NEXSAN

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Nexsan Unity

Hardware Reference Guide

Firmware Version Unity v. 7.0

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Regulatory Compliance

United States Statement for FCC: Nexsan 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.

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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)

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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
underline 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).
`monospace`	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).
italics	System messages and non-interactive items in the graphical user interface (GUI) References to Software User Guides
▶ (arrow icon)	A visual cue to indicate an action carried out by the user to accomplish a given task, or to draw attention to key information. Also used to indicate the beginning of, a step within, or what's next after a procedure.

Contacting Nexsan

For questions about Nexsan products, please visit the Nexsan support Web page, and the Nexsan Unity Documents and Downloads 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 Documents & Downloads page:
https://helper.nexsansupport.com/unt_

Contact Nexsan Unity support:
https://helper.nexsansupport.com/unt_support

downloads.html Worldwide Web site: www.nexsan.com

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.

Related documentation

The following Nexsan product manuals contain related information:

- Nexsan Unity Online Help
- *NexsanUnity Hardware Reference Guide*
- *NexsanUnityHardware Maintenance Guide, Unity Next Generation*
- *NexsanUnity Software User Guide*
- *NexsanUnity nxadmin Command-line Interface Reference Guide*
- *NexsanUnity nxcmd Command-line Interface Reference Guide*
- *NexsanUnity Snapshots and Replication Guide*
- *NexsanUnity Storage Expansion Reference Guide*
- *NexsanUnity VMware Best Practices Guide*
- *NexsanUnity NFS Interoperability*
- *NexsanUnity Networking Best Practices Guide*
- *NexsanUnity Performance Best Practices Guide*
- *NexsanUnity 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 10º to 35º C (50º to 95º 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 NexsanUnity Storage Systems are hot-pluggable. However, new expansions must be powered on AFTER you connect it to the existing system.

Chapter 1

UNITY3300 Hardware overview

UNITY3300 storage systems include dual UNITY3300 controllers with automatic failover and Active/Active Clustering. Each controller includes a chassis inter-connect providing high speed, low-latency communication between the two UNITY3300 controllers.

UNITY3300 is an entry-level system comprised of dual-controllers and internal storage. Optionally, you can connect an external storage expansion. The US316 Expansion is a 3U chassis that uses 14 drives standard (12 data, with two additional slots that can be used for FASTier or HDDs). 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

Storage and FASTier cache devices are allocated as follows:

Configuration	Storage	FASTier Read cache	FASTier Write cache
With 2.5" SSD drives	• 1.92TB • 3.84TB • 7.68TB • 15.36TB • 30.72TB	1.9TB SSD	1.9TB SSD
7.2K drives	• 8TB • 10TB • 12TB • 14TB • 16TB • 18TB	1.9TB SSD	1.9TB SSD

UNITY3300 General specifications

This section describes the UNITY3300 hardware specifications.

Hardware component	Specifications
System	• 12 HDD drives with 2 FASTier drives • 2 empty slots that can be used for additional FASTier or HDDs
Rail kit mounting	• 3U enclosure height • The rack must have square holes • Maximum distances: 30" (800 mm)
Redundant components	• 2 power supply units • Cooling fans • Host connectivity ports • Controllers
Enclosure physical dimensions	• 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	• 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)
	  ◦ 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)

UNITY3300 front and rear views

These diagrams represent the front and rear views of the UNITY3300.

