



HYPER—UNIFIED STORAGE

Nexsan Unity

Hardware Reference Guide

Firmware Version Unity v. 6.0
(HTML5 interface)

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About this document

This *Hardware Reference Guide* provides hardware information for the following platforms. For installation procedures, please refer to the appropriate Quick Start Guide.

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
underlined blue	Cross-references, hyperlinks, URLs, and email addresses.
boldface	Text that refers to labels on the physical unit or interactive items in the graphical user interface (GUI).
<code>monospace</code>	Text that is displayed in the command-line interface (CLI) or text that refers to file or directory names.
monospace bold	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

Unity Online Help page:

https://helper.nexsansupport.com/unt_onlinehelp.html

Contact Nexsan Unity support:

https://helper.nexsansupport.com/unt_support

Worldwide Web site:

www.nexsan.com

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

UNITY2200 hardware overview

A UNITY2200 storage system includes two UNITY2200 controllers with automatic failover and Active/Active Clustering. Each controller includes a chassis inter-connect providing high speed, low-latency communication between the two UNITY2200 controllers.

UNITY2200 is an entry-level system comprised of dual-controllers and internal storage. Optionally, you can connect an external UNITY2200X storage expansion. UNITY2200X is a 3U chassis and uses 16 drives (14 data NL-SAS drives, 1 FASTier Write Cache device, and 1 FASTier Read Cache device). The FASTier cache devices support both read and write caching. The capacity-optimized configuration is best suited for:

- backup
- unstructured files
- specific applications that benefit from advanced caching
- video streaming

The amount of storage and FASTier cache devices is allocated as follows:

Configuration	Storage	FASTier Read cache	FASTier Write cache
With a storage expansion:	<ul style="list-style-type: none">• 7 or 14 3.5" NL-SAS drives in the front bay• 7.2K: 2TB 4TB 6TB 8TB 10TB 12TB	800 GB (default) 1.9 TB 3.8 TB	400 GB
Half-populated:	<ul style="list-style-type: none">• 8 or 16 in front bay for SSD• 800GB 1.9TB 3.8TB 7.6TB		

UNITY2200 General specifications

This section describes the UNITY2200 hardware specifications.

Hardware component	Specifications
System	7 or 14 3.5" NL-SAS drives in the front bay 8 or 16 in front bay for SSD
Rail kit mounting	<ul style="list-style-type: none"> ● 3U enclosure height ● The rack must have square holes ● Maximum distances: 30" (800 mm)
Redundant components	<ul style="list-style-type: none"> ● 2 power supply units ● Cooling fans ● Host connectivity ports ● Controllers
Enclosure physical dimensions	<ul style="list-style-type: none"> ● Height 5.2" 132 mm ● Width 17.2" 437 mm ● Length 25.5" 648 mm
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"> ● Rated output power : 1,200W redundant ● Rated output voltages: +12V (83A max.) +5Vsb (4A max.) ● Input voltage: 100-240VAC ● AC input frequency: 50/60 Hz ● Power consumption: varies depending on the number and size of drives, running fans, and room temperature ● Cooling system: 12 fans (4 cm) <ul style="list-style-type: none"> ● 6 counter-rotating fans behind the HDD backplane ● 6 counter-rotating fans at the rear of each node ● Power supply: 2 fans (one per power supply)

1

UNITY2200 front and rear views

These diagrams represent the front and rear views of the UNITY2200.

Figure 1-1: UNITY2200 front view

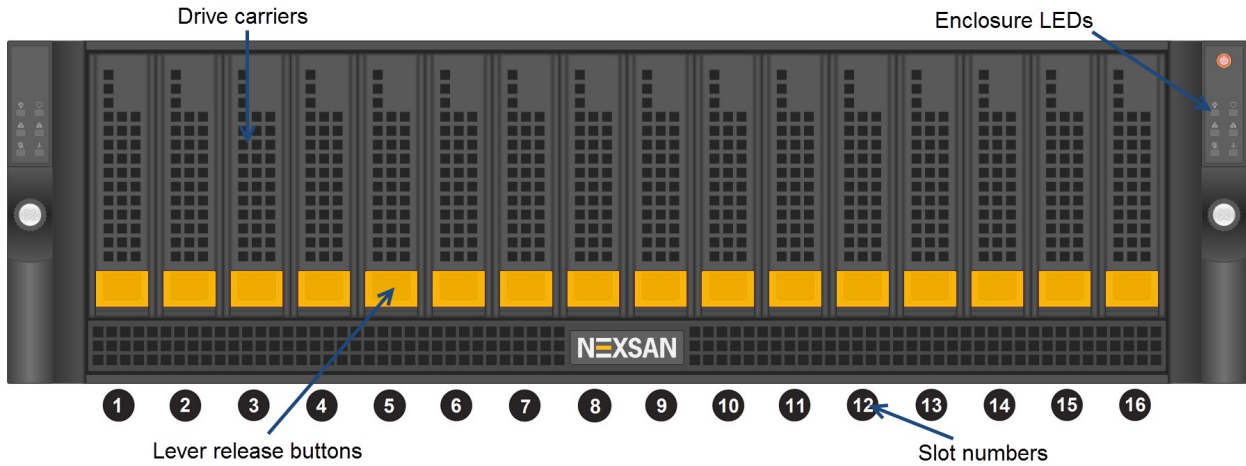


Figure 1-2: UNITY2200 rear view

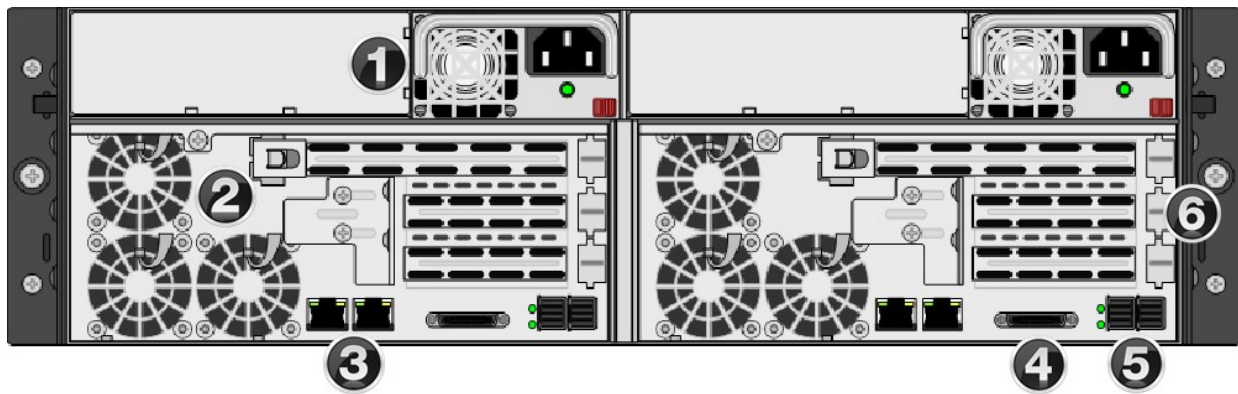


Table 1-1: UNITY2200 rear components

Rear components	Optional PCIe cards for connectivity
<ol style="list-style-type: none"> Power supply units Fan assemblies On-board GigE LAN ports (2 per node): KVM connections Storage connectivity: Dual-port SAS PCIe to HD Mini-SAS (Serial Attached SCSI) HBA (host bus adapter) 	<ol style="list-style-type: none"> Optional connectivity to Fibre Channel hosts: Dual-port 8Gb Fibre Channel to Express Host Bus Adapter Note If you did not purchase a Fibre Channel card, you can use this slot for an additional network card, which can be any of the supported NICs mentioned below.







