



## HYPER—UNIFIED STORAGE

### Nexsan Unity

#### Storage Expansion Reference Guide

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Firmware v. 6.0

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

Electromagnetic Emissions: FCC Class A, EN 55022 Class A, EN 61000-3-2/-3-3, CISPR 22 Class A, ICES-003

Electromagnetic Immunity: EN 55024/CISPR 24, (EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11)

Ⓢ Safety: CSA/EN/IEC/UL 60950-1 Compliant, UL or CSA Listed (USA and Canada), CE Marking (Europe)

RoHS: RoHS2 (Global)

Other international regulatory compliance: VCC (Japan)

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## About this document

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This *Unity Storage Expansion Reference Guide* provides information and steps for installing and connecting the following Nexsan Unity hardware Storage Systems:

- Nexsan UNITY2200™ Storage System
- Nexsan UNITY4400™ Storage System
- Nexsan UNITY6900™ Storage System
- Nexsan UNITY2200™ Storage Expansion
- Nexsan US224™ Storage Expansion
- Nexsan US316™ Storage Expansion
- Nexsan US424™ Storage Expansion
- Nexsan US460™ Storage Expansion

This Reference Guide assumes that you are familiar with Serial Attached SCSI (SAS) technology, computer hardware, data storage and network administration terminology and tasks.

Because this guide provides information that can be used to manage one or more Nexsan Unity Storage Expansions, the generic term “storage system” is used to refer to the controller, disk drives, and expansions being used together for data storage.

Many of the terms and concepts referred to in this Reference Guide are known to computer users by multiple names. This terminology is used:

- I/O Controller (also known as an I/O module, controller or controller node)
- Disk drive (also known as hard disk drive (HDD) or hard disk, and solid state disk drive (SSD))
- HBA (also known as Host Bus Adapter or SAS Adapter)

## Audience

This guide has been prepared for the following audience:

- IT system administrators
- Engineers
- Technicians
- Any qualified NST/Unity administrator.

## Conventions

Here is a list of text conventions used in this document:

Convention	Description
<u>underlined</u> <u>blue</u>	Cross-references, hyperlinks, URLs, and email addresses.
<b>boldface</b>	Text that refers to labels on the physical unit or interactive items in the graphical user interface (GUI).
monospace	Text that is displayed in the command-line interface (CLI) or text that refers to file or directory names.
<b>monospace</b> <b>bold</b>	Text strings that must be entered by the user in the command-line interface or in text fields in the graphical user interface (GUI).
<i>italics</i>	System messages and non-interactive items in the graphical user interface (GUI) References to Software User Guides

### *Notes, Tips, Cautions, and Warnings*

**Note** Notes contain important information, present alternative procedures, or call attention to certain items.

**Tip** Tips contain handy information for end-users, such as other ways to perform an action.



**CAUTION:** In hardware manuals, cautions alert the user to items or situations which may cause damage to the unit or result in mild injury to the user, or both. In software manuals, cautions alert the user to situations which may cause data corruption or data loss.



**WARNING:** Warnings alert the user to items or situations which may result in severe injury or death to the user.

## Contacting Nexsan

For questions about Nexsan products, please visit the [Nexsan support](#) Web page, and the Nexsan Unity [Documents & Online Help](#) page. If you are unable to find the answer to your question there, please see our contact information below.

### *Service and support*

Nexsan's Technical Services Group provides worldwide assistance with installation, configuration, software support, warranty, and repair for all Nexsan products. A variety of service and support programs are available to provide you with the level of coverage and availability your operation requires.

Nexsan Unity Documentation & Online Help page:

[https://helper.nexsansupport.com/unt\\_downloads.html](https://helper.nexsansupport.com/unt_downloads.html)

Unity Online Help page:

[https://helper.nexsansupport.com/unt\\_onlinehelp.html](https://helper.nexsansupport.com/unt_onlinehelp.html)

Contact Nexsan Unity support:

[https://helper.nexsansupport.com/unt\\_support](https://helper.nexsansupport.com/unt_support)

Worldwide Web site:

[www.nexsan.com](http://www.nexsan.com)

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## Related documentation

The following Nexsan product manuals contain related information:

- Nexsan Unity Online Help
- *Nexsan Unity Hardware Reference Guide*
- *Nexsan Unity Hardware Maintenance Guide, Unity Next Generation*
- *Nexsan Unity Software User Guide*
- *Nexsan Unity nxadmin Command-line Interface Reference Guide*
- *Nexsan Unity nxcmd Command-line Interface Reference Guide*
- *Nexsan Unity Snapshots and Replication Guide*
- *Nexsan Unity Storage Expansion Reference Guide*
- *Nexsan Unity VMware Best Practices Guide*
- *Nexsan Unity NFS Interoperability*
- *Nexsan Unity Networking Best Practices Guide*
- *Nexsan Unity Performance Best Practices Guide*
- *Nexsan Unity Microsoft Best Practices Guide*

## Safety notices

Always observe the following precautions to reduce the risk of injury and equipment damage:

- Computer components and disk drives are sensitive to static discharge. Take precautions to discharge any electrostatic charge from your person before and while handling components with your hands or any tools. Use an anti-static wrist-strap.
- The system only be installed in a clean, dry environment. The operating temperature is 10° to 35° C (50° to 95° F), with operating relative humidity at 20 to 95%, non-condensing.
- Do not install hardware in an enclosed cabinet or other small area without ventilation.
- Ensure correct lifting methods are used when handling hardware. Special care should be taken when removing hardware from its packaging and positioning it into its required location. When lifting hardware, two people at either end should lift slowly with their feet spread out to distribute the weight. Always keep your back straight and lift with your legs.
- When installing the system as a rack-mounted component, ensure that all Nexsan-supplied mounting fixtures are secure. All bolts and screws should be fully tightened. Failure to comply with this may result in the unit not being fully supported in the rack and could lead to the product falling from the rack causing personal injury or falling onto other rack components.
- Ensure that the rack is sufficiently stable by having wall anchors and/or stabilizing legs, and that the floor supporting the rack has sufficient strength for the overall weight loading.
- Only a fully-trained Service Engineer is authorized to disassemble any other part of the hardware, and then only when the hardware is powered off.
- The system has multiple power connections; as a result, you must remove all power leads to completely isolate the power and always use the IEC power cords which are supplied with the system.



**CAUTION:** All Nexsan Unity Storage Systems are hot-pluggable. However, new expansions must be powered on AFTER you connect it to the existing system.

# Chapter 1

## Unity Storage Expansion overview

---

This document describes and explains how to install and monitor the Nexsan Unity Storage Systems:

- Nexsan UNITY2200™ Storage System
- Nexsan UNITY4400™ Storage System
- Nexsan UNITY6900™ Storage System
- Nexsan UNITY2200X™ Storage Expansion
- Nexsan US224™ Storage Expansion
- Nexsan US316™ Storage Expansion
- Nexsan US424™ Storage Expansion
- Nexsan US460™ Storage Expansion

This section includes these topics:

<a href="#">Storage capacities by Unity Storage System</a> .....	12
<a href="#">Connection and configuration options</a> .....	13
<a href="#">Components and features</a> .....	14

## Storage capacities by Unity Storage System

Here is a brief listing of maximum storage capacities by Unity Storage System.

Unity Storage System	System capacity		Description
	Maximum storage capacity with SDDs	Maximum storage capacity with HDDs	
Unity2200	243 TB	280 TB	Entry-level system The UNITY2200 storage system can be used standalone as well.
Unity4400	737 TB	1.7 PB	Mid-level system Daisy chain support: One storage system with up to three storage expansions.
Unity6900	1.6 PB	4.6 PB	High-end system Cascade and daisy chain support: One storage system with up to eight storage expansions.



## Connection and configuration options

This table lists the Unity Storage Systems and their supported Unity Storage Expansions.

Nexsan Unity Storage Systems	UNITY2200X	US224	US316	US424	US460
UNITY2200	1, plus the front bay	x	x	x	x
UNITY4400	x	Up to 3 of any combined Storage Expansions, plus the front bay	Up to 3 of any combined Storage Expansions, plus the front bay	Up to 3 of any combined Storage Expansions, plus the front bay	Up to 3 of any combined Storage Expansions, plus the front bay
UNITY6900	x	Up to 8 of any combined Storage Expansions, plus the front bay	Up to 8 of any combined Storage Expansions, plus the front bay	Up to 8 of any combined Storage Expansions, plus the front bay	Up to 8 of any combined Storage Expansions, plus the front bay

### ► What's next

- [Basic configurations](#) on page 62
- [Cascade configurations](#) on page 68

## Components and features

This section shows the main components and capacities available in Unity Storage Systems Unity hardware.

### Front and top views

This section shows the Unity Storage Expansion front and top views (US460), with front bezels removed.

Figure 1-1: UNITY2200 and UNITY2200X

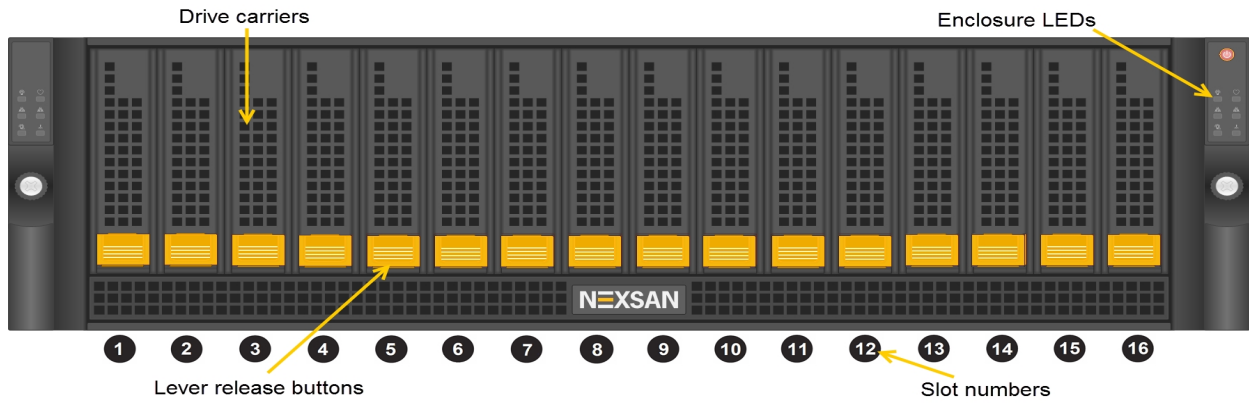


Figure 1-2: UNITY4400, UNITY6900, and US224

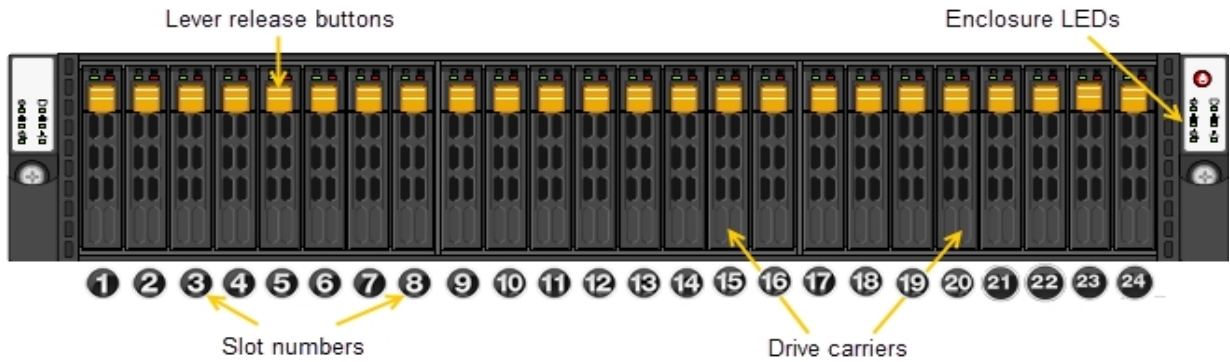


Figure 1-3: US316

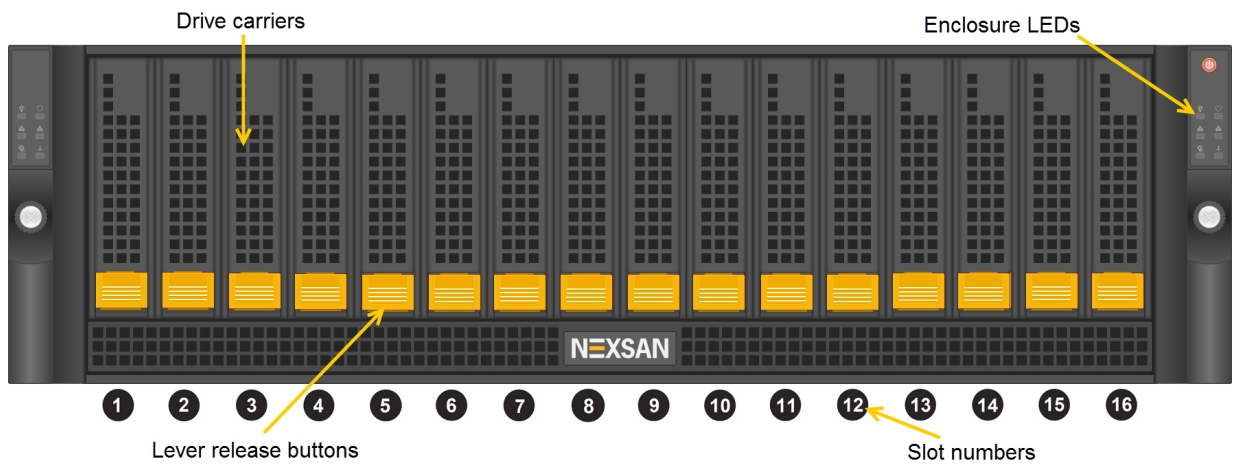


Figure 1-4: US424

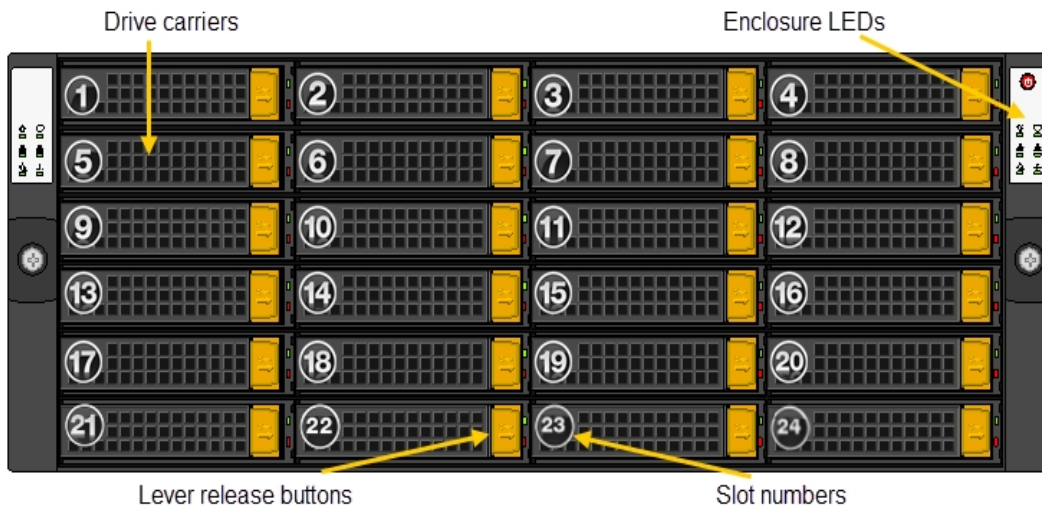
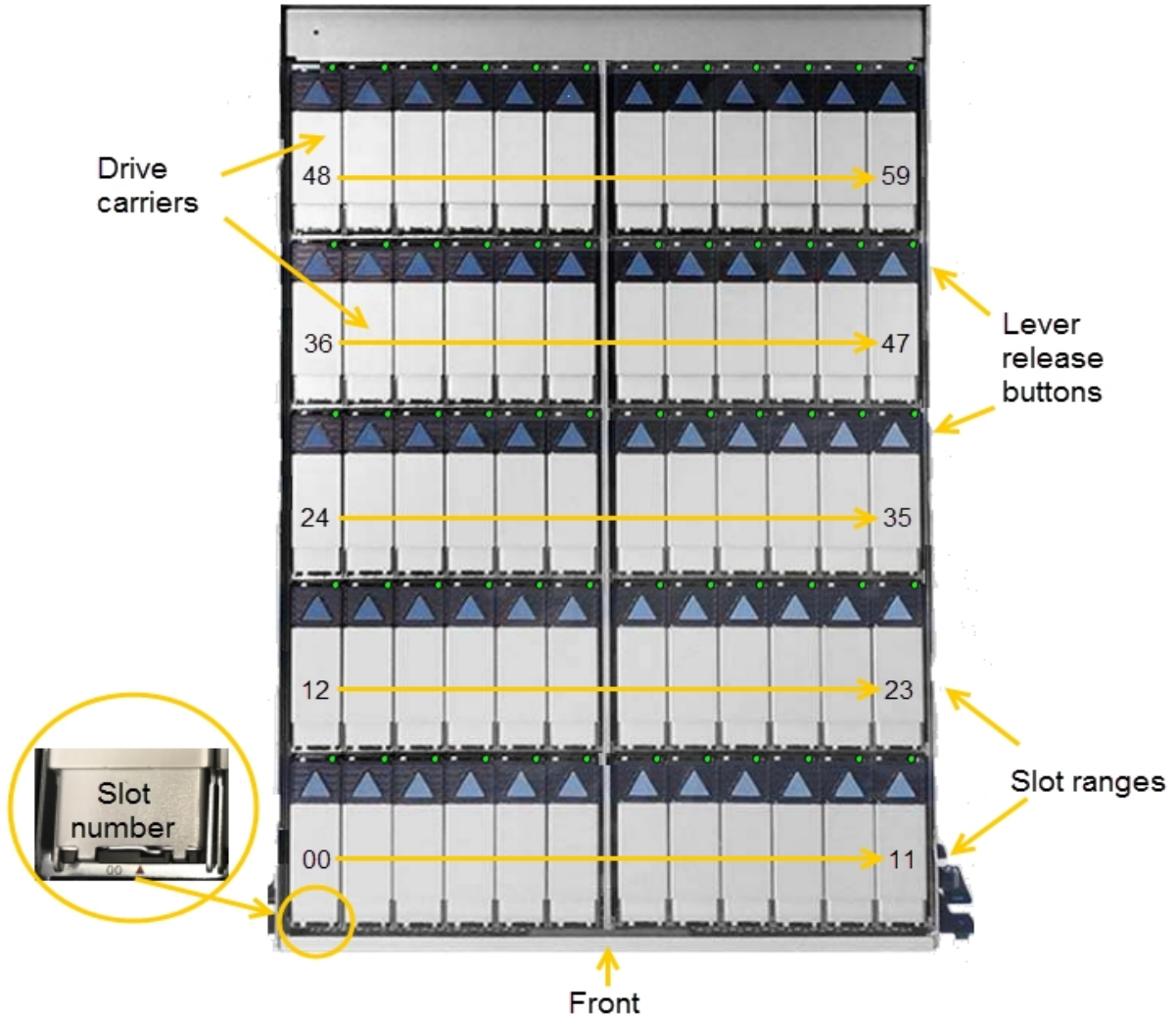


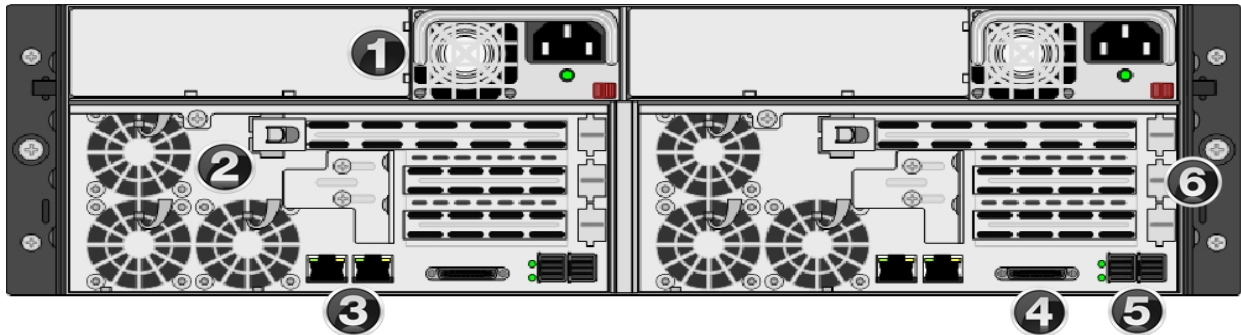
Figure 1-5: US460 top view



## Rear views

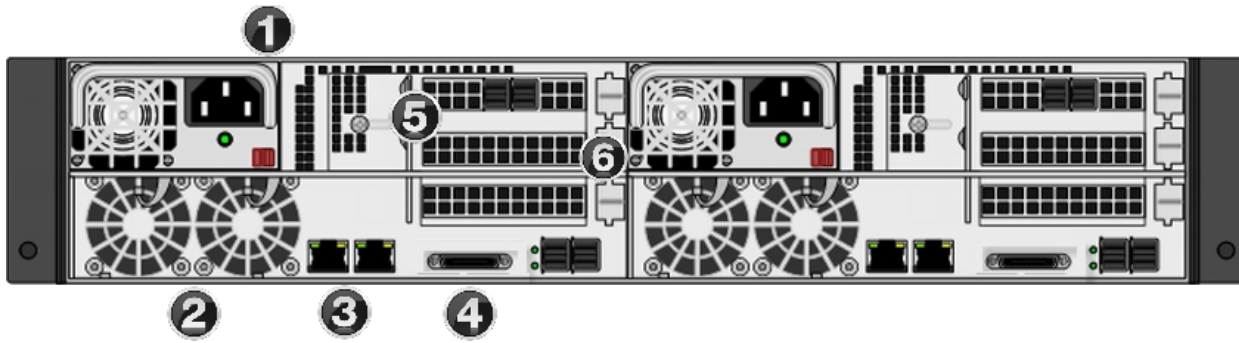
This section shows the Unity rear views.

