User Manual

XCubeSAN Hardware Manual

For XS7200 / XS5200

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This edition applies to QSAN XCubeSAN XS7200 / XS5200. Note that this document was produced based on beta code and some screens may change when it becomes generally available.

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This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products.

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Regulatory Statements

FCC Statement

This device has been shown to be in compliance with and was tested in accordance with the measurement procedures specified in the Standards and Specifications listed below.

Technical Standard: FCC Part 15 Class A (Verification)

IC ICES-003

CE Statement

This device has been shown to be in compliance with and was tested in accordance with the measurement procedures specified in the Standards and Specifications listed below.

Technical Standard: EMC DIRECTIVE 2004/108/EC

(EN55022 / EN55024)

UL Statement

Rack Mount Instructions - The following or similar rack-mount instructions are included with the installation instructions:

1. Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.
2. Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
3. Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
4. Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
5. Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

CAUTION:

The main purpose of the handles is for rack mount use only. Do not use the handles to carry or transport the systems.

The ITE is not intended to be installed and used in a home, school or public area accessible to the general population, and the thumbscrews should be tightened with a tool after both initial installation and subsequent access to the panel.

Warning: Remove all power supply cords before service

This equipment intended for installation in restricted access location.

- Access can only be gained by SERVICE PERSONS or by USERS who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken.
- Access is through the use of a TOOL or lock and key, or other means of security, and is controlled by the authority responsible for the location.

CAUTION: (English)

Risk of explosion if battery is replaced by incorrect type. Please replace the same or equivalent type battery use and dispose of used batteries according to the instructions.

ATTENTION: (French)

IL Y A RISQUE D'EXPLOSION SI LA BATTERIE EST REMPLACEE PAR UNE BATTERIE DE TYPE INCORRECT. METTRE AU REBUT LES BATTERIES USAGEES CONFORMEMENT AUX INSTRUCTIONS.

VORSICHT: (German)

Explosionsgefahr bei unsachgemasem Austausch der Batterie. Entsorgung gebrauchter Batterien nach Anleitung.

ADVERTENCIA: (Spanish)

Las baterias pueden explotar si no se manipulan de forma apropiada. No desmonte ni tire las baterias al fuego. Siga las normativas locales al desechar las baterias agotadas.

警告: (Simplified Chinese)

本电池如果更换不正确会有爆炸的危险，请依制造商说明处理用过之电池。

警告: (Traditional Chinese)

本電池如果更換不正確會有爆炸的危險，請依製造商說明處理用過之電池。

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Preface

About This Manual

This manual is the introduction of QSAN storage system and it aims to help users know the hardware installation of the disk array system easily. Information contained in this manual has been reviewed for accuracy, but not for product warranty. Information and specification will be changed without further notice. For any update information, please visit www.qsan.com and your contact windows.

CAUTION:

Do not attempt to service, change, disassemble or upgrade the equipment's components by yourself. Doing so may violate your warranty and expose you to electric shock. Refer all servicing to authorized service personnel. Please always follow the instructions in this user's manual.

Technical Support

Thank you for using QSAN Technology, Inc. products; if you have any questions, please contact QSAN Support. We will reply to you as soon as possible.

- Website: http://www.qsan.com/en/contact_support.php
- Email: support@qsan.com (09:00 GMT+8 ~ 18:00 GMT+8, 09:00 GMT ~ 18:00 GMT)
- Skype ID: qsan.support (09:00 GMT+8 ~ 18:00 GMT+8, 09:00 GMT ~ 18:00 GMT)

Notes and Cautions

This manual uses the following symbols to draw attention to important safety and operational information.

NOTE:

NOTE provides helpful information, guidelines, or suggestions for performing tasks more effectively.

CAUTION:

CAUTION indicates that failure to take a specified action could result in damage to the software or hardware.

Conventions

The following table describes the typographic conventions used in this manual.

Conventions	Description
Bold	Indicates text on a window, other than the window title, including menus, menu options, buttons, fields, and labels. Example: Click **OK** button.
<*Italic*>	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: copy <*source-file*> <*target-file*>.
[ ] square brackets	Indicates optional values. Example: [a | b] indicates that you can choose a, b, or nothing.
{ } braces	Indicates required or expected values. Example: { a | b } indicates that you must choose either a or b.
| vertical bar	Indicates that you have a choice between two or more options or arguments.
/ Slash	Indicates all options or arguments.
underline	Indicates the default value. Example: [a | b]

1. Overview

Thank you for purchasing QSAN Technology, Inc. products. QSAN XCubeSAN Storage is a high-performance storage solutions combining outstanding performance with high reliability, availability, flexibility, and manageability.

1.1. XCubeSAN Series Overview

Built for Work, Designed to Impress

XCubeSAN series, the most advanced modern technology meets the most outstanding QSAN storage yet. XCubeSAN series is a whole new era of power, performance, and capacity SAN system. XCubeSAN series gives all the business customers the performance and reliable storage you need, now with the newest generation Intel Xeon processor. XCubeSAN series base system equips with onboard four 10G BASE-T ports, it meets the requirement of 10GbE SAN system. XCubeSAN series also has four slots to expand host connectivity. Three types of host card are available for selection: 16Gb FC, 10GbE, and 1GbE host cards. XCubeSAN series is fully modular design, the modular components including controllers, power supply units, and fans. These components are fully redundant to guarantee zero downtime for service.

High Availability

- Dual-controller active-active system design
- Hot pluggable and redundant components: RAID controller, cooling fan module, power supply module
- Non-disruptive firmware upgrade

Large Capacity Expansion

XCubeSAN provides excellent storage expansion capability among the SMB High-End SAN storage system in market. XCubeSAN provides onboard 4x min SAS HD ports (SFF-8644) for capacity expansion use. It supports up to 446 drives through XD5300 (QSAN 12Gb SAS3 XCubeDAS series), hybrid storage with SSD, SAS and NL-SAS HDDs.

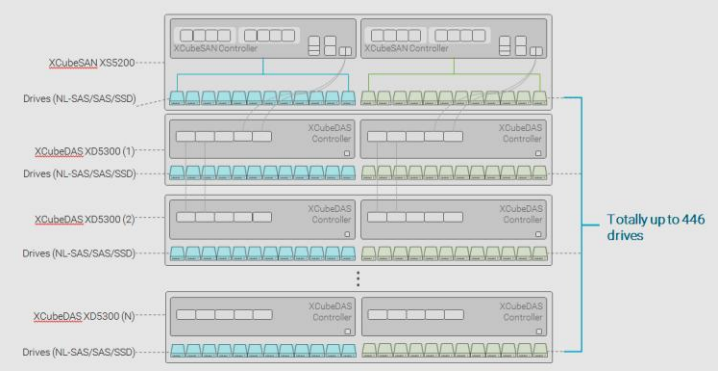


Figure 1-1 XCubeSAN Series Supports up to 446 Drives

1.2. XCubeSAN All Series Models

XCubeSAN series supports various form factors:

- Large form factor (LFF): 12-disk 2U chassis, 16-disk 3U chassis, and 24-disk 4U chassis.
- Small form factor (SFF): 26-disk 2U chassis.

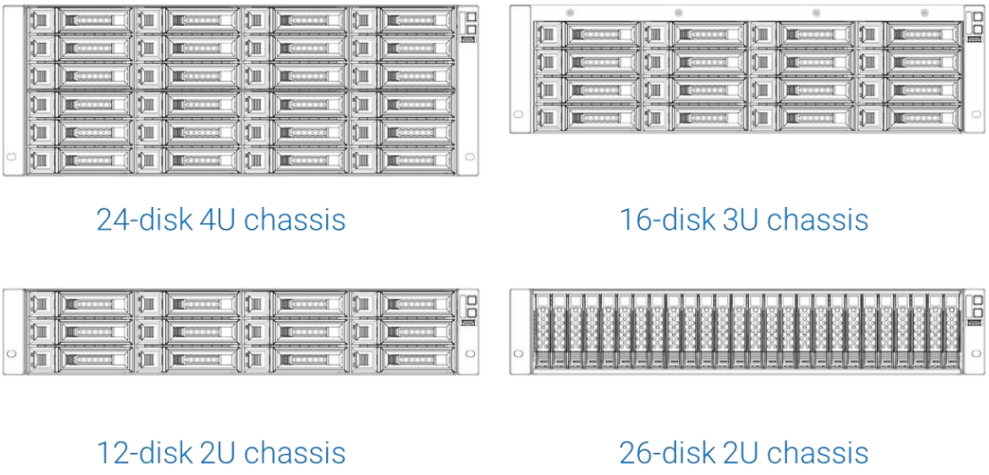


Figure 1-2 XCubeSAN All Series Models

Table 1-1 XS7200 All Series Models

Model	Controller Type	Form Factor & Bay Count
XS7224-D	Dual Controller	LFF 24-disk 4U Chassis
XS7224-S	Single Controller	LFF 24-disk 4U Chassis
XS7216-D	Dual Controller	LFF 16-disk 3U Chassis
XS7216-S	Single Controller	LFF 16-disk 3U Chassis
XS7212-D	Dual Controller	LFF 12-disk 2U Chassis
XS7212-S	Single Controller	LFF 12-disk 2U Chassis
XS7226-D	Dual Controller	SFF 26-disk 2U Chassis
XS7226-S	Single Controller	SFF 26-disk 2U Chassis

Table 1-2 XS5200 All Series Models

Model	Controller Type	Form Factor & Bay Count
XS5224-D	Dual Controller	LFF 24-disk 4U Chassis
XS5224-S	Single Controller	LFF 24-disk 4U Chassis
XS5216-D	Dual Controller	LFF 16-disk 3U Chassis
XS5216-S	Single Controller	LFF 16-disk 3U Chassis
XS5212-D	Dual Controller	LFF 12-disk 2U Chassis
XS5212-S	Single Controller	LFF 12-disk 2U Chassis
XS5226-D	Dual Controller	SFF 26-disk 2U Chassis
XS5226-S	Single Controller	SFF 26-disk 2U Chassis

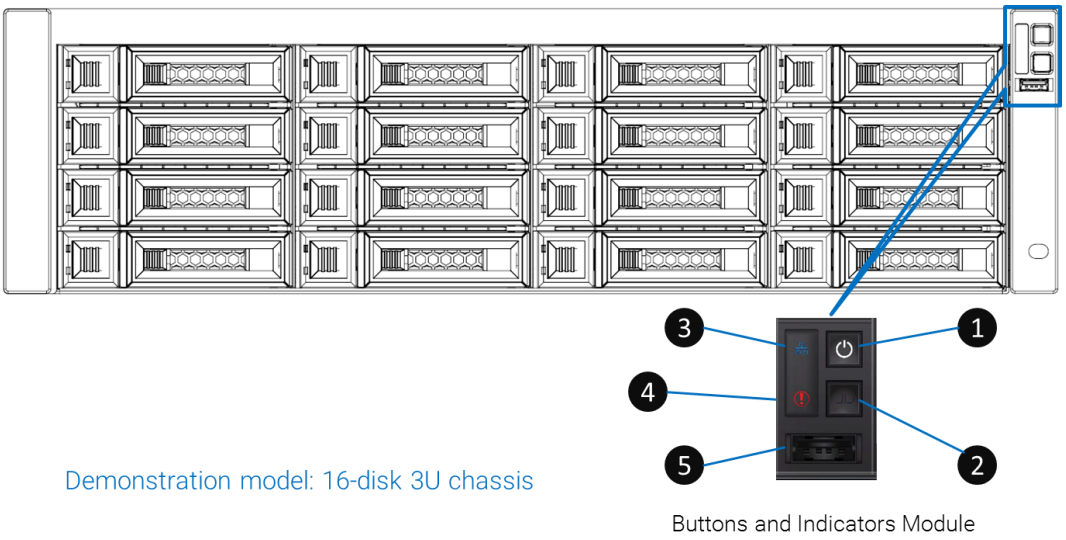
2. Product Components

2.1. Front Panel Components

XCubeSAN series features a unique design: buttons and indicators module (BIM) on the right ear.

Buttons and indicators module integrates functional buttons and indicators, which can be easy to operate and read by users.

The figure below is the detail information about buttons and indicators module.



Demonstration model: 16-disk 3U chassis

Figure 2-1 Buttons and Indicators Module (BIM)

Table 2-1 Description of Buttons and Indicators Module

Number	Description
1	System Power Button/LED
2	Unit Identification (UID) Button/LED
3	System Access LED
4	System Status LED
5	USB Port

2.2. System Front Panel Components

Figures and the table below demonstrate LFF & SFF system front panel components.

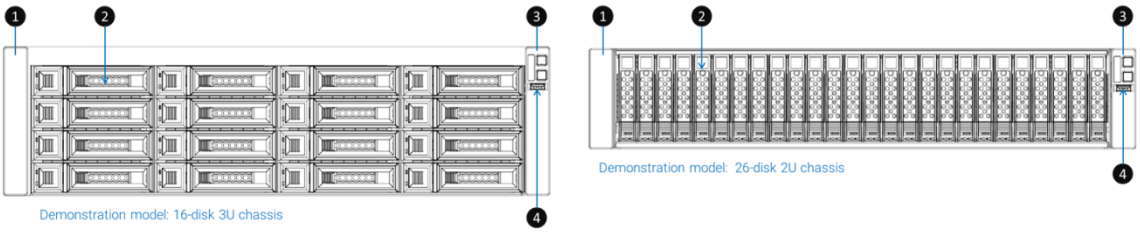


Figure 2-2 LFF & SFF System Front Panel Components

Table 2-2 Description of LFF & SFF System Front Panel Components

Number	Description
1	System Left Ear
2	Disk Drive Tray
3	System Right Ear
4	Buttons and Indicators Module (BIM)

2.3. System Disk Drive Numbering

Figures below demonstrate system disk drive numbering of XS5200 series. Disk drive numbering for LFF system is from the top of first row in the left column; this numbering rule can balance the disk drive weight distribution and easy for users to do disk drive zoning management. SFF system disk drive numbering is single row and from left to right.

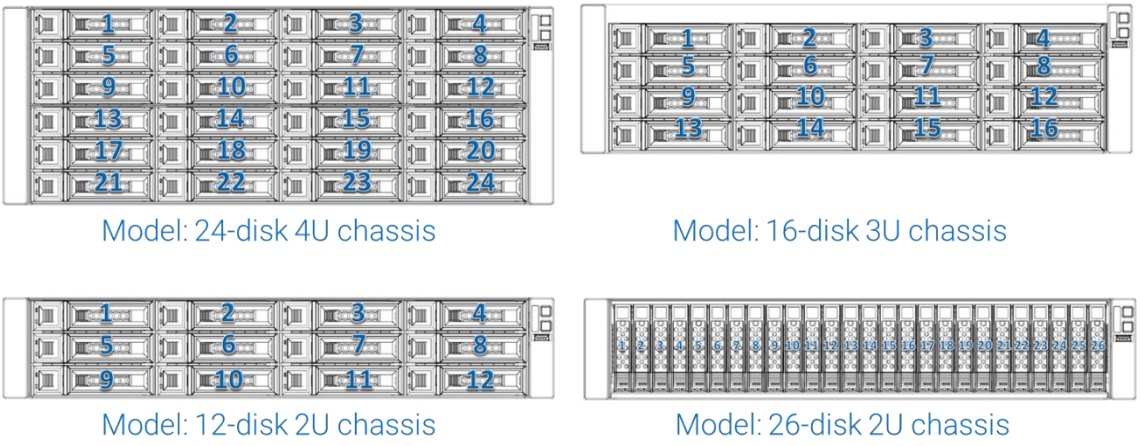


Figure 2-3 System Disk Drive Numbering of XCubeSAN Series

2.4. Supported Disk Drives for XCubeSAN Series

The table below shows supported disk drives for XCubeSAN series, which can be a reference for users to purchase suitable disk drives for the system.