Figure 1-1: UNITY3300 front view

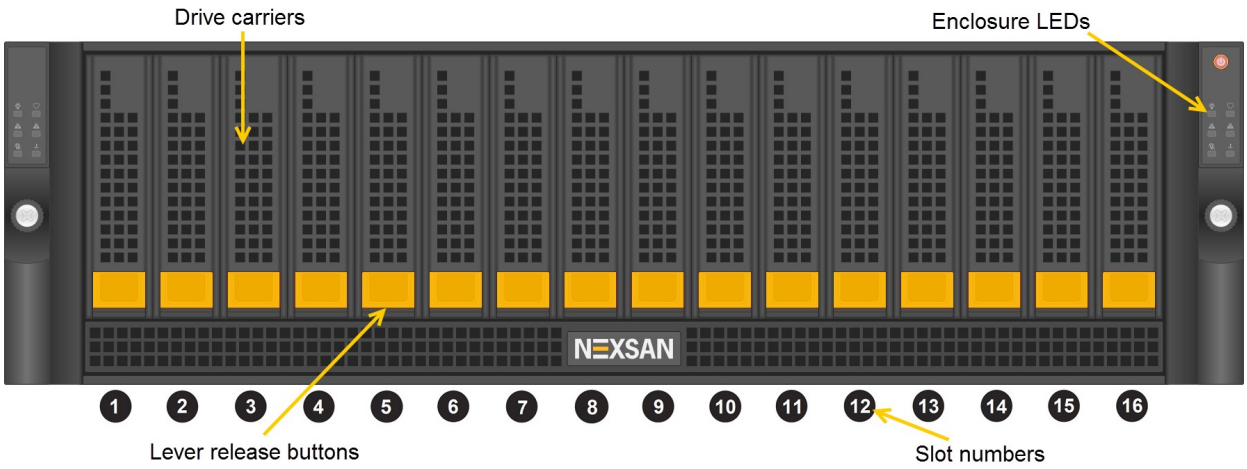


Figure 1-2: UNITY3300 rear view

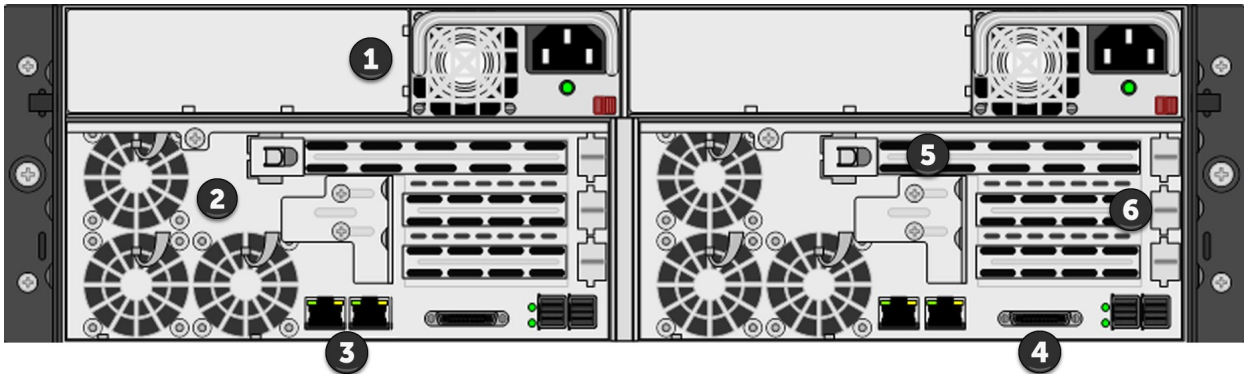


Table 1-1: UNITY3300 rear components

Rear components	Optional connectivity to Hosts
1. Power supply units 2. Fan assemblies 3. On-board GigE LAN ports (2 per node): 4. KVM connections 5. Storage connectivity	6. Optional connectivity to Fibre Channel hosts: • Single port 100GbE • Pair of 40GbE NIC with dual QSFP Connectivity • Pair of 10GbE NIC with dual RJ-45 • Pair of 10GbE NIC with dual SFP+ • Pair of 1GigE, Quad-port NIC, RJ-45 • Pair of 1GigE, Dual-port NIC, RJ-45 • Pair of 32Gb Fibre Channel - dual-port • Pair of 16Gb Fibre Channel - dual-port • Pair of 8Gb Fibre Channel - dual-port

UNITY3300 LEDs

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

This table describes each LED and any corrective action you may need to take.

Table 1-2: Control panel LEDs

LED	Description
	**Power** Indicates power is being supplied to the system's power supply units. This LED is illuminated when the system is operating.
	**Heartbeat** Indicates that power is being supplied to the server board. This LED flashes amber to indicate normal activity.
	**NIC1** Indicates network activity on the LAN1 port when flashing.
	**NIC2** Indicates network activity on the LAN2 port when flashing.
	**Power failure** 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.
	**Overheat/fan failure** ● 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. This LED will remain flashing or on as long as the indicated condition exists. ▶ **Perform these steps:** 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	• 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	• A steady red LED indicates a drive failure. • A blinking red LED indicates that a RAID rebuild is in progress.

Chapter 2

UNITY7900 Hardware overview

The UNITY7900 deployment includes two UNITY7900 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 UNITY7900 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 UNITY7900 controllers.

UNITY7900 is an 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	• 1.92TB • 3.84TB • 7.68TB • 15.36TB • 30.72TB	when used with U2G460, FASTier is put in 7900 head unit	NVRAM, when using 16GB NVDIMM

UNITY7900 General specifications

This section describes the UNITY7900 hardware specifications.

Hardware component	Specifications
System	• up to 24, 2.5” SSD drives
Rail kit mounting	• 2U enclosure height • Cable specifications: 19.6"(500 mm) minimum 118.1" (3000 mm) maximum
Field Replaceable Units (FRU)	• Disk drives and drive carrier blanks • APC units • I/O modules • I/O module slot blanks
Enclosure physical dimensions	Height 3.5" 88 mm Width 17.2" 437 mm Length 25.5" 641 mm
Weight	Chassis: 67 lbs (30.4 kg) With drives installed: 114 lbs (51.7 kg)

Power supply units	• System input requirements:
	  • 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:
	  • 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.
	• Cooling system:
	  • 2 hot-swappable APC units
	  • 8x 40mm cooling fans
	  • Variable speed blowers, two per APC. Total of four blowers per enclosure.

UNITY7900 front and rear views

These diagrams represent the front and rear views of the UNITY7900.