Rear components	Optional PCIe cards for connectivity
	<p>7. Network connectivity:</p> <ul style="list-style-type: none"> ● 10GbE dual-port network PCIe card with RJ-45 interfaces, or ● 10GbE dual-port network PCIe card with SFP+ SR interfaces, or ● GigE quad-port network PCIe card with RJ-45 interfaces, or ● 8Gb Fibre Channel ● 16Gb Fibre Channel ● GigE dual port

UNITY2200 LEDs

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 1-2: Control panel LEDs

LED	Description
	<p>Power</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>Heartbeat</p> <p>Indicates that power is being supplied to the server board. This LED flashes amber to indicate normal activity.</p>
	<p>NIC1</p> <p>Indicates network activity on the LAN1 port when flashing.</p>
	<p>NIC2</p> <p>Indicates network activity on the LAN2 port when flashing.</p>
	<p>Power failure</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>Overheat/fan failure</p> <ul style="list-style-type: none"> ● When this LED flashes, it indicates a fan failure. ● 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. <p>This LED will remain flashing or on as long as the indicated condition exists.</p> <p>▶ Perform these steps:</p> <ol style="list-style-type: none"> 1. Check the routing of the cables and make sure all fans are present and operating normally. 2. Check to make sure that the chassis covers are installed. 3. Verify that the heat sinks are installed properly.

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 1-3: Drive carrier LEDs

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

Chapter 2

UNITY4400 hardware overview

The UNITY4400 includes two UNITY4400 controllers with automatic failover and Active/Active Clustering in a 2U form factor. The UNITY4400 includes a dual-port for connectivity to Unity Storage Expansions. Each controller includes a chassis inter-connect Host Bus Adapter used for multipathing, providing high speed, low-latency communication between the two UNITY4400 controllers.

UNITY4400 is a mid-level system comprised of dual-controllers and internal storage. In addition to the front bay storage, you can connect up to three Unity Storage Expansions. This configuration is best suited for:

- backup
- unstructured files
- specific applications that benefit from advanced caching

Drive configurations for the front bay can be 6 / 12 / 18 / 24.

Configuration	Storage	FASTier Read cache	FASTier Write cache
With 2.5" SSD drives	<ul style="list-style-type: none">• 600GB• 800GB• 1.9TB• 3.8TB• 7.6TB	In Unity Storage Expansions	NVRAM, when using 8GB NVDIMM
7.2K drives	<ul style="list-style-type: none">• 2TB• 4TB• 6TB• 8TB• 10TB• 12TB	In Unity Storage Expansions	
10K drives:	<ul style="list-style-type: none">• 900GB• 1.2TB• 1.8TB	<ul style="list-style-type: none">• 800 GB• 1.92 GB• 3.84 GB	

UNITY4400 General specifications

This section describes the UNITY4400 hardware specifications.

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

2

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

UNITY4400 front and rear views

These diagrams represent the front and rear views of the UNITY4400.

