



Overland  
Storage

**SnapServer<sup>®</sup>**

# *Setup Guide*

For SnapServers and Expansion  
Arrays With GuardianOS<sup>™</sup> 6.5

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Overland Storage, Inc.  
9112 Spectrum Center Blvd.  
San Diego, CA 92123  
U.S.A.

Tel: 1.877.654.3429 (toll-free U.S.)  
Tel: +1.858.571.5555 Option 5 (International)  
Fax: +1.858.571.0982 (general)  
Fax: +1.858.571.3664 (sales)  
[www.overlandstorage.com](http://www.overlandstorage.com)

# Preface

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## Audience and Purpose

This guide provides information and assistance to system or network administrators preparing for the installation of a SnapServer storage system on their network.

## Product Documentation

Overland Storage product documentation and additional literature are available online at:

<http://support.overlandstorage.com/support/snapsan.htm>

## Overland Technical Support

For help configuring and using your product, search for help at:

<http://support.overlandstorage.com/kb>

You can email our technical support staff at [techsupport@overlandstorage.com](mailto:techsupport@overlandstorage.com) or get additional technical support information on the [Contact Us](#) web page.

Our Overland Storage Technical Support staff is also available to assist you by phone at:

1.877.654.3429 (Toll-free and active only in the U.S. and Canada)

1.858.571.5555 x5 (Worldwide access)

For a complete list of support times depending on the type of coverage, visit our website at:

[http://support.overlandstorage.com/support/overland\\_care.html](http://support.overlandstorage.com/support/overland_care.html)

In addition, European customers can contact our United Kingdom office at:

+44 (0) 118-9898050

9:00 A.M. to 5:00 P.M. (GMT) Monday through Friday

## Conventions

This document exercises several typographical conventions and alerts.

## Alerts

Convention	Description & Usage
 <b>IMPORTANT</b>	An <i>Important</i> note is a type of note that provides information essential to the completion of a task or that can impact the product and its function.
 <b>CAUTION</b>	A <i>Caution</i> contains information that the user needs to know to avoid damaging or permanently deleting data or causing physical damage to the hardware or system.
 <b>WARNING</b> <b>AVERTISSEMENT</b>	A <i>Warning</i> contains information concerning personal safety. Failure to follow directions in the warning could result in bodily harm or death. Un Canadien avertissement comme celui-ci contient des informations relatives à la sécurité personnelle. Ignorer les instructions dans l'avertissement peut entraîner des lésions corporelles ou la mort.

## Typographical Conventions

Convention	Description & Usage
<b>Boldface</b>	Words in boldface indicate items to select such as menu items or command buttons.
Ctrl-Alt-r	This type of format details the keys you press simultaneously. In this example, hold down the <b>Ctrl</b> and <b>Alt</b> keys and press the <b>r</b> key.
NOTE	A Note indicates neutral or positive information that emphasizes or supplements important points of the main text. A note supplies information that may apply only in special cases, for example, memory limitations or details that apply to specific program versions.
Menu Flow Indicator (>)	Words with a greater than sign between them indicate the flow of actions to accomplish a task. For example, <b>Setup &gt; Passwords &gt; User</b> indicates that you should press the Setup button, then the Passwords button, and finally the User button to accomplish a task.

Information contained in this guide has been reviewed for accuracy, but not for product warranty because of the various environments, operating systems, or settings involved. Information and specifications may change without notice.

## Software Updates

The latest release of the GuardianOS software can be obtained from the Downloads and Resources (NAS Solutions) page at the Overland Storage website:

<http://support.overlandstorage.com/support/snapserver-nas.htm>

Follow the appropriate instructions to download the **latest** software file.

For additional assistance, search at <http://support.overlandstorage.com/>.

## Electrostatic Discharge Information

A discharge of static electricity can damage static-sensitive devices. Proper packaging and grounding techniques are necessary precautions to prevent damage. To prevent electrostatic damage, observe the following precautions:

- Transport products in static-safe containers such as conductive tubes, bags, or boxes.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
- Use a wrist strap connected to the work surface and properly-grounded tools and equipment.
- Keep the work area free of non-conductive materials such as foam packing materials.
- Make sure you are always properly grounded when touching a static-sensitive component or assembly.
- Avoid touching pins, leads, or circuitry.

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## How to Use This Guide

This guide provides information and assistance to system or network administrators preparing for the installation of a SnapServer storage system on their network. Every network topology is different, and every administrator works with different goals and resources. Using this guide, administrators can determine what additional hardware components or software packages to acquire before the server arrives.

### Hardware Components

SnapServers come with the hardware required to install the server into an EIA-compliant rack (if applicable), as well as the cables required to connect the server to a power source and to an Ethernet network. Other hardware required for a basic installation, such as Ethernet switches, racks, and UPS devices, must be supplied by the administrator from third-party vendors.

Some advanced configurations involving expansion arrays or direct-attached tape backup may require the separate purchase of SAS, SCSI, or FC-HBA cards from an authorized Overland Storage reseller. The hardware checklists in this guide show the required and optional hardware components available for each SnapServer model.

### Software Components

SnapServers also come with native support for partner-vendor software packages that enhance or extend the functionality and security of SnapServers. These packages include antivirus, backup, and administrative software. SnapServers are also compatible with a number of widely-used third-party backup solutions.

This guide briefly describes these software packages and provides information on upgrade procedures. For full descriptions and specifications, see the SnapServer, partner-vendor, or third-party vendor Web sites as appropriate.

## Product Descriptions

SnapServers provide a cost-effective, low-maintenance network block and file sharing solution that supports simultaneous access by Windows, UNIX/Linux, Macintosh, HTTP/HTTPS, and FTP clients. All GuardianOS SnapServers come with one or two Gigabit Ethernet (GbE) ports, CA eTrust Antivirus, and BakBone NetVault backup software preinstalled (subject to licensing on some platforms), and support for third party backup agents.

Model	Description
<b>SnapServer 110</b> 	SnapServer 110 is a desktop file server, with one disk drive and four USB ports.
<b>SnapServer 210</b> 	SnapServer 210 is a desktop file server, with two disk drives and four USB ports.
<b>SnapServer 410</b> 	SnapServer 410 is a 1U departmental file server, with four redundant, hot-swappable ATA disk drives, and four USB ports
<b>SnapServer 500/600 Series</b> 	SnapServer 520, 620, and 650 are 1U departmental file servers with: <ul style="list-style-type: none"> <li>• 4 redundant, hot-swappable SATA disk drives (520 and 620 models) or SAS disk drives (650 model).</li> <li>• Dual power supplies (650 model)</li> <li>• Dual core (620 and 650 models)</li> <li>• Dual processor (650 model)</li> <li>• Expandable by attaching multiple Snap Expansion S50 expansion arrays (520, 620, and 650 models).</li> </ul>
<b>SnapServer N2000</b> 	The SnapServer N2000 is a 2U departmental file server with: <ul style="list-style-type: none"> <li>• 4 to 12 redundant hot-swappable SATA II or SAS disk drives</li> <li>• Dual power supplies</li> <li>• Quad core processor</li> <li>• Expandable by attaching multiple SnapDisk E2000 expansion arrays</li> </ul>

Model	Description
<b>SnapDisk E2000 Expansion Array</b> 	<p>The SnapDisk E2000 is a 2U expansion array with 4 to 12 hot-swappable SATA II or SAS disk drives that adds capacity to the SnapServer N2000. Up to five E2000s can be added to a single N2000.</p>
<b>Snap Expansion S50</b> 	<p>The Snap Expansion S50 is a 2U expansion array with 12 hot-swappable SAS or SATA disk drives that adds capacity to the SnapServer 520, 550, 620, or 650.</p> <p><b>Note:</b> Up to seven S50s can be added to the SnapServer 520, 550, 620, and 650.</p>

## GuardianOS Software Specifications

These specifications apply to all SnapServers and expansion arrays running the most recent version of GuardianOS.

Feature	Specification
<b>Network Transport Protocols</b>	TCP/IP UDP/IP
<b>Network Block Protocols</b>	iSCSI
<b>Network File Protocols</b>	Microsoft Networking (CIFS/SMB) UNIX Network File System (NFS) 2.0/3.0/4.0 Apple Filing Protocol (AFP) v2.0/v3.1 Hypertext Transfer Protocol (HTTP/HTTPS) File Transport Protocol (FTP/FTPS)
<b>Network Client Types</b>	Microsoft Windows 2000/XP/2003 R2/2008 R2/Vista/7 Mac OS X 10.x Sun Solaris 10 HP-UX 11 AIX 5.3/6 Red Hat Linux 9.0 Red Hat Enterprise Linux (RHEL) 4.x/5.x Red Hat Fedora Core SuSE Linux Enterprise Server (SLES) 10.x/11.x
<b>Server Emulation</b>	Windows 2000/2003/2008 AppleShare 6.0 Network File System (NFS) 2/3/4 Windows Print Server IPP Print Server