Figure 2-1: UNITY7900 front view

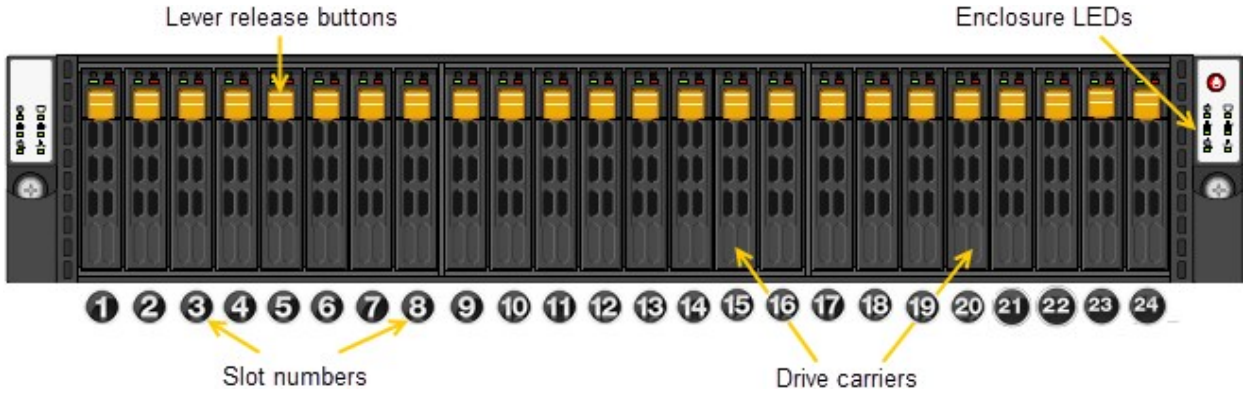


Figure 2-2: UNITY7900 rear view

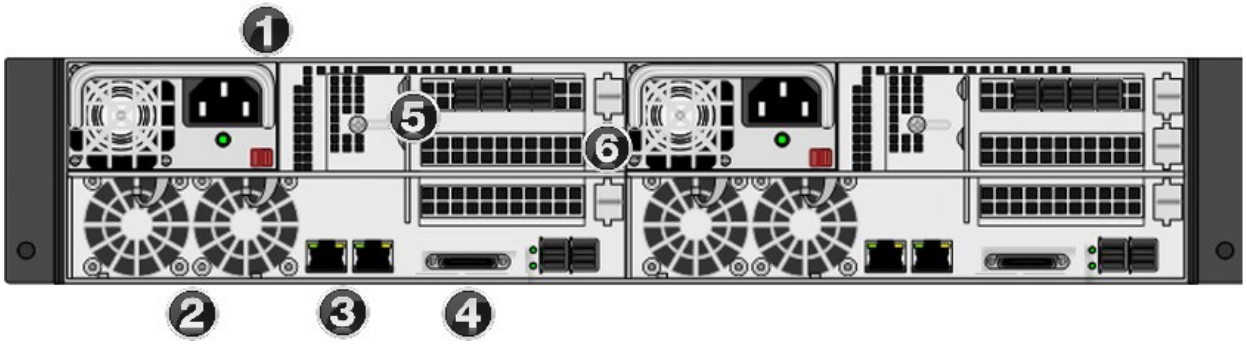


Table 2-1: Rear components

Rear components	Optional connectivity to Hosts
1. Power supply units 2. Fan assemblies 3. On-board GigE LAN ports (2 per node): • RIGHT port: Primary data network interface (nx0) (optional) • LEFT port: Management Interface (nx99) and IPMI interface 4. KVM connections 5. Storage connectivity: 12 Gbps SAS Quad port to (Mini-SAS HD) added-on host bus adapter	6. Optional connectivity to Fibre Channel hosts: • Single port 100GbE • Pair of 40GbE NIC with dual QSFP Connectivity • Pair of 10GbE NIC with dual RJ-45 • Pair of 10GbE NIC with dual SFP+ • Pair of 1GigE, Quad-port NIC, RJ-45 • Pair of 1GigE, Dual-port NIC, RJ-45 • Pair of 32Gb Fibre Channel - dual-port • Pair of 16Gb Fibre Channel - dual-port • Pair of 8Gb Fibre Channel - dual-port

UNITY7900 LEDs

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

This table describes each LED and any corrective action you may need to take.

Table 2-2: Control panel LEDs

LED	Description
	**Power** Indicates power is being supplied to the system's power supply units. This LED is illuminated when the system is operating.
	**Heartbeat** Indicates that power is being supplied to the server board. This LED flashes amber to indicate normal activity.
	**NIC1** Indicates network activity on the LAN1 port when flashing.
	**NIC2** Indicates network activity on the LAN2 port when flashing.
	**Power failure** 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.
	**Overheat/fan failure** ● 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. This LED will remain flashing or on as long as the indicated condition exists. ► **Perform these steps:** 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 2-3: Drive carrier LEDs

LED	Description
Green	• 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	• A steady red LED indicates a drive failure. • A blinking red LED indicates that a RAID rebuild is in progress.

2

Chapter 3

UNITY NV10000 Hardware overview

The UNITY NV10000 deployment includes two UNITY NV10000 controllers with automatic failover and Active/Active Clustering in a 2U form factor. They have dual E5-2640v4 CPUs and 192GB RAM per controller. The UNITY NV10000 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 UNITY NV10000 controllers.

UNITY NV10000 is an 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:

- big data, backup and archive, data virtualization
- unstructured files
- video editing and streaming
- specific applications that benefit from advanced caching

Configuration	Storage	FASTier Read cache	FASTier Write cache
2.5" NVMe SSD drives	• 1.92TB • 3.84TB • 7.68TB • 15.36TB	1.9TB SSD	1.9TB SSD

UNITY NV10000 General specifications

This section describes the UNITY NV10000 hardware specifications.

Hardware component	Specifications
System	• up to 24 drives (2.5” NVMe SSD drives)
Rail kit mounting	• 2U enclosure height • Cable specifications: 19.6"(500 mm) minimum 118.1" (3000 mm) maximum
Field Replaceable Units (FRU)	• Disk drives and drive carrier blanks • APC units • I/O modules • I/O module slot blanks
Enclosure physical dimensions	Height 3.5" 88 mm Width 17.2" 437 mm Length 25.6" 650 mm
Weight	Chassis: 67 lbs (30.4 kg) With drives installed: 114 lbs (51.7 kg)

Power supply units	• System input requirements:
	  • 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:
	  • 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.
	• Cooling system:
	  • 2 hot-swappable APC units
	  • 8x 40mm cooling fans
	  • Variable speed blowers, two per APC. Total of four blowers per enclosure.

