



Spectra Logic BlackPearl NAS Solution Site Preparation Guide



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Part Number

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Revision History

Revision	Date	Description
A	March 2020	Initial release.
B	January 2022	Updated to add Gen2 chassis.

Note: To make sure you have the most current version of this guide check the Spectra Logic Technical Support portal at support.spectralogic.com/documentations/user-guides/.

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Chapter 1 - About This Guide

This guide describes site preparation for the Spectra® BlackPearl® NAS Solution. Use the information in this guide to prepare your site for the installation of the system.

This guide also describes the site preparation requirements for the Spectra 44-bay, 96-bay, and 107-bay expansion nodes. The expansion nodes are used in conjunction with the BlackPearl NAS solution and cannot be used as stand-alone products. When instructions in this guide apply to both the BlackPearl NAS master and expansion nodes, *BlackPearl system*, or *the system* are used to refer to both.

INTENDED AUDIENCE

This guide is intended for data center administrators and operators who maintain and operate file storage systems. The information in this guide assumes a familiarity with computing terminology and with network connectivity protocols such as SAS and Ethernet. You also need to be familiar with installing, configuring, and using data file storage and data management software.

OVERVIEW

The BlackPearl NAS solution provides high-density, network-attached storage for most major operating environments, including Microsoft® Windows® operating system, Apple® OS X® operating system, UNIX®, and Linux®.

Optimized for secondary storage, the highly versatile BlackPearl NAS solution has many applications, including use as:

- Network-Attached Storage (NAS) for sharing file-based information over an IP network.
- Bulk file storage for both general and digital preservation usage.
- Disk-to-disk data file storage, either alone or as part of a tiered storage solution.

RELATED INFORMATION

This section contains information about this document and other documents related to the Spectra BlackPearl NAS Solution.

Typographical Conventions

This document uses the following conventions to highlight important information:

**WARNING**

Read text marked by the “Warning” icon for information you must know to avoid personal injury.

**CAUTION**

Read text marked by the “Caution” icon for information you must know to avoid damaging the library, the tape drives, or losing data.

**IMPORTANT**

Read text marked by the “Important” icon for information that helps you complete a procedure or avoid extra steps.

Note: Read text marked with “Note” for additional information or suggestions about the current topic.

Related Publications

For additional information about the Spectra BlackPearl NAS Solution, refer to the publications listed in this section.

Spectra BlackPearl NAS Solution

The following documents related to the Spectra BlackPearl NAS are available on the Support Portal website at support.spectralogic.com, and from the Documentation screen in the BlackPearl user interface.

- The *Spectra BlackPearl NAS Solution User Guide* provides detailed information about configuring, using, and maintaining your BlackPearl NAS solution.
- The *Spectra BlackPearl NAS Solution Gen1 Installation Guide* provides detailed instructions for installing a Gen1 BlackPearl NAS solution.
- The *BlackPearl NAS Quick Start Guide* provides instructions to rack mount and configure a Gen2 BlackPearl NAS solution.

- The *Spectra BlackPearl Network Setup Tips* document provides helpful instructions for troubleshooting common connectivity problems.
- The *Spectra BlackPearl HotPair Installation & Configuration Guide* document provides detailed information on installing and using a the BlackPearl NAS solution in a HotPair configuration.

The following documents are available after logging into your Support portal account at: support.spectralogic.com.

- The *Spectra BlackPearl Release Notes and Documentation Updates* provide the most up-to-date information about the BlackPearl NAS solution, including information about the latest software releases and documentation updates.
- The *Spectra 12- & 36-Drive Chassis HBA Installation Guide* provides instructions for installing an HBA in the solution.
- The *Spectra 12- & 36-Drive Chassis Boot Drive Replacement Guide* provides instructions for replacing a failed boot drive in the solution.
- The *Spectra 12-, 36- & 45-Drive Chassis Drive Replacement Guide* provides instructions for replacing a failed data drive after the solution is installed.
- The *Spectra 12-, 36- & 45-Drive Chassis Fan Replacement Guide* provides instructions for replacing a failed fan in the solution.
- The *Spectra 12-, 36- & 45-Drive Chassis Power Supply Replacement Guide* provides instructions for replacing a failed power supply after the solution is installed.
- The *Spectra 12-Drive Chassis HBA Replacement Guide* and *Spectra 36-Drive Chassis HBA Replacement Guide* provide instructions for replacing a failed HBA in the solution.
- The *Spectra 96-Bay Chassis Drive Replacement Guide* provides instructions for replacing a failed data drive in the 96-bay expansion node.
- The *Spectra 96-Bay Chassis Fan Replacement Guide* provides instructions for replacing a failed fan in the 96-bay expansion node.
- The *Spectra 96-Bay Chassis Power Supply Replacement Guide* provides instructions for replacing a failed power supply in the 96-bay expansion node.
- The *Spectra 96-Bay Chassis I/O Module Replacement Guide* provides instructions for replacing a failed I/O module in the 96-bay expansion node.
- The *Spectra 107-Bay Expansion Node FRU Guide* provides instructions for replacing fans, power supplies, drives, and SAS expanders in the 107-bay expansion node.

Chapter 2 - Site Preparation Checklist

Use the checklist to ensure that all of the site preparation requirements are met prior to delivery of your system and, optionally, one or more expansion nodes.