Figure 1-6: UNITY2200



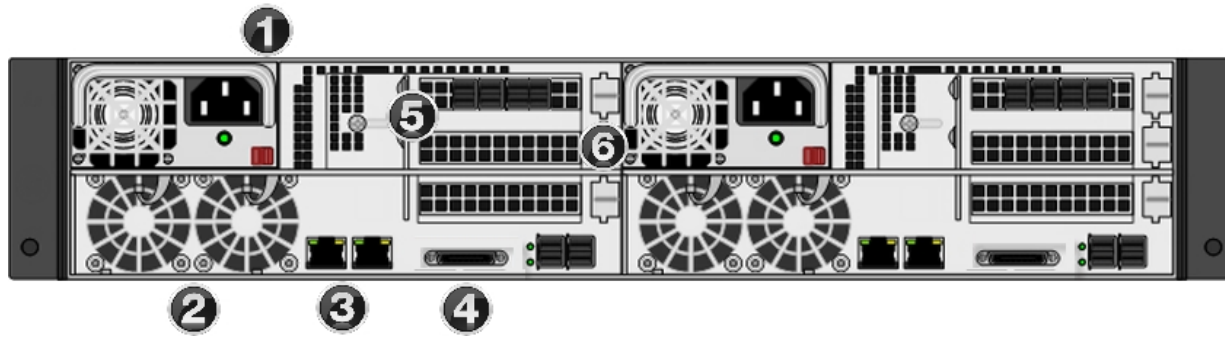
Item	Name	Description
1	Power supply unit	1200W redundant power supplies with PMBus
2	Fan assembly	4x 80mm and 4x 40mm PWM cooling fans Redundant cooling
3	On-board 10GigE LAN ports (2 per controller)	Right port: Primary data network interface (nx0 - optional) Left port: Management Interface (nx99) and IPMI interface
4	KVM connections	USB, VGA and Serial connections for remote console access to the Unity2200
5	Storage connectivity	Dual-port SAS PCIe to HD Mini-SAS HBA
6	Optional connectivity (up to two): Dual-port 8 Gb Fibre Channel to Express HBA	You can use these slots for additional network cards, which can be any of these supported NICs: <ul style="list-style-type: none"> <li>● 10 GbE dual-port HBA with RJ-45 interfaces</li> <li>● 10 GbE dual-port HBA with SFP+ optical interfaces</li> <li>● 8 Gb FC dual-port HBA</li> <li>● 16 Gb FC dual-port HBA</li> <li>● 1 GbE quad-port HBA with RJ-45 interfaces</li> <li>● 1 GbE dual-port HBA with RJ-45 interfaces</li> </ul>

Figure 1-7: UNITY4400



Item	Name	Description
1	Power supply unit	1200W redundant power supplies with PMBus
2	Fan assembly	4x 80mm and 4x 40mm PWM cooling fans Redundant cooling
3	On-board 10GigE LAN ports (2 per controller)	Right port: Primary data network interface (nx0 - optional) Left port: Management Interface (nx99) and IPMI interface
4	KVM connections	USB, VGA and Serial connections for remote console access to the Unity2200
5	Storage connectivity	Dual-port SAS PCIe to HD Mini-SAS HBA
6	Optional connectivity (up to two): Dual-port 8 Gb Fibre Channel to Express HBA	You can use these slots for additional network cards, which can be any of these supported NICs: <ul style="list-style-type: none"> <li>• 10 GbE dual-port HBA with RJ-45 interfaces</li> <li>• 10 GbE dual-port HBA with SFP+ optical interfaces</li> <li>• 8 Gb FC dual-port HBA</li> <li>• 16 Gb FC dual-port HBA</li> <li>• 1 GbE quad-port HBA with RJ-45 interfaces</li> <li>• 1 GbE dual-port HBA with RJ-45 interfaces</li> </ul>

Figure 1-8: UNITY6900



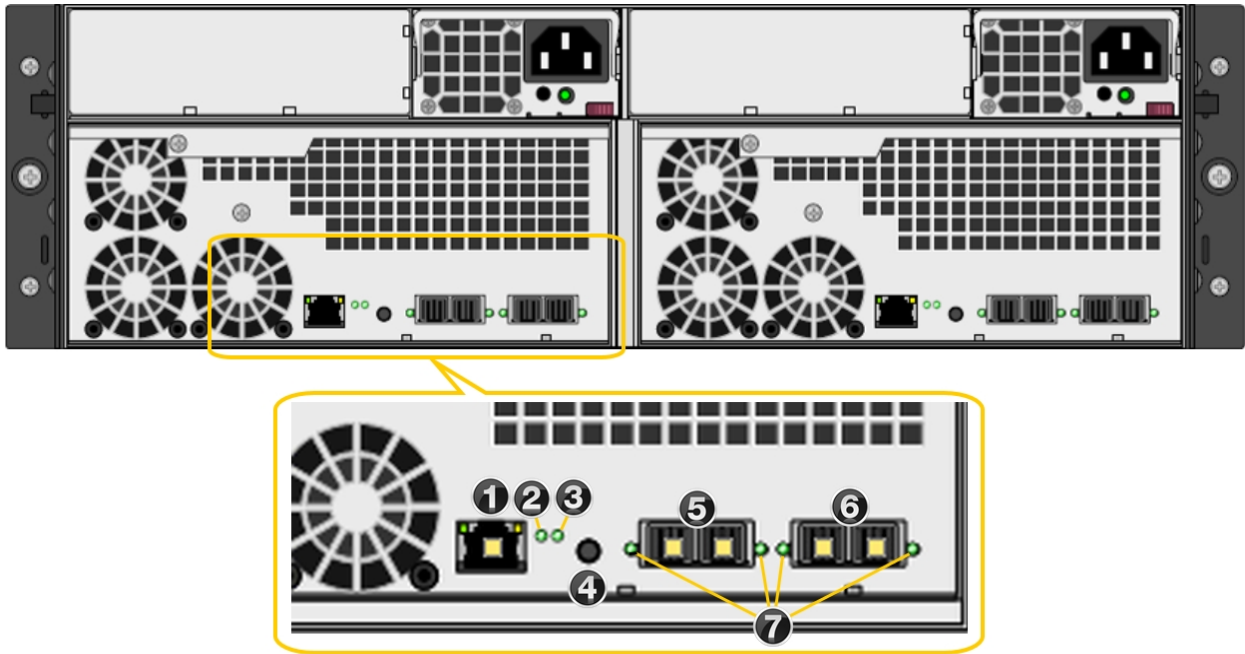
Item	Name	Description
1	Power supply unit	1200W redundant power supplies with PMBus
2	Fan assembly	4x 80mm and 4x 40mm PWM cooling fans Redundant cooling
3	On-board 10GigE LAN ports (2 per controller)	Right port: Primary data network interface (nx0 - optional) Left port: Management Interface (nx99) and IPMI interface
4	KVM connections	USB, VGA and Serial connections for remote console access to the Unity2200
5	Storage connectivity	Quad-port SAS PCIe to HD Mini-SAS HBA
6	Optional connectivity (up to two): Dual-port 8 Gb Fibre Channel to Express HBA	You can use these slots for additional network cards, which can be any of these supported NICs: <ul style="list-style-type: none"> <li>● 10 GbE dual-port HBA with RJ-45 interfaces</li> <li>● 10 GbE dual-port HBA with SFP+ optical interfaces</li> <li>● 8 GbE FC dual-port HBA</li> <li>● 16 GbE FC dual-port HBA</li> <li>● 1 GbE quad-port HBA with RJ-45 interfaces</li> <li>● 1 GbE dual-port HBA with RJ-45 interfaces</li> </ul>

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### Unity Storage Expansions

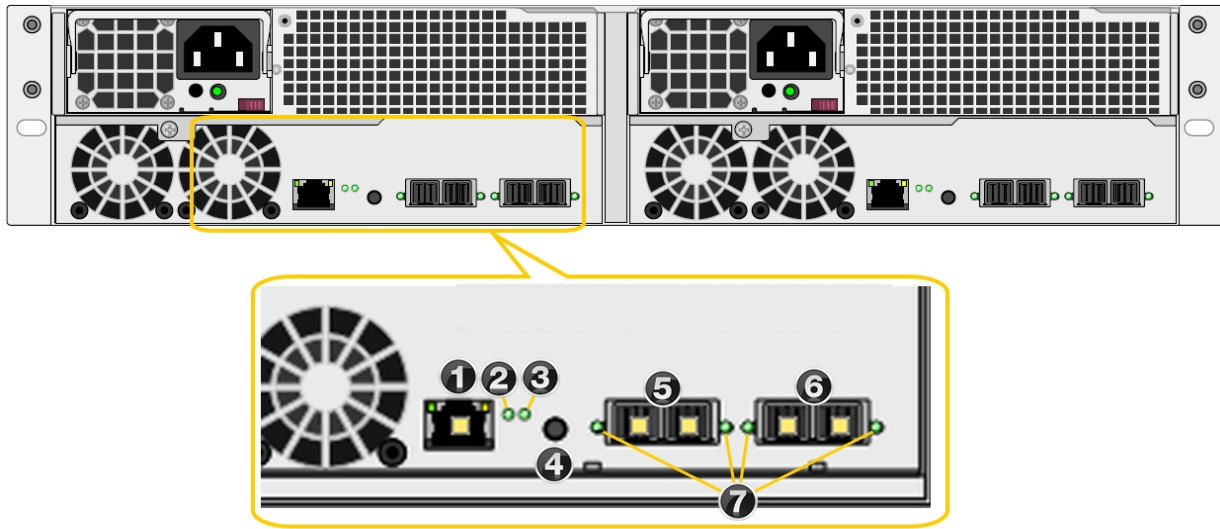
This section illustrates Unity Storage Expansion rear views.

Figure 1-9: UNITY2200X



Item	Name	Description
1	LAN Port	Not used
2	Storage unit status LED	Green: Initialization successful Red: Initialization failure
3	Unit ID status LED	On/Off
4	BMC Reset button	Resets the base management controller
5	SAS IN ports	Serial Attached SCSI IN ports from the Storage System
6	SAS OUT ports	SAS OUT ports to another storage unit
7	SAS link status LEDs (2 IN, 2 OUT)	Green: All four physical layers (PHY) of each port connected with consistent link speed (12 G or 6 G) Red: Single PHY degraded link speed or disconnected

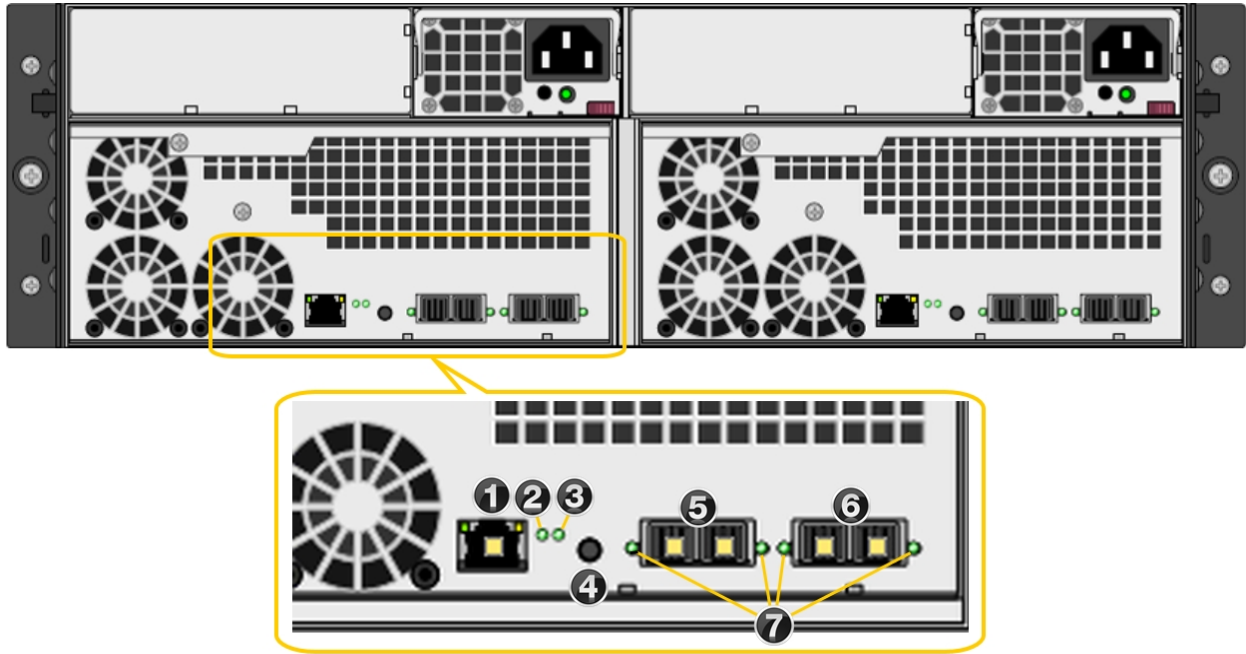
Figure 1-10: US224



Item	Name	Description
1	LAN Port	Not used
2	Storage unit status LED	Green: Initialization successful Red: Initialization failure
3	Unit ID status LED	On/Off
4	BMC Reset button	Resets the base management controller
5	SAS IN ports	Serial Attached SCSI IN ports from the Storage System
6	SAS OUT ports	SAS OUT ports to another storage unit
7	SAS link status LEDs (2 IN, 2 OUT)	Green: All four physical layers (PHY) of each port connected with consistent link speed (12 G or 6 G) Red: Single PHY degraded link speed or disconnected

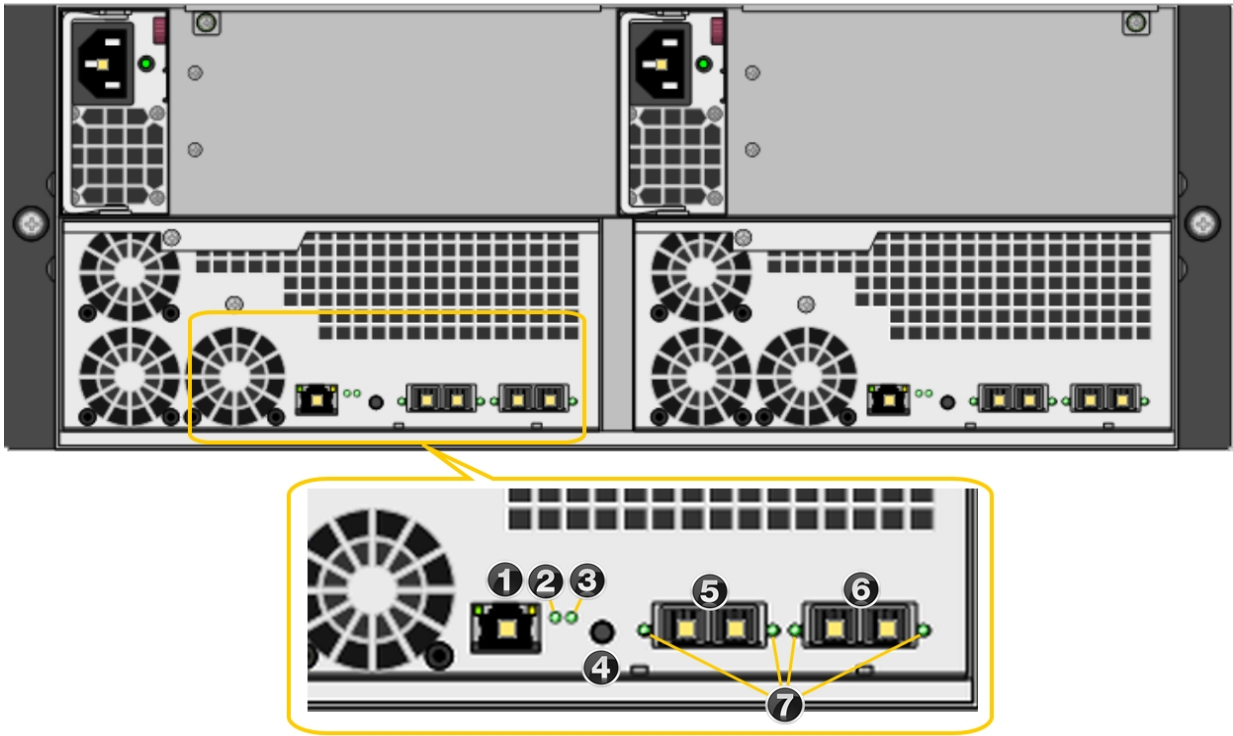


Figure 1-11: US316



Item	Name	Description
1	LAN Port	Not used
2	Storage unit status LED	Green: Initialization successful Red: Initialization failure
3	Unit ID status LED	On/Off
4	BMC Reset button	Resets the base management controller
5	SAS IN ports	Serial Attached SCSI IN ports from the Storage System
6	SAS OUT ports	SAS OUT ports to another storage unit
7	SAS link status LEDs (2 IN, 2 OUT)	Green: All four physical layers (PHY) of each port connected with consistent link speed (12 G or 6 G) Red: Single PHY degraded link speed or disconnected

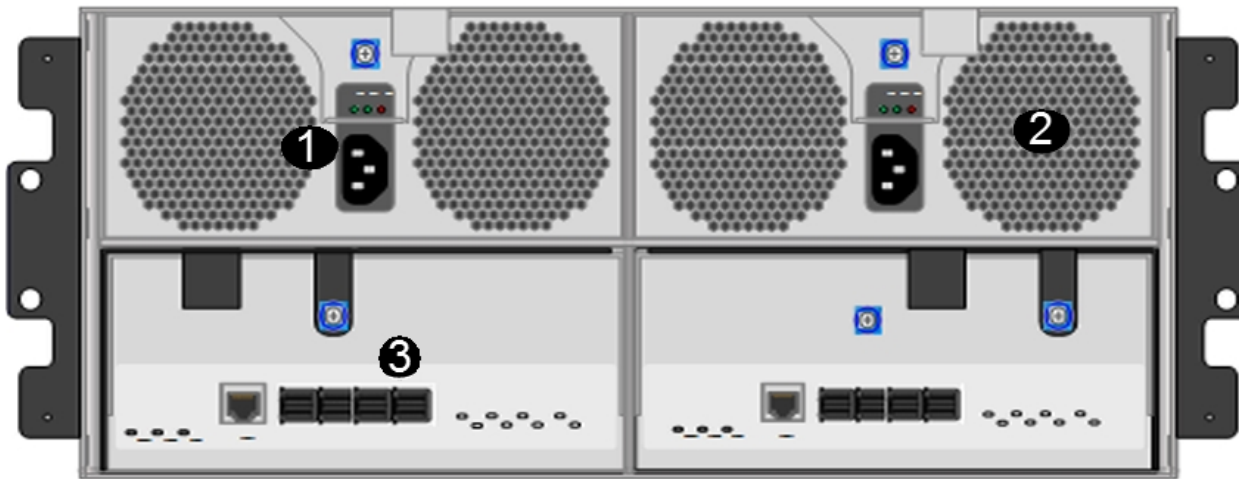
Figure 1-12: US424



1

Item	Name	Description
1	LAN Port	Not used
2	Storage unit status LED	Green: Initialization successful Red: Initialization failure
3	Unit ID status LED	On/Off
4	BMC Reset button	Resets the base management controller
5	SAS IN ports	Serial Attached SCSI IN ports from the Storage System
6	SAS OUT ports	SAS OUT ports to another storage unit
7	SAS link status LEDs (2 IN, 2 OUT)	Green: All four physical layers (PHY) of each port connected with consistent link speed (12 G or 6 G) Red: Single PHY degraded link speed or disconnected

Figure 1-13: US460



Item	Name	Description
1	Power supply units	<ul style="list-style-type: none"> <li>• Two 1650W PSUs, hot swappable and redundant</li> <li>• AC Input voltage: 200-240VAC auto-ranging, 47Hz-63Hz input (high line power only)</li> </ul>
2	Fan assemblies	<ul style="list-style-type: none"> <li>• Cooling system: <ul style="list-style-type: none"> <li>• 4 x 80 mm and 4 x 40 mm PWM cooling fans</li> <li>• Redundant cooling</li> </ul> </li> </ul>
3	SAS Ports	Storage connectivity: SAS Quad port PCIe to Serial Attached SCSI (HD Mini-SAS) host bus adapter

For more information, see:

- [About the SAS I/O controllers on the next page](#)
- [About the power supply units \(PSUs\) on the next page](#)
- [About the disk drives and drive carriers on page 25](#)
- [Disk drive specifications on page 28](#)
- [Cable specifications on page 30](#)

## About the SAS I/O controllers

Unity Storage Systems and Unity Storage Expansions connect using HBA SAS I/O controllers on the back of the enclosures.

### Making SAS connections

The Unity2200 connects to the UNITY2200X from the lower, on-board HBA SAS ports, while the UNITY4400 and UNITY6900 connect from the upper, add-on SAS ports to the lower on-board HBA SAS ports on the US224, US316, US424, or US460. See [Connection and configuration options](#) on page 13.

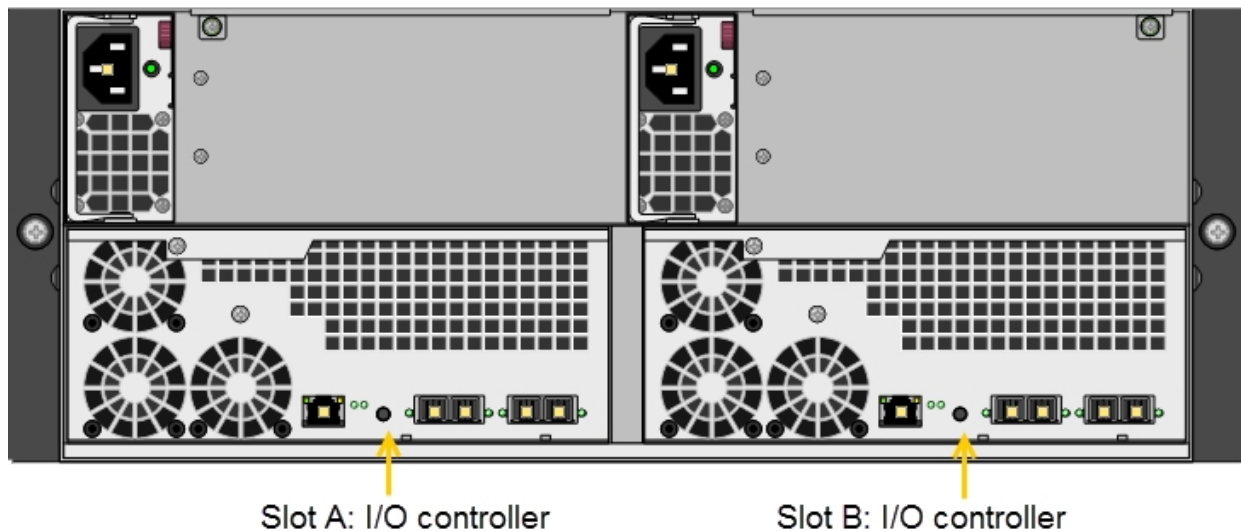
#### ▶ SAS I/O controller LEDs and ports

Each controller also has status LEDs on the front, as described in [Monitoring enclosures](#) on page 81. The diagram below identifies the rear I/O controller ports and LEDs.

#### ▶ Controller slot numbers

This diagram identifies controller slot order for a typical Unity Storage Expansion—slot A is on the left and slot B is on the right.

Figure 1-14: US424 SAS I/O controller slots



## About the power supply units (PSUs)

The cooling fans in each PSU run on separate circuits from the power supply. Therefore, if one PSU fails, its fans continue to run on power supplied by the other PSU.

**Note** PSUs are hot-swappable; see [Replacing a PSU](#) on page 93 for more information.

#### ▶ Maintaining correct airflow and cooling:

In addition to supplying power, the PSUs maintain proper airflow and cooling within the enclosure.

Because there are two PSUs, Unity Storage Systems can continue to operate even if one PSU fails.

However, for proper operation and cooling, two PSUs with fully-functional fans must be installed at all times.

A unit can run **temporarily** (for no more than five minutes) with a single PSU while you install a new one—you must install a second PSU **as quickly as possible** to maintain correct airflow and cooling.



**CAUTION:** Once you remove a failed PSU, you must replace it within five minutes or the remaining unit may overheat and shut down to prevent hardware damage. This type of shutdown is **immediate**—unexpected loss of data access and permanent data loss may occur.

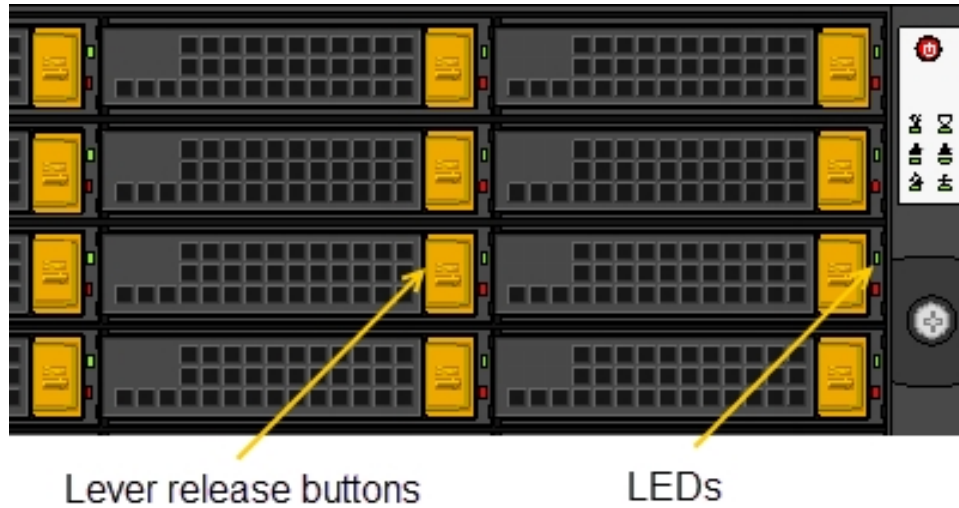
### About the disk drives and drive carriers

Each disk drive is mounted in a drive carrier with a push-button lever for quick installation and removal. Each drive carrier has two LEDs, which indicate status as described in [Monitoring disk drives](#) on page 85.

To maintain proper airflow and cooling inside the enclosure, drive slots cannot be left empty. Blank drive carriers are available to fill empty drive slots.

Disk drives are hot-swappable.

Figure 1-15: Example of US424 drive carrier front view



**Note** A disk drive must not be removed from its drive carrier. A disk drive removed from its carrier is not covered by the hardware warranty.