Table 2-3 Supported Disk Drives for XCubeSAN Series

Form Factor	Drive Type	Connection Interface
LFF 3.5”	HDD	SAS, NL-SAS
SFF 2.5”	HDD	SAS, NL-SAS
SFF 2.5”	SSD	SAS, SATA*Note

NOTE:

Due to standard supported disk drive interface of XCubeSAN series is SAS; users must purchase and install a bridge board for SATA interface SSD before installing into the system.

2.5. Rear Components and Layout

Rear side of XCubeSAN series accommodates two controller modules, power supply units, and fans in the individual slot. Figures and contents below will introduce rear side components of XCubeSAN series and its layout.

2.5.1. XCubeSAN Series Controller Module

The figure and table below provide descriptions of each component of the XCubeSAN series controller module. XCubeSAN series supports controller hot swappable replacement.

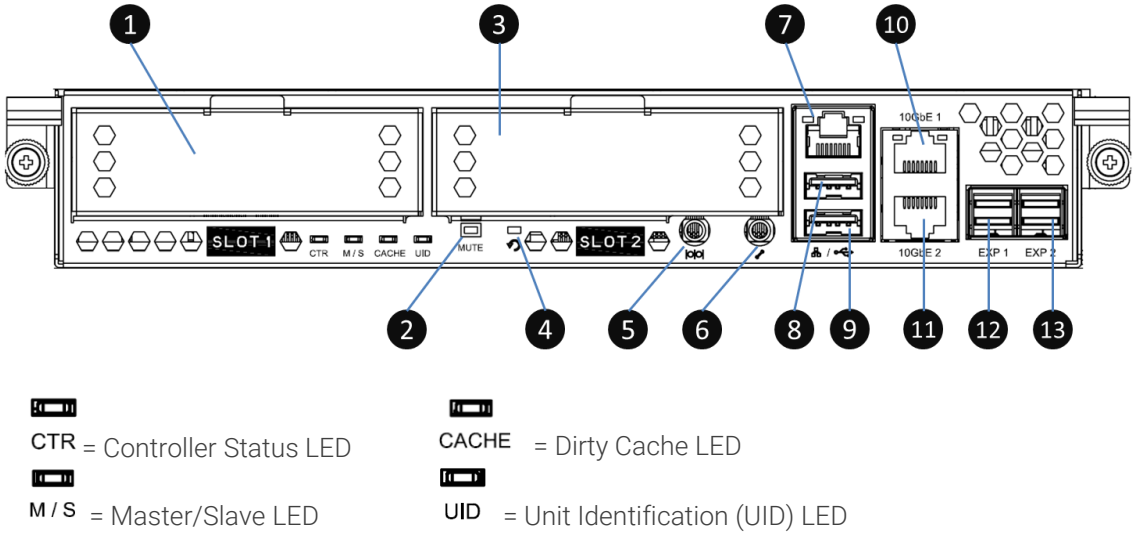


Figure 2-4 XCubeSAN Series Controller Module

Table 2-4 Description of XCubeSAN Series Controller Module Components

Number	Description
1	Host Card Slot #1 (host card is optional part)
2	Buzzer Mute Button
3	Host Card Slot #2 (host card is optional part)

4	Reset to Factory Default Button
5	Console Port (3.5mm jack to RS232) *NOTE #1
6	Service Port (UPS) *NOTE #2
7	Management Port
8	USB Port #1
9	USB Port #2
10	10GbE iSCSI (RJ45) Port #1
11	10GbE iSCSI (RJ45) Port #2
12	12Gb/s Mini SAS HD Port #1
13	12Gb/s Mini SAS HD Port #2

NOTE:

1. Console cable (NULL modem cable) to connect from console port of the storage system to RS 232 port of the management PC. The console settings are on the following: Baud rate: 115200, 8 data bit, no parity, 1 stop bit, and no flow control; terminal Type: vt100.
2. XCubeSAN supports the traditional UPS via serial port and network UPS via SNMP. If using the UPS with serial port, connect the system to UPS via the included cable for communication. (The cable plugs into the serial cable that comes with the UPS.) Then set up the shutdown values for when the power goes out.

2.5.2. XCubeSAN Series Power Supply Unit (PSU)

XCubeSAN series equips two redundant and hot swappable PSUs. The PSU for 3U/4U system and 2U system is the same but the installation direction is different. The figures and tables below descript the location and major components of PSU in different form factor systems.

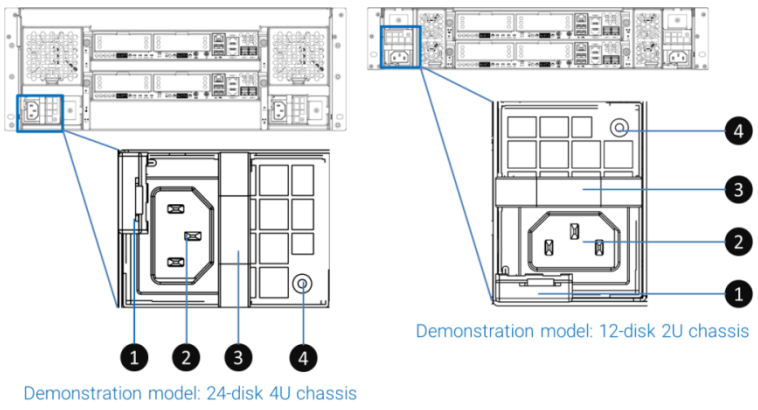


Figure 2-5 Power Supply Unit for XCubeSAN Series

Table 2-5 Description of XCubeSAN Series Power Supply Unit

Number	Description
1	PSU Release Tab
2	PSU Power Cord Connect
3	PSU Handle
4	PSU LED Indicator

2.5.3. XCubeSAN Series Fan

XCubeSAN series equips two redundant and hot swappable fans. The fan for 4U/3U system chassis or 2U system chassis is different. Figures and tables below descript the location and major components of the fan that installed in the different system chassis.

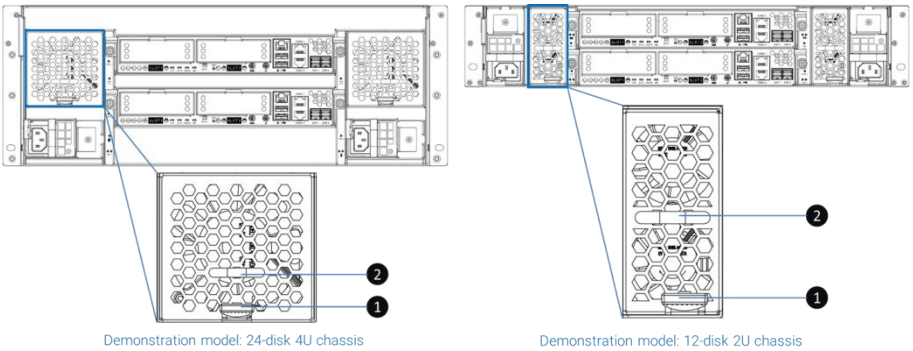


Figure 2-6 Fan for XCubeSAN Series

Table 2-6 Description of XCubeSAN Series Fan Components

Number	Description
1	Fan Release Tab
2	Fan Handle

2.5.4. XCubeSAN Series Rear Layout and Components

Figures and the table below describe the layout and components of XCubeSAN series rear side.

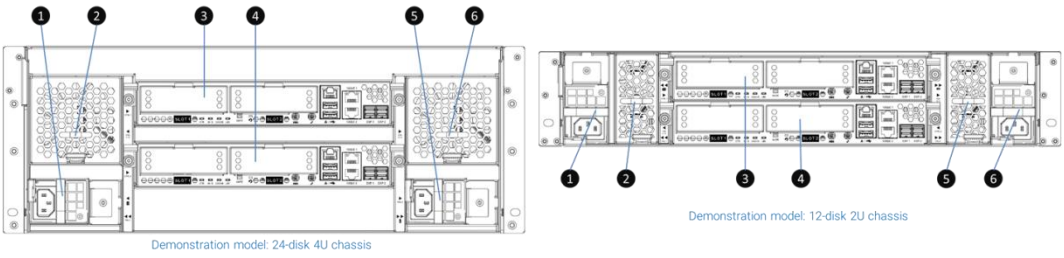


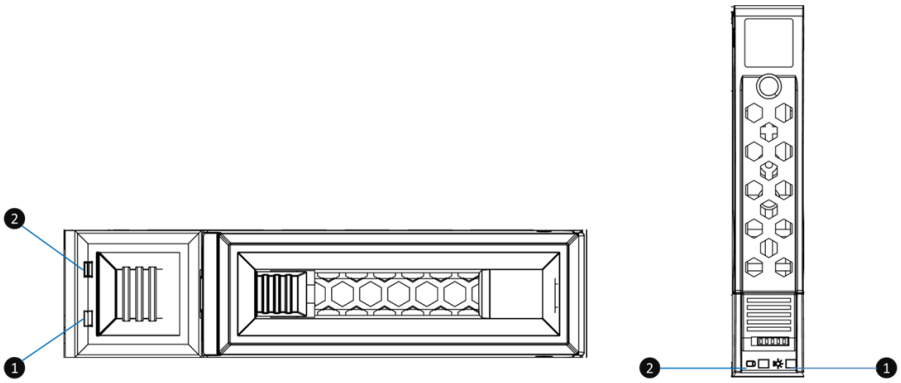
Figure 2-7 XCubeSAN Series System Rear Layout and Components

Table 2-7 Description of XCubeSAN Series Rear Components

Number	Description
1	Power Supply Unit (PSU) #1
2	Fan #1
3	Controller Module #1
4	Controller Module #2
5	Fan #2
6	Power Supply Unit (PSU) #2

2.5.5. XCubeSAN Series Disk Drive Tray Indicators

Figures and the table below provide descriptions of LFF and SFF disk drive tray indicators.



LFF Disk Drive Tray SFF Disk Drive Tray

Figure 2-8 Disk Drive Indicators of XCubeSAN Series

Table 2-8 Description of Disk Drive Indicators

Number	Description
1	Disk Drive Power LED
2	Disk Drive Status LED

3. Installing the System

3.1. Installation Checklist

This chapter will show you the procedures of installing and initializing the system. To ensure a successful installation, perform the tasks that are listed in the table below.

Table 3-1 Installation Checklist

Step	Task	Where to find the detail procedure
1	Installing the rail kit.	Installing the Rail Kit
2	Removing empty disk drive trays from the chassis.	Removing a Disk Drive Tray
3	Installing a disk drive into the disk drive tray.	Installing a Disk Drive into the Disk Drive tray
4	Installing a disk drive with the tray into the system.	Installing a Disk Drive with the Tray into the System
5	Connecting the system to the host.	Connecting the System to the Host
6	Connecting power cords and power on the system.	Connecting Power Cords and Power on the System
7	Testing the system connections	Testing the System Connections

NOTE:

Rail kit is the optional part of all XCubeSAN series, if you do not purchase QSAN qualified rail kit, you can skip the first step of the system installation task. If customers need QSAN qualified full extension thin slide with tool-less bracket: AA612 series, please contact QSAN authorized reseller.

3.2. Installing the Rail Kit

The QSAN qualified rail kit is an innovated tool-less, slide type, and easy-to-install rail kit. This slide type rail kit can fit all XCubeSAN series models.

CAUTION:

The whole system is very heavy. To prevent any potential unexpected accident might occur to damage the system or threaten the installer's safety; we strongly recommend at least two certified operators or engineers to perform the system installation.

- First Step of the Rail Kit Installation
  - Take the rail kit from the carton. (the rail kit is on the EPE of the system)
  - Pull the inner member out and slide the intermediate member back.

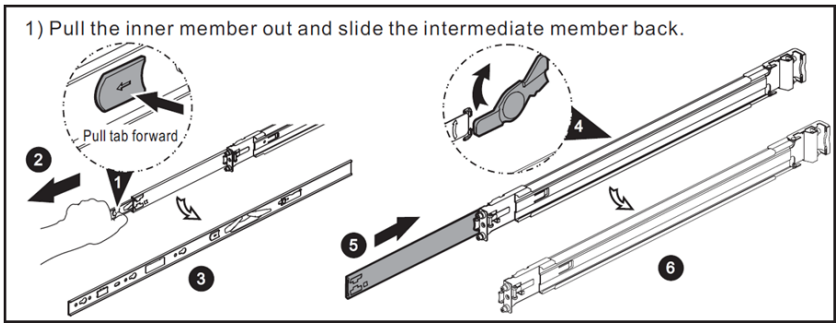


Figure 3-1 First Step of the Rail Kit Installation

- Second Step of the Rail Kit Installation
  - Install the inner member onto the chassis.

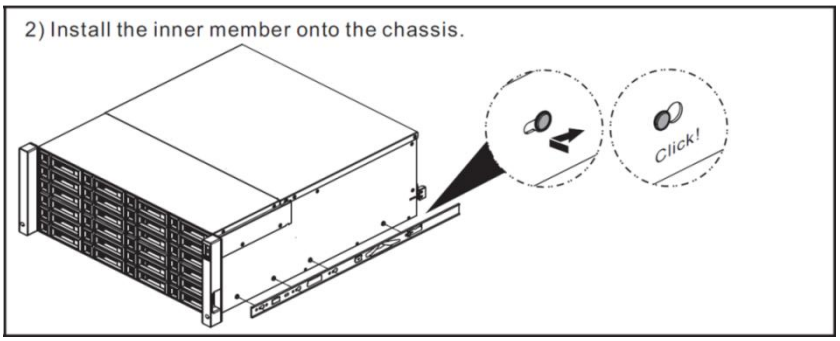


Figure 3-2 Second Step of the Rail Kit Installation

- Third Step of the Rail Kit Installation
  - Install the outer member/bracket assembly to the frame.
  - Repeat this installation step for the other side.

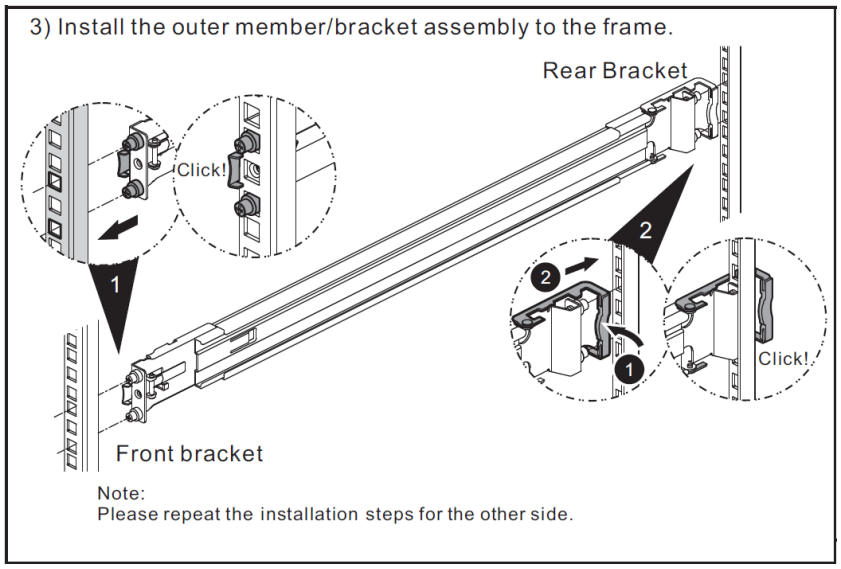


Figure 3-3 Second Step of the Rail Kit Installation

- Fourth Step of the Rail Kit Installation
  - Pull the middle member fully extended in locked position.
  - Ensure ball bearing retainer is located at the front of the middle member.
  - Insert chassis into middle-outer member.
  - When hitting the stop, pull/push release tab to unlock and retract chassis into rack.
  - Use M5*20 screws to fasten the chassis ear.