Checklist

Status	Description
<input type="checkbox"/>	<p>Physical requirements are met (see Physical Requirements on page 15).</p> <ul style="list-style-type: none"> • Access to the system is restricted to authorized personnel. • There is room for unpacking and moving the system. • The installation area has a level, hard flooring that can support the weight of the rack and system. <p>BlackPearl master nodes and 44-bay expansion nodes</p> <ul style="list-style-type: none"> • There is at least 36 inches (91.4 cm) of clearance in front and behind the system. • Recommended - A fire suppression system is in place. • Required - A rack stability kit is installed. • Recommended - A rack bolt down kit is installed. • Recommended - A server lift. <p>96-bay expansion nodes</p> <ul style="list-style-type: none"> • There is at least 48 inches (122 cm) of clearance in front and behind the system. • Recommended - A fire suppression system is in place. • Required - A rack bolt down kit is installed. • Required - A server lift. <p>107-bay expansion nodes</p> <ul style="list-style-type: none"> • There is at least 48 inches (122 cm) of clearance in front and behind the system. • Recommended - A fire suppression system is in place. • Required - A rack bolt down kit is installed. • Required - A server lift.
<input type="checkbox"/>	<p>Environmental requirements are met (see Environmental Specifications on page 23).</p> <ul style="list-style-type: none"> • The temperature, humidity, and altitude are within the system's specifications. • The location is as free of airborne particulates as possible.
<input type="checkbox"/>	<p>Power requirements are met (see Power Requirements on page 26).</p> <ul style="list-style-type: none"> • A sufficient number of power outlets are installed near the back of the system, and are accessible when the system is fully inserted into the rack. • Power cords meet country and local electrical codes.
<input type="checkbox"/>	<p>Network cable requirements are addressed (see Interface Specifications on page 30).</p> <ul style="list-style-type: none"> • The correct number and types of network cables are available.

Status	Description
<input type="checkbox"/>	<p>Rack-mount requirements are met (see Rack-Mount Requirements on page 33).</p> <p>BlackPearl Gen1 master node, Gen2 X series or V series master node, and 44-bay expansion nodes</p> <ul style="list-style-type: none"> • The rack is of a sufficient size to hold the system including cable clearance in back and clearance between the front door frame and the front mounting posts of the rack to allow the door to close over the front bezel. • The rack can safely handle the weight of the system. • The rack is assembled. <p>BlackPearl Gen2 S series master node</p> <ul style="list-style-type: none"> • The rack is of a sufficient size to hold the system including cable clearance in back and clearance between the front door frame and the front mounting posts of the rack to allow the door to close over the front bezel. • The rack can safely handle the weight of the system. • The rack is assembled. • The rack is assembled and affixed to the floor to eliminate the risk of tipping when a fully loaded BlackPearl Gen2 S series master node is extended from the rack. <p>WARNING Failure to anchor the rack to the floor could allow the rack to tip over which could cause personal injury.</p> <p>WARNUNG Wenn das Rack nicht am Boden verankert wird, kann das Rack umkippen, was zu Verletzungen führen kann.</p> <p>96-bay expansion nodes</p> <ul style="list-style-type: none"> • The rack is of a sufficient size to hold the system including cable clearance in back and clearance between the front door frame and the front mounting posts of the rack to allow the door to close over the front bezel. • The rack can safely handle the weight of the system. • The rack is assembled and affixed to the floor to eliminate the risk of tipping when a fully loaded 96-bay expansion node is extended from the rack. <p>WARNING Failure to anchor the rack to the floor could allow the rack to tip over which could cause personal injury.</p> <p>WARNUNG Wenn das Rack nicht am Boden verankert wird, kann das Rack umkippen, was zu Verletzungen führen kann.</p> <p>107-bay expansion nodes</p> <ul style="list-style-type: none"> • The rack is of a sufficient size to hold the system including cable clearance in back and clearance between the front door frame and the front mounting posts of the rack to allow the door to close over the front bezel. • The rack can safely handle the weight of the system. • The rack is assembled and affixed to the floor to eliminate the risk of tipping when a fully loaded 107-bay expansion node is extended from the rack. <p>WARNING Failure to anchor the rack to the floor could allow the rack to tip over which could cause personal injury.</p> <p>WARNUNG Wenn das Rack nicht am Boden verankert wird, kann das Rack umkippen, was zu Verletzungen führen kann.</p>

Chapter 3 - Site Preparation

This chapter describes the site requirements for the BlackPearl NAS solution master nodes and 44-bay, 96-bay, and 107-bay expansion nodes. Make sure that the location where the system is used meets these requirements before installing the system.

Physical Requirements	15
Environmental Specifications	23
Power Requirements	26
Interface Specifications	30
Rack-Mount Requirements	33

PHYSICAL REQUIREMENTS

The following physical requirements apply to the operating location of the BlackPearl NAS solution. Meeting these requirements is necessary for successfully operating the system.

Restricted Access

Ensure that your installation location is only accessible to authorized personnel.

Shipping Size and Weight

The following table provides the shipping size and weight specifications for the systems.

Note: All dimensions and weights are approximate.

Chassis	Height	Width	Depth	Weights ^{a, b, c}
Gen1 V Series 2U master node	13.25 in. (33.6 cm)	26 in. (66 cm)	34.25 in. (87.0 cm)	12-drive configuration: 80.5 lb (36.5 kg)
Gen1 S or P Series master node or 44-bay expansion node	17.5 in. (44.5 cm)	27 in. (68.6 cm)	39 in. (99.0 cm)	20-drive configuration: 127.4 lb (57.8 kg)

a) Includes chassis, drives, and packaging.

b) Twenty drives are installed in the BlackPearl NAS solution 4U master node for shipping, 12 drives are installed in the BlackPearl NAS solution 2U master node. Install additional drives after the system is installed in a rack.

c) The 44-bay expansion node, and 96-bay expansion node ship without drives installed. Install drives shipped after the system is installed in a rack.

