest drive that needs replacement. If the capacity of the spare drive is less than the capacity of the drive to be replaced, the controller will not proceed with the failed drive rebuild.

- When rackmounting, leave enough space for the cables. DO NOT bend them to a diameter of less than 76 mm (3 inches).

- When connecting between devices, follow all the specifications. Pay attention to the signals and avoid electronic noise from adjacent interfaces. DO NOT put power cords on optical cables.

- Route the cables away from places where it can be damaged by other devices such as fan exhaust or foot traffic.

- DO NOT over-tighten, twist, or bend the cables.

Configuring the host-side topologies

When configuring host-side topologies, avoid the points of failure. It is recommended that the host ports are connected to at least two HBAs.

NOTES:

- To manage the fault-tolerant data paths and optimize data throughput on multiple data paths, you must apply MPIO software or other multipathing utilities such as Linux Device Mapper.

- Host port channel designation may vary by system. Refer to the topologies of this manual to create your own connections that suit your needs.

Configuring the host-side parameters

For the host-side parameters, we strongly recommend that you use the default settings of your system. If you need to adjust the host-side parameters, consult your on-site technical personnel or seek technical support from your vendor.

Familiarizing the Maximum Concurrent Host LUN Connection (Nexus in SCSI)

The menu option *Max Number of Concurrent Host-LUN Connection* allows you to set the maximum number of concurrent host LUN connections. This is the arrangement of the controller internal resources to use with a number of current host nexus.

For example, if you have four hosts (A, B, C, and D) and four host IDs/LUNs (IDs 0, 1, 2, and 3) in a configuration, where:

- Host A accesses ID 0 (one nexus)

- Host B accesses ID 1 (one nexus)

- Host C accesses ID 2 (one nexus)

- Host D accesses ID 3 (one nexus)

These connections are queued in the cache, which are called four nexus. If there is an I/O in the cache with these four nexus and another host I/O comes with a nexus different from the four in the cache (e.g. host A accesses ID 3), the controller returns as busy. This happens with the concurrent active nexus. If the cache is cleared, it accepts four different nexus again. Many I/O operations can be accessed via the same nexus.

Knowing the Maximum Queued I/O Count

The menu option *Maximum Queued I/O Count* allows you to configure the maximum number of I/O operations per host channel that can be accepted from the servers. The predefined range is from 1 to 1024 I/O operations per host channel. You can also choose **Auto**, which sets the automatic configuration. The default value is 256 I/O operations. The appropriate setting for this option depends on how many I/O operations the attached servers are performing. This varies according to the amount of the host memory present as well as the number of drives and their respective sizes. Usually, the optimum performance occurs from using **Auto** or **256** settings. For more information, refer to the firmware manual that came with your system.

2.3.2   Fibre-Host connections

The Fibre Channel standard allows optical connections. The optical cables are used over long distances and have been proven to be more reliable. Due to the demands of high transfer rates, optical cables are preferred for a 4 Gbps, 8 Gbps, or 16 Gbps fiber connectivity, as they are not vulnerable to EMI.

The fibre host ports are connected to fibre channel host adapters (HBA) that feature SFP interface with full duplex transfer support in a PCIe interface. For the latest certified items, please contact the vendor near you.

WARNING!

- All fibre cables are sensitive and must be handled with care. To avoid interference, the cabling path must be carefully planned without the cables getting bent.

- Lasers are hazardous and may cause blindness or permanent eye damage. Use them with utmost caution. Never look directly when lasers are turned on or operating.

Detecting auto speed

Speed auto-detection is specified by the Fibre channel standard. If a 16 Gbps port is connected to an 8 Gbps port, the speed slows down at 8 Gbps. If there are 16 Gbps ports on both ends of the link, the speed runs at 16 Gbps.

SFP/SFP+ transceivers

An SFP transceiver converts electrical data signals into light signals then transfers these signals transparently via the optical fiber. A transceiver provides bi-directional data links, a laser transmitter (for fiber optic cables), LC connector, and a metal enclosure to lower the EMI.

Other features of a typical SFP transceiver include a single power supply, low power dissipation, and hot-swap capability. It is also important that the transceiver you use meets the FC performance and reliability specifications.

WARNING! The SFP transceiver has a laser diode featuring a Class 1 laser. To ensure safety, DO NOT remove any covers or attempt access of the inside of the device. If problems arise or if you need technical service, contact a qualified personnel.

FC port dust plugs

Each FC port comes with a dust plug. Remove these plugs ONLY when you insert an SFP transceiver.

NOTE: Contact your vendor for the list of compatible SFP/SFP+ transceivers.

Fibre-host topologies

The fibre-host standard supports three topologies:

- **Point-to-point topology**

  A direct connection between two fibre-channel devices. The simplest among the three topologies.

- **FB-AL (Fibre Channel Arbitrated Loop)**

  The fibre-channel devices are all connected to a loop. Each device is assigned to an AL_PA (Arbitrated Loop Physical Address). FC-AL supports 124 devices in a single loop. This is the most commonly-used topology among the three.

- **Fabric switch**

  This topology can support up to 224 fibre-channel devices and allows multiple devices to communicate simultaneously. A fibre switch is required to implement this topology.

  IMPORTANT! If different servers need to access your logical drive, file locking, FC switch zoning, port binding, and multipath access control configurations are necessary.

Fibre cabling

Before you set up your fibre cabling connection, you must:

a. Create a configuration plan. In addition to cabling topologies and the list of networking components, you must also include the firmware and software maintenance details.

b. Confirm that your fibre-channel cable's loop measures 6 inches or longer.

c. Ensure proper airflow and keep the cables away from ventilation outlets.

To connect devices using fibre cable:

1. Take out the SFP transceiver module from the static protective package.

2. Remove the dust plug from the transceiver module.

SPF transceiver module

Dust plug
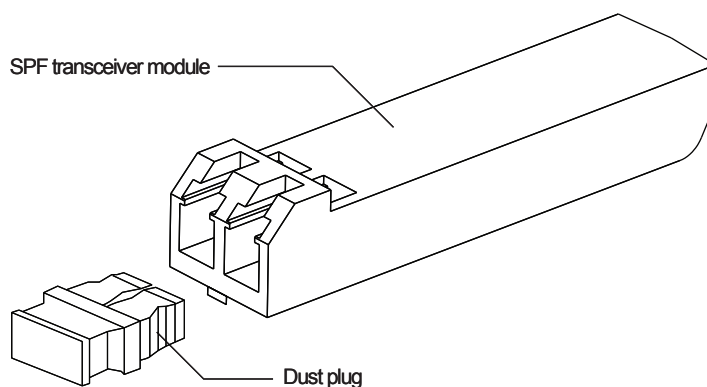
3. Insert the SFP module into one of the system host ports. The module will snap into place.
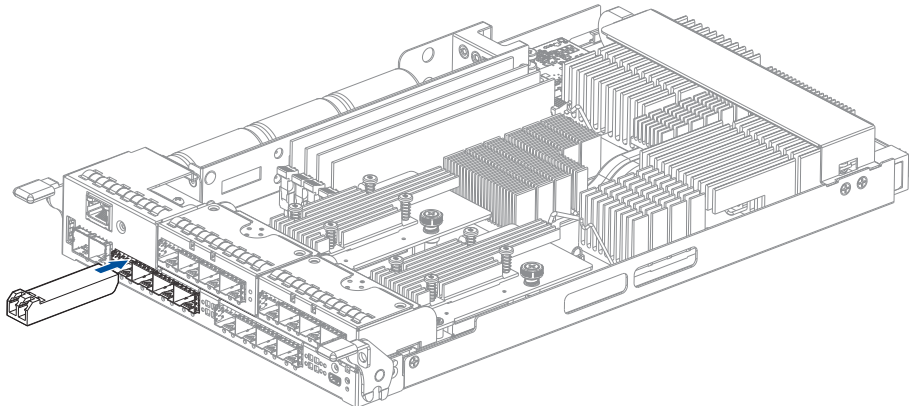
4. Remove the two protective caps from the LC-to-LC type cable. Save the protective caps for future use.

Protective caps
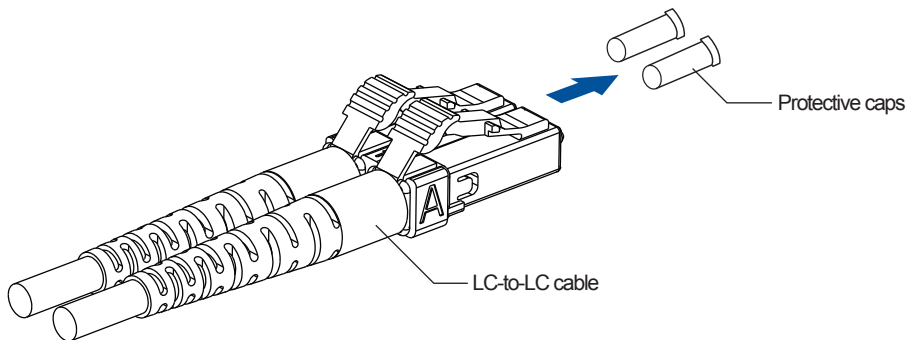
LC-to-LC cable

5. Insert the LC-to-LC cable to the SFP transceiver module already connected to the system. You can hear a clicking sound, securing the cable in place.
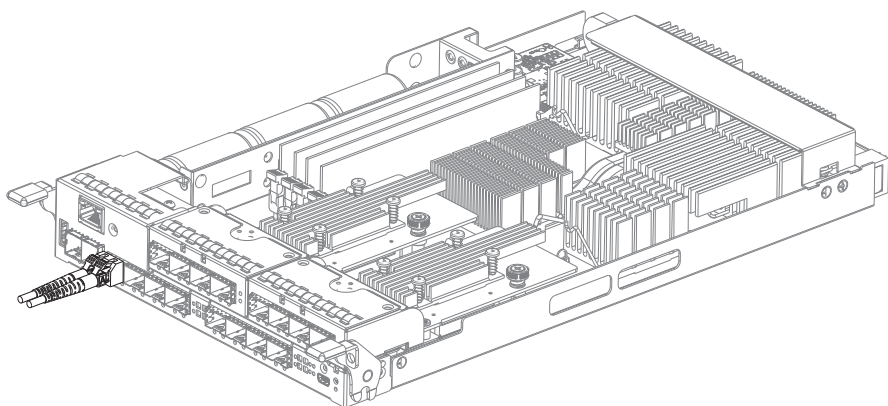
6. Remove the protective caps on the other end of the cable, then connect to an SFP transceiver module on a Fibre Channel switch port or a Fibre Channel host bus adapter (HBA) port.

Simple end-to-end connection

This connection type shows a simple end-to-end connection, with each SFP port is connected to a host adapter. Multiple logical drives. logical volumes, and logical partitions are created and each partition is mapped to a corresponding host channel ID/LUN combination.
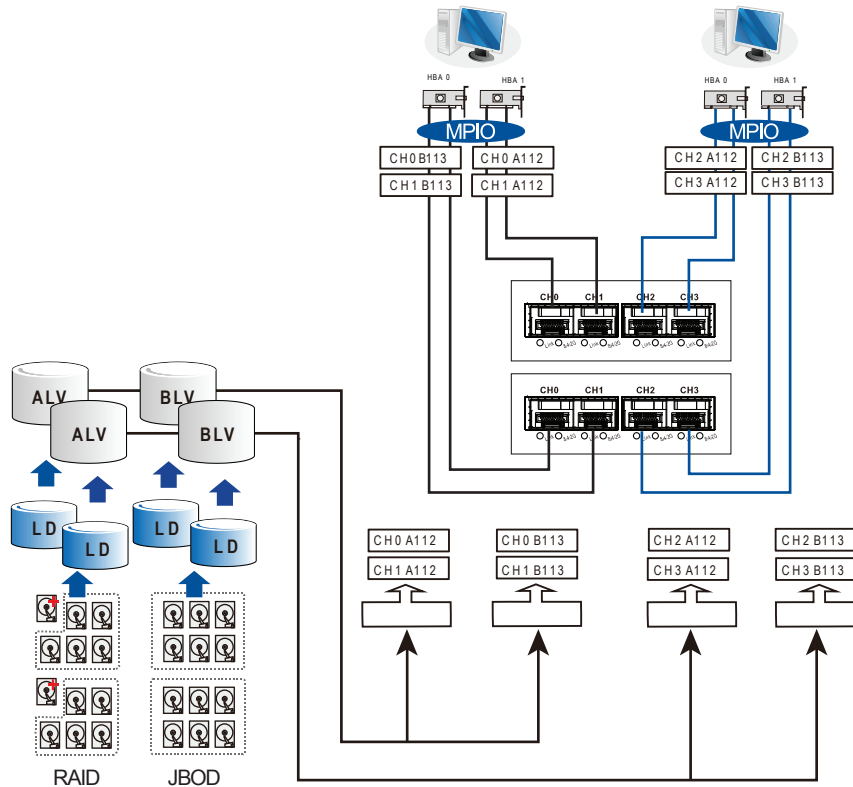
Channels	Controller A	Controller B
Host	CH0, CH1, CH2, CH3	CH0, CH1, CH2, CH3
Configuration information		
Number of controllers	2	
Host servers	2	
Data path connection	Fault-tolerant data paths	

NOTE: You need a multipathing software such as **MPIO** or **Linux Device Mapper** to control and optimize the access to logical drives via multiple data paths.

DAS (Direct-Attached) connection

This connection has more disk drives over SAS expansion links. With this connection, you can create more logical groups of drives. These logical drives use more host channel IDs or LUN numbers.

The two logical drives in the illustration below cannot equate the full power of the system. You can attach one or two more expansion enclosures to achieve more end-to-end performance.
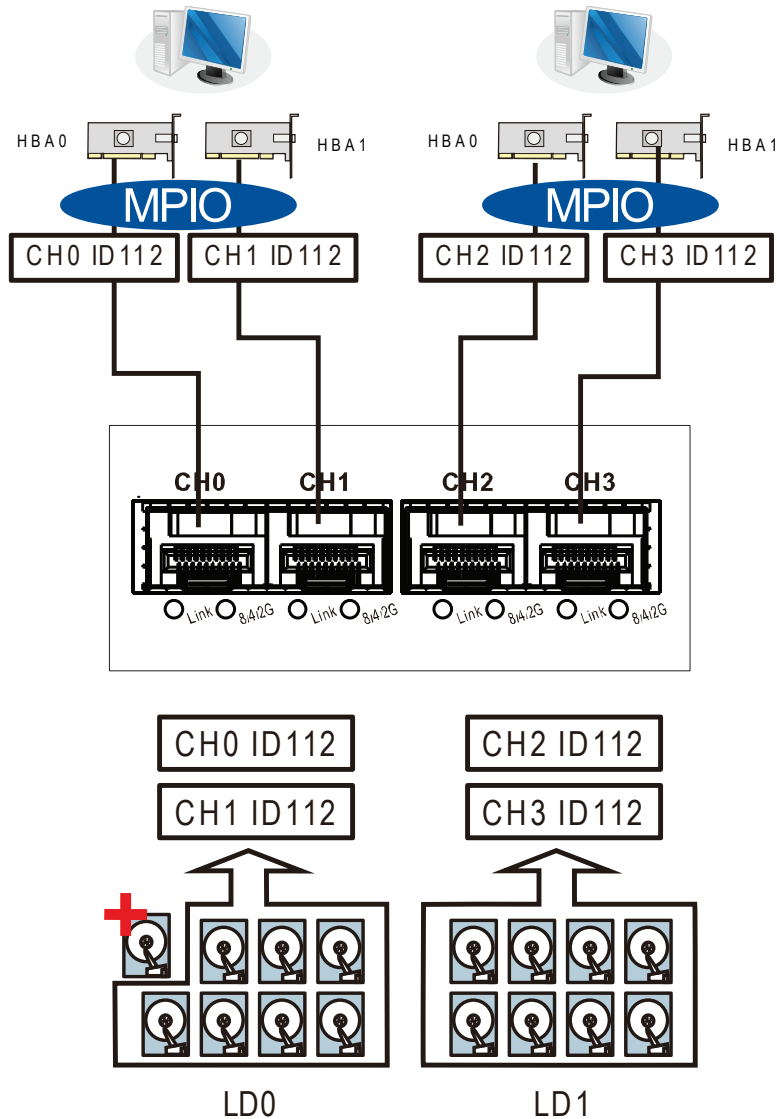
Channels	Controller A
Host	CH0, CH1, CH2, CH3
Configuration information	
Number of controllers	1
Host servers	2
Data path connection	Simple end-to-end connections with fault-tolerant pairs

NOTE: If a server has multiple data paths to a SAN storage, a multipathing software such as MPIO, is needed.