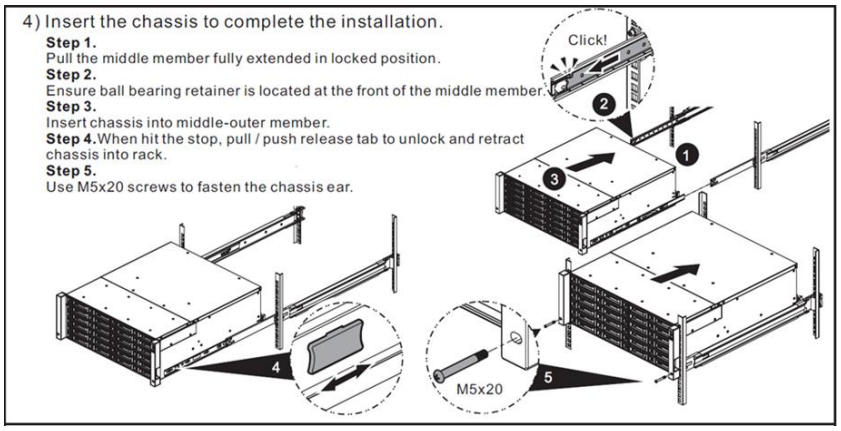
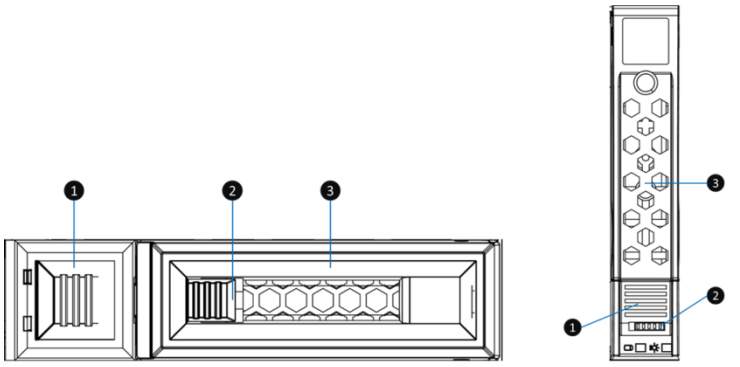


Figure 3-4 Fourth Step of the Rail Kit Installation

3.3. Removing a Disk Drive Tray

Figures and the table that immediately follow provide descriptions of each component on the front side of the LFF and SFF disk drive tray.



LFF Disk Drive Tray SFF Disk Drive Tray

Figure 3-5 Front Side Components of LFF Disk Drive Tray

Table 3-2 Components on the Front Side of LFF & SFF Disk Drive Tray

Item Number	Description
1	Carrier Handle Release Button
2	Release Button Lock *Note*
3	Carrier Handle

NOTE:

If the release button lock is at OPEN status, the indicator will show RED color to remind user that the carrier handle might have a chance to accidentally pop out and result in disk drive sliding out from the system chassis. Please make sure the release button lock is always at CLOSE status.

Following contents and figures are detail steps of removing disk drive tray from the system.

- Unlock release button lock: push the lock from left to right. (LFF and SFF trays)
- Push the carrier handle release button (from right to left for LFF tray; from top to bottom for SFF tray), then the carrier handle will automatically pop out to its maximum angle.

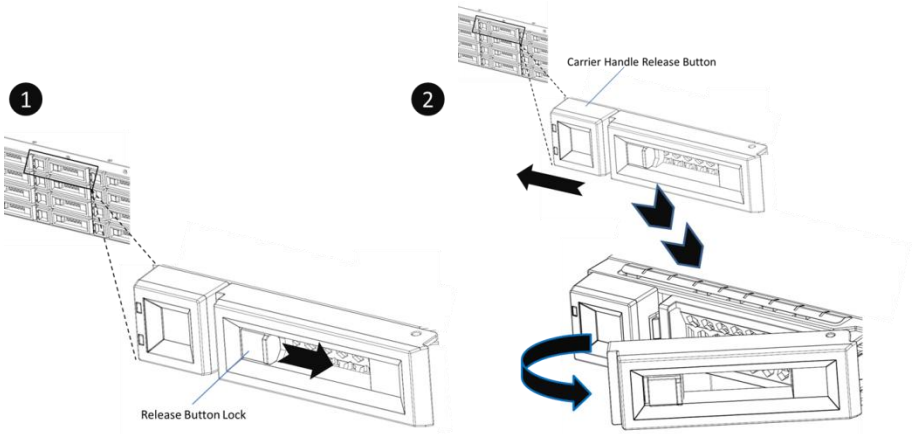


Figure 3-6 Unlock and Open the Carrier Handle of a Disk Drive Tray (LFF)

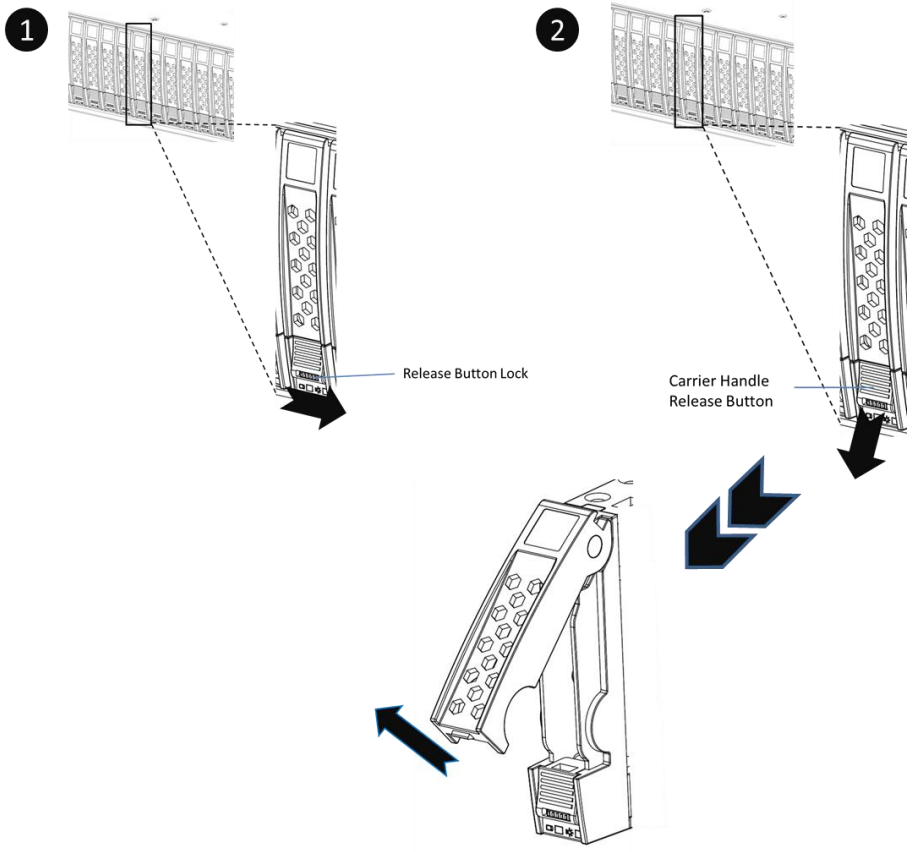


Figure 3-7 Unlock and Open the Carrier Handle of a Disk Drive Tray (SFF)

- Hold the carrier handle and pull the disk drive tray out until it is free of the disk drive bay.
- Repeat steps above for another empty disk drive trays that you would like to remove.

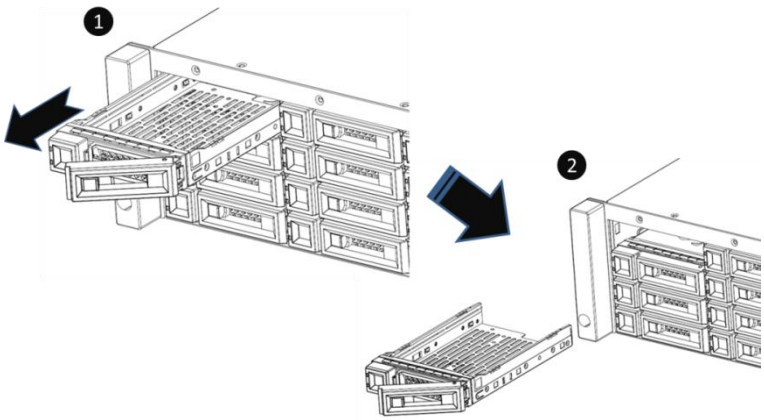


Figure 3-8 Hold the Carrier Handle and Pull out the Disk Drive Tray (LFF)

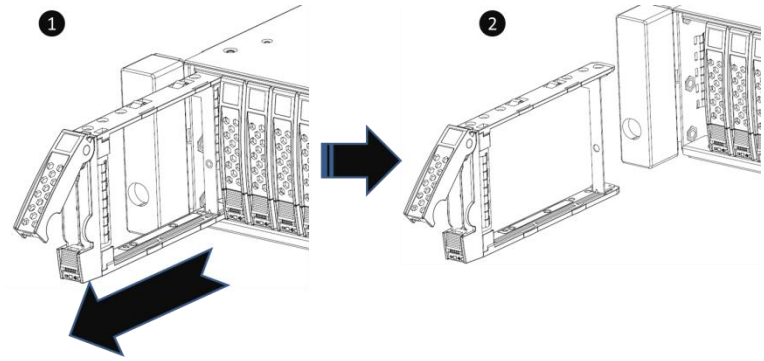


Figure 3-9 Hold the Carrier Handle and Pull out the Disk Drive Tray (SFF)

3.4. Installing a Disk Drive into the Disk Drive Tray

Following contents and figures are detail steps of installing a disk drive into the disk drive tray.

- For LFF disk drive, flip the disk drive to the back side and place on a desktop or other stable place.

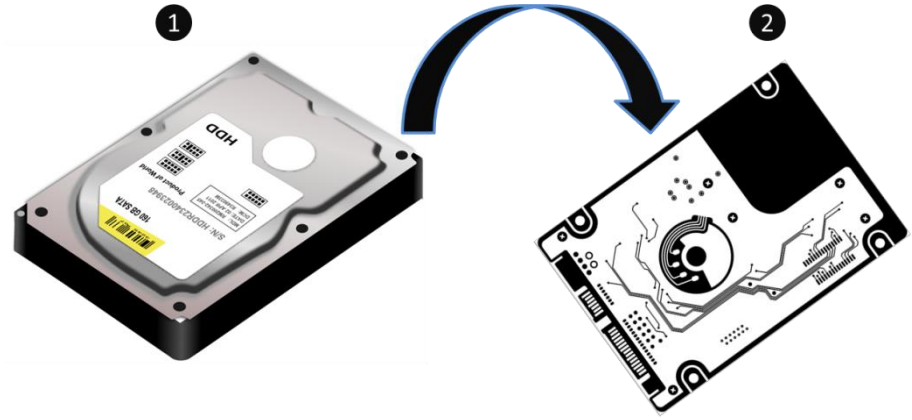


Figure 3-10 Flip the Disk Drive (LFF)

- For LFF disk drive, flip the empty disk drive tray (carrier handle direction is opposite to the disk drive connector) and align 4 disk drive tray screw holes with the disk drive. For SFF disk drive, align the disk drive with the tray (carrier handle direction is opposite with the disk drive connector) and align 4 disk drive tray screw holes with the disk drive.
- Install and tighten four screws to secure disk drive well within the tray.

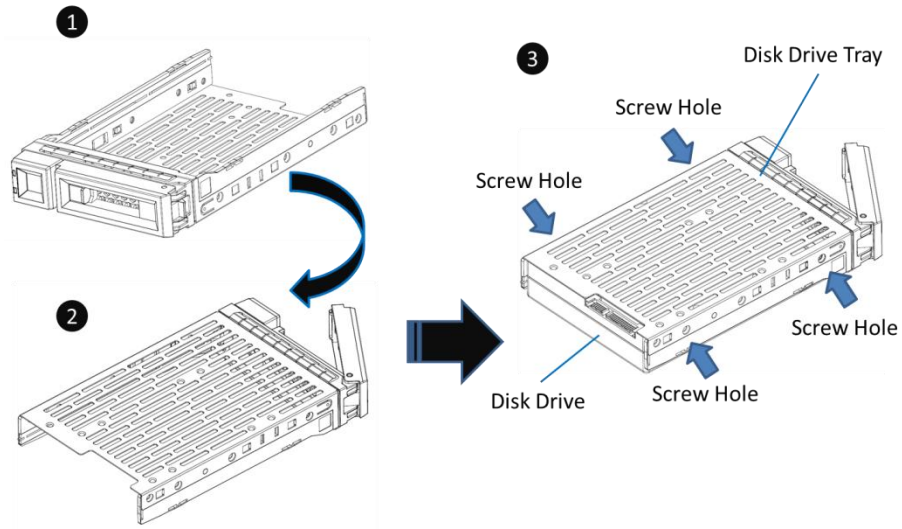


Figure 3-11 Flip the Disk Drive Tray & Install Disk Drive into the Tray (LFF)

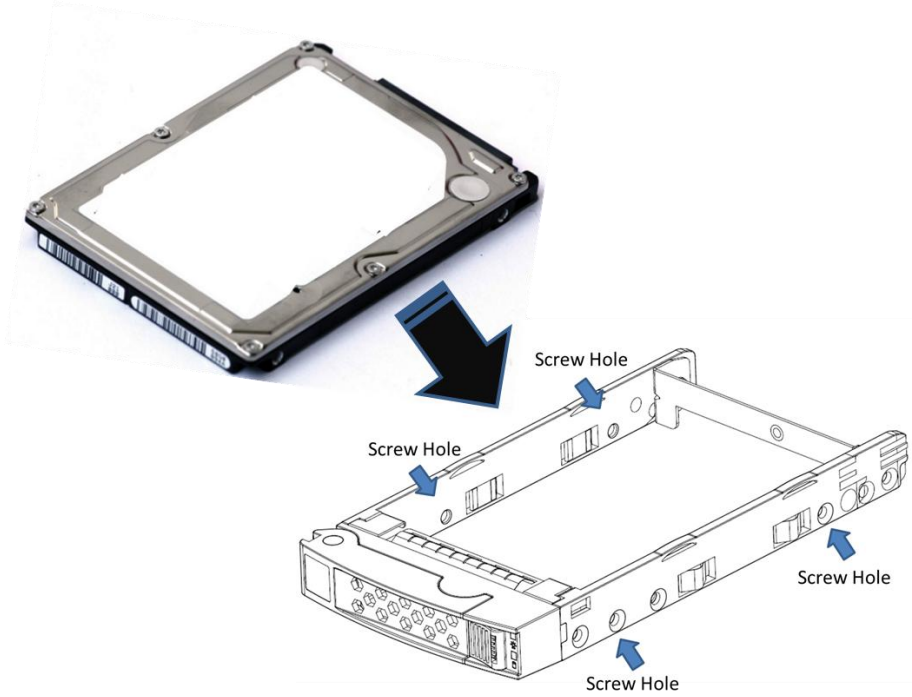


Figure 3-12 Align the Disk Drive & Install into the Tray (SFF)

3.5. Installing a Disk Drive with the Tray into the System

Following contents and figures are detail steps of installing a disk drive with the tray into the system.