Chassis	Height	Width	Depth	Weights ^{a, b, c}
Gen2 X Series master node	TBD	TBD	TBD	TBD
Gen2 V Series master node	11.5 in. (29.2 cm)	23.7 in. (60.2 cm)	45 in. (114.3 cm)	TBD
Gen2 S Series master node	15.9 in. (40.4 cm)	23.7 in. (60.2 cm)	46.9 in. (119.1 cm)	TBD
96-bay expansion node	14 in. (35.6 cm)	24.5 in. (62.2 cm)	43.5 in. (110.5 cm)	<ul style="list-style-type: none"> • Empty chassis: 108 lb (49 kg) • Rack mounting kit: 21 lb (9.5 kg)
107-bay expansion node	18.4 in. (46.7 cm)	24.3 in. (61.7 cm)	52.3 in. (132.8 cm)	<ul style="list-style-type: none"> • Empty chassis: 154.5 lb (70.1 kg) • Rack mounting kit: 21 lb (9.5 kg)

**WARNING**

Lifting hazard. Use lifting aids and proper lifting techniques with assistance when handling heavy equipment.

WARNUNG Gefahren beim Heben. Verwenden Sie Hebehilfen und richtige Hebetchnik mit Unterstützung beim Umgang mit schwerem Gerät.

a) Includes chassis, drives, and packaging.

b) Twenty drives are installed in the BlackPearl NAS solution 4U master node for shipping, 12 drives are installed in the BlackPearl NAS solution 2U master node. Install additional drives after the system is installed in a rack.

c) The 44-bay expansion node, and 96-bay expansion node ship without drives installed. Install drives shipped after the system is installed in a rack.

Unpacked Size and Weight

The following table provides the unpacked size and weight specifications for the systems.

Note: All dimensions and weights are approximate.

Chassis	Height	Width	Depth ^a	Weights
Gen1 V Series 2U master node	2U—3.5 in. (8.9 cm)	19 in. (48.3 cm)	27.5 in. (69.9 cm)	<ul style="list-style-type: none"> • Empty chassis: 39 lb (17.7 kg) • 12-drive configuration: 60.6 lb (27.5 kg)
Gen1 S or P Series 4U master node or 44-bay expansion node	4U—7 in. (17.8 cm)	19 in. (48.3 cm)	29 in. (73.7 cm)	<ul style="list-style-type: none"> • Empty chassis: 57 lb (25.8 kg) • 20-drive configuration: 93.2 lb (42.3 kg) • 35-drive configuration: 120.2 lb (54.5 kg) • 44-drive configuration: 136.4 lb (61.9 kg)
Gen2 X Series master node	2U—3.5 in. (8.9 cm)	19 in. (48.3 cm)	33 in. 83.8 cm)	<ul style="list-style-type: none"> • Empty chassis: 60 lb (27.2 kg) • Additional for each SSD: 0.8 lb (0.4 kg)
Gen2 V Series master node	2U—3.5 in. (8.9 cm)	19 in. (48.3 cm)	27.5 in. (69.9 cm)	<ul style="list-style-type: none"> • Empty chassis: 72 lb (32.7 kg) • Additional for each HDD: 1.5 lb (0.8 kg) • Additional for each SSD: 0.8 lb (0.4 kg)
Gen2 S Series master node	4U—6.9 in. (17.6 cm)	19 in. (48.3 cm)	37.5 in. (95.3 cm)	<ul style="list-style-type: none"> • Empty chassis: 99 lb (45 kg) • Additional for each HDD: 1.5 lb (0.8 kg) • Additional for each SSD: 0.8 lb (0.4 kg)

a) Includes the front bezel.

Chassis	Height	Width	Depth ^a	Weights
96-bay expansion node	4U–7 in. (17.8 cm)	19 in. (48.3 cm)	40 in. (101.6 cm)	<ul style="list-style-type: none"> • Empty chassis: 97 lb (44 kg) • Additional for each HDD: 1.8 lb (0.8 kg) • With 96 HDDs: 270 lb (122.5 kg)
107-bay expansion node	4U–7 in. (17.8 cm)	17 in. (43.2 cm)	41 in. (104.1 cm)	<ul style="list-style-type: none"> • Empty chassis: 109.4 lb (49.6 kg) • With 107 SDDs: 195 lb (88.5 kg) • With 107 HDDs: 270 lb (122.5 kg)

**WARNING**

Lifting hazard. Use lifting aids and proper lifting techniques with assistance when handling heavy equipment.

WARNUNG Gefahren beim Heben. Verwenden Sie Hebehilfen und richtige Hebetchnik mit Unterstützung beim Umgang mit schwerem Gerät.

Maximum Configuration Size and Weight

The following table shows the maximum configuration for each master node type and the size and weight of the combined units.

Note: All dimensions and weights are approximate.

Chassis	Height	Width	Depth ^b	Weight
One Gen1 V Series 2U master node and two 44-bay expansion nodes	17.5 in. (44.5 cm)	19 in. (48.3 cm)	29 in. (73.7 cm)	337 lb (152.9 kg)
One Gen1 V Series 2U master node and two 96-bay expansion nodes	17.5 in. (44.5 cm)	19 in. (48.3 cm)	40 in. (101.6 cm)	600.2 lb (272.2 kg) ^c

a) Includes the front bezel.

b) Includes the front bezel.

c) Weight includes the weight of 2 rack kits used for the expansion nodes. Each rack kit weighs 21 lb (9.5 kg).

Chassis	Height	Width	Depth ^a	Weight
One Gen1 V Series 2U master node and two 107-bay expansion nodes	17.5 in. (44.5 cm)	19 in. (48.3 cm)	41 in. (104.1 cm)	600.6 lb (272.4 kg) ^b
One Gen1 S or P Series 4U master node and nine 44-bay expansion nodes	63 in. (160 cm)	19 in. (48.3 cm)	29 in. (73.7 cm)	1364 lb (618.7 kg) ^b
One Gen1 S or P Series 4U master node and nine 96-bay expansion nodes	63 in. (160 cm)	19 in. (48.3 cm)	40 in. (101.6 cm)	2550.2 lb (1156.8 kg) ^c
One Gen1 S or P Series 4U master node and nine 107-bay expansion nodes	63 in. (160 cm)	19 in. (48.3 cm)	41 in. (104.1 cm)	2550.2 lb (1156.8 kg) ^c
One Gen2 X Series 2U master node and eight 107-bay expansion nodes	56 in. (142.2 cm)	19 in. (48.3 cm)	41 in. (104.1 cm)	2237.6 lb (1015 kg) ^c
One Gen2 V Series 2U master node and nine 107-bay expansion nodes	63 in. (160 cm)	19 in. (48.3 cm)	41 in. (104.1 cm)	2520 lb (1143 kg) ^c
One Gen2 S Series 4U master node and nine 107-bay expansion nodes	63 in. (160 cm)	19 in. (48.3 cm)	41 in. (104.1 cm)	2619 lb (1188 kg) ^c

a) Includes the front bezel.

b) Weight includes the weight of 9 rack kits used for the expansion nodes. Each rack kit weighs 21 lb (9.5 kg).

c) Weight includes the weight of 8 rack kits used for the expansion nodes. Each rack kit weighs 21 lb (9.5 kg).