UNITY NV10000 front and rear views

These diagrams represent the front and rear views of the UNITY NV10000.

Figure 3-1: UNITY NV10000 front view

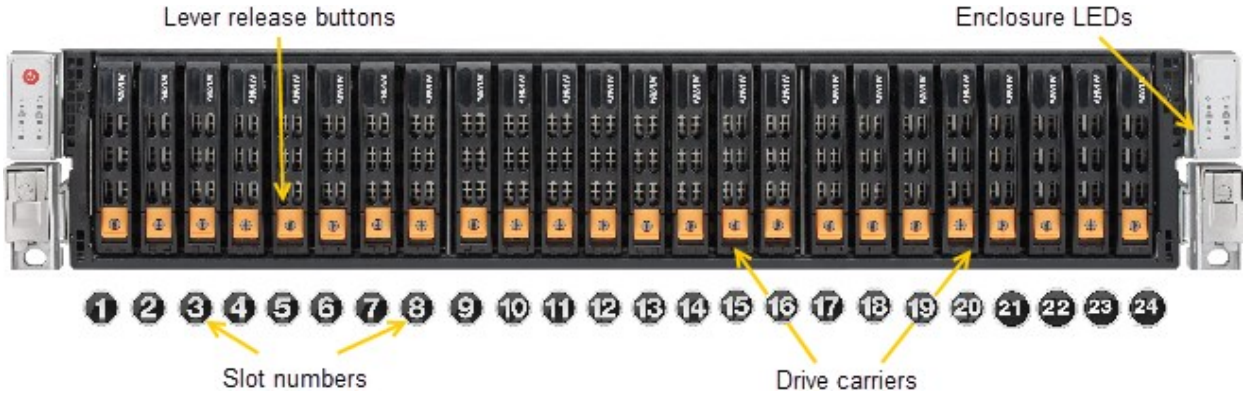


Figure 3-2: UNITY NV10000 rear view

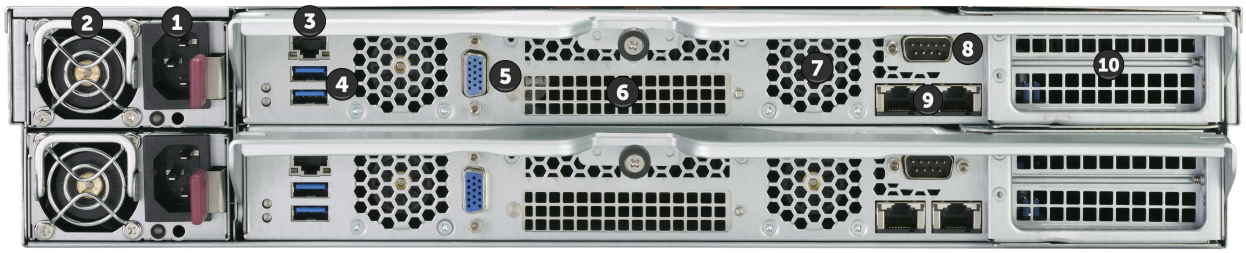


Table 3-1: Rear components

Rear components UNITY NV10000	Optional connectivity to Hosts
1. Power supply units 2. Fan assemblies 3. Dedicated IPMI LAN port 4. USB 3.0 ports 5. VGA port 6. Storage connectivity 7. Internal cooling fan vents 8. Serial port 9. Dual RJ45 10GbE LAN ports	10. PCIe 3.0x16 slots (2), Optional host connectivity: • Dual port 16G/32G FC • Dual port 40G NIC • Single and Dual port 100G NIC

UNITY NV10000 LEDs

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

This table describes each LED and any corrective action you may need to take.

Table 3-2: Control panel LEDs

LED	Description
	**Power** Indicates power is being supplied to the system's power supply units. This LED is illuminated when the system is operating.
	**Heartbeat** Indicates that power is being supplied to the server board. This LED flashes amber to indicate normal activity.
	**NIC1** Indicates network activity on the LAN1 port when flashing.
	**NIC2** Indicates network activity on the LAN2 port when flashing.
	**Power failure** 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.
	**Overheat/fan failure** ● 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. This LED will remain flashing or on as long as the indicated condition exists. ► **Perform these steps:** 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	• 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	• A steady red LED indicates a drive failure. • A blinking red LED indicates that a RAID rebuild is in progress.

3

Chapter 4

US224 Expansion Hardware overview

The US224 Expansion 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	• 1.92TB • 3.84TB • 7.68TB • 15.36TB • 30.72TB	1.92TB SSD	1.92TB SSD

US224 Expansion general specifications

This section describes the US224 Expansion hardware specifications.

Hardware component	Specifications
System	• up to 24, 2.5” SSD drives
Rail kit mounting	• 2U enclosure height • Cable specifications: 19.6"(500 mm) minimum 118.1" (3000 mm) maximum
Field Replaceable Units (FRU)	• Disk drives and drive carrier blanks • APC units • I/O modules • I/O module slot blanks
Enclosure physical dimensions	Height 3.5" 88 mm Width 17.2" 437 mm Length 25.5" 641 mm
Weight	Chassis: 67 lbs (30.4 kg) With drives installed: 114 lbs (51.7 kg)

Power supply units	• System input requirements:
	  • 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:
	  • 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.
	• Cooling system:
	  • 2 hot-swappable APC units
	  • 8x 40mm cooling fans
	  • Variable speed blowers, two per APC. Total of four blowers per enclosure.