Switched fabric connection in dual controller

In this type of connection, the channel link bypass is provided by external FC switches. Each application server shown in the illustration below is equipped with two HBAs with FC links, connecting via two FC switches to the SFP ports on individual controllers.
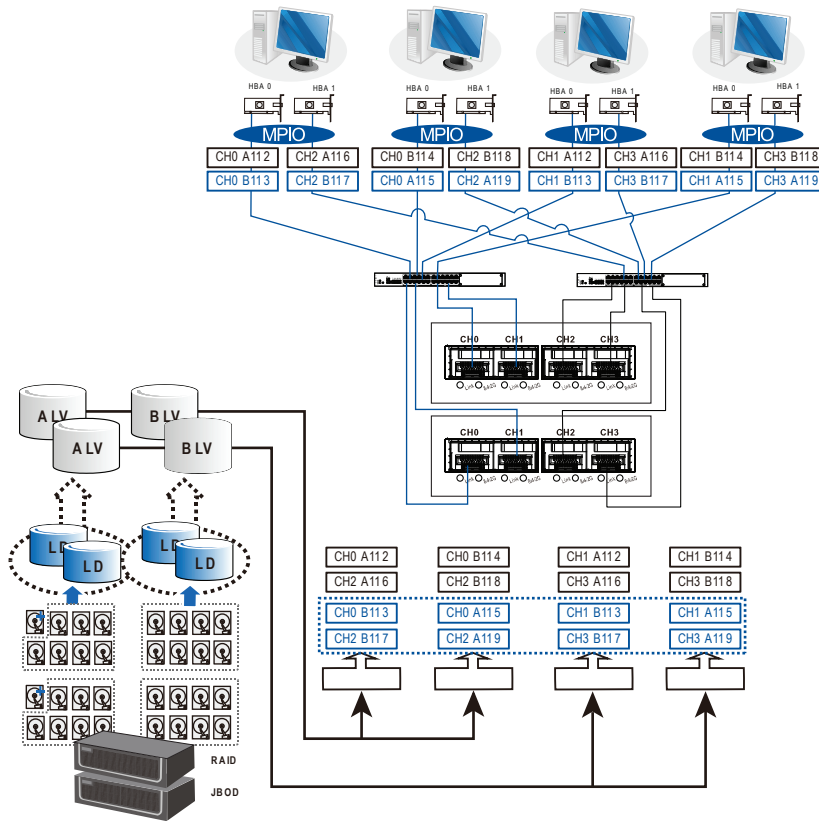
Channels	Controller A	Controller B
Host	CH0, CH1, CH2, CH3	CH0, CH1, CH2, CH3
Configuration information		
Number of controllers	2	
Host servers	4 (or more via FC switches)	
FC switches	2 (or 1 into 2 zones)	
Data path connection	Fault-tolerant data paths	

Each logical partition is redundantly mapped to multiple host channel IDs in an AAPP (Active-Passive-Passive-Passive) configuration. Logical volumes are managed by either controller A or controller B. The passive IDs will only become functional when a single controller fails in the system.

The MPIO driver is needed on the application servers. This driver communicates with the system firmware and performs load balance and automated distribution of I/Os across the preferred paths (active IDs on data paths). TPGS (Target Port Group Service) is supported so that the I/Os are routed to the preferred paths.

Switched fabric connection in single controller

In this type of connection, each SFP port is connected to an FC switch then to the host adapters. Each logical partition is mapped to a single host channel ID. If you prefer path redundancy, you can map a logical partition to IDs residing on two different channels.

Channels	Controller A
Host	CH0, CH1, CH2, CH3
Configuration information	
Number of controllers	1
Host servers	4
Data path connection	The data paths are connected to one or more FC switches. The SAN management measures, such as switch zoning and port binding, must be taken to avoid multiple servers from accessing the same LUN.

If multiple servers detect a mapped volume, you have to avoid access contention using file locking software, port binding, or zoning feature of the FC switches, which limits the access from host to a specific LUN. If you have two servers in a clustered configuration, the clustering software will perform the access control.

IMPORTANT!

- We suggest you to use an enclosure-specific spare drive to prevent it from participating in the rebuild of a logical drive on another enclosure. You can refer to the ID tags on the host links to see the related LUN mapping and cable links routing paths.

- You need MPIO driver to manage the access via two different HBA ports. This driver communicates with the system firmware and performs load balance and automated distribution of I/O.

2.3.3   SAS - host connections

This section details about the connections between SAS and host using SAS cables. The SAS cables (8 pairs of 28 mm AWG) are characterized by the following:

- 100 Ohms

- Black color

- UL-approved, lead free 50 cm, 120 cm, or 170 cm in length

- Connectors must be secured to the receptacle of the chassis using a latching mechanism

WARNING! The SAS cables are sensitive and must be handled with care. To prevent interference within the rackmount, the cable routing path must be carefully planned and the cables must not be bent.

DAS (Direct-Attached Storage) connection with Redundant host path

• Dual-controller models
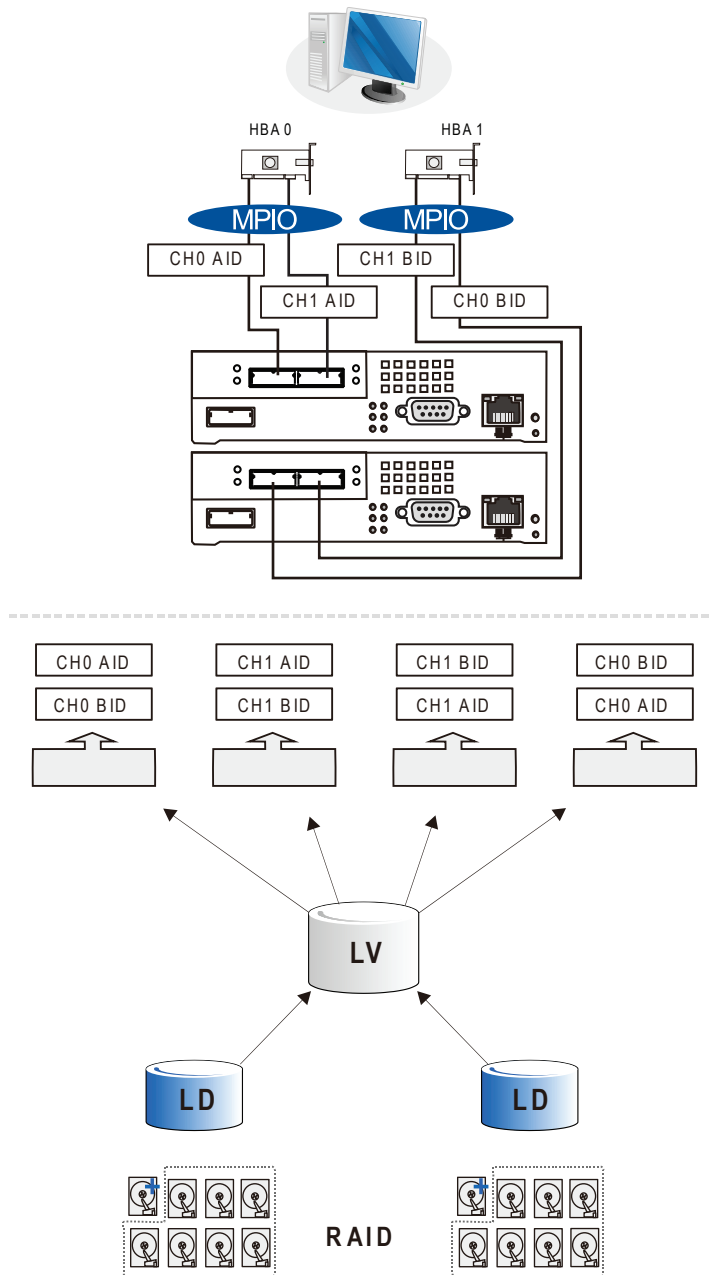
- Single-controller models
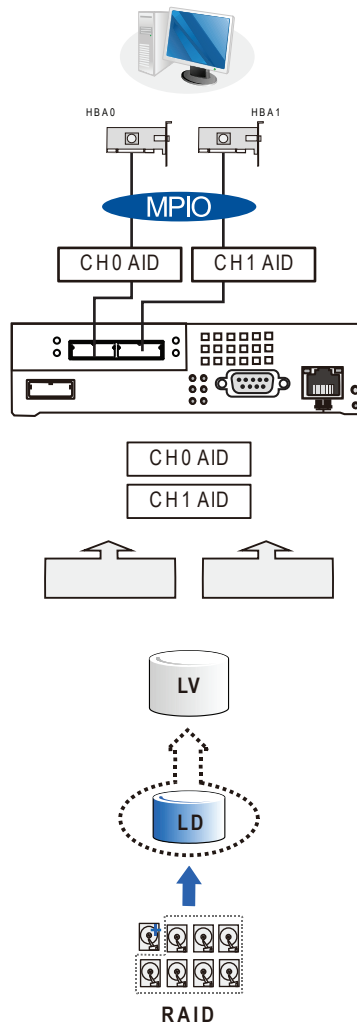
NOTES:

- With more hard drives over SAS expansion links, you can create more logical groups of drives. Avail the logical partitions using more LUNs.

- If your operating system is Windows® 2003 server, you need a multipathing software such as **MPIO** or **Linux Device Mapper** to control and optimize the access to logical drives via multiple data paths.

DAS (Direct-Attached Storage) connection to two servers
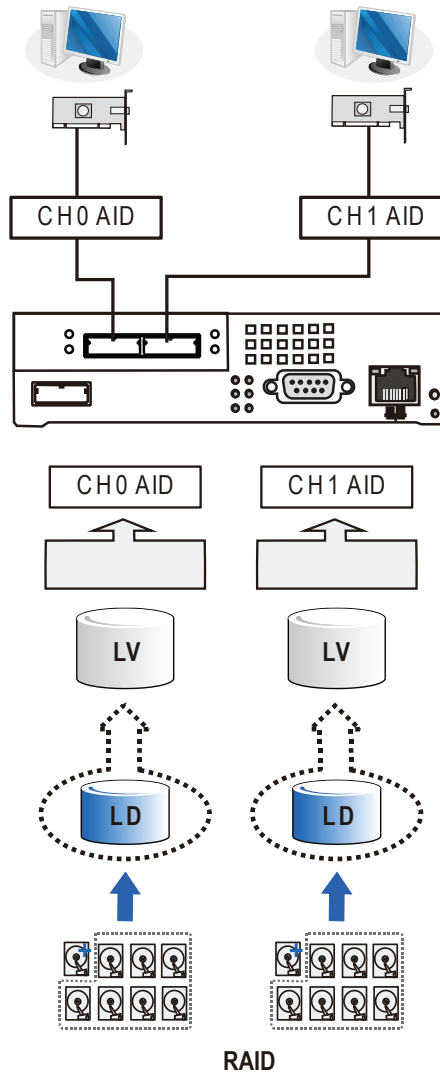
NOTE: If you want your LUN to be accessible by multiple hosts, use locking or multipath access control.

2.3.4   Ethernet - host connections

Before performing the connections between Ethernet and host, take note of the following requirements:

- Ethernet cables are user-supplied. We recommend you to use CAT5e shielded STP type network cables or cables with better performance types (important for meeting the requirements imposed by emission standards).

- Use of straight-through Ethernet cables with RJ-45 plugs.

- Use of cross-over cables. These cables are automatically detected and rerouted for a valid connection.

See below the list of connection types:

- Directly to iSCSI initiators (software or hardware) or via the Gigabit Ethernet switches.

- To servers equipped with iSCSI HBA, preferably a hardware TOE (TCP/IP Offload Engine) card, then to client stations with an Ethernet NIC or iSCSI HBA.

- The system presents its logical volumes via SCSI-like IDs and LUNs. These RAID volumes then appear as iSCSI targets via the network.

> **IMPORTANT!** Even though the iSCSI initiator software is a cost-effective way of building an iSCSI SAN, this software initiator adds additional workload to the server CPU. We recommend you to apply iSCSI HBAs that come with TCP/IP offload engines in order to reduce overhead.

Network and host connection topologies

The iSCSI host ports must be connected to Ethernet network devices and iSCSI initiators that comply with IEFT iSCSI standard (RFC 3720). The network connection of the iSCSI ports is flexible. The use of network connecting devices, subnet, name servers, or iSCSI management software varies from case to case.

Note that the host NIC ports and the storage system's iSCSI host ports must be configured in the same subnet, and the following:

- Use the Ethernet Management port for management purposes only such as EonOne or telnet console. This port must not be used for I/O processes.

- Configurations such subnet or virtual LAN can separate iSCSI host links, decrease overhead, and eliminate the impact of link failure.

- Multiple arrays or logical partitions can be created and made available separately via different IDs or LUNs on host ports. Usually, a RAID5 logical drive of 8 members sometimes brings optimal array performance.

IMPORTANT! If you are using Microsoft's software initiator, uncheck the embedded MPIO function when installing the software as the MPIO selection creates conflict with MPIO driver.
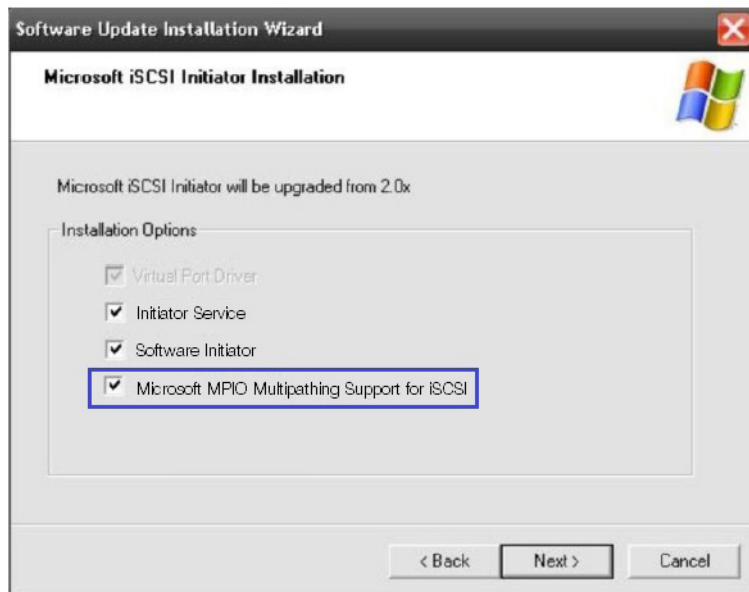
High availability IP SAN with redundant controller

CH0 AID*	CH1 AID*	CH2 BID*	CH3 BID*
CH0 BID	CH1 BID	CH2 AID	CH3 AID

Component	Description
SAN storage system	Redundant controllers with a total of 8 host ports
HBA	iSCSI initiators, preferably PCIe TCP/IP offload engine (TOE)-capable cards
GbE cables	GbE network cables
GbE switch	Ports divided into 2 virtual LANs to separate access from host to targets
Software	MPIO to manage the fault-tolerant paths with failover/failback and load balance capabilities. Use MPIO multipathing software for the operating system to identify the alternative paths to the same logical drive.
RAID configuration	• This configuration does not support remote replication functionality. To set up remote replication, refer to High Availability IP SAN with Port Trunk (Remote Replication Enabled) or High Availability IP SAN with Port Trunk (Remote Replication Enabled). • Four logical drives (each logical drive has four member drives). You can include the drives from the expansion systems for better performance. • LD0 mapped to CH0 AID and CH0 BID; LD assigned to controller A • LD1 mapped to CH1 AID and CH1 BID; LD assigned to controller A • LD2 mapped to CH2 AID and CH2 BID; LD assigned to controller B • LD3 mapped to CH3 AID and CH3 BID; LD assigned to controller B
CH0 AID CH1 AID CH2 BID CH3 BID	Logical drive assignment

IMPORTANT! In the event of single-controller failure, a logical drive drive is accessed via the host IDs managed by the alternate controller. The host and port IDs do not failover to the remaining controller. In this case, MPIO driver is necessary for path redundancy and controller failover.