Figure 2-1: UNITY4400 front view

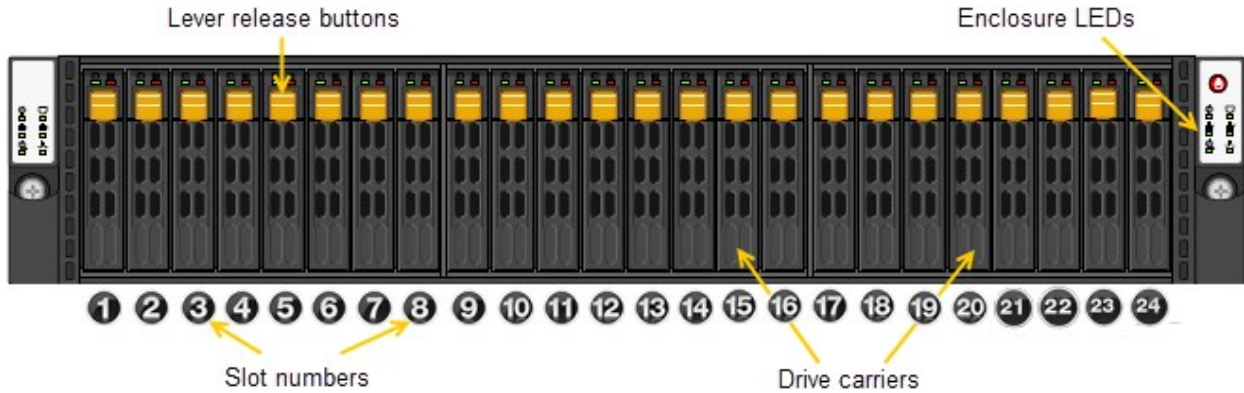


Figure 2-2: UNITY4400 rear view

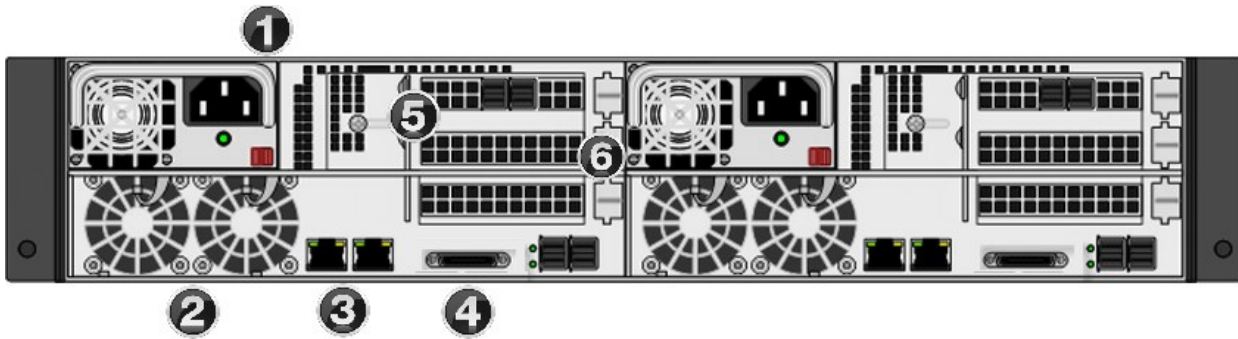


Table 2-1: Rear components

Rear components	Optional PCIe cards for connectivity
<ol style="list-style-type: none"> 1. Power supply units 2. Fan assemblies 3. On-board GigE LAN ports (2 per node): <ul style="list-style-type: none"> ● RIGHT port: Primary data network interface (nx0) (optional) ● LEFT port: Management Interface (nx99) and IPMI interface 4. KVM connections 5. Storage connectivity: <ul style="list-style-type: none"> 12 Gbps SAS Dual port to (Mini-SAS HD) added-on host bus adapter 	<ol style="list-style-type: none"> 6. Optional connectivity to Fibre Channel hosts: Dual-port 8Gb Fibre Channel to Express HBA <ul style="list-style-type: none"> ● 16Gb Fibre Channel: Dual port, ● 10GbE dual-port network PCIe card with RJ-45 interfaces, ● 10GbE dual-port network PCIe card with SFP+ SR interfaces, ● GbE dual-port network PCIe card with RJ-45 interfaces







2

UNITY4400 LEDs

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 2-2: Control panel LEDs

LED	Description
	<p>Power</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>Heartbeat</p> <p>Indicates that power is being supplied to the server board. This LED flashes amber to indicate normal activity.</p>
	<p>NIC1</p> <p>Indicates network activity on the LAN1 port when flashing.</p>
	<p>NIC2</p> <p>Indicates network activity on the LAN2 port when flashing.</p>
	<p>Power failure</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>Overheat/fan failure</p> <ul style="list-style-type: none"> When this LED flashes, it indicates a fan failure. 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. <p>This LED will remain flashing or on as long as the indicated condition exists.</p> <p>▶ Perform these steps:</p> <ol style="list-style-type: none"> Check the routing of the cables and make sure all fans are present and operating normally. Check to make sure that the chassis covers are installed. Verify that the heat sinks are installed properly.

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 2-3: Drive carrier LEDs

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

Chapter 3

UNITY6900 hardware overview

The UNITY6900 deployment includes two UNITY6900 controllers with automatic failover and Active/Active Clustering in a 2U form factor. They have dual E5-2640v4 CPUs and 192GB RAM + 16GB NVDIMM per controller. The UNITY6900 includes a quad-port for connectivity to Unity Storage Expansions. Each controller includes a chassis inter-connect used for multipathing, providing high speed, low-latency communication between the two UNITY6900 controllers.

UNITY6900 is a high-level system comprised of dual-controllers and internal storage. In addition to the front bay storage, you can connect up to eight Unity Storage Expansions. The capacity-optimized configuration is best suited for:

- backup
- unstructured files
- specific applications that benefit from advanced caching

Drive configurations in the front bay can be 6 / 12 / 18 / 24.

Configuration	Storage	FASTier Read cache	FASTier Write cache
With 2.5" SSD drives	<ul style="list-style-type: none">• 600GB• 800GB• 1.9TB• 3.8TB• 7.6TB	In Unity Storage Expansions	NVRAM, when using 16GB NVDIMM
7.2K drives	<ul style="list-style-type: none">• 2TB• 4TB• 6TB• 8TB• 10TB• 12TB	In Unity Storage Expansions	
10K drives:	<ul style="list-style-type: none">• 900GB• 1.2TB	<ul style="list-style-type: none">• 800 GB• 1.92 GB	

Configuration	Storage	FASTier Read cache	FASTier Write cache
	<ul style="list-style-type: none"> 1.8TB 	<ul style="list-style-type: none"> 3.84 GB 	

UNITY6900 General specifications

This section describes the UNITY6900 hardware specifications.

Hardware component	Specifications									
System	<ul style="list-style-type: none"> up to 24 drives (2.5" SAS and/or SSD drives) 									
Rail kit mounting	<ul style="list-style-type: none"> 2U enclosure height <p>Cable specifications:</p> <p>Passive SAS cables</p> <ul style="list-style-type: none"> 19.6" (500 mm) minimum 36" (914 mm) maximum <p>Active cables</p> <ul style="list-style-type: none"> Any length 									
Field Replaceable Units (FRU)	<ul style="list-style-type: none"> Disk drives and drive carrier blanks APC units I/O modules I/O module slot blanks 									
Enclosure physical dimensions	<table> <tbody> <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> </tbody> </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"> System input requirements: <ul style="list-style-type: none"> AC Input voltage: 100-240 V AC Input frequency: 50-60 Hz AC Input amperage: 11-4,5 Amp 1,200W redundant power supplies with PMBus Output power: <ul style="list-style-type: none"> Output Type: 19 pairs gold finger connector Total output power: 1,200 W/1,000, 80 plus Titanium Certified Rated output voltages: +5V (45A), 3.3V (24A), -12V (0.6A) 									

Hardware component	Specifications
	<ul style="list-style-type: none">● Power consumption: varies depending on the number and size of drives, running fans, and room temperature.● Cooling system:<ul style="list-style-type: none">● 2 hot-swappable APC units● 8x 40mm cooling fans● Variable speed blowers, two per APC. Total of four blowers per enclosure.

UNITY6900 front and rear views

These diagrams represent the front and rear views of the UNITY6900.