- Check if the carrier handle is at open status; if the carrier handle is at close status, please follow procedures of opening the carrier handle in Removing a Disk Drive Tray section.
- Align a disk drive with the tray to the empty bay you would like install.

- Push the tray with disk drive all the way into the empty disk drive bay and then push back the carrier handle to the close status and then lock the release button lock.

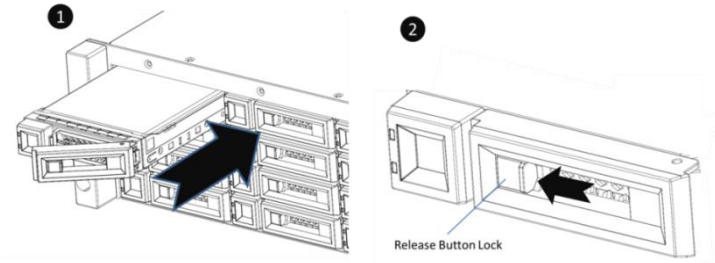


Figure 3-13 Install the Tray with Disk Drive and Lock the Release Button Lock

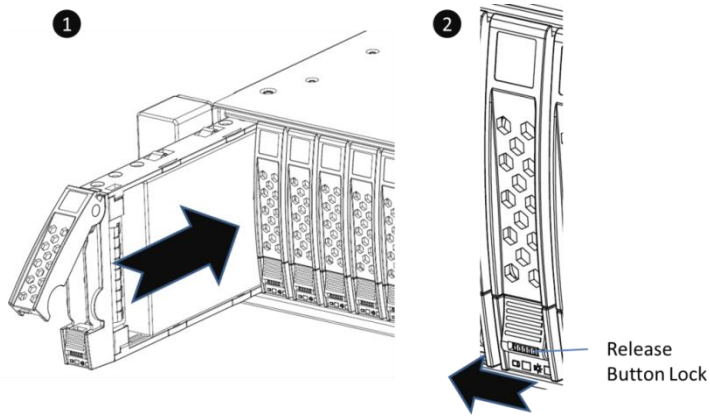


Figure 3-14 Install the Tray with Disk Drive and Lock the Release Button Lock (SFF)

3.6. Connecting the System to the Host

XCubeSAN series equips two 10GbE iSCSI (RJ45) ports onboard per controller for data host connection and 4-ported SAS3 expansion ports for capacity expansion by adding more XCubeDAS series enclosures. Following contents are examples of connecting the system to data host. Learn more about other types of cabling; please refer to Deployment Types and Cabling section.

3.6.1. Dual Path Configuration

One Server / One HBA / Dual Path

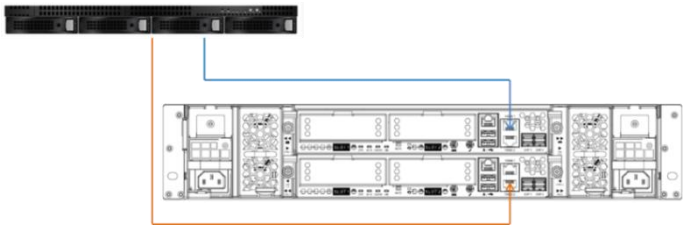


Figure 3-15 One Server / One HBA / Dual Path

Two Servers / One HBA per Server / Dual Path

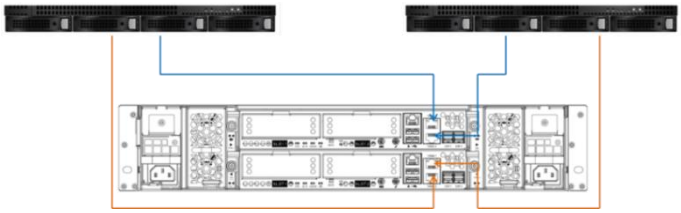


Figure 3-16 Two Servers / One HBA per Server / Dual Path

3.6.2. Single Path Configurations

One Server / One HBA / Single Path

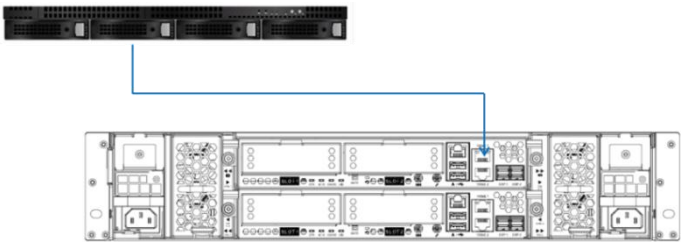


Figure 3-17 One Server / One HBA / Single Path

Two Servers / One HBA per Server / Single Path

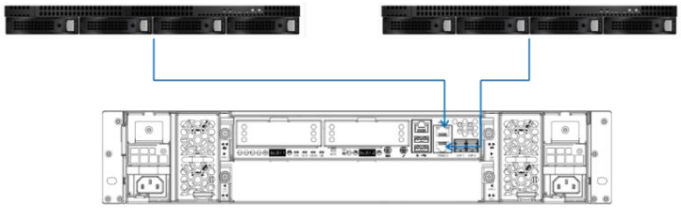


Figure 3-18 Two Server / One HBA per Server / Single Path

3.7. Connecting Power Cords and Power on the System

3.7.1. Before Power on the System for the First Time

- Install all disk drives in the system so the controllers can identify and configure them at power-up.
- Connect all the cables and power cords to the system before pressing power button.

Generally, when powering up, please make sure to power up the system(s) and associated data hosts in the following sequence:

- SAN system first: this ensures that disks in the system have enough time to completely spin up before being scanned by data hosts and controller modules.
- Data host last (if powered down for maintenance purposes)

3.7.2. AC Power Supply

XCubeSAN series is equipped with a power button for switching system on/off that relies on power cords. For switching system power on, plug the power cord into the power cord connect on the system rear side and then plug the other end of the power cord into the wall outlet. Repeat this sequence for the other side of PSU.

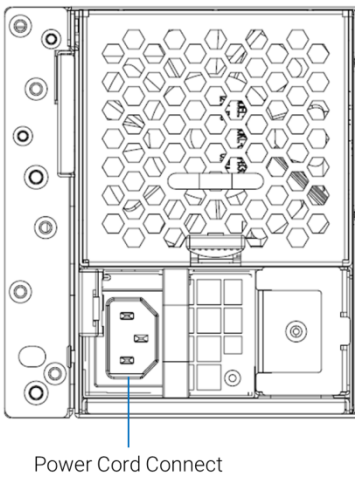


Figure 3-19 AC Power Supply – PSU Power Cord Connect

To power off the system:

- Stop all I/O from hosts to the system.
- Shut down the system by the method described below:
  - Keep pressing power button for 4 seconds.
  - Use CLI to shut down system power.
  - Use CubeView to shut down the system remotely.

3.8. Testing the System Connections

If all system components and disk drives are installed properly and well function, data host(s) should detect the system after it powering on. User can use following method for testing the system connections:

- Use storage management software that installed in the data host to verify connections.
- Use QSAN web UI to search every XCubeSAN series models that connect to data host.

If users cannot find any XCubeSAN series that connect to data host by following installation and test procedures, please refer to Troubleshooting section for immediate basic troubleshooting.

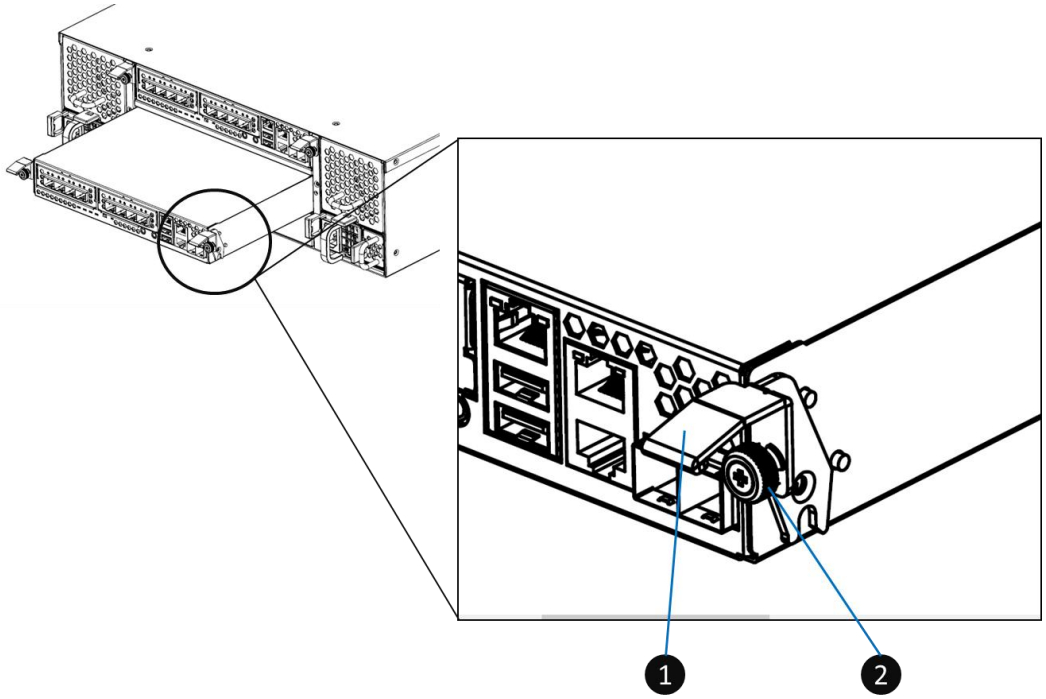
4. Major Components Replacement

4.1. Installing/Removing a Controller Module

4.1.1. Removing a Controller Module

CAUTION:

The controller module is heavy; please use both hands while installing, removing, or carrying the controller module. Recommended place for removing a controller module: the system is on the well secured rack or on the stable place. For single controller series, controller cage must install in the slot #1 (upper side) and must install dummy controller cage for empty slot to ensure the system cooling.



Demonstration model: 12-disk 3U chassis + 2X 16GB FC Host Card

Figure 4-1 Mechanic Components of a Controller Module

Table 4-1 Mechanic Components of a Controller Module

Number	Description
1	Release Lever
2	Screw

Following contents and figures are detail steps of removing a controller module from the system chassis.

- Use Phillips screwdriver to loosen the screws on each release levers.
- Pull down two release levers at the same time and then pull out about half length of the controller module by holding two release levers.
- Use one hand to hold one end of the controller module (the side with release levers) and the other hand hold the bottom of the controller; pull out the controller module until it is free from the system chassis.

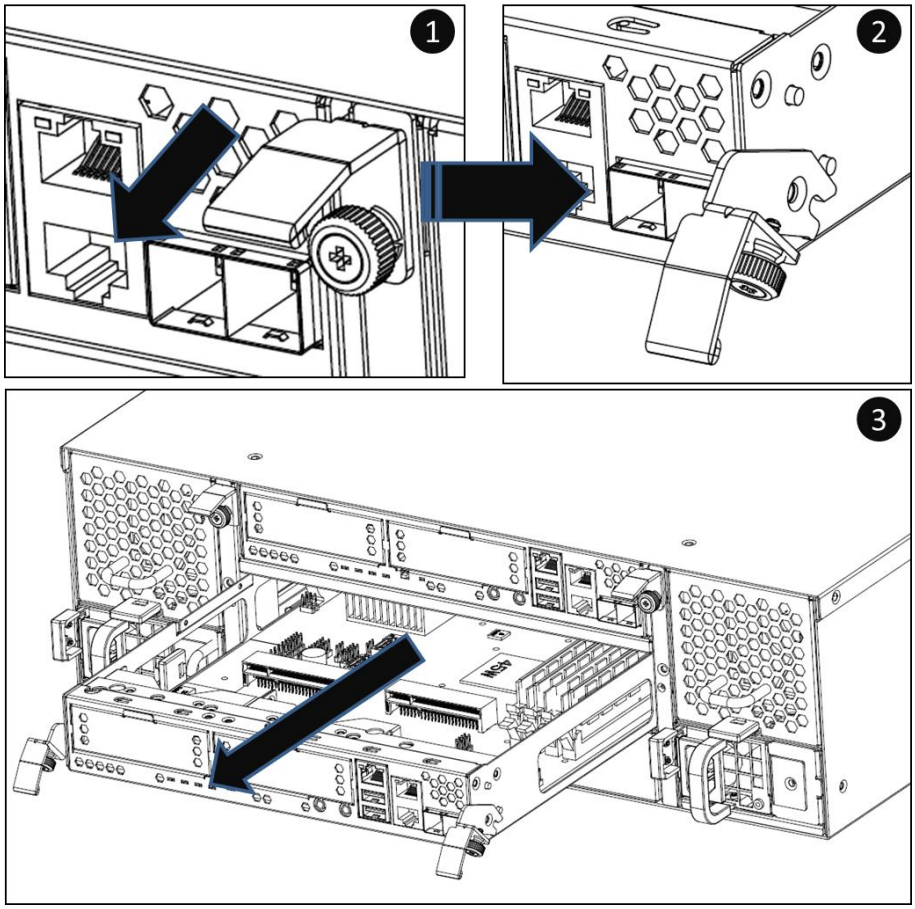


Figure 4-2 Steps of Removing a Controller Module

4.1.2. Installing a Controller Module

Following contents and figures are the detail steps of installing a controller module from the system chassis.

- Make sure the position of two release levers of the controller is at downward.
- Align and place the controller to the empty controller slot.
- Push the controller module all the way into the controller slot until the position of two release levers move upward automatically.

- Pull up two release leavers until it totally parallel with the controller cage and then use Phillips screw driver to tighten two screws.