Single-Controller with Fault-Tolerant Path

Component	Description
SAN storage system	Single-controller with 4 host ports
HBA or NIC	iSCSI initiators, preferably PCIe TCP/IP offload engine (TOE)-capable cards
GbE cables	GbE network cables
Software	MPIO to manage the fault-tolerant paths with failover/failback and load balance capabilities.
RAID configuration	• Four logical partitions (created from two logical volumes) • Two logical volumes (each contains a logical drive) NOTE: Each logical partition appears on two different host links for fault tolerance. Use MPIO software so that your operating system can identify the alternate paths to the same logical drive.

High Availability IP SAN (Recommended for remote replication)

Component	Description
SAN storage system	Redundant controllers with eight host ports
HBA	iSCSI initiators, preferably PCIe TCP/IP offload engine (TOE)-capable cards
GbE cables	GbE network cables
GbE switch	Ports divided into 2 virtual LANs. Both controllers are linked to both virtual LAN zones.
Software	MPIO to manage the fault-tolerant paths with failover/failback and load balance capabilities. Use MPIO multipathing software for the operating system to identify the alternative paths to the same logical drive.
RAID configuration	• Two logical drives; each has eight member drives. You can create more logical drives from the drives in the expansion systems. • LD0 mapped to CH0 AID, CH1 BID, CH2 AID, and CH3 BID. LD must be assigned to controllers A and B to enable remote replication. • LD1 mapped to CH1 BID, CH0 AID, CH3 BID, and CH2 AID. LD must be assigned to controllers A and B to enable remote replication.

IMPORTANT! For systems operating in Windows® 2003 server, and in the event of single-controller failure, a logical drive drive is accessed via the host IDs managed by the alternate controller. The host and port IDs do not failover to the remaining controller. In this case, MPIO driver is necessary for path redundancy and controller failover.
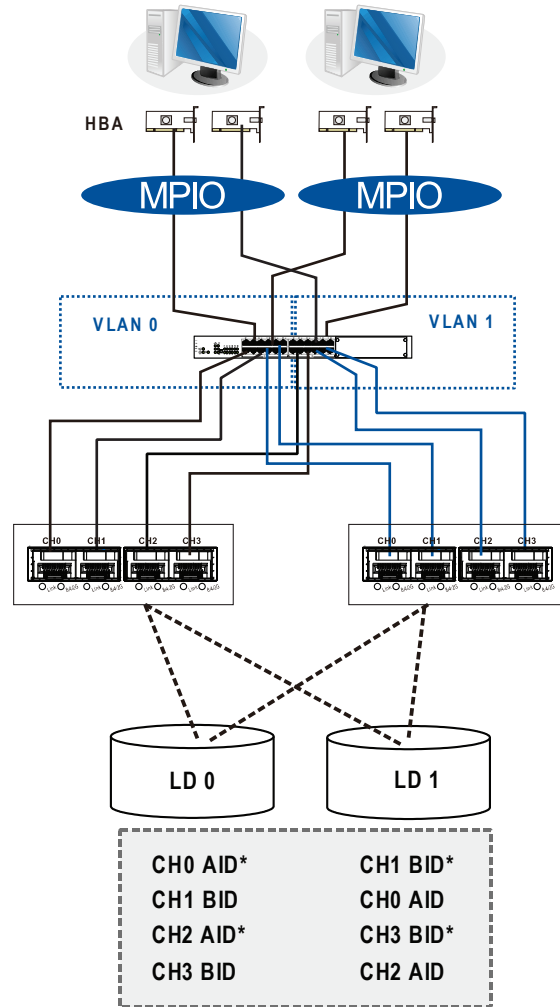
High Availability IP SAN with Port Trunk (Remote replication-enabled)

Component	Description
SAN storage system	Redundant controllers with eight host ports
HBA	iSCSI initiators, preferably PCIe TCP/IP offload engine (TOE)-capable cards
GbE cables	GbE network cables; port trunking marked in orange rectangles
GbE switch	Ports divided into 2 virtual LANs. Both controllers are linked to both virtual LAN zones.
Software	MPIO to manage the fault-tolerant paths with failover/failback and load balance capabilities. Use MPIO multipathing software for the operating system to identify the alternative paths to the same logical drive.

(see next page)

Component	Description
RAID configuration	• Two logical drives; each has eight member drives. You can create more logical drives from the drives in the expansion systems. • LD0 mapped to CH0 AID, CH1 BID. LD must be assigned to controllers A and B to enable remote replication. • LD1 mapped to CH1 BID, CH0 AID. LD must be assigned to controllers A and B to enable remote replication.

2.3.5 Hybrid host connections

For hybrid systems that feature two additional iSCSI ports, you can use these systems for remote replication or for host LUN mapping.

Single Hybrid Unit Connected to FC/iSCSI Hosts
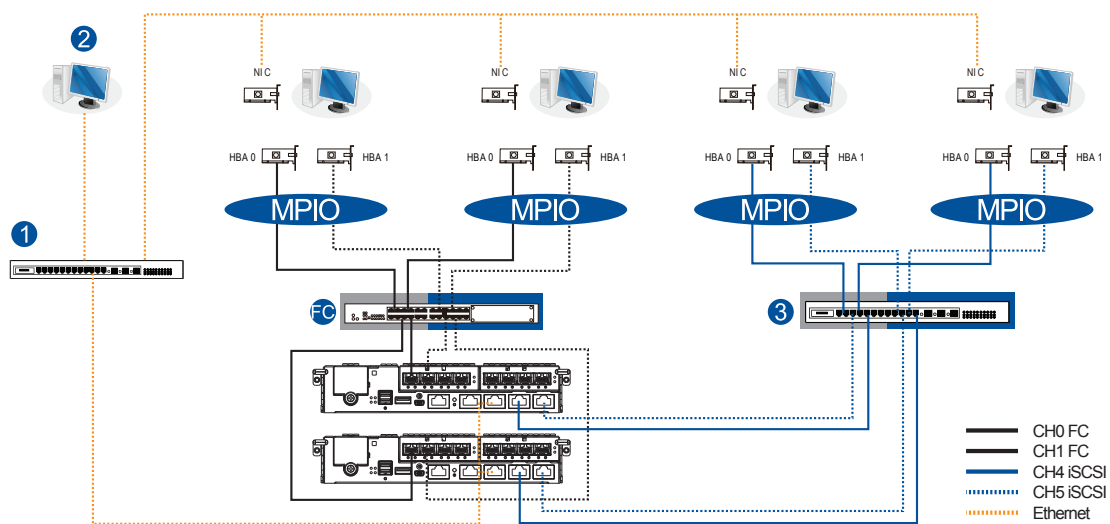
When connected to FC and iSCSI hosts, the connections are working in their respective speeds. This connection maximizes the number of connections while keeping the optimum performance gained by the high-speed FC link and FC switch.

NOTES:

• To gain optimum performance, ensure that the LAN switch (1) for the management station (2), the LAN switch for the systems, and the iSCSI switch (3) for iSCSI host link are separated.

• If they are not separated, the host may consider that the iSCSI connection is a part of the host connection and might use it for data I/O, even if the iSCSI ports are not mapped to the host. As a result, the data transaction speed slows down to iSCSI connection's level and the fast FC connection bandwidth may be spent without use.

Utilizing Hybrid iSCSI ports for Data Replication

CH0 FC
CH1 FC
CH4 iSCSI
CH5 iSCSI
Ethernet
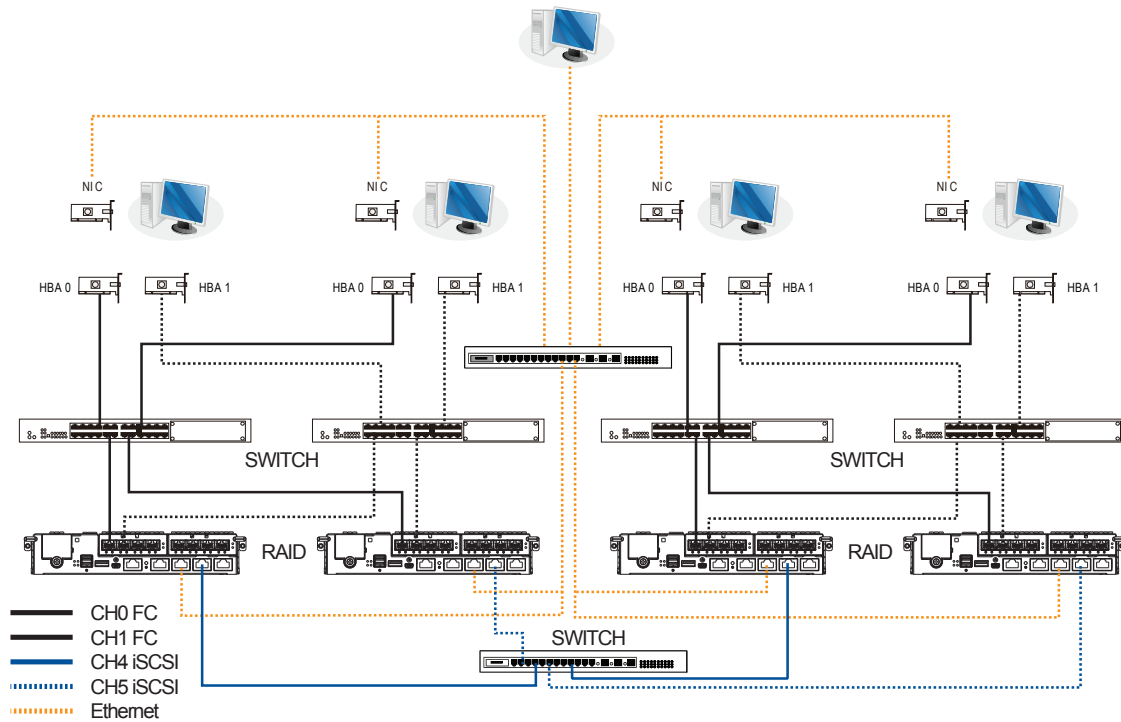
The illustration above depicts the utilization of the iSCSI host ports for remote data replication.

Two hybrid systems, a source system and a target system, reside within the same virtual pool but are physically apart. You can create a volume copy/mirror pair for data protection without relying on slow management LAN cable connections. In such case, you can link the hybrid systems using iSCSI host ports. If the distances between systems are far, additional switches may be required.

2.3.6 Expansion connections

A SAS host link cable is bundled per expansion package. If you need to purchase other cables, or if you need other cables of different lengths, contact your vendor.

Before configuring the expansions, you must take note of the following important points:

* For a cleaner and clutter-free rack system, have a carefully planned routing paths when connecting between systems.

* All SAS cables are sensitive and must be handled with care. DO NOT bend or twist the cables when connecting the systems installed to the rack.

Configuring the SAS expansion

The SAS expansion port of the GS system connects to the expansion systems. For dual-controller systems, each expansion port connects to a controller of another expansion system, making a fault-tolerant linkage to different SAS domains.

The following principles apply to SAN storage and expansion system connections:

* Dual-controller SAN storage connects to a single-controller expansion system

* Single-controller SAN storage connects to a single-controller expansion system

* A longer cable is available in making expansion links with a dual-controller configuration. If you need to connect expansion systems from two opposite directions, you may need a longer cable. Routing between two different connections can avoid loss of data links if one expansion fails to operate.

Setting the expansion IDs

Each expansion system must have a unique ID and you can configure the ID via the rotary ID switch. To set the expansion IDs, use a small flat-blade screwdriver.

You must take note of the following when setting the IDs on the expansion system:

* Set the IDs from 1 to 15. The order starts from the expansion enclosure that is closest to the managing GS enclosure.

* Ensure to set a unique ID on each expansion enclosure so that the SAS WWN addresses of the disk drives are properly assigned. The SAN storage system firmware automatically manages these addresses.
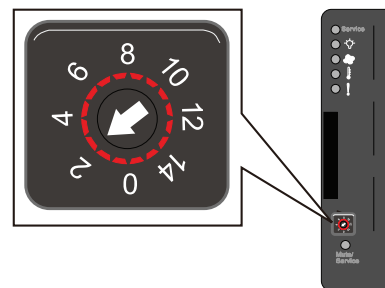
Configuration rules

To connect the SAS interfaces across storage and expansion systems, you must take note of the following:

- **Fault-tolerant links in a dual-controller combination**

  Corresponding to the dual-port interfaces of the SAS drives, two physical links are available per disk drive, routed across the backplane board, then to a SAS expander, and interfaced via a 4x wide external SAS port.

- **With data paths via separate SAS domains**

  Access to disk drives can be continued in the event of a failure from a cable link or SAS expansion controller.
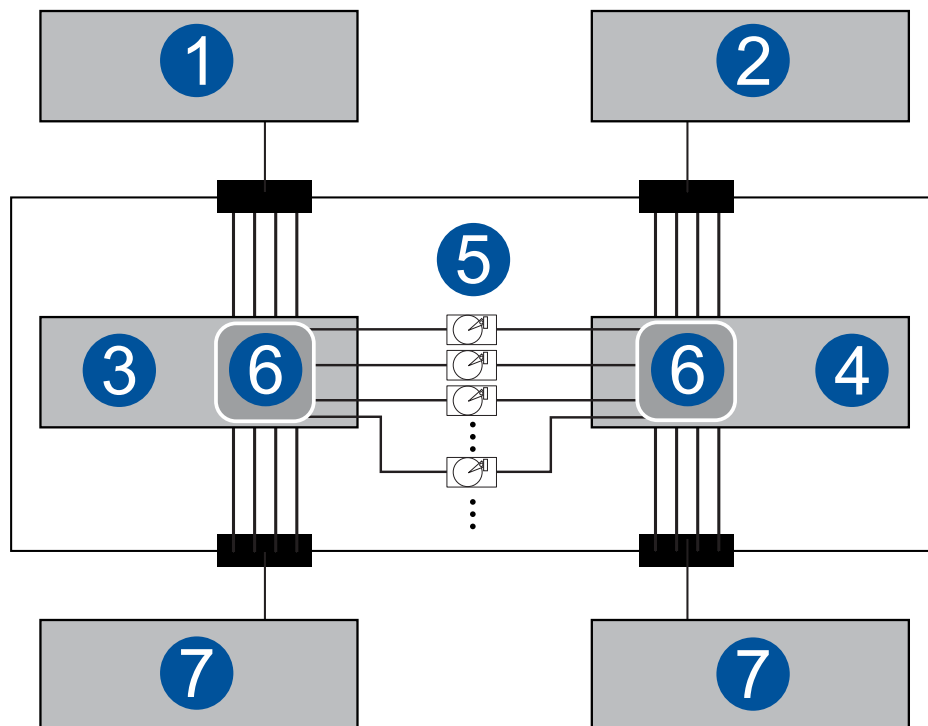
Number	Description
1	RAID controller A
2	RAID controller B
3	Expansion system controller A
4	Expansion system controller B
5	Dual-port SAS drives
6	Expander
7	To another expansion system

- **Fault-tolerant links to SAS disk drives**

  - The SAS expansion cables are bundled with the expansion systems. Take note that if there are many expansion systems connected, a longer SAS external cable, approximately measured 120 cm, may be needed to connect an expansion system from the opposite direction for a higher redundancy.

  - One expansion link connects the expansion system from a storage system with HBA/RAID card to the nearest expansion system, then to the most distant expansion system. Another expansion link connects to the most distant expansion system, from the opposite direction to the first expansion system from the storage system.

  - Each expander controller on the SAS expansion system controls a *SAS domain* that connects to one of the alternative interfaces of the disk drives in the enclosure. For example, one expander unit controls Domain A while the other expander controls Domain B. In a fault-tolerant topology, the SAS external links always connect to the SAS ports of the same SAS domain.

  - Identify the SAS domains by the location of the expanders: the left controller is controller A, the right is controller B.

  - On a storage system, each controller is considered as managing a separate SAS domain. With the help of the port selector mechanism, the idea of SAS domain applies even when SATA drives are used in a dual-controller expansion system.