US224 Expansion Front and rear views

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

Figure 4-1: US224 Expansion Front view

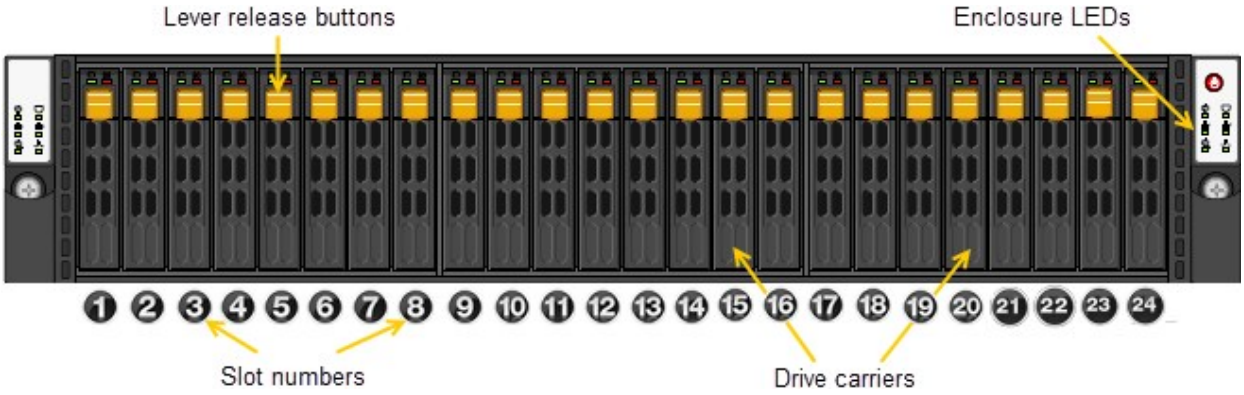


Figure 4-2: US224 Expansion Rear view

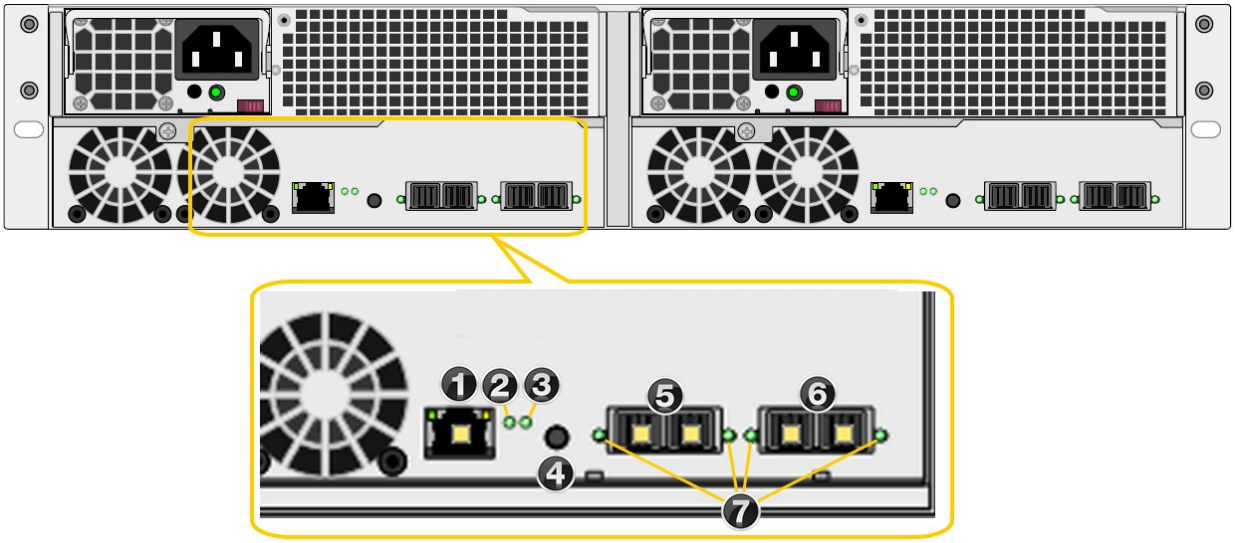


Table 4-1: Rear view connections

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

Item	Name	Description
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

US224 Expansion Front panel LEDs

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

This table describes each LED and any corrective action you may need to take.

Table 4-2: Control panel LEDs

LED	Description
	**Power** Indicates power is being supplied to the system's power supply units. This LED is illuminated when the system is operating.
	**Heartbeat** Indicates that power is being supplied to the server board. This LED flashes amber to indicate normal activity.
	**NIC1** Indicates network activity on the LAN1 port when flashing.
	**NIC2** Indicates network activity on the LAN2 port when flashing.
	**Power failure** 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.
	**Overheat/fan failure** ● 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. This LED will remain flashing or on as long as the indicated condition exists. ▶ **Perform these steps:** 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	• 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	• A steady red LED indicates a drive failure. • A blinking red LED indicates that a RAID rebuild is in progress.

Chapter 5

US316 Expansion Hardware overview

The US316 Expansion 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 configuration for the front bay is 12 data disks, 1 FASTier write, 1 FASTier read, plus 2 empty slots.

Configuration	Storage	FASTier Read cache	FASTier Write cache
With 3.5" SSD drives	• 8 | 10 | 12 | 14 | 16 | 18 TB	1.92TB SSD	1.92TB SSD

US316 Expansion general specifications

This section describes the US316 Expansion hardware specifications.