Floor Load / Tipping Hazard

The data center flooring must be able to support the weight of a fully loaded rack with 10 units. Additionally, any rack containing a 96-bay expansion node or 107-bay expansion node must be anchored to the floor to prevent the rack from tipping over, which could cause personal injury.



WARNING

A fully loaded **BlackPearl NAS solution Gen1 V Series 2U system with 44-bay expansion nodes** weighs 337 lb (152.9 kg). **Serious damage and personal injury could occur if the floor collapses or if the rack tips over.**

A fully loaded **BlackPearl NAS solution Gen1 V Series 2U system with 96-bay expansion nodes** weighs 600.2 lb (272.2 kg). **Serious damage and personal injury could occur if the floor collapses or if the rack tips over.**

A fully loaded **BlackPearl NAS solution Gen1 V Series 2U system with 107-bay expansion nodes** weighs 600.6 lb (272.4 kg). **Serious damage and personal injury could occur if the floor collapses or if the rack tips over.**

A fully loaded **BlackPearl NAS solution Gen1 S or P Series 4U system with 44-bay expansion nodes** weighs 1364 lb (618.7 kg). **Serious damage and personal injury could occur if the floor collapses or if the rack tips over.**

A fully loaded **BlackPearl NAS solution Gen1 S or P Series 4U system with 96-bay expansion nodes** weighs 2550.2 lb (1156.8 kg). **Serious damage and personal injury could occur if the floor collapses or if the rack tips over.**

A fully loaded **BlackPearl NAS solution Gen1 S or P Series 4U system with 107-bay expansion nodes** weighs 2550.2 lb (1156.8 kg). **Serious damage and personal injury could occur if the floor collapses or if the rack tips over.**



WARNING

A fully loaded **BlackPearl NAS solution Gen2 X Series 2U system with 107-bay expansion nodes** weighs 2237.6 lb (1015 kg). **Serious damage and personal injury could occur if the floor collapses or if the rack tips over.**

A fully loaded **BlackPearl NAS solution Gen2 V Series 2U system with 107-bay expansion nodes** weighs 2520 lb (1143 kg). **Serious damage and personal injury could occur if the floor collapses or if the rack tips over.**

A fully loaded **BlackPearl NAS solution Gen2 S Series 4U system with 107-bay expansion nodes** weighs 2619 lb (1188 kg). **Serious damage and personal injury could occur if the floor collapses or if the rack tips over.**

WARNUNG Eine voll beladene **BlackPearl NAS solution Gen1 V Series 2U-System mit 44-Schacht-Erweiterungsknoten** wiegt 152,9 kg. **Ein Einstürzen des Bodens oder ein Umkippen des Racks können zu schweren Schäden und Personenschäden führen.**

WARNUNG Eine voll belastete **BlackPearl NAS solution Gen1 V Series 2U-System mit 96-Schacht-Erweiterungsknoten** wiegt 272,2 kg. **Ein Einstürzen des Bodens oder ein Umkippen des Racks können zu schweren Schäden und Personenschäden führen.**

WARNUNG Eine voll beladene **BlackPearl NAS solution Gen1 V Series 2U-System mit 107-Schacht-Erweiterungsknoten** wiegt 272,4 kg. **Ein Einstürzen des Bodens oder ein Umkippen des Racks können zu schweren Schäden und Personenschäden führen.**

WARNUNG Eine voll beladene **BlackPearl NAS solution Gen1 S- oder P-Serie 4U-System mit 44-Bay-Erweiterungsknoten** wiegt 618,7 kg. **Ein Einstürzen des Bodens oder ein Umkippen des Racks können zu schweren Schäden und Personenschäden führen.**



WARNUNG

WARNUNG Eine voll beladene **BlackPearl NAS solution Gen1 S- oder P Series 4U-System mit 96-Bay-Erweiterungsknoten** wiegt 1156,8 kg. **Ein Einstürzen des Bodens oder ein Umkippen des Racks können zu schweren Schäden und Personenschäden führen.**

WARNUNG Eine voll beladene **BlackPearl NAS solution Gen1 S oder P Series 4U-System mit 107-Schacht-Erweiterungsknoten** wiegt 1156,8 kg. **Ein Einstürzen des Bodens oder ein Umkippen des Racks können zu schweren Schäden und Personenschäden führen.**



WARNUNG

WARNUNG Eine voll beladene **BlackPearl NAS solution Gen2 X Series 2U-System mit 107-Bay-Erweiterungsknoten** wiegt 1015 kg. **Ein Einstürzen des Bodens oder ein Umkippen des Racks können zu schweren Schäden und Personenschäden führen.**

WARNUNG Eine voll beladene **BlackPearl NAS solution Gen2 V Series 2U-System mit 107-Schacht-Erweiterungsknoten** wiegt 1143 kg. **Ein Einstürzen des Bodens oder ein Umkippen des Racks können zu schweren Schäden und Personenschäden führen.**

WARNUNG Eine voll belastete **BlackPearl NAS solution Gen2 S Series 4U-System mit 107-Schacht-Erweiterungsknoten** wiegt 1188 kg. **Ein Einstürzen des Bodens oder ein Umkippen des Racks können zu schweren Schäden und Personenschäden führen.**

Working Area - All BlackPearl NAS master nodes and 44-Bay Expansion Nodes

Spectra Logic requires a minimum of 36 inches (91.4 cm) of clearance both in front and in back of the system for ventilation and access during installation, operation, and service.