Figure 3-1: UNITY6900 front view

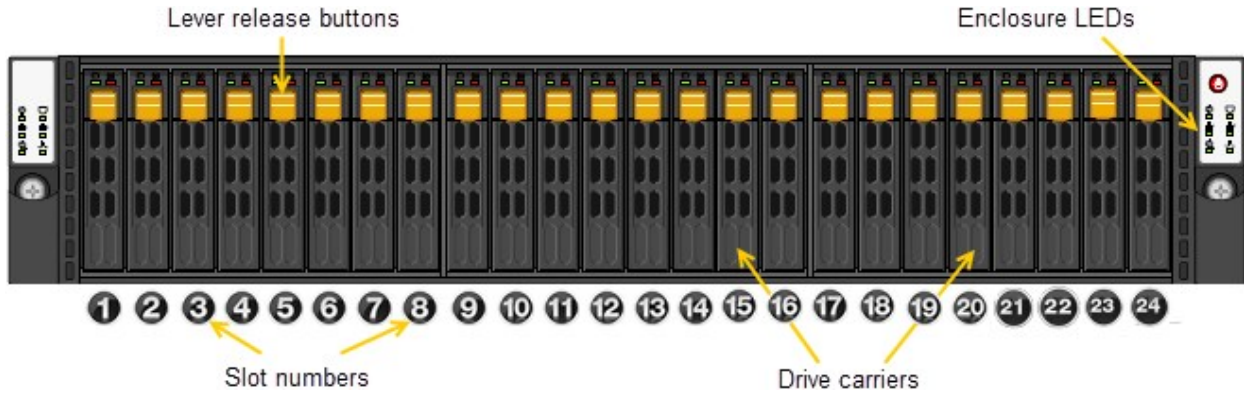


Figure 3-2: UNITY6900 rear view

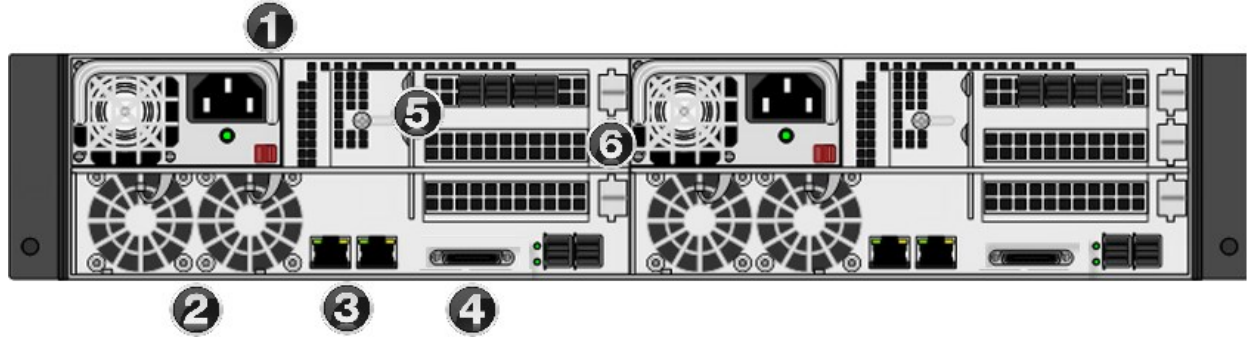


Table 3-1: Rear components







Rear components	Optional PCIe cards for connectivity
<ol style="list-style-type: none"> 1. Power supply units 2. Fan assemblies 3. On-board GigE LAN ports (2 per node): <ul style="list-style-type: none"> ● RIGHT port: Primary data network interface (nx0) (optional) ● LEFT port: Management Interface (nx99) and IPMI interface 4. KVM connections 5. Storage connectivity: <ul style="list-style-type: none"> 12 Gbps SAS Dual port to (Mini-SAS HD) added-on host bus adapter 	<ol style="list-style-type: none"> 6. Optional connectivity to Fibre Channel hosts: Dual-port 8Gb Fibre Channel to Express HBA <ul style="list-style-type: none"> ● 16Gb Fibre Channel: Dual port, ● 10GbE dual-port network PCIe card with RJ-45 interfaces, ● 10GbE dual-port network PCIe card with SFP+ SR interfaces, ● GbE dual-port network PCIe card with RJ-45 interfaces

UNITY6900 LEDs

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 3-2: Control panel LEDs

LED	Description
	<p>Power</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>Heartbeat</p> <p>Indicates that power is being supplied to the server board. This LED flashes amber to indicate normal activity.</p>
	<p>NIC1</p> <p>Indicates network activity on the LAN1 port when flashing.</p>
	<p>NIC2</p> <p>Indicates network activity on the LAN2 port when flashing.</p>
	<p>Power failure</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>Overheat/fan failure</p> <ul style="list-style-type: none"> • When this LED flashes, it indicates a fan failure. • 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. <p>This LED will remain flashing or on as long as the indicated condition exists.</p> <p>▶ Perform these steps:</p> <ol style="list-style-type: none"> 1. Check the routing of the cables and make sure all fans are present and operating normally. 2. Check to make sure that the chassis covers are installed. 3. Verify that the heat sinks are installed properly.

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 3-3: Drive carrier LEDs

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

Chapter 4

US224 Hardware overview

The US224 is a high-end Unity Storage Expansion in a 2U form factor with no single point-of-failure architecture, including: dual redundant storage controllers with automatic failover and full Active/Active Clustering capability; redundant, hot-swappable power supply units; and interface link aggregation for full networking redundancy.

Drive configurations for the front bay can be 6 / 12 / 18 / 24.

Configuration	Storage	FASTier Read cache	FASTier Write cache
With 2.5" SSD drives	<ul style="list-style-type: none">● 800GB● 1.9TB● 3.8TB● 7.6TB		
10K drives:	<ul style="list-style-type: none">● 600GB● 980GB● 1.2TB● 1.8TB	<ul style="list-style-type: none">● 800 GB● 1.92 GB● 3.84 GB	

US224 general specifications

This section describes the US224 hardware specifications.

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

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

US224 Front and rear views

These diagrams represent the front and rear views of the US224.