Hardware component	Specifications
System	• Up to 16 disk drives with 3.5" SAS drives and FASTier SSD
Rail kit mounting	• 3U enclosure height • The rack must have square holes • Maximum distances: 30" (800 mm)
Redundant components	• 2 power supply units • Cooling fans • Host connectivity ports • Controllers
Enclosure physical dimensions	• 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	• 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)
	  ◦ 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 Expansion front and rear views

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

Figure 5-1: US316 Expansion front view

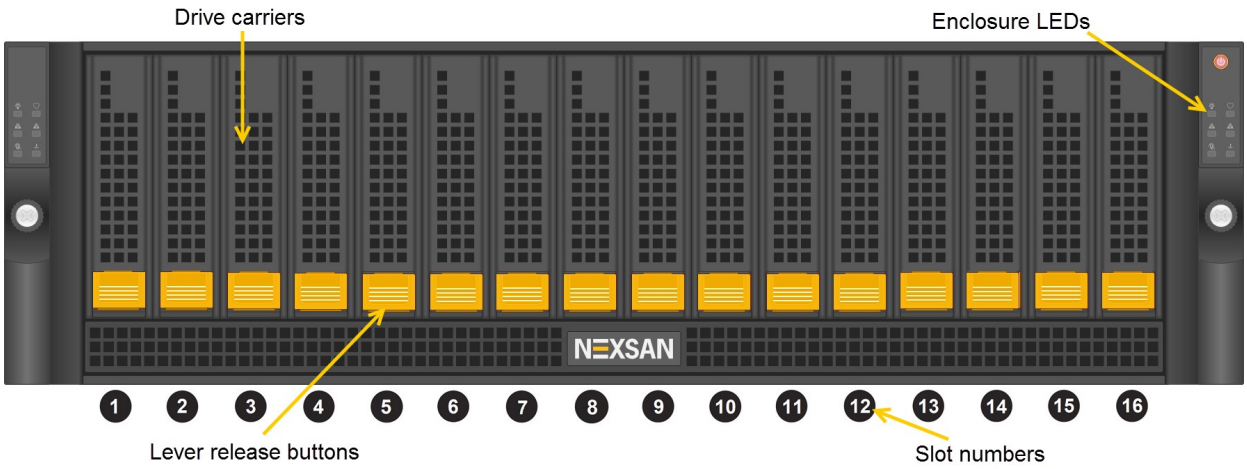


Figure 5-2: US316 Expansion rear view

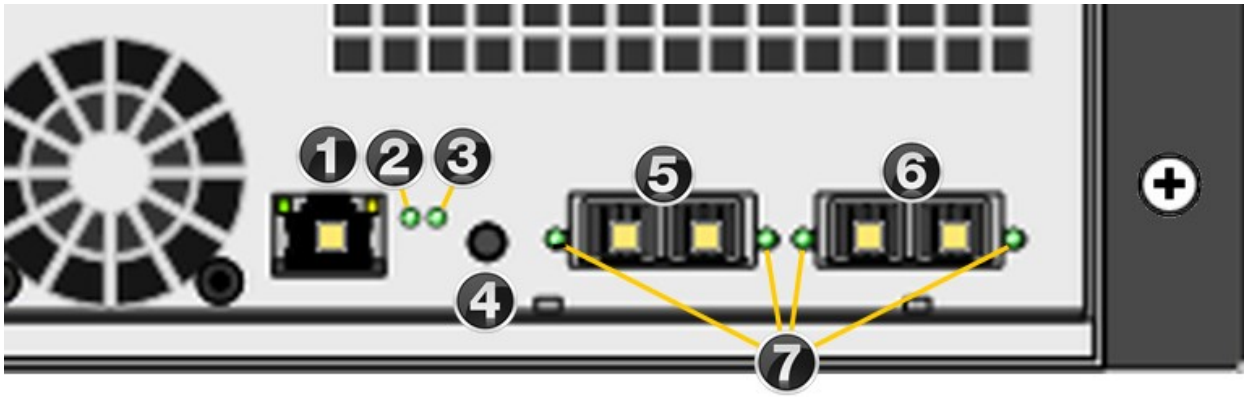


Table 5-1: US316 Expansion rear components

	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 Expansion LEDs

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

This table describes each LED and any corrective action you may need to take.

Table 5-2: Control panel LEDs

LED	Description
	**Power** Indicates power is being supplied to the system's power supply units. This LED is illuminated when the system is operating.
	**Heartbeat** Indicates that power is being supplied to the server board. This LED flashes amber to indicate normal activity.
	**NIC1** Indicates network activity on the LAN1 port when flashing.
	**NIC2** Indicates network activity on the LAN2 port when flashing.
	**Power failure** 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.
	**Overheat/fan failure** ● 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. This LED will remain flashing or on as long as the indicated condition exists. ▶ **Perform these steps:** 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	• 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	• A steady red LED indicates a drive failure. • A blinking red LED indicates that a RAID rebuild is in progress.

Chapter 6

U2G460 Expansion Hardware overview

The U2G460 Expansion 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 bays can be 20/40/60.

Configuration	Storage	FASTier Read cache	FASTier Write cache
With 3.5" drives	8 | 10 | 12 | 14 | 16 | 18 TB	located in Unity chassis	located in Unity chassis when needed

U2G460 Expansion general specifications

This section describes the U2G460 Expansion hardware specifications.