Feature	Specification
<b>Network Security</b>	CA Antivirus software Microsoft Active Directory Service (ADS) (member server) UNIX Network Information Service (NIS) File and Folder Access Control List (ACL) Security for Users and Groups Secure Sockets Layer (SSL v2/3) 128-bit Encryption Target Challenge Handshake Authentication Protocol (CHAP) for iSCSI SMTP Authentication and support for email encryption (STARTTLS and TLS/SSL encryption protocols)
<b>Data Protection</b>	Snapshots for immediate or scheduled point-in-time images of the file system Local Backup with BakBone NetVault Workgroup Edition and Symantec Backup Exec Remote Media Server for Linux Support for Network Backup with VERITAS NetBackup/Backup Exec, CA ARCserve, EMC NetWorker, or BakBone NetVault APC-brand Uninterruptible Power Supply (UPS) with Network Management Cards, a USB interface, or a serial interface (with USB to serial adapter) are supported for graceful system shutdown
<b>System Management</b>	Browser-based remote administration tool called the Web Management Interface SnapCLI for volume system deployment SnapServer Manager utility (platform independent) SNMP (MIB II and Host Resource MIB) User disk quotas for Windows, UNIX/Linux, Mac, FTP/FTPS Group disk quotas for UNIX/Linux Environmental monitoring Email event notification and SNMP trap notification Data migration

Feature	Specification
RAID Options	<ul style="list-style-type: none"><li>• <b>RAID 0 (drive striping):</b> Large virtual drive with data striped across all drives of the array to provide maximum performance with no loss in usable capacity. Does not provide data protection.</li><li>• <b>RAID 1 (drive mirroring):</b> One or more drives duplicate one drive for maximum data protection. Available only on systems with two (2) or more drives.</li><li>• <b>RAID 5 (drive striping with parity):</b> For each array, the size of one drive is reserved for parity. Provides good performance and space utilization with one-drive fault tolerance. Available only on systems with four (4) or more drives.</li><li>• <b>RAID 6 (drive striping with two parity drives):</b> Like a RAID 5 except that two drives are used for parity rather than one. Provides moderate performance and reasonable space utilization with two-drive fault tolerance. Available only on systems with four (4) or more drives.</li><li>• <b>RAID 10 (striped mirroring):</b> A combination of RAID 0 and RAID 1. Provides high performance and fault tolerance. Available only on systems with four (4) or more drives.</li><li>• <b>Global or local hot spare support</b></li><li>• <b>Instant Capacity Expansion (ICE):</b> Logically groups RAIDs for dynamic online scalability.</li></ul>
DHCP Support	Supports Dynamic Host Configuration Protocol (DHCP) for automatic assignment of IP addresses

All rack-mountable SnapServers and expansion arrays come with the cables and hardware required to install them into a rack and connect them to the network or other SnapServer storage products. Customers supply the rack, Ethernet switches, UPS devices, and any backup devices such as a tape library.

The performance and functionality of the SnapServer can be enhanced through the installation of additional hardware components. A SCSI card can be installed in the SnapServer 410, 510, 620, and N2000 for attaching tape backup devices. Additional RAM can also be installed to the SnapServer 510, 520, 550, 620, 650, and N2000. Your SnapServer 520, 550, 620, 650, and N2000 capacities can be increased through the attachment of one or more expansion arrays (SAS cards need to be installed in the 520 and 620 to allow for expansion). If your SnapServer N2000, SnapDisk E2000, or Snap Expansion S50 came with less than the maximum number of drives, it can be upgraded to increase available capacity. The number of Ethernet ports on the SnapServer 520, 550, 620, and 650 can be increased to four with the installation of the Ethernet PCI adapter. The SnapServer N2000 can increase the number of Ethernet ports to six.

- **Use only internal hardware components qualified by Overland Storage** – Overland Storage strongly recommends that you use only qualified components from authorized Overland Storage resellers. *Qualified* means that Overland Storage technicians have tested and verified that the component operates properly with the SnapServer and other network components. Failure to use qualified components may seriously impact data availability, could potentially lead to data loss and corruption, and will void your warranty.
- **Standardize on a single vendor for external hardware components** – Not only will standardization on a single vendor minimize the chance of unforeseen interoperability failures, it will also simplify troubleshooting procedures.

#### Notes:

- For a complete list of qualified components, including replacement parts and installation instructions, go to <http://www.snapserver.com> and navigate to your server model
- To find an authorized reseller in your area, go to <http://www.snapserver.com> and click the **How to Buy** tab.

## Safety Precautions

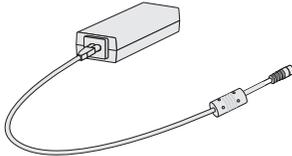
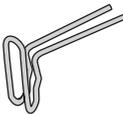
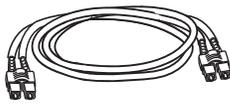
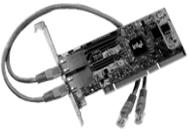
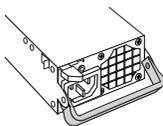
- **Environmental Conditions** – Make sure the physical environment in which the unit resides falls within the specifications for your model as described in this guide.
- **Installing the Server or Expansion Array** – During installation, make sure the unit is always placed on a secure surface capable of supporting its weight.
- **Connecting to the Main Power** – Install the unit near an easily accessible power source. Make sure the source is the proper voltage for your model. Place the power cords out of the way of traffic; do not place any object over the power cords. If the unit is taken offline for an extended period, disconnect it from the power source to avoid possible damage from a power surge.
- **Enclosure Openings** – The openings in the enclosure ensure proper airflow and prevent overheating; do not cover these openings. Never place liquids on or near the unit to avoid spillage; liquid entering an enclosure opening could cause fire or electrical shock.
- **Cleaning the Unit** – Before cleaning the unit, be sure to disconnect all cabling. Do not use any liquid or spray cleaning agents to clean the unit; use only a damp sheet or cloth.
- **Servicing the Unit** – If one of the following situations arises, do not attempt a remedy:
  - The power cord or plug is damaged.
  - Liquid has penetrated the server.
  - The unit has been exposed to moisture.
  - The unit continues to operate in an unexpected manner even after suggested solutions in the Administration Guide have been followed.
  - The unit is dropped or otherwise physically damaged.
  - The unit has obvious signs of damage.

If one or more of these situations exist, contact Overland Storage technical support.

### Basic Hardware Shipped with GuardianOS SnapServers

In addition to the enclosures and disk drives, the SnapServer comes with the following cables and components:

Component	Description
 <p><b>Power Cables</b></p>	<p>Three different power cables are provided for each power supply. These cables comply with power supply requirements of the following countries:</p> <ul style="list-style-type: none"> <li>• United States</li> <li>• United Kingdom</li> <li>• Europe</li> </ul>
 <p><b>Ethernet Cables</b></p>	<p>All SnapServers except the SnapServer 110 and 210 have dual 10/100/1000 Ethernet ports. Two Ethernet cables per SnapServer are supplied. The SnapServer 110 and 210 have a single 10/100/1000 Ethernet port, and one Ethernet cable is supplied.</p> <p><b>Note:</b> Expansion arrays connect to a host SnapServer, not directly to the network, and thus do not ship with Ethernet cables.</p>

Component	Description
<p data-bbox="418 235 651 264"><b>External Power Supply</b></p> 	<p data-bbox="750 235 1382 296">The SnapServer 110 and 210 include an external power supply and three AC power cords (1 U.S., 1 U.K., and 1 EU).</p>
<p data-bbox="418 441 688 470"><b>Power Cord Retention Clip</b></p> 	<p data-bbox="750 441 1382 527">The SnapServer 110 and 210 include a retention clip that attaches to the rear of the unit to prevent the power cord from becoming dislodged.</p>
<p data-bbox="418 604 669 634"><b>Rack Mount Assemblies</b></p> 	<p data-bbox="750 604 1382 749">Mounting brackets or slide rail assemblies for installing the server into a standard EIA rack come with every rack-mountable SnapServer. See the next section, “Basic Hardware To Be Acquired from Third-Party Vendors” for additional requirements for your SnapServer or expansion array.</p>
<p data-bbox="418 768 604 798"><b>Expansion Cables</b></p> 	<p data-bbox="750 768 1382 854">SnapDisk E2000 and Snap Expansion S50 connect to their host SnapServer via SAS cables. SnapDisk E2000s and Snap Expansion S50s each come with one SAS external cable.</p>
<p data-bbox="418 932 743 993"><b>Expansion Array Controller Card (optional)</b></p> 	<p data-bbox="750 932 1382 1131">The capacity of SnapServer 520, 550, 620, and 650 can be increased through the connection of one or more Snap Expansion S50 expansion arrays to a controller card installed in the host SnapServer. A SAS controller card is included on the SnapServer 550 and 650; a SAS card can be ordered for the 520 and 620 by going to <a href="http://www.snapserver.com">http://www.snapserver.com</a> and selecting the <b>How to Buy</b> tab.</p> <p data-bbox="750 1140 1382 1201"><b>Note:</b> The N2000 comes with a pre-installed expansion card for use with SnapDisk E2000 expansion arrays.</p>
<p data-bbox="418 1213 630 1243"><b>SCSI Card (optional)</b></p> 	<p data-bbox="750 1213 1382 1274">The SnapServer 410, 510, 620, and N2000 can be upgraded to include a SCSI card for attaching a tape backup device.</p> <p data-bbox="750 1283 1382 1365">If you require a SCSI card for your existing SnapServer, you can obtain one by going to <a href="http://www.snapserver.com">http://www.snapserver.com</a> and selecting the <b>How to Buy</b> tab.</p>
<p data-bbox="418 1377 743 1438"><b>Dual- or Quad-Gigabit Ethernet PCI Adapter (optional)</b></p> 	<p data-bbox="750 1377 1382 1610">The number of Ethernet ports on the SnapServer 510, 520, 550, 620, and 650 can be increased to four with the installation of a dual-Gigabit Ethernet PCI adapter. The SnapServer N2000 can be increased to six Ethernet ports with the installation either of one Quad-Gigabit Ethernet PCI adapter or two dual-Gigabit Ethernet PCI adapters. To order one of these adapters, go to <a href="http://www.snapserver.com">http://www.snapserver.com</a> and select the <b>How to Buy</b> tab.</p>
<p data-bbox="418 1625 716 1654"><b>Dual Power Supply (optional)</b></p> 	<p data-bbox="750 1625 1382 1799">The SnapServer 550, 650, N2000, and SnapDisk E2000 come with dual power supplies. The SnapServer 510 and 520 come with a single power supply but can be upgraded to a configuration with dual power supplies, which can be ordered separately by going to <a href="http://www.snapserver.com">http://www.snapserver.com</a> and selecting the <b>How to Buy</b> tab.</p>

## Basic Hardware To Be Acquired from Third-Party Vendors

The hardware components listed in the following table are to be supplied by the customer from third-party vendors.