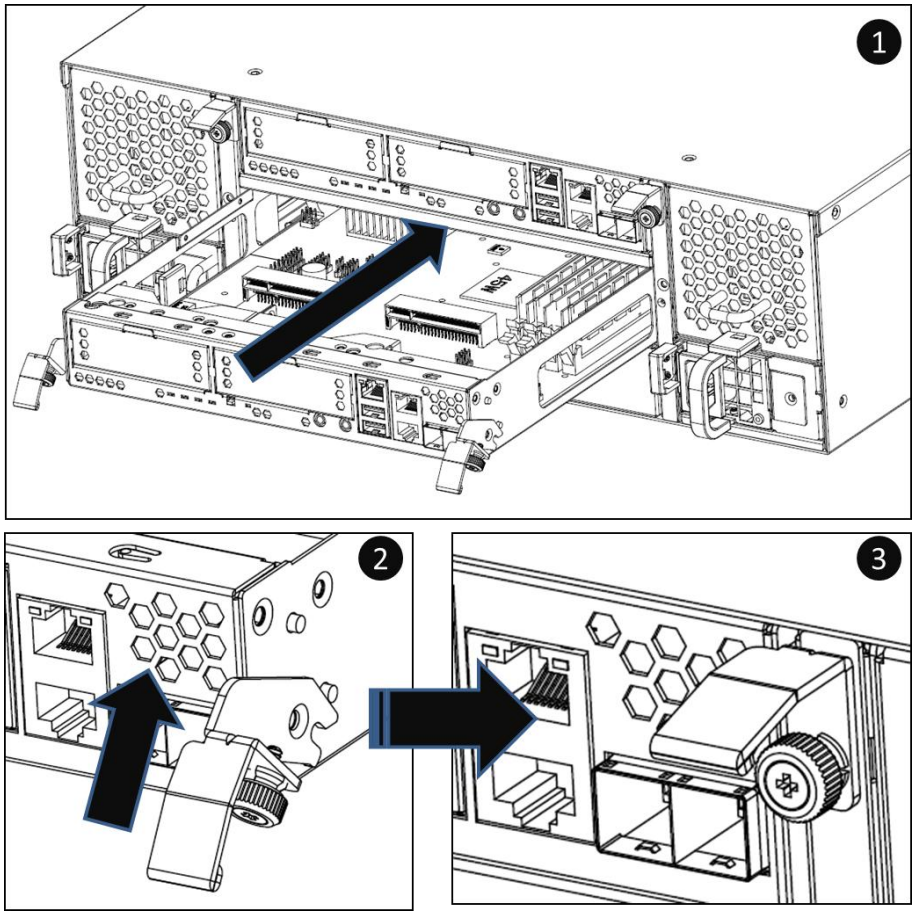


Figure 4-3 Detail Steps for Installing a Controller Module

4.2. Installing/Removing a Power Supply Unit (PSU)

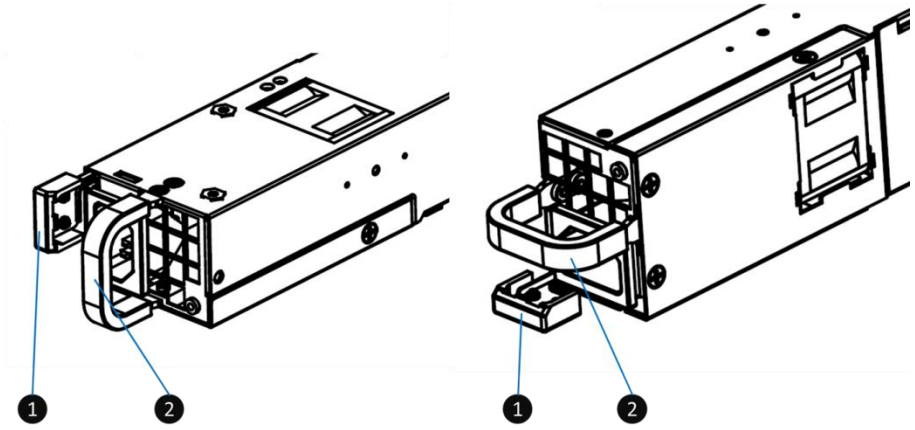
XCubeSAN series uses the same power supply unit (PSU) but the installation direction for 4U/3U and 2U system chassis is different. Please refer to following information for the PSU installing / removing guide.

CAUTION:

The power supply unit is heavy; please use both hands while installing, removing, or carrying the power supply unit. Recommended place for installing/removing a power supply unit: the system is on the well secured rack or on the stable place.

4.2.1. Removing the Power Supply Unit

- Figures below are power supply units installed in 4U/3U or 2U system chassis.



PSU Installed in 4U/3U System Chassis PSU Installed in 2U System Chassis

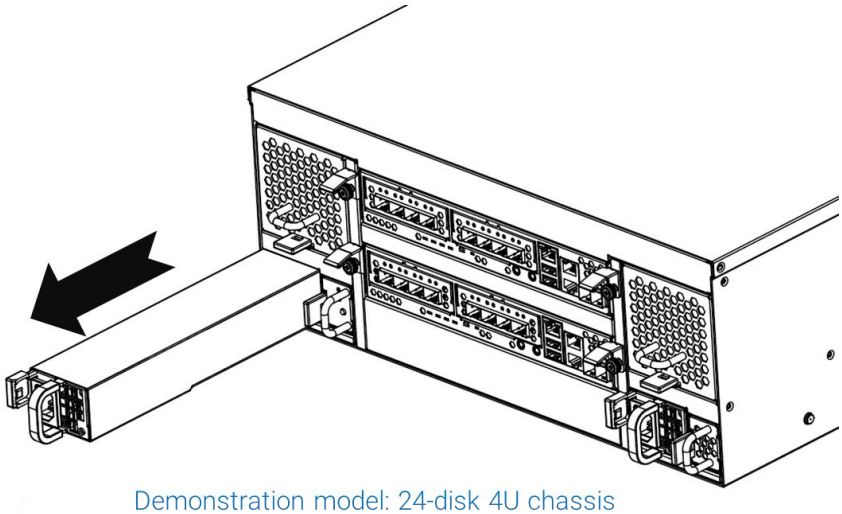
Figure 4-4 Power Supply Units installed in the Different System Chassis

Table 4-2 Mechanic Components of a PSU

Number	Description
1	PSU Release Tab
2	PSU Handle

Following contents and figures are detail steps of removing a power supply unit from the system chassis.

- Disconnect the power cord from the wall outlet; then remove the other end from power cord connect on the PSU.
- Hold the PSU handle first, and then press the release tab. Pull out the power supply around half of the total PSU length.
- Use one hand to hold one end of the power supply unit (the side with release tab) and the other hand hold the bottom of the power supply unit; pull out the power supply unit until it is free from the system chassis.



Demonstration model: 24-disk 4U chassis

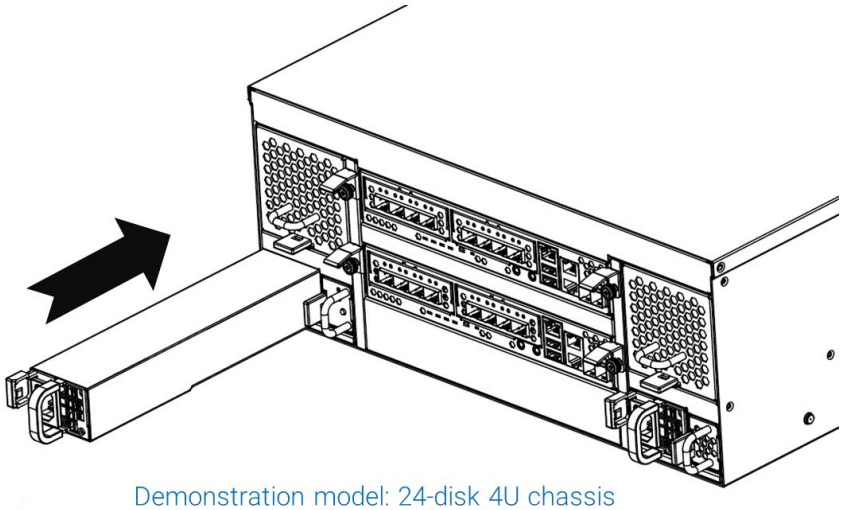
Figure 4-5 Removing the Power Supply Unit

- Repeat three steps above if there is another power supply unit needs to be removed.

4.2.2. Installing a Power Supply Unit

Following contents and figures are detail steps of installing a power supply unit into the system chassis.

- Use one hand to hold one end of the power supply unit (the side with release tab and handle) and the other hand hold the bottom of the power supply unit; then align the power supply unit with the empty PSU slot. Installation direction:
- Push the power supply unit all the way into the empty slot until hear the “click” sound from the release tab.



Demonstration model: 24-disk 4U chassis

Figure 4-6 Installing a Power Supply Unit in the System Chassis

- Repeat two steps above if there is another PSU needs to be installed.

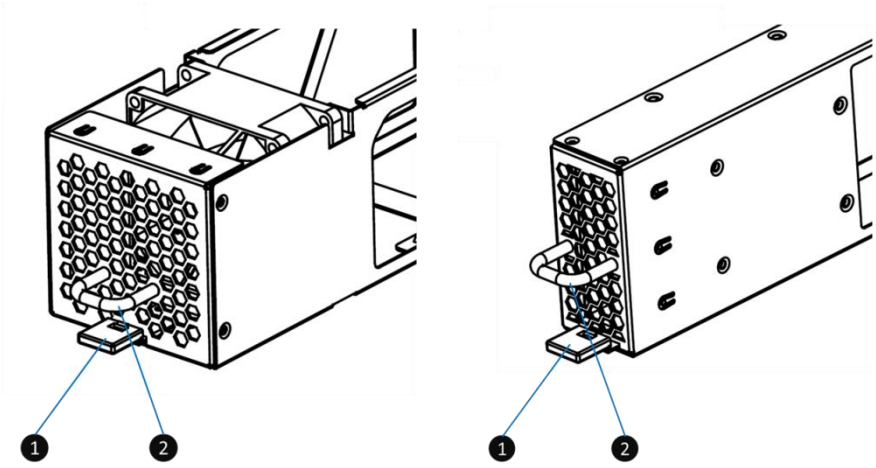
4.3. Installing/Removing a Fan

XCubeSAN series uses different fan for 4U/3U and 2U system chassis. Please refer to following information for the fan installing/removing guide.

CAUTION:

The fan is heavy; please use both hands while removing, holding, or carrying a fan. The fan for XCubeSAN series is hot swappable fan, but power off the system to do the fan installing or removing is recommended. Recommended place for installing/removing a fan: the system chassis is on the well secured rack or on stable places.

4.3.1. Removing a Fan



Fan Installed in 4U/3U System Chassis Fan Installed in 2U System Chassis

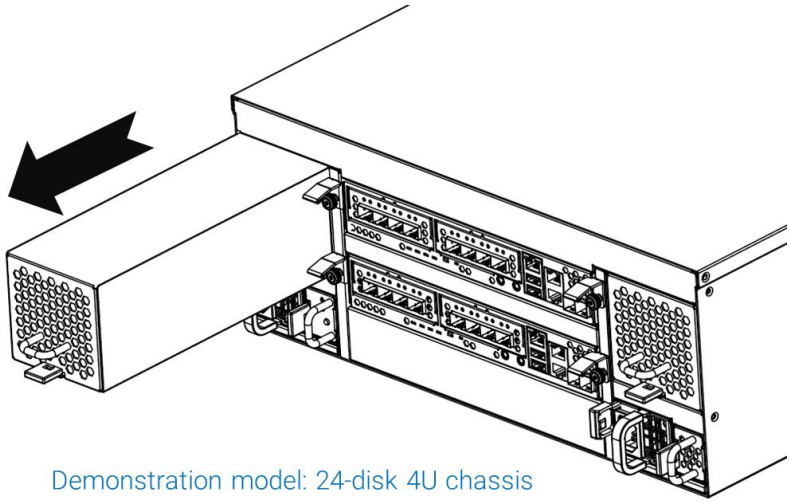
Figure 4-7 Mechanic Components of Fans

Table 4-3 Mechanic Components of a Fan

Number	Description
1	Fan Release Tab
2	Fan Handle

Following contents and figures are detail steps of removing a fan from the system chassis.

- Hold the fan handle first, and then press the fan release tab. Pull out the fan around half of the total fan module length.
- Use one hand to hold one end of the fan (the side with release tab and handle) and the other hand hold the bottom of the fan; pull out the fan until it is free from the system chassis.



Demonstration model: 24-disk 4U chassis

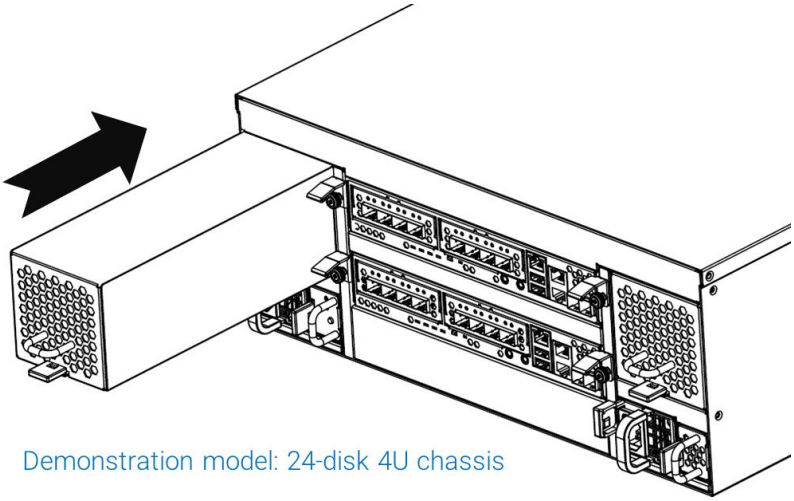
Figure 4-8 Removing a Fan

- Repeat two steps above if the other fan needs to be removed as well.

4.3.2. Installing a Fan

Following contents and figures are detail steps of installing a fan into the system chassis.

- Use one hand to hold one end of the fan (the side with release tab and handle) and the other hand hold the bottom of the fan module; then align the fan with the empty fan slot. Installation direction of LFF and SFF systems is the same.
- Push the fan all the way into the empty slot until hear the “click” sound from the release tab.



Demonstration model: 24-disk 4U chassis

Figure 4-9 Installing a Fan

- Repeat two steps above if the other fan needs to be installed as well.

4.4. Installing the Optional DIMM

Default quantity of the DIMM for XCubeSAN series is one strip per controller and installed in slot #1. If users purchase additional optional QSAN qualified or compatible DIMM, installation sequence should be #3 → #2 → #4.

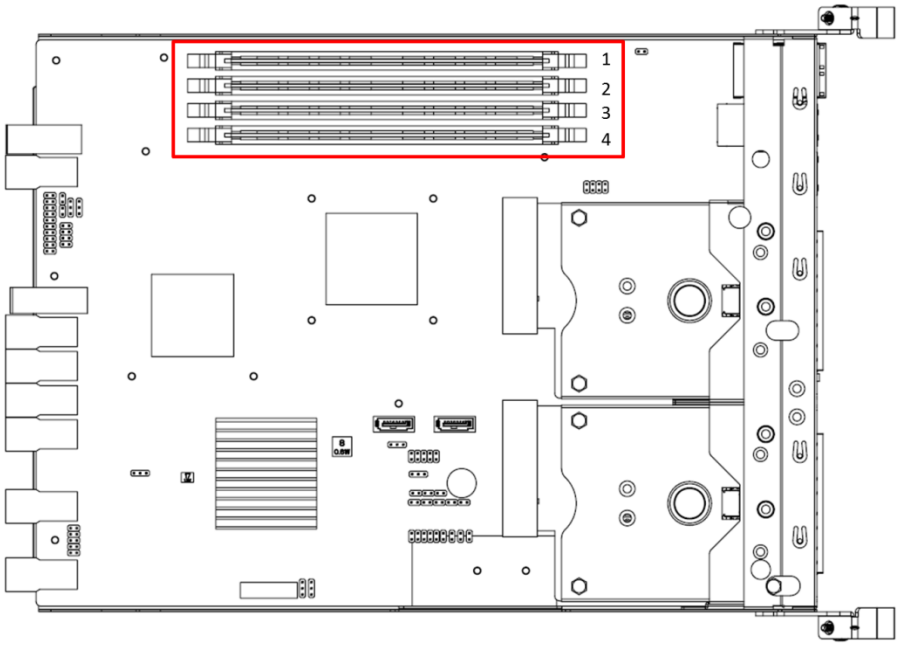


Figure 4-10 Installation Sequence of Additional Optional DIMM

4.5. Installing/removing the Host Card

The host card is an optional part for XCubeSAN series. If users want to expand host connectivity, there are three types of host cards that are available for selection: 16Gb FC, 10GbE, and 1GbE host cards. The table below is the available host card list.

