



## Lenovo Storage S3200 Product Guide

The Lenovo® Storage S3200 (shown in the following figure) is a versatile storage system that is designed to provide simplicity, speed, scalability, security, and high availability for small to large businesses. The S3200 SAN array delivers enterprise-class storage management technology in a cost-effective solution with a wide choice of host connectivity options, flexible drive configurations, and enhanced data management features.

The S3200 is a perfect fit for for a wide range of workloads, from specialized workloads such as big data and analytics, video surveillance, media streaming, and private clouds to general purpose workloads such as file and print serving, web serving, e-mail and collaboration, and OLTP databases. The S3200 is also suited very well for secure archive storage or a consolidated backup solution.



Figure 1. Lenovo Storage S3200

The S3200 offers the flexible choice of storage connectivity protocols: 6/12 Gb SAS, 1 Gb or 10 Gb iSCSI, and 4/8/16 Gb Fibre Channel (FC). Converged Network Controller (CNC) design of the S3200 makes the selection of iSCSI or FC host connectivity (or both FC and iSCSI) as simple as attaching corresponding transceivers or 10 GbE SFP+ Direct-Attach Copper (DAC) cables to the SFP/SFP+ ports on the RAID controller.

The S3200 supports up to 192 drives with up to seven external expansion enclosures, and it offers flexible drive configurations with the choice of 2.5-inch and 3.5-inch drive form factors, 10K or 15K rpm SAS and 7.2K rpm NL SAS hard disk drives (HDDs) and self-encrypting drives (SEDs), and SAS solid-state drives (SSDs). The S3200 can be scaled up to 960 TB of raw storage capacity.

### Did you know?

The S3200 supports Intelligent Real-time Tiering capabilities that help optimize system performance, reduce costs, and simplify management. The base software includes the ability to move data dynamically between SAS HDDs that are optimized for cost per IOPS and NL SAS HDDs that are optimized for cost per GB. With the optional software license, the S3200 supports hybrid tiering across HDDs and SSDs.

With flexibility of the Converged Network Controllers, the S3200 supports hybrid iSCSI and Fibre Channel connectivity at the same time.

The S3200 supports battery-free cache protection which reduces maintenance costs and provides permanent backup of unwritten cache data in case of power failure.

## Key features

Key features and benefits provided by the S3200 storage system include:

- Versatile, scalable storage with a single controller, or dual active/active controller configurations for high availability and performance.
- Flexible host connectivity to match diverse client needs with support for 6/12 Gb SAS (SAS controller) or 1/10 Gb iSCSI or 4/8/16 Gb FC connectivity (FC and iSCSI controller) or both iSCSI and FC at the same time.
- 6 Gb SAS drive-side connectivity with support for 12x 3.5-inch large form factor (LFF) or 24x 2.5-inch small form factor (SFF) drives in the controller enclosure; scalable up to 96 LFF drives per system with the attachment of Lenovo Storage E1012 expansion enclosure (12x LFF drives each) or up to 192 SFF drives per system with the attachment of Lenovo Storage E1024 expansion enclosure (24x SFF drives each) to satisfy growing needs for storage capacity and performance.
- Flexibility in storing data on high performance SAS SSDs, performance-optimized enterprise SAS HDDs, or capacity-optimized enterprise NL SAS HDDs; mixing and matching drive types and form factors within a single system to perfectly meet performance and capacity requirements for various workloads.
- Support for self-encrypting drives to allow clients to secure their sensitive data and to comply with various security regulations when required.
- Rich set of standard functions available at no additional cost, including virtualized storage pools, snapshots, thin provisioning, rapid rebuild, real-time HDD tiering, and SSD read cache.
- Optional licensed functions, including higher number of snapshots for more scalability, real-time SSD tiering for boosting IOPS performance, and asynchronous replication for 24x7 data protection and disaster recovery.
- Intuitive, web-based GUI for easy system setup and management.
- Designed to comply with NEBS and MIL-STD requirements.
- Designed for 99.999% availability.

The S3200 is designed to support the complete range of data storage requirements, from highly utilized applications to high-capacity, low usage applications.

The following 3.5-inch drives are supported:

- High performance solid-state drives (10 drive writes per day [DWD]): 400 GB
- Performance-optimized, enterprise class disk drives: 600 GB and 900 GB 10K rpm
- High-capacity, archival-class nearline disk drives: 2 TB, 4 TB, 6 TB, 8 TB, and 10 TB 7.2K rpm

The following 2.5-inch drives are supported:

- High performance solid-state drives (3 DWD and 10 DWD): 400 GB, 800 GB, and 1.6 TB
- High performance self-encrypting solid-state drives (10 DWD): 400 GB and 800 GB
- Capacity-optimized solid-state drives (1 DWD): 3.84 TB
- Performance-optimized, enterprise class disk drives
  - 300 GB and 600 GB 15K rpm
  - 600 GB, 900 GB, 1.2 TB, and 1.8 TB 10K rpm
- High-capacity, archival-class nearline disk drives: 1 TB and 2 TB 7.2K rpm

Additional drives and expansion units are designed to be dynamically added with virtually no downtime, helping to quickly and seamlessly respond to ever-growing capacity demands.

The S3200 storage system is designed to offer high levels of system and data availability with the following technologies:

- Dual-active RAID controllers with low latency cache mirroring
- Dual-port drives (both HDDs and SSDs) with automatic drive failure detection and rapid RAID rebuild with global hot spares
- Redundant hardware, including host ports, controller modules, and power supplies and fans
- Hot-swappable and customer replaceable components, including controllers, power supplies with fans, and drives
- Automated path failover support for the data path between the host and the drives with multipathing software
- Non-disruptive controller firmware upgrades for dual controller configurations with multipathing

The following functions are included with every S3200:

- **Intelligent Real-time Tiering for HDDs:** Storage tiering helps optimize storage use with intelligent data placement to improve system performance, reduce costs, and simplify management. The S3200 automatically and dynamically moves frequently accessed data to higher performing HDDs in the system without manually creating and managing storage tier policies.
- **RAID levels 0, 1, 5, 6, and 10 :** Provide the flexibility to choose the level of data protection required.
- **Virtualized storage pools:** Enables rapid, flexible storage provisioning and simple configuration changes. Stored data is distributed across all drive groups in the pool (wide striping) which helps improve performance, lower latency, and achieve higher volume capacities. When a new drive group is added to the pool, the system performs automatic rebalancing to utilize all drives in the pool for better performance.
- **Thin provisioning:** Optimizes efficiency by allocating drive storage space in a flexible manner among multiple applications, based on the minimum space required by each application at any given time. With thin provisioning, applications consume only the space they are actually using, not the total space that has been allocated to them, which allows clients to purchase storage they need today and add more as application requirements grow.
- **SSD Read Cache:** An extension of the controller's cache to improve performance of read-centric workloads
- **Rapid RAID Rebuild:** Helps significantly decrease the time to recover lost data by only rebuilding the stripe where the corruption occurred, not the empty space or other stripes
- **Snapshots:** Enables creation of copies of data for backup, parallel processing, testing, and development, and have the copies available almost immediately. Base software supports up to 128 snapshot targets per system.

The S3200 storage capabilities can be expanded with optional licensed functions. Each optional S3200 function is licensed on a per-system basis and covers both controller enclosure and all attached expansion units.

Optional licensed functions include:

- **Intelligent Real-time Tiering for SSDs:** The SSD tiering upgrade option allows the use of SSDs as read and write storage. Also, this option makes it easy and economical to deploy hybrid storage by dynamically moving frequently accessed data to SSDs in the system, resulting in flash drive performance without manually creating and managing storage tier policies.
- **Snapshots upgrade:** The snapshot upgrade options increase the supported number of snapshot targets to 512 or 1,024 per system.

- **Asynchronous Replication:** The asynchronous replication feature provides storage system-based data replication between two peers by using asynchronous data transfers over IP communication links.

The replication is done at predetermined intervals (Now, 1 hour, 12 hour, 24 hour) and does not require high-bandwidth network connection. For ultimate flexibility, S3200 asynchronous replication interoperates with Lenovo Storage S2200.

The asynchronous replication option must be acquired (or licensed) for both primary (local) and secondary (remote) systems.

The S3200 supports the following management interfaces:

- Web-based graphical user interface (GUI) via HTTP that requires only a supported browser (Microsoft Internet Explorer, Google Chrome, or Mozilla Firefox), so there is no need for a separate console or plug-in
- Command line interface (CLI) via Telnet or SSH or through Direct Connect USB
- HTTP scripting interface with XML encoding
- SNMP and e-mail notifications

## Components and connectors

The following figure shows the front of the S3200 SFF chassis and E1024 drive expansion enclosure.