#### ► Drive slot numbers:

Figure 1-16: UNITY2200X drive slot numbers

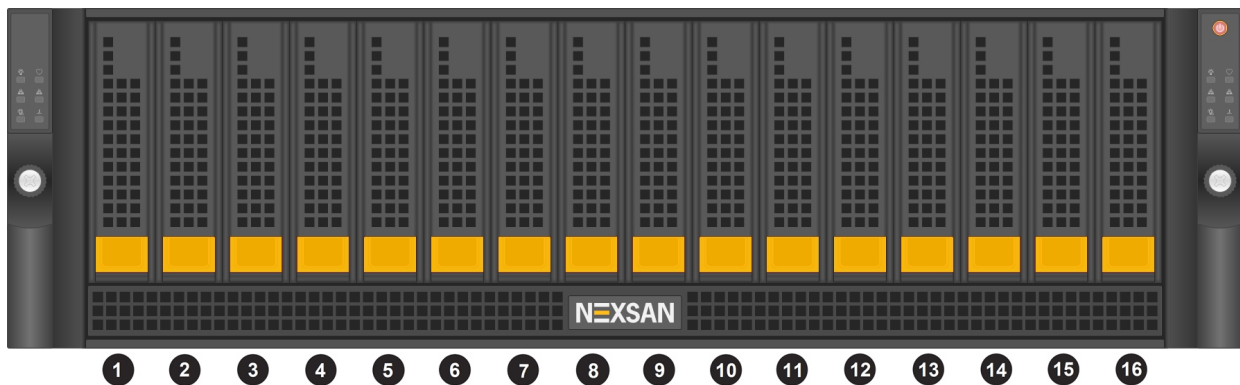


Figure 1-17: US224 drive slot numbers



Figure 1-18: US316 drive slot numbers

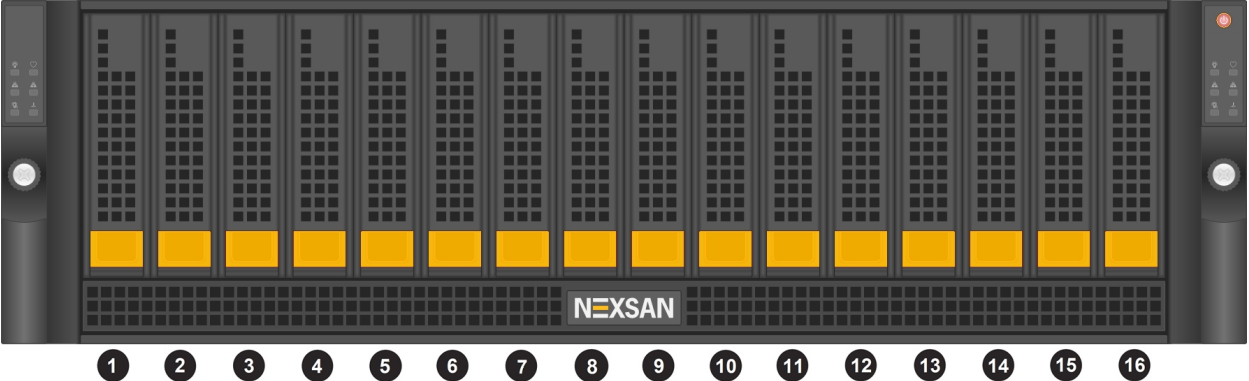
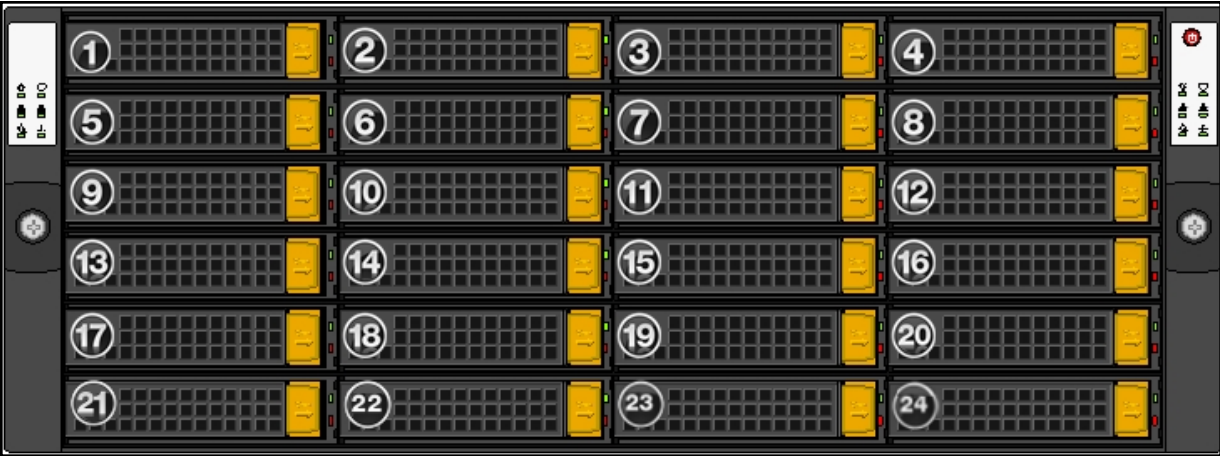
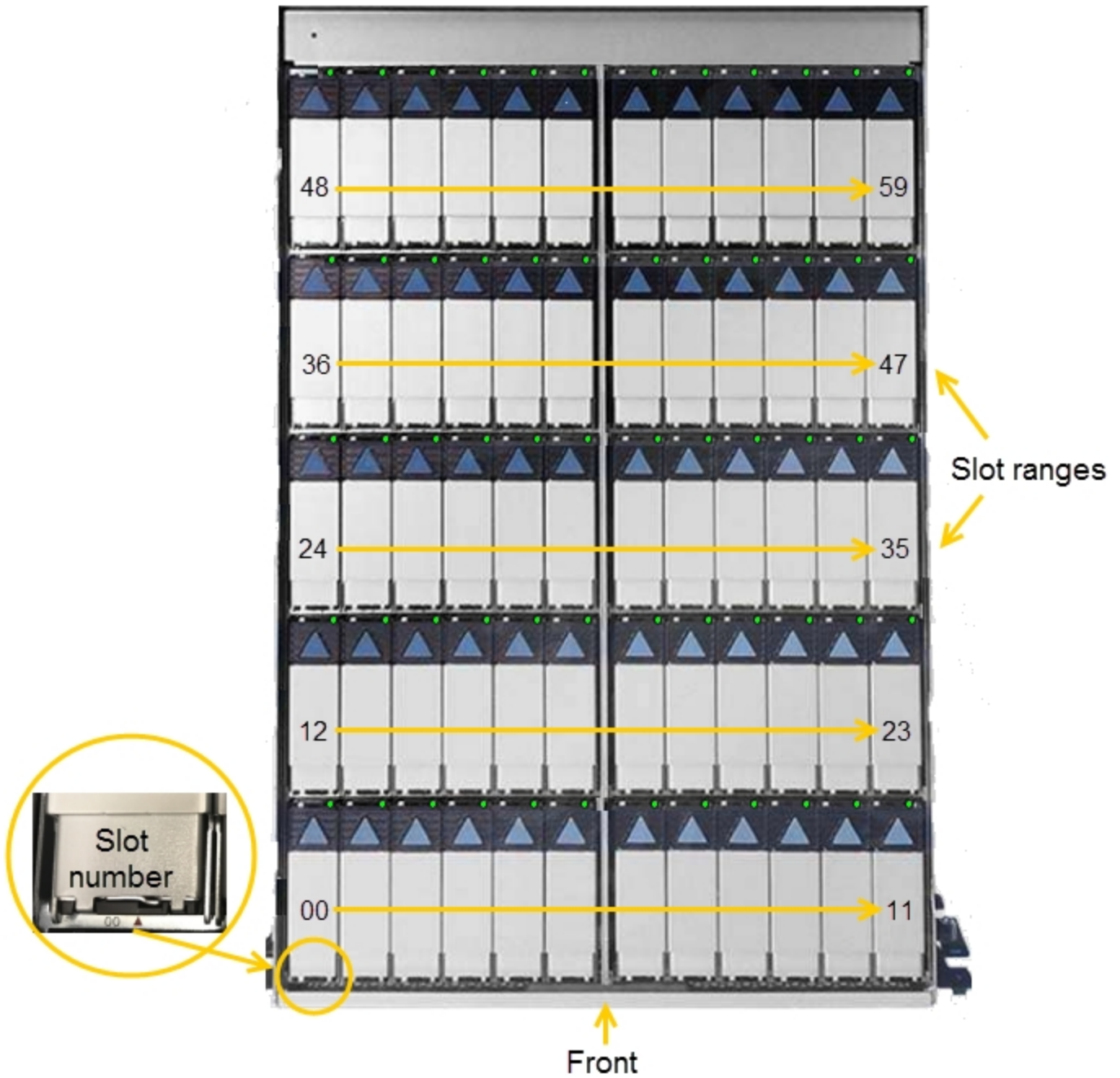


Figure 1-19: US424 drive slot numbers



1

Figure 1-20: US460 drive slot numbers





### Disk drive specifications

Unity Storage System disk drives must be qualified by Nexsan and meet the specifications listed in this section. See also [Technical specifications on page 99](#) and the [product data sheets](#), available at Nexsan.com.

#### Unity2200 and UNITY2200X

Disk drive specifications for these Unity storage expansions:

Feature	Description
Form factor	3U 3.5" front-loading
Disk drives	Up to 15 HDDs and one FASTier read drive
	HDD drives: 7.2K 600 GB   900 GB   1.2 TB   1.8 TB 10K: 2TB   4TB   6TB   8TB   10TB   12TB
	FASTier SSD drives One 800 GB drive per drive pack, option to upgrade to 1.92 TB FASTier or 3.84 TB drives
Cascadable?	No
Hot-swap/hot-plug support	Yes
Interface	SAS 3
Transfer rate	12.0 Gb/sec
Upgradable disk drive firmware?	Yes

#### US316

Disk drive specifications for these Unity storage expansions:

Feature	Description
Form factor	3U 3.5" front-loading
Disk drives	Up to 15 HDDs and one FASTier read drive
	HDD drives: 7.2K 600 GB   900 GB   1.2 TB   1.8 TB 10K: 2TB   4TB   6TB   8TB   10TB   12TB
	FASTier SSD drives One 800 GB drive per drive pack, option to upgrade to 1.92 TB FASTier or 3.84 TB drives
Cascadable?	Yes



Feature	Description
Hot-swap/hot-plug support	Yes
Interface	SAS 3
Transfer rate	12.0 Gb/sec
Upgradable disk drive firmware?	Yes

### *UNITY4400, UNITY6900, and US224*

Disk drive specifications for these Unity storage expansions:

Feature	Description
Form factor	2U 2.5" front-loading
Disk drives	Supports up to 24 drives (SSD option)
	SSD drives: 800 GB   1.9 TB   3.8 TB   7.6 TB
	HDD drives 7.2K: 600 GB   900 GB   1.2 TB   1.8 TB 10K: 2TB   4TB   6TB   8TB   10TB   12TB
	FASTier SSD drives: 800 GB per drive pack, option to upgrade to 1.92 TB FASTier or 3.84 TB drives. Not used when all data drives are SSDs.
Cascadable?	Yes. See <a href="#">Connection and configuration options</a> on page 13
Hot-swap/hot-plug support	Yes
Interface	SAS 3
Transfer rate	12.0 Gb/sec
Upgradable disk drive firmware?	Yes

### *US424*

Disk drive specifications for these Unity storage expansions:

Feature	Description
Form factor	4U 3.5" front-loading
Disk drives	Supports up to 24 drives
	HDD drives

Feature	Description
	.2K: 2TB   4TB   6TB   8TB   10TB   12TB 10K: 2TB   4TB   6TB   8TB   10TB   12TB
	FASTier SSD drives: 800 GB per drive pack, option to upgrade to 1.92 TB FASTier or 3.84 TB drives
Cascadable?	Yes
Hot-swap/hot-plug support	Yes
Interface	SAS 3
Transfer rate	12.0 Gb/sec
Upgradable disk drive firmware?	Yes

### US460

Disk drive specifications for these Unity storage expansions:

Feature	Description
Form factor	4U 3.5" top loading
Disk drives	
	Supported drives: HGST or Sandisk 2TB   4TB   6TB   8TB   10TB   12TB
	FASTier SSD drives: 800 GB FASTier per drive pack. Option to upgrade to 1.92 TB FASTier or 3.84 TB drives
Cascadable?	Yes
Hot-swap/hot-plug support	Yes
Interface	SAS 3
Transfer rate	12.0 Gb/sec
Upgradable disk drive firmware?	Yes

### Cable specifications

To connect a Nexsan Unity Storage Expansion, use high-quality SAS cables that meet these length requirements:

#### Passive SAS

- Minimum length: 0.5 meters
- Maximum length: 3 meters

**Active cables**

- Any length

For updated disk drive information or to purchase approved SAS cables, please contact your Nexsan sales representative or reseller.



# Chapter 2

## Installing Unity Storage Systems

---

This chapter explains how to install Unity Storage Systems.

The chapter includes these topics:

Preparing for the installation .....	34
Package contents .....	34
Installing a Unity2200, Unity2200X, or US316 in a rack .....	40
Installing a Unity4400, Unity6900, or US224 in a rack .....	44
Installing a US424 in a rack .....	48
Installing a US460 in a rack .....	52
Installing the disk drives in the Unity2200, Unity2200X, and US316 .....	56
Installing the disk drives in the US224, Unity4400, and Unity6900 .....	58
Installing the disk drives in the US424 .....	59
Installing the disk drives in the US460 .....	60

## Preparing for the installation

▶ **Before you begin:**

1. Carefully read [Safety notices](#) on page ix.
2. Ensure ahead of time that you have chosen a suitable location for the enclosure and the rack; see [Technical specifications](#) on page 99.
3. Ensure that you have a Phillips screwdriver.
4. Have someone assist you during installation.



**CAUTION:** Acclimate new disk drives to room temperature for 2 hours before installation.

▶ **To unpack the Unity Storage Expansions:**

1. Remove all the components from packaging. Position hands under the chassis to pull it free from the foam insert.

Do NOT lift out the chassis from its packaging using the controller handles or attached rails.

2. Place the components on an anti-static surface until you are ready to use them.

## Package contents

When you receive your Unity hardware shipment, check to ensure that no damage has been sustained to the packaging in transit. If any enclosure shows damage, you should file a damage claim with the carrier who delivered it. See also [Components not included in your package](#)

### *UNITY2200 Storage System*

Your shipment includes these components:

Quantity	Item description
1	Unity 2200 3U dual-controller chassis with 16-drive (3.5") front bay enclosure (with front bezel)
<b>Rack mounting hardware</b>	
2	Outer-rack rail assemblies (inner-chassis rails are already installed)
4	Mounting screws with 4 washers to attach outer-rack rails to the rack (1 on the front and 1 on the back for both the left and right rail assemblies)
<b>Disk drives</b>	
	FASTier, SSD, and HDD drives. Check that the components included in your shipment correspond to your packing slip.
<b>Cables and miscellaneous items</b>	
2	SAS cables (Mini SAS HD to Mini SAS HD)
2	Power cords

Quantity	Item description
2	KVM cables
1	Electrostatic discharge (ESD) wrist strap
1	DVD containing the Discovery wizard and documentation

### *UNITY4400 Storage System*

Your shipment includes these components:

Quantity	Item description
1	Unity4400 2U dual-controller chassis with 24-drive (2.5") front bay enclosure (with front bezel)

#### **Rack mounting hardware**

2	Outer-rack rail assemblies (inner-chassis rails are already installed)
4	Mounting screws with 4 washers to attach outer-rack rails to the rack (1 on the front and 1 on the back for both the left and right rail assemblies)
2	Long screws to secure the chassis to the rack from the front (attached to the chassis)

#### **Disk drives**

FASTier, SSD, and HDD drives. Check that the components included in your shipment correspond to your packing slip.

#### **Cables and miscellaneous items**

4	SAS cables (Mini SAS HD to Mini SAS HD)
2	Power cords
2	KVM cables
1	Electrostatic discharge (ESD) wrist strap
1	DVD containing the Discovery wizard and documentation

### *UNITY6900 Storage System*

Your shipment includes these components:

Quantity	Item description
1	Unity6900 2U dual-controller chassis with 24-drive (2.5") front bay enclosure (with front bezel)

#### **Rack mounting hardware**

2	Outer-rack rail assemblies (inner-chassis rails are already installed)
4	Mounting screws with 4 washers to attach outer-rack rails to the rack (1 on the front and 1 on the back for both the left and right rail assemblies)

Quantity	Item description
	the back for both the left and right rail assemblies)
2	Long screws to secure the chassis to the rack from the front (attached to the chassis)
<b>Disk drives</b>	
	FASTier, SSD, and HDD drives. Check that the components included in your shipment correspond to your packing slip.
<b>Cables and miscellaneous items</b>	
4	SAS cables (Mini SAS HD to Mini SAS HD)
2	Power cords
2	KVM cables
1	Electrostatic discharge (ESD) wrist strap
1	DVD containing the Discovery wizard and documentation

## UNITY2200X Storage Expansion

Your shipment includes these components:

Quantity	Item description
1	Unity 2200 3U dual-controller chassis with 16-drive (3.5") front bay enclosure (with front bezel)
<b>Rack mounting hardware</b>	
2	Outer-rack rail assemblies (inner-chassis rails are already installed)
4	Mounting screws with 4 washers to attach outer-rack rails to the rack (1 on the front and 1 on the back for both the left and right rail assemblies)
<b>Disk drives</b>	
	FASTier, SSD, and HDD drives. Check that the components included in your shipment correspond to your packing slip.
<b>Cables and miscellaneous items</b>	
2	SAS cables (Mini SAS HD to Mini SAS HD)
2	Power cords
2	KVM cables
1	Electrostatic discharge (ESD) wrist strap

## US224

Your shipment includes these components:



Quantity	Item description
1	US224 2U storage expansion (with front bezel)
<b>Rack mounting hardware</b>	
2	Outer-rack rail assemblies (inner-chassis rails are already installed)
4	Mounting screws with 4 washers to attach outer-rack rails to the rack (1 on the front and 1 on the back for both the left and right rail assemblies)
2	Long screws to secure the chassis to the rack from the front (attached to the chassis)
<b>Disk drives</b>	
	FASTier, SSD, and HDD drives. Check that the components included in your shipment correspond to your packing slip.
<b>Cables and miscellaneous items</b>	
	SAS cables (Mini SAS HD to Mini SAS HD)
2	Power cords
2	KVM cables
1	Electrostatic discharge (ESD) wrist strap

## US316

Your shipment includes these components:

Quantity	Item description
1	US316 3U dual-controller storage expansion with 16-drive (3.5") front bay enclosure (with front bezel)
<b>Rack mounting hardware</b>	
2	Outer-rack rail assemblies (inner-chassis rails are already installed)
4	Mounting screws with 4 washers to attach outer-rack rails to the rack (1 on the front and 1 on the back for both the left and right rail assemblies)
<b>Disk drives</b>	
	FASTier, SSD, and HDD drives. Check that the components included in your shipment correspond to your packing slip.
<b>Cables and miscellaneous items</b>	
	SAS cables (Mini SAS HD to Mini SAS HD)
2	Power cords

Quantity	Item description
2	KVM cables
1	Electrostatic discharge (ESD) wrist strap

### US424

Your shipment includes these components:

Quantity	Item description
1	US424 expansion (with front bezel)

#### Rack mounting hardware

2	Outer-rack rail assemblies (inner-chassis rails are already installed)
4	Mounting screws with 4 washers to attach outer-rack rails to the rack (1 on the front and 1 on the back for both the left and right rail assemblies)
2	Long screws to secure the chassis to the rack from the front (attached to the chassis)

#### Disk drives

	FASTier, SSD, and HDD drives. Check that the components included in your shipment correspond to your packing slip.
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#### Cables and miscellaneous items

	SAS cables (Mini SAS HD to Mini SAS HD)
2	Power cords
2	KVM cables
1	Electrostatic discharge (ESD) wrist strap

### US460

Your shipment includes these components:

Quantity	Item description
1	US460 expansion (with front bezel)

#### Rack mounting hardware

2	Outer-rack rail assemblies (inner-chassis rails are already installed)
4	Mounting screws with 4 washers to attach outer-rack rails to the rack (1 on the front and 1 on the back for both the left and right rail assemblies)
2	Long screws to secure the chassis to the rack from the front (attached to the chassis)

Quantity	Item description
<b>Disk drives</b>	
	FASTier, SSD, and HDD drives. Check that the components included in your shipment correspond to your packing slip.
<b>Cables and miscellaneous items</b>	
	SAS cables (Mini SAS HD to Mini SAS HD)
2	Power cords
2	KVM cables
1	Electrostatic discharge (ESD) wrist strap

### *Components not included in your package*

- Client computer
- Network switches
- Network cables

Recommended	Acceptable
10GbE Ethernet: CAT6a cable	10GbE Ethernet: CAT6 or higher cable
1GbE Ethernet: CAT6 cable	1GbE Ethernet: CAT5E or higher cable
10GbE Fibre	Multimode duplex LC/LC 50µ OM3 Fibre cable

## Installing a Unity2200, Unity2200X, or US316 in a rack



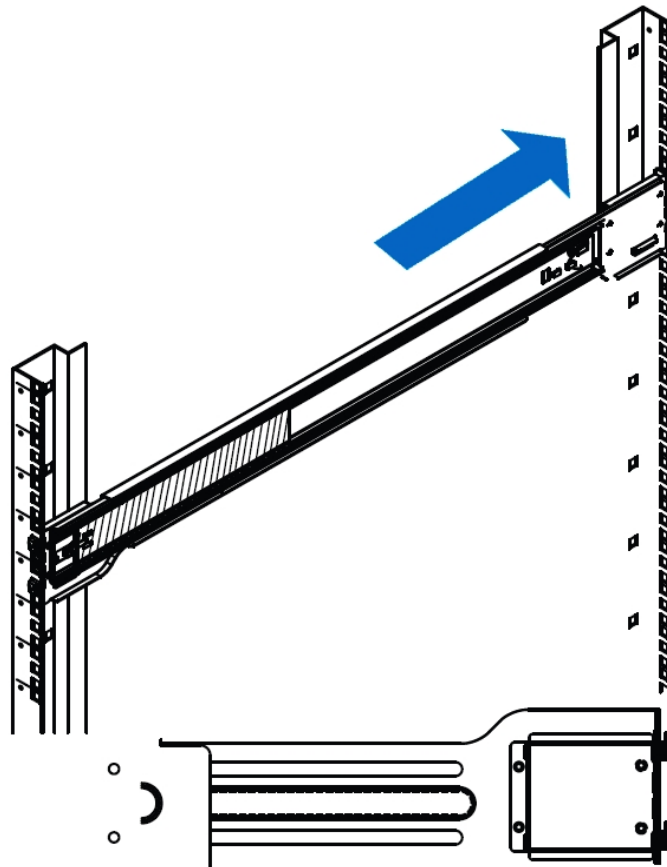
**CAUTION:** Unity Storage Systems and Expansions are heavy. Physical installation requires two people.

▶ **Step 1: Remove the front bezel**

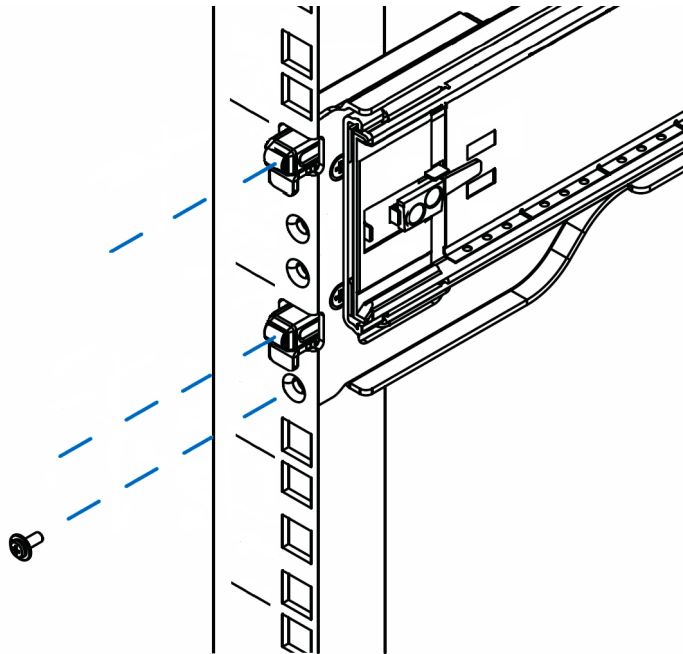
1. Turn the keylock at the right end of the bezel to the unlock position.
2. Unhook the left end of the bezel from the chassis.

▶ **Step 2: Install the outer-rack rails on the rack**

1. Attach the RIGHT and LEFT outer-rack rails to the rack by inserting the hooks included on the rails into the holes provided on the rack. The hooks should be located in the TOP holes of the rack units selected.
2. Extend rail assemblies to fit the depth of the rack. Pull on the rear of the assembly until the hooks reach the back of the rack.



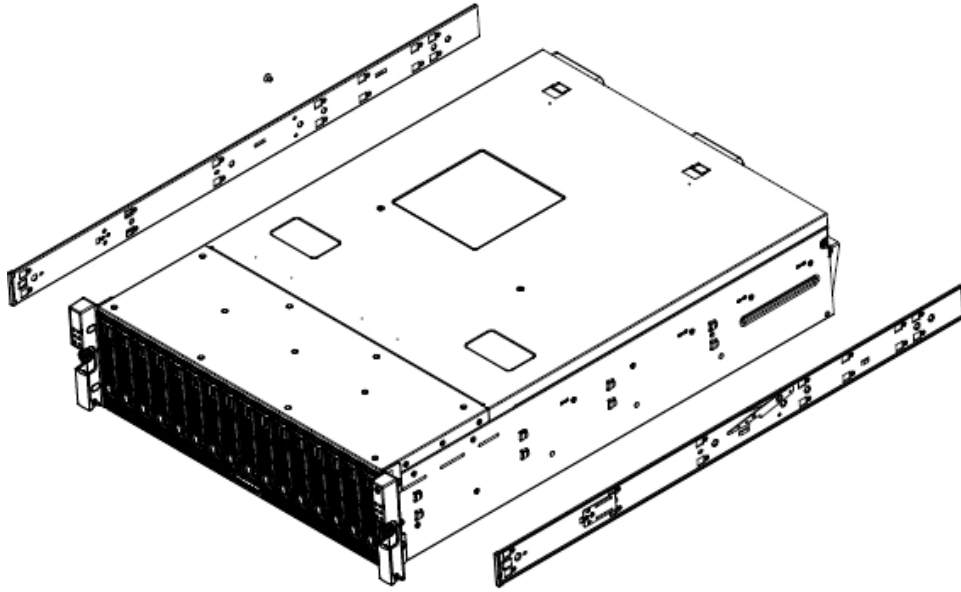
3. Screw the rail to the rack using the mounting screws provided. The screws should be secured in the **BOTTOM** hole on the front and back of each rail assembly.



► **Step 3: install the inner-rack rails (if necessary):**

1. Ensure the Unity chassis is upright and locate the **LEFT** hand rail assembly.
2. Extend the inner rail toward the front of the rail assembly as far as possible, then depress the locking tab to pull it completely out and remove it from the rest of the rail assembly.
3. Place the inner rail on the side of the chassis, and make sure that you align the hooks of the chassis with the rail extension holes.
4. Slide the extension toward the front of the chassis until it clicks and locks into place.
5. Secure the inner-rail rack to the chassis with the mounting screws provided with your hardware installation package.