Working Area - 96-Bay Expansion Nodes

Spectra Logic requires a minimum of 48 inches (122 cm) of clearance both in front and in back of the system for ventilation and access during installation, operation, and service.

Working Area - 107-Bay Expansion Nodes

Spectra Logic requires a minimum of 48 inches (122 cm) of clearance, both in front and in back of the expansion node, for ventilation and access during installation, operation, and service.

Flooring

Place the rack on a level, hard-surfaced floor such as cement or tile. Do not place the rack on a carpeted floor or anywhere else that poses risk for static discharge that could damage your system or its drives.

Fire Protection

If possible, install the BlackPearl NAS solution close to your data center's fire suppression equipment.

Stability Kit - BlackPearl NAS Solution and 44-Bay Expansion Nodes

In earthquake-prone areas, it is important to adequately restrain file storage systems to prevent personal injury and limit potential damage to system components.



WARNING

In earthquake-prone areas, the rack must have stabilizing equipment or be anchored to the floor to eliminate the risk of tipping, which could lead to personal injury.

WARNUNG In erdbebengefährdeten Gebieten muss das Rack stabilisierende Ausrüstung oder am Boden verankert, um die Kippgefahr, die zu Verletzungen führen können beseitigt werden.

Bolt Down Kit - 96-Bay and 107-Bay Expansion Nodes

When installing one or more 96-bay or 107-bay expansion nodes, use a bolt down kit, such as the one shipped with the rack available from Spectra Logic, to prevent personal injury and limit potential damage to system components.



WARNING

The rack must be anchored to the floor before the 96-bay or 107-bay expansion node is installed to eliminate the risk of tipping when a fully loaded 96-bay or 107-bay expansion node is extended from the rack, which could lead to personal injury.

WARNUNG Das Rack muss am Boden verankert werden, bevor das 96-bay oder 107-bay Erweiterungsknoten installiert ist, um die Kippgefahr zu beseitigen, wenn ein voll beladener 96-bay oder 107-bay Erweiterungsknoten aus dem Rack, die zu Personenschäden führen könnte erweitert.

ENVIRONMENTAL SPECIFICATIONS

The tables below show the temperature, humidity, and altitude requirements for each chassis.

Gen2 X Series BlackPearl NAS Solution

Parameter	Operating Environment ^a	Storing and Shipping (Non-Operating) Environment ^b	Transit Conditions Storage Environment
Humidity	20% to 80% (non-condensing)	10% to 90% (non-condensing)	10% to 90% (non-condensing)
Temperature	41° F to 95° F ^c (5° C to 35° C)	-40° F to 113° F (-40° C to 45° C)	-40° F to 140° F (-40° C to 60° C)
Altitude	-200 ft to 10,000 ft (-61 m to 3,048 m)	-200 ft to 10,000 ft (-61 m to 3,048 m)	-200 ft to 40,000 ft (-61 m to 12,192 m)
Maximum wet bulb temperature	84° F (29° C)	95° F (35° C)	

Gen2 S Series and Gen2 V Series BlackPearl NAS Solution

Parameter	Operating Environment ^a	Storing and Shipping (Non-Operating) Environment ^b
Humidity	5% to 95% (non-condensing)	5% to 95% (non-condensing)
Temperature	50° F to 95° F (10° C to 35° C)	32° F to 122° F (0° C to 50° C)

a) When moving the BlackPearl NAS solution or expansion node from a cold storage environment to a warm operating environment, it must acclimate in its packaging for at least 12 hours before opening to prevent serious condensation damage.

b) Specifications are for the BlackPearl NAS solution or expansion node in its original packaging. The packaging protects the BlackPearl NAS solution from condensation caused by extreme temperature variations (27° F per hour or 15° C per hour, or more).

c) Maximum operating temperature is specified at sea level and is 2 percent lower per 1,000 ft (305 m) of increased altitude.

Gen1 S Series and Gen1 V Series BlackPearl NAS Solutions, and 44-Bay Expansion Nodes

Parameter	Operating Environment ^a	Storing and Shipping (Non-Operating) Environment ^b
Humidity	8% to 90% (non-condensing)	5% to 95% (non-condensing)
Temperature	50° F to 95° F (10° C to 35° C)	-40° F to 158° F (-40° C to 70° C)
Altitude	Sea level to 10,000 ft (3,048 m)	Sea level to 39,370 ft (12,000 m)
Maximum wet bulb temperature	84° F (29° C)	95° F (35° C)

96-Bay Expansion Node

Parameter	Operating Environment ^a	Storing and Shipping (Non-Operating) Environment ^b
Humidity	20% to 80% (non-condensing)	10% to 90% (non-condensing)
Temperature	41° F to 95° F (5° C to 35° C)	-40° F to 140° F (-40° C to 60° C)
Altitude	-200 ft to 10,000 ft (-61 m to 3,048 m)	-200 ft to 40,000 ft (-61 m to 12,192 m)

a) When moving the BlackPearl NAS solution or expansion node from a cold storage environment to a warm operating environment, it must acclimate in its packaging for at least 12 hours before opening to prevent serious condensation damage.

b) Specifications are for the BlackPearl NAS solution or expansion node in its original packaging. The packaging protects the BlackPearl NAS solution from condensation caused by extreme temperature variations (27° F per hour or 15° C per hour, or more).