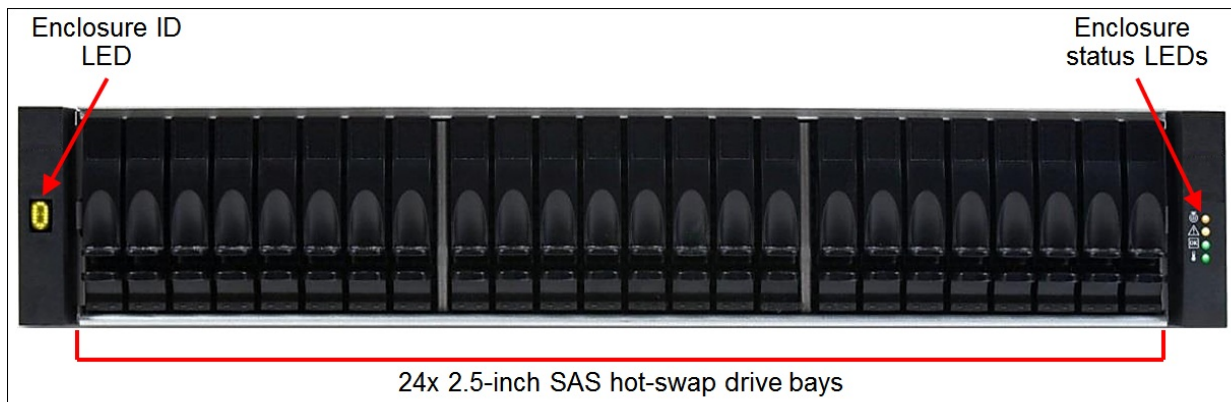


Figure 2. Front view of the S3200 SFF chassis and E1024 drive enclosure

The following figure shows the front of the S3200 LFF chassis and E1012 drive expansion enclosure.

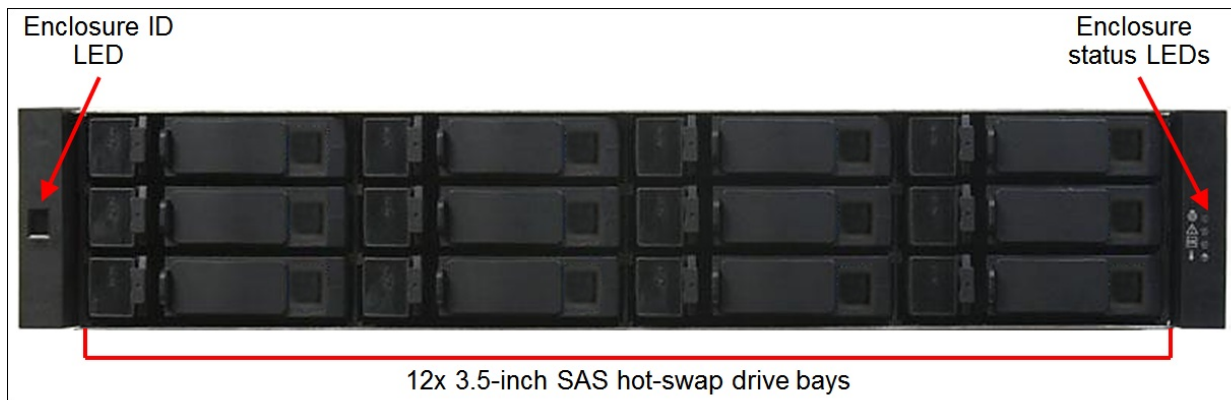


Figure 3. Front view of the S3200 LFF chassis and E1012 drive enclosure

The following figure shows the rear of the S3200 with FC or iSCSI host interfaces with dual RAID controllers. Single RAID controller configurations are also supported.

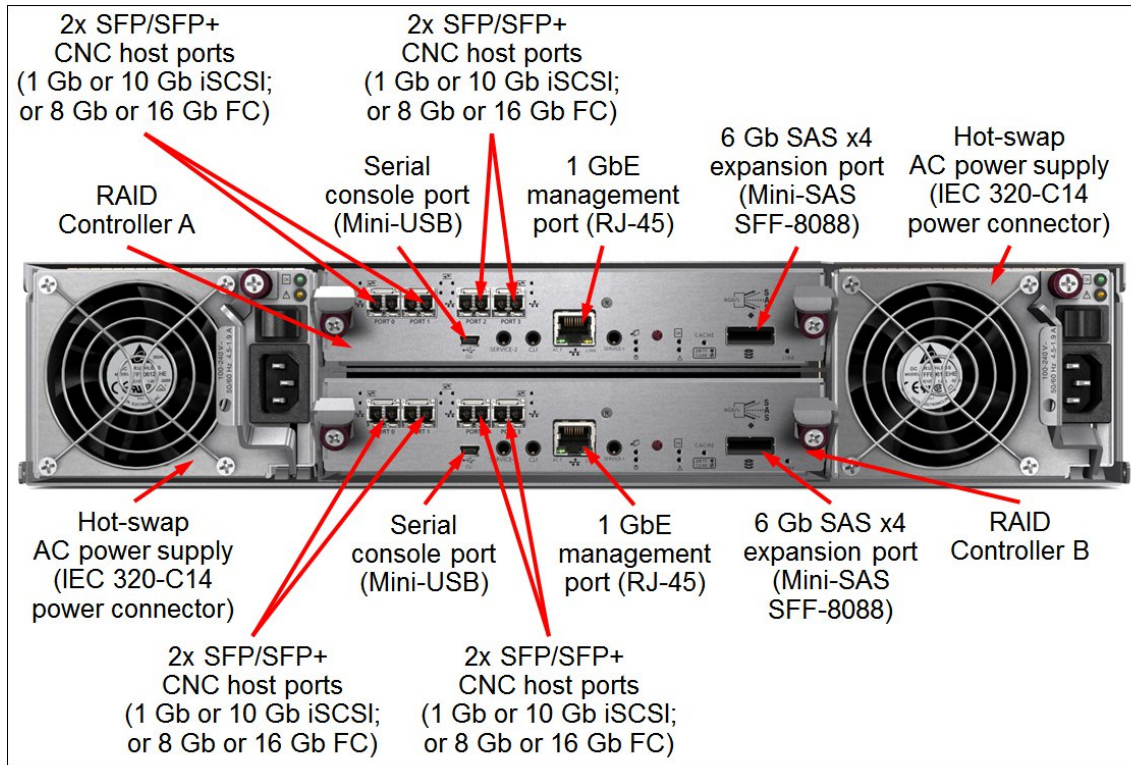


Figure 4. Rear view of the S3200 with FC or iSCSI host interfaces

The following figure shows the rear of the S3200 with SAS host interfaces with dual RAID controllers. Single RAID controller configurations are also supported.

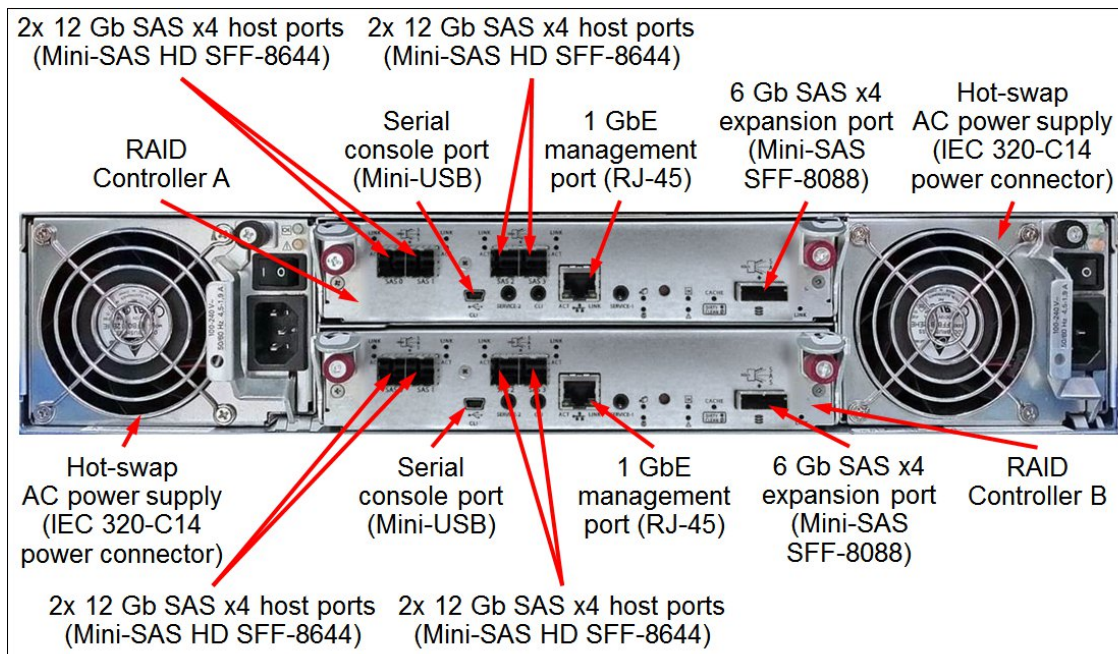


Figure 5. Rear view of the S3200 with SAS host interfaces

The following figure shows the rear of the E1012 and E1024 drive enclosures with dual I/O expansion modules. Single I/O module configurations are also supported with the single-controller S3200.