Component	Description
<b>Ethernet Switches</b>	For optimal performance, use only switches that support GbE.
<b>APC-Brand UPS Devices</b>	Overland Storage recommends that you use a UPS with SnapServers. SnapServers are compatible with USB-based and network-based APC-brand uninterruptible power supplies that allow you to take advantage of the automatic shutdown capability. Visit the APC website for a listing of optimal APC models for use with your SnapServer.
<b>Rack for 1U Units</b> SnapServer 410	You can use either a two-post telco-style rack or a four-post rack to mount the SnapServer 410. Non-EIA compliant racks may not be able to support the server using only the front posts. If you are using a non-EIA rack, Overland Storage recommends that you secure the server using slide rails, available from an authorized Overland Storage reseller.  The SnapServer 410 comes with two L-shaped rack mount brackets (ears). You can attach them in one of two ways: (1) to the front of the server for mounting to the front posts of a four-post rack; or (2) to the middle or front of the server for mounting to both posts of a Telco rack.
SnapServer 510 SnapServer 520 SnapServer 550 SnapServer 620 SnapServer 650	The SnapServer 510, 520, 550, 620, and 650 come with two (left and right) slide rails and must be installed in a four-post, 32" deep (or greater) EIA-compliant rack.  <b>Note:</b> Mounting the SnapServer 510, 520, 550, 620, or 650 into a two-post rack is not supported.
<b>Rack for 2U units</b> SnapServer N2000 SnapDisk E2000 Snap Expansion S50	The SnapServer N2000, E2000, and Snap Expansion S50 come with two adjustable (left and right) slide rails for attaching the server to a 32" deep (or greater) four-post EIA-compliant rack.  <b>Note:</b> Mounting the SnapServer N2000, E2000, or S50 into a two-post rack is not supported.  The rails for the SnapServer N2000 and SnapDisk E2000 are designed for square-hole racks. To use the units with round-hole racks, attach the adapters included in the kit. The rack depth must be a minimum of 29 inches if you are using adapters. If you have adjusted your rack to under 29 inches, you will need to reset it before installing the N2000 or E2000. For threaded-hole racks, Overland Storage suggests using a shelf.
<b>Tape Backup Devices and Cables</b>	Tape backup devices can be connected locally to some SnapServers via available ports: <ul style="list-style-type: none"> <li>All SnapServers that support GuardianOS 6.5 support USB tape drives. A USB 2.0 cable is required.</li> <li>Most SnapServers that support GuardianOS 6.5 (except the 110 and 210) support SCSI tape drives. A 68-pin VHDCI cable is required.</li> <li>The N2000 additionally supports direct-connected SAS tape devices. A 4-lane SAS cable with an external Mini-SAS connector is required.</li> </ul>
<b>Kensington Lock (optional)</b>	A Kensington lock can be attached to the SnapServer 110 and SnapServer 210 to provide extra security against removal of the system.



## Optional Expansion Cards and Cables

The capacity of SnapServer 520, 550, 620, and 650 can be expanded by attaching one or more S50 expansion arrays. The SnapServer N2000 can be expanded by attaching one or more SnapDisk E2000 expansion arrays.

Component	Description
<b>SAS Cable</b> 	<p>The Snap Expansion S50 comes with one SAS cable to connect to the SnapServer 520, 550, 620, or 650.</p> <p>The SnapDisk E2000 comes with one SAS cable to connect to the SnapServer N2000.</p>

### Snap Expansion S50 Configuration Options and Requirements

#### SnapServer 520, 550, 620, and 650

Up to seven (7) S50 expansion arrays can be connected to the SnapServer 520, 550, 620, and 650, supporting a maximum of 88 disk drives.

<b>SAS Card</b>	The SnapServer 550, 620 (1.2 TB model), and 650 come with a SAS card preinstalled. The SnapServer 520 and 620 (except the 1.2 TB model) require a SAS expansion card to be added.
<b>SAS Cable</b>	The S50 comes with the required SAS cable.

### SnapDisk E2000 Configuration Options and Requirements

#### SnapServer N2000

Up to five (5) E2000 expansion arrays can be connected to the SnapServer N2000, supporting a maximum of 72 disk drives.

<b>SAS Card</b>	The SnapServer N2000 comes with a SAS card preinstalled.
<b>SAS Cable</b>	The SnapDisk E2000 comes with the required SAS cable.

## SnapServer Hardware Checklists

Hardware checklists show all hardware required for the installation of a SnapServer. Use the checklist to calculate the necessary rack allocations, switches, cables, and other materials needed for your chosen configuration prior to the arrival of the storage system.

### SnapServer Hardware Checklists

- [SnapServer 110 Hardware Checklist](#)
- [SnapServer 210 Hardware Checklist](#)
- [SnapServer 410 Hardware Checklist](#)
- [SnapServer 510 Hardware Checklist](#)
- [SnapServer 520 Hardware Checklist](#)
- [SnapServer 550 Hardware Checklist](#)
- [SnapServer 620 Hardware Checklist](#)
- [SnapServer 650 Hardware Checklist](#)
- [SnapServer N2000 Hardware Checklist](#)
- [SnapDisk E2000 Hardware Checklist](#)
- [Snap Expansion S50 Hardware Checklist](#)

### Legend for Checklists

The following symbols indicate which hardware components come with each SnapServer:

- The described item comes with the SnapServer.
- The described item must be obtained separately.
- The described item is available as an option for this SnapServer model.

## SnapServer 110 Hardware Checklist

The checklist shows the required and optional hardware to install a SnapServer 110, and indicates whether a component comes with the server or must be supplied by the customer.

Component	Description
Network and Power	<input checked="" type="checkbox"/> <b>Ethernet Cables (1 per enclosure)</b> Required to connect the Ethernet ports to the network.
	<input checked="" type="checkbox"/> <b>External Power Supply and Cable</b> to connect to server (1 per enclosure)
	<input checked="" type="checkbox"/> <b>Power Cables (3 per enclosure)</b> Required to connect between the power supply and the mains (One US, one UK, one EU.)
	<input checked="" type="checkbox"/> <b>Power Cord Retainer Clip</b> Attaches to the server to hold the power cord in place.
	<input type="checkbox"/> <b>Ethernet Switches</b> Use switches that support GbE.
	<input type="checkbox"/> <b>APC-Brand UPS Devices (optional)</b> SnapServers are designed to work with a USB-based or network-based, APC-brand UPS. Visit the <a href="#">APC Web site</a> for a listing of optimal APC models.
Backup	<input type="checkbox"/> • <b>USB 2.0 Cable</b> To attach a tape device via USB, you need a USB 2.0 cable. <b>Note:</b> For a list of compatible backup solutions, see “SnapServer Backup Solutions Feature Comparison Chart” on page 3.
	<input type="checkbox"/> <b>USB-Connected Tape Backup Devices</b> For a list of compatible tape drives/libraries, see the appropriate backup software vendor's supported tape device list.
Printer	<input type="checkbox"/> <b>USB 2.0 Cable</b> To attach a tape device via USB, you need a USB 2.0 cable.
	<input type="checkbox"/> <b>USB-Connected Printer</b>

## SnapServer 210 Hardware Checklist

The checklist shows the required and optional hardware to install a SnapServer 210, and indicates whether a component comes with the server or must be supplied by the customer.

Component	Description
Network and Power	<input checked="" type="checkbox"/> <b>Ethernet Cables (1 per enclosure)</b> Required to connect the Ethernet ports to the network.
	<input checked="" type="checkbox"/> <b>External Power Supply and Cable</b> to connect to server (1 per enclosure)
	<input checked="" type="checkbox"/> <b>Power Cables (3 per enclosure)</b> Required to connect between the power supply and the mains (One US, one UK, one EU.)
	<input checked="" type="checkbox"/> <b>Power Cord Retainer Clip</b> Attaches to the server to hold the power cord in place.
	<input type="checkbox"/> <b>Ethernet Switches</b> Use switches that support GbE.
	<input type="checkbox"/> <b>APC-Brand UPS Devices (optional)</b> SnapServers are designed to work with a USB-based or network-based, APC-brand UPS. Visit the <a href="#">APC Web site</a> for a listing of optimal APC models.
Backup	<input type="checkbox"/> • <b>USB 2.0 Cable</b> To attach a tape device via USB, you need a USB 2.0 cable. <b>Note:</b> For a list of compatible backup solutions, see “SnapServer Backup Solutions Feature Comparison Chart” on page 3.
	<input type="checkbox"/> <b>USB-Connected Tape Backup Devices</b> For a list of compatible tape drives/libraries, see the appropriate backup software vendor's supported tape device list on their website.
Printer	<input type="checkbox"/> <b>USB 2.0 Cable</b> To attach a tape device via USB, you need a USB 2.0 cable.
	<input type="checkbox"/> <b>USB-Connected Printer</b>

## SnapServer 410 Hardware Checklist

The checklist shows the required and optional hardware to install a SnapServer 410, and indicates whether a component comes with the server or must be supplied by the customer.