107-Bay Expansion Node

Parameter	Operating Environment ^a	Storing and Shipping (Non-Operating) Environment ^b
Humidity	20% to 80% (non-condensing)	10% to 90% (non-condensing)
Temperature	32° F to 95° F (0° C to 35° C)	-4° F to 140° F (-20° C to 60° C)
Altitude	-200 ft to 10,000 ft (-61 m to 3,048 m)	-200 ft to 40,000 ft (-61 m to 12,192 m)

Heat Generation

The following table shows the approximate heat generation of each BlackPearl chassis.

Chassis	Heat Generation at Maximum Wattage
Gen2 X Series 2U master node	5460 BTUs/hour
Gen2 V Series 2U master node	2729 BTUs/hour
Gen2 S Series 4U master node	5460 BTUs/hour
Gen1 V Series 2U master node	3138 BTUs/hour
Gen1 S or P Series 4U master node	3410 - 4365 BTUs/hour
44-bay expansion node	3751 - 4775 BTUs/hour
96-bay expansion node	3751 BTUs/hour
107-bay expansion node	6820 BTUs/hour

a) When moving the expansion node from a cold storage environment to a warm operating environment, it must acclimate in its packaging for at least 12 hours before opening to prevent serious condensation damage.

b) Specifications are for the expansion node in its original packaging. The packaging is designed to protect the expansion node from condensation caused by extreme temperature variations (27° F per hour or 15° C per hour, or more).

POWER REQUIREMENTS

The BlackPearl NAS solutions, 44-bay, 96-bay, and 107-bay expansion nodes, have the following power requirements.



CAUTION Failure to meet the cabling and power specifications could damage your BlackPearl NAS solution, result in data loss, or both.

Input Power Requirements

The following tables provide the input power requirements for each solution or expansion node.

Gen2 X Series BlackPearl NAS Solution

Parameter	Requirements
Input Voltage	200–240 VAC, 40 A peak, 1600 watts maximum
Input Frequency	50–60 Hz

Gen2 V Series BlackPearl NAS Solution

Parameter	Requirements
Input Voltage	100-120 VAC, 40 A peak, 800 watts maximum 200–240 VAC, 20 A peak, 800 watts maximum
Input Frequency	50–60 Hz

Gen2 S Series BlackPearl NAS Solution

Parameter	Requirements
Input Voltage	200–240 VAC, 40 A peak, 1600 watts maximum
Input Frequency	50–60 Hz

Gen1 V Series 2U BlackPearl NAS Solution

Parameter	Requirements
Input Voltage	100–240 VAC, 11–4.5 A, 920 watts maximum
Input Frequency	50–60 Hz

Gen1 S Series 4U BlackPearl NAS Solution

Parameter	Requirements
Input Voltage	100–140 VAC, 12–8 A, 1000 watts maximum 180–240 VAC, 8–6 A, 1280 watts maximum
Input Frequency	50–60 Hz

44-Bay Expansion Node

Parameter	Requirements
Input Voltage	100–140 VAC, 13.5–9.5 A, 1100 watts maximum 180–240 VAC, 9.5–7 A, 1400 watts maximum
Input Frequency	50–60 Hz

96-Bay Expansion Node

Parameter	Requirements
Input Voltage	90–264 VAC, 1100 watts maximum
Input Frequency	47–63 Hz

107-Bay Expansion Node

Parameter	Requirements
Input Voltage	200–240 VAC, 15 A, 2000 watts maximum
Input Frequency	50–60 Hz

Power Cord Specifications

The power cords included with the BlackPearl NAS solutions are part of the unit and are not intended for use with any other equipment.



IMPORTANT Confirm the PDU used with the BlackPearl NAS solution has enough amperage for the power supply in each chassis included in your installation.

Cables provided by Spectra Logic are between 6 ft (1.8m) to 6.5 ft (2m) in length. If you need to use a longer cord, make sure it conforms to the specifications listed below.

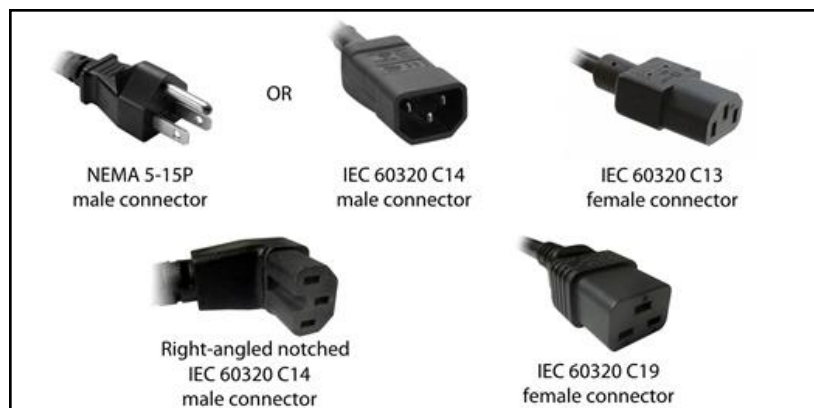
Power cords must comply with local electrical codes.



WARNING WARNUNG Die Verwendung von Verlängerungskabeln in Verbindung mit den Kabeln, die mit einem 96-Schacht-Erweiterungsknoten oder 107-Schacht-Erweiterungsknoten geliefert werden, kann schwere Schäden verursachen.

Using extension cords in conjunction with the cords provided with a 96-bay expansion node or 107-bay expansion node, may cause serious damage.

Note: 96-bay expansion nodes ship with cables for use with the chassis. These power cables have a right-angled notched C14 connector, which is required for the 96-bay expansion node. Only use the cords provided by Spectra Logic with the 96-bay expansion node.