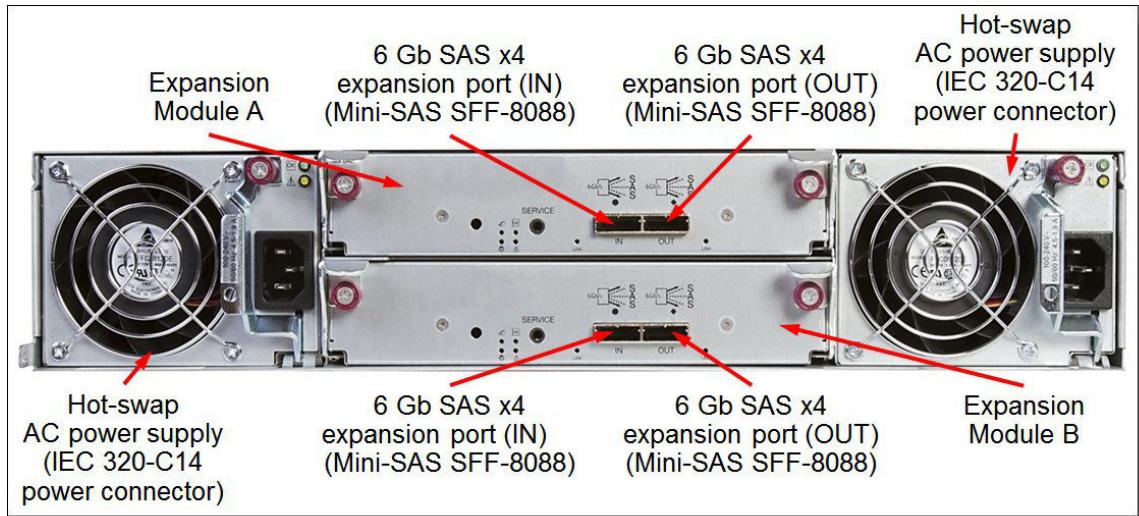


Figure 6. Rear view of the E1012 and E1024 drive enclosures

**Note:** The RAID controllers (shown in Figure 4 and Figure 5) and expansion modules (shown in Figure 6) have additional service ports with a specialized connector, and these ports are reserved for use by a Lenovo service technician.

## System specifications

The following table lists the S3200 storage system technical specifications.

Table 1. System specifications

Components	Specification
Form factor	S3200 controller enclosure: 2U rack mount E1012 or E1024 drive expansion enclosure: 2U rack mount
RAID controller configuration	Two types of controllers: <ul style="list-style-type: none"> <li>• S3200 SAS controller</li> <li>• S3200 FC and iSCSI controller</li> </ul> Single or dual RAID controller configurations supported. Single controller systems can be upgraded to dual controller non-disruptively. Both controllers in the system must be the same.
RAID levels	RAID 0, 1, 5, 6, and 10
RAID controller cache	6 GB per controller. Battery-free cache protection with flash memory and supercapacitors. Low latency cache mirroring protection for dual controller configurations.
Drive bays	Up to 192 SFF drive bays per system: <ul style="list-style-type: none"> <li>• 24 SFF drive bays in the S3200 controller enclosure</li> <li>• 24 SFF drive bays in the E1024 drive expansion enclosure; up to 7x E1024 enclosures</li> </ul> Up to 96 LFF drive bays per system: <ul style="list-style-type: none"> <li>• 12 LFF drive bays in the S3200 controller enclosure</li> <li>• 12 LFF drive bays in the E1012 drive expansion enclosure; up to 7x E1012 enclosures</li> </ul> Intermix of SFF and LFF enclosures is supported.
Drive technologies	SAS and NL SAS HDDs and SEDs; eMLC SAS SSDs. Intermix of HDDs and SSDs is supported. Intermix of SEDs with HDDs or SSDs is not supported.

Components	Specification
Drive connectivity	<p>Dual-ported 6 Gb SAS drive attachment infrastructure.</p> <p>Controller enclosure with one or two RAID controllers (ports per one controller):</p> <ul style="list-style-type: none"> <li>• 24x 6 Gb SAS internal drive ports (SFF chassis)</li> <li>• 12x 6 Gb SAS internal drive ports (LFF chassis)</li> <li>• 1x 6 Gb SAS x4 (Mini-SAS SFF-8088) expansion port for the attachment of the external drive enclosures</li> </ul> <p>Drive expansion enclosure with one or two expansion modules (ports per one module):</p> <ul style="list-style-type: none"> <li>• 24x 6 Gb SAS internal drive ports (SFF chassis)</li> <li>• 12x 6 Gb SAS internal drive ports (LFF chassis)</li> <li>• 2x 6 Gb SAS x4 (Mini-SAS SFF-8088) expansion ports (IN and OUT) for the daisy chained attachment of the external drive enclosures</li> </ul>
Drives	<p>SFF drives:</p> <ul style="list-style-type: none"> <li>• 400 GB, 800 GB, and 1.6 TB SAS SSDs (3 DWD and 10 DWD)</li> <li>• 400 GB and 800 GB SAS SED SSDs (10 DWD)</li> <li>• 3.84 TB SAS SSDs (1 DWD)</li> <li>• 300 GB and 600 GB 15K rpm SAS HDDs</li> <li>• 600 GB, 900 GB, 1.2 TB, and 1.8 TB 10K rpm SAS HDDs</li> <li>• 1 TB and 2 TB 7.2K rpm NL SAS HDDs</li> </ul> <p>LFF drives:</p> <ul style="list-style-type: none"> <li>• 400 GB SAS SSDs (10 DWD)</li> <li>• 600 GB and 900 GB 10K rpm SAS HDDs</li> <li>• 2 TB, 4 TB, 6 TB, 8 TB, and 10 TB 7.2K rpm NL SAS HDDs</li> </ul>
Storage capacity	Up to 960 TB (96x 10 TB NL SAS HDDs)
Host connectivity	<p>S3200 SAS controller: 4x 6/12 Gb SAS host ports (Mini-SAS HD, SFF-8644)</p> <p>S3200 FC and iSCSI controller: 4x SFP/SFP+ host ports with two built-in dual-port CNCs (each port on the same CNC must have the same connectivity type, different CNCs might have different connectivity types)</p> <p>CNC host port options (per each CNC on the RAID controller):</p> <ul style="list-style-type: none"> <li>• 2x 1 Gb iSCSI SFP (1 Gb speed, UTP, RJ-45)</li> <li>• 2x 10 Gb iSCSI SFP+ (1/10 Gb speeds, SW fiber optics, LC)</li> <li>• 2x 8 Gb FC SFP+ (4/8 Gb speeds, SW fiber optics, LC)</li> <li>• 2x 16 Gb FC SFP+ (4/8/16 Gb speeds, SW fiber optics, LC)</li> <li>• 2x 10 Gb iSCSI SFP+ DAC cables</li> </ul>
Host operating systems	Microsoft Windows Server 2012 and 2012 R2; Red Hat Enterprise Linux (RHEL) 6 and 7; SUSE Linux Enterprise Server (SLES) 10, 11, and 12; VMware vSphere 5.5 and 6.0.
Standard software features	Intelligent Real-time Tiering for HDDs, Virtualized Storage Pools, Thin Provisioning, SSD Read Cache, Rapid RAID Rebuild, Snapshots - up to 128 targets.
Optional software features	Intelligent Real-time Tiering for SSDs, Snapshots - up to 1,024 targets, Asynchronous Replication.
Performance	<p>Dual controller configuration:</p> <ul style="list-style-type: none"> <li>• Up to 120,000 random read IOPS (4 KB blocks)</li> <li>• Up to 6.4 GBps sequential read throughput (512 KB blocks)</li> <li>• Up to 5.3 GBps sequential write throughput (512 KB blocks)</li> </ul>

Components	Specification
Configuration maximums	Per system: <ul style="list-style-type: none"> <li>• Maximum number of virtual storage pools: 2 (1 per controller)</li> <li>• Maximum number of logical volumes (total/mapped): 2,048/1,024</li> <li>• Maximum logical volume size: 128 TB</li> <li>• Maximum number of drives in a drive group: 16</li> <li>• Maximum number of drive groups: 32</li> <li>• Maximum global spares: 16</li> <li>• Maximum number of initiators: 8,192 (1,024 per port)</li> <li>• Maximum number of hosts in a host group: 256</li> <li>• Maximum number of host groups: 32</li> <li>• Maximum number of initiators per host: 128</li> <li>• Maximum number of snapshots: 1,024 (requires an optional license)</li> <li>• Maximum number of replication peers: 1 (requires an optional license)</li> <li>• Maximum number of replication volumes: 32 (requires an optional license)</li> </ul>
Cooling	Redundant cooling with two fans that are built into power supplies.
Power supply	Two redundant hot-swap 595 W AC power supplies.
Hot-swap parts	RAID controllers, expansion modules, SFP/SFP+ transceivers, drives, power supplies/fans.
Management interfaces	Web-based graphical user interface (GUI); Telnet, SSH, or Direct Connect USB command-line interface (CLI); HTTP scripting with XML encoding; SNMP and e-mail notifications
Security features	Secure Socket Layer (SSL), Secure Shell (SSH), self-encrypting drives (SEDs)
Warranty	Three-year customer-replaceable unit, parts only limited warranty with 9x5 next business day.
Service and support	Optional warranty service upgrades are available through Lenovo: on-site support, 24x7 coverage, 4-hour response time, 1-year or 2-year warranty extensions, Hard Drive Retention.
Dimensions	<ul style="list-style-type: none"> <li>• LFF chassis: Height: 87 mm (3.4 in), width: 447 mm (17.6 in), depth: 523 mm (20.6 in)</li> <li>• SFF chassis: Height: 89 mm (3.5 in), width: 447 mm (17.6 in), depth: 519 mm (20.5 in)</li> </ul>
Weight	<ul style="list-style-type: none"> <li>• S3200 LFF: Minimum: 18.4 kg (40.6 lb); Maximum: 28.2 kg (62.2 lb)</li> <li>• S3200 SFF: Minimum: 18.5 kg (40.8 lb); Maximum: 25.0 kg (55.2 lb)</li> <li>• E1012: Minimum: 16.8 kg (37.0 lb); Maximum: 26.6 kg (58.6 lb)</li> <li>• E1024: Minimum: 16.9 kg (37.2 lb); Maximum: 23.4 kg (51.6 lb)</li> </ul>

## Controller enclosures

The following table lists the relationship models of the S3200.