Component	Description
Network and Power	<input checked="" type="checkbox"/> <b>Ethernet Cables (2 per enclosure)</b> Required to connect the Ethernet ports to the network.
	<input checked="" type="checkbox"/> <b>Power Cables (3 per enclosure)</b> Required to plug into the mains (1US, 1UK, 1EU).
	<input type="checkbox"/> <b>Ethernet Switches</b> Use switches that support GbE.
	<input type="checkbox"/> <b>APC-Brand UPS Devices (optional)</b> SnapServers are designed to work with a USB-based or network-based APC-brand UPS. Visit the <a href="#">APC Web site</a> for a listing of optimal APC models.
Memory	<input checked="" type="checkbox"/> <b>Memory Upgrade (optional)</b> Memory can be upgraded to a maximum of 2 GB.
Rack	<input checked="" type="checkbox"/> <b>Rack Mount Brackets</b> Two (2) rack mount brackets and screws for attaching the server to a rack.
	<input type="checkbox"/> <b>EIA-Compliant Rack</b> SnapServers are designed for use with EIA-compliant racks. You can use either a two-post telco-style rack or a four-post rack.  <b>Note:</b> Noncompliant racks may not be able to support the server using only the front posts. If you are using a non-EIA rack, we recommend that you secure the server using slide rails, available from an <a href="#">authorized SnapServer reseller</a> .
Backup	<input checked="" type="checkbox"/> <b>SCSI Card (optional)</b> Required to connect a SCSI tape device locally to the SnapServer.
	<input type="checkbox"/> <b>SCSI Cable or USB 2.0 cable</b> <ul style="list-style-type: none"> <li>To attach a tape device via a SCSI connection to the SnapServer, you need a 68-pin Ultra160-LVD cable.</li> <li>To attach a tape device via a USB connection, you need a USB 2.0 cable.</li> </ul> <b>Note:</b> For a list of compatible backup solutions, see “SnapServer Backup Solutions Feature Comparison Chart” on page 3.
	<input type="checkbox"/> <b>Tape Backup Devices</b> For a list of compatible tape drives/libraries, see the appropriate backup software vendor's supported tape device list on their website.
Printer	<input type="checkbox"/> <b>USB 2.0 Cable</b> To attach a printer via USB, you need a USB 2.0 cable.
	<input type="checkbox"/> <b>USB-Connected Printer</b>

## SnapServer 510 Hardware Checklist

The following checklist shows the required and optional hardware to install a SnapServer 510, and indicates whether a component comes with the server or must be supplied by the customer.

Component	Description
Network and Power	<input checked="" type="checkbox"/> <b>Ethernet Cables (2 per enclosure)</b> Required to connect the Ethernet ports to the network.
	<input checked="" type="checkbox"/> <b>Power Cables (3 per enclosure)</b> Required to plug into the mains (1US, 1UK, 1 EU).
	<input type="checkbox"/> <b>Ethernet Switches</b> Use switches that support GbE.
	<input type="checkbox"/> <b>Ethernet PCI Adapter (optional)</b> Expand the number of Ethernet ports to four by installing a dual-Gigabit Ethernet PCI Adapter.
	<input type="checkbox"/> <b>APC-Brand UPS Devices (optional)</b> SnapServers are designed to work with a USB-based or network-based APC-brand UPS. Visit the <a href="#">APC Web site</a> for a listing of optimal APC models.
Memory	<input checked="" type="checkbox"/> <b>Memory Upgrade (optional)</b> Memory can be upgraded to a maximum of 4 GB.
Rack	<input checked="" type="checkbox"/> <b>Slide Rail Assemblies (2 per enclosure)</b> Two (2) slide rails and screws for attaching the server to a rack.
	<input type="checkbox"/> <b>32 inch/36 inch, Four-post Rack</b> You must use a 32-inch (or greater) four-post rack to mount this server.
Backup	<input checked="" type="checkbox"/> <b>SCSI Card (optional)</b> Required to connect a tape device locally to the SnapServer.
	<input type="checkbox"/> <b>SCSI Cable or USB 2.0 cable</b> <ul style="list-style-type: none"> <li>To attach a tape device via a SCSI connection to the SnapServer, you need a 68-pin Ultra160-LVD cable.</li> <li>To attach a tape device via a USB connection, you need a USB 2.0 cable.</li> </ul> <p><b>Note:</b> For a list of compatible backup solutions, see “SnapServer Backup Solutions Feature Comparison Chart” on page 3.</p>
	<input type="checkbox"/> <b>Tape Backup Devices</b> For a list of compatible tape drives/libraries, see the appropriate backup software vendor's supported tape device list on their website.

## SnapServer 520 Hardware Checklist

The following checklist shows the required and optional hardware to install a SnapServer 520, and indicates whether a component comes with the server or must be supplied by the customer.

Component	Description
Network and Power	<input checked="" type="checkbox"/> <b>Ethernet Cables (2 per enclosure)</b> Required to connect the Ethernet ports to the network.
	<input checked="" type="checkbox"/> <b>Power Cables (3 per enclosure)</b> Required to plug into the mains (1 US, 1 UK, 1 EU).
	<input type="checkbox"/> <b>Ethernet Switches</b> Use switches that support GbE.
	<input type="checkbox"/> <b>Ethernet PCI Adapter (optional)</b> Expand the number of Ethernet ports to four by installing a dual-Gigabit Ethernet PCI Adapter.
	<input type="checkbox"/> <b>APC-Brand UPS Devices (optional)</b> SnapServers are designed to work with a USB-based or network-based APC-brand UPS. Visit the <a href="#">APC Web site</a> for a listing of optimal APC models.
Memory	<input checked="" type="checkbox"/> <b>Memory Upgrade (optional)</b> Memory can be upgraded to a maximum of 4 GB.
Rack	<input checked="" type="checkbox"/> <b>Slide Rail Assemblies (2 per enclosure)</b> Two (2) slide rails and screws for attaching the server to a rack.
	<input type="checkbox"/> <b>32 inch/36 inch, Four-post Rack</b> You must use a 32-inch (or greater) four-post rack to mount this server.
Backup	<input checked="" type="checkbox"/> <b>SCSI Card (integrated SCSI connector on motherboard)</b> Required to connect a tape device locally to the SnapServer.
	<input type="checkbox"/> <b>SCSI Cable or USB 2.0 cable</b> <ul style="list-style-type: none"> <li>• To attach a tape device via a SCSI connection to the SnapServer, you need a 68-pin Ultra160-LVD cable.</li> <li>• To attach a tape device via a USB connection, you need a USB 2.0 cable.</li> </ul> <p><b>Note:</b> For a list of compatible backup solutions, see “SnapServer Backup Solutions Feature Comparison Chart” on page 3.</p>
	<input type="checkbox"/> <b>Tape Backup Devices</b> For a list of compatible tape drives/libraries, see the appropriate backup software vendor's supported tape device list on their website.
Expansion	<input checked="" type="checkbox"/> <b>SAS Card (optional)</b> Required to connect to an S50 expansion array.

## SnapServer 550 Hardware Checklist

The following checklist shows the required and optional hardware to install a SnapServer 550, and indicates whether a component comes with the server or must be supplied by the customer.

Component	Description
Network and Power	<input checked="" type="checkbox"/> <b>Ethernet Cables (2 per enclosure)</b> Required to connect the Ethernet ports to the network.
	<input checked="" type="checkbox"/> <b>Power Cables (6 per enclosure)</b> Required to plug into the mains (2 US, 2 UK, 2 EU).
	<input type="checkbox"/> <b>Ethernet Switches</b> Use switches that support GbE.
	<input type="checkbox"/> <b>Ethernet PCI Adapter (optional)</b> Expand the number of Ethernet ports to four by installing a dual-Gigabit Ethernet PCI Adapter.
	<input type="checkbox"/> <b>APC-Brand UPS Devices (optional)</b> SnapServers are designed to work with a USB-based or network-based APC-brand UPS. Visit the <a href="#">APC Web site</a> for a listing of optimal APC models.
Memory	<input checked="" type="checkbox"/> <b>Memory Upgrade (optional)</b> Memory can be upgraded to a maximum of 4 GB total.
Rack	<input checked="" type="checkbox"/> <b>Slide Rail Assemblies (2 per enclosure)</b> Two (2) slide rails and screws for attaching the server to a rack.
	<input type="checkbox"/> <b>32 inch/36 inch, Four-post Rack</b> You must use a 32-inch (or greater) four-post rack to mount this server.
Backup	<input checked="" type="checkbox"/> <b>SCSI Card (integrated SCSI connector on motherboard)</b> Required to connect a tape device locally to the SnapServer.
	<input type="checkbox"/> <b>SCSI Cable or USB 2.0 cable</b> <ul style="list-style-type: none"> <li>• To attach a tape device via a SCSI connection to the SnapServer, you need a 68-pin Ultra160-LVD cable.</li> <li>• To attach a tape device via a USB connection, you need a USB 2.0 cable.</li> </ul> <p><b>Note:</b> For a list of compatible backup solutions, see “SnapServer Backup Solutions Feature Comparison Chart” on page 3.</p>
	<input type="checkbox"/> <b>Tape Backup Devices</b> For a list of compatible tape drives/libraries, see the appropriate backup software vendor's supported tape device list on their website.
Expansion	<input checked="" type="checkbox"/> <b>SAS Card</b> Required to connect to an S50 expansion array.