Hardware component	Specifications		
System	Up to 60 top-loading, hot swappable 3.5" drives, SAS 3 I/O controllers. Minimum 20 HDDs per enclosure.		
Rail kit mounting	4U enclosure height ● Cable specifications: 19.6" (500 mm) minimum 118.1" (3000 mm) maximum		
Drive bays	60 x 3.5" hot swappable SAS drive bays		
Field Replaceable Units (FRU)	Disk drives and drive carrier blanks I/O modules I/O module slot blanks		
Enclosure physical dimensions	Height Width Depth - With drawer extended: Weight	6.88" 17.72" 35.43" 72" 83.9 lbs. 175 lbs.	174 mm 450 mm 900 mm 1830 mm 38.4 kg (no drives installed) 79.4 kg (all drives installed)
Power supply units	Two 1,600W PSUs, hot swappable and redundant AC Input voltage: 200-240V		

U2G460 Expansion front and rear views

These diagrams represent the front and rear views of the U2G460 Expansion.

Figure 6-1: Front view

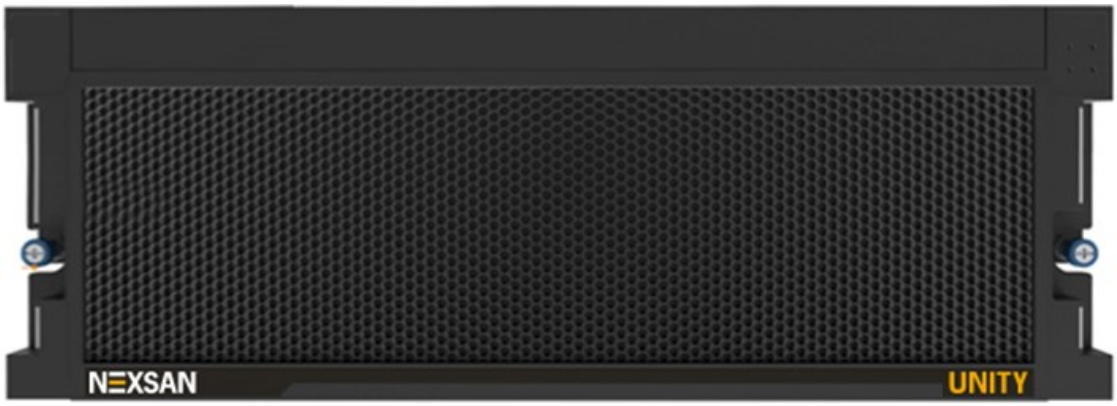


Figure 6-2: Rear view

Table 6-1: Rear components

Rear components
1. Power supply units and fan assemblies 2. Primary fan assemblies 3. LEDs 4. I/O module (IOM) ports 1-6, SAS Quad port PCIe to Serial Attached SCSI (HD Mini-SAS) host bus adapter 5. Management ports

Figure 6-3: Top view

6

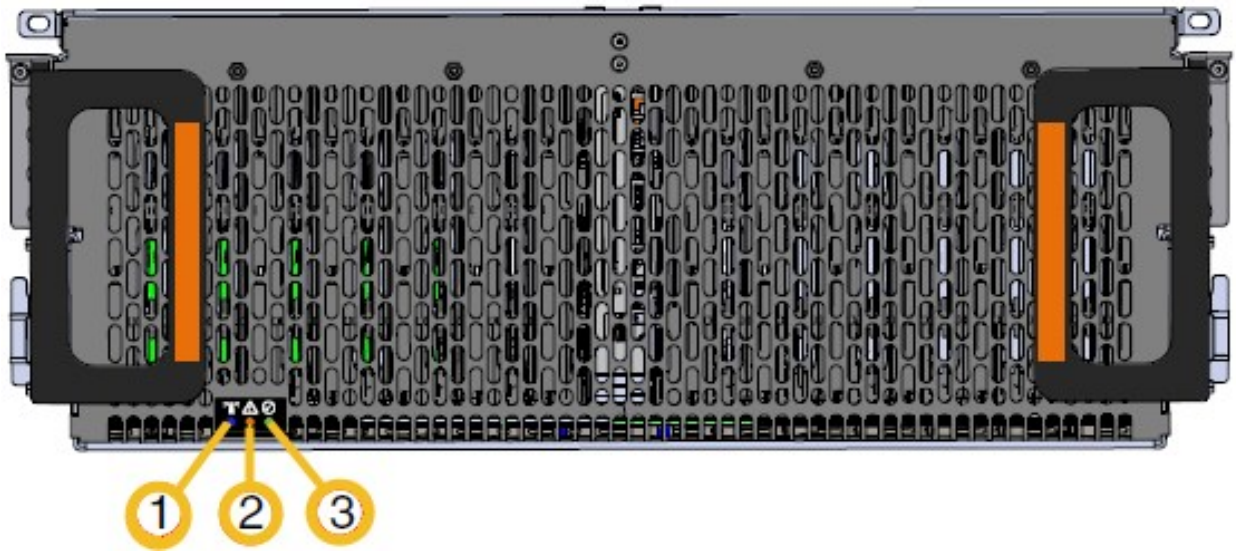
U2G460 Expansion LEDs

LEDs on the front, rear, and IO module of the U2G460 Expansion are provided to keep you constantly informed of overall system status, and the activity and health of specific components.

Front panel LEDs

The front panel LEDs includes an identifier (for any component), and enclosure fault and power status.