Connecting expansion systems

- Connecting dual-controller expansions using the on-board SAS expansion ports
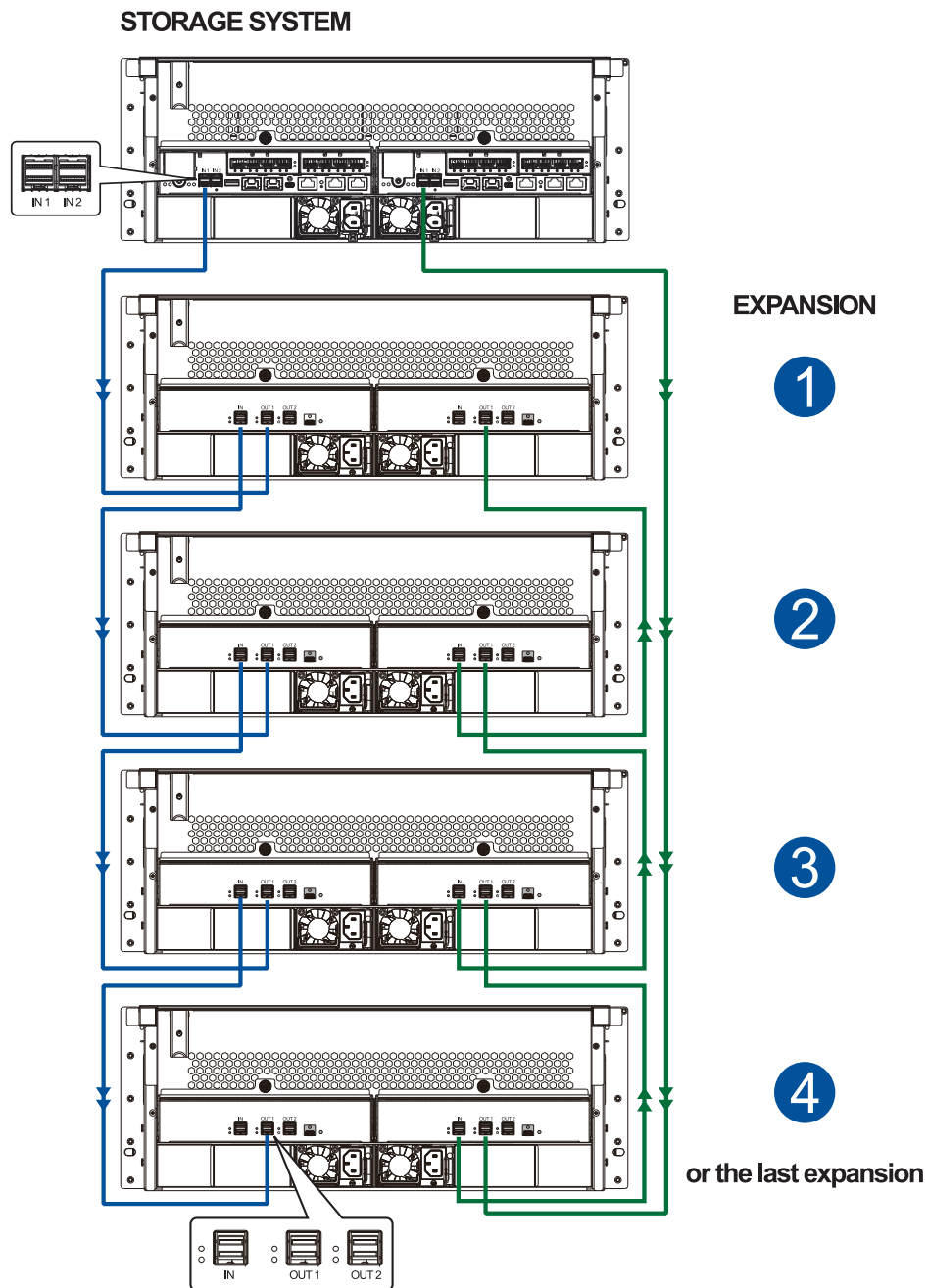
STORAGE SYSTEM

IN 1   IN 2

EXPANSION

1

2

3

4

or the last expansion

IN   OUT 1   OUT 2

- Connecting dual-controller expansions using the host boards' SAS expansion ports

STORAGE SYSTEM

EXPANSION

1

2

3

4

or the last expansion

- Connecting single-controller expansions using the on-board SAS expansion ports

STORAGE SYSTEM

EXPANSION

1

2

3

4

or the last expansion

- Connecting single-controller expansions using the host board's SAS expansion ports

STORAGE SYSTEM

EXPANSION

1

2

3

4
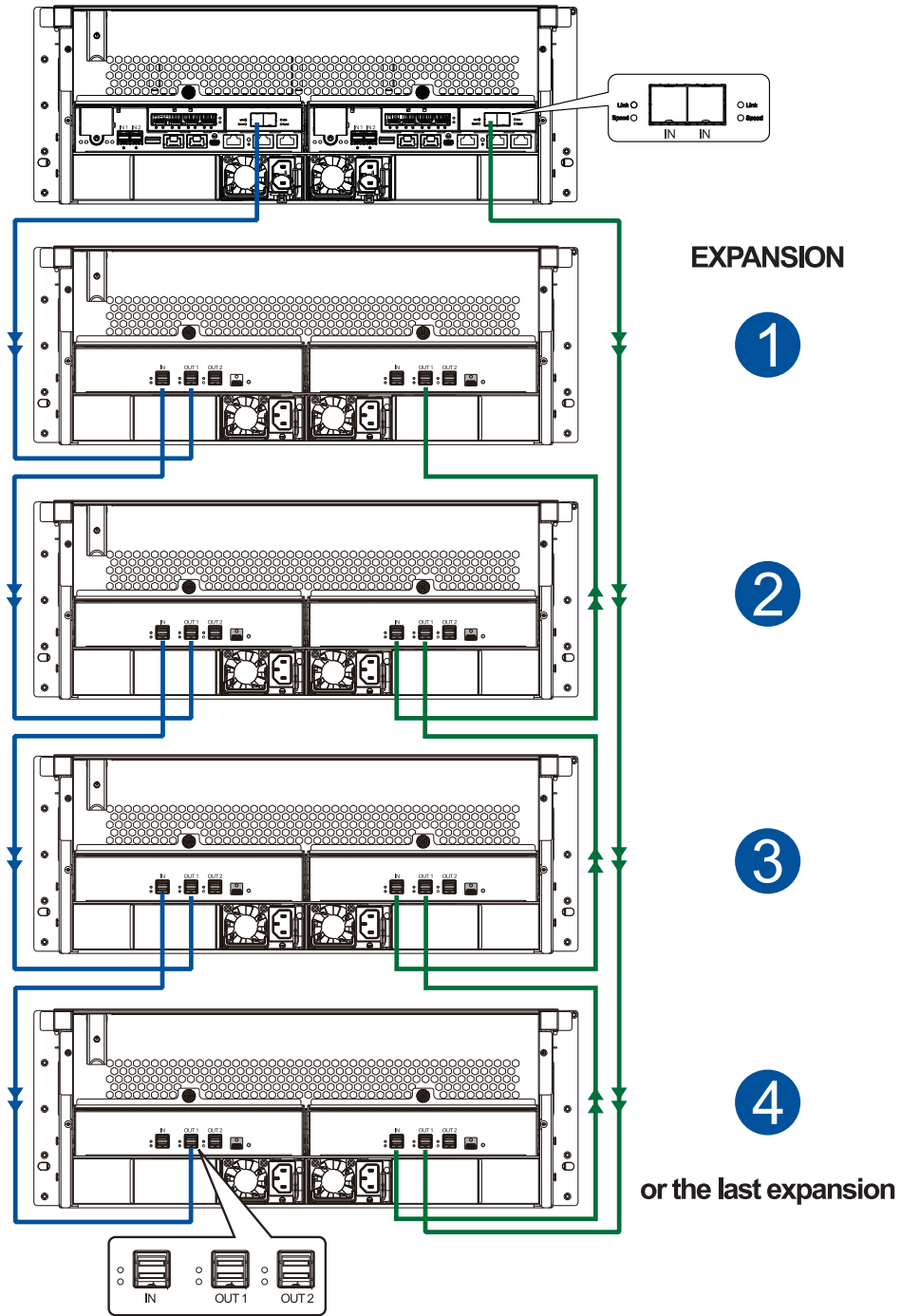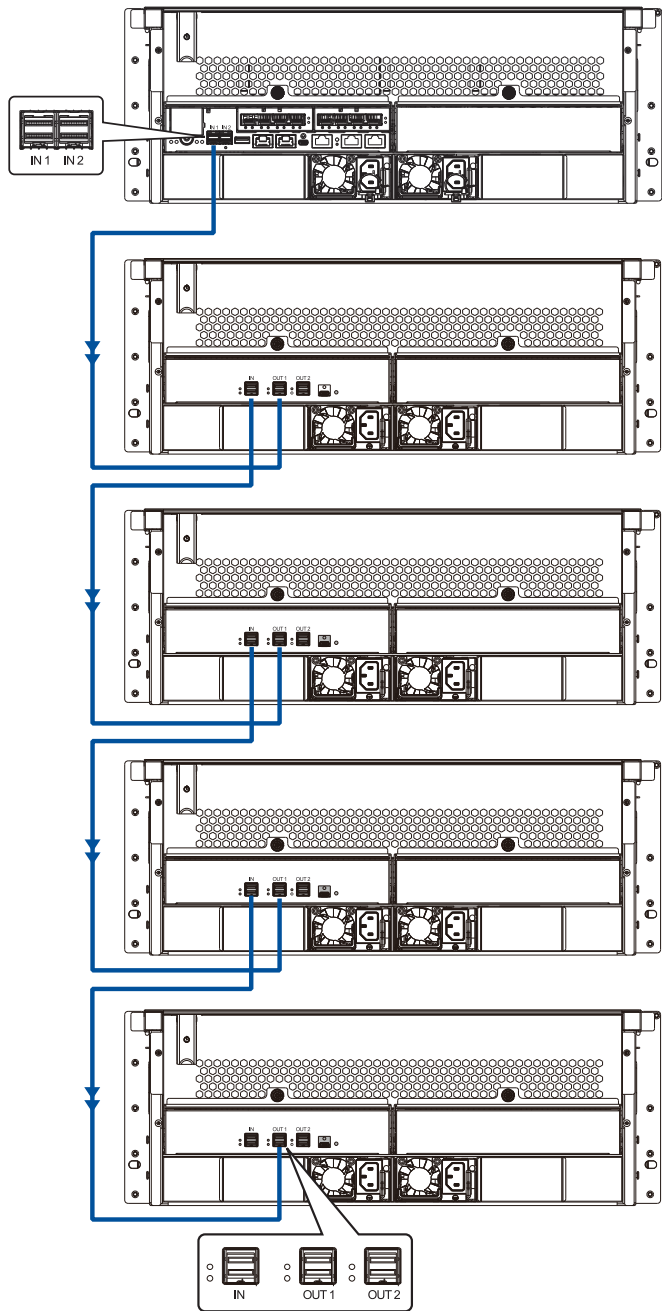
or the last expansion
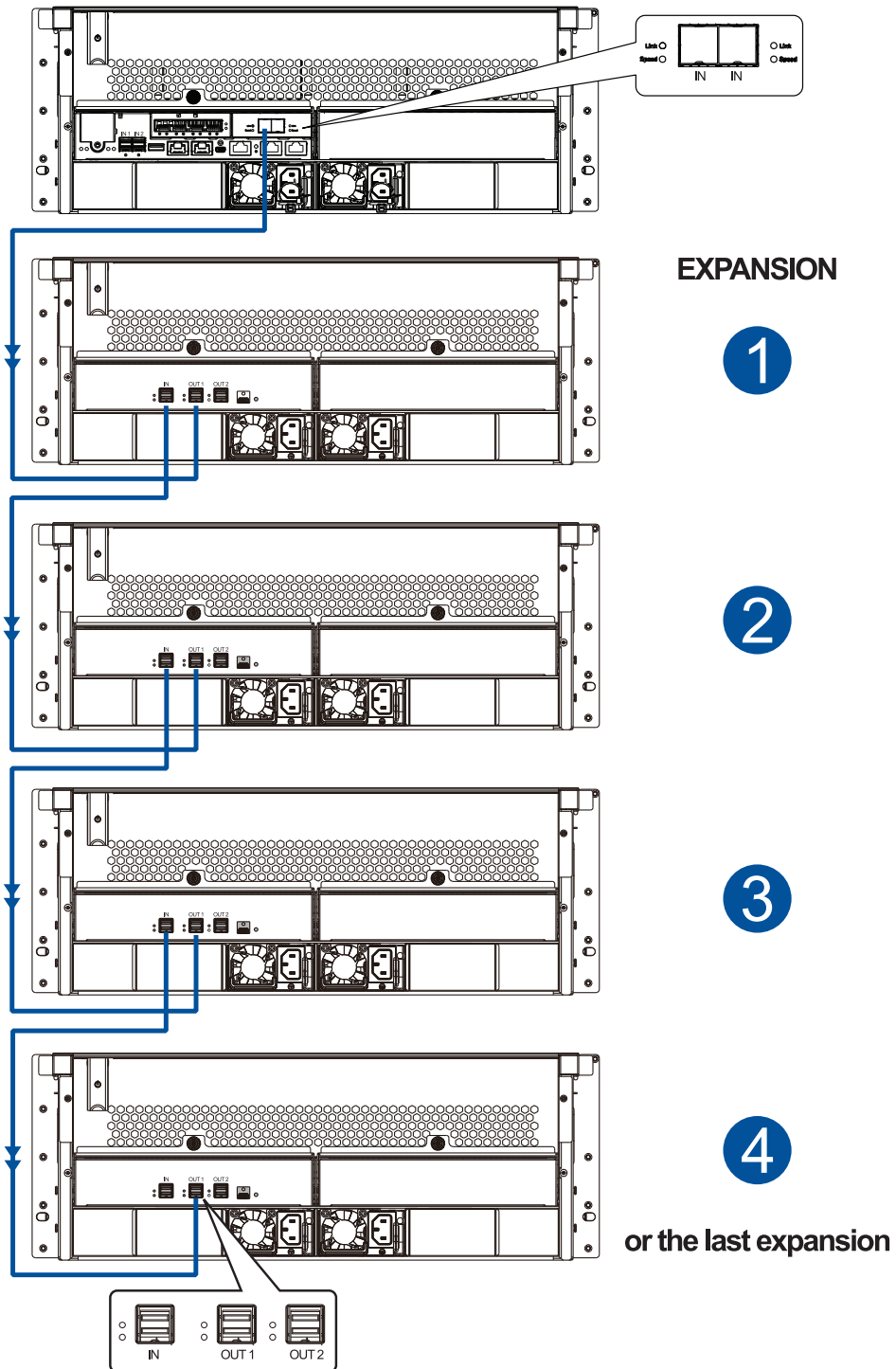
2.3.7 Management console connections

To connect you SAN storage to external consoles, you need the following:

• DB 9 female to mini-USB cable (bundled with the package)

• CAT 5e LAN cable (user supplied)

Connecting SAN storage to external consoles
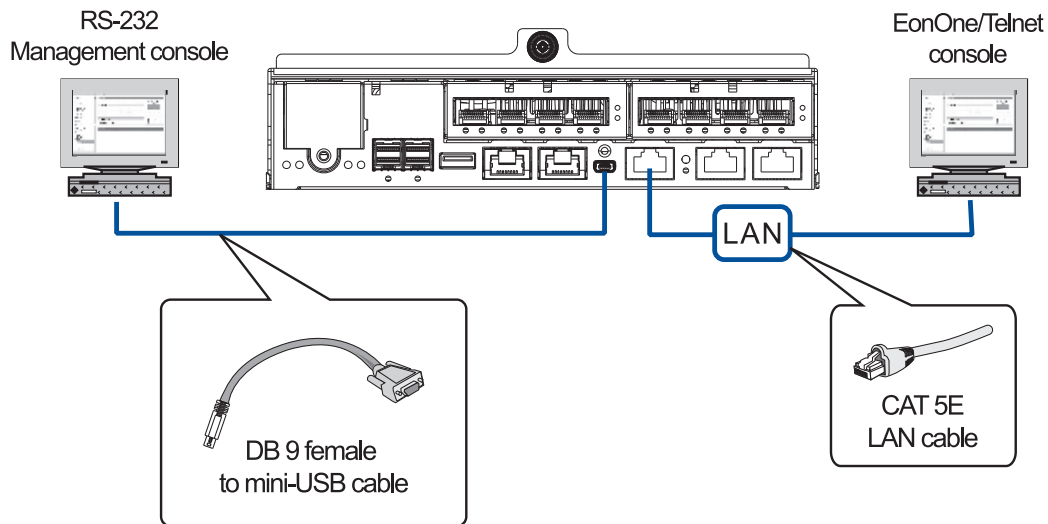
See below table for the list of default values of the serial port.