Table 2. Part numbers for ordering S3200 relationship models

Description	Part number
<b>LFF models</b>	
Lenovo Storage S3200 LFF Chassis SAS Single Controller, Rack Kit, 9x5NBD	64113B1*
Lenovo Storage S3200 LFF Chassis SAS Dual Controller, Rack Kit, 9x5NBD	64113B2
Lenovo Storage S3200 LFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD	64116B1*
Lenovo Storage S3200 LFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD	64116B2
<b>SFF models</b>	
Lenovo Storage S3200 SFF Chassis SAS Single Controller, Rack Kit, 9x5NBD	64113B3*
Lenovo Storage S3200 SFF Chassis SAS Dual Controller, Rack Kit, 9x5NBD	64113B4
Lenovo Storage S3200 SFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD	64116B3*
Lenovo Storage S3200 SFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD	64116B4

\* Not available for ordering in North America (United States and Canada).



The part number for the S3200 includes the following items:

- One S3200 chassis with two power supplies and fans:
  - With one or two SAS RAID controllers installed
  - With one or two FC and iSCSI RAID controllers installed
- Two 4.3 m, 10 A/100 - 250 V, C13 to IEC 320-C14 Rack Power Cables
- Lenovo Storage SAN Rack Mount Kit: Rails 25-inch to 36-inch
- Lenovo 1.5 m USB console cable (USB to-Mini-USB)
- Getting Started Guide
- Warranty Flyer
- Important Notices Flyer
- Documentation CD-ROM

The following table lists the TopSeller models of the S3200.

Table 3. Part numbers for ordering S3200 TopSeller models

Description	Part number
LFF models	
S3200 LFF Dual FC/iSCSI Controller/4x 8Gb FC/Rack Kit/Base Warranty	6411E24*
SFF models	
S3200 SFF Dual SAS Controller/4x 400GB SSDs/10x 600GB 10K HDDs/Rack Kit/Base Warranty	6411E25*
S3200 SFF Dual FC/iSCSI Controller/4x 8Gb FC/Rack Kit/Base Warranty	6411E29*
S3200 SFF Dual FC/iSCSI Controller/4x 8Gb FC/Rack Kit/Base Warranty	6411E37*
S3200 SFF Dual FC/iSCSI Controller/4x 8Gb FC/5x 300GB 15K HDDs/Rack Kit/Base Warranty	6411E26*
S3200 SFF Dual FC/iSCSI Controller/4x 8Gb FC/5x 600GB 10K HDDs/Rack Kit/Base Warranty	6411E27*
S3200 SFF Dual FC/iSCSI Controller/2x 8Gb FC/5x 900GB 10K HDDs/Rack Kit/Base Warranty	6411E28*
S3200 SFF Dual FC/iSCSI Controller/4x 8Gb FC/6x 600GB 10K HDDs/Rack Kit/Base Warranty	6411E36*
S3200 SFF Dual FC/iSCSI Controller/4x 8Gb FC/8x 600GB 10K HDDs/Rack Kit/Base Warranty	6411E33*
S3200 SFF Dual FC/iSCSI Controller/4x 8Gb FC/8x 900GB 10K HDDs/Rack Kit/Base Warranty	6411E31*
S3200 SFF Dual FC/iSCSI Controller/4x 8Gb FC/8x 900GB 10K HDDs/4x 400GB SSDs/Tiering	6411E2D
S3200 SFF Dual FC/iSCSI Controller/4x 16Gb FC/12x 600GB 10K HDDs/Rack Kit/Base Warranty	6411E35*
S3200 SFF Dual FC/iSCSI Controller/4x 16Gb FC/10x 600GB 10K HDDs/4x 400GB SSDs/Tiering	6411E34

\* Not available for ordering in North America (United States and Canada).

**Note:** S3200 TopSeller models are country-specific; that is, not all listed models might be available for ordering in a particular country or area. Ask a Lenovo representative for specifics.

The S3200 TopSeller model part numbers include the following items:

- One S3200 chassis with two power supplies and fans:
  - With two SAS RAID controllers installed
  - With two FC/iSCSI RAID controllers installed (with 2x or 4x SFPs; see Table 3 for details)
  - Without drives, or with HDDs, or with HDDs and SSDs (see Table 3 for details)
  - Tiering license (part numbers 6411E2D and 6411E34 only)
- Two 4.3 m, 10 A/100 - 250 V, C13 to IEC 320-C14 Rack Power Cables
- Lenovo Storage SAN Rack Mount Kit: Rails 25-inch to 36-inch
- Lenovo 1.5 m USB console cable (USB to Mini-USB)
- Getting Started Guide
- Warranty Flyer
- Important Notices Flyer
- Documentation CD-ROM

## RAID controller modules

The S3200 supports single and dual controller configurations. Standard models of the S3200 ship with two RAID controller modules (see Table 2). Custom models of the S3200 can be configured with one or two RAID controllers. Single-controller models can be upgraded to dual-controller models non-disruptively.

There are two types of RAID controller modules available:

- S3200 SAS RAID Controllers
- S3200 FC and iSCSI RAID Controllers

S3200 SAS RAID Controllers provide direct SAS attachment for up to four hosts with a supported SAS HBA installed in the host. Each S3200 SAS Controller has four 6/12 Gb SAS ports with Mini-SAS HD (SFF-8644) connectors.

S3200 FC and iSCSI RAID Controllers provide SAN based iSCSI or Fibre Channel connectivity to the hosts with a supported software initiator or HBA installed. Each S3200 FC and iSCSI Controller has two built-in CNCs that have two SFP/SFP+ ports each for a total of four SFP/SFP+ ports per RAID controller. Ports on the CNC must have the same connectivity type, and different CNCs might have different connectivity types.

The Converged Network Controller supports the following storage connectivity protocols depending on the SFP/SFP+ transceivers installed:

- 1 Gb iSCSI with 1 GbE RJ-45 SFP optical modules
- 1/10 Gb iSCSI with 10 GbE SW SFP+ optical modules with LC connectors
- 10 Gb iSCSI with 10 GbE SFP+ DAC cables
- 4/8 Gb Fibre Channel with 8 Gb FC SW SFP+ optical modules with LC connectors
- 4/8/16 Gb Gb Fibre Channel with 16 Gb FC SW SFP+ optical modules with LC connectors

### Notes:

- Both ports on the same CNC on the S3200 FC and iSCSI RAID Controller must have the same connectivity type (the same type of SFP/SFP+ modules or DAC cables).
- Hybrid iSCSI and FC connectivity or 1 Gb and 10 Gb iSCSI connectivity is supported on a per CNC basis; that is, each of two CNCs on the RAID controller is configured with the different types of transceivers.
- For dual-controller configurations, both RAID controllers in the system must be of the same type, and they must have matching port configurations (i.e. the matching ports on both RAID controllers must have SFP/SFP+ modules of the same type).

Both SAS controllers and FC and iSCSI controllers have one 6 Gb SAS x4 expansion port (Mini-SAS SFF-8088 connector) for the attachment of the E1012 and E1024 expansion enclosures.

The following table lists ordering information for the RAID controllers and related connectivity options.

Table 3. RAID controllers and connectivity options

Description	Part number	Feature code (MTM 6411-HC2)	Max qty per one S3200
<b>RAID controller modules</b>			
Lenovo Storage S3200 FC and iSCSI Controller	00WC083	AT23	2
Lenovo Storage S3200 SAS Controller	00WC084	AT24	2
<b>FC and iSCSI controller host connectivity options</b>			
Lenovo Storage S2200/S3200 1G RJ45 iSCSI SFP+ Module 1 pack	00WC086	AT2C	8*
Lenovo Storage S2200/S3200 10G SW Optical iSCSI SFP+ Module 1 pack	00WC087	AT2A	8*
Lenovo Storage S2200/S3200 8G Fibre Channel SFP+ Module 1 pack	00WC088	AT28	8*
Lenovo Storage S2200/S3200 16G Fibre Channel SFP+ Module 1 pack	00WC089	AT29	8*
<b>Cable options for FC and optical iSCSI host connectivity options</b>			
Lenovo 1m LC-LC OM3 MMF Cable	00MN502	ASR6	8**
Lenovo 3m LC-LC OM3 MMF Cable	00MN505	ASR7	8**
Lenovo 5m LC-LC OM3 MMF Cable	00MN508	ASR8	8**
Lenovo 10m LC-LC OM3 MMF Cable	00MN511	ASR9	8**
Lenovo 25m LC-LC OM3 MMF Cable	00MN517	ASRB	8**
<b>DAC cable options for 10 Gb iSCSI host connectivity</b>			
Lenovo 1m Passive SFP+ DAC Cable	90Y9427	A1PH	8**
Lenovo 2m Passive SFP+ DAC Cable	00AY765	A51P	8**
Lenovo 3m Passive SFP+ DAC Cable	90Y9430	A1PJ	8**
<b>SAS host connectivity cables - Mini-SAS HD (controller) to Mini-SAS (host)</b>			
1.5m HD-miniSAS to miniSAS SAS Cable	00D5224	A3HX	8**
3m HD-miniSAS to miniSAS SAS Cable	00D5226	A3HY	8**
<b>SAS host connectivity cables - Mini-SAS HD (controller) to Mini-SAS HD (host)</b>			
External MiniSAS HD 8644/MiniSAS HD 8644 1m cable	00WE748	AT1D	8**
External MiniSAS HD 8644/MiniSAS HD 8644 2m cable	00WE749	AT1E	8**
<b>Cable options for 1 Gb iSCSI and management ports</b>			
Lenovo Ethernet CAT5E shielded 6m cable	00WE747	AT1G	10***
<b>Spare cables for serial management ports</b>			
Lenovo USB A Male-to-Mini-B 1.5m cable	00WE746	AT1F	1

\* Up to two SFP/SFP+ modules per CNC, up to four modules per controller. Mixing module types is supported on different CNCs; ports on the same CNC must have the same connectivity type.

\*\* Up to two cables per CNC, up to four cables per controller.

\*\*\* Up to two cables per CNC with 1G RJ45 modules attached, up to five cables per controller (one cable for 1 GbE management port connection; up to four cables for CNC port connections with RJ-45 SFP+ modules installed).

## Expansion enclosures

The S3200 supports attachment of up to seven Lenovo Storage E1012 or E1024 expansion enclosures. Intermix of E1012 and E1024 is supported. The enclosures can be added to the system non-disruptively.

The following table lists the models of the E1012 and E1024 expansion enclosure models.

Table 5. Part numbers for ordering E1012 and E1024 models

Description	Part number
LFF models	
Lenovo Storage E1012 LFF Disk Expansion Single SAS IO Module, Rail Kit, 9x5 NBD	64111B1
Lenovo Storage E1012 LFF Disk Expansion Dual SAS IO Module, Rail Kit, 9x5 NBD	64111B2
SFF models	
Lenovo Storage E1024 SFF Disk Expansion Single SAS IO Module, Rail Kit, 9x5 NBD	64111B3
Lenovo Storage E1024 SFF Disk Expansion Dual SAS IO Module, Rail Kit, 9x5 NBD	64111B4

The part number for the E1012 or E1024 includes the following items:

- One enclosure with two power supplies and fans and with one or two expansion modules installed
- Two 4.3m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cables
- Lenovo Storage SAN Rack Mount Kit - Rails 25"-36"
- Getting Started Guide
- Warranty Flyer
- Important Notices Flyer
- Documentation CD-ROM

The E1012 and E1024 support single and dual expansion module configurations. Standard models of the E1012 and E1024 ship with two expansion modules (see Table 4). Custom models of the E1012 and E1024 can be configured with one or two expansion modules. Single module configurations can be upgraded to dual module configurations non-disruptively. The number of expansion modules in the E1012 or E1024 must match the number of RAID controllers in the S3200.

Each expansion module has two 6 Gb SAS x4 ports (Mini-SAS SFF-8088 connectors) labelled IN and OUT. These ports are used for connections to the S3200 and for daisy chaining the E1012 and E1024 enclosures between each other. The expansion port on the S3200 controller is connected to the IN port on the expansion module, and the OUT port on the expansion module is connected to the IN port on the expansion module in the adjacent enclosure and so on.

The expansion connectivity topology for dual controller configurations is illustrated in the following figure. For single controller configurations, only Controller A path is present.

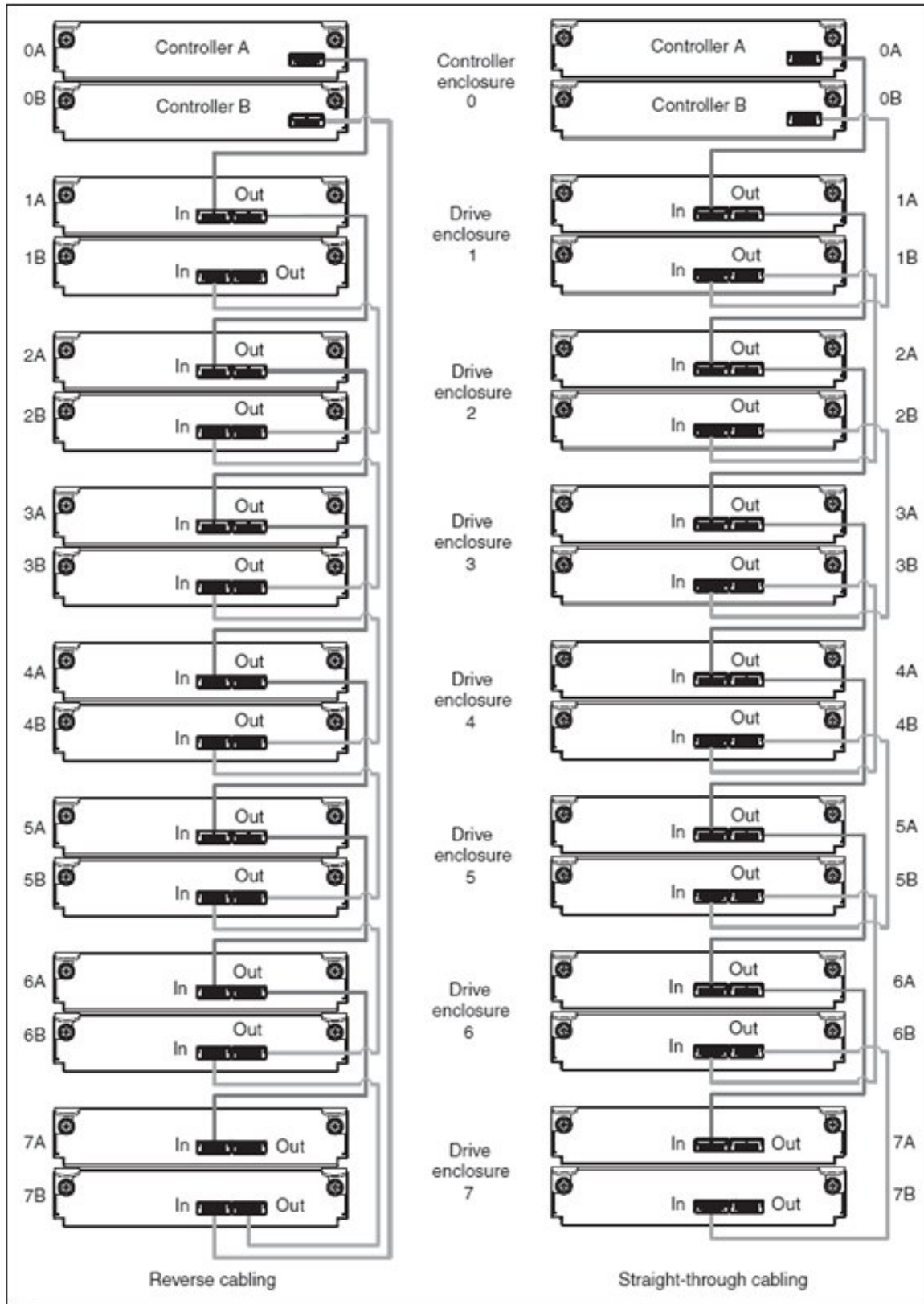


Figure 7. Expansion connectivity topology

The following table lists ordering information for the expansion modules and related connectivity options.

Table 6. Expansion modules and connectivity options

Description	Part number	Feature code (MTM 6411-HC3)	Max qty per one E1012 or E1024
Expansion modules			
Lenovo Storage Expansion SAS IO Module	00WC085	AT27	2
SAS expansion connectivity cables			
External MiniSAS 8088/MiniSAS 8088 0.6m cable	00WE754	AT1A	2*
External MiniSAS 8088/MiniSAS 8088 1m cable	00WE755	AT1B	2*
External MiniSAS 8088/MiniSAS 8088 2m cable	00WE756	AT1C	2*

\* One cable per SAS expansion module.

## Drives

The S3200 LFF chassis and the E1012 expansion enclosure support up to 12 LFF hot-swap drives, and the S3200 SFF chassis and the E1024 expansion enclosure support up to 24 SFF hot-swap drives.

The following table lists drive options for the S3200 LFF chassis and the E1012 expansion enclosure.

Table 7. LFF drive options

Description	Part number	Feature code (MTM 6411-HC2, 6411-HC3)	Max qty per one S3200 LFF or E1012
3.5-inch SAS hot-swap HDDs			
Lenovo Storage 3.5" 600GB 10K SAS HDD (2.5" in 3.5")	00WC040	AT21	12
Lenovo Storage 3.5" 900GB 10K SAS HDD (2.5" in 3.5")	00WC035	AT1Z	12
3.5-inch NL SAS hot-swap HDDs			
Lenovo Storage 3.5" 2TB 7.2k NL-SAS HDD	00MM735	AT1V	12
Lenovo Storage 3.5" 4TB 7.2k NL-SAS HDD	00MM730	AT1W	12
Lenovo Storage 3.5" 6TB 7.2k NL-SAS HDD	00MM725	AT1Y	12
Lenovo Storage 3.5" 8TB 7.2k NL-SAS HDD	00WE790	AT47	12
Lenovo Storage 3.5" 10TB 7.2k NL-SAS HDD	01DC631	AU7W	12
3.5-inch NL SAS hot-swap SEDs			
Lenovo Storage 3.5" 4TB 7.2k NL-SAS HDD (SED)	00WC025	AT1X	12
3.5-inch SAS hot-swap SSDs (10 DWD)			
Lenovo Storage 3.5" 400GB SSD SAS (2.5" in 3.5")	00WC030	AT20	12

The following table lists drive options for the S3200 SFF chassis and the E1024 expansion enclosure.

Table 8. SFF drive options

Description	Part number	Feature code (MTM 6411-HC2, 6411-HC3)	Max qty per one S3200 SFF or E1024
<b>2.5-inch SAS hot-swap HDDs</b>			
Lenovo Storage 2.5" 300GB 15k SAS HDD	00MM685	AT1H	24
Lenovo Storage 2.5" 600GB 10k SAS HDD	00MM700	AT1K	24
Lenovo Storage 2.5" 600GB 15k SAS HDD	00MM680	AT1J	24
Lenovo Storage 2.5" 900GB 10k SAS HDD	00MM695	AT1M	24
Lenovo Storage 2.5" 1.2TB 10k SAS HDD	00MM690	AT1P	24
Lenovo Storage 2.5" 1.8TB 10k SAS HDD	00YG718	ATSK	24
<b>2.5-inch SAS hot-swap SEDs</b>			
Lenovo Storage 2.5" 600GB 10k SAS HDD (SED)	00WC020	AT1L	24
Lenovo Storage 2.5" 900GB 10k SAS HDD (SED)	00MM745	AT1N	24
Lenovo Storage 2.5" 1.2TB 10k SAS HDD (SED)	00MM740	AT1Q	24
<b>2.5-inch NL SAS hot-swap HDDs</b>			
Lenovo Storage 2.5" 1TB 7.2k NL-SAS HDD	00MM705	AT1R	24
Lenovo Storage 2.5" 2TB 7.2k NL-SAS HDD	00YG698	ATSL	24
<b>2.5-inch SAS hot-swap SSDs (1 DWD)</b>			
Lenovo Storage 2.5" 3.84TB 1DWD SSD	01CX868	AUJN	24
<b>2.5-inch SAS hot-swap SSDs (3 DWD)</b>			
Lenovo Storage 2.5" 400GB 3DWD SSD	00YH988	AU22	24
Lenovo Storage 2.5" 800GB 3DWD SSD	00YH978	AU21	24
Lenovo Storage 2.5" 1.6TB 3DWD SSD	00YH968	AU20	24
<b>2.5-inch SAS hot-swap SSDs (10 DWD)</b>			
Lenovo Storage 2.5" 400GB SSD (SAS)	00MM720	AT1S	24
Lenovo Storage 2.5" 800GB SSD (SAS)	00MM715	AT1T	24
Lenovo Storage 2.5" 1.6TB SSD (SAS)	00MM710	AT1U	24
<b>2.5-inch SAS hot-swap SED SSDs (10 DWD)</b>			
Lenovo Storage 2.5" 400GB 10DWD SED SSD	00YH983	AU24	24
Lenovo Storage 2.5" 800GB 10DWD SED SSD	00YH973	AU23	24

## Software

The S3200 comes standard with the following software features:

- Intelligent Real-time Tiering for HDDs
- Virtualized Storage Pools
- Thin Provisioning
- SSD Read Cache
- Rapid RAID Rebuild
- Snapshots - up to 128 targets.

The functionality of the S3200 can be expanded with the following optional software features:

- Intelligent Real-time Tiering for SSDs (Required for hybrid array configurations with SSDs and HDDs)
- Snapshots - up to 512 targets
- Snapshots - up to 1,024 targets
- Asynchronous replication

The following table lists ordering information for optional software features.

Table 9. Optional software features

Description	Part number	Feature code (MTM 6411-HC2)	Max qty per one S3200
Lenovo Storage S2200/S3200 512 Snapshot Upgrade	00WE761	AT2E	1
Lenovo Storage S3200 1024 Snapshot Upgrade	00WE787	AT2F	1
Lenovo Storage SSD Data Tiering Upgrade	00WE764	AT2J	1*
Lenovo Storage S2200/S3200 Asynchronous Replication Upgrade	00YG676	ATRJ	1**

\* Prior to the firmware version GL221R019-05, the SSD Data Tiering Upgrade option was required for all flash array configurations (a storage system with SSDs only; no HDDs installed) and for hybrid array configurations (a storage system with SSDs and HDDs). With the firmware version GL221R019-05 or later, the SSD Data Tiering Upgrade option is no longer required for all flash array configurations, however, it is required for hybrid configurations.

\*\* Asynchronous Replication requires an FC and iSCSI Controller-based S3200 storage unit.

Software maintenance for standard software features is included in the S3200 base warranty and optional warranty extensions, which provides 3-year software support with the option to extend it up to 5 years in 1-year or 2-year increments (see the Warranty section for details).

Optional software features that are listed in Table 9 include 3-year software maintenance with the ability to extend it up to 5 years in 1-year or 2-year increments with the purchase of the software maintenance extension options that are listed in the following table.

**Note:** The S3200 must have active warranty coverage for the duration of an intended software maintenance extension period.

Table 10. Software maintenance extension options

Description	Part number	Feature code (MTM 6411-HC2)
Lenovo Storage 512 Snapshot Upgrade Maintenance 1 yr	00WF825	ATT4
Lenovo Storage 512 Snapshot Upgrade Maintenance 2 yr	00WF829	ATT5
Lenovo Storage 1024 Snapshot Upgrade Maintenance 1 yr	00WF833	ATT6
Lenovo Storage 1024 Snapshot Upgrade Maintenance 2 yr	00WF837	ATT7
Lenovo Storage SSD Data Tiering Maintenance 1 yr	00WF841	ATT8
Lenovo Storage SSD Data Tiering Maintenance 2 yr	00WF845	ATT9
Lenovo Storage Asynch Replication Maintenance 1yr	00YG680	ATTA
Lenovo Storage Asynch Replication Maintenance 2yr	00YG684	ATTB



## Power cables

The S3200, E1012, and E1024 ship standard with two 4.3m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cables. Other power cable options are also available, and the part numbers and feature codes to order the power cables (two power cables are required per each S3200, E1012, and E1024) are listed in the following table.

Table 11. Part numbers and feature codes for ordering power cables

Description	Part number	Feature code (MTM 6411-HC2, 6411-HC3)
<b>Rack power cables</b>		
1.2m, 10A/100-250V, 2 Short C13s to Short C14 Rack Power Cable	47C2487	A3SS
1.2m, 16A/100-250V, 2 Short C13s to Short C20 Rack Power Cable	47C2491	A3SW
1.5m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	39Y7937	6201
2.5m, 10A/100-250V, 2 Long C13s to Short C14 Rack Power Cable	47C2488	A3ST
2.5m, 16A/100-250V, 2 Long C13s to Short C20 Rack Power Cable	47C2492	A3SX
2.8m, 10A/100-250V, 2 Short C13s to Long C14 Rack Power Cable	47C2489	A3SU
2.8m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	None*	6311
2.8m, 10A/100-250V, C13 to IEC 320-C20 Rack Power Cable	39Y7938	6204
2.8m, 16A/100-250V, 2 Short C13s to Long C20 Rack Power Cable	47C2493	A3SY
4.1m, 10A/100-250V, 2 Long C13s to Long C14 Rack Power Cable	47C2490	A3SV
4.1m, 16A/100-250V, 2 Long C13s to Long C20 Rack Power Cable	47C2494	A3SZ
4.3m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	39Y7932	6263
<b>Country-specific power cords</b>		
10A/125V C13 to NEMA 5-15P 4.3m line cord	39Y7931	6207
10A/250V C13 to NEMA 6-15P 2.8m line cord	46M2592	A1RF
Argentina 10A/250V C13 to IRAM 2073 2.8m line cord	39Y7930	6222
Australia/NZ 10A/250V C13 to AS/NZ 3112 2.8m line cord	39Y7924	6211
Brazil 10A/250V C13 to NBR 14136 2.8m line cord	69Y1988	6532
China 10A/250V C13 to GB 2099.1 2.8m line cord	39Y7928	6210
Denmark 10A/250V C13 to DK2-5a 2.8m line cord	39Y7918	6213
European 10A/230V C13 to CEE7-VII 2.8m line cord	39Y7917	6212
India 10A/250V C13 to IS 6538 2.8m line cord	39Y7927	6269
Israel 10A/250V C13 to SI 32 2.8m line cord	39Y7920	6218
Italy 10A/250V C13 to CEI 23-16 2.8m line cord	39Y7921	6217
Japan 12A/125V C13 to JIS C-8303 2.8m line cord	46M2593	A1RE
Korea 12A/250V C13 to KETI 2.8m line cord	39Y7925	6219
South Africa 10A/250V C13 to SABS 164 2.8m line cord	39Y7922	6214
Switzerland 10A/250V C13 to SEV 1011-S24507 2.8m line cord	39Y7919	6216
Taiwan 15A/125V C13/CNS 10917 2.8m line cord	00CG267	6402
United Kingdom 10A/250V C13 to BS 1363/A 2.8m line cord	39Y7923	6215

## Physical specifications

The S3200, E1012, and E1024 have the following dimensions and weight (approximate):

- LFF chassis
  - Height: 87 mm (3.4 in.)
  - Width: 447 mm (17.6 in.)
  - Depth: 523 mm (20.6 in.)
- SFF chassis
  - Height: 89 mm (3.5 in.)
  - Width: 447 mm (17.6 in.)
  - Depth: 519 mm (20.5 in.)
- Weight
  - S3200 LFF: Minimum: 18.4 kg (40.6 lb); Maximum: 28.2 kg (62.2 lb)
  - S3200 SFF: Minimum: 18.5 kg (40.8 lb); Maximum: 25.0 kg (55.2 lb)
  - E1012: Minimum: 16.8 kg (37.0 lb); Maximum: 26.6 kg (58.6 lb)
  - E1024: Minimum: 16.9 kg (37.2 lb); Maximum: 23.4 kg (51.6 lb)

## Operating environment

The S3200, E1012, and E1024 are supported in the following environment:

- Air temperature:
  - Operating: 5 °C to 40 °C (41 °F to 104 °F); decrease the maximum ambient temperature by 3.3 °C for every 1,000 m (3,280 ft)
  - Storage: -10 °C to +60 °C (14 °F to 140 °F)
  - Maximum altitude: 3,000 m (9,842 ft)
- Humidity:
  - Operating: 8% to 85% (non-condensing)
  - Storage: 5% to 90% (non-condensing)
- Electrical:
  - 100 to 240 (nominal) V AC; 50 Hz to 60 Hz
- BTU output: 1488 Btu/hr (436 W)
- Noise level: 6.8 bels

## Warranty

The S3200 has a three-year parts only warranty with 9x5/next business day (NBD) terms. Lenovo offers the service upgrades through warranty maintenance upgrades and post-warranty maintenance agreements with a well-defined scope of services, including service hours, response time, term of service, and service agreement terms and conditions.

Lenovo warranty service upgrade offerings are country-specific. Not all warranty service upgrades are available in every country. For more information about Lenovo warranty service upgrade offerings that are available in your country, go to the Data Center Advisor and Configurator (formerly known as LESC) website <http://lesc.lenovo.com>, then do the following steps:

1. In the Parts & Services box in the middle of the page, click the **Services only** radio button.
2. In the same box, type in your machine type model and press Enter.
3. From the search results, you can click either **Deployment Services** or **Support Services** to view the offerings.

The following table explains warranty service definitions for the S3200 system in more detail.

Table 12. Warranty service definitions

Term	Description
On-site service	A service technician will arrive at the client's location for equipment service.
24x7x4 hour	A service technician is scheduled to arrive at the client's location within four hours after remote problem determination is completed. Lenovo provides service around the clock, every day, including Lenovo holidays.
9x5x4 hour	A service technician is scheduled to arrive at the client's location within four business hours after remote problem determination is completed. Lenovo provides service 8:00 am - 5:00 pm in the client's local time zone, Monday-Friday, excluding Lenovo holidays. For example, if a customer reports an incident at 3:00 pm on Friday, the technician will arrive by 10:00 am the following Monday.
9x5 next business day	A service technician is scheduled to arrive at the client's location on the business day after remote problem determination is completed. Lenovo provides service 8:00 am - 5:00 pm in the client's local time zone, Monday - Friday, excluding Lenovo holidays. Calls received after 4:00 pm local time require an extra business day for service dispatch. Next business day service is not guaranteed.

In general, the types of Lenovo warranty service upgrades for the S3200 are as follows:

- Warranty and maintenance service upgrades:
  - Onsite support for 9x5 NBD coverage
  - 4-hour target response time with onsite, 9x5 or 24x7 service coverage
  - Up to five years of warranty extension for all service levels in one or two year increments
- Hard Drive Retention
 

Lenovo's Hard Drive Retention service is a multi-drive hard drive retention offering that ensures your data is always under your control, regardless of the number of hard drives that are installed in your Lenovo system. In the unlikely event of a hard drive failure, you retain possession of your hard drive while Lenovo replaces the failed drive part. Your data stays safely on your premises, in your hands. The Hard Drive Retention service can be purchased in convenient bundles with our warranty upgrades and extensions.

## Regulatory compliance

The S3200 conforms to the following regulations:

- UL 60950-1, 2nd Edition, 2007-03-27 (USA)
- CAN/CSA-C22.2 No 60950-1-07, 2nd Edition, 2007-03 (Canada)
- IEC 60950-1:2005 (2nd Edition); Am 1:2009
- EN 60950-1:2005, 2nd Edition, AM1 2009 (EU)
- CFR 47 Part 15 Subpart B Class A (USA FCC)
- ICES-003:2012, Class A (Canada)
- EN 55022: 2010 Class A (EU)
- EN 55024: 2010 (EU)
- AS/NZS CISPR 22 -2009 Class A
- CNS 14338 (2006)
- KN22 Class A
- VCCI Technical Requirements 2012 Class A
- RoHS Directive 2011/65/EU
- EAC
- NOM
- BMSI
- CCC

## Interoperability

Lenovo provides end-to-end storage compatibility testing to deliver interoperability throughout the network. The S3200 supports attachment to Lenovo System x, ThinkServer, and Flex System hosts by using SAS, iSCSI, Fibre Channel, or Fibre Channel over Ethernet (FCoE) (via the FCoE gateway) storage connectivity protocols. Hybrid storage connectivity is also supported.

### SAS interoperability

The System x and ThinkServer SAS adapters that are listed in the following table are compatible with the S3200 SAS storage (direct attach).

Table 13. S3200 SAS adapter interoperability

Description	Part number
System x servers	
N2125 SAS/SATA HBA	46C9010
N2225 SAS/SATA HBA	00AE912
N2226 SAS/SATA HBA	00AE916
ThinkServer servers	
Lenovo ThinkServer 9300-8e PCIe 12Gb 8 Port External SAS Adapter by LSI	4XB0F28703

### iSCSI interoperability

The S3200 supports iSCSI attachments via standard 1 Gb or 10 Gb Ethernet network. Any compatible Ethernet switch, including Lenovo RackSwitch top of rack (TOR) switches and integrated Flex System Ethernet I/O modules, can be used to provide iSCSI connectivity with the S3200 iSCSI storage.

With software iSCSI initiators, any supported 1 Gb Ethernet or 10 Gb Ethernet adapter for System x, ThinkServer, or Flex System is compatible with the S3200 iSCSI storage. For hardware iSCSI initiators (iSCSI HBAs), check the S3200 support page on the Lenovo support web site (<http://support.lenovo.com>) or ask a Lenovo representative.

## Fibre Channel interoperability

The S3200 supports direct FC attachments and FC switch based attachments. Brocade and QLogic SAN switches can be used to provide FC connectivity with the S3200 FC storage.

The System x, ThinkServer, and Flex System FC adapters that are listed in the following table are compatible with the S3200 FC storage.

Table 14. S3200 FC adapter interoperability

Description	Part number
<b>System x servers - 16 Gb FC</b>	
Brocade 16Gb FC Dual-port HBA	81Y1675
Brocade 16Gb FC Single-port HBA	81Y1668
Emulex 16Gb FC Dual-port HBA	81Y1662
Emulex 16Gb FC Single-port HBA	81Y1655
QLogic 16Gb FC Single-port HBA	00Y3337
QLogic 16Gb FC Dual-port HBA	00Y3341
<b>System x servers - 8 Gb FC</b>	
Brocade 8Gb FC Dual-port HBA	46M6050
Brocade 8Gb FC Single-port HBA	46M6049
Emulex 8Gb FC Dual-port HBA	42D0494
Emulex 8Gb FC Single-port HBA	42D0485
QLogic 8Gb FC Dual-port HBA	42D0510
QLogic 8Gb FC Single-port HBA	42D0501
<b>ThinkServer servers - 16 Gb FC</b>	
ThinkServer QLE2672 PCIe 16Gb 2 Port FC Adapter by Qlogic	4XC0F28745
ThinkServer LPe16000B Single Port 16Gb FC HBA by Emulex	4XB0F28653
ThinkServer LPe16002B Dual Port 16Gb Fiber Channel HBA by Emulex	4XB0F28650
ThinkServer LPe16002B-M6-L PCIe 16Gb 2 Port FC HBA by Emulex	4XB0F28705
ThinkServer LPe16004B-M6-L PCIe 16Gb 4 Port FC HBA by Emulex	4XB0F28681
ThinkServer LPm16002-M6-L AnyFabric 16Gb 2 Port FC HBA by Emulex	4XB0F28706
<b>ThinkServer servers - 8 Gb FC</b>	
ThinkServer QLE2562 Dual Port 8Gb Fibre Channel HBA by Qlogic	0C19482
ThinkServer LPe16002B-M8-L PCIe 8Gb 2 Port FC HBA by Emulex	4XB0F28704
ThinkServer LPe15004B-M8-L PCIe 8Gb 4 Port FC HBA by Emulex	4XB0F28682
ThinkServer LPm15004-M8-L AnyFabric 8Gb 4 Port FC HBA by Emulex	4XB0F28707
<b>Flex System - 16 Gb FC</b>	
Flex System FC5052 2-port 16Gb FC Adapter	95Y2386
Flex System FC5172 2-port 16Gb FC Adapter	69Y1942
<b>Flex System - 8 Gb FC</b>	
Flex System FC3052 2-port 8Gb FC Adapter	95Y2375
Flex System FC3172 2-port 8Gb FC Adapter	69Y1938

## Networking switches

The following table lists the Ethernet and Fibre Channel rack mount switches offered by Lenovo that can be used in S3200 storage solutions.

Table 15. Ethernet and Fibre Channel rack mount switches

Description	Part number
<b>1 Gb Ethernet (iSCSI connectivity)</b>	
Lenovo RackSwitch G7028 (Rear to Front)	7159BAX
Lenovo RackSwitch G7052 (Rear to Front)	7159CAX
Lenovo RackSwitch G8052 (Rear to Front)	7159G52
<b>10 Gb Ethernet (iSCSI connectivity, FCoE transit switch)</b>	
Lenovo RackSwitch G8124E (Rear to Front)	7159BR6
Lenovo RackSwitch G8264 (Rear to Front)	7159G64
Lenovo RackSwitch G8272 (Rear to Front)	7159CRW
Lenovo RackSwitch G8296 (Rear to Front)	7159GR6
<b>Converged 10 GbE and 8 Gb FC (iSCSI connectivity, FCoE gateway)</b>	
Lenovo RackSwitch G8264CS (Rear to Front)	7159DRX
<b>8 Gb Fibre Channel</b>	
Lenovo B300, 8 ports activated w/ 8Gb SWL SFPs, 1 PS, Rail Kit	3873AR3
Lenovo B6505, 12 ports activated w/ 8Gb SWL SFPs, 1 PS, Rail Kit	3873AR4
Lenovo B6510, 24 ports activated w/ 8Gb SWL SFPs, 2 PS, Rail Kit	3873BR2
<b>16 Gb Fibre Channel</b>	
Lenovo B6505, 12 ports activated w/ 16Gb SWL SFPs, 1 PS, Rail Kit	3873AR5
Lenovo B6510, 24 ports activated w/ 16Gb SWL SFPs, 2 PS, Rail Kit	3873BR3

The following table lists the Ethernet and Fibre Channel integrated switches for Flex System that can be used in S3200 storage solutions.

Table 16. Ethernet and Fibre Channel integrated switches for Flex System

Description	Part number
<b>10 Gb Ethernet (iSCSI connectivity, FCoE transit switch)</b>	
Lenovo Flex System Fabric EN4093R 10Gb Scalable Switch	00FM514
Cisco Nexus B22 Fabric Extender for Flex System*	94Y5350
Cisco Nexus B22 Fabric Extender with FET bundle for Flex System*	94Y5355
<b>Converged 10 GbE and 8 Gb FC (iSCSI connectivity, FCoE gateway)</b>	
Lenovo Flex System Fabric CN4093 10Gb Converged Scalable Switch	00FM510
<b>Converged 10 GbE and 16 Gb FC (iSCSI connectivity, FCoE gateway)</b>	
Flex System EN4023 10Gb Scalable Switch	94Y5212
<b>16 Gb Fibre Channel</b>	
Flex System FC5022 16 Gb SAN Scalable Switch	88Y6374
Flex System FC5022 24-port 16 Gb SAN Scalable Switch (includes two 16 Gb SFPs)	00Y3324
Flex System FC5022 24-port 16 Gb ESB SAN Scalable Switch	90Y9356

\* Requires a supported Cisco Nexus top of rack switch.

## Operating systems

The S3200 supports host attachments with the following host operating systems:

- Microsoft Windows Server 2012 R2
- Microsoft Windows Server 2012 R2 (Hyper-V + NPV)
- Microsoft Windows Server 2012
- Red Hat Enterprise Linux 7
- Red Hat Enterprise Linux 6 (Update 6)
- SUSE Linux Enterprise Server 12
- SUSE Linux Enterprise Server 11 (SP3)
- SUSE Linux Enterprise Server 10 (SP4)
- VMware vSphere 6.0
- VMware vSphere 5.5

Other configurations might be supported; for the most recent information check the S3200 support page on the Lenovo support web site (<http://support.lenovo.com>) or ask a Lenovo representative.

## Rack cabinets

The following table lists the rack cabinets offered by Lenovo that can be used in S3200 storage solutions.

Table 17. Rack cabinets

Description	Part number
11U Rack Office Enablement Kit	201886X
25U S2 Standard Rack	93072RX
25U Static S2 Standard Rack	93072PX
42U S2 Standard Rack	93074RX
42U 1100mm Enterprise V2 Dynamic Rack	93634PX
42U 1100mm Enterprise V2 Dynamic Expansion Rack	93634EX
42U 1200mm Deep Dynamic Rack	93604PX
42U 1200mm Deep Static Rack	93614PX
42U Enterprise Rack	93084PX
42U Enterprise Expansion Rack	93084EX

For more information, see the list of Product Guides in the Rack cabinets category:  
<http://lenovopress.com/servers/options/racks>

## Power distribution units

The following table lists the the power distribution units (PDUs) that are offered by Lenovo that can be used in S3200 storage solutions.

Table 18. Power distribution units

Description	Part number
<b>0U Basic PDUs</b>	
0U 36 C13/6 C19 24A/200-240V 1 Phase PDU with NEMA L6-30P line cord	00YJ776
0U 36 C13/6 C19 32A/200-240V 1 Phase PDU with IEC60309 332P6 line cord	00YJ777
0U 21 C13/12 C19 32A/200-240V/346-415V 3 Phase PDU with IEC60309 532P6 line cord	00YJ778
0U 21 C13/12 C19 48A/200-240V 3 Phase PDU with IEC60309 460P9 line cord	00YJ779
<b>Switched and Monitored PDUs</b>	
0U 20 C13/4 C19 Switched and Monitored 24A/200-240V/1Ph PDU w/ NEMA L6-30P line cord	00YJ781
0U 20 C13/4 C19 Switched and Monitored 32A/200-240V/1Ph PDU w/ IEC60309 332P6 line cord	00YJ780
0U 18 C13/6 C19 Switched / Monitored 32A/200-240V/346-415V/3Ph PDU w/ IEC60309 532P6 cord	00YJ782
0U 12 C13/12 C19 Switched and Monitored 48A/200-240V/3Ph PDU w/ IEC60309 460P9 line cord	00YJ783
1U 9 C19/3 C13 Switched and Monitored DPI PDU (without line cord)	46M4002
1U 9 C19/3 C13 Switched and Monitored 60A 3Ph PDU with IEC 309 3P+Gnd cord	46M4003
1U 12 C13 Switched and Monitored DPI PDU (without line cord)	46M4004
1U 12 C13 Switched and Monitored 60A 3 Phase PDU with IEC 309 3P+Gnd line cord	46M4005
<b>Ultra Density Enterprise PDUs (9x IEC 320 C13 + 3x IEC 320 C19 outlets)</b>	
Ultra Density Enterprise C19/C13 PDU Module (without line cord)	71762NX
Ultra Density Enterprise C19/C13 PDU 60A/208V/3ph with IEC 309 3P+Gnd line cord	71763NU
<b>C13 Enterprise PDUs (12x IEC 320 C13 outlets)</b>	
DPI C13 Enterprise PDU+ (without line cord)	39M2816
DPI Single Phase C13 Enterprise PDU (without line cord)	39Y8941
<b>C19 Enterprise PDUs (6x IEC 320 C19 outlets)</b>	
DPI Single Phase C19 Enterprise PDU (without line cord)	39Y8948
DPI 60A 3 Phase C19 Enterprise PDU with IEC 309 3P+G (208 V) fixed line cord	39Y8923
<b>Front-end PDUs (3x IEC 320 C19 outlets)</b>	
DPI 30amp/125V Front-end PDU with NEMA L5-30P line cord	39Y8938
DPI 30amp/250V Front-end PDU with NEMA L6-30