Table 4-4 XCubeSAN Series Available Host Cards List

Host Card Type	Model Name	Description
16Gb Fibre Channel	HQ-16F4S2	4-ported 16Gb FC host card
10GbE iSCSI	HQ-10G4S2	4-ported 10GbE iSCSI (SFP+) host card
1GbE iSCSI	HQ-01G4T	4-ported 1GbE iSCSI (SFP+) host card

CAUTION:

Host card is NOT hot swappable. Hot plug in/out the host card might damage the system. Users should remove the controller cage from the system chassis before installing/removing host card. Please DO NOT attempt to hot plug in/out the host card.

4.5.1. Installing the Host Card

Following contents and figures are detail steps of installing a host card into the system.

- Remove the controller from the system chassis. (refer to Removing a Controller Module section)
- Remove the dummy host card cage by loosening two screws of the dummy host card cage and then take dummy host card cage from controller cage.
- Align the host card to the slot to be installed and then push all the way into the controller cage until hear a “click” sound and make sure the host card is well connected with the connector in the controller cage.
- Repeat procedures above if there are other host cards to be installed.
- Install controller cage into system chassis if the host card installation completes.

  (Refer to Installing a Controller Module section)

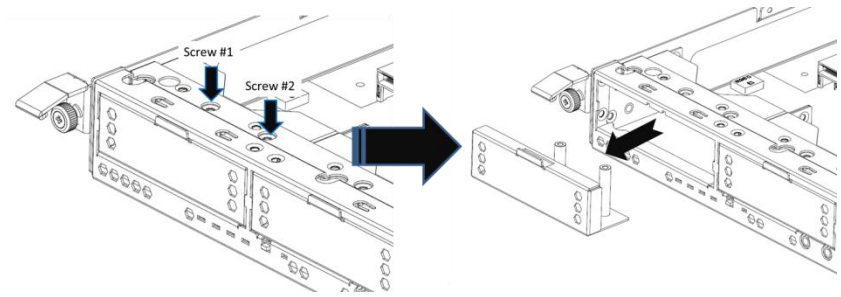


Figure 4-11 Removing Dummy Host Card Cage

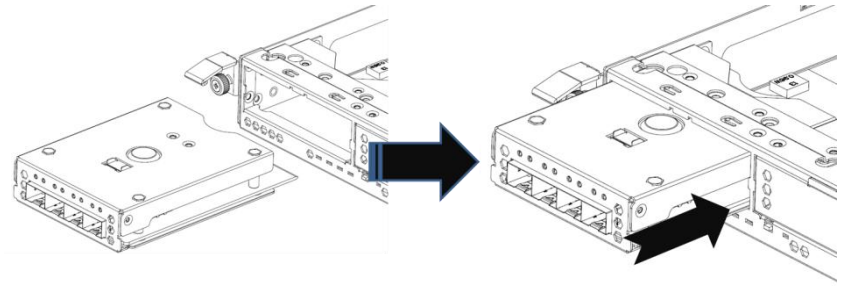


Figure 4-12 Install Host Card into Controller Cage

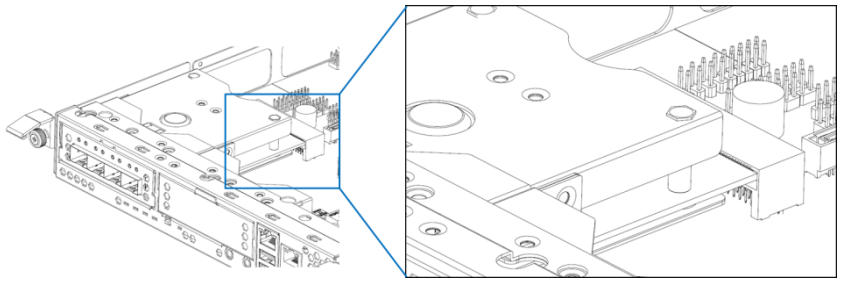


Figure 4-13 Finished Installed Host Card in the Controller Cage

4.5.2. Removing the Host Card

Following contents and figures are detail steps of removing a host card from the system.

- Press host card release button and disconnect the host card with the connector in the controller cage.
- Pull the host card out until it is free from the controller cage.
- Install the dummy host card in the empty host card slot and tighten two screws.
- Repeat procedures above if there are other host cards need to be removed. To ensure the system cooling, please install all dummy host card cages if host cards are removed.

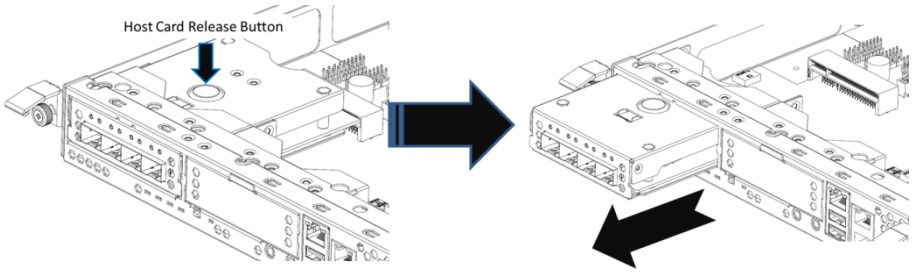


Figure 4-14 Remove Host Card from the Controller Cage

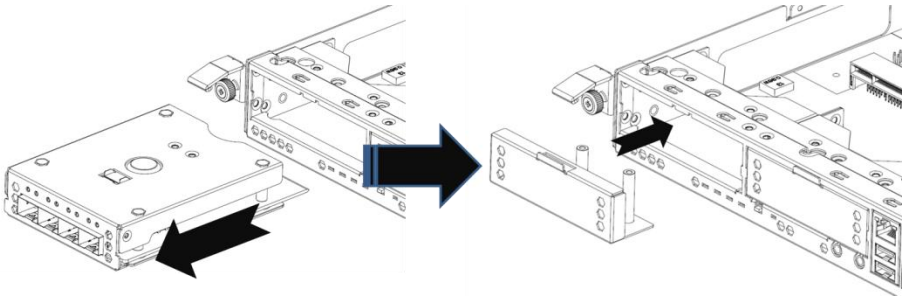


Figure 4-15 Pull out the Host Card and Install Dummy Host Card Cage

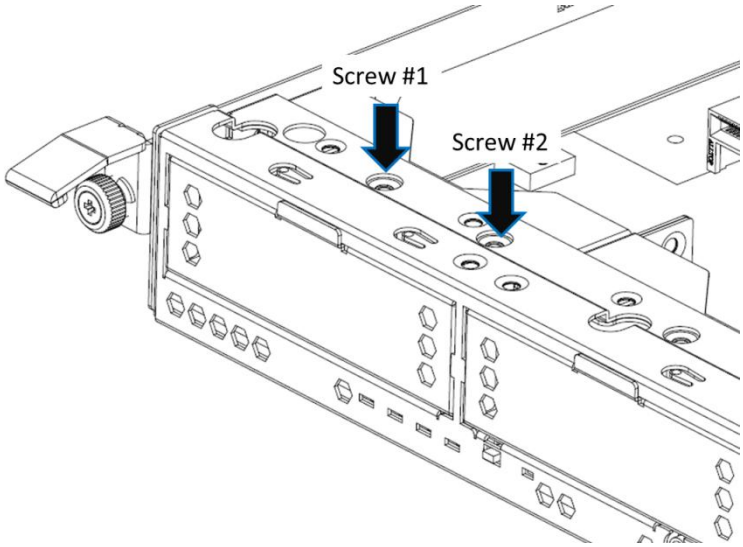


Figure 4-16 Finished Installed Dummy Host Card Cage

4.6. Installing/Removing the Cache-to-Flash Module

The Cache-to-Flash module is an optional part for XCubeSAN series. It is a combination of flash memory and power module for write-back data protection when encounter sudden electricity power off incident. The table below is the available Cache-to Flash module list.

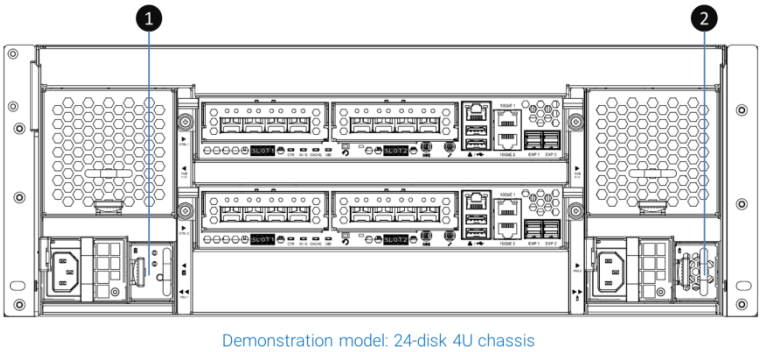
Table 4-5 XCubeSAN Series Cache-to-Flash Module List

Power Module Type	Model Name	Description
BBM	C2F-BMC2F	Battery-Backed Module (BBM): Retain memory up to 64GB
Super Capacitor	C2F-SPC2F	Super Capacitor Module (SCM): Retain memory up to 16GB

CAUTION:

Flash module of Cache-to-Flash modules is hot swappable, but user must press attention button until the flash module status LED is blinking before removing the flash module from the system chassis.

4.6.1. Installing the Cache-to-Flash Modules



Demonstration model: 24-disk 4U chassis

Figure 4-17 Cache-to-Flash Modules

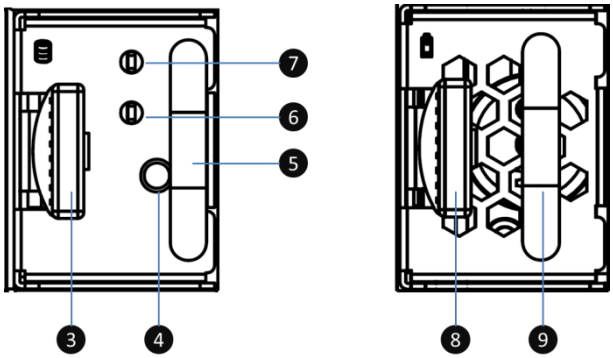


Figure 4-18 Components of Cache-to-Flash Modules

Table 4-6 Cache-to-Flash Modules

Number	Description
1	Flash module
2	Power module (BBM or Super Capacitor)
3	Flash module release tab
4	Flash module attention button
5	Flash module handle
6	Flash module status LED
7	Flash module power LED
8	Power module release tab
9	Power module handle

Following contents and the figure are detail steps of installing the cache-to-flash modules.

- Remove the dummy cache-to-flash cage by losing the screw on it and then take the dummy cage from the system chassis. The same procedure for both sides.
- Align the flash module cage to the slot and then push it all the way into the system chassis until hear a “click” sound.
- Repeat procedures above for the power module.

4.6.2. Removing the Cache-to-Flash Modules

Following contents and the figure are the detail steps of removing the cache-to-flash modules.

- Press attention button of flash module until the flash module status LED is blinking.
- Press release button of flash module and pull out until it is free from system chassis.
- Install the dummy cache-to-flash cage and then use Phillips screw driver to tighten it.
- Repeat procedures above for the power module but no need to press attention button.

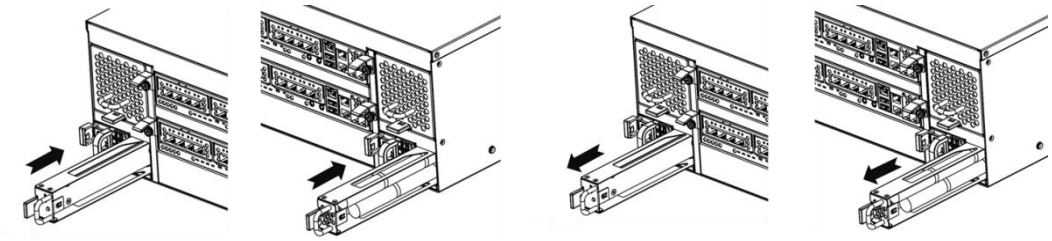


Figure 4-19 Installing/Removing Cache-to-Flash Modules

5. Deployment Types and Cabling

5.1. Deployment Types

XCubeSAN series supports following deployment types:

Table 5-1 Deployment Types

Deployment Type	Description
Dual Path (for dual controller module)	In a dual path deployment, two paths are connected from the data host to the system. In a dual path deployment, both controllers in the system are used. Due to dual path deployment provides two paths and dual controller system supports real-time fail over, so the data and the access will be protected. In dual domain deployment mode, disk drives must support dual paths I/O (SAS interface).
Single Path (for dual or single controller models)	In a single path deployment, only one path is connected from the data host to the system. In a single path deployment, only one controller in the enclosure is used.
Multi-server Attached	In multi-server attached deployment, more than one server is connected to the system. In multi-server attached deployment, both single and dual path deployment modes are supported.

5.2. Cabling the System

Following examples illustrate how to do the cabling for XCubeSAN series system. Recommend SAS cable length for the host connection: less than 3 meters. XCubeSAN series supports maximum up to 446 drives for the system storage space expansion; single and dual path cabling are supported.