North American 120 Volt-AC Power Cord

The criteria for a 120-volt power cord for use in the United States and Canada are as follows:

Parameter	Specification
Power cordage	Three-conductor, 14 AWG
Power input connectors	Gen1 S, P and V Series, Gen2 X and V Series, and 44-Bay Expansion Node: <ul style="list-style-type: none"> • Male: NEMA 5-15P or IEC-60320 C14 • Female: IEC 60320 C13

North American 220 Volt-AC Power Cord

The criteria for a 220-volt power cord for use in the United States and Canada are as follows:

Parameter	Specification
Power cordage	SJT type, three-conductor, 14 AWG minimum
Power input connectors	Gen1 S, P, and V Series, Gen2 X, S, and V Series, and 44-Bay Expansion Node: <ul style="list-style-type: none"> • Male: NEMA 5-15P or IEC-60320 C14 • Female: IEC 60320 C13 96-Bay Expansion Node: <ul style="list-style-type: none"> • Male: Connector must be of the proper type, rating, and safety approval. • Female: Right-angled notched IEC 60320 C14 107-Bay Chassis Expansion Node: <ul style="list-style-type: none"> • Male: Connector must be of the proper type, rating, and safety approval. • Female: IEC 60320 C19

International 220 Volt-AC Power Cord

The criteria for an international 220-volt AC power cord are as follows:

Parameter	Specification
Power cordage	Flexible, HAR (harmonized) type H05VV-F, three conductor, cord with minimum conductor size of 1.7 square millimeters (0.0026350 square inches).
Power input connectors	<p>Gen1 S, P, and V Series, Gen2 X, S, and V Series, and 44-Bay Expansion Node:</p> <ul style="list-style-type: none"> • Male: Connector must be of the proper type, rating, and safety approval. • Female: IEC 60320 C13 <p>96-Bay Expansion Node:</p> <ul style="list-style-type: none"> • Male: Connector must be of the proper type, rating, and safety approval. • Female: Right-angled notched IEC 60320 C14 <p>107-Bay Chassis Expansion Node:</p> <ul style="list-style-type: none"> • Male: Connector must be of the proper type, rating, and safety approval. • Female: IEC 60320 C19

INTERFACE SPECIFICATIONS

This section provides information about the interfaces used to connect a BlackPearl NAS solution to expansion nodes, tape drives, and host systems.

System Interface Connectors

Gen2 X Series BlackPearl NAS Solution

Interface Type	Number of Ports and Connector Type
Ethernet <ul style="list-style-type: none"> • 1 Gig E • 100 GigE 	One RJ-45 socket Two QSFP28 sockets.
SAS (12 Gbps) (Optional)	Four SFF-8644 sockets per 12 Gbps SAS card provide connections to four 96-bay expansion nodes, or four 107-bay disk expansion nodes, using one port per expansion node.

Gen2 S Series and V Series BlackPearl NAS Solution

Interface Type	Number of Ports and Connector Type
Ethernet 10GBase-T	Two RJ-45 sockets.
IPMI Management Port	One RJ-45 socket
Ethernet (25 GigE) (Optional)	Two SFP28 optical modules with a duplex LC connector per optional 25 GigE NIC.
SAS (12 Gbps) (Optional)	Four SFF-8644 sockets per 12 Gbps SAS card provide connections to four 96-bay expansion nodes, or four 107-bay disk expansion nodes, using one port per expansion node.

Gen1 S Series and Gen1 V Series BlackPearl NAS Solution

Interface Type	Number of Ports and Connector Type
Ethernet (1000BaseT, 10GBase-T)	Two RJ-45 sockets.
IPMI Management Port	One RJ-45 socket
Ethernet (10 GigE)	Two SFP+ optical modules with a duplex LC connector per optional 10 GigE NIC.

Interface Type	Number of Ports and Connector Type
Ethernet (40 GigE)	Two QSFP+ optical modules with a duplex LC connector per optional 40 GigE NIC.
SAS (6 Gbps) (Optional)	Four SFF-8644 sockets per optional 6 Gbps SAS card provide connections to two 44-bay expansion nodes, using two ports for each expansion node.
SAS (12 Gbps) (Optional)	Two or four SFF-8644 sockets per optional 12 Gbps SAS card provide connections to two or four 96-bay expansion nodes, or two or four 107-bay disk expansion nodes, using one port per expansion node.

Expansion Node Interface Connectors

Interface Type	Number of Ports and Connector Type
44-Bay Expansion Node	Two SFF-8088 ports per 44-bay expansion node. Both ports are required to connect the expansion node to a BlackPearl NAS solution.
96-Bay Expansion Node	Two SFF-8644 ports per 96-bay expansion node. Only a single port is required to connect the expansion node to a BlackPearl NAS solution.
107-Bay Expansion Node	<ul style="list-style-type: none"> • Four SFF-8644 ports per expander in the 107-bay expansion node. Maximum of two expanders. • One 1 GigE Ethernet port per expander in the 107-bay expansion node. Maximum of two expanders.

Network Interface Cables

The type of cables required to connect the BlackPearl NAS solution to an Ethernet network, a 44-bay, 96-bay, or 107-bay expansion node depend on the type of interface.

Interface Type	Cable Requirements
Ethernet (10GBase-T or 10/100/1000Base-T)	<p>10GBase-T - Shielded Category 6A data-grade cable with an RJ-45 connector.</p> <p>10/100/1000Base-T - Shielded Category 5 data-grade cable with an RJ-45 connector.</p> <p>Note: Cables to be provided by the customer.</p>
Ethernet (10 GigE)	<p>SFP+ transceiver multimode optical cable with duplex LC connectors.</p> <p>Note: Cables to be provided by the customer.</p>

Interface Type	Cable Requirements
Ethernet (25 GigE)	SFP28 transceiver multimode optical cable with duplex LC connectors. Note: Cables to be provided by the customer.
Ethernet (40 GigE)	QSFP+ transceiver MPT optical cables with duplex LC connectors, or copper cables with QSFP+ connector. Note: Cables to be provided by the customer.
Ethernet (100 GigE)	100 GbE QSFP28 cable. Note: Cables to be provided by the customer.
SAS	<p>44-bay expansion node: 6 Gbps 4 lane cable with SFF-8644 and SFF-8088 connectors. Two SAS cables are required for each 44-bay expansion node. Note: Two SAS cables are included with each 44-bay expansion node.</p> <p>96-bay expansion node: 12 Gbps cable with SFF-8644 connectors. One SAS cable is required for each 96-bay expansion node.</p> <p>107-bay expansion node: 12 Gbps cable with SFF-8644 connectors. One SAS cable is required for each 107-bay expansion node. Note: One SAS cable is included with each 96-bay expansion node or 107-bay expansion node.</p>

Universal Serial Bus (USB) Support

Spectra Logic supports using the USB ports on the solution for the following:

- USB mass storage devices (for example, flash drives)
- Keyboards & pointer devices (for example, a computer mouse)
- CD or DVD drives with USB interface

RACK-MOUNT REQUIREMENTS

Ensure that an appropriate rack is assembled and placed near the AC power outlets and network connections.