Figure 6-4: Front LEDs



The U2G460 Expansion storage expansion has the following LEDs on the front of the enclosure:

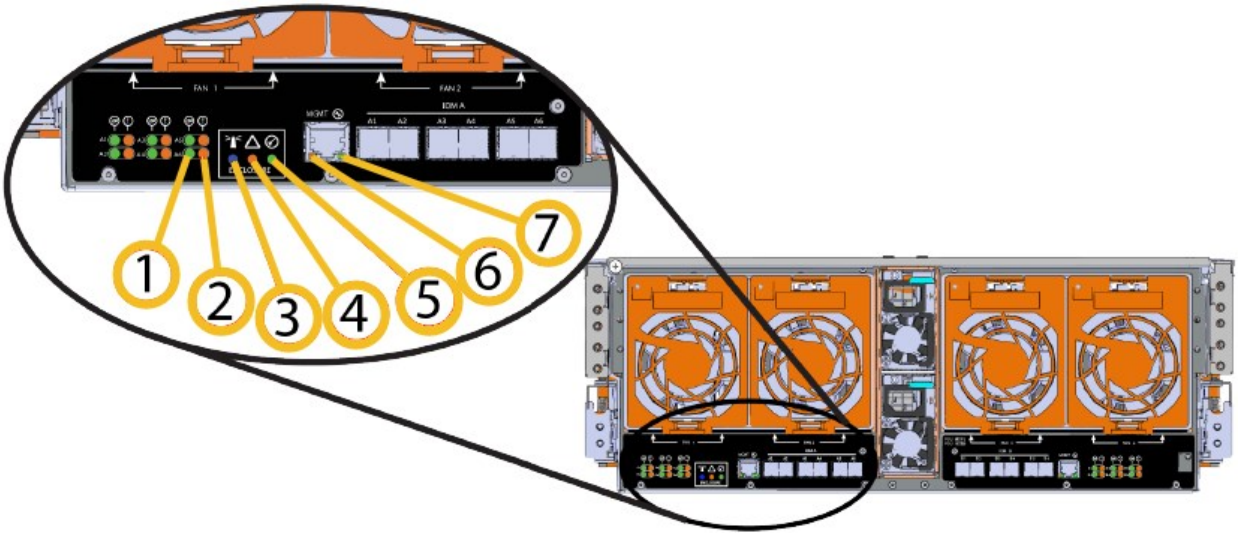
Number	Color	LED name	Description
1	Blue	Identify	Blink @ 1 Hz – Blinks only when Identification has been activated. Will blink when any component is identified.
2	Amber	Fault	Blink @ 1 Hz –Enclosure has a fault Off – Enclosure has no fault
3	Green	Power	Solid - Powered On

Control panel LEDs

The control panel located on the U2G460 Expansion has several LEDs. These LEDs provide you with 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.

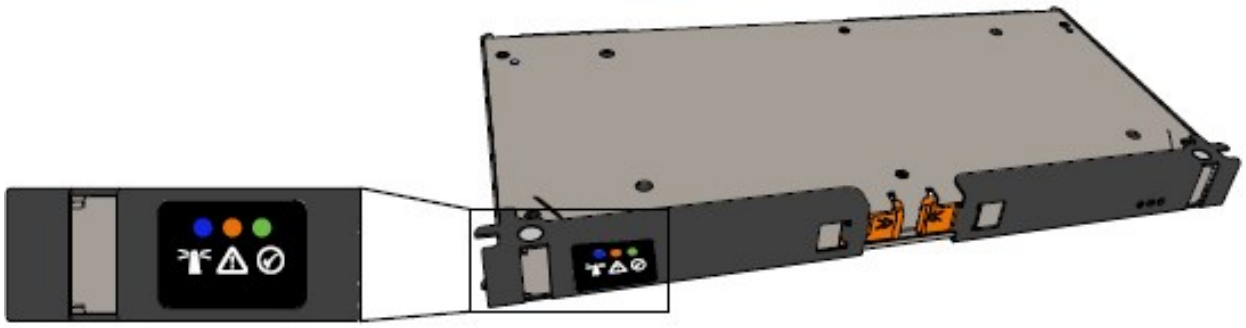
Figure 6-5: Rear I/O LEDs



Number	Color	LED name	Description
1	Green	SAS link status	Solid – SAS Cable Connected Off – SAS Cable Not Connected
2	Amber	SAS fault status	Blink @ 1 Hz – SAS connection fault Off – No SAS connection fault
3	Blue	Identification	Blink @ 1 Hz – Blinks only when Identification has been activated. Will blink when any component is identified.

Number	Color	LED name	Description
4	Amber	Fault	Blink @ 1 Hz –Enclosure has a fault Off – Enclosure has no fault
5	Green	Power	Solid - Powered On
6	Green/Amber	Ethernet connectors link/activity	Off - Operating at 10 Mbps Green Solid - Operating at 100 Mbps Amber Solid - Operating at 1Gpbs
7	Green	Ethernet connector	Off - No Connection Solid - Connected Blink - Activity

Figure 6-6: IOM LEDs



The U2G460 I/O modules (IOMs) have the following LEDs:

Color	Name	Description
Blue	Identify	Blink @ 1 Hz – Blinks only when Identification has been activated. Will blink when any component is identified.
Amber	Fault	Blink @ 1 Hz –Enclosure has a fault Off – Enclosure has no fault
Green	Power	Solid - Powered On

Each drive carrier has two LEDs. If a drive fails, replace the drive as described in the Nexsan Unity Storage Expansion Reference Guide (www.nexsan.com).

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

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