Figure 4-1: US224 Front view

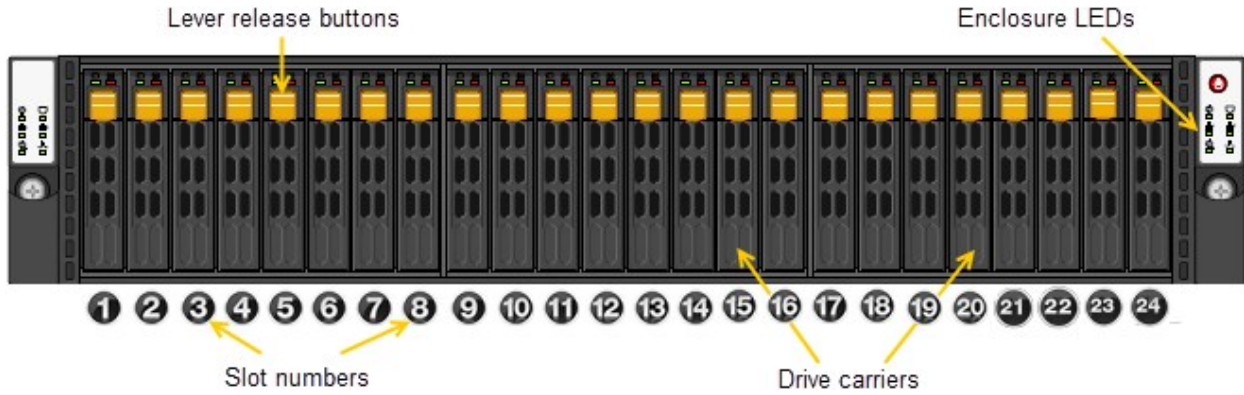


Figure 4-2: US224 Rear view

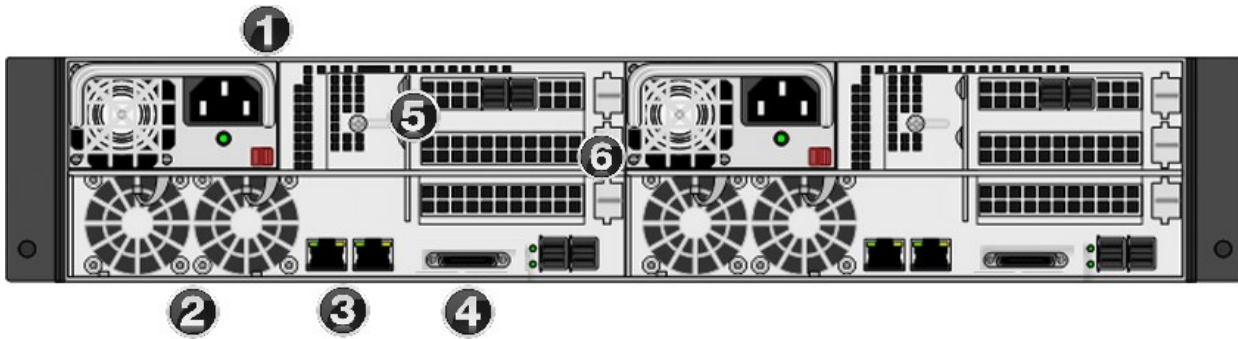


Table 4-1: Rear components







Rear components	Optional PCIe cards for connectivity
<ol style="list-style-type: none"> 1. Power supply units 2. Fan assemblies 3. On-board GigE LAN ports (2 per node): <ul style="list-style-type: none"> ● RIGHT port: Primary data network interface (nx0) (optional) ● LEFT port: Management Interface (nx99) and IPMI interface 4. KVM connections 5. Storage connectivity: <ul style="list-style-type: none"> 12 Gbps SAS Dual port to (Mini-SAS HD) added-on host bus adapter 	<ol style="list-style-type: none"> 6. Optional connectivity to Fibre Channel hosts: Dual-port 8Gb Fibre Channel to Express HBA <ul style="list-style-type: none"> ● 16Gb Fibre Channel: Dual port, ● 10GbE dual-port network PCIe card with RJ-45 interfaces, ● 10GbE dual-port network PCIe card with SFP+ SR interfaces, ● GbE dual-port network PCIe card with RJ-45 interfaces

US224 Front panel LEDs

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 4-2: Control panel LEDs

LED	Description
	<p>Power</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>Heartbeat</p> <p>Indicates that power is being supplied to the server board. This LED flashes amber to indicate normal activity.</p>
	<p>NIC1</p> <p>Indicates network activity on the LAN1 port when flashing.</p>
	<p>NIC2</p> <p>Indicates network activity on the LAN2 port when flashing.</p>
	<p>Power failure</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>Overheat/fan failure</p> <ul style="list-style-type: none"> ● When this LED flashes, it indicates a fan failure. ● 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. <p>This LED will remain flashing or on as long as the indicated condition exists.</p> <p>▶ Perform these steps:</p> <ol style="list-style-type: none"> 1. Check the routing of the cables and make sure all fans are present and operating normally. 2. Check to make sure that the chassis covers are installed. 3. Verify that the heat sinks are installed properly.

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 4-3: Drive carrier LEDs

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

Chapter 5

US316 Hardware overview

The US316 is a high-end Unity Storage Expansion in a 3U form factor with no single point-of-failure architecture, including: dual redundant storage controllers with automatic failover and full Active/Active Clustering capability; redundant, hot-swappable power supply units; and interface link aggregation for full networking redundancy.

Drive configurations for the front bay can be 7 / 15.

Configuration	Storage	FASTier Read cache	FASTier Write cache
With 3.5" SSD drives	<ul style="list-style-type: none">● 800GB● 1.9TB● 3.8TB● 7.6TB		
10K drives:	<ul style="list-style-type: none">● 600GB● 980GB● 1.2TB● 1.8TB	<ul style="list-style-type: none">● 800 GB● 1.92 GB● 3.84 GB	

US316 general specifications

This section describes the US316 hardware specifications.

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

US316 front and rear views

These diagrams represent the front and rear views of the capacity-optimized US316.