Baud rate	38400
Data bit	8
Parity	None
Stop bit	1
Flow control	Hardware

IMPORTANT! Always connect to the primary controller.

NOTES:

• A null modem may be required if you are using a 3rd party cable.

• For TCP/IP connection and firewall configuration, refer to EonOne, your management software's online help, or user manual. If your network is not running the DHCP server protocols, you can use the default IP **10.10.1.1** if you are accessing for the first time.

2.3.8   Power connection

Before connecting to a power source, ensure that all components are properly installed and the management interfaces are properly connected.

Take a look at the list below and check the following:

1.   The hard drives are correctly installed to the drive trays.

2.   All drive trays are installed to the system, whether or not they contain a hard drive.

3.   The system is connected to host computers, management computers, or external networking devices with the correct cables.

> **IMPORTANT!** Ensure to use the power cables with at least 1.2 meters in length. DO NOT use extension cables as the power cables are designed to connect **ONLY and DIRECTLY** to relocatable power taps (RPTs) on server cabinets.

4.   Ensure that the ambient temperature is not less than 35°C (with CBM).

Assembling the power cable tie

Before connecting the power cord to the system, use the bundled cable tie to secure the power cord to the system for a cleaner and clutter-free connection.

To assemble the cable tie:

1.   Insert the cable tie's anchor (A) into the mounting hole of the system (B).
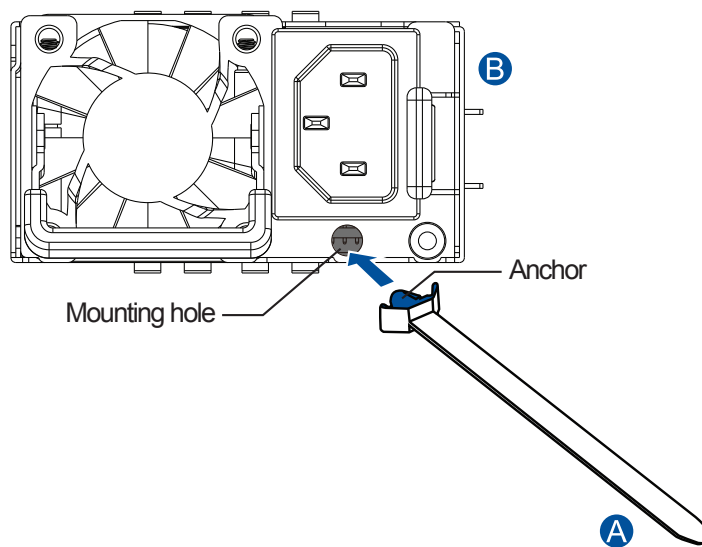
2.   Insert the cable tie (A) into the lower slot of the cable clamp (B).
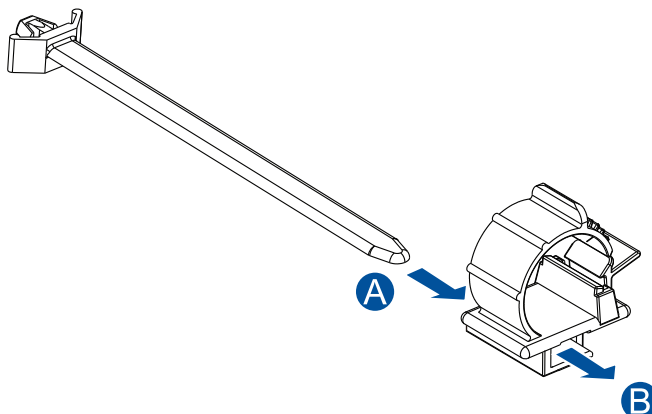
Connecting to a power source

To connect your storage system to a power source:

1. Connect the power cords to the PSU's power sockets.
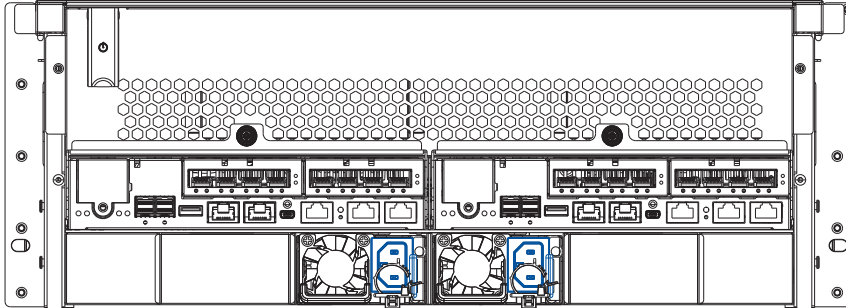
> **IMPORTANT!** DO NOT plug the system to the power outlet yet.

2. Use the assembled cable tie and clamp to secure the power cord.

   a. Use the cable release tab to open the clamp.

   b. Insert the power cord to the clamp then press to close it until you hear a snap.

   c. Use the clamp's release tab to adjust the cable's position and tightness.

Cable release tab

Release tab
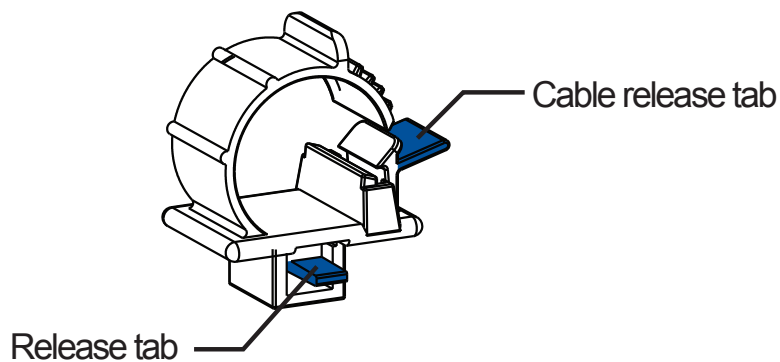
3. Connect the power cord(s) to the power outlet.

Turning on the system

Before turning on the GS system, you must turn on the expansion enclosures first if your network configuration consists of multiple arrays.

To turn on the system:

1. Turn on the networking devices.

2. Turn on the JBOD expansion systems.

3. Press the power switch on the upper-left side of the rear panel.
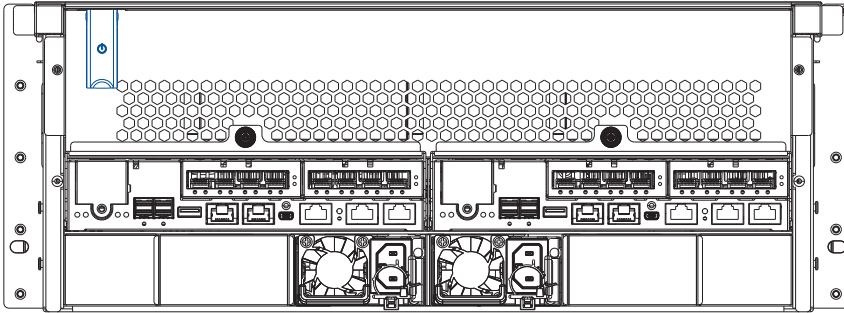
4. Turn on the application servers.

Checking the power status

Once the system is on, no LEDs should light up in red or amber, nor should you hear an alarm from the system. Start verifying the system status via the following interfaces:

• Front panel LEDs
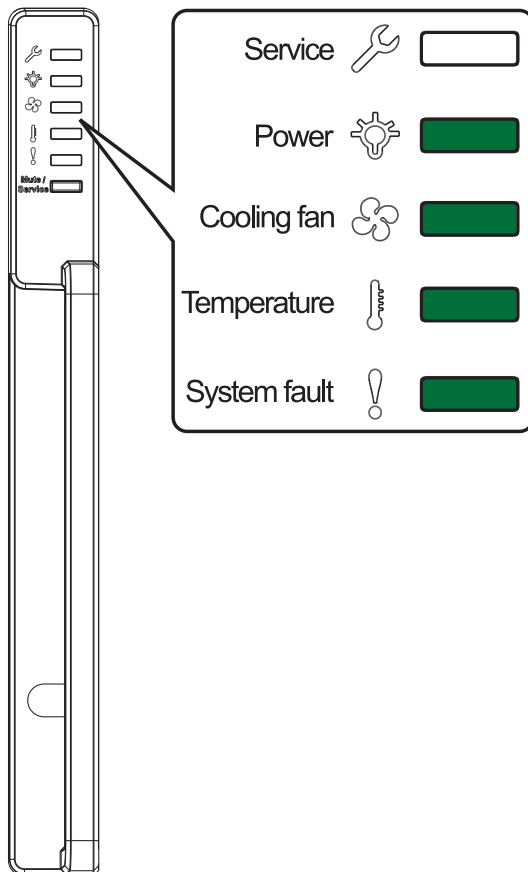
• Controller module LEDs
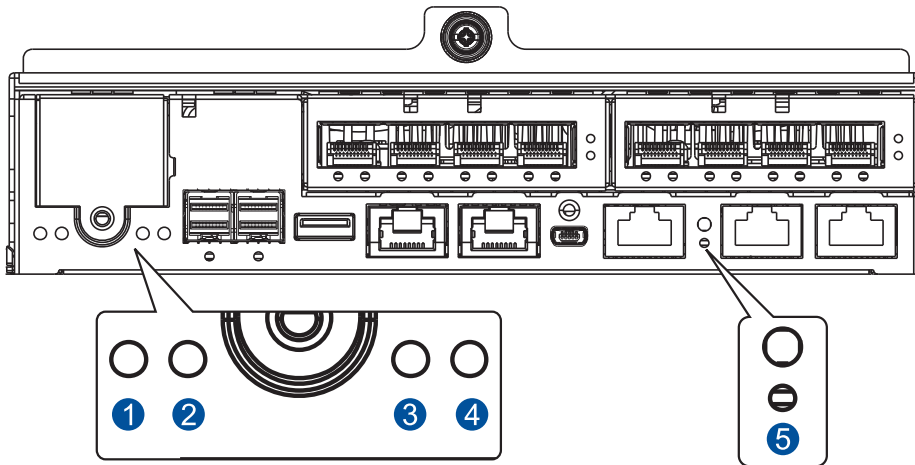
Number	Name	Status
1	Control status	**ON**
2	CBM Status	**ON**
3	Cache Dirty	**OFF**
4	Host Busy	**OFF**
5	Restore Default	**OFF**

NOTE: Refer to chapter **System maintenance** for more information regarding the LED description.

• PSU LED
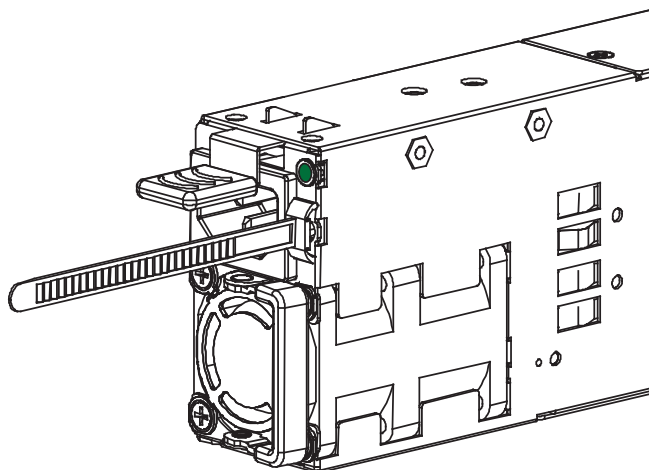
2.3.9 Turning off the system

Before turning off the system, ensure that no processes are taking place such as **Regenerate Logical Drive Parity** or **Media Scan**.

To turn off the system:

1. Close all applications to stop the I/O access to the system.

2. Flush the cache to clear the DRAM data. If the DRAM contains cached data, the Cache_Dirty LED lights up in amber.

3. Flush all cached data using the controller's shutdown function to prepare the RAID system for a safe power shutdown. Refer to EonOne manual for details.

4. Once the cache is flushed, switch off the system.

System monitoring

3

This chapter details the monitoring features and the status of EonStor GS 3060L system.

3.1   Monitoring features

The EonStor GS 3060L is equipped with self-monitoring features the help you keep track of the system's operating status.

You can monitor your system's status with the following features:

- **Firmware**

  The firmware manages the controllers of the system, which is accessible in a terminal program via the serial port. For more details, see the firmware manual in the bundled CD.

- **EonOne**

  EonOne is a browser-based GUI (graphic user interface) software that you can install into a local or remote computer and access via the network. You can refer to EonOne manual in your bundled CD for more information.

- **LEDs**

  The LEDs are indicators that notify you of the system status, events, and errors or failed operations. The LEDs are located on both front and rear panels of the chassis.

- **Audible alarms**

  The audible alarms are triggered in case of system failures. For more information, see **PSU LED**.

3.1.1 LEDs

This section details the system LEDs and their descriptions.

Front panel LEDs
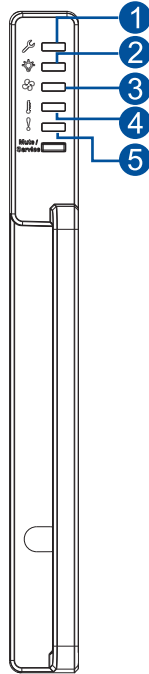
Number	LED name	Color/ Status	Description
❶	Service	◯	The system is being serviced or is requiring services.
		OFF	The system is not being serviced or does not require a service.
❷	Power	🟢	The system is powered properly.
		🟠	A power failure occurred in the system.
❸	Cooling module status	🟢	The cooling module and fan built with the PSU are running normally.
		🟠	A fan failure occurred.
❹	Temperature status	🟢	The internal temperature is normal and within the safety threshold.
		🟠	The internal temperature exceeds the safety threshold.
❺	System fault	🟢	The system is operating normally.
		🟠	The system encounters abnormal conditions.

IMPORTANT! If the cooling module status lights up in 🟠, check the cooling module inside the enclosure or the fan built with the PSU.

Rear panel LEDs

• **Controller LEDs**

Number	LED name	Color/Status	Description
➊	Control status	🟢	A controller is operating normally.
		🟠	• A component has failed or inappropriate RAID configurations cause system faults. • The controller is initializing.
➋	CBM Status	🟢	• Supercapacitor and flash modules are installed in the system. • The CBM is ready for operation.
		⚡	The supercapacitor is charging.
		🟠	• The CBM failed in operating, either the supercapacitor or flash module. • Either the supercapacitor and flash module is missing.
		OFF	The super capacitor is not installed in generic models.
➌	Cache Dirty	🟠	• Cache memory is dirty. • Data in flash backup module is flushed to the cache. • Errors occurred with cache memory (ECC errors). • Data is flushed from flash backup module to drive when the power is restored. • The supercapacitor temperature reading is abnormal (out of 0 - 35°C range). • The supercapacitor is not present.
		⚡	The cached data is being transferred to the flash module after a power outage. Once the transfer is done, all LEDs will turn off. This signal is local to each controller.
		OFF	The cache is clean and the supercapacitor can sustain the memory in case of power loss.
➍	Host Busy	⚡	Traffic going on the host bus.
➎	Restore Default	🟢	Successfully reset the controller after the press and hold the Restore Default button.

- **1 G Ethernet management port/1 G iSCSI port LEDs**
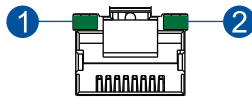
Number	LED name	Color/Status	Description
①	Speed	🟢	1 Gb connection is established.
		OFF	• 10/100 Mb connection is established. • No connection is established.
②	Link/Active	🟢	A connection is established.
		⚡	Data I/O is ongoing.
		OFF	No connection is established.