## SnapServer 620 Hardware Checklist

The following checklist shows the required and optional hardware to install a SnapServer 620, and indicates whether a component comes with the server or must be supplied by the customer.

Component	Description
Network and Power	<input checked="" type="checkbox"/> <b>Ethernet Cables (2 per enclosure)</b> Required to connect the Ethernet ports to the network.
	<input checked="" type="checkbox"/> <b>Power Cables (3 per enclosure)</b> Required to plug into the mains (1 US, 1 UK, 1 EU).
	<input type="checkbox"/> <b>Ethernet Switches</b> Use switches that support GbE.
	<input type="checkbox"/> <b>Ethernet PCI Adapter (optional)</b> Expand the number of Ethernet ports to four by installing a dual-Gigabit Ethernet PCI Adapter.
	<input type="checkbox"/> <b>APC-Brand UPS Devices (optional)</b> SnapServers are designed to work with a USB-based or network-based APC-brand UPS. Visit the <a href="#">APC Web site</a> for a listing of optimal APC models.
Memory	<input checked="" type="checkbox"/> <b>Memory Upgrade (optional)</b> Memory can be upgraded to a maximum of 4 GB.
Rack	<input checked="" type="checkbox"/> <b>Slide Rail Assemblies (2 per enclosure)</b> Two (2) slide rails and screws for attaching the server to a rack.
	<input type="checkbox"/> <b>32 inch/36 inch, Four-post Rack</b> You must use a 32-inch (or greater) four-post rack to mount this server.
Backup	<input checked="" type="checkbox"/> <b>SCSI Card (integrated SCSI connector on motherboard)</b> Required to connect a tape device locally to the SnapServer.
	<input type="checkbox"/> <b>SCSI Cable or USB 2.0 cable</b> <ul style="list-style-type: none"> <li>• To attach a tape device via a SCSI connection to the SnapServer, you need a 68-pin Ultra160-LVD cable.</li> <li>• To attach a tape device via a USB connection, you need a USB 2.0 cable.</li> </ul> <p><b>Note:</b> For a list of compatible backup solutions, see “SnapServer Backup Solutions Feature Comparison Chart” on page 3.</p>
	<input type="checkbox"/> <b>Tape Backup Devices</b> For a list of compatible tape drives/libraries, see the appropriate backup software vendor's supported tape device list on their website.
Expansion	<input checked="" type="checkbox"/> <b>SAS Card</b> Required to connect to an S50 expansion array.

## SnapServer 650 Hardware Checklist

The following checklist shows the required and optional hardware to install a SnapServer 650, and indicates whether a component comes with the server or must be supplied by the customer.

Component	Description
Network and Power	<input checked="" type="checkbox"/> <b>Ethernet Cables (2 per enclosure)</b> Required to connect the Ethernet ports to the network.
	<input checked="" type="checkbox"/> <b>Power Cables (6 per enclosure)</b> Required to plug into the mains (2 US, 2 UK, 2 EU).
	<input type="checkbox"/> <b>Ethernet Switches</b> Use switches that support GbE.
	<input type="checkbox"/> <b>Ethernet PCI Adapter (optional)</b> Expand the number of Ethernet ports to four by installing a dual-Gigabit Ethernet PCI Adapter.
	<input type="checkbox"/> <b>APC-Brand UPS Devices (optional)</b> SnapServers are designed to work with a USB-based or network-based APC-brand UPS. Visit the <a href="#">APC Web site</a> for a listing of optimal APC models.
Memory	<input checked="" type="checkbox"/> <b>Memory Upgrade (optional)</b> Memory can be upgraded to a maximum of 4 GB total.
Rack	<input checked="" type="checkbox"/> <b>Slide Rail Assemblies (2 per enclosure)</b> Two (2) slide rails and screws for attaching the server to a rack.
	<input type="checkbox"/> <b>32 inch/36 inch, Four-post Rack</b> You must use a 32-inch (or greater) four-post rack to mount this server.
Backup	<input checked="" type="checkbox"/> <b>SCSI Card (integrated SCSI connector on motherboard)</b> Required to connect a tape device locally to the SnapServer.
	<input type="checkbox"/> <b>SCSI Cable or USB 2.0 cable</b> <ul style="list-style-type: none"> <li>• To attach a tape device via a SCSI connection to the SnapServer, you need a 68-pin Ultra160-LVD cable.</li> <li>• To attach a tape device via a USB connection, you need a USB 2.0 cable.</li> </ul> <p><b>Note:</b> For a list of compatible backup solutions, see “SnapServer Backup Solutions Feature Comparison Chart” on page 3.</p>
	<input type="checkbox"/> <b>Tape Backup Devices</b> For a list of compatible tape drives/libraries, see the appropriate backup software vendor's supported tape device list on their website.
Expansion	<input checked="" type="checkbox"/> <b>SAS Card</b> Required to connect to an S50 expansion array.

## SnapServer N2000 Hardware Checklist

The following checklist shows the required and optional hardware to install a SnapServer N2000, and indicates whether a component comes with the server or must be supplied by the customer.

Component	Description
Network and Power	<input checked="" type="checkbox"/> <b>Ethernet Cables (2 per enclosure)</b> Required to connect the Ethernet ports to the network.
	<input checked="" type="checkbox"/> <b>Power Cables (6 per enclosure)</b> Required to plug into the mains (2 US, 2 UK, 2 EU).
	<input type="checkbox"/> <b>Ethernet Switches</b> Use switches that support GbE.
	<input type="checkbox"/> <b>Ethernet PCI Adapter (optional)</b> Expand the number of Ethernet ports up to six by installing a quad-Gigabit Ethernet PCI adapter or one or two dual-Gigabit Ethernet PCI Adapters.
	<input type="checkbox"/> <b>APC-Brand UPS Devices (optional)</b> SnapServers are designed to work with a USB-based or network-based APC-brand UPS. Visit the <a href="#">APC Web site</a> for a listing of optimal APC models.
Rack	<input checked="" type="checkbox"/> <b>Slide Rail Assemblies (2 per enclosure)</b> Two (2) slide rails and screws for attaching the server to a rack.
	<input type="checkbox"/> <b>32 inch/36 inch, Four-post Rack</b> You must use a 32-inch (or greater) four-post rack to mount this server.
Backup	<input checked="" type="checkbox"/> <input type="checkbox"/> <b>Parallel SCSI Card</b> Required to connect a SCSI tape device locally to the N2000.
	<input checked="" type="checkbox"/> <input type="checkbox"/> <b>Additional SAS Controller</b> Required to connect a SAS tape device locally to the N2000 if the existing SAS controller is in use by E2000 expansion units.
	<input type="checkbox"/> <b>SCSI, SAS, or USB 2.0 Cable</b> <ul style="list-style-type: none"> <li>• To attach a tape device via a SCSI connection to the SnapServer, you need a 68-pin Ultra160-LVD cable.</li> <li>• To attach a tape device via a SAS, you need a 4-lane SAS cable with an external Mini-SAS connector to connect to the N2000 SAS controller.</li> <li>• To attach a tape device via a USB connection, you need a USB 2.0 cable.</li> </ul> <p><b>Note:</b> For a list of compatible backup solutions, see “SnapServer Backup Solutions Feature Comparison Chart” on page 3.</p>
	<input type="checkbox"/> <b>Tape Backup Devices</b> For a list of compatible tape drives/libraries, see the appropriate backup software vendor's supported tape device list on their website.
Expansion	<input checked="" type="checkbox"/> <b>SAS Card</b> Required to connect to a SnapServer EXP E2000 expansion array.

## SnapDisk E2000 Hardware Checklist

The following checklist shows the required and optional hardware to install SnapDisk E2000, and indicates whether a component comes with the server or must be supplied by the customer.

Component	Description
Connection and Power	<input checked="" type="checkbox"/> <b>SAS Cable (1 per enclosure)</b> Required to connect the expansion array to the host SnapServer.
	<input checked="" type="checkbox"/> <b>Power Cables (6 per enclosure)</b> Required to plug into the mains.
	<input type="checkbox"/> <b>APC-Brand UPS Devices (optional)</b> The E2000 should be connected to the same UPS as the SnapServer to which it is attached.
Rack	<input checked="" type="checkbox"/> <b>Slide Rail Assemblies (2 per enclosure)</b> Two (2) slide rails and screws for attaching the server to a rack.
	<input type="checkbox"/> <b>32 inch/36 inch, Four-post Rack</b> You must use a 32-inch (or greater) four-post rack to mount this server.

## Snap Expansion S50 Hardware Checklist

The following checklist shows the required and optional hardware to install an S50, and indicates whether a component comes with the server or must be supplied by the customer.

Component	Description
Connection and Power	<input checked="" type="checkbox"/> <b>SAS Cable (1 per enclosure)</b> Required to connect the expansion array to the host SnapServer.
	<input checked="" type="checkbox"/> <b>Power Cables (2 per enclosure)</b> Required to plug into the mains.
	<input type="checkbox"/> <b>APC-Brand UPS Devices (optional)</b> The S50 should be connected to the same UPS as the SnapServer to which it is attached.
Rack	<input checked="" type="checkbox"/> <b>Rack Mount Brackets</b> Two (2) rack mount shelves and screws for attaching the server to a rack.
	<input type="checkbox"/> <b>EIA-Compliant Rack</b> S50 expansion arrays are designed for use with EIA-compliant 4-post racks.