5.2.1. Dual Path Deployment

One Server / One HBA / Dual Path Cabling

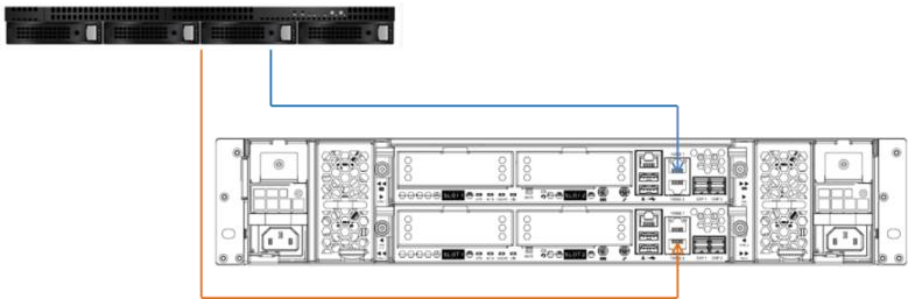


Figure 5-1 One Server / One HBA / Dual Path Cabling

One Server / One HBA / One DAS System / Dual Path Cabling

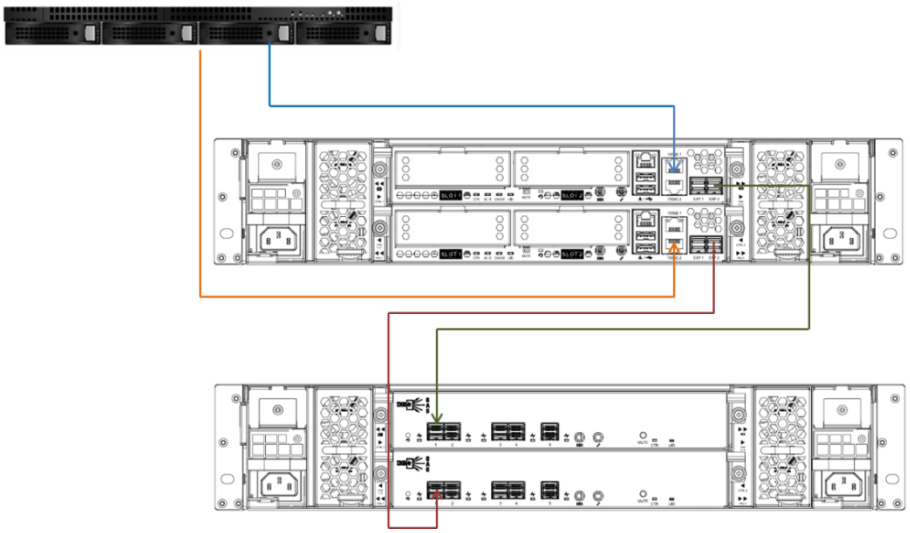


Figure 5-2 One Server / One HBA / One DAS System / Dual Path Cabling

One Server / One HBA / Two DAS Systems / Dual Path Cabling

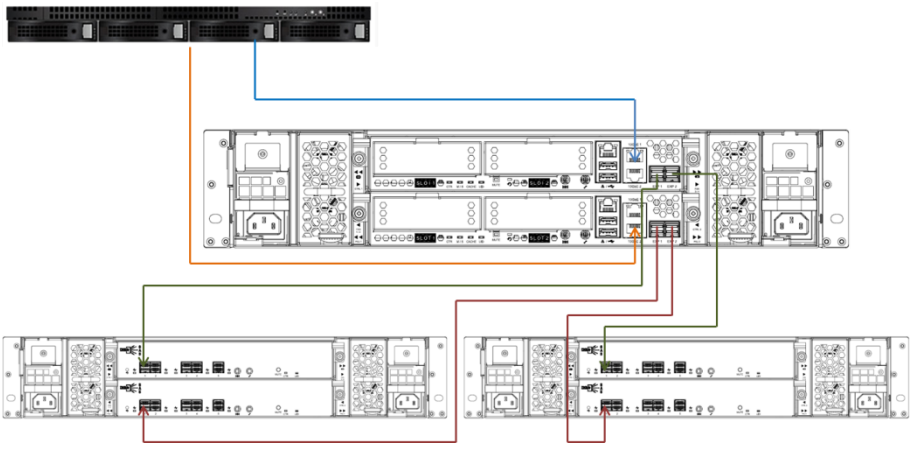


Figure 5-3 One Server / One HBA / Two DAS Systems / Dual Path Cabling

One Server / One HBA / Ten DAS systems / Dual Path Cabling

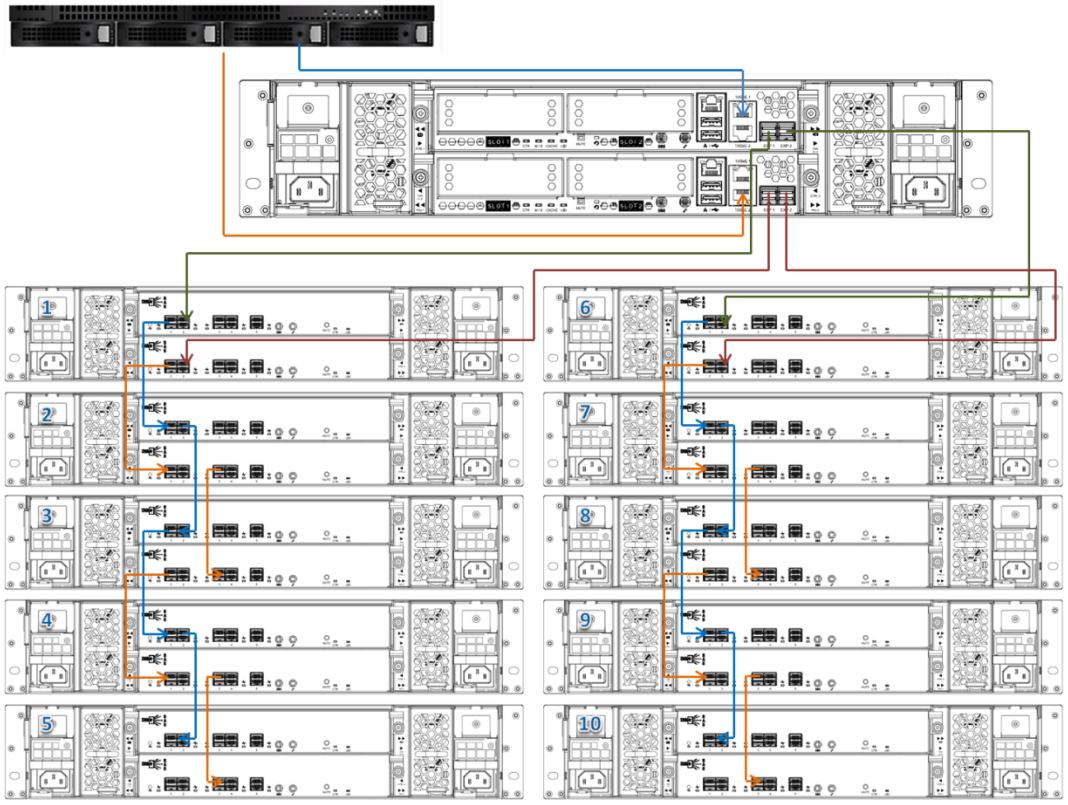


Figure 5-4 One Server / One HBA / Ten DAS Systems / Dual Path Cabling

5.2.2. Single Path Deployment

One Server / One HBA / Single Path Cabling

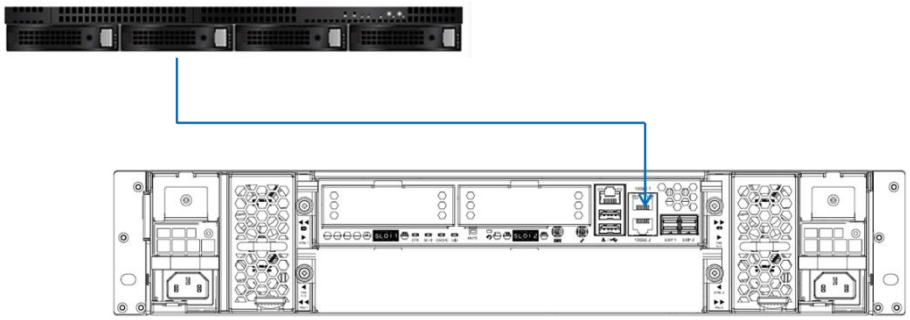


Figure 5-5 One Server / One HBA / Single Path Cabling

One Server / One HBA / One DAS System / Single Path Cabling

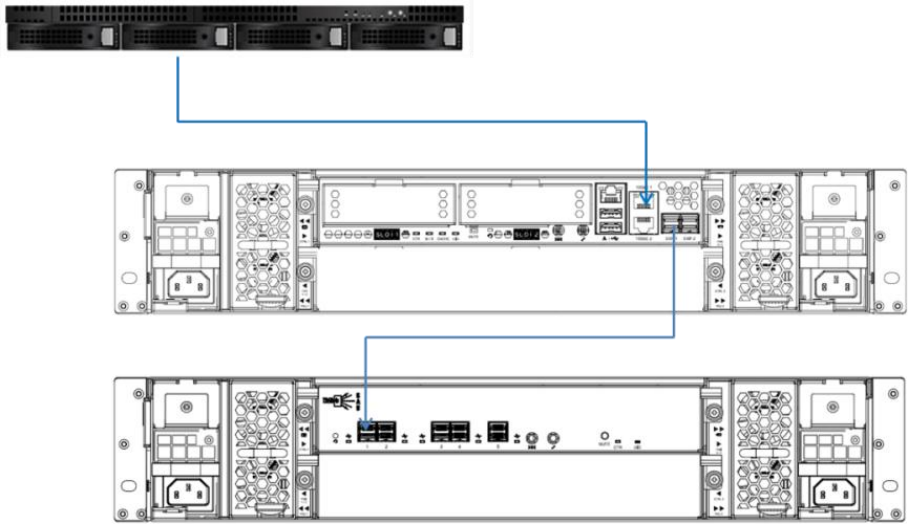


Figure 5-6 One Server / One HBA / One DAS System / Single Path Cabling

5.2.3. Multi-server Attached Cabling

Two Servers / One HBA per Server / Dual Path Cabling

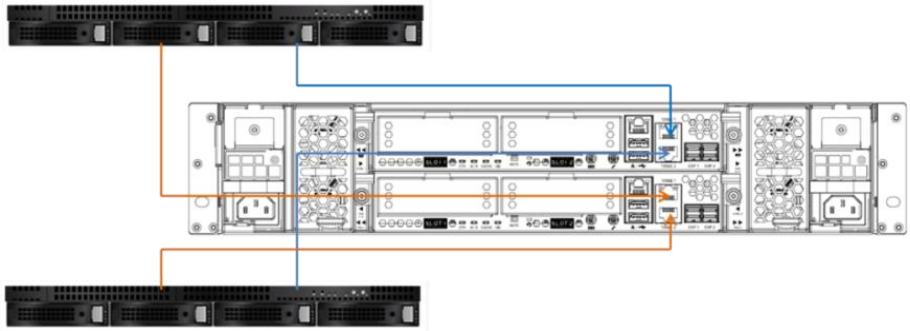


Figure 5-7 Two Serves / One HBA per Server / Dual Path Cabling

Two Servers / One HBA per Server / Single Path Cabling

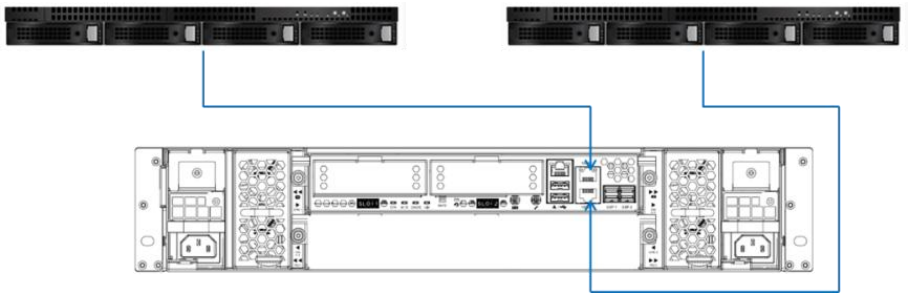


Figure 5-8 Two Servers / One HBA per Server / Single Path Cabling

Four Servers / One HBA per Server / Single Path Cabling

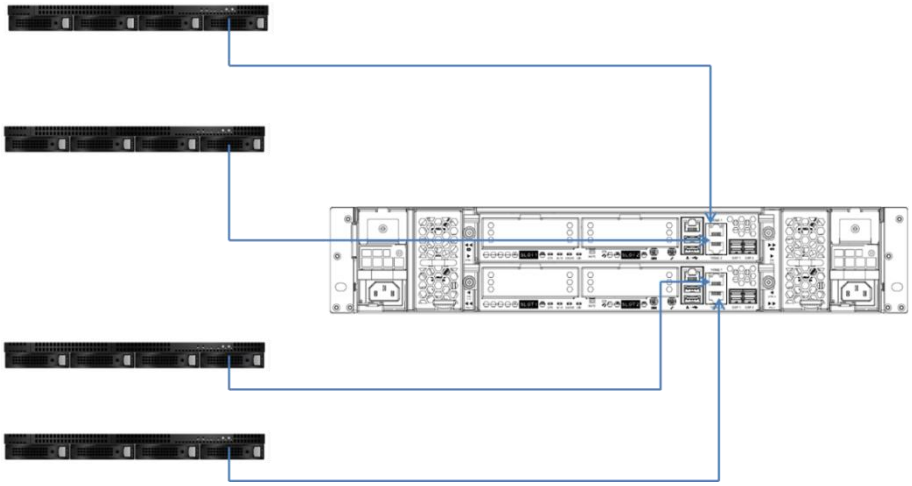


Figure 5-9 Four Servers / One HBA per Server / Single Path Cabling

Two Servers / One HBA per Server / Two Switches / Dual Path Cabling

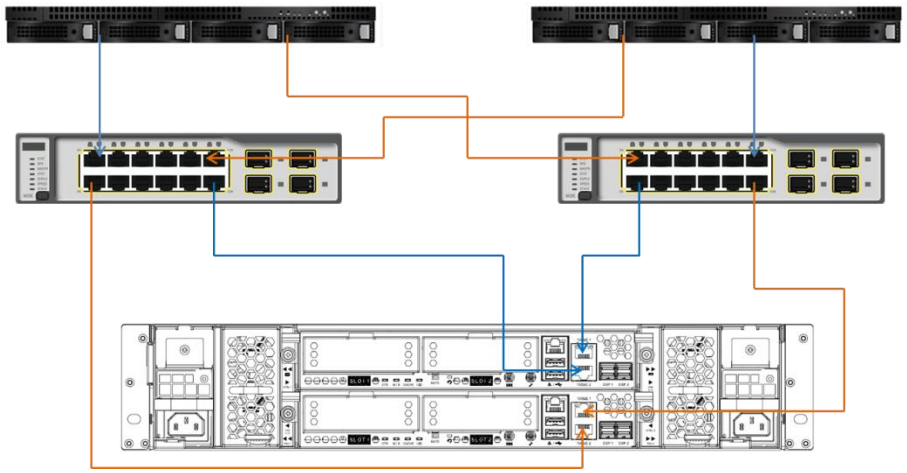


Figure 5-10 Two Servers / One HBA per Server / Two Switches / Dual Path Cabling

If customers purchase optional host cards, following is the cabling example:

Ten Servers / One HBA per Server / Dual Path Cabling

- Two servers connect to on-board 10GbE iSCSI (RJ45) port.
- Eight servers connect to optional host cards.
- Host card types: 4F3 (16Gb FC SFP+); 4P2 (10Gb iSCSI SFP+); 4T1 (1GBASE-T)
- XS5200 supports different host card in the same controller, however, the server must connect the same type of host card if doing dual path cabling.

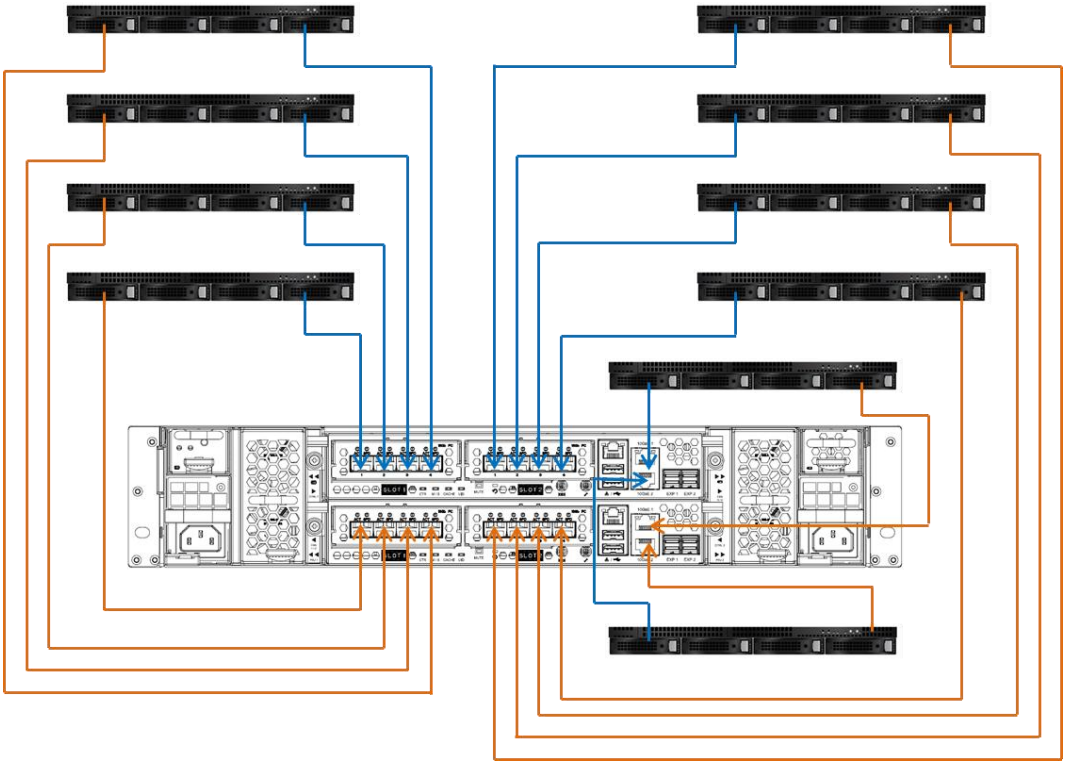


Figure 5-11 Ten Servers / One HBA per Server / Dual Path Cabling

6. LED Descriptions

6.1. Front Panel LEDs

XCubeSAN series features a unique buttons and indicators module (BIM) on the right ear. Please refer to following contents for definitions of LED behaviors.