Figure 5-1: US316 front view

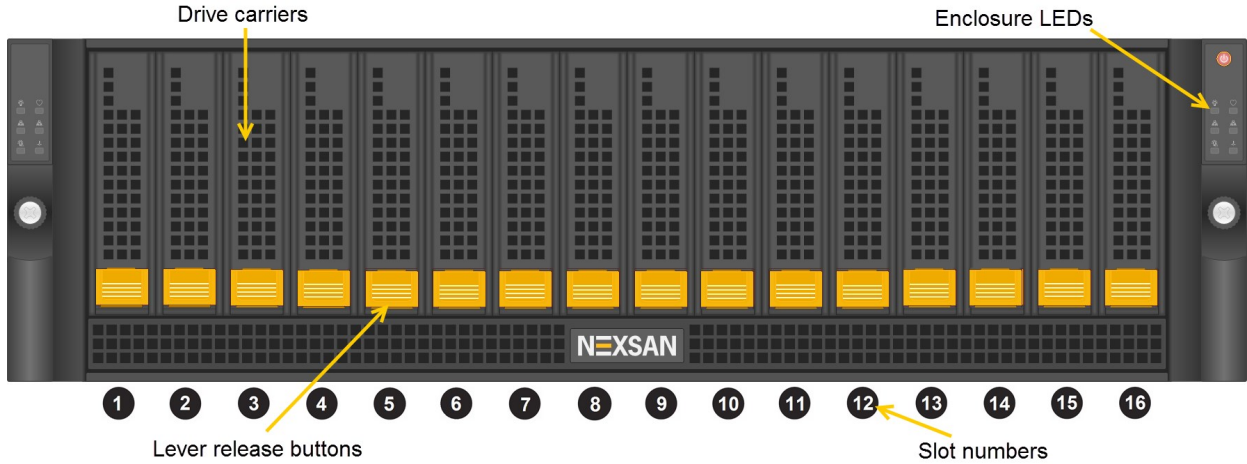


Figure 5-2: US316 rear view

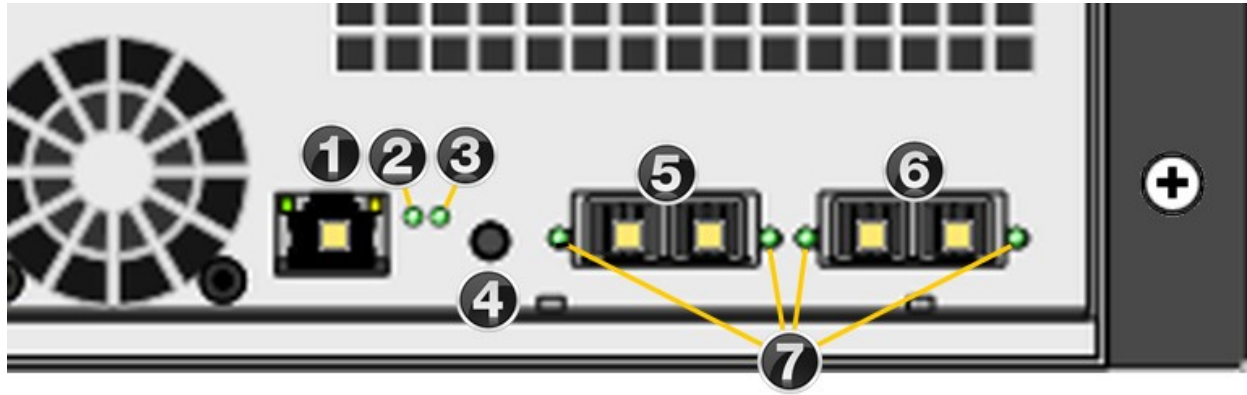


Table 5-1: US316 rear components

	Rear components	Optional PCIe cards for connectivity
1	LAN Port	Not used
2	Status LED	Green: Initialization successful Red: Initialization failure
3	Unit ID status LED	On/Off (controlled by the base management controller)
4	BMC Reset button	Resets the base management controller
5	SAS IN ports	Serial Attached SCSI IN ports from the Storage System







	Rear components	Optional PCIe cards for connectivity
6	SAS OUT ports	SAS OUT ports to another storage unit
7	SAS link status LEDs (2 IN, 2x OUT)	Green: All four physical layers (PHY) of each port connected with consistent link speed (12 G or 6G) Red: Single PHY degraded link speed or disconnected

US316 LEDs

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 5-2: Control panel LEDs

LED	Description
	<p>Power</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>Heartbeat</p> <p>Indicates that power is being supplied to the server board. This LED flashes amber to indicate normal activity.</p>
	<p>NIC1</p> <p>Indicates network activity on the LAN1 port when flashing.</p>
	<p>NIC2</p> <p>Indicates network activity on the LAN2 port when flashing.</p>
	<p>Power failure</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>Overheat/fan failure</p> <ul style="list-style-type: none"> When this LED flashes, it indicates a fan failure. 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. <p>This LED will remain flashing or on as long as the indicated condition exists.</p> <p>▶ Perform these steps:</p>

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

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 5-3: Drive carrier LEDs

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

US424 Hardware overview

The US424 is a high-end Unity Storage Expansion in a 4U form factor with no single point-of-failure architecture, including: dual redundant storage controllers with automatic failover and full Active/Active Clustering capability; redundant, hot-swappable power supply units; and interface link aggregation for full networking redundancy.

Drive configurations for the front bay can be 11 or 22.

Configuration	Storage	FASTier Read cache	FASTier Write cache
With 3.5" drives	<ul style="list-style-type: none">● 2 TB● 4 TB● 6 TB● 8 TB● 10 TB● 12 TB	<ul style="list-style-type: none">● 800 GB● 1.92 GB● 3.84 GB	

US424 General specifications

This section describes the US424 hardware specifications.

Hardware component	Specifications
System	US424 <ul style="list-style-type: none">● up to 24 front-loading, hot swappable 3.5" drives, SAS 3 I/O controllers
Rail kit mounting	<ul style="list-style-type: none">● 4U enclosure height● Cable specifications:<ul style="list-style-type: none">19.6" (500 mm) minimum118.1" (3000 mm) maximum
Drive bays	US424 <ul style="list-style-type: none">● 24 x 3.5" hot-swappable SAS drive bays with SES2

Hardware component	Specifications															
	<ul style="list-style-type: none"> ● SAS drives recommended 															
Field Replaceable Units (FRU)	<ul style="list-style-type: none"> ● Disk drives and drive carrier blanks ● I/O modules ● I/O module slot blanks 															
Enclosure physical dimensions	<p>US424</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> <tr> <td></td> <td>90 lbs.</td> <td>40.8 kg (all 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)		90 lbs.	40.8 kg (all drives installed)
Height	7"	178 mm														
Width	17.2"	437 mm														
Length	27"	686 mm														
Weight	85 lbs.	38.6 kg (no drives installed)														
	90 lbs.	40.8 kg (all drives installed)														
Power supply units	<p>US424</p> <ul style="list-style-type: none"> ● Redundant 1,200 power supplies with PMBus ● AC Input voltage: <ul style="list-style-type: none"> ● 100-127 Vac / 15-12A / 50-60Hz ● 200-240 Vac / 8.5-A / 50-60Hz ● +12V <ul style="list-style-type: none"> ● Max: 83A / Min: 0A (100-127 Vac) ● Max: 100A / Min: 0A (200-240 Vac) ● +5Vsp: Max 4A / Min: 0A ● With Power Distributor: +5V: 45 Amp; +3.3V: 24 Amp; -12V: 0.6 Amp ● Maximum output power: 1,600W ● Power consumption: varies depending on the number and size of drives, running fans, and room temperature ● Cooling system: <ul style="list-style-type: none"> ● 4 x 80mm and 4 x 40mm PWM cooling fans ● Redundant cooling 															

US424 front and rear views

These diagrams represent the front and rear views of the US424.