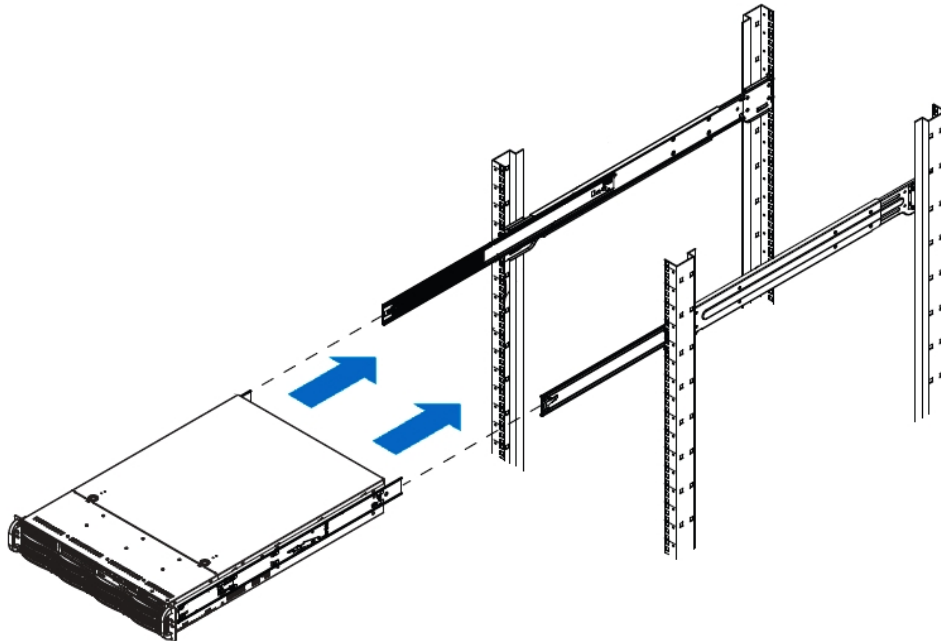
6. Repeat these steps for the RIGHT inner-rack rail.



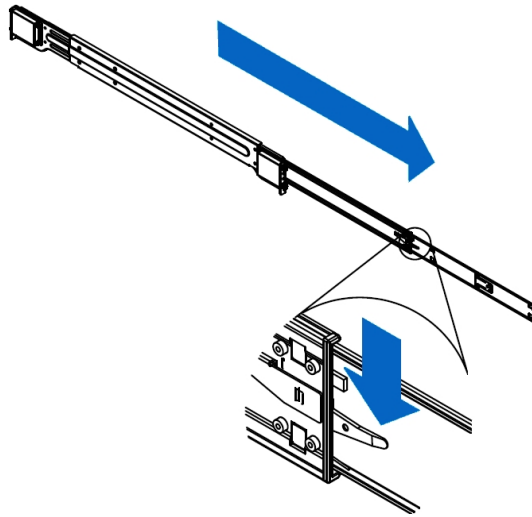
7.

► **Step 3: Install the Unity Storage Expansion on the rack**

1. Lift the chassis from each side—not from the front and back.
2. Line up the inner-rack (chassis) rails with the front of the outer-rack rails.



- Slide the inner-rack rails into the outer-rack rails, keeping the pressure even on both sides. You have to depress the locking tabs when inserting.



- When you push the chassis completely into the rack, you should hear the locking tabs click into position.
- Tighten the thumbscrews that hold the front of the unit to the rack.

▶ **What's Next:**

Continue with [Installing the disk drives in the Unity2200, Unity2200X, and US316](#) on page 56.

## Installing a Unity4400, Unity6900, or US224 in a rack



**CAUTION:** Unity Storage Systems and Expansions are heavy. Physical installation requires two people.

### ▶ Step 1: Remove the front bezel

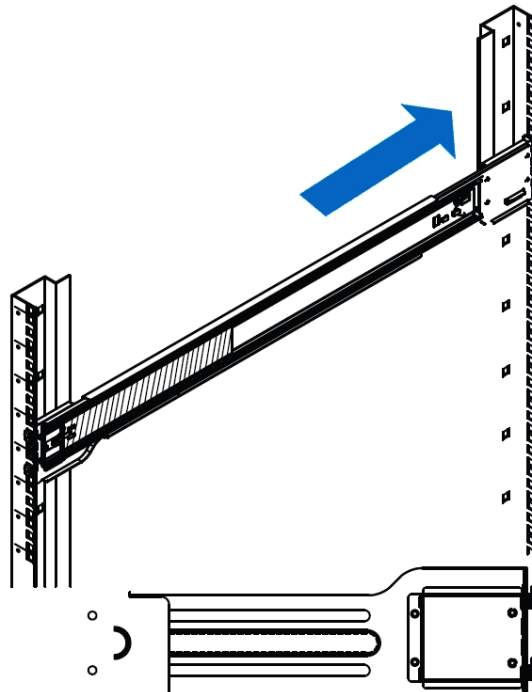
1. Turn the keylock at the right end of the bezel to the unlock position.
2. Unhook the left end of the bezel from the chassis.

### ▶ Step 2: Install the outer-rack rails on the rack

1. Attach the **RIGHT** and **LEFT** outer-rack rails to the rack by inserting the hooks included on the rails into the holes provided on the rack.

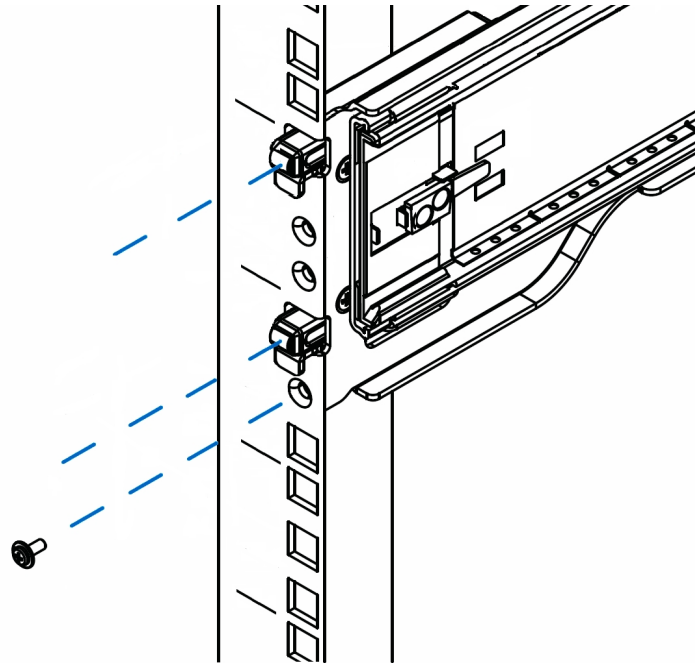
The hooks should be located in the **TOP** holes of the rack units selected (see image in Step 3).

2. Extend rail assemblies to fit the depth of the rack. Pull on the rear of the assembly until the hooks reach the back of the rack.





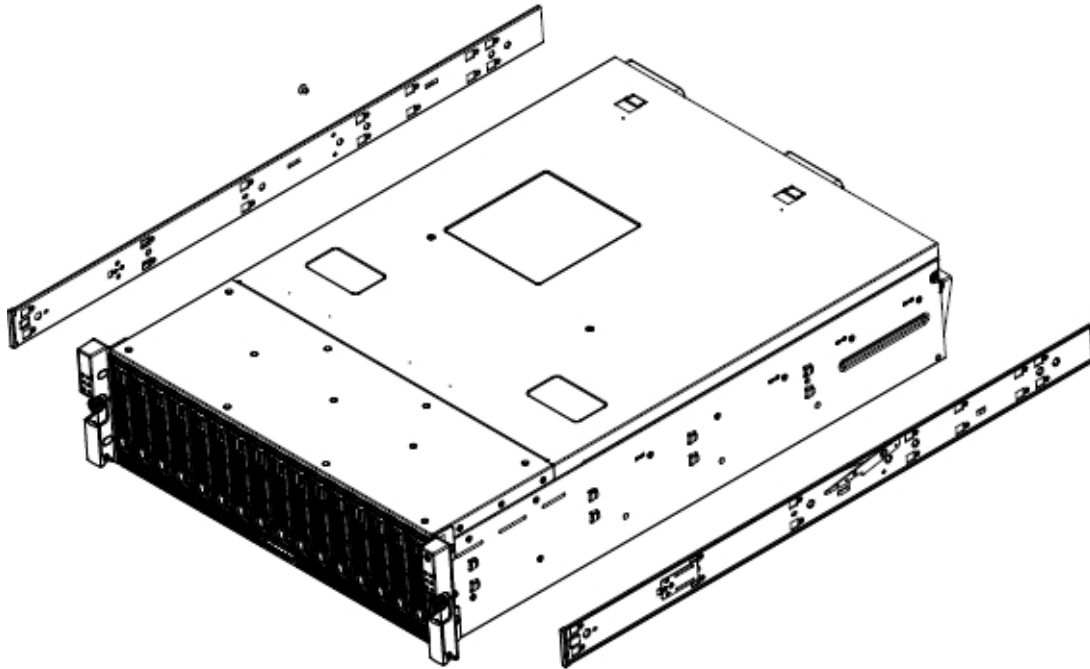
3. Screw the rail to the rack using the mounting screws provided with your hardware installation package. The screws should be secured in the **MIDDLE** hole of each of the rails.



► **Step 3: Install the inner-rack rails (if necessary):**

1. Ensure the Unity chassis is upright and locate the LEFT hand rail assembly.
2. Extend the inner rail toward the front of the rail assembly as far as possible, then depress the locking tab to pull it completely out and remove it from the rest of the rail assembly.
3. Place the inner rail on the side of the chassis, and make sure that you align the hooks of the chassis with the rail extension holes.
4. Slide the extension toward the front of the chassis until it clicks and locks into place.
5. Secure the inner-rail rack to the chassis with the mounting screws provided with your hardware installation package.

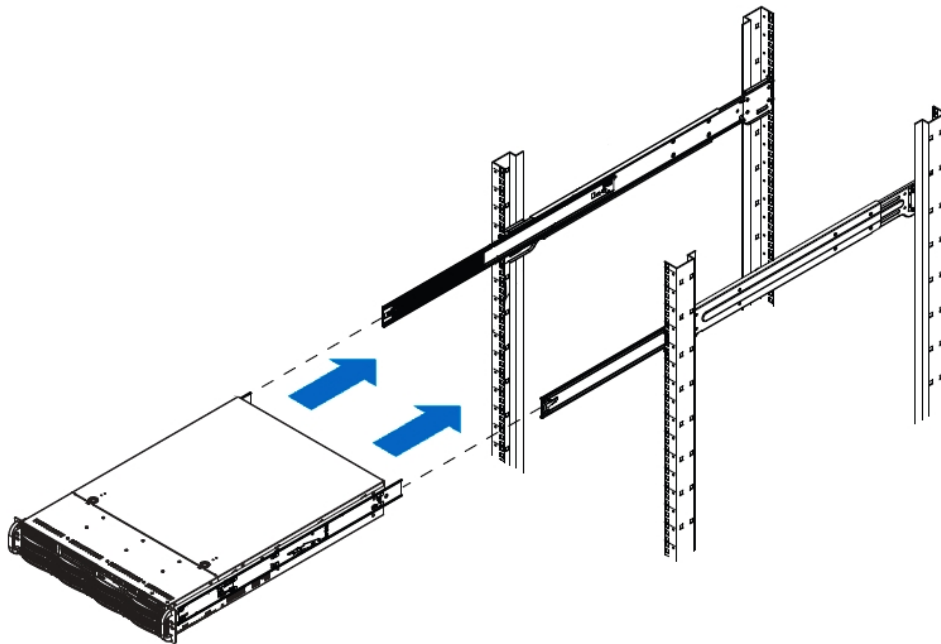
6. Repeat these steps for the RIGHT inner-rack rail.



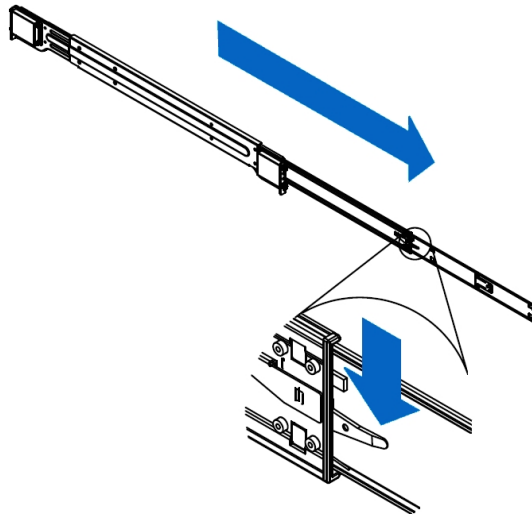
2

► **Step 4: Install the Unity Storage Expansion on the rack**

1. Lift the chassis from each side—not from the front and back.
2. Line up the inner-rack (chassis) rails with the front of the outer-rack rails.



3. Slide the inner-rack rails into the outer-rack rails, keeping the pressure even on both sides. You have to depress the locking tabs when inserting.



4. When you push the chassis completely into the rack, you should hear the locking tabs click into position.
5. Tighten the thumbscrews that hold the front of the unit to the rack.

Install the US460 in a rack

► **What's Next:**

Continue with [Installing the disk drives in the Unity2200, Unity2200X, and US316](#) on page 56.

## Installing a US424 in a rack



**CAUTION:** The Unity Storage Expansion is heavy. Physical installation requires two people.

▶ **Step 1: Remove the front bezel**

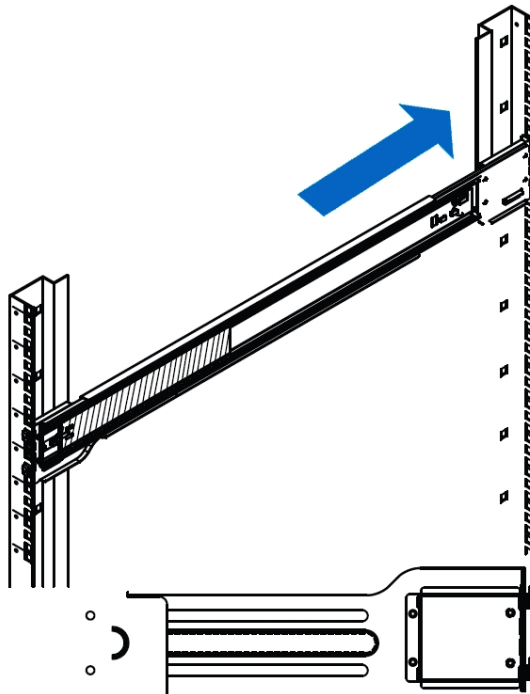
1. Turn the keylock at the right end of the bezel to the unlock position.
2. Unhook the left end of the bezel from the chassis.

▶ **Step 2: Install the outer-rack rails on the rack**

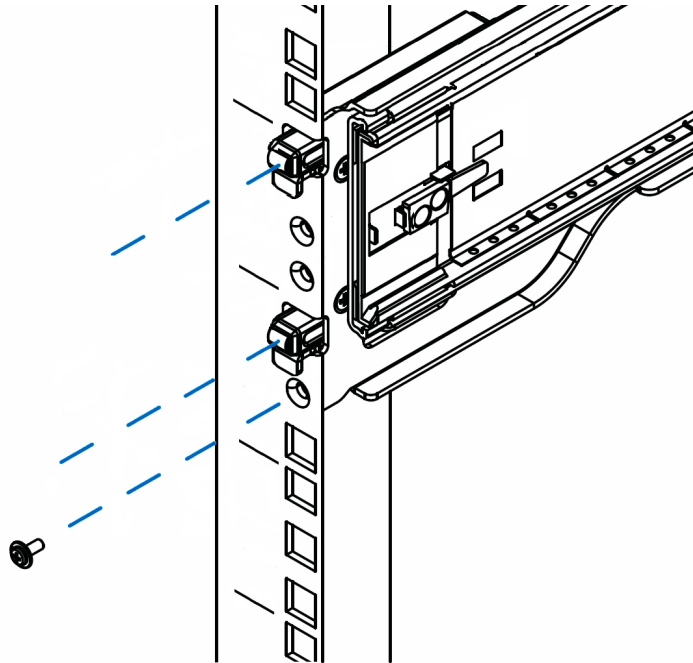
1. Attach the **RIGHT** and **LEFT** outer-rack rails to the rack by inserting the hooks included on the rails into the holes provided on the rack.

The hooks should be located in the **TOP** holes of the rack units selected (see image in Step 3).

2. Extend rail assemblies to fit the depth of the rack. Pull on the rear of the assembly until the hooks reach the back of the rack.



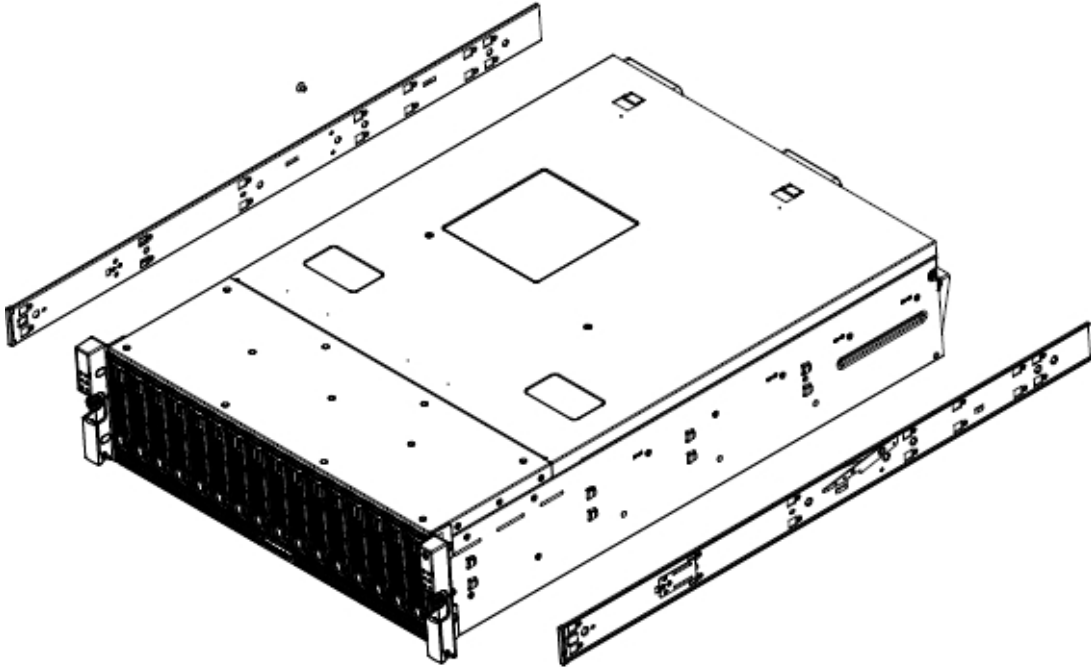
3. Screw the rail to the rack using the mounting screws provided with your hardware installation package. The screws should be secured in the **MIDDLE** hole of each of the rails.



► **Step 3: install the inner-rack rails (if necessary):**

1. Ensure the Unity chassis is upright and locate the LEFT hand rail assembly.
2. Extend the inner rail toward the front of the rail assembly as far as possible, then depress the locking tab to pull it completely out and remove it from the rest of the rail assembly.
3. Place the inner rail on the side of the chassis, and make sure that you align the hooks of the chassis with the rail extension holes.
4. Slide the extension toward the front of the chassis until it clicks and locks into place.
5. Secure the inner-rail rack to the chassis with the mounting screws provided with your hardware installation package.

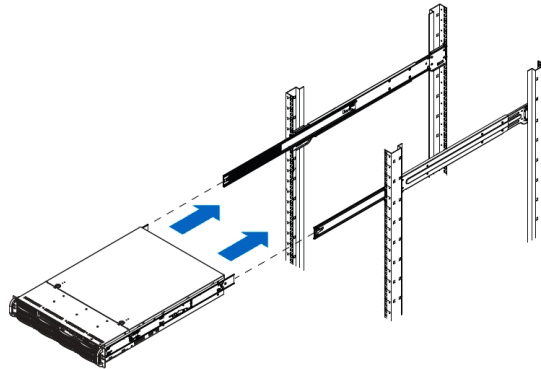
6. Repeat these steps for the RIGHT inner-rack rail.



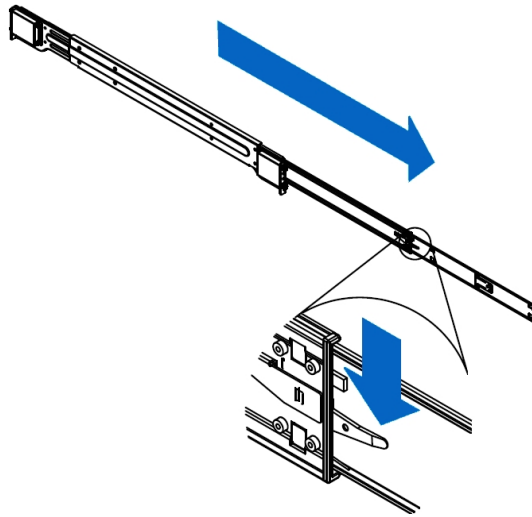
2

► **Step 4: Install the Unity Storage Expansion on the rack**

1. Lift the chassis from each side—not from the front and back.
2. Line up the inner-rack (chassis) rails with the front of the outer-rack rails.



3. Slide the inner-rack rails into the outer-rack rails, keeping the pressure even on both sides. You have to depress the locking tabs when inserting.



4. When you push the chassis completely into the rack, you should hear the locking tabs click into position.
5. Tighten the thumbscrews that hold the front of the unit to the rack.

▶ **What's Next:**

Continue with [Installing the disk drives in the Unity2200, Unity2200X, and US316](#) on page 56.

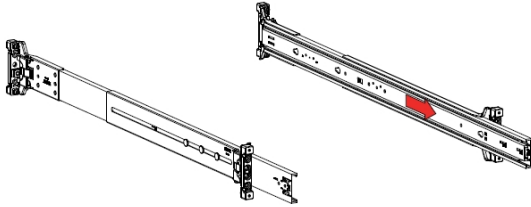
## Installing a US460 in a rack



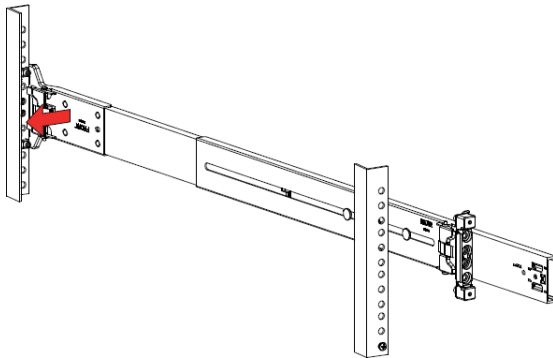
**CAUTION:** Physical installation requires three people—two to move the enclosure into position in the rack, and one to guide and spot the others.

### ► Step 1: Install the outer-rack rails on the rack

1. From the inside of the rail kit, press the release latch to unlock the inner rails from the rack mount rails. Pull the inner rail out of the rack mount rail, and repeat for the remaining rail.



2. Install the inner rails onto the enclosure (if necessary):
  - a. Attach the inner rail by aligning the holes in the inner rail with the pegs on the side of the chassis and sliding them forward to lock them in place.
  - b. From the side of the chassis, using the #2 Phillips-head screwdriver, attach the inner rails to the chassis using the screws provided with the rail kit.
  - c. Repeat the previous steps to attach the other inner rail to the chassis.
3. Install the rack mount rails:
  - a. On the first rack location, from the rear of the rack, latch the rear rack mount clip. Repeat to connect the other rear mount clip.

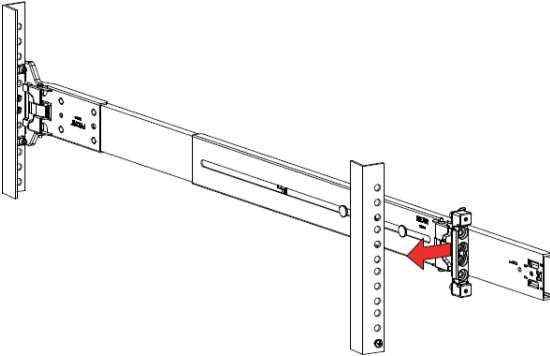


4. From the front of the rack, latch the front rack mount clip. Repeat to connect the other front rack mount clip.

**Note** Ensure that the front and rear of the rails are attached to the same U location.

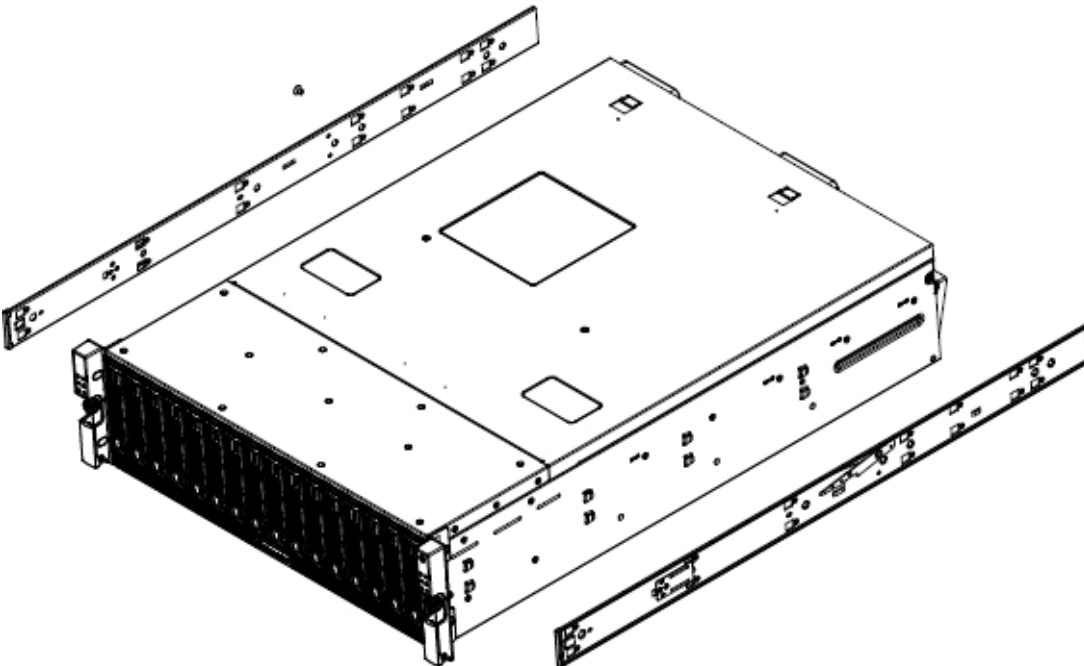


- Grasping the inside rail on the rack mount rails, slide the rails until locked in the extended position.