**Note:** The SnapServer 110 is a single disk server that does not support RAID configurations other than the default RAID 0. The SnapServer 210 is a two-disk server that supports RAID 0 and RAID 1. Discussions in this chapter of RAID 5, RAID 6, and RAID 10 configurations and global hot spares only apply to SnapServers with four (4) or more drives. For more information about RAID configurations for SnapServer 110 and 210, see the *User's Guide for SnapServers 110 and 210* on the User CD.

This section describes the default configurations of SnapServers with four (4) or more drives and expansion arrays, how to change this configuration, how to add capacity to the SnapServer by attaching one or more expansion arrays, and how to prepare the server to store data.

After deploying your SnapServer storage system, you should provision and configure the servers for optimal use in your network environment. The four sections in this chapter provide guidelines and procedures for administrators who are implementing a SnapServer on their network:

- Determining capacity
- Changing the default storage configuration
- Configuring email notification, task scheduling, and security
- Migrating data from a legacy server or workstation to a SnapServer

## Determining Capacity

The factory default configuration reduces potential capacity in order to provide a high degree of data protection and backup capability. By default, SnapServers with four (4) to eight (8) disk drives are configured into a RAID 5 created during the manufacturing process (SnapServer 110 and SnapServer 210 are configured as a 1- and 2-drive RAID 0, respectively). SnapServers with twelve (12) drives are configured into a RAID 6. In a RAID 5 configuration, the capacity of one drive is used for data protection, reducing the available capacity of the server by one drive. In a RAID 6 configuration, two drives are used for data protection, so the capacity is reduced by two drives.

Approximately 20% of the default RAID is available for snapshot space and 80% of the default RAID is assigned to the primary data volume.

For example, to calculate the capacity of a SnapServer 520 with 1 TB total capacity in its default state, consider both the hardware and software configuration:

- The four 250 GB disk drives each provide 240 GB of formatted capacity.
- The four disks in a RAID 5 configuration net 720 GB of capacity for the RAID.
- The snapshot space is 20% of the space available on the RAID, reducing the space on the RAID for the data volume by 144 GB.

This results in a data volume capacity of 576 GB for this SnapServer 520/1 TB.

## Changing the Default Storage Configuration

The SnapServer's flexible storage architecture allows for a wide variety of implementations to suit many different storage needs. In some cases, administrators may change the default configuration to increase capacity by modifying the configuration of the SnapServer, or attaching one or more expansion arrays.

When a backup scheme does not require backing up from a snapshot, or when a backup window can be used while files are not active, the snapshot space can be reclaimed for storage on the data volume. In cases when backup is ongoing or very frequent, a RAID 0 configuration may be more appropriate than a RAID 5. In cases where multiple expansion arrays are being attached to the SnapServer, a combination of a RAID 1 and hot spares may be the optimal configuration for the SnapServer.

### Storage Configuration Examples

The following examples and procedures detail three common alternative storage configurations.

#### Removing the Snapshot Space

A common change to the default storage configuration is to remove the snapshot space and add the capacity to the primary data volume. Perform the following steps to remove the snapshot space and add its capacity to the data volume. This procedure will preserve any data that is already present on the server.

1. Open a web browser, enter the name or IP address of the server in the address bar, and log into the browser-based Web Management Interface as an administrator.
2. Navigate to the **Storage > Snapshots** page, and click **Snapshot Space**.
3. Click the RAID set you want to change, and change the Snapshot Space field, then click **OK**.
4. Navigate to the **Storage > Volumes** page and click the data volume (by default, VOL0).
5. Click the **Grow to Max. Size** button to consume the remaining capacity on the RAID or change the volume Size field to the desired size).
6. Click **OK**.

#### Changing the RAID Configuration

The default RAID configuration can be easily changed by removing the existing RAID and building one or more new RAID sets. A disk drive must be a part of a RAID in order to create a volume and share. You can create single-drive RAID 0's to replicate a JBOD configuration.

In the following procedure, we will create two 2-drive mirrors on a SnapServer 520. Capacity is reduced in the head to provide redundancy and high data availability. Capacity is regained by adding expansion arrays in the following procedure. This configuration can sustain up to two drive failures, making it more fault tolerant than a RAID 5. This procedure will not retain any data that is already present on the server.

1. Navigate to **Storage > RAID Sets** and click the RAID to be deleted.

2. Click **Delete RAID**, and click **Yes** on the confirmation page. You will be returned to the main RAID page.
3. Click **Create RAID** on the **Storage > RAID Sets** page to create a new RAID.
4. Create a two-disk RAID 1 with Drives 1 and 2 for the antivirus and backup software to reside on.
5. Create a volume and share for the RAID 1. Optionally create user shares within the primary, administrative share for user data. If user data will be stored on this volume, configuring snapshots, antivirus, and a Disaster Recovery Image is strongly recommended.
6. Create a second RAID 1 with Drives 3 and 4. Configure the volume without snapshots for use as an iSCSI target, or to store data, optionally configuring snapshots and a Disaster Recovery Image.

### Adding Capacity to a SnapServer with Expansion Arrays

When adding an expansion array, a RAID must be created on the expansion array and a volume created before utilizing the storage space. The existing volume on the host SnapServer can be extended to provide more capacity for network users in a seamless fashion, or a new volume can be created to host data. In the following procedure, an unconfigured SnapDisk E2000 will be used to increase the capacity of a SnapServer N2000 with a 4-drive RAID 5. This procedure will retain any data that is already present on the server.

1. Shut down the SnapServer N2000 and attach a SnapDisk E2000 as described in the *SnapDisk E2000 Quick Install Guide*.
2. Power on the E2000 expansion and, when it is running, restart the SnapServer N2000.
3. When the server has completed booting, log into the Web Management Interface for the SnapServer N2000.
4. Navigate to **Storage > Volumes** and click the volume you want to expand.
5. Click the **Expand Volume** button.
6. Check four or more drives on the expansion array and follow the onscreen instructions to complete growing the volume.

The server:

- Creates a RAID of the same type as the volume's RAID with the selected drives.
  - Groups the head RAID with the new expansion RAID.
  - Groups the volume to the full space available in the new RAID group.
7. Repeat this as needed across the expansion array, or set up further RAID sets with separate volume and share settings.

## Configuring Email Notification, Task Scheduling, and Security

After configuring the basic storage structure on the SnapServer, administrators should enable event notification, schedule data protection tasks, and configure security for user-accessible shares.

## Configuring Email Notification

The SnapServer can provide email notification when certain events occur on the system.

1. Navigate to **Server > Email Notification** in the Web Management Interface.
2. Enable Email Notification, specify the SMTP server's IP address and email addresses, and indicate whether you want to use SMTP Authentication or Secure Connection.
3. Optionally, change the default 'from' email address for server event notices.
4. Check the box by each event requiring administrator notification and click **OK**.

## Scheduling Data Protection Tasks

Scheduling snapshots and antivirus scans, and creating a disaster recovery image preserves your server configuration and protects your data from loss or corruption. Snapshots can be taken to provide a point-in-time image of files and changes to files to help in quickly recovering from accidental deletion or modification, or to facilitate performing an offline tape backup of an active data partition.

Navigate to **Storage > Snapshots** in the browser-based Web Management Interface to schedule snapshots or modify the space available for storing snapshots. Snapshots should be taken when the system is idle or under low data traffic.

Click the **SnapExtensions** icon , and then click **CA Antivirus**. Click the checkbox to enable antivirus, and click **OK**. Then click the **configure** link to launch the eTrust administration user interface for configuration and scheduling of virus scans and virus signature file updates.

Create a disaster recovery image (DRImage) on the **Maintenance > Disaster Recovery** page. This DRImage should be created after the server configuration is complete, and can be used to recover the server or a replacement server to the configured state.

## Configuring Share and Folder Security

SnapServers support file access in Windows, UNIX, and Apple networks, as well as access via FTP and HTTP. Although the GuardianOS runs on an optimized Linux kernel and has many Linux characteristics, the cross-platform features make it very different than a pure Linux distribution. Systems running GuardianOS are storage appliances dedicated to file services. Administrators should not expect the same behavior as a pure Linux system when administering the SnapServer.

By default, volumes are created with the Windows/Mixed security model (Windows-style ACLs for files created by SMB clients and UNIX-style permissions for files created by other protocols and processes), and allow all users to create, delete, and configure permissions on their own files and to access files and directories created by other users.

New shares are created by default with full read-write access to all users, subject to the file system permissions on the share target directory. The first step to securing a SnapServer is to specify access at the individual share level. Administrators can assign Read/Write or Read-Only share access to individual Windows (and local) users and groups.

### Hidden Shares

There are three ways a share can be hidden in GuardianOS:

- Name the share with a dollar-sign (\$) at the end. This is the traditional Windows method of hiding shares; however, it does not truly hide the share since Windows clients themselves filter the shares from share lists. Other protocols can still see dollar-sign shares.
- Hide the share from all protocols (except NFS) by navigating to the **Security > Shares** page, selecting the share, expanding the **Advanced Share Properties** link, and clicking the **Hide this Share** check box. When a share is hidden this way, the share is invisible to clients, and must be explicitly specified to gain access.  
**Note:** Hidden shares are not hidden from NFS, which cannot access invisible shares. To hide shares, from NFS, consider disabling NFS access to the hidden shares.
- Disable individual protocol access to certain shares by navigating to **Security > Shares**, selecting the share, expanding the **Advanced Share Properties** link, and enabling/disabling specific protocols.