Figure 6-1: US424 front view

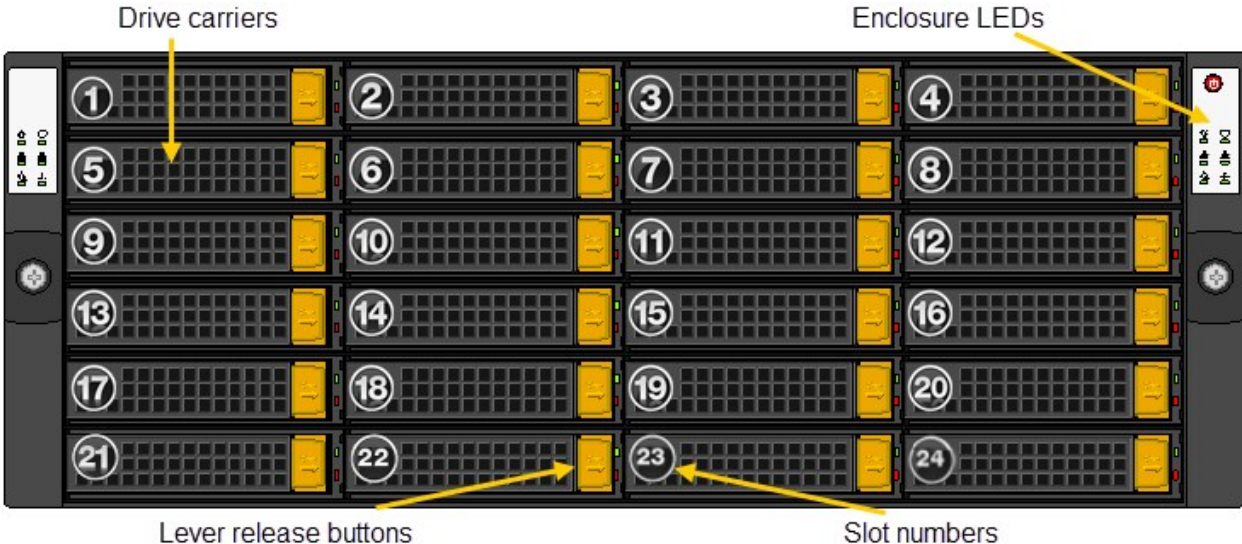


Figure 6-2: US424 rear view

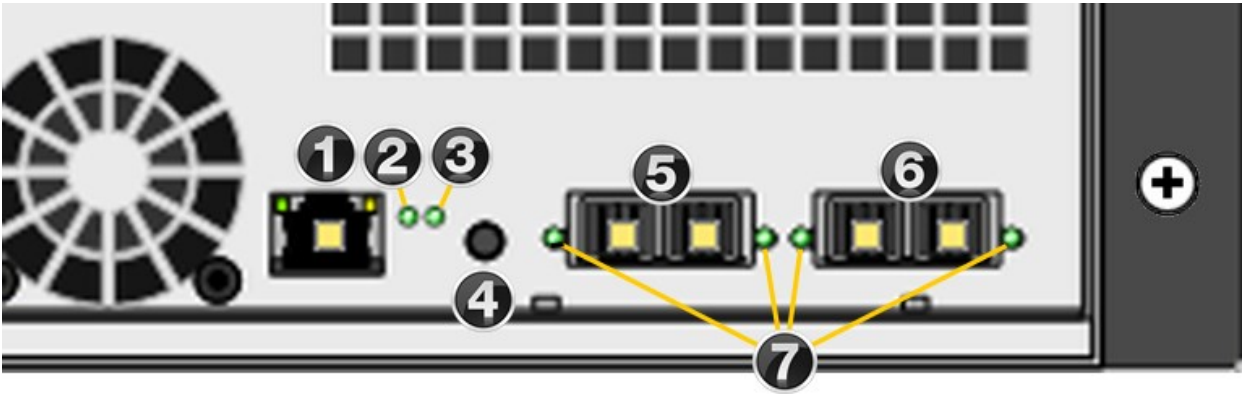


Table 6-1: US424 rear components

	Rear components	Optional PCIe cards for connectivity
1	LAN Port	Not used
2	Status LED	Green: Initialization successful Red: Initialization failure
3	Unit ID status LED	On/Off (controlled by the base management controller)
4	BMC Reset button	Resets the base management controller
5	SAS IN ports	Serial Attached SCSI IN ports from the Storage System







	Rear components	Optional PCIe cards for connectivity
6	SAS OUT ports	SAS OUT ports to another storage unit
7	SAS link status LEDs (2 IN, 2x OUT)	Green: All four physical layers (PHY) of each port connected with consistent link speed (12 G or 6G) Red: Single PHY degraded link speed or disconnected

US424 LEDs

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 6-2: Control panel LEDs

LED	Description
	<p>Power</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>Heartbeat</p> <p>Indicates that power is being supplied to the server board. This LED flashes amber to indicate normal activity.</p>
	<p>NIC1</p> <p>Indicates network activity on the LAN1 port when flashing.</p>
	<p>NIC2</p> <p>Indicates network activity on the LAN2 port when flashing.</p>
	<p>Power failure</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>Overheat/fan failure</p> <ul style="list-style-type: none"> When this LED flashes, it indicates a fan failure. 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. <p>This LED will remain flashing or on as long as the indicated condition exists.</p> <p>▶ Perform these steps:</p>

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

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 6-3: Drive carrier LEDs

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

Chapter 7

US460 Hardware overview

The US460 is a high-end Unity Storage Expansion in a 4U form factor with no single point-of-failure architecture, including: dual redundant storage controllers with automatic failover and full Active/Active Clustering capability; redundant, hot-swappable power supply units; and interface link aggregation for full networking redundancy.

Drive configurations for the drive bay can be 19/38/57.

Configuration	Storage	FASTier Read cache	FASTier Write cache
With 3.5" drives (HGST Data and SSD drives)	<ul style="list-style-type: none">● 2TB● 4TB● 6TB● 8TB● 10TB● 12TB	<ul style="list-style-type: none">● 800 GB● 1.92 GB● 3.84 GB	

7

US460 general specifications

This section describes the US460 hardware specifications.

Hardware component	Specifications
System	Up to 57 top-loading, hot swappable 3.5" drives, SAS 3 I/O controllers. Minimum 20 HDDs per enclosure.
Rail kit mounting	4U enclosure height <ul style="list-style-type: none">● Cable specifications:<ul style="list-style-type: none">19.6" (500 mm) minimum118.1" (3000 mm) maximum
Drive bays	60 x 3.5" hot swappable SAS drive bays
Field	Disk drives and drive carrier blanks

Hardware component	Specifications		
	I/O modules I/O module slot blanks		
Enclosure physical dimensions	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)
Power supply units	Two 1,650W PSUs, hot swappable and redundant AC Input voltage: 200-240VAC auto-ranging, 47Hz-63Hz input (high line power only)		

US460 front and rear views

These diagrams represent the front and rear views of the US460.