► **Step 2: Install the inner-rack rails (if necessary):**

- Ensure the Unity chassis is upright and locate the LEFT hand rail assembly.
- Extend the inner rail toward the front of the rail assembly as far as possible, then depress the locking tab to pull it completely out and remove it from the rest of the rail assembly.
- Place the inner rail on the side of the chassis, and make sure that you align the hooks of the chassis with the rail extension holes.
- Slide the extension toward the front of the chassis until it clicks and locks into place.
- Secure the inner-rail rack to the chassis with the mounting screws provided with your hardware installation package.
- Repeat these steps for the RIGHT inner-rack rail.

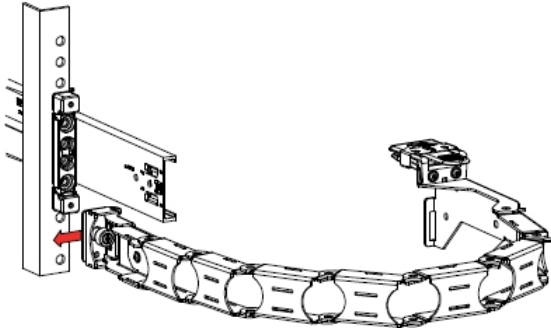


► **Step 3: Install the Cable Management Arm (CMA) (Optional)**

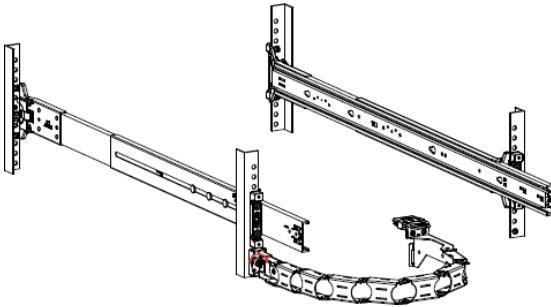
**Note** If using a storage enclosure with a shorter depth you may not be able to use the CMA. Ensure the CMA does not bind or bend. Improper installations could result in damage to cabling and components.

*Install CMA arms onto the rack*

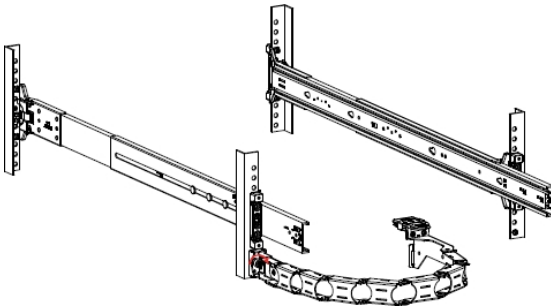
1. From the inside of the rack, slide the bracket over the 1U location below the rail kit.



2. Tighten the captive screw while pressing the CMA mounting bracket to the top of the U location.



3. Install the M4 screw in the lower hole in bracket.



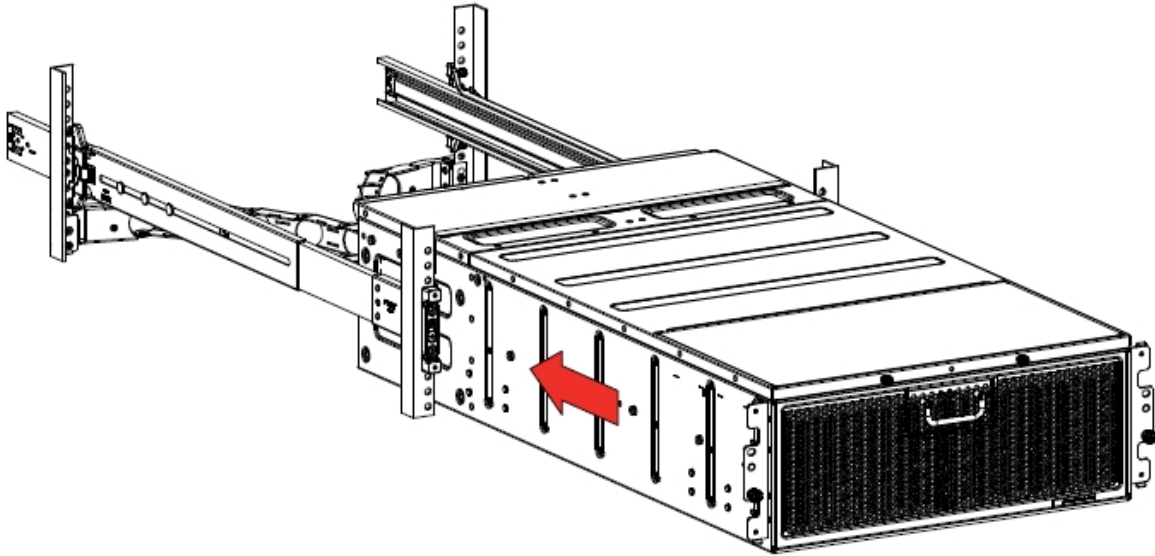
4. Repeat the previous steps on the other CMA arm.

► **Step 4: Install the Unity Storage Expansion on the rack**

1. Lift the US460 chassis from each side—not from the front and back.
2. Line up the inner-chassis rails with the extended rack rails, until the rail locks engage.
3. Locate the blue tabs located on each of the inner rails, and slide them towards the front of the chassis. Push on the chassis.

2

4. Push the US460 completely into the rack; you should hear the locking tabs click into position.



5. Tighten the thumbscrews that hold the front of the US460 to the rack.

► **What's Next:**

Continue with [Installing the disk drives in the Unity2200, Unity2200X, and US316](#) on the next page.

## Installing the disk drives in the Unity2200, Unity2200X, and US316

This section explains how to install the disk drives in the UNITY2200, UNITY2200X, and US316.



**CAUTION:** Put on the ESD wrist strap before starting:

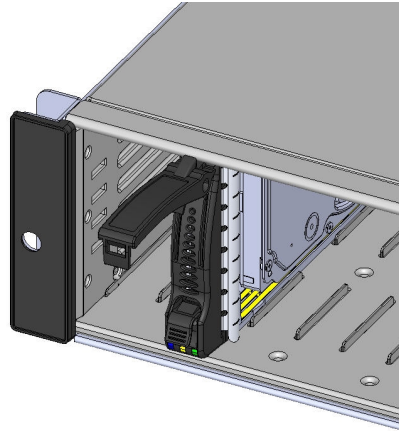
1. Slip the wrist loop over your hand (left or right), then tighten the loop against your wrist.
2. Attach the clip end of the anti-static wrist strap to a properly grounded metal surface.

▶ **Installation order:**

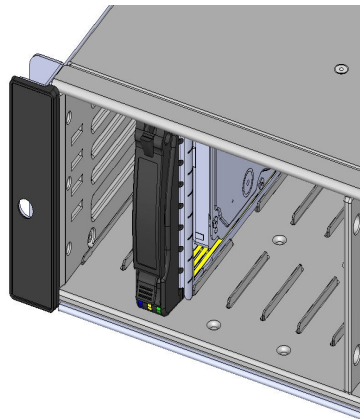
1. Install the FASTier Write Cache drive in the FIRST slot on the LEFT.
2. Install the FASTier Read Cache drive in the SECOND slot on the LEFT.
3. Install the disk drives in any order in the remaining slots.

▶ **To install the drives on the Unity Storage Expansion:**

1. Hold the disk drive so that the LEDs are on the bottom and THE LEVER IS FULLY OPEN.



2. Slide the disk drive into the drive slot using the lever until the drive locks into place.
3. Gently push the lever until it mates with the latch on the bottom of the drive slot and clicks into place.



4. Repeat these steps for all remaining disk drives.

**Note** To maintain proper airflow and cooling, a disk drive or a blank drive carrier must be installed in every slot of the enclosure.

▶ **What's Next:**

- "Connecting and powering on" ([page 61](#))

## Installing the disk drives in the US224, Unity4400, and Unity6900

This section explains how to install the SAS disk drives in the US224, Unity4400, and Unity6900



**CAUTION:** Put on the ESD wrist strap before starting:

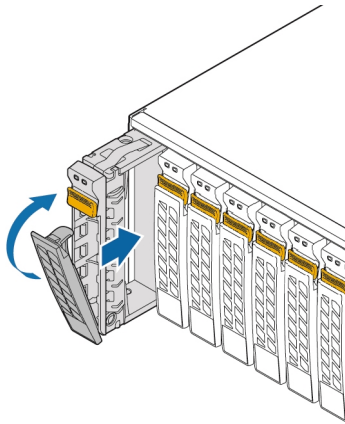
1. Slip the wrist loop over your hand (left or right), then tighten the loop against your wrist.
2. Attach the clip end of the anti-static wrist strap to a properly grounded metal surface.

▶ **Installation order:**

1. Install the FASTier Read Cache SSDs from the LEFT, starting with the FIRST slot.
2. Install the disk drives in any order in the remaining slots.

▶ **To install the drives:**

1. Slide the release button on the front of the drive carrier and open the handle.



2. Insert the hard-drive carrier into the drive bay until the carrier contacts the backplane.
3. Close the hard-drive carrier handle to lock the drive in place.
4. Repeat these steps for each drive.

**Note** To maintain proper airflow and cooling, a disk drive or a blank drive carrier must be installed in every slot of the enclosure.

▶ **What's Next:**

- "Connecting and powering on" ([page 61](#))

## Installing the disk drives in the US424

This section explains how to install the SAS disk drives in the US424.



**CAUTION:** Put on the ESD wrist strap before starting:

1. Slip the wrist loop over your hand (left or right), then tighten the loop against your wrist.
2. Attach the clip end of the anti-static wrist strap to a properly grounded metal surface.

▶ **Installation order:**

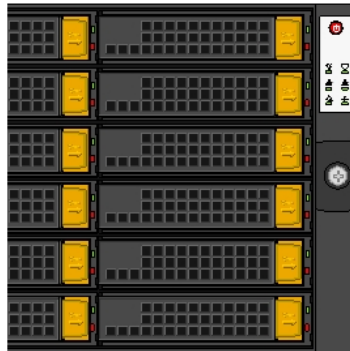
1. Install the FASTier Write Cache SSD into slot 1.
2. Install the FASTier Read Cache SSD into slot 2.
3. Install the disk drives in any order in the remaining slots.

The half-populated drive configuration includes empty drive carriers for expansion.

▶ **To install the drives on the Unity Storage Expansion:**

To install the drives:

1. Slide the release button on the front of the drive carrier and open the handle.
2. Insert the hard-drive carrier into the drive bay until the carrier contacts the backplane.



3. Repeat these steps for all remaining disk drives.

**Note** To maintain proper airflow and cooling, a disk drive or a blank drive carrier must be installed in every slot of the enclosure.

▶ **What's Next:**

- "Connecting and powering on" ([page 61](#))

## Installing the disk drives in the US460

This section explains how to install the SAS disk drives in the US460.



**CAUTION:** Put on the ESD wrist strap before starting:

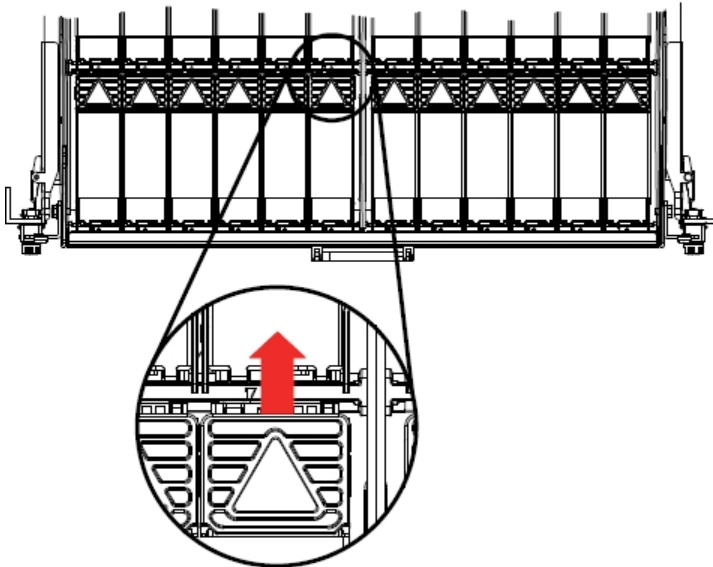
1. Slip the wrist loop over your hand (left or right), then tighten the loop against your wrist.
2. Attach the clip end of the anti-static wrist strap to a properly grounded metal surface.

▶ **Installation order:**

1. If you are installing one 20-drive pack, install the SSD in slot 30.
2. If you are installing two 20-drive packs, install the SSDs in slots 29 and 30.
3. If you are installing three 20-drive packs, install the SSDs in slots 28 to 30.
4. Install the disk drives in any order in the remaining slots.

▶ **To install the drives:**

1. From the front of the expansion, turn the thumbscrews counterclockwise.
2. From the front of the expansion, turn the thumbscrews counterclockwise and slide the drive bay cover towards the front, and up.
3. Open the first drive carrier by sliding the arrow tab in the direction of the arrow.



4. Insert the hard-drive carrier into the drive bay until the drive is fully seated. There should be an audible click.
5. Repeat these steps for each drive.
6. Close the hard-drive carrier handle to lock the drive in place.
7. Repeat these steps for all remaining disk drives.

▶ **What's Next:**

- "Connecting and powering on" ([page 61](#))



# Chapter 3

## Connecting and powering on

---

This chapter explains how to connect and power on Unity Storage Systems.

The chapter includes these topics:

Basic configurations .....	62
Connecting a UNITY2200X to a UNITY2200 .....	62
Connecting a US224 to a Unity4400 or Unity6900 .....	63
Connecting a US316 to a Unity4400 or Unity6900 .....	64
Connecting a US424 to a Unity4400 or Unity6900 .....	65
Connecting a US460 to a Unity4400 or Unity6900 .....	66
Cascade configurations .....	68
Connecting the power cords .....	74
Powering on .....	75

## Basic configurations

This section shows the basic configurations for Unity Storage Expansions.

### Connecting a UNITY2200X to a UNITY2200

The UNITY2200 can be connected to one UNITY2200X Storage Expansion. This configuration does not support daisy chaining and controller redundancy.

► **To connect a UNITY2200X Storage Expansion:**

*Slot A*

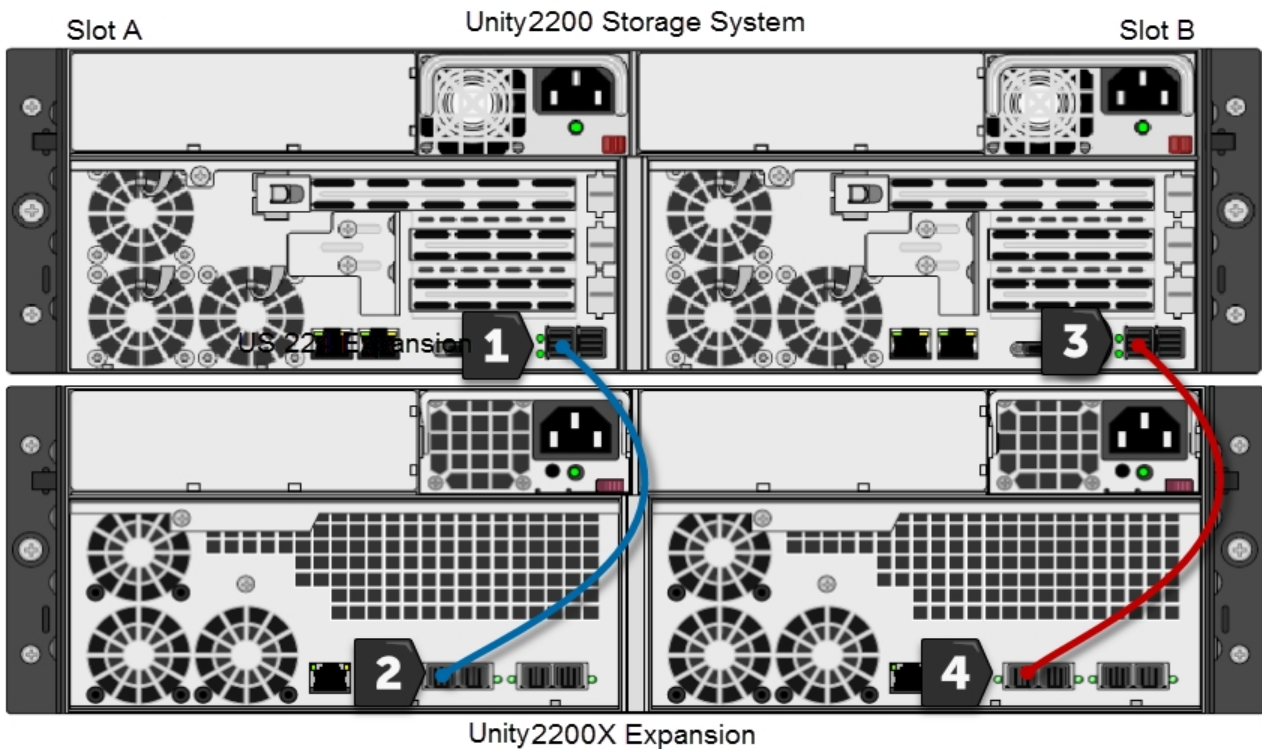
1. On the Unity Storage System slot A controller, connect the first SAS cable into the on-board HBA SAS OUT port (1), as shown.
2. Connect the other end of the same SAS cable into the left SAS IN port (2) on the Unity Storage Expansion.

*Slot B*

3. On the Unity Storage System slot B controller, connect the second SAS cable into the right on-board SAS OUT port (3).
4. Connect the other end of the same SAS cable into the second-from-left SAS IN port (4) on the Unity Storage Expansion.

**Note** Be sure to snap the cables securely into place.

Figure 3-1: UNITY2200 connected to the UNITY2200X



► **What's Next:**

Proceed to [Connecting the power cords](#) on page 74.

## Connecting a US224 to a Unity4400 or Unity6900

The UNITY4400 or UNITY6900 can be connected to US224 Storage Expansion.

### ► To connect a US224 Storage Expansion:

On each Unity Storage System controller, cross-connect SAS cables from the Add-on HBA SAS OUT ports to the HBA SAS IN ports on the Unity Storage Expansion controllers, as shown.

#### Slot A

1. On the Unity Storage System, connect a SAS cable into the HBA SAS OUT port (1).
2. Connect the other end of the SAS cable into the SAS IN port (2) on the Unity Storage Expansion.
3. On the Unity Storage System, connect the second SAS cable into the SAS OUT port (3).
4. Cross-connect the other end of the SAS cable into the SAS IN port (4) on the Unity Storage Expansion.

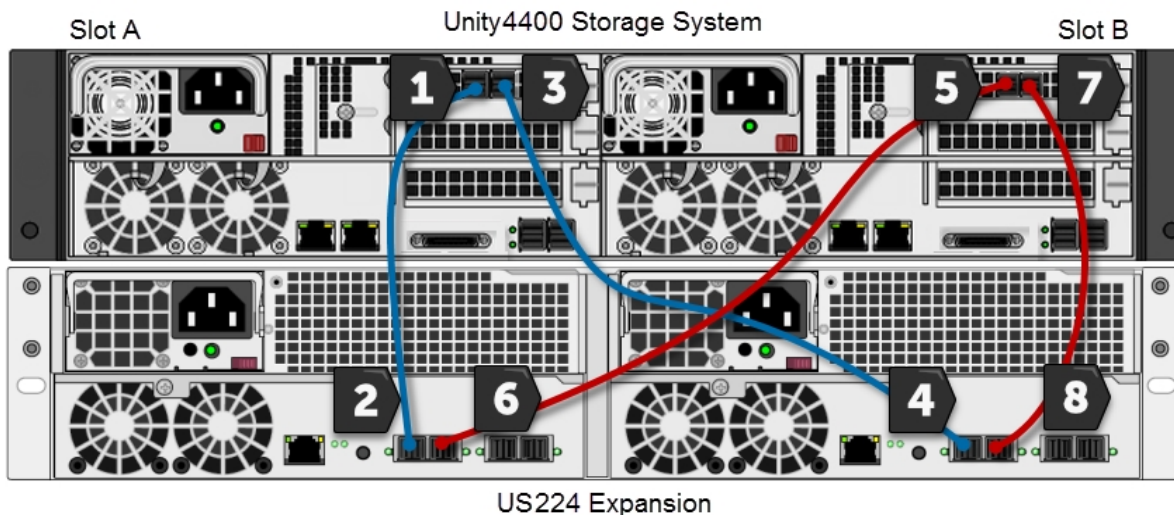
#### Slot B

5. On the Unity Storage System, connect the third SAS cable into the HBA SAS OUT port (5).
6. Cross-connect the other end of the SAS cable into the SAS IN port (6) on the Unity Storage Expansion.
7. On the Unity Storage System, connect the fourth SAS cable into the SAS OUT port (7).
8. Connect the other end of the cable into the SAS IN port (8) on the Unity Storage Expansion.

Additional storage connections should be parallel connected. See [Cascade configurations](#) on page 68

**Note** Be sure to snap all cables securely into place.

Figure 3-2: UNITY4400 connected to the US224



### ► What's Next:

"Cascade configurations" ([page 68](#))

[Connecting the power cords](#) on page 74.

## Connecting a US316 to a Unity4400 or Unity6900

The UNITY4400 or UNITY6900 can be connected to up to three US316.

### ► To connect a US316 Storage Expansion:

On each Unity Storage System controller, cross-connect SAS cables from the Add-on HBA SAS OUT ports to the HBA SAS IN ports on the Unity Storage Expansion controllers, as shown.

#### Slot A

1. On the Unity Storage System, connect a SAS cable into the HBA SAS OUT port (1).
2. Connect the other end of the SAS cable into the SAS IN port (2) on the Unity Storage Expansion.
3. On the Unity Storage System, connect the second SAS cable into the SAS OUT port (3).
4. Cross-connect the other end of the SAS cable into the SAS IN port (4) on the Unity Storage Expansion.

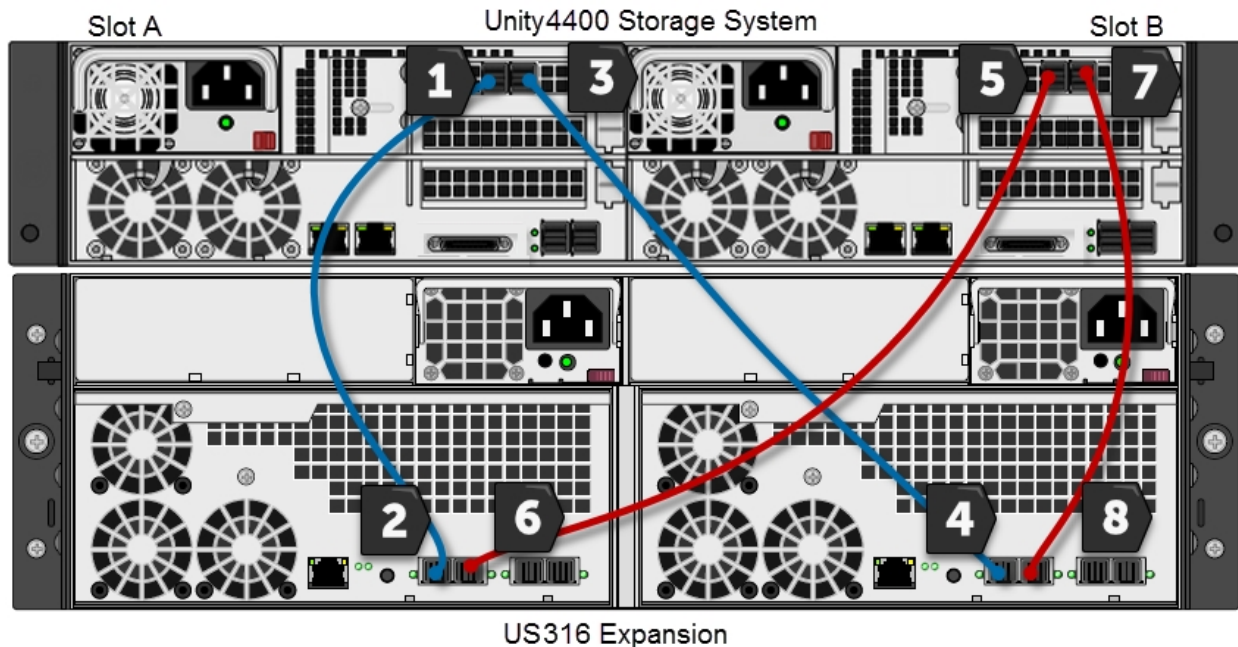
#### Slot B

5. On the Unity Storage System, connect the third SAS cable into the HBA SAS OUT port (5).
6. Cross-connect the other end of the SAS cable into the SAS IN port (6) on the Unity Storage Expansion.
7. On the Unity Storage System, connect the fourth SAS cable into the SAS OUT port (7).
8. Connect the other end of the cable into the SAS IN port (8) on the Unity Storage Expansion.

Additional storage connections should be parallel connected. See [Cascade configurations](#) on page 68

**Note** Be sure to snap all cables securely into place.

Figure 3-3: UNITY4400 connected to the US316



### ► What's Next:

"Cascade configurations" ([page 68](#))

[Connecting the power cords](#) on page 74.

## Connecting a US424 to a Unity4400 or Unity6900

The UNITY4400 or UNITY6900 can be connected to the US424 Storage Expansion.

► **To connect a US424 Storage Expansion:**

On each Unity Storage System controller, cross-connect SAS cables from the Add-on HBA SAS OUT ports to the HBA SAS IN ports on the Unity Storage Expansion controllers, as shown.