- **10 G iSCSI port LEDs**
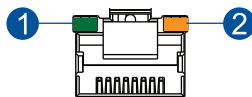
Number	LED name	Color/Status	Description
①	Speed	🟢	10 Gb connection is established.
		🟠	1 Gb connection is established.
		OFF	10/100 Mb connection is established.
②	Link/Active	ON	A connection is established.
		Flashing	Data I/O is ongoing.
		OFF	No connection is established.

- **SAS expansion port LEDs**
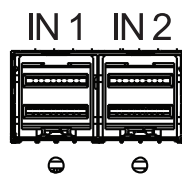
LED name	Status	Description
Link/Active	ON	All 4 PHY links are validly linked.
	Flashing	Less than 4 PHY links are connected (at least one of the PHYs has failed).
	OFF	All 4 PHY links are offline.

- **Converged host board LEDs**
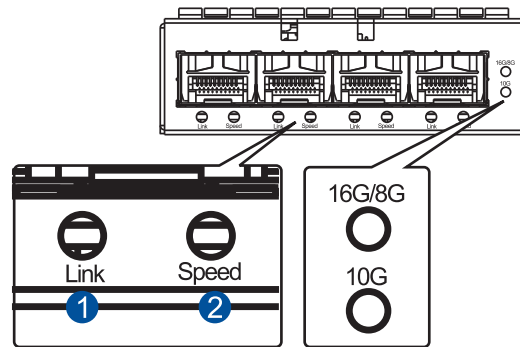
Number	LED name	Color/Status	Description
❶	Link	🟢	A connection is established.
		OFF	A link is broken.

Number	LED name	Color/Status	16 G Fibre channel	8 G Fibre channel	10 G Ethernet
❷	Speed	🟢	16 G FC	8 G FC	10 G Ethernet
		🟠	8 G FC	4 G FC	---------------------
		OFF	4 G FC or no link	2G FC or no link	No link

LED name	Connection type	Color/Status	Description
16 G/8 G	Fibre channel	🟢	16 G Fiber channel mode
		🟠	8 G Fiber channel mode
10 G	Ethernet	🟢	10 G Ethernet mode

NOTE: The following 4 x 16Gb/s FC host boards do not support Remote Replication feature:

- RFC16G1HIO4-0010
- RFC16G0HIO4-0010

- **12 G SAS expansion controller LEDs**

IN   OUT 1   OUT 2
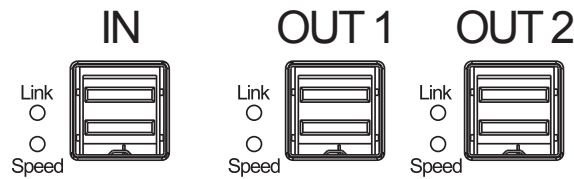
LED name	Color/Status	Description
Link/Active	ON	All PHYs are validly linked.
	Flashing	One of the PHYs has failed.
	OFF	All PHYs are offline.
Speed	🟢	12 Gb link speed
	🟠	6 Gb/3 Gb link speed
	OFF	No connection
⬡ ⊘/🔧	🟢	The controller is operating normally.
	🟠	• A component failure occurred. • Initialization is ongoing.

- **PSU LED**
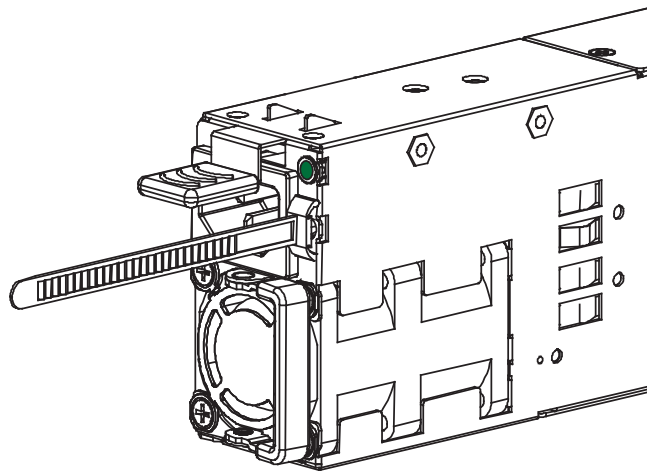
Color	Description
⚡	The system is connected to the power source but the system is not turned on.
🟢	The PSU is operating normally.
🔴	The PSU is faulty.

The PSU LED alerts you of the current status of your PSU. When this component fails, you must replace the PSU immediately.

WARNING! Keep your fingers away from moving parts of the system to prevent technical mishaps and physical injuries.

NOTE: For more details, see section **4.1.1 Replacing the PSU**.

3.1.2   Alarms and I²C bus

This section details the system alarms and I²C bus.

Audible alarms

You will hear an audible alarm if any of the following components fails:

- Cooling module

- PSU modules

- Hard disk drives

- Sensors or presence detection circuitries

If you hear an audible alarm, ensure to read the error message on the terminal or EonOne screen to determine the cause of the alarm. Take appropriate actions to solve the problem. You can turn off the alarm using the mute button on the front panel. To know more of the alarm beep patterns, see the Troubleshooting Guide included in the bundled CD.

NOTE: When the temperature exceeds the preset threshold, the controller's charger circuits stop charging. You will receive a messages that says *Thermal Shutdown/Enter Sleep Mode*. When the temperature falls back to normal range, the battery resumes charging.

I²C bus

The operating status of the PSU and cooling fan modules are collected via the I²C serial bus. If either of the modules fails, the system detects the failure and you will be notified via the same methods stated in audible alarms.

System maintenance

4

This chapter provides maintenance and replacement procedures of replaceable components of your EonStor GS 3060L system.

4.1   Replaceable components

Your EonStor GS system is comprised of replaceable components:

*   PSU

*   Cooling module

*   Controller module

*   Memory module

*   CBM

*   Host board

*   Hard disk drives

WARNING!

*   DO NOT remove a defective component from the system until you have the replacement on hand. Doing so may disrupt the internal airflow.

*   Consult with the qualified engineers who are familiar with the system to recommend you of the component replacements.

*   DO NOT use excessive force when installing a replaceable module. Forced installation of the module can damage the connector pins of the system, the module, or the internal backplane.

4.1.1   Replacing the PSU

The PSUs are configured in a redundant configuration, with each PSU housed in a robust steel canister.

Detecting a failed PSU

If a PSU module fails, the system notifies you via the following indicators:

- The PSU LED lights in red

- Audible alarm

> **NOTE:** See section **3.1.2 Alarms and I2C bus** for more details.

- Firmware utility

> **NOTE:** Refer to the Firmware User Manual in the bundled CD for more details.

- EonOne Manager software

> **NOTE:** Refer to EonOne User Manual in the bundled CD for more details.

Replacing the PSU

Replace the defective PSU immediately, but only if you have the replacement.

> **WARNING!** Although the system can still operate with a defective PSU, it is not recommended to use it for an extended period of time.

> **NOTE:** Contact your system vendor for more information.

To replace the PSU:

1. Shut down the system, turn off the PSU, then unplug the power cord.

2. Remove the screws that secure the PSU to the enclosure.
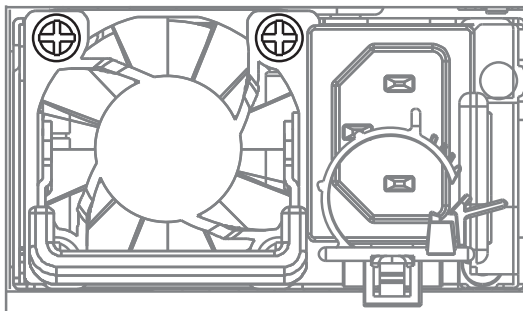
3. Press the retention lever to the left (A) then pull out the extraction handle (B).
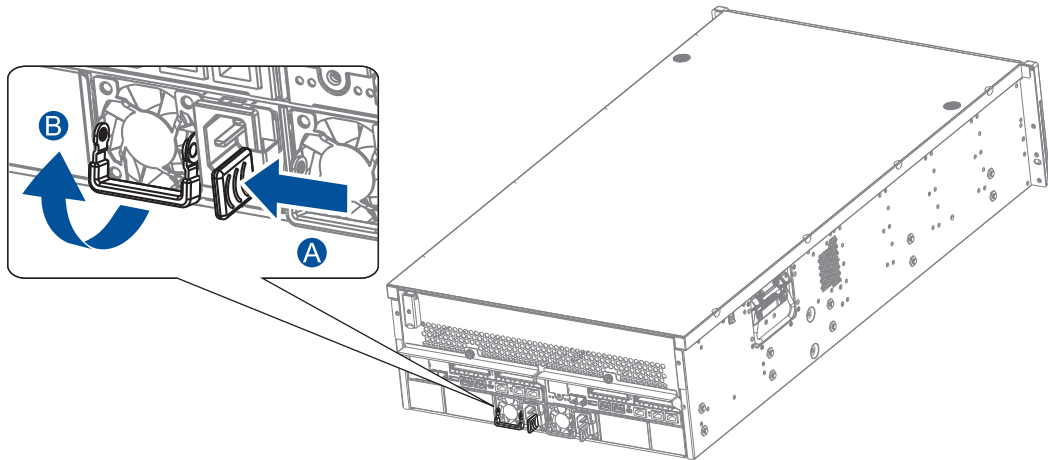
4. Hold the extraction handle then pull gently to remove the PSU from the system.
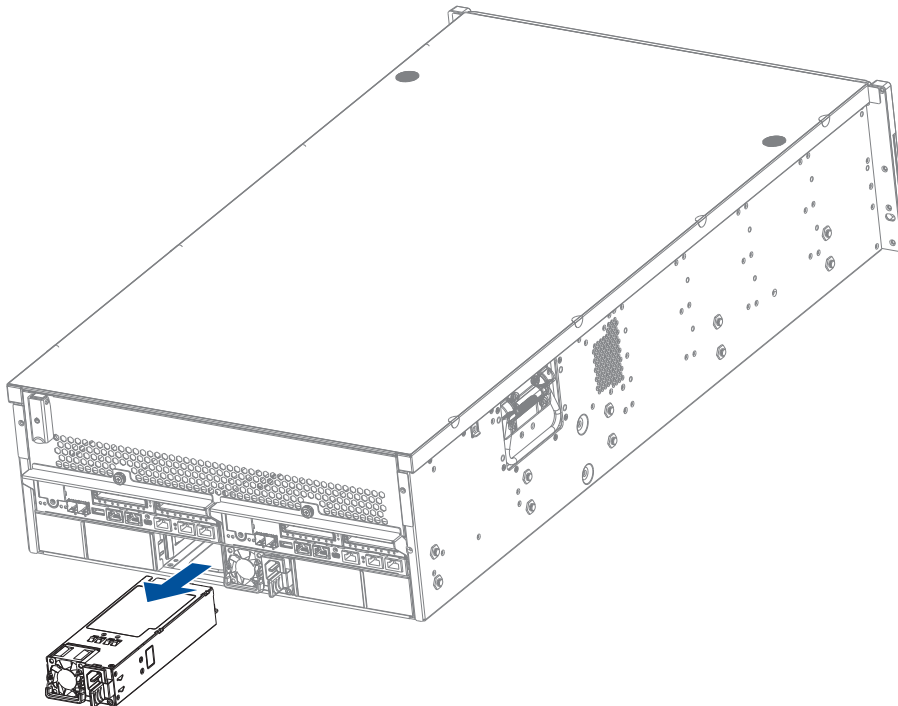
5. Insert the replacement PSU into the enclosure then push it gently. When you feel a resistance, push the module to lodge it to the backend connectors. Once lodged, the retention lever clicks back into place.

6. Fasten the PSU to the systems using the screws that you removed in step 2.

7. Connect the power cord.

8. Turn on the system.

4.1.2   Replacing the cooling module

To replace the cooling module:

1. Shut down the system, turn off the PSU, then unplug the power cord.

2. Push the two release buttons to dislodge the cover from the enclosure.
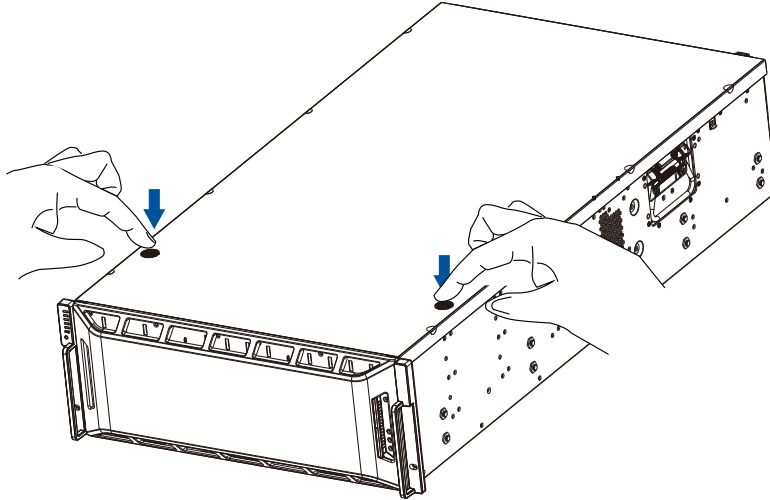
3. Gently slide the top cover backward.
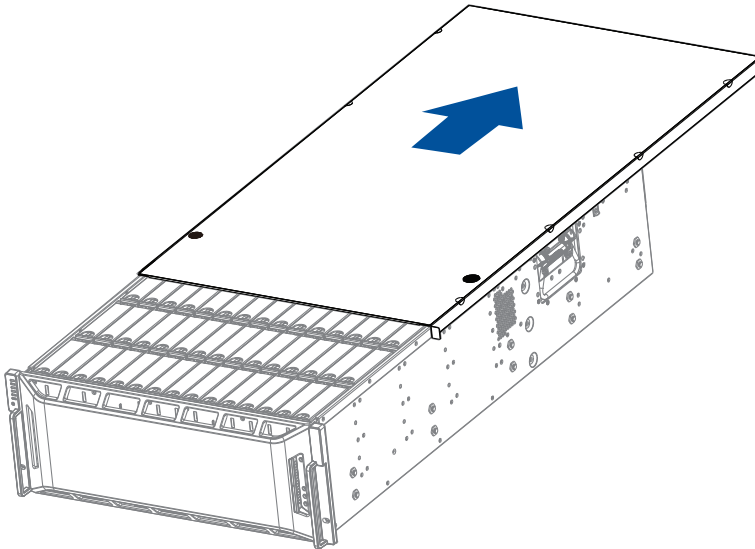
NOTE: You cannot totally remove the cover from the enclosure.

4. From inside the enclosure, loosen the thumb screws that secure the cooling module to the enclosure.
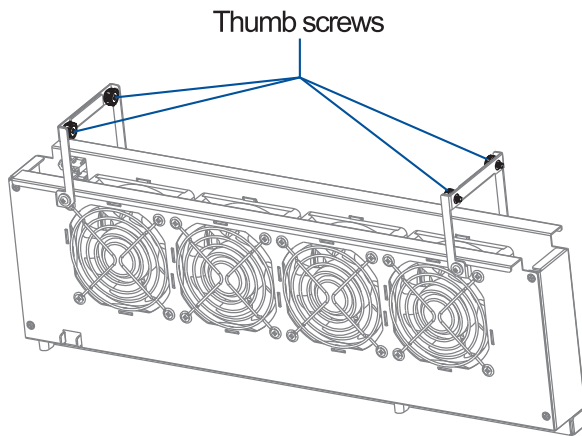
Thumb screws

5. Use the extraction handles to pull out the cooling module from the enclosure.

Extraction handle

Extraction handle
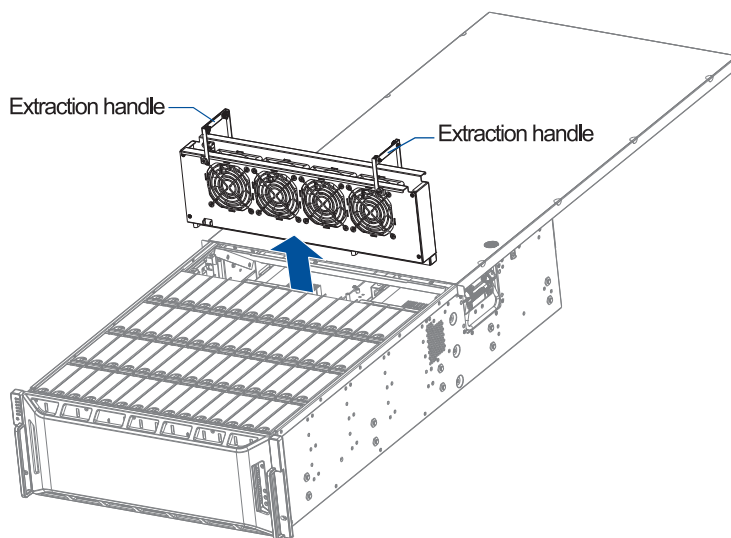
6. Insert the replacement cooling module into the enclosure.