Figure 7-1: US460 front view

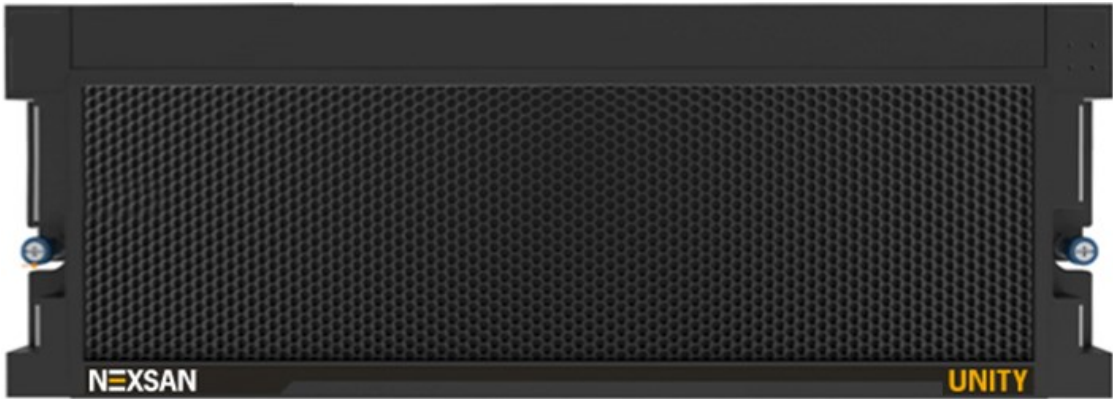


Figure 7-2: US460 rear view

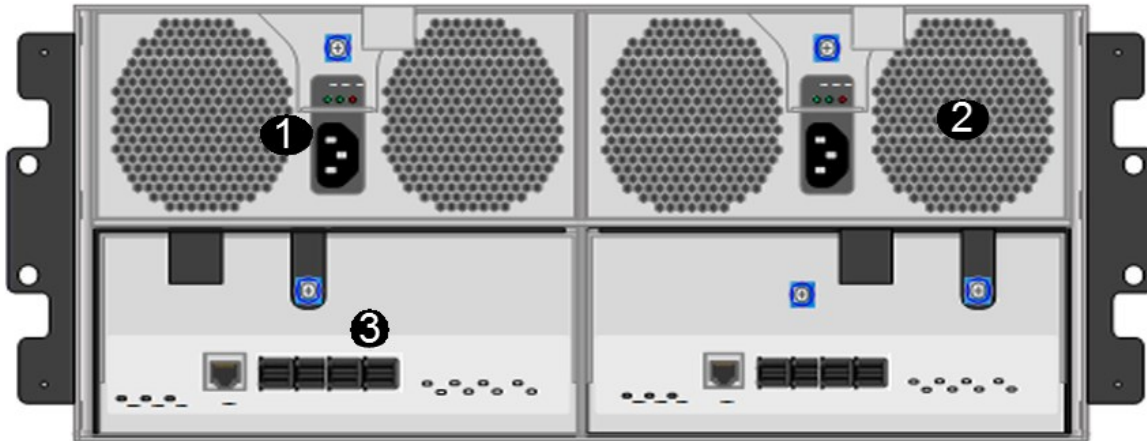
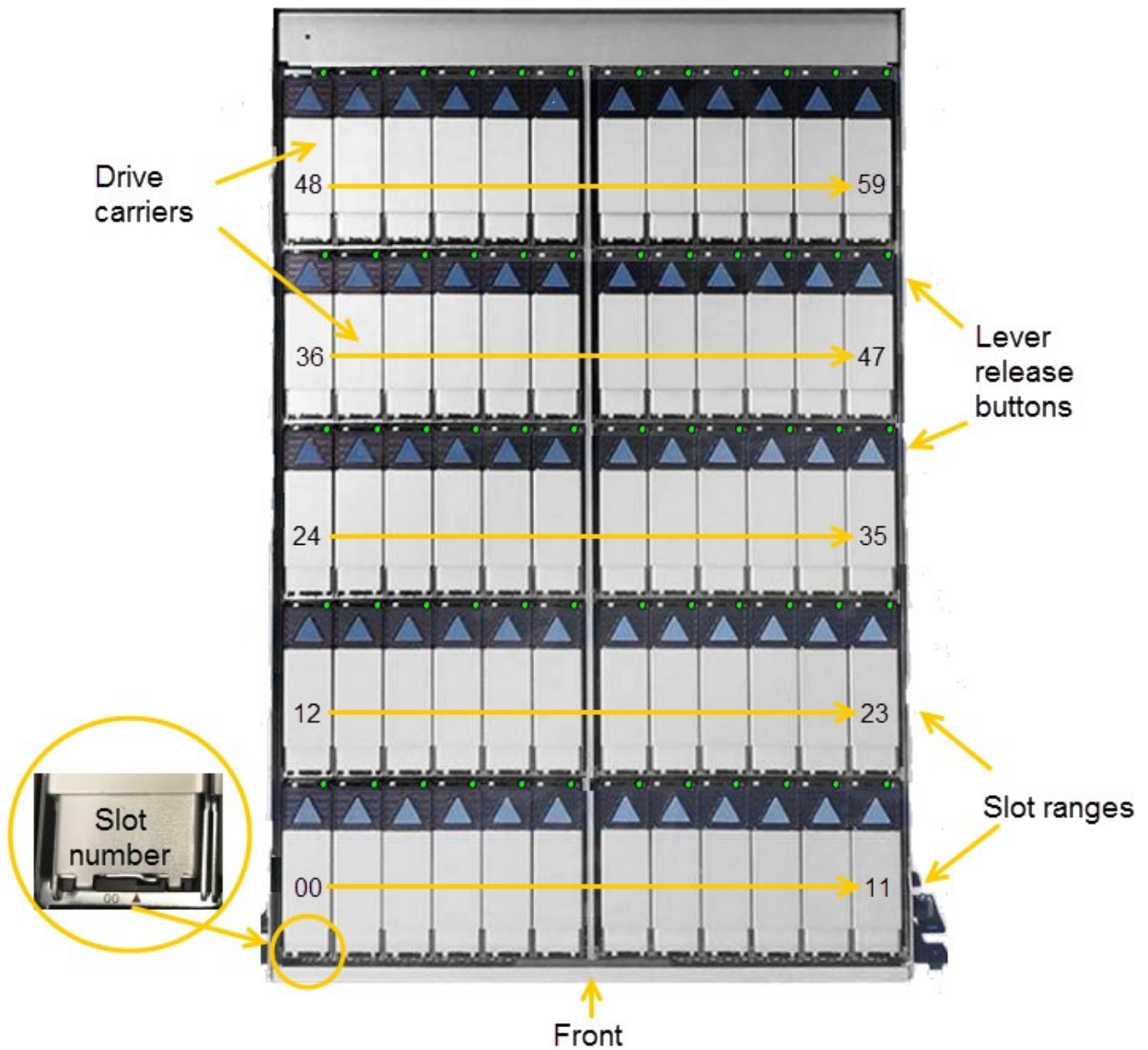


Table 7-1: US460 rear components

Rear components
1. Power supply units
2. Fan assemblies
3. Storage connectivity: SAS Quad port PCIe to Serial Attached SCSI (HD Mini-SAS) host bus adapter

Figure 7-3: US460 top view



7


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.	Red: PSU contains one or more faults
		Red (flashing): PSU alarm status is being identified.
		Off: PSU is functioning normally.
ACIN	AC Input LED: Indicates whether the controller has input power.	Green: AC input is functioning normally.
		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	Green: Powered on Off: Powered off
Identify 	Identifies the location of the enclosure, and enables users to turn on the LED from the Unity firmware	Amber (flashing): Enclosure is being identified Off: Enclosure is not being identified

Name	Description	LED status
Fault 	Indicates whether the enclosure has faults	<p>Red: Enclosure has fault conditions</p> <p>Off: No fault conditions</p>
<p>Host Storage System LEDs (Link/Fault) </p>		
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.	<p>Link: (Green)</p> <p>On: SAS cable connected</p> <p>Off: SAS cable not connected</p> <p>Fault: (Red)</p> <p>Flashing: One or more of the SAS connections is not connected</p> <p>Off: SAS connection contains no faults</p>



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

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