*Slot A*

1. On the Unity Storage System, connect a SAS cable into the HBA SAS OUT port (1).
2. Connect the other end of the SAS cable into the SAS IN port (2) on the Unity Storage Expansion.
3. On the Unity Storage System, connect the second SAS cable into the SAS OUT port (3).
4. Cross-connect the other end of the SAS cable into the SAS IN port (4) on the Unity Storage Expansion.

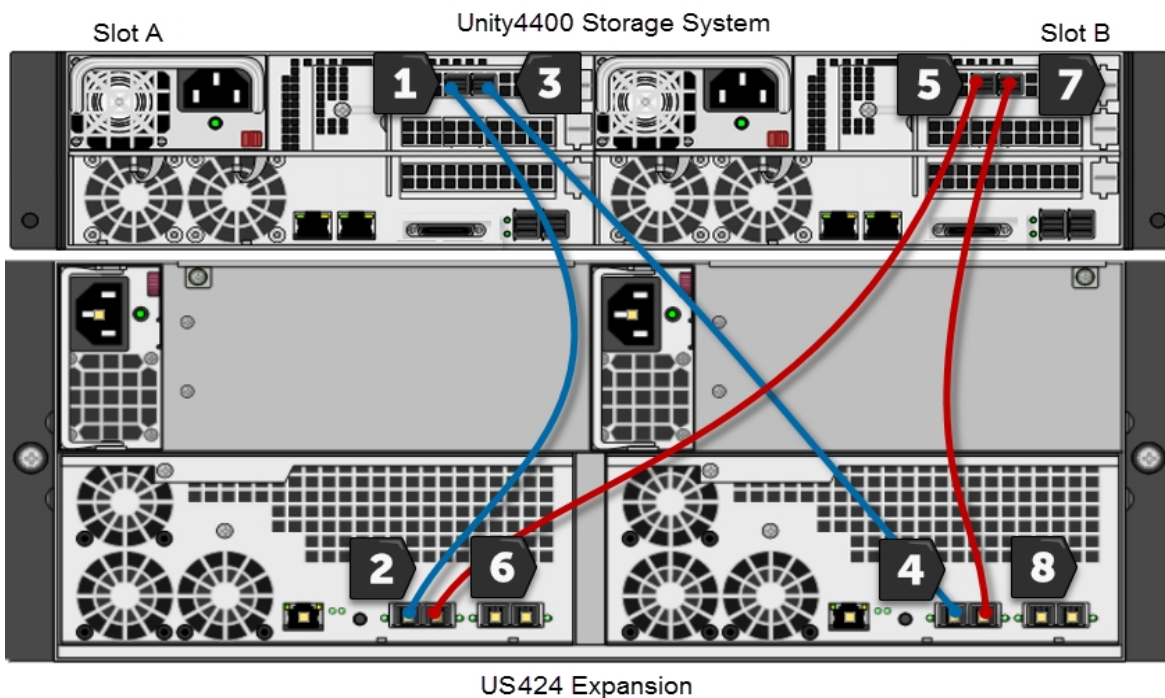
*Slot B*

5. On the Unity Storage System, connect the third SAS cable into the HBA SAS OUT port (5).
6. Cross-connect the other end of the SAS cable into the SAS IN port (6) on the Unity Storage Expansion.
7. On the Unity Storage System, connect the fourth SAS cable into the SAS OUT port (7).
8. Connect the other end of the cable into the SAS IN port (8) on the Unity Storage Expansion.

Additional storage connections should be parallel connected. See [Cascade configurations](#) on page 68

**Note** Be sure to snap all cables securely into place.

Figure 3-4: UNITY4400 connected to the US424



► **What's Next:**

[Cascade configurations](#) on page 68

[Connecting the power cords](#) on page 74

## Connecting a US460 to a Unity4400 or Unity6900

The UNITY4400 can be connected up to four Unity Storage Expansions and the UNITY6900 can be connected to up to eight Unity Storage Expansions. See also: [Cascade configurations](#) on page 68

### ► To connect a US460 Storage Expansion:

On each Unity Storage System controller, cross-connect SAS cables from the Add-on HBA SAS OUT ports to the HBA SAS IN ports on the Unity Storage Expansion controllers, as shown.

#### Slot A

1. On the Unity Storage System, connect a SAS cable into the HBA SAS OUT port (1).
2. Connect the other end of the SAS cable into the SAS IN port (2) on the Unity Storage Expansion.
3. On the Unity Storage System, connect the second SAS cable into the SAS OUT port (3).
4. Cross-connect the other end of the SAS cable into the SAS IN port (4) on the Unity Storage Expansion.

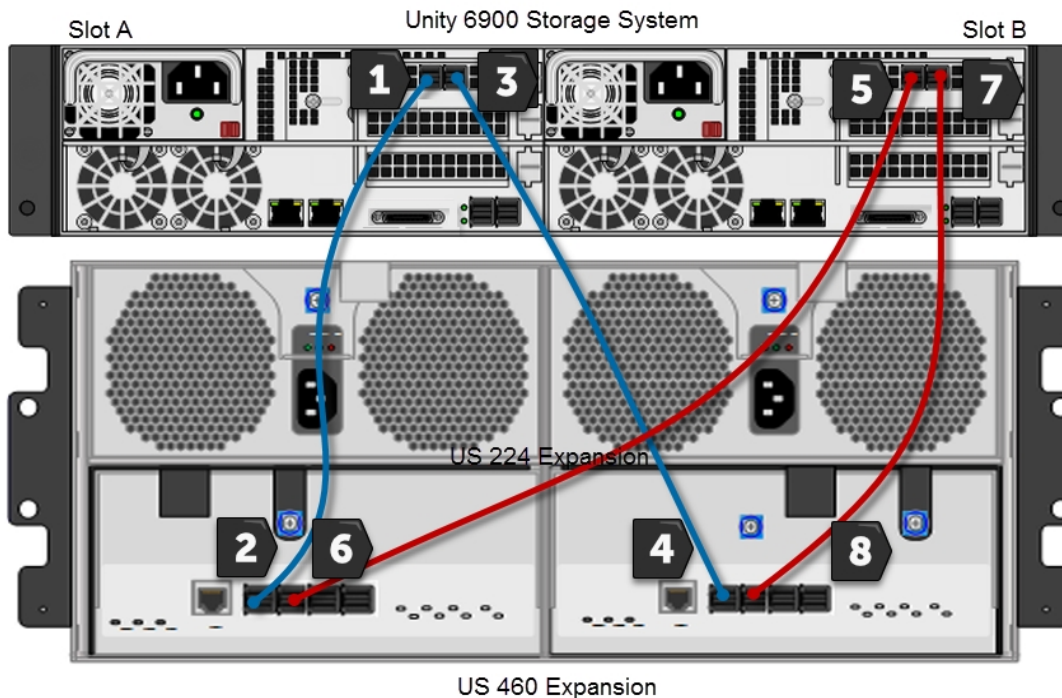
#### Slot B

5. On the Unity Storage System, connect the third SAS cable into the HBA SAS OUT port (5).
6. Cross-connect the other end of the SAS cable into the SAS IN port (6) on the Unity Storage Expansion.
7. On the Unity Storage System, connect the fourth SAS cable into the SAS OUT port (7).
8. Connect the other end of the cable into the SAS IN port (8) on the Unity Storage Expansion.

Additional storage connections should be parallel connected. See [Cascade configurations](#) on page 68

**Note** Be sure to snap all cables securely into place.

Figure 3-5: UNITY6900 connected to the US460



▶ **What's Next:**

[Cascade configurations](#) on the next page

[Connecting the power cords](#) on page 74



## Cascade configurations

You can connect multiple Unity Storage Expansions in almost any combination to the UNITY4400 and UNITY6900 Storage Systems.

To take advantage of redundancy, the first two Unity Storage Expansions must be cross-connected to the SAS add-on ports on the Unity Storage System, and the rest can be connected in parallel.

### *Unity4400*

With UNITY4400 Storage Systems, you can connect up to three Unity storage expansions. See [Cascading the Unity4400 Storage System](#) on the facing page

### *Unity6900*

With the Unity6900, you can connect up to eight storage expansions. See [Cascading the Unity6900 Storage System](#) on page 71

**Note** For more details about connecting Nexsan Unity Storage Expansions, please consult your Quick Start Guide.

Here the Unity Storage Expansions available for cascade configurations:

- US224
- US316
- US424
- US460



## Cascading the Unity4400 Storage System

You can cascade (daisy chain) up to three Unity Storage Expansions in any combination with the UNITY4400.

**Important:** Cross-connect from opposite controllers on the Unity Storage System, as shown in this section, so that in the event of the failure of one unit, the other nodes in the array can remain in service.

### ► To connect the Unity Storage Expansions:

1. Cross-connect the first Unity Storage Expansion from the add-on HBA SAS ports on the UNITY4400 to the on-board SAS ports on the first Unity Storage Expansion. See [Connecting a US224 to a Unity4400 or Unity6900](#) on page 63
2. Parallel-connect the rest of the Unity Storage Expansions using the on-board SAS ports.

Figure 3-6: Unity4400 cascade example with the US224

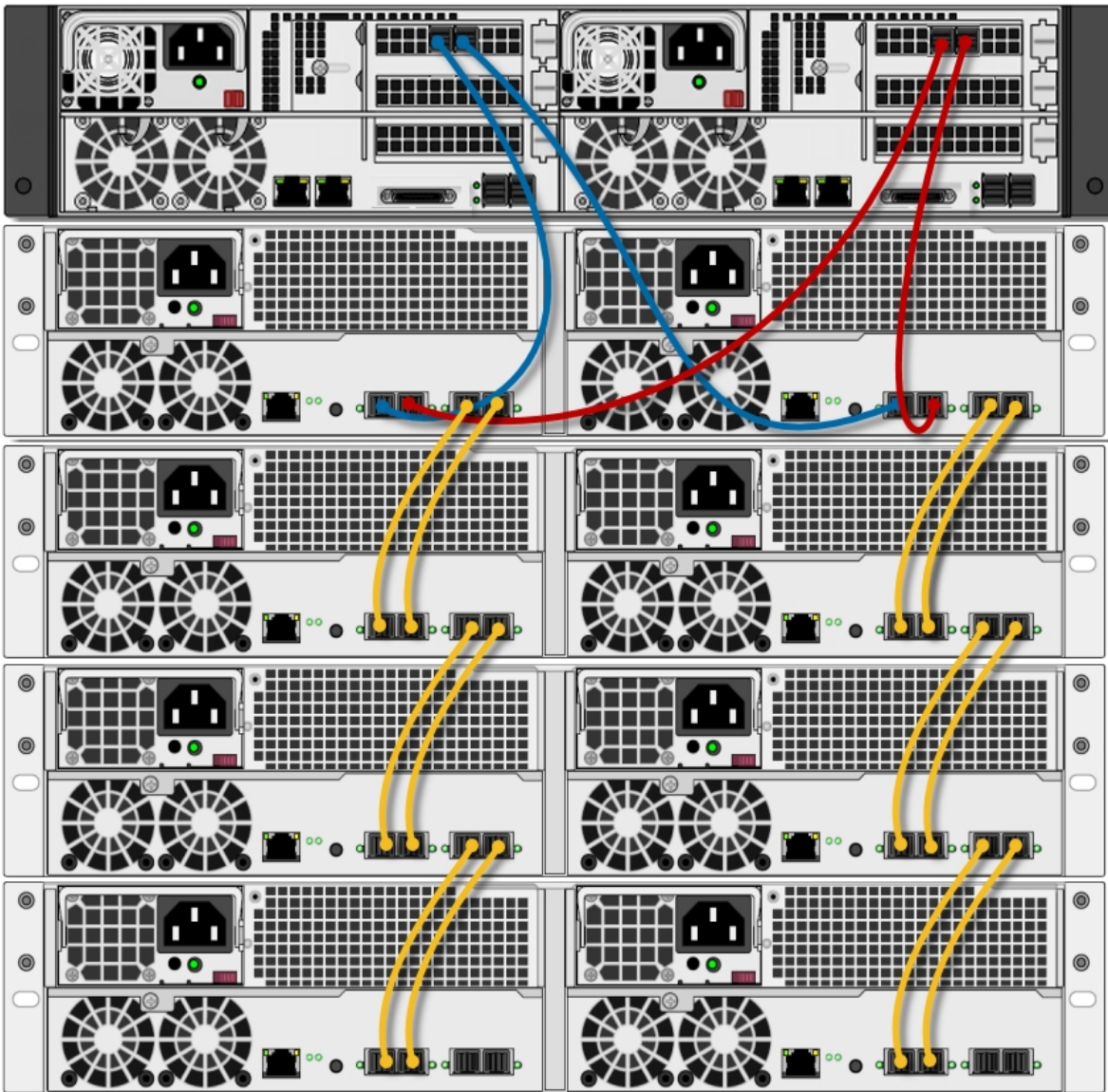
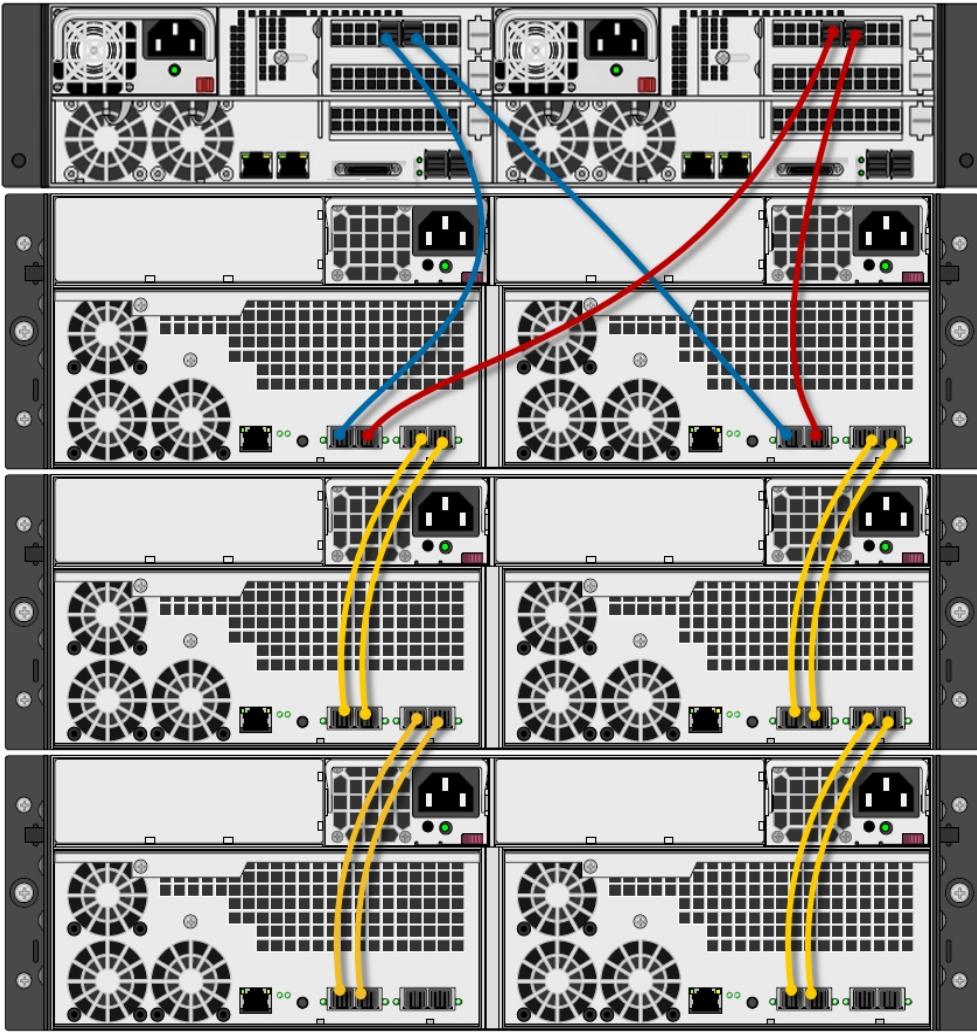


Figure 3-7: Unity4400 cascade example with the US316



3

► **What's Next:**

[Connecting the power cords on page 74](#)

## *Cascading the Unity6900 Storage System*

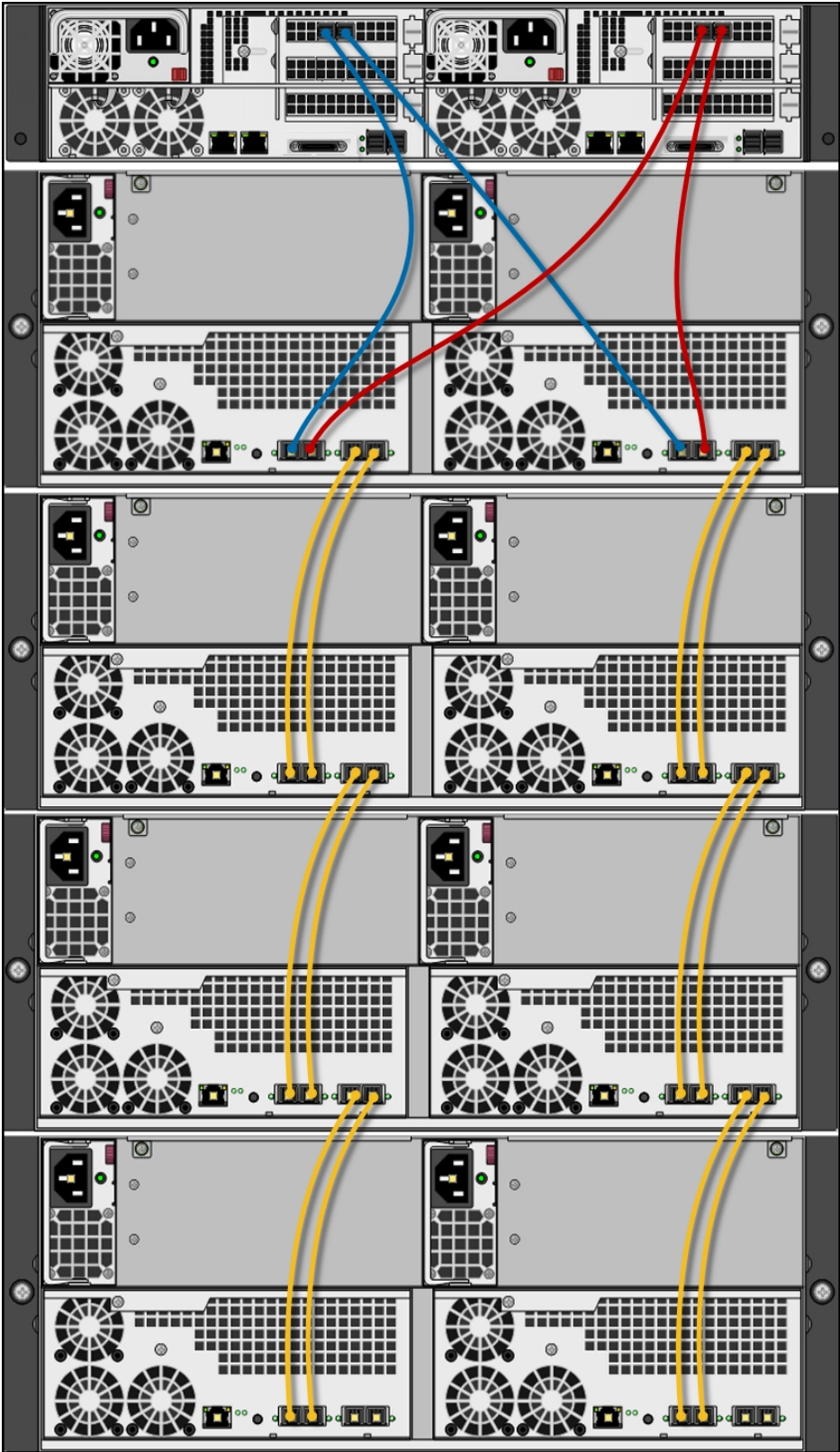
You can cascade (daisy chain) up to eight Unity Storage Expansion to the UNITY6900. Connect the first two storage expansions directly to the four SAS add-on ports on the Unity6900, and then daisy-chain from those expansions, as shown in [Unity6900 cascade example with four US460s \(maximum 7\) on page 73](#).

**Important:** Cross-connect from opposite controllers on the Unity Storage System, so that in the event of the failure of one unit, the other nodes in the array can remain in service. If you are mixing different Unity Storage Expansions, and include one or more US460s, place them at the end of the series.

► **To connect the Unity Storage Expansions:**

1. Cross-connect the first Unity Storage Expansion from the add-on HBA SAS ports on the UNITY6900 to the on-board SAS ports on the first Unity Storage Expansion. See [Connecting a US460 to a Unity4400 or Unity6900 on page 66](#)
2. Parallel-connect the rest of the Unity Storage Expansions using the on-board SAS ports.

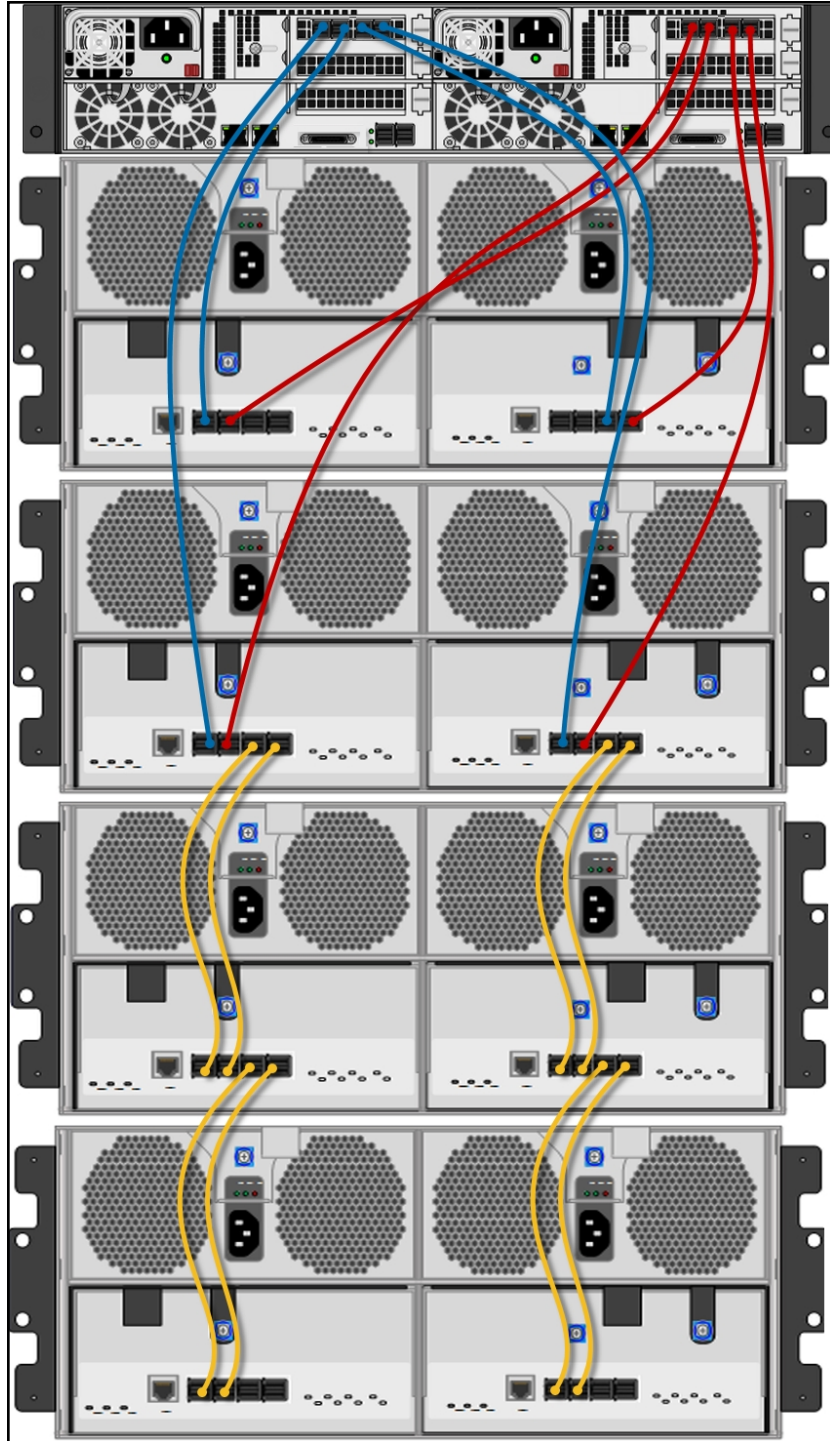
Figure 3-8: Unity6900 cascade example with US424



3



Figure 3-9: Unity6900 cascade example with four US460s (maximum 7)



► **What's Next:**

[Connecting the power cords](#) on the next page

## Connecting the power cords

This section describes typical power connections.