7. Tighten the thumb screws to secure the cooling module to the enclosure.

8. Close the top cover of the enclosure.

9. Connect the power cord.

10. Turn on the system.

4.1.3 Replacing the controller module

In replacing a controller in a dual-controller system, ensure that the replacement controller's firmware matches with the controller that you want to get replaced. The replacement provided to you has the firmware version on the label of the packaging.

Use EonOne to find out the firmware version of the present controller. From EonOne GUI, go to **Storage Manager** > **Information** > **Enclosure View**.

WARNING! DO NOT use the controller modules from different models. Each module has a unique ID which is applied to the host port names. If you insist on using other models' controller modules, you may encounter SAN problems on multiple systems.

IMPORTANT! When removing/installing a controller in a single-controller system, ensure that you shut down the applications and the system.

NOTE: Refer to EonOne user manual for more details.

To replace the controller module:

1. From your system's software, go to **Main Menu** > **System Functions** > **Shutdown controller** function to stop all I/O access to the system and the cached data are distributed to the disk drives.

2. Shut down the system, switch off the power buttons, and unplug the power cords from the PSUs.

3. Disconnect all cables from the controller module that you want to be replaced.

4. Unfasten the retention screw of the controller module that you wish to replace.
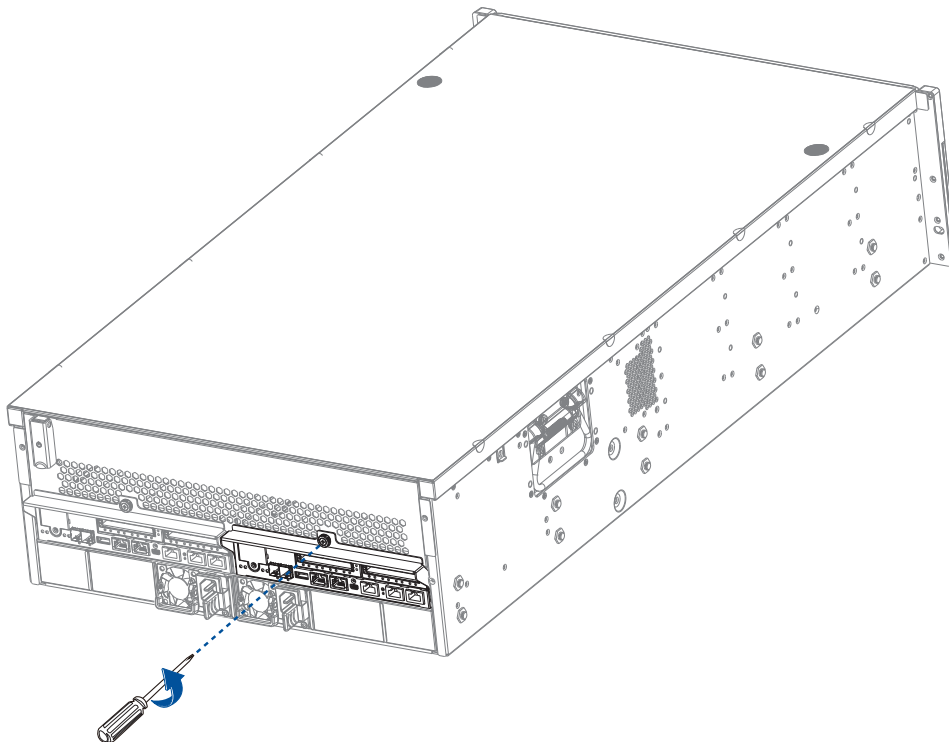
5.   Hold the rim then pull the controller out of the enclosure.

Rim
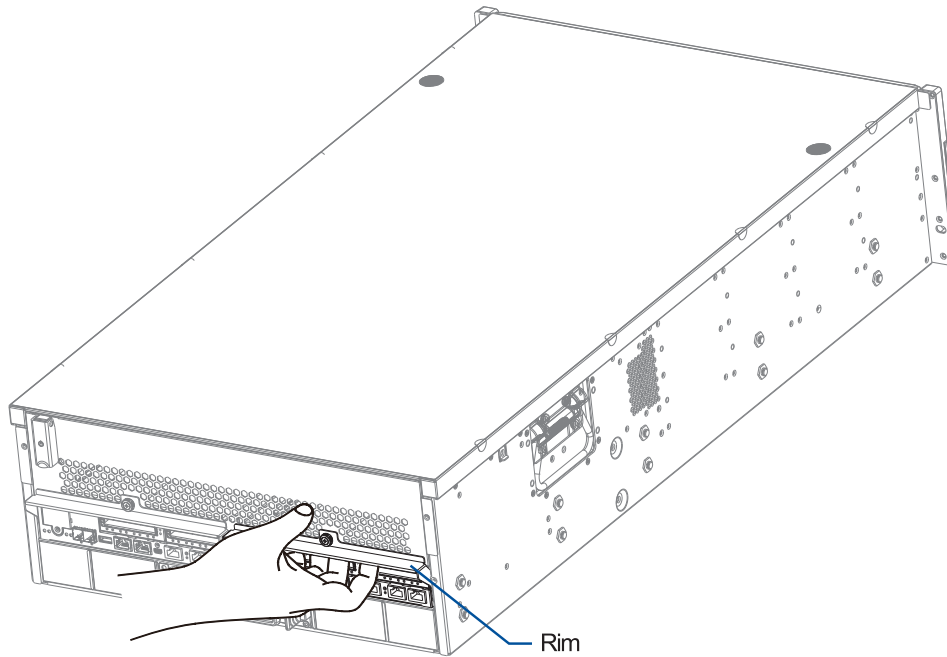
6.   Insert the replacement controller carefully into the module slot. When you feel a contact resistance, push the controller with a small but careful force, then secure the replacement controller to the enclosure with the retention screw you removed in step 4.

7.   Attach the cables.

8.   Turn on the system, then check the system message on EonOne or the firmware utility.

> **NOTE:** Once the replacement controller becomes active online, the Control status LED lights up in green. See section **Rear panel LEDs** for details.

9.   Restore the previous ID/LUN mapping settings that you set using the following options:

a.   Restore NVRAM from Disks

b.   Restore NVRAM from Files

4.1.4　Replacing the memory module

The controller comes with a pre-installed DRAM module(s). You can upgrade or replace it when the bundled module malfunctions.

IMPORTANT!

- We strongly recommend you to NOT use the removed DRAM module from a failed controller of a different storage system.

- Contact your system vendor to help you purchase the compatible DRAM modules.

NOTE:　Refer to section **ESD precautions** for safety information.

To replace the memory module:

1. Shut down your system, unplug the power cords, then remove the controller. Wait for a minute for the remaining electric current to dissipate.

NOTE:　See section **4.1.2 Replacing the controller module** for details.

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2. Look for the DIMM slots in the controller.
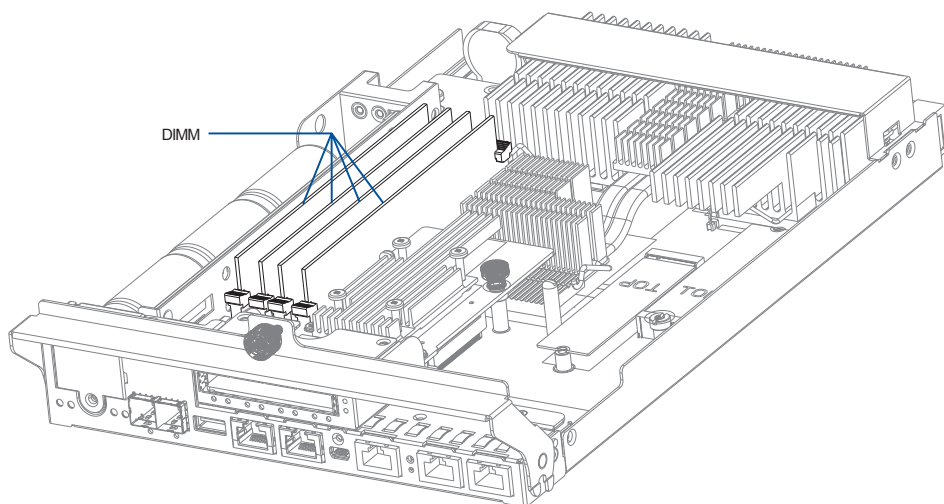
3. Push down the clips to release the DRAM module from the DIMM socket.
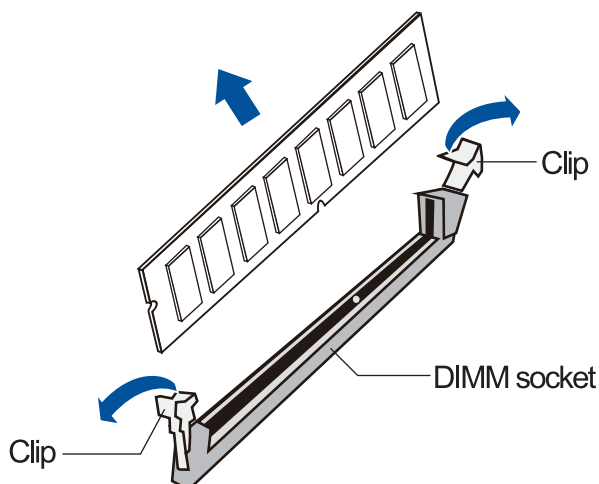
4. Insert the replacement DIMM carefully into the DIMM socket, with the DIMM's notch aligned to the DIMM socket's notch guide.
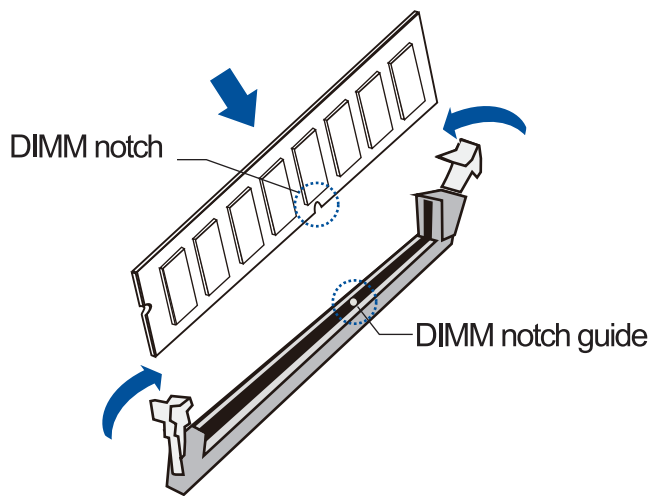
5. Insert the controller back to the enclosure.

4.1.5   Replacing the CBM (Cache Backup Module) components

The CBM is comprised of a super capacitor and the FBM (flash backup module). The super capacitor allows your controller to provide more power during a power outage, supporting the controller to save the data to the FBM.

> **WARNING!** Ensure that you have the replacement on hand before replacing your current CBM.

Super capacitor fault conditions and precautions

If a super capacitor leaks, gives off bad odor, generates abnormal amount of heat, becomes discolored or deformed, or appears abnormal when charging or storing, remove it from the system immediately. These issues may be due to the following:

*   The temperature sensor on the system's charger circuit reports a temperature that exceeds the preset threshold. The charger circuit enters to a low power and self-protection state.

*   A super capacitor module has been charged for more than 10 minutes. When this occurs, the charger enters a timer fault state. Charging resumes automatically after you remove or reinstall the super capacitor, or after you reset the system.

When reinstalling/replacing the super capacitor, remember these precautions:

*   ONLY use a replacement super capacitor supplied by an authorized distributor. Use of other capacitors voids your system's warranty.

*   ONLY dispose your used/defective super capacitor at an authorized battery disposal sites.

*   DO NOT place the super capacitor near a heat source.

*   DO NOT immerse/submerge the super capacitor in water or other liquids.

*   DO NOT disassemble or modify the super capacitor.

*   DO NOT pierce, strike, throw, or exert pressure on the super capacitor.

**Replacing the super capacitor**

To replace the super capacitor:

1. Shut down your system, unplug the power cords, then remove the controller. Wait for a minute for the remaining electric current to dissipate.

    > **NOTE:** See section **4.1.2 Replacing the controller module** for details.

2. Loosen the screw that secures the super capacitor to the controller (A), lift its side to a 45° angle (B), then pull to remove from the controller (C).
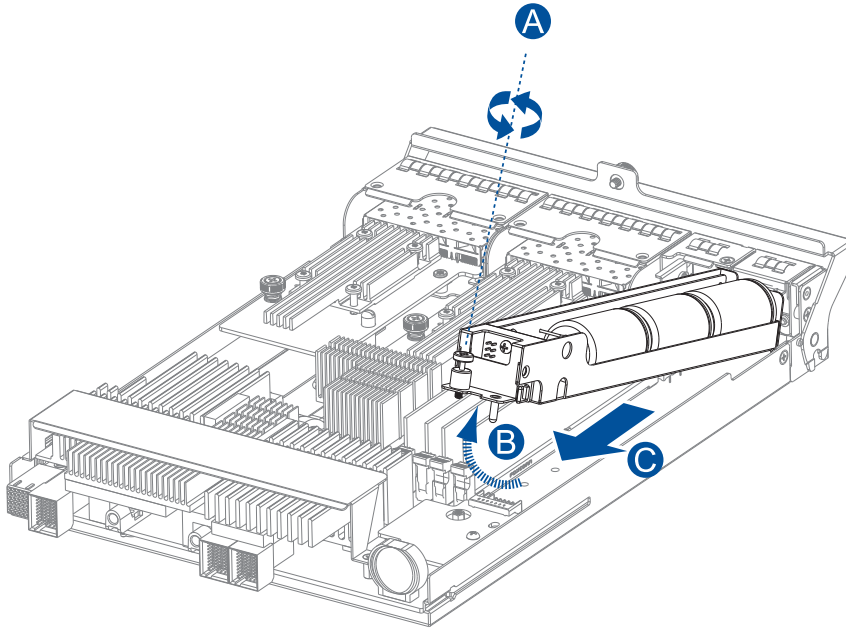
3. Install the replacement super capacitor to the controller, then tighten the screw to secure it in place.

4. Insert the controller back to the enclosure.

Replacing the FBM (Flash Backup Module)

You can install two FBMs in the controller. Both FBMs are located under host board 2.

> **NOTE:** Refer to section **4.1.5 Replacing the host board** when replacing/uninstalling a host board.

To replace the FBM:

1. Shut down your system, unplug the power cords, then remove the controller. Wait for a minute for the remaining electric current to dissipate.

> **NOTE:** See section **4.1.2 Replacing the controller module** for details.