### Directory Permissions

GuardianOS supports two “personalities” of file system security on files and directories:

- **UNIX:** Traditional UNIX permissions (**rwX**) for owner, group owner, and other.
- **Windows ACLs:** Windows NTFS-style file system permissions.

Windows ACLs fully support the semantics of NTFS ACLs, including configuration, enforcement, and inheritance models (not including the behavior of some built-in Windows users and groups). The security personality of a file or directory is dependent on the security model of the SnapTree or Volume in which the file or directory exists.

### Share Level Permissions

Share-level permissions on GuardianOS are applied cumulatively. For example, if the user “j\_doe” has Read-Only share access and belongs to the group “sales”, which has Read/Write share access, the result is that the user “j\_doe” will have Read/Write share access.

**Note:** Share-level permissions only apply to non-NFS protocols. NFS access is configured independently by navigating to the **Security > Shares** page and clicking the appropriate **NFS Access** link in the Shares table.

### Where to Place Shares

For security and backup purposes, it is recommended that administrators restrict access to shares at the root of a volume to administrators only. All SnapServers are shipped with a default share named *SHARE1* that points to the root of the default volume *vol0*. The share to the root of the volume should only be used by administrators as a “door” into the rest of the directory structure so that, in the event that permissions on a child directory are inadvertently altered to disallow administrative access, access from the root share is not affected. This also allows one root share to be targeted when performing backups of the server. If it is necessary to have the root of the volume accessible, using the Hidden option helps ensure only those that need access to that share can access it.

### SnapTrees

SnapTrees are directories that can be configured for the Windows/Mixed or UNIX security model. SnapTrees make a specific directory structure follow the rules of the

specified security model, which indicates which file permission personality will be present on files by default, and whether that personality can be changed by users when changing permissions. All top level volume directories, as well as all directories inside the first level of a volume, are considered SnapTrees.

### NFS Share Access

When controlling share access for NFS clients, administrators can limit client access to the shares independently of share level permissions that apply to other protocols. Access is controlled on a per-share basis. To set the NFS access, open the **Shares** page and click the appropriate **NFS Access** link in the Shares table. Changes made on this screen affect the NFS “exports” file within GuardianOS.

**Note:** If there are multiple shares to the same directory on the disk, and those shares permit access via NFS, they must all have the same NFS export configuration. This is enforced when configuring NFS access to the overlapping shares.

## Migrating Data to the SnapServer

Once storage structure and data management configurations have been set, data can be migrated from a legacy SnapServer or other computer that supports CIFS or NFS to the new SnapServer. The Data Migration (DM) utility can be used to copy or move files and folders from a server on the network (source) to a SnapServer (target).

### Using the Data Migration Utility

Use the Data Migration utility to transport data directly from the source to the SnapServer target.

The following migration options can be specified:

- Copy or move data
- Include subfolders
- Overwrite existing files
- Preserve the original permissions settings

**Note:** Before selecting this option, be sure to read the Data Migration topic in the *Administrators Guide* for information about the migration behavior of different permissions.

- Verify migrated data

**Note:** If you select to verify migrated data, all data will be read from the source twice, once to write to the SnapServer and once to perform a binary comparison with the data written to the SnapServer. This could be a lengthy process.

If an error or exception is encountered during migration (e.g., a file or folder is locked and cannot be migrated), the DM utility records the exception in a log, and continues the operation. When the migration is completed, the administrator can view the log of migration errors.

### Setting Up a Data Migration Job

1. To access the Data Migration utility, navigate to **Maintenance > Data Migration**.
2. Provide the required information about the source server or workstation and the target SnapServer.

3. Select your migration options.
4. Click the **Start Migration** button to begin the migration.
5. If desired, set up email notification to notify you when a migration operation is complete. See [“Configuring Email Notification” on page 3-4](#) for more information.
6. Once the migration is complete, click the **View Log** button to see details of any errors or exceptions. Click the **Data Migration error log** link to download the entire log.

# Optional Backup Software

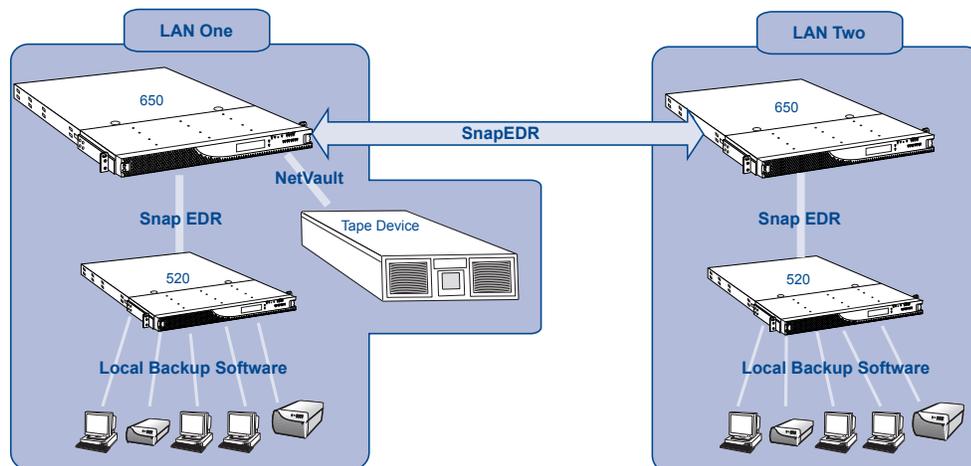
This section describes SnapServer support for backup software included with the SnapServer and third-party backup solutions.

## Integrated Backup Solutions

SnapServers offer integrated support for a number of third-party backup packages that can be used to create a complete backup solution out-of-the-box or to enhance existing backup solutions. The scenario below suggests one way these components may be integrated.

### Scenario

The following diagram shows the relationship between data management and replication tools supplied with the SnapServer to back up clients and servers to a local SCSI-attached tape device.



1. Use local backup software to back up data from user workstations or laptops to workgroup SnapServers on both LANs.
2. Snap EDR then replicates the data stored on enterprise GuardianOS-powered SnapServers from LAN 2 to LAN 1.
3. Snapshots configured on the SnapServer 650 ensure that the file system back up is internally consistent and complete.
4. NetVault backs up data from these snapshots to a local SCSI-attached tape device for off-site storage.

## Integrated Backup Options

A wide variety of data management and backup applications are included or available for GuardianOS-powered SnapServers. As described in the previous scenarios, these applications and protocols can greatly enhance data protection and backup routines that involve not only SnapServers, but clients and servers on your network.

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### Software

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#### NetVault for GuardianOS

NetVault is a comprehensive backup solution from [BakBone, Inc.](#) The master server component of the NetVault software is preinstalled on your server to support backup and restore operations to a local SCSI- or USB-connected tape drive.

**Note:** GuardianOS SnapServers also support a number of popular third-party backup solutions. For a list of these solutions and how they compare to NetVault, see the following section.

**Licensing** License required on some SnapServers for back up to a locally attached SCSI- or USB-connected tape device. Licensing required on all SnapServers for additional modules to upgrade NetVault functionality. Go to the SnapExtensions page in the GuardianOS and click the **License Required** link. Upgrades to NetVault functionality are available from the [SnapServer](#) Web site.

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#### Snapshots

Snapshots can be incorporated as a central component of your backup strategy to ensure that all data in every backup operation is internally consistent and that no data is overlooked or skipped. Snapshots are incorporated into the GuardianOS and are managed from the SnapServer's browser-based Administration Tool.

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#### Snap Enterprise Data Replicator (EDR)

Snap EDR is an enterprise-class data management and replication suite. Snap EDR is managed from a central browser-based console on the SnapServer. Replication Agents can be installed on GuardianOS-powered SnapServers, as well as Windows, Linux, and Mac workstations.

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## SnapServer Backup Solutions Feature Comparison Chart

		Backup and Replication Solutions					
		BakBone NetVault	Snap EDR	CA BrightStor	EMC NetWorker	Symantec Backup Exec	Symantec NetBackup
GuardianOS	Snap to Backup Server via installed agent	X <sup>1</sup>		X	X	X	X
	Snap to Backup Server via network protocol			X		X	
	SnapServers to SCSI-attached tape drive <sup>2</sup> (disk-to-tape backup)	X				X	X
	SnapServers to SAS-attached tape drive (disk-to-disk backup, N2000 only)					X	X
	SnapServers to USB-attached tape drive (disk-to-tape backup)	X				X	X
	Security Meta Data Backup	X	X				

1. The NetVault agent was preinstalled on SnapServers running GuardianOS 3.0 through 5.2.
2. SCSI not applicable to the SnapServers 110 and 210. They support USB only.

This guide provides hardware specifications for GuardianOS SnapServers and expansion arrays. Specifications are subject to change without notice; for updates to and further information on the specifications, see <http://www.snapserver.com>.

## SnapServers

- [SnapServer 110 Specifications](#)
- [SnapServer 210 Specifications](#)
- [SnapServer 410 Specifications](#)
- [SnapServer 500/600 Series Specifications](#)
- [SnapServer N2000 Specifications](#)
- [SnapDisk E2000 Specifications](#)
- [Snap Expansion S50 Specifications](#)

For a list of qualified hardware replacement components, navigate to your specific server and click the **Configurations** tab.

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**CAUTION:** Use only qualified components purchased from an authorized Overland Storage reseller to service SnapServer storage products. *Qualified* means that Overland Storage technicians have tested and verified that the component operates properly with the SnapServer and other network components. Failure to use qualified components may seriously impact data availability, potentially lead to data loss and corruption, and will void your warranty.