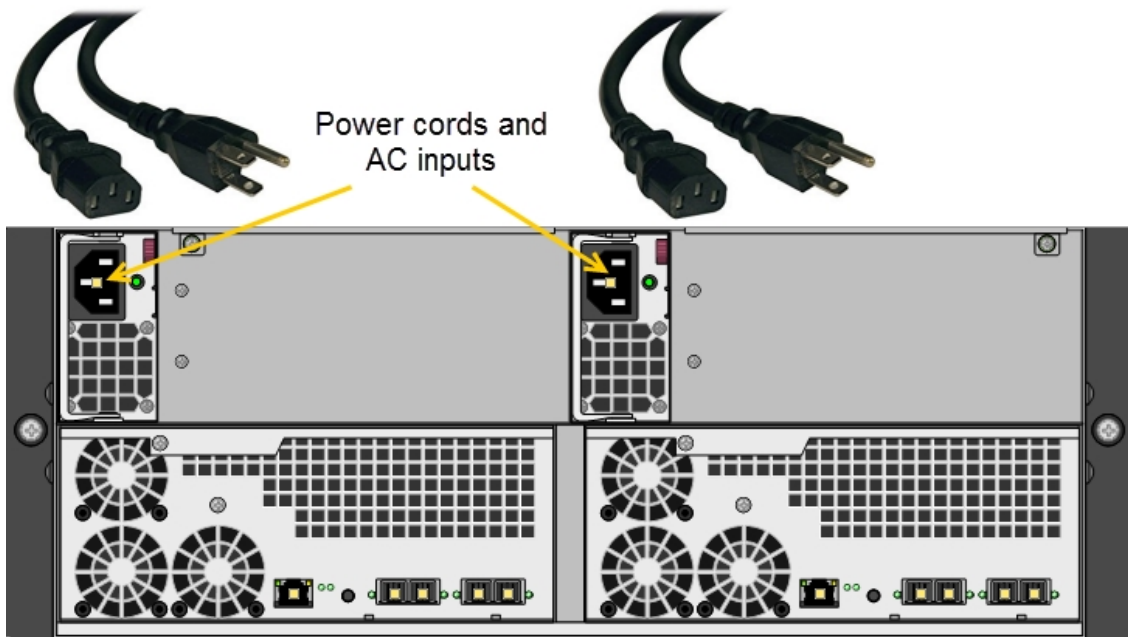


**CAUTION:** Use only the power cords supplied with the Unity Storage Expansion. Do not use another type of cord or extension cords. If you require additional power cords, please contact your Nexsan sales representative or reseller.

▶ **To connect the power cords:**

1. Plug the power cords into their respective power supplies on the rear of the storage expansions.
2. Using the included power cords, connect each power supply unit to an AC power source.

Figure 3-10: Example showing a US424



**Note** We strongly recommend that you use an uninterruptible power supply (UPS) to protect your enclosure.



## Powering on

Unity Storage Expansions must be powered on first and allowed to complete drive spin-up and discovery prior to powering on the Unity Storage System for the first time. Discovery is complete once the drive LEDs stop flashing.

The Unity Storage System is hot pluggable: Once in service, powering down is not normally required to add a Unity Storage Expansion.

### *Powering on all other Unity enclosures*

#### ▶ **To power on Unity Storage Systems (US460):**

1. Connect to AC power. See [Connecting the power cords](#) on the previous page
2. Press and hold the power button  located on the right front panel of the chassis until the power LED  lights up.


#### ▶ **Attach the front bezel to the storage expansion:**

1. Hook the left end of the bezel onto the chassis.
2. Fit the right side of the bezel onto the chassis.
3. Turn the key lock at the right end of the bezel to the lock position to secure the bezel to the chassis.

#### ▶ **Check Storage Expansion and drive status:**

1. Check the status LEDs on the front of the unit:

*For the UNITY2200X, US224, US316, or US424:*

- Check the power LEDs on the LEFT and RIGHT front control panels to ensure that both controllers are receiving power and that the power modules are functioning properly.
  - Verify that the heartbeat  is blinking yellow in 2-3 second intervals.
2. Verify that the drive carrier LEDs are illuminated in green.
  3. Wait approximately one minute for all drives to become ready. All drive carrier activity LEDs should be illuminated in green.

If a drive carrier activity LED does not light up, check to make sure the corresponding drive is properly seated in the chassis.

### *Powering on the US460*

#### ▶ **To power on the US460:**

1. Connect the US460 to a UNITY4400 or UNITY6900 storage system.
2. Connect the power cord to each AC Input on the back of the expansion enclosure.
3. Plug the power cord into AC power.
4. Check that the Power (left) and Ready (middle) LEDs are illuminated and solid GREEN.





# Chapter 4

## Monitoring

---

This chapter describes the status and activity LEDs that help you monitor the Nexsan Unity 2.0 Storage Systems and Unity Storage Expansions.

The chapter includes these topics:

Monitoring power supply units .....	78
Monitoring enclosures .....	81
Monitoring disk drives .....	85

## Monitoring power supply units

This section documents PSU status LEDs for the following Unity Storage Expansions:

- UNITY2200X
- US224
- US316
- US424

When a failure occurs on a power supply unit, the enclosure LEDs indicate an enclosure fault. Always check the PSU status whenever the enclosure LEDs indicate a fault.

Both controllers for the units in this section have a PSU LED.

For information about the US460 power status LEDs, please see "Monitoring power supply units" ([page 78](#))

For additional information about enclosure LEDs, see [Monitoring enclosures](#) on page 81.

**Note** With the exception of the US460, the power button  is located on the front right side of the enclosure. The US460 have no power buttons; they power up when they connect to power.

Figure 4-1: UNITY2200X and US316

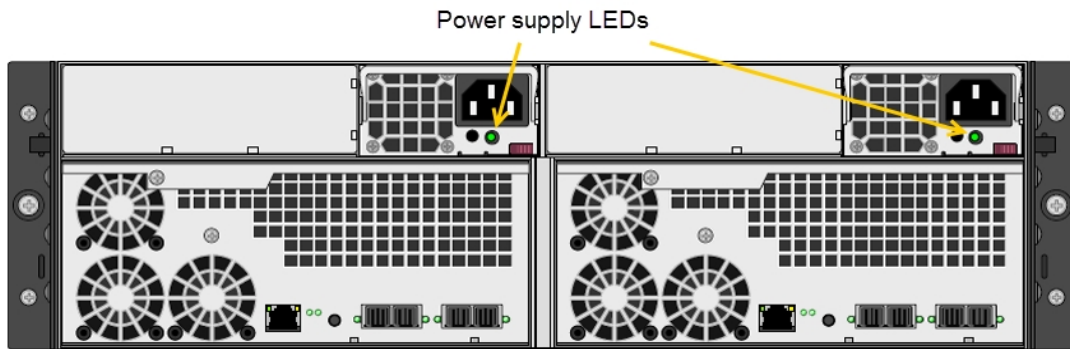


Figure 4-2: US224

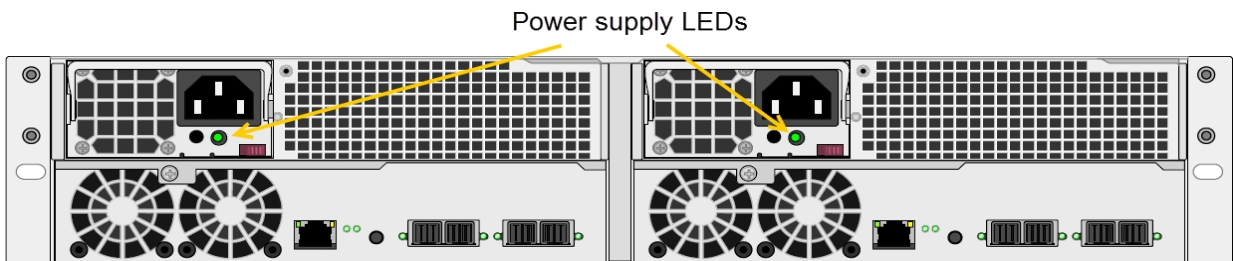


Figure 4-3: US424

Power supply LEDs

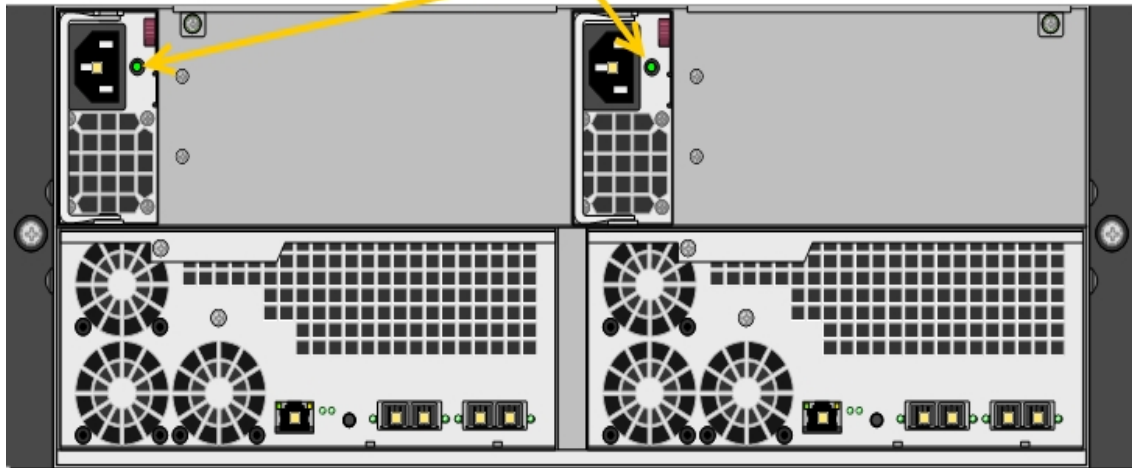


Table 4-1: Power supply LEDs

Name	Description	LED status
Power	Indicates PSU status	<b>Green:</b> The unit is powered on and working normally
		<b>Green (flashing):</b> Indicates a fault status
		<b>Off:</b> The unit is powered off.

Color	LED name	Description
Green	Power	

This section documents US460 power supply LEDs.

Power LEDs

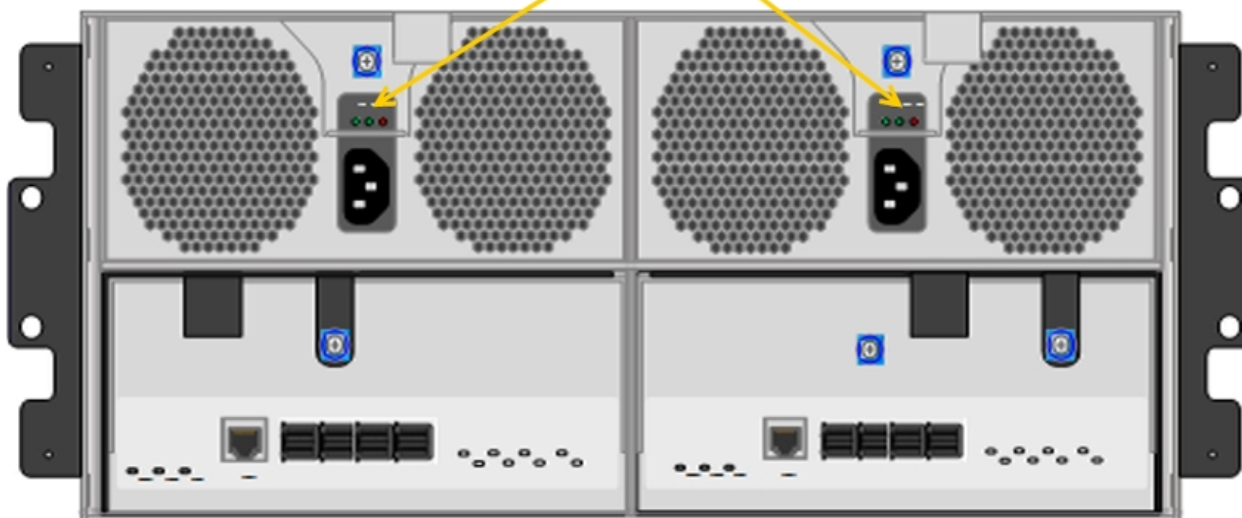


Table 4-2: US460 rear panel power supply LEDs


Name	Description	LED status
ALM	Alarm LED: Indicates if there are faults on the PSU (power supply unit) for each controller.	<b>Red:</b> PSU contains one or more faults
		<b>Red (flashing):</b> PSU alarm status is being identified.
		<b>Off:</b> PSU is functioning normally.
ACIN	AC Input LED: Indicates whether the controller has AC input power.	<b>Green:</b> AC input is functioning normally.
		<b>Off:</b> No AC input
RDY	Ready LED: Indicates whether the PSU is providing power to the enclosure.	<b>Green:</b> DC input is functioning normally.
		<b>Off:</b> No DC output

## Monitoring enclosures



**CAUTION:** If the power fail LED comes on, or if the fan fail LED starts flashing on either controller, replace the component as described in [Replacing a controller on page 91](#).

All Unity Storage Systems feature redundant PSUs, accessed from the rear of the unit. Each PSU has one or more status LEDs.







**Note** With the exception of the US460, the power button  is located on the front right side of the enclosure. The US460 has no power button. The unit powers up when it is plugged in.

For information about the US460 enclosure LEDs, please see "Monitoring enclosures" ([page 81](#)).

The control panel located on the right side of Unity chassis has several LEDs. These LEDs provide you with critical information related to the node on the same side of the chassis.

This table describes what each LED indicates when illuminated and any corrective action you may need to take.

Table 4-3: Control panel LEDs

LED	Description
	<p><b>Power</b></p> <p>Indicates power is being supplied to the system's power supply units. This LED is illuminated when the system is operating.</p>
	<p><b>Heartbeat</b></p> <p>Indicates that power is being supplied to the server board. This LED flashes amber to indicate normal activity.</p>
	<p><b>NIC1</b></p> <p>Indicates network activity on the LAN1 port when flashing.</p>
	<p><b>NIC2</b></p> <p>Indicates network activity on the LAN2 port when flashing.</p>
	<p><b>Power failure</b></p> <p>Indicates a power supply module as failed. The second power supply module will take the load and keep the system running but the failed module will need to be replaced. This LED is OFF when the system is operating normally.</p>
	<p><b>Overheat/fan failure</b></p> <ul style="list-style-type: none"> <li>When this LED flashes, it indicates a fan failure.</li> <li>When it is ON continuously, it indicates an overheat condition, which may be caused by cables obstructing the airflow in the system or the ambient room temperature being too warm.</li> </ul> <p>This LED will remain flashing or on as long as the indicated condition exists.</p>

LED	Description
	<p>▶ <b>Perform these steps:</b></p> <ol style="list-style-type: none"> <li>1. Check the routing of the cables and make sure all fans are present and operating normally.</li> <li>2. Check to make sure that the chassis covers are installed.</li> <li>3. Verify that the heat sinks are installed properly.</li> </ol>

### Drive carrier LEDs

Each drive carrier on Unity's chassis has two LEDs, a green LED on the left to indicate activity, and a red LED on the right to indicate status.

Table 4-4: Drive carrier LEDs

LED	Description
Green	<ul style="list-style-type: none"> <li>• When illuminated, the green LED on the drive carrier indicates the drive is powered on.</li> <li>• If this LED is not lit, it means no power is being provided for the drive.</li> </ul>
Red	<ul style="list-style-type: none"> <li>• A steady red LED indicates a drive failure.</li> <li>• A blinking red LED indicates that a RAID rebuild is in progress.</li> </ul>


### US460 Front panel LEDs

There are several LEDs on the control panel of the US460, and on the drive carriers, to keep you constantly informed of the overall status of the system and the activity and health of specific components.

#### Control panel LEDs

The control panel provide critical information related to the corresponding node.

This table describes what each LED indicates when illuminated and any corrective action you may need to take.

Name	Description	LED status
		
ALM	Alarm LED: Indicates if there are faults on the PSU for each controller.	<p>Red: PSU contains one or more faults</p> <p>Red (flashing): PSU alarm status is being identified.</p> <p>Off: PSU is functioning normally.</p>
ACIN	AC Input LED: Indicates whether the controller has input power.	Green: AC input is functioning normally.




Name	Description	LED status
		Off: No AC input
RDY	Ready LED: Indicates whether the PSU is providing power to the enclosure.	Green: DC input is functioning normally. Off: No DC output

### Rear LEDs

This table describes the US460 enclosure status backplane LEDs.

Name	Description	LED status
------	-------------	------------

#### Status LEDs

Power 	Indicates whether the enclosure has power	<b>Green:</b> Powered on <b>Off:</b> Powered off
Identify 	Identifies the location of the enclosure, and enables users to turn on the LED from the Unity firmware	<b>Amber (flashing):</b> Enclosure is being identified <b>Off:</b> Enclosure is not being identified
Fault 	Indicates whether the enclosure has faults	<b>Red:</b> Enclosure has fault conditions <b>Off:</b> No fault conditions

#### Host Storage System LEDs (Link/Fault)



Host 1 Host 2 Host 3 Host 4	The Host Storage System LEDs, positioned to the right of the host ports, indicate links and faults on the host Unity Storage System. In the image above, only one storage system is connected.	<b>Link:</b> (Green) <b>On:</b> SAS cable connected <b>Off:</b> SAS cable not connected <b>Fault:</b> (Red) <b>Flashing:</b> One or more of the SAS connections is not connected
--------------------------------------	--	--

Name	Description	LED status
		<b>Off:</b> SAS connection contains no faults



## Monitoring disk drives

Each Unity Storage Expansion disk drive carrier has LEDs that indicate the status of the disk drive. If a drive fails, replace the drive as described in [Removing a disk drive](#) on page 92.

**Note** If replacing a disk drive does not resolve a fault or failure indicated by LED 2, replace the I/O controller; for more information, see [Replacing a controller](#) on page 91

All Unity Storage Expansion drive carriers have two status LEDs, as shown in these images.

Figure 4-4: US224

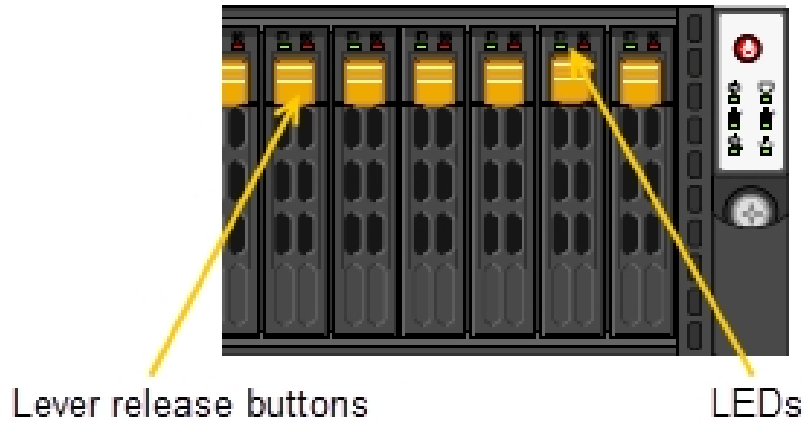


Figure 4-5: US316 and UNITY2200X

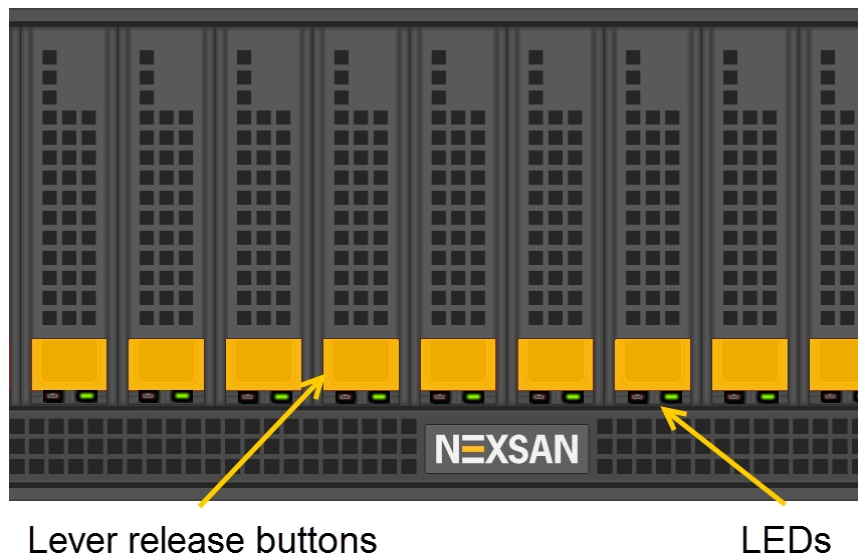


Figure 4-6: US424

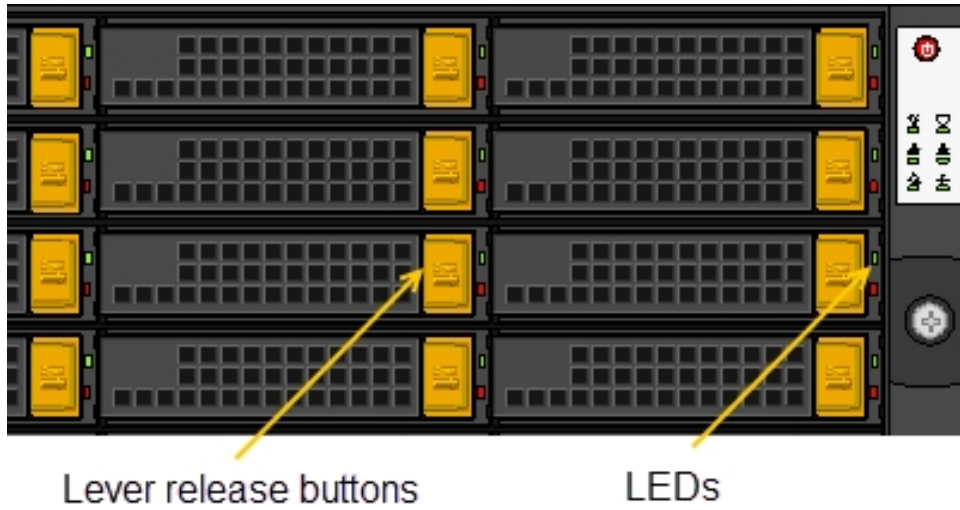


Table 4-5: Drive carrier LEDs

LED	Indication
Green	<ul style="list-style-type: none"> <li>• A steady green LED indicates the drive is powered on.</li> <li>• If this LED is not lit, the drive is not getting power.</li> <li>• If this LED is flashing, the drive is being accessed (read or write).</li> </ul>
Red	<ul style="list-style-type: none"> <li>• A steady red LED indicates a drive failure.</li> </ul>

Figure 4-7: US460



Table 4-6: US460 drive carrier LEDs

LED	Indication
Ready (Green)	<ul style="list-style-type: none"> <li>• A steady green LED indicates the drive is ready.</li> <li>• If this LED is not lit, the drive is not getting power.</li> </ul>

LED	Indication
	<ul style="list-style-type: none"><li>● If this LED is flashing, the drive is being accessed (read or write).</li></ul>
Status (Red)	<ul style="list-style-type: none"><li>● A steady red LED indicates a drive failure.</li><li>● If this LED is not lit, the drive has no faults.</li></ul>



# Chapter 5

## Solving problems

---

This chapter describes how to remove and replace failed or failing components of the Unity Storage Expansions. It includes these topics:

General troubleshooting tips .....	90
Powering down .....	91
Replacing a controller .....	91
Removing a disk drive .....	92
Replacing a PSU .....	93
Removing a Unity Storage Expansion .....	94

## General troubleshooting tips

Use these tips if you encounter difficulties installing or using your Unity Storage System or Unity Storage Expansion,

- Check all components on the enclosure—disk drives, power supply units, I/O controllers—for illuminated Fault LEDs. See [Monitoring enclosures on page 81](#) for more information.
- Ensure that all components are fully and properly seated in their slots.
- Ensure that all cables are properly connected. If necessary, try using different SAS cables.
- Ensure that both APC units are powered on.

### *If you need to power down your equipment*

The Unity Storage System is hot pluggable and powering down is not required to add a Unity Storage Expansion. If however, you determine that powering down is necessary, perform the shutdown in this order:

1. Power down the Unity Storage Expansion.
2. Power on the Unity Storage Expansion.
3. Power on Unity.

For procedural steps, see [Powering down on the facing page](#) and [Powering on on page 75](#).

## Powering down

This section describes the power down sequence for Unity Storage Expansions and Unity Storage Systems.

**Note** The Unity Storage System should be shut down before the Unity Storage Expansions during a power down sequence. You can do this from Nexsan Unity or from the nxadmin Command-line Interface (CLI) on Unity; for more information, see the *Nexsan Unity Software User Guide*.

### ► To power down the Unity Storage Expansions and Unity Storage System:

1. Power down the Unity Storage System from Nexsan Unity or from the nxadmin Command-line Interface (CLI).

**Note** Both Unity controllers must be powered off simultaneously.

2. Power down the Unity Storage Expansion by pressing and holding the power button on the power supply units or by unplugging the unit (US460).

## Replacing a controller

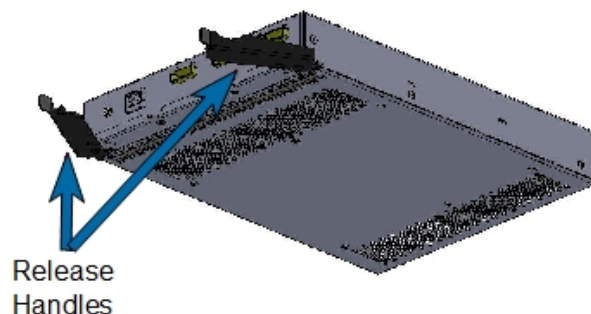


**CAUTION:** Although the controllers are hot-swappable, the **safest** way to replace a controller without any risk of damage or data loss is with the Unity Storage Expansion powered off.

**Note** I/O traffic to an I/O controller should be stopped before hot swapping a controller.

### ► To remove the controller:

1. If you are not doing a hot-swap, power off your equipment in this order:
  - a. Power off Unity.
  - b. Power off the Unity Storage Expansion.
  - c. For more information about the power off sequence, see "Powering down," above.
2. Before you disconnect the cables, label each cable with the name of the port it connects to. You will need this information when installing a new controller.
3. Disconnect all the cables connected to the controller.
4. Pull the two black release handles and carefully slide the controller out of the enclosure.



5. Gently slide a new controller into the empty controller bay until the black handles engage, then press the handles until the I/O canister latches into place.
6. Connect the cables according to the notes you made when you removed the old controller.