CAUTION

You must locate the rack on a level, hard-surfaced floor, such as cement or tile. Do not place the rack on a carpeted floor or anywhere else that poses risk for static discharge that could damage your system or its drives.

BlackPearl NAS Master Nodes and 44-Bay Expansion Node

Note: When installing a BlackPearl NAS solution with a 96-bay or 107-bay expansion node, you must use the rack requirements for the appropriate expansion node:

- See [96-Bay Expansion Node on page 35](#).

-OR-

- See [107-Bay Expansion Node on page 35](#)

Otherwise, use the instructions on this page.

The BlackPearl NAS solution 4U master node and 44-bay expansion node are 7 inches (17.8 cm) tall and occupies 4U of rack space. The BlackPearl NAS solution 2U master nodes are 3.5 inches (8.9 cm) tall and occupy 2U of rack space. All are designed to fit in a standard 19-inch, 4-post rack. Keep the following in mind when selecting a rack:

- Make sure that the distance between the mounting surfaces on the front and rear posts is between 27 inches (68.6 cm) and 36 inches (91 cm).

Note: If you are using the adaptors to install the rack-mount kit in a rack with circular mounting cutouts, the distance between the front and rear posts must be at least 28.5 inches (72.4 cm), and not more than 37.5 inches (95.25 cm).

- Allow approximately 3 inches (8 cm) of additional depth at the back of the rack for cable clearance.
- If the rack has a door, allow at least 2 inches (5 cm) of clearance between the front door frame and the front mounting posts of the rack to allow the door to close over the front bezel.
- Check your rack's specifications to make sure it accommodates the weight and depth of the BlackPearl NAS system.

Notes:

- Spectra Logic does not support the use of a two-post rack with a BlackPearl NAS master node or expansion node.
- An enclosed 19-inch, four-post rack is available for purchase from Spectra Logic. The rack has two doors and removable side panels. Contact Spectra Logic Sales for more information (see [Contacting Spectra Logic](#)).
- In earthquake prone areas, provide restraints as necessary. See [Stability Kit - BlackPearl NAS Solution and 44-Bay Expansion Nodes on page 22](#).

96-Bay Expansion Node

The 96-bay expansion node chassis is 6.9 inches (17.5 cm) tall and occupies 4U of rack space; it fits in a standard 19-inch, 4-post rack. Keep the following in mind when selecting a rack:

- Make sure that the distance between the mounting surfaces on the front and rear posts is between 19 inches (48.3 cm) and 30 inches (76.2 cm).
- Allow approximately 3 inches (8 cm) of additional depth at the back of the rack for cable clearance.
- If the rack has a door, allow at least 2 inches (5 cm) of clearance between the front door frame and the front mounting posts of the rack to allow the door to close over the front bezel.
- Check your rack's specifications to make sure it accommodates the weight and depth of the 96-bay expansion node. See [Physical Requirements on page 15](#) for more information.



WARNING

The rack must be anchored to the floor before the 96-bay expansion node is installed to eliminate the risk of tipping when a fully loaded 96-bay expansion node is extended from the rack, which could lead to personal injury.

WARNING Das Rack muss am Boden verankert werden, bevor das 96-bay Erweiterungsknoten installiert ist, um die Kippgefahr zu beseitigen, wenn ein voll beladener 96-bay Erweiterungsknoten aus dem Rack, die zu Personenschäden führen könnte erweitert.

Notes:

- Spectra Logic does not support the use of a two-post rack with an 96-bay expansion node.
- An enclosed 19-inch, four-post rack and suitable bolt down kit is available for purchase from Spectra Logic. The rack has two doors and removable side panels.

107-Bay Expansion Node

The 107-bay expansion node chassis is 6.9 inches (17.5 cm) tall and occupies 4U of rack space; it fits in a standard 19-inch, 4-post rack. Keep the following in mind when selecting a rack:

- Make sure that the distance between the mounting surfaces on the front and rear posts is between 31 inches (78.6 cm) and 36.4 inches (92.4 cm).
- Allow approximately 3 inches (8 cm) of additional depth at the back of the rack for cable clearance.

- If the rack has a door, allow at least 2 inches (5 cm) of clearance between the front door frame and the front mounting posts of the rack to allow the door to close over the front bezel.
- Check your rack's specifications to make sure it accommodates the weight and depth of the 107-bay expansion node. See [Physical Requirements on page 15](#) for more information.

**WARNING**

The rack must be anchored to the floor before the 107-bay expansion node is installed to eliminate the risk of tipping when a fully loaded 107-bay expansion node is extended from the rack, which could lead to personal injury.

WARNUNG Das Rack muss am Boden verankert werden, bevor das 107-bay Erweiterungsknoten installiert ist, um die Kippgefahr zu beseitigen, wenn ein voll beladener 107-bay Erweiterungsknoten aus dem Rack, die zu Personenschäden führen könnte erweitert.

Notes:

- Spectra Logic does not support the use of a two-post rack with an 107-bay expansion node.
- An enclosed 19-inch, four-post rack and suitable bolt down kit is available for purchase from Spectra Logic. The rack has two doors and removable side panels.