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## SnapServer 110 Specifications

Feature	Specification
<b>Network Connection</b>	Auto-sensing 10/100/1000Base-T, single RJ-45 network connector.
<b>Dimensions</b>	Width.....6.1 in (154.9 mm) Depth.....10.1 in (256.5 mm) Height.....3.1 in (44.45 mm) Weight.....6.5 lbs (2.77 kg)
<b>Power</b>	Power Rating: 60W, 100-240 VAC, 50-60 Hz Input Current: 1.8A (RMS) for 115VAC, 0.9A (RMS) for 240VAC Power Consumption: 44W (steady state) Heat Dissipation: 150 BTUs/hr.
<b>Operating Environment</b>	50° F to 95° F (10° C to 35° C) 20% to 80% humidity (noncondensing) Vibration: 0.10G at 10-300Hz Random for 120 min. max duration Shock: 6 pulses of 33G for up to 2ms Altitude: 0 ft. to 10,000 ft. (0m to 3,048m)
<b>Non-operating Environment</b>	14° F to 149° F (-10° C to 65° C) 5% to 95% humidity (noncondensing) Vibration: 2G at 5-500Hz for 90 min. max duration Altitude: 0 ft. to 35,000 ft. (0m to 10,668m)
<b>Regulatory Certifications</b>	UL, cUL, CE, FCC Class B, TuV, Nemko, C-Tick

## SnapServer 210 Specifications

Feature	Specification
<b>Network Connection</b>	Auto-sensing 10/100/1000Base-T, single RJ-45 network connector.
<b>Dimensions</b>	Width.....6.1 in (154.9 mm) Depth.....10.5 in (266.7 mm) Height.....4.3 in (109.22 mm) Weight.....9.4 lbs (4.26 kg)
<b>Power</b>	Power Rating: 60W, 100-240 VAC, 50-60 Hz Input Current: 1.8A (RMS) for 115VAC, 0.9A (RMS) for 240VAC Power Consumption: 47W (steady state) Heat Dissipation: 160 BTUs/hr.
<b>Operating Environment</b>	50° F to 95° F (10° C to 35° C) 20% to 80% humidity (noncondensing) Vibration: 0.10G at 10-300Hz Random for 120 min. max duration Shock: 6 pulses of 33G for up to 2ms Altitude: 0 ft. to 10,000 ft. (0m to 3,048m)
<b>Non-operating Environment</b>	14° F to 149° F (-10° C to 65° C) 5% to 95% humidity (noncondensing) Vibration: 2G at 5-500Hz for 90 min. max duration Altitude: 0 ft. to 35,000 ft. (0m to 10,668m)
<b>Regulatory Certifications</b>	UL, cUL, CE, FCC Class B, TuV, Nemko, C-Tick

## SnapServer 410 Specifications

Feature	Specification
<b>Network Connection</b>	Auto-sensing 10/100/1000Base-T, dual RJ-45 network connectors, with support for load-balancing and failover.
<b>Dimensions</b>	Width.....16.7 in (424.2 mm) Depth.....19.2 in (487.68 mm) Height.....1.75 in (44.45 mm), 1U Weight.....26 lbs (11.8 kg)
<b>Power</b>	Power Rating: 200W, 100-240 VAC, 50-60 Hz Input Current: 1.5A (RMS) for 115VAC, 0.75A (RMS) for 230VAC Power Consumption: 172W (steady state) Heat Dissipation: 587 BTUs/hr.
<b>Operating Environment</b>	50° F to 95° F (10° C to 35° C) 20% to 80% humidity (noncondensing) Vibration: 0.10G at 10-300Hz Random for 120 min. max duration Shock: 6 pulses of 33G for up to 2ms Altitude: 0 ft. to 10,000 ft. (0m to 3,048m)
<b>Non-operating Environment</b>	14° F to 149° F (-10° C to 65° C) 5% to 95% humidity (noncondensing) Vibration: 2G at 5-500Hz for 90 min. max duration Altitude: 0 ft. to 35,000 ft. (0m to 10,668m)
<b>Regulatory Certifications</b>	UL, cUL, CE, FCC Class A, TuV, Nemko, C-Tick

## SnapServer 500/600 Series Specifications

Feature	Specification
<b>Network Connection</b>	Auto-sensing 10/100/1000Base-T, dual RJ-45 network connectors, with support for load-balancing and failover.
<b>Dimensions</b>	Width.....17.5 in (444.5 mm) Depth.....28.07 in (713 mm) Height.....1.75 in (44.45 mm), 1U Weight.....40 lbs (18.5 kg)
<b>Power</b>	Power Rating: 400W, 100-240 VAC, 50-60Hz, Input Current: 3.4A (RMS) for 115VAC, 2.3A (RMS) for 230VAC Power Consumption: 290W (steady state), 360W (maximum) Heat Dissipation: 990 BTUs/hr.
<b>Operating Environment</b>	50° F to 95° F (10° C to 35° C) 20% to 80% humidity (noncondensing) Vibration: 0.10G at 10-300Hz Random for 120 min. max duration Shock: 6 pulses of 33G for up to 2ms Altitude: 0 ft. to 10,000 ft. (0m to 3,048m)
<b>Non-operating Environment</b>	14° F to 149° F (-10° C to 65° C) 5% to 95% humidity (noncondensing) Vibration: 2G at 5-500Hz for 90 min. max duration Altitude: 0 ft. to 35,000 ft. (0m to 10,668m)
<b>Regulatory Certifications</b>	UL, cUL, CE, FCC Class A, TuV, NEMKO, C-Tick

## SnapServer N2000 Specifications

Feature	Specification
<b>Network Connection</b>	Auto-sensing 10/100/1000Base-T, dual RJ-45 network connectors, with support for load-balancing and failover.
<b>Dimensions</b>	Width.....17.2 in (437 mm) Depth.....25.2 in (648 mm) Height.....3.5 in (89 mm), 2U Weight.....55 lbs (24.9 kg)
<b>Power</b>	Power Rating: 720W, 100-240 VAC, 50-60Hz, Input Current: 3-9 Amps
<b>Operating Environment</b>	50° F to 95° F (10° C to 35° C) 8% to 90% humidity (noncondensing) Vibration: 0.10G at 10-300Hz Random for 120 min. max duration Shock: 6 pulses of 33G for up to 2ms Altitude: 0 ft. to 10,000 ft. (0m to 3,048m)
<b>Non-operating Environment</b>	-40° F to 158° F (-40° C to 70° C) 5% to 95% humidity (noncondensing) Vibration: 2G at 5-500Hz for 90 min. max duration Altitude: 0 ft. to 35,000 ft. (0m to 10,668m)
<b>Regulatory Certifications</b>	cULus, CE, FCC Class A, C-Tick, VCCI

## SnapDisk E2000 Specifications

Feature	Specification
<b>Network Connection</b>	SAS connection to SnapServer N2000. No direct network connection.
<b>Dimensions</b>	Width.....17.2 in (437 mm) Depth.....25.2 in (648 mm) Height.....3.5 in (89 mm), 2U Weight.....up to 35.68 lbs (16.9 kg) without drives .....55 lbs (24.9 kg) with drives
<b>Power</b>	Power Rating: 720W, 100-240 VAC, 50-60Hz, Input Current: 3-9 Amps
<b>Operating Environment</b>	50° F to 95° F (10° C to 35° C) 8% to 90% humidity (noncondensing) Vibration: 0.10G at 10-300Hz Random for 120 min. max duration Shock: 6 pulses of 33G for up to 2ms Altitude: 0 ft. to 10,000 ft. (0m to 3,048m)
<b>Non-operating Environment</b>	-40° F to 158° F (-40° C to 70° C) 5% to 95% humidity (noncondensing) Vibration: 2G at 5-500Hz for 90 min. max duration Altitude: 0 ft. to 35,000 ft. (0m to 10,668m)
<b>Regulatory Certifications</b>	cULus, CE, FCC Class A, C-Tick, VCCI

## Snap Expansion S50 Specifications

Feature	Specification
<b>Network Connection</b>	SAS connection to SnapServer 650, 620, 550, and 520. No direct network connection.
<b>Dimensions</b>	Width.....17.6 in (44.7 cm) Depth.....19.5 in (49.5 cm) Height.....3.5 in (8.9 cm), 2U Weight.....up to 60 lbs (27 kg) maximum
<b>Power</b>	Power Rating: 100-240 VAC Current Rating: 6-2.5 Amps Outputs: <ul style="list-style-type: none"> <li>• +5 V @ 37.5 A</li> <li>• +12 V @ 20.0A</li> <li>• +3.3 V @ 1.0 A</li> </ul> Maximum Average Output Power: 430 Watts Maximum Peak Output Power: 491 Watts Heat Dissipation: 1467 BTUs/hr.
<b>Operating Environment</b>	5° C to 40° C 10% to 80% humidity (noncondensing) Vibration: 5-400 Hz random at 0.15 G Shock: 8 G half sine shock with pulse duration of 11 milliseconds or less. Altitude: -200 ft. to 10,000 ft. (0m to 3,048m)
<b>Non-operating Environment</b>	-40° C to 70° C 5% to 95% humidity (noncondensing) Shock: 15 G half sine shock with pulse duration of 11 milliseconds or less. Vibration: 5-400 Hz random at 0.5 G Altitude: -200 ft. to 40,000 ft. (0m to 10,668m)
<b>Regulatory Certifications</b>	UL, cUL, CE, FCC Class A, TuV, TuV-CB, VCCI, CSA, C-Tick