6.1.1. LEDs of Buttons and Indicators Module

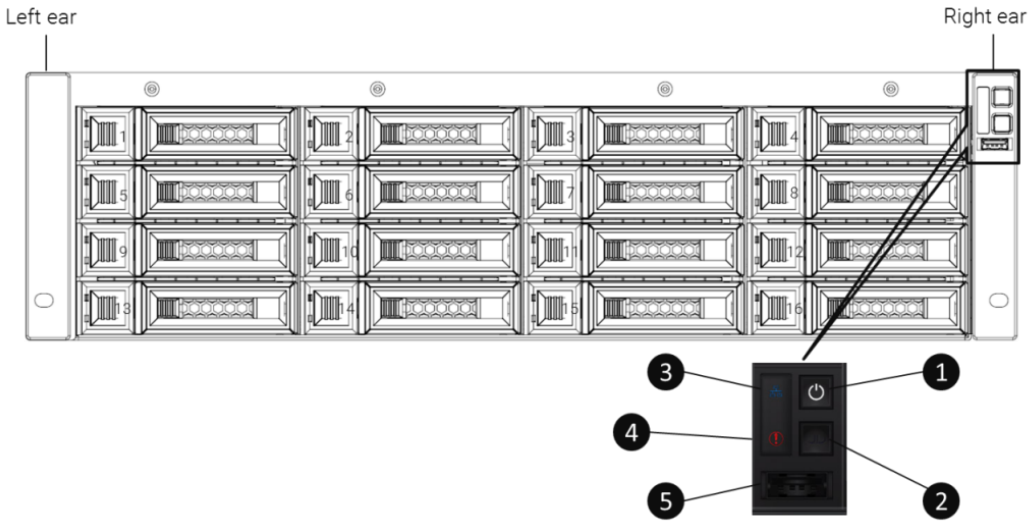


Figure 6-1 Buttons and Indicators Module (BIM)

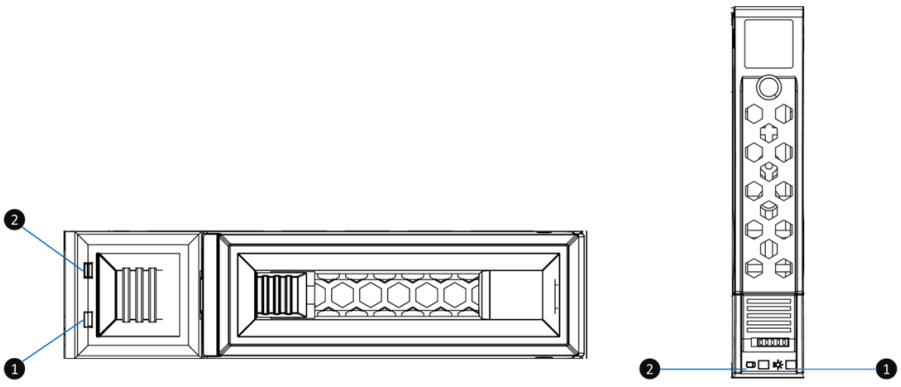
Table 6-1 Descriptions for LEDs of Buttons and Indicators Module

Number	Description	Definition
1	Enclosure Power Button/LED	**Power Button** • Press the button one time to turn ON the system power and keep pressing for 4 seconds to turn OFF the system power. **Power LED** • White: power is ON (at least one power supply unit is supplying power to the system). • White blinking: the system is in the stage of boot or shutdown. • Off: the system shutdown.
2	Unit Identification (UID) Button/LED	**UID (Unique Identity) button** • Press the button one time to turn it ON; press it again to turn it OFF. **UID (Unique Identity) LED**

		• Press the button to turn it ON, and press it again to turn it OFF. • Blue: the system has been identified. • Off: the system has not been identified.
3	Enclosure Access LED	**Enclosure Access LED** (Indicate the host interface connectivity.) • Blue Blinking: the host interface activity is on-going. • Off: no host interface activity.
4	Enclosure Status LED	**Status LED** (Indicate current health status of the system.) • Amber: system error (PSU failed, abnormal voltage, temperature is at critical high/low, any cooling fan module failed or removed, degraded mode, any pool failed.) • Amber Blinking: firmware is upgrading or rebuilding. • Off: the system is healthy.
5	USB Port	For LCM

6.1.2. Disk Drive LEDs

XCubeSAN Series LFF & SFF Disk Drive LEDs



LFF Disk Drive Tray SFF Disk Drive Tray

Figure 6-2 XCubeSAN Series LFF Disk Drive LEDs

Table 6-2 Descriptions for LEDs of LFF & SFF Disk Drive LEDs

Number	Description	Definition
1	Disk Drive Power LED	• Blue on: the disk drive is inserted and no data access.

		• Blue blinking: the disk drive is accessing data. • Off: no disk drive is inserted.
2	Disk Drive Status LED	• Off: the disk drive is healthy. • Amber ON: the disk drive is error. • Amber blinking (interval of 0.5 sec): the disk drive is rebuilding. • Amber blinking (interval of 0.05 sec): identify the disk drive.

6.2. Rear Panel LEDs

6.2.1. XCubeSAN Series Controller LEDs

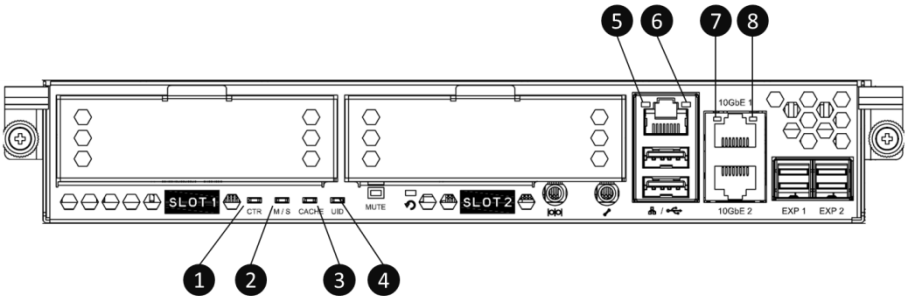


Figure 6-3 XCubeSAN Series Controller LEDs

Table 6-3 Descriptions of XCubeSAN Series Controller LEDs

Number	Description	Definition
1	Controller Status LED	• Solid Green: Controller status normal. • Solid Red: System booting or controller failure.
2	Master / Slave LED (only for dual controllers)	• Solid Green: This is the Master controller. • Off: This is the Slave controller.
3	Dirty Cache LED	• Solid Amber: Data on the cache waiting for flush to disks. • Off: No data on the cache.
4	Unit Identification (UID) LED	• Solid Blue: The enclosure has been identified. • Off: The enclosure is not being identified.
5	Management Port Connection LED	• Solid Green: the connection is built and normal. • Off: no connection is built.
6	Management Port	• Amber Blinking: data accessing

	Accessing LED	
7	10Gb Port #1 LED	• Blinking Yellow: data accessing
8	(lower port)	• Blinking Yellow: data accessing

6.2.2. XCubeSAN Series Power Supply Unit LED

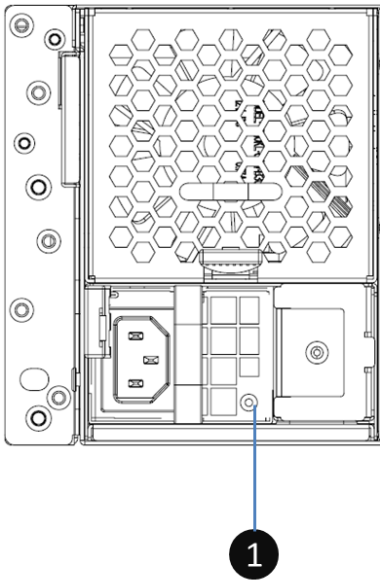


Figure 6-4 XCubeSAN Series Power Supply Unit LED

Table 6-4 Descriptions of Power Supply Unit LED

Number	Description	Definition
1	PSU LED	• Green: PSU is on and OK • Blinking green: PSU is off, 5VSB is on • Amber: critical event caused shutdown • Blinking Amber: PSU warning events (high temp, high power, high current, slow fan, under input voltage)

7. Troubleshooting

CAUTION:

We suggest most of the repairs are done by a certified technician. You should only perform some simple troubleshooting or repairs which are defined in your product documentation. System damage due to the troubleshooting or repair would affect your product warranty. If you are not quite sure the problem of the XCubeSAN series system, we strongly recommend you to contact your local support directly or get help from QSAN Support.

7.1. Troubleshooting for System Startup Failure

If your system encounters malfunction during startup, please check if:

- The PSU LED is on.
- Power cords are well secured.
- The system failure LED light is on. See Rear Panel LEDs section.
- There is a constant grinding or other abnormal sound when you access the disk drives.
- A message is displayed on the screen from web UI.
- If the case not belongs to the scenario above, please contact your local support or get help on line at www.QSAN.com/contact_support.

7.2. Troubleshooting for Communication Loss (internal/external)

If your system loses communication with the host or other connected systems, please check if:

- The management port or controller module is failed. See Rear Panel LEDs section.
- Connection cable falls from the host or the enclosure.
- Connection cable fault: suggest replacing another cable to check if the communication loss is due to the connection cable fault.

7.3. Troubleshooting for Power Supply Unit

- Power supply unit LED is amber or amber blinking. See XCubeSAN Series Power Supply Unit LED section.
- The power supply unit is not installed properly. Regarding to installing of the power supply unit, please see Installing/Removing a Power Supply Unit section.

- If the power supply unit is installed properly and the power indicator LED is not on, check if the power cord on the system or the plug on the outlet is well secured. (repeat the same procedure for the other power supply unit)
- If finished checking all steps above but the problem is still unsolved, please contact your local support or get help on line at www.QSAN.com/contact_support.

7.4. Troubleshooting for Fan

If your fan module of the system doesn't work properly, please check if:

- The fan module is not installed properly. Regarding to installation of a fan, pleases see Installing/Removing a Fan section.
- If the cooling fan module is installed properly, check if:
  - The internal/external airflow is obstructed.
  - The ambient temperature is too high.
  - The power supply unit is properly installed.
- If finishes checking all steps above but the problem is still unsolved, please contact your local support or get help from QSAN Support.

7.5. Troubleshooting for Disk Drive

If the disk drive in your system encounters abnormal status, please follow checking steps below:

- Disk drive power LED is off:
  - Check if the status of controller, power supply unit, and cooling fan is normal.
  - Remove the disk drive from the enclosure. See Removing a Disk Drive Tray section.
  - Check connectors of disk drive and backplane are not damaged.
  - Reinstall the tray with a disk drive. See Installing a Disk Drive with the tray into the system section.
- If the disk drive problem is not resolved but the system is healthy, please contact your local support of disk drive.

7.6. Troubleshooting for a Damaged System

If your system accidently encounters damaged issue (collision by external force or fall down from the rack), please check follow steps:

- Check if following components are properly installed:
  - Disk drives.
  - Controller(s).
  - Power supply units.

- Cooling modules.
- Power cords.
- Host card(s). <optional part>
- BBM/super capacitor module. <optional part>
- Cache to flash module. <optional part>
- Top cover.

- Check if all cables are properly connected, well secured, and no damaged pins in the connectors.
- If the system still does not start or run properly, please contact your local support or get help from QSAN Support.

7.7. Troubleshooting for the Wet System

If your system encounters wet problem, please follow steps below:

- Turn off the system and disconnect all cables.
- Remove following components from your system:
  - Power cords
  - All connection cables
  - Disk drives.
  - Controller(s).
  - Power supply units.
  - Fans.
  - Host card(s). <optional part>
  - BBM/super capacitor module. <optional part>
  - Cache to flash module. <optional part>
  - Top cover.
- Let the system dry completely (at least 24 hours).
- Reinstall all components into the system.
- Connect all cables and turn on the power of system.
- If the system does not start or run properly, please contact your local support or get help from QSAN Support.

8. Support and Other Resources

8.1. Accessing Support

After installing your device, locate the serial number on the side sticker of the chassis and use it to register your product at https://partner.qsan.com/ (End-User Registration). We recommend registering your product in QSAN partner website for firmware updates, document download, and latest news in eDM. To contact QSAN Support, please use the following information.

- Website: http://www.qsan.com/en/contact_support.php
- Email: support@qsan.com (09:00 GMT+8 ~ 18:00 GMT+8, 09:00 GMT ~ 18:00 GMT)
- Skype ID: qsan.support (09:00 GMT+8 ~ 18:00 GMT+8, 09:00 GMT ~ 18:00 GMT)

Information to collect

- Product name, model or version, and serial number
- Operating system name and version
- Firmware version
- Error messages or capture screenshots
- Product-specific reports and logs
- Add-on products or components
- Third-party products or components

8.2. Accessing Update

To download product updates, please go to the following website:

https://www.qsan.com/en/download.php

8.3. Documentation Feedback

QSAN is committed to providing documentation that meets your needs. To help us improve the documentation, email any errors, suggestions, or comments to docsfeedback@qsan.com.

When submitting your feedback, include the document title, part number, revision, and publication date located on the front cover of the document.

Appendix

Glossary and Acronym List

Common Terminology

Item	Description
SCSI	Small Computer Systems Interface
SAS	Serial Attached SCSI
S.M.A.R.T.	Self-Monitoring Analysis and Reporting Technology
WWN	World Wide Name
HBA	Host Bus Adapter
SES	SCSI Enclosure Services
NIC	Network Interface Card
BBM	Battery Backup Module
SCM	Super Capacitor Module

FC / iSCSI / SAS Terminology

Item	Description
FC	Fibre Channel
FC-P2P	Point-to-Point
FC-AL	Arbitrated Loop
FC-SW	Switched Fabric
iSCSI	Internet Small Computer Systems Interface
LACP	Link Aggregation Control Protocol
MPIO	Multi-Path Input/Output
MC/S	Multiple Connections per Session
MTU	Maximum Transmission Unit
CHAP	Challenge Handshake Authentication Protocol. An optional security mechanism to control access to an iSCSI storage system over the iSCSI data ports.
iSNS	Internet Storage Name Service
SAS	Serial Attached SCSI

Dual Controller Terminology

Item	Description
SBB	Storage Bridge Bay. The objective of the Storage Bridge Bay Working Group (SBB) is to create a specification that defines mechanical, electrical and low-level enclosure management requirements for an enclosure controller slot that will support a variety of storage controllers from a variety of independent hardware vendors (“IHVs”) and system vendors.
6G MUX	Bridge board is for SATA II disk to support dual controller mode.

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