2. Remove the second host board from the controller.
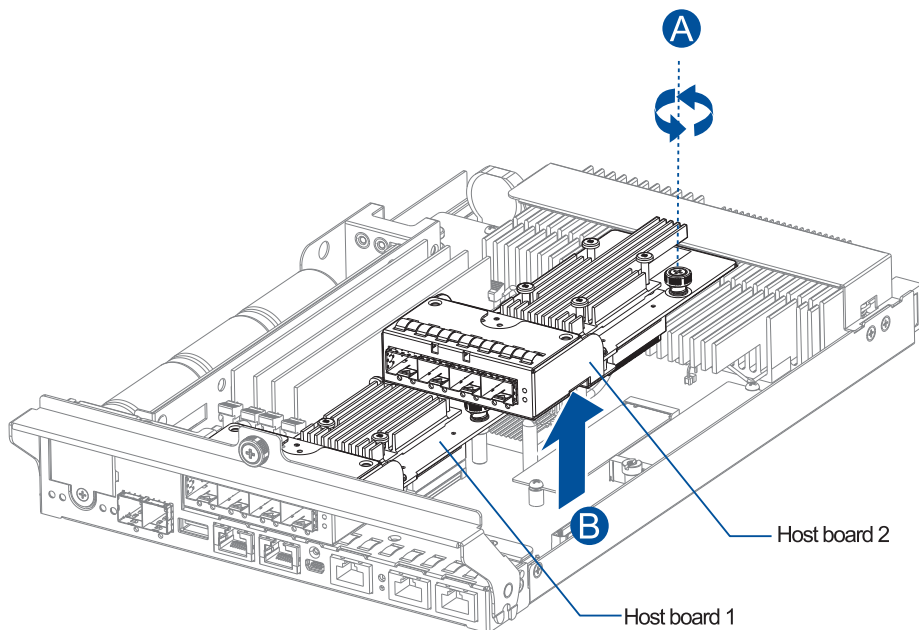
3. Remove the screw that secures the FBM to the controller (A), then remove the FBM from the module slot (B). Do the same step to the other FBM if you want it replaced.
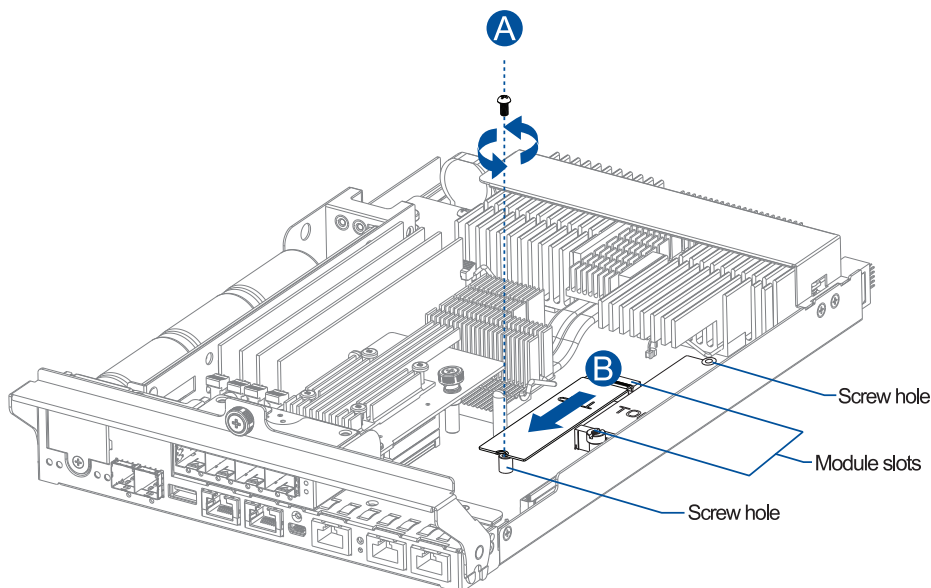
4. Orient and insert the replacement FBM's notch to the module slot's guide in a 45° angle (A), orient the screw notch on the screw hole (B), then secure the FBM to the board with a screw (C) you removed in step 3.
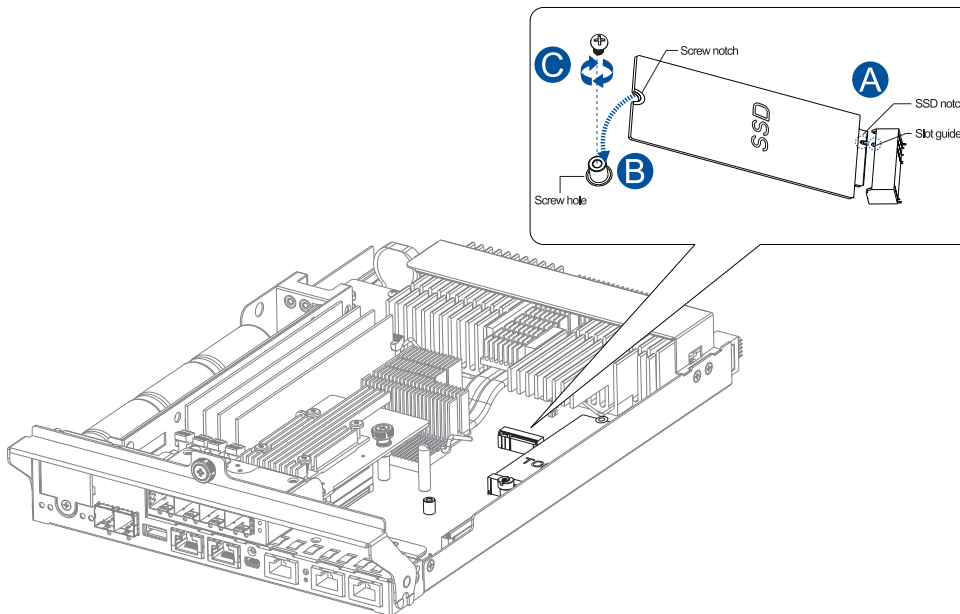
5. Install the host board back to the controller.

6. Insert the controller back to the enclosure.

4.1.5   Replacing the host board

Before replacing the host board to the controller, you must take note of the following considerations:

- A controller/host board downtime may occur if you replace a host board for an upgrade.

- The firmware automatically restores the system to its factory settings when adding or replacing a host board.

To replace the host board:

1. Shut down your system, unplug the power cords, then remove the controller. Wait for a minute for the remaining electric current to dissipate.

   NOTE: See section **4.1.2 Replacing the controller module** for details.

2. Loosen the thumb screw (A) that secures the host board to the controller, then gently lift the host board (B).
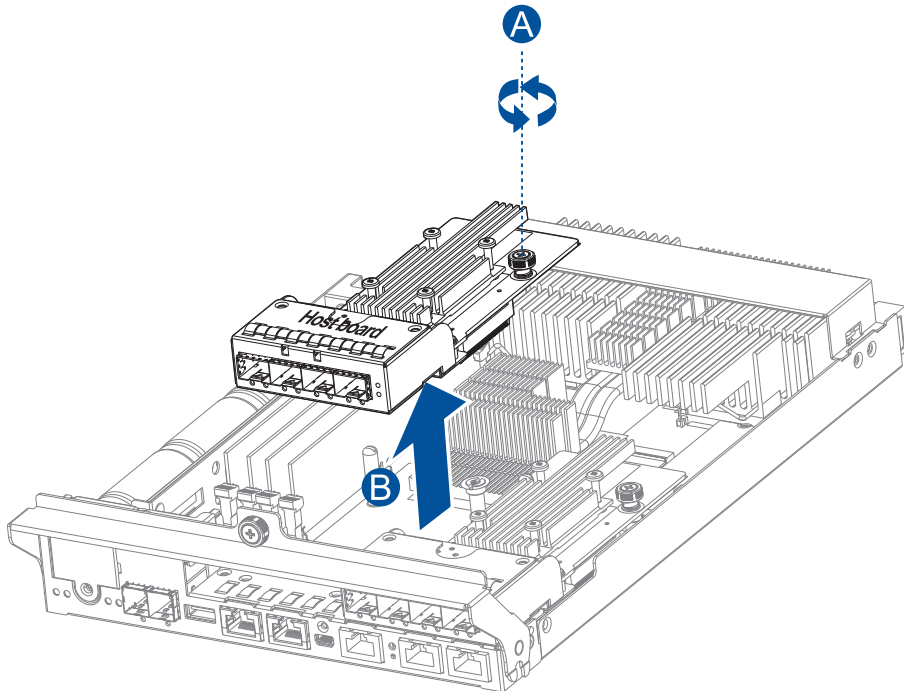
3. Orient the replacement host board to the controller's guide pin, place it carefully, then tighten the thumb screw to secure in place.

Guide pin
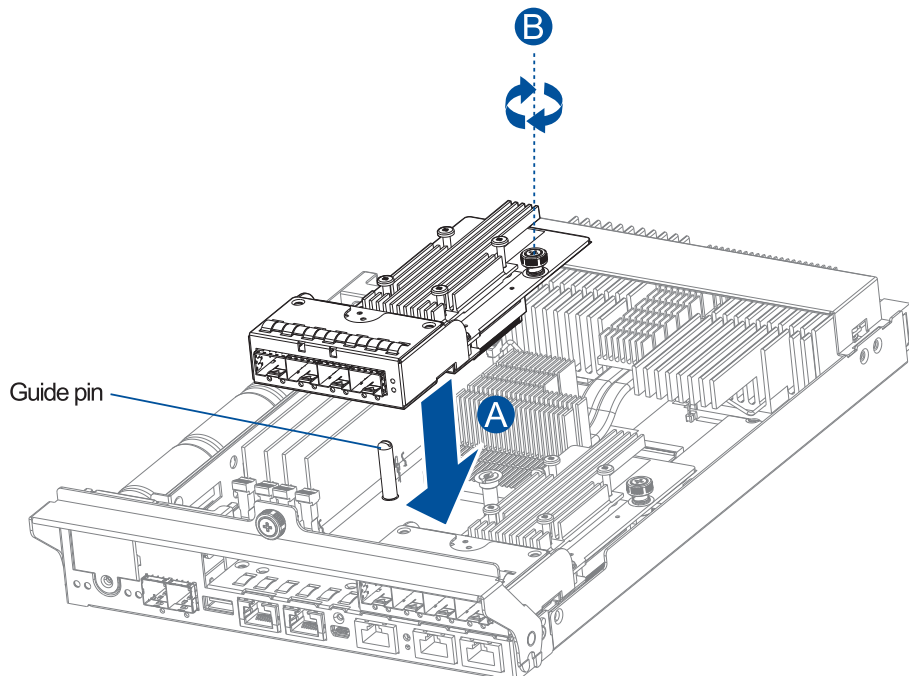
4. Insert the controller back to the enclosure.

4.1.7   Replacing the hard drive

WARNING!

• Ensure to have the replacement ready before replacing the hard drive. DO NOT leave the drive tray open for long periods to prevent disruption of internal airflow.

• Handle the hard drives with extreme care. Hold them by the edges and avoid touching the circuits and interface connectors.

To replace the hard drive:

1. Identify the faulty hard drive using the EonOne software.

NOTE: See section **Hard drive designation** for the order of the drive bays.

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2. When the faulty hard drive is located, open the top cover of the enclosure.

NOTE: See section **4.1.1 Replacing the PSU** on how to open the top cover.

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3. Look for the defective hard drive, pull up its handle plate (A), then remove the assembled drive and tray (B).
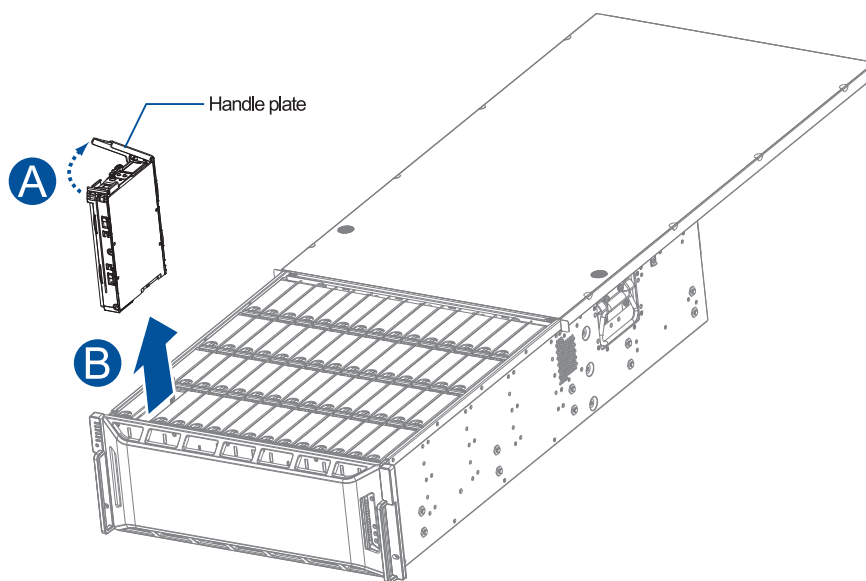
4. Take out the defective hard drive from the tray, assemble the hard drive replacement to the tray, then install the assembly back to the system.

NOTE: See section **2.2.3 Installing the hard drives** to complete the hard drive installation.

Appendices

A

Technical specification

Host board interface

Fibre/iSCSI hybrid-host storage systems	
Host interface	• 8 Gbps, 16 Gbps fibre host interface • 8 Gbps, 16 Gbps fibre + 2 onboard iSCSI
Drive interface/channel	Supports 12, 16, 24 channels of 3 Gbps, 6 Gbps, or 12 Gbps SAS, SATA-II/SATA-III, Near-line SAS series
SAS/iSCSI hybrid-host storage systems	
Host OS compatibility	Host OS independent
Host interface	3 Gbps, 6 Gbps, 12 Gbps multi-lane SAS
Host channels	Multiple SAS PHYs logically combined into 2 host channels per controller
Drive interface/channel	Supports 12, 16, 24 channels of 3 Gbps, 6 Gbps, or 12 Gbps SAS, SATA-II/SATA-III, Near-line SAS series
iSCSI-host storage systems	
Host OS compatibility	Host OS independent, iSCSI offload utilities and hardware
Host interface	RJ-45 Gigabit Ethernet/RJ-45 10 Gb Ethernet/10 Gb FCoE
Drive interface/channel	Supports 12, 16, 24 channels of 3 Gbps, 6 Gbps, or 12 Gbps SAS, SATA-II/SATA-III, Near-line SAS series
Expansion enclosure models	
SAS interface	8 SMP PHYs interfaced to 2 or 3 12 Gbps SAS ports
Drive interface/channel	Supports up to 12, 16, 24, 60 channels of 3 Gbps, 6 Gbps, or 12 Gbps SAS, SATA-II/SATA-III, Near-line series

NOTE: The host board interface and specifications are subject to change without prior notice. For the latest specification and information, visit the official EonStor GS website at https://www.infortrend.com/global/products/GS.

Certifications

Summary

Safety	UL 60950-1 second edition BSMI CNS 14336-1: 99 年版 CB IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013 EAC TP TC 004/2011, TP TC 020/2011
EMC	CE EN 55032:2012 +AC:2013 / EN61000-3-2:2014 EN 61000-3-3: 2013 / EN 55024:2010+A1:2015 BSMI (CNS 13438) FCC (FCC Part 15, subpart B)
Environment	IEC 60068-2 MIL-STD-810E/883E ISTA ASTM-D3332 IPC-TM-650
Others	ISO7779/3744 RoHS Microsoft WHQL-Windows Server 2003

User warning

This is Class A Information Technology product which may cause radio frequency interference when used in a residential area, in which case the user will be required to take certain appropriate measures/ troubleshooting.

警告使用者

這是甲類資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當對策

사 용 자 안 내 문

이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

Declaration of the presence condition of the restricted substance marking

A-3

設備名稱：儲存器 **Equipment name**	型號（型式）: GS 3060L **Type designation (Type) GS 3060L**				
	限用物質及其化學符號 **Restricted substances and its chemical symbols**				
單元 **Unit**	鉛 Lead (Pb)	汞 Mercury (Hg)	鎘 Cadmium (Cd)	六價鉻 Hexavalent chromium (Cr+6)	多溴聯苯 brominated biphenyls (PBB)	多溴二苯醚 brominated diphenyl ethers (PBDE)
外殼 Case	○	○	○	○	○	○
電路板 PCB assembly		○	○	○	○	○
電源供應器 Power supply		○	○	○	○	○
硬碟 Hard disk		○	○	○	○	○
電源線 Power cable	○	○	○	○	○	○
風扇 Fan	○	○	○	○	○	○

備考1.〝超出0.1 wt %〞及〝超出0.01 wt %〞係指限用物質之百分比含量超出百分比含量基準值。

Note 1: "Exceeding 0.1 wt %" and "exceeding 0.01 wt %" indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition.

備考2.〝○〞係指該項限用物質之百分比含量未超出百分比含量基準值。

Note 2: "○" indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence.

備考3.〝－〞係指該項限用物質為排除項目。

Note 3: The "–" indicates that the restricted substance corresponds to the exemption.

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