7. If necessary, power on your equipment **in this order**:
  - a. Power on the Unity Storage Expansion.
  - b. Power on Unity.

## Removing a disk drive

If you will be installing a replacement disk drive, allow it to acclimate to room temperature before continuing.

**Note** For disk drive installation instructions, see [Installing Unity Storage Systems](#) on page 33.

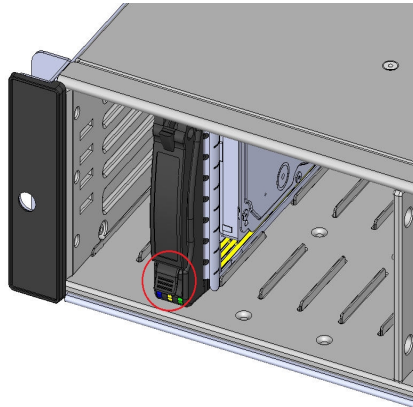


### Important safety precautions

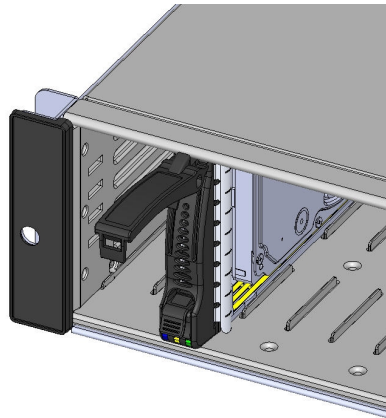
- To avoid data loss, stop all I/O activity on the disk drive before removing it. Removing a disk drive during I/O activity could also hang the host system.
- **Do not** attempt to remove more than one disk drive or blank drive carrier at a time. Damage to the drive carrier can occur if adjacent disk drives are removed at the same time.
- To maintain proper airflow and cooling inside the enclosure, install either a disk drive or a blank drive carrier into the empty drive bay as quickly as possible.

### ► To remove a disk drive (or blank drive carrier):

1. Press the button on the disk drive carrier to release the lever (drive may not be exactly as shown).



2. Gently pull open the lever.





- If the enclosure is powered on, in the case of HDDs, allow the disk drive to fully spin down (wait approximately 30 seconds).



**CAUTION:** Removing a disk drive before it has fully spun down may result in disk drive damage and possible personal injury.

- Gently pull the disk drive out of the enclosure.

**Note** Do not remove the disk drive from its drive carrier. A disk drive removed from its carrier is not covered by the hardware warranty.

- Immediately replace the disk drive or install a blank drive carrier to maintain correct airflow and cooling; for more information, see [Installing Unity Storage Systems](#) on page 33.

## Replacing a PSU

You must replace a failed PSU **as quickly as possible** (within five minutes) to maintain correct airflow and cooling. failed PSUs can be hot-swapped.

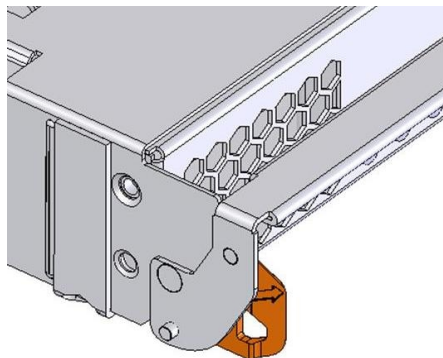
If you don't have a replacement unit available for immediate installation, you must power off the enclosure.

**Note** If the enclosure is still operational, the failed PSU can be left installed to maintain proper cooling until a replacement unit is available. The fans in both PSUs will continue to run at high speed until the PSU is replaced.

For more information about PSUs, see [Components and features](#) on page 14.

### ► To replace a PSU:

- Power off the failed PSU and remove the power cable. If the enclosure is powered on, the fans in the other PSU switch to high speed to compensate for the reduced airflow.
- Push the release tab to the right and rotate the handle down.
- Slide the PSU out of the enclosure. **Do not** use the thumb-presses as handles to lift or carry the PSU (example picture shown).



**CAUTION:** To avoid electrical shock, **do not** insert any instruments or tools into the open PSU slot.

- Gently slide a new PSU into the empty slot until the handle rotates up and the release tab clicks into place.
- Reconnect the power cable.
- Power on the PSU.

When proper airflow returns, the cooling fans in the other PSU return to their normal speed.

## Removing a Unity Storage Expansion

This section describes how to disconnect a Unity Storage Expansion from an Unity or another Nexsan Unity Storage Expansion. Nexsan Unity Storage Expansions are hot-pluggable. They can be added or removed from an Unity or another Nexsan expansion unit that is currently running.

▶ **Before you begin:**

Before you can physically remove a Unity Storage Expansion, you must:

1. Remove all storage pools on the Unity Storage Expansion, as described in [Deleting a storage pool](#) below.
2. Remove the Unity Storage Expansion from Unity, as described in [Removing a Unity Storage System](#) on page 96.

▶ **To remove a Unity Storage Expansion:**

1. Put on the disposable ESD strap:
  - a. Slip the wrist loop over your hand (left or right), then tighten the loop against your wrist.
  - b. Attach the clip end of the anti-static wrist strap to a properly grounded metal surface, such as a server rack's grounding pin.
2. Power OFF the expansion unit.
3. Unplug the power cords from their respective power supplies on the rear of the expansion unit, then unplug them from the power source.
4. Unplug the SAS cables connected to the expansion unit from the main unit.
5. (Optionally) Replace the expansion unit with another one by connecting the SAS cable from the SAS on-board port to the appropriate SAS port on the new expansion unit.

### *Deleting a storage pool*

This section explains how to delete a storage pool on Unity.



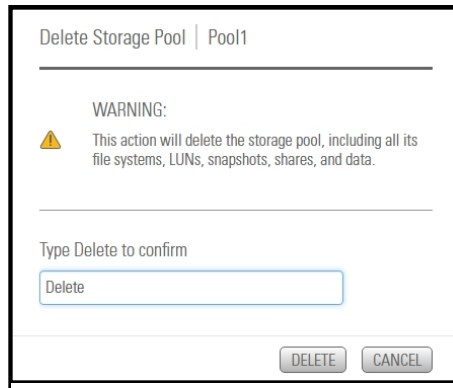
**CAUTION:** Deleting a storage pool also deletes all shares and their underlying data in the storage pool, including snapshots of the data. If the storage pool is replicated, Unity will ask you if you want to also delete the storage pool's replica on the remote site, or if you want to promote the storage pool's replica to primary pool.

▶ **To delete a storage pool:**

1. On the **Unity navigation bar**, select **Storage > Storage Pools**.
2. In the **Storage Pool** panel, click the link to the pool you want to delete.

3. Click the **Delete Pool** button. The **Delete Storage Pool** confirmation popup opens.

Figure 5-1: Delete Pool popup



4. Type **Delete** in the text box.
5. Click **Delete** to delete the storage pool.

## Removing a Unity Storage System

Use this procedure to remove a Unity Storage System.



**CAUTION:** This action will permanently remove the storage system from the Unity System; if you proceed, the storage system will no longer be allocated to the Unity System.

As part of the removal process, you can specify whether or not you want Unity to delete all existing volumes (RAID sets) on the storage system, or leave them intact.

Note that Unity supports two options for the RAID sets on the system being removed:

- **Delete volumes:** With this option, you remove existing RAID configurations.
- **Leave volumes intact.** With this option, you keep the RAID configurations on the removed system.

### Prerequisites

- Remove storage pools allocated to the system, as described in [Deleting a storage pool on page 94](#).

#### ▶ To remove a Unity Storage System:

1. From the **Unity navigation bar**, select **Storage > Storage Systems**. The **Storage Systems** panel opens.

Figure 5-2: Storage Systems panel

NAME	STATUS	USED SPACE	CAPACITY	
NST5000X (2)	OK	0%	800 MB	Remove System
NSTvm (1)	OK	0.16%	664.51 MB	


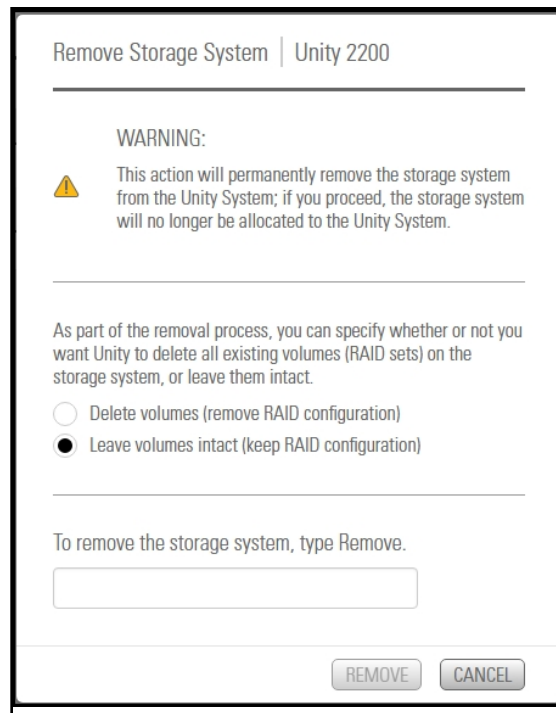
- In the row containing the system you that want to remove, click the **Remove System** icon . The **Remove Storage System** window opens.

Figure 5-3: Remove Storage System window



- Choose one of the following:
  - **Delete volumes:** With this option, you remove existing RAID configurations.
  - **Leave volumes intact.** With this option, you keep the RAID configurations on the removed system.
- Type **Remove** in the text box.
- Click the **Remove** button to complete the operation.

▶ **What's Next:**

You can now remove the storage enclosure physically.



# Appendix A

## Technical specifications

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This chapter lists the technical specifications of the Nexsan Unity Storage Expansions. It includes these topics:

Unity2200 Expansion general specifications .....	100
US224 general specifications .....	101
US316 general specifications .....	103
General specifications for 4U Unity Storage Expansions .....	104

## Unity2200 Expansion general specifications

This section describes the UNITY2200X hardware specifications.

Hardware component	Specifications
System	<ul style="list-style-type: none"> <li>Up to 16 drives with 3.5" SAS disk drives</li> </ul>
Rail kit mounting	<ul style="list-style-type: none"> <li>3U enclosure height</li> <li>The rack must have square holes</li> <li>Maximum distances: 30" (800 mm)</li> <li>Cable specifications:               <ul style="list-style-type: none"> <li><b>Passive SAS cables</b> <ul style="list-style-type: none"> <li>19.6" (500 mm) minimum</li> <li>36" (914 mm) maximum</li> </ul> </li> <li><b>Active cables</b> <ul style="list-style-type: none"> <li>Any length</li> </ul> </li> </ul> </li> </ul>
Redundant components	<ul style="list-style-type: none"> <li>2 power supply units</li> <li>Cooling fans</li> <li>Host connectivity ports</li> <li>Controllers</li> </ul>
Enclosure physical dimensions	<ul style="list-style-type: none"> <li>Height 5.2" 132 mm</li> <li>Width 17.2" 437 mm</li> <li>Length 25.5" 648 mm</li> </ul>
Weight	<p>Chassis: 56 lbs (25.5 kg)</p> <p>With drives installed: 75 lbs (34 kg)</p>
Advanced power and cooling units	<ul style="list-style-type: none"> <li>Rated output power : 1,200W redundant</li> <li>Rated output voltages: +12V (83A max.) +5Vsb (4A max.)</li> <li>Input voltage: 100-240VAC</li> <li>AC input frequency: 50/60 Hz</li> <li>Power consumption: varies depending on the number and size of drives, running fans, and room temperature</li> <li>Cooling system: 12 fans (4 cm)               <ul style="list-style-type: none"> <li>6 counter-rotating fans behind the HDD backplane</li> <li>6 counter-rotating fans at the rear of each node</li> <li>Power supply: 2 fans (one per power supply)</li> </ul> </li> </ul>



## US224 general specifications

This section describes the US224 hardware specifications.

Hardware component	Specifications									
System	<ul style="list-style-type: none"> <li>● up to 24 drives (2.5" SAS and/or SSD drives)</li> </ul>									
Rail kit mounting	<ul style="list-style-type: none"> <li>● 2U enclosure height</li> </ul> <p>Cable specifications:</p> <p><b>Passive SAS cables</b></p> <ul style="list-style-type: none"> <li>● 19.6" ( 500 mm) minimum</li> <li>● 36" (914 mm) maximum</li> </ul> <p><b>Active cables</b></p> <ul style="list-style-type: none"> <li>● Any length</li> </ul>									
Field Replaceable Units (FRU)	<ul style="list-style-type: none"> <li>● Disk drives and drive carrier blanks</li> <li>● APC units</li> <li>● I/O modules</li> <li>● I/O module slot blanks</li> </ul>									
Enclosure physical dimensions	<table border="0"> <tr> <td>Height</td> <td>3.5"</td> <td>88 mm</td> </tr> <tr> <td>Width</td> <td>17.2"</td> <td>437 mm</td> </tr> <tr> <td>Length</td> <td>25.5"</td> <td>641 mm</td> </tr> </table>	Height	3.5"	88 mm	Width	17.2"	437 mm	Length	25.5"	641 mm
Height	3.5"	88 mm								
Width	17.2"	437 mm								
Length	25.5"	641 mm								
Weight	<p>Chassis: 67 lbs (30.4 kg)</p> <p>With drives installed: 114 lbs (51.7 kg)</p>									
Power supply units	<ul style="list-style-type: none"> <li>● System input requirements: <ul style="list-style-type: none"> <li>● AC Input voltage: 100-240 V</li> <li>● AC Input frequency: 50-60 Hz</li> <li>● AC Input amperage: 11-4,5 Amp</li> <li>● 1,200W redundant power supplies with PMBus</li> </ul> </li> <li>● Output power: <ul style="list-style-type: none"> <li>● Output Type: 19 pairs gold finger connector</li> <li>● Total output power: 1,200 W/1,000, 80 plus Titanium Certified</li> <li>● Rated output voltages: +5V (45A), 3.3V (24A), -12V (0.6A)</li> </ul> </li> <li>● Power consumption: varies depending on the number and size of drives, running fans, and room temperature.</li> </ul>									

Hardware component	Specifications
	<ul style="list-style-type: none"><li>● Cooling system:<ul style="list-style-type: none"><li>● 2 hot-swappable APC units</li><li>● 8x 40mm cooling fans</li><li>● Variable speed blowers, two per APC. Total of four blowers per enclosure.</li></ul></li></ul>



## US316 general specifications

This section describes the US316 hardware specifications.

Hardware component	Specifications
System	<ul style="list-style-type: none"> <li>Up to 16 drives with 3.5" SAS disk drives</li> </ul>
Rail kit mounting	<ul style="list-style-type: none"> <li>3U enclosure height</li> <li>The rack must have square holes</li> <li>Maximum distances: 30" (800 mm)</li> <li>Cable specifications:               <ul style="list-style-type: none"> <li><b>Passive SAS cables</b> <ul style="list-style-type: none"> <li>19.6" (500 mm) minimum</li> <li>36" (914 mm) maximum</li> </ul> </li> <li><b>Active cables</b> <ul style="list-style-type: none"> <li>Any length</li> </ul> </li> </ul> </li> </ul>
Redundant components	<ul style="list-style-type: none"> <li>2 power supply units</li> <li>Cooling fans</li> <li>Host connectivity ports</li> <li>Controllers</li> </ul>
Enclosure physical dimensions	<ul style="list-style-type: none"> <li>Height 5.2" 132 mm</li> <li>Width 17.2" 437 mm</li> <li>Length 25.5" 648 mm</li> </ul>
Weight	Chassis: 56 lbs (25.5 kg) With drives installed: 75 lbs (34 kg)
Advanced power and cooling units	<ul style="list-style-type: none"> <li>Rated output power : 1,200W redundant</li> <li>Rated output voltages: +12V (83A max.) +5Vsb (4A max.)</li> <li>Input voltage: 100-240VAC</li> <li>AC input frequency: 50/60 Hz</li> <li>Power consumption: varies depending on the number and size of drives, running fans, and room temperature</li> <li>Cooling system: 12 fans (4 cm)               <ul style="list-style-type: none"> <li>6 counter-rotating fans behind the HDD backplane</li> <li>6 counter-rotating fans at the rear of each node</li> <li>Power supply: 2 fans (one per power supply)</li> </ul> </li> </ul>

## General specifications for 4U Unity Storage Expansions

This section describes the US424 and US460 hardware specifications.

Hardware component	Specifications																	
System	<p><b>US424</b></p> <ul style="list-style-type: none"> <li>up to 24 front-loading, hot swappable 3.5" drives, SAS 3 I/O controllers</li> </ul> <p><b>US460</b></p> <ul style="list-style-type: none"> <li>up to 57 top-loading, hot swappable 3.5" drives, SAS 3 I/O controllers. Minimum 24 HDDs per enclosure.</li> </ul>																	
Rail kit mounting	<ul style="list-style-type: none"> <li>4U enclosure height</li> <li>Cable specifications:                             <ul style="list-style-type: none"> <li><b>Passive SAS cables</b> <ul style="list-style-type: none"> <li>19.6" ( 500 mm) minimum</li> <li>36" (914 mm) maximum</li> </ul> </li> <li><b>Active cables</b> <ul style="list-style-type: none"> <li>Any length</li> </ul> </li> </ul> </li> </ul>																	
Drive bays	<p><b>US460</b></p> <ul style="list-style-type: none"> <li>57 x 3.5" hot swappable SAS drive bays</li> </ul> <p><b>US424</b></p> <ul style="list-style-type: none"> <li>24 x 3.5" hot-swappable SAS drive bays with SES2</li> <li>SAS drives recommended</li> </ul>																	
Field Replaceable Units (FRU)	<ul style="list-style-type: none"> <li>Disk drives and drive carrier blanks</li> <li>I/O modules</li> <li>I/O module slot blanks</li> </ul>																	
Enclosure physical dimensions	<p><b>US460</b></p> <table border="0"> <tr> <td>Height</td> <td>6.88"</td> <td>174 mm</td> </tr> <tr> <td>Width</td> <td>16.69"</td> <td>424 mm</td> </tr> <tr> <td>Depth</td> <td>40.30"</td> <td>1033.78 mm</td> </tr> <tr> <td>Weight</td> <td>99.6 lbs.</td> <td>45 kg (no drives installed)</td> </tr> <tr> <td></td> <td>207.6 lbs.</td> <td>93.7 kg (all drives installed)</td> </tr> </table>			Height	6.88"	174 mm	Width	16.69"	424 mm	Depth	40.30"	1033.78 mm	Weight	99.6 lbs.	45 kg (no drives installed)		207.6 lbs.	93.7 kg (all drives installed)
Height	6.88"	174 mm																
Width	16.69"	424 mm																
Depth	40.30"	1033.78 mm																
Weight	99.6 lbs.	45 kg (no drives installed)																
	207.6 lbs.	93.7 kg (all drives installed)																
Enclosure physical dimensions	<p><b>US424</b></p> <table border="0"> <tr> <td>Height</td> <td>7"</td> <td>178 mm</td> </tr> <tr> <td>Width</td> <td>17.2"</td> <td>437 mm</td> </tr> <tr> <td>Length</td> <td>27"</td> <td>686 mm</td> </tr> <tr> <td>Weight</td> <td>85 lbs.</td> <td>38.6 kg (no drives installed)</td> </tr> </table>			Height	7"	178 mm	Width	17.2"	437 mm	Length	27"	686 mm	Weight	85 lbs.	38.6 kg (no drives installed)			
Height	7"	178 mm																
Width	17.2"	437 mm																
Length	27"	686 mm																
Weight	85 lbs.	38.6 kg (no drives installed)																

Hardware component	Specifications
	<div style="display: flex; justify-content: space-around;"> <span>90 lbs.</span> <span>40.8 kg (all drives installed)</span> </div>
Power supply units	<p><b>US460</b></p> <ul style="list-style-type: none"> <li>● Two 1,650W PSUs, hot swappable and redundant</li> <li>● AC Input voltage: 200-240VAC auto-ranging, 47Hz-63Hz input (high line power only)</li> </ul>
Power supply units	<p><b>US424</b></p> <ul style="list-style-type: none"> <li>● Redundant 1,200 power supplies with PMBus</li> <li>● AC Input voltage: <ul style="list-style-type: none"> <li>● 100-127 Vac / 15-12A / 50-60Hz</li> <li>● 200-240 Vac / 8.5-&amp;A / 50-60Hz</li> </ul> </li> <li>● +12V <ul style="list-style-type: none"> <li>● Max: 83A / Min: 0A (100-127 Vac)</li> <li>● Max: 100A / Min: 0A (200-240 Vac)</li> </ul> </li> <li>● +5Vsp: Max 4A / Min: 0A</li> <li>● With Power Distributor: +5V: 45 Amp; +3.3V: 24 Amp; -12V: 0.6 Amp</li> <li>● Maximum output power: 1,600W</li> <li>● Power consumption: varies depending on the number and size of drives, running fans, and room temperature</li> <li>● Cooling system: <ul style="list-style-type: none"> <li>● 4 x 80mm and 4 x 40mm PWM cooling fans</li> <li>● Redundant cooling</li> </ul> </li> </ul>



# Appendix B

## Regulatory compliance

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This chapter includes these topics:

Regulatory compliance statements .....	108
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## Regulatory compliance statements

Nexsan Unity Storage Expansions conform to the following Regulatory Agency requirements:

Category	Range
Temperature	Operating: 5 °C to +40 °C
	Storage: 1°C to +60 °C
	Transit: -40°C to +60 °C
	Maximum Rate of Temperature Change: 20 °C per hour
Humidity	Relative Humidity Operating: 20% to 80%, non-condensing
	Maximum Rate of Operational Humidity Change: 10% per hour
	Relative Humidity Storage: 10% to 80%, non-condensing
Altitude	Altitude Operating: -200 to 10,000 feet
	Altitude Storage: -200 to 10,000 feet
Operational shock	5 G half sine shock with pulse duration of 11 milliseconds or less.
Non-operational shock	Half Sine Shock: 10 G half sine shock with pulse duration of 11 milliseconds or less.
Operational vibration	Sinusoidal vibration from 5 to 500 Hz at 0.16 G (0 to peak) at a sweep rate of 0.5 octaves per minute.
	Random vibration from 5 to 500 Hz at 0.15 G (rms).
Non-operational vibration	Sinusoidal vibration from 5 to 500 Hz at 0.75 G (half-sine) at a sweep rate of 0.5 octaves per minute.
	Random vibration from 5 to 500 Hz at 0.5 G (rms).
Acoustics	Acoustic level shall not exceed a weighted sound power of 6.9 Bels at normal operation tested to ISO7779.



## Regulatory agency compliance

Nexsan Unity Storage Expansions comply with the following Regulatory Agency requirements:

Standard	Certifications
<b>Product safety standards</b>	
	UL60950 Information Technology Equipment (US)
	CSA C22.2 No 60950 Information Technology Equipment (Canadian Law)
	EN 60950 Information Technology Equipment (European Norm)
	IEC60950 Information Technology Equipment
<b>Product safety third party certifications</b>	
	cUL Listed USA
	TUV, GS Certified Germany
	TUV CB Certified
<p>The Unity Storage Expansion is CE and FCC marked to indicate compliance with the European Low Voltage Directive and the EMC directive. The Unity Storage Expansion is certified to Class A emission limits.</p>	
<b>Product Safety</b>	
	EN60950 ITE
<b>Emissions Testing</b>	
	EN55024 Radiated and conducted emissions
	FCC, Part 15
	VCCI
<b>Immunity Testing</b>	
	CENELEC EN55024 Light Industry
	CENELEC EN61000-4-2 Electrostatic Discharge
	CENELEC EN61000-4-3 Radiated Immunity
	CENELEC EN61000-4-4 Electrical Fast Transients (Burst)
	CENELEC EN61000-4-5 Transient (Surge)

Standard	Certifications
	CENELEC EN61000-4-6 Conducted Immunity
	CENELEC EN61000-4-8 Power Frequency Magnetic Fields
	CENELEC EN61000-4-11 Power Line Interruption
	EN61000-3-2 Harmonic current emissions
	EN61000-3-3 Voltage fluctuations and flicker

**Certification marks**

The Unity Storage Expansion is labeled with the following compliance marks:

	United States FCC standard, 47 CFR Part 15
	Canadian standard, Industry Canada ICES-003
	CE Mark
	GS Mark
	TUV Safety Mark

**Product safety certifications on power supplies as a component**

	UL Recognized Component (QQGQ2)
	TUV BG Certification
	CB Certificate and Report
	CE Mark
	BSMI
	CCC

B



#### **Nexsan Headquarters**

325 E. Hillcrest Drive, Suite #150  
Thousand Oaks, CA 91360  
United States of America

#### **Nexsan Shipping**

302 Enterprise Street , Suite A  
Escondido, CA 92029  
United States of America

#### **Nexsan Unity Documentation & Online Help page:**

[https://helper.nexsansupport.com/unt\\_support](https://helper.nexsansupport.com/unt_support)

#### **Worldwide Web**

[www.nexsan.com](http://www.nexsan.com)

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Document Reference: 20190815PM010103

#### **Nexsan Canada**

1405 Trans Canada Highway, Suite 300  
Dorval, QC H9P 2V9  
Canada

#### **Nexsan UK**

Units 33–35, Parker Centre, Mansfield Road  
Derby, DE21 4SZ  
United Kingdom

#### **Nexsan Unity support:**

[https://helper.nexsansupport.com/unt\\_support](https://helper.nexsansupport.com/unt_support)

This product is protected by one or more of the following patents, and other pending patent applications worldwide:

United States patents US8,191,841, US8,120,922;

United Kingdom patents GB2466535B, GB2467622B, GB2467404B, GB2296798B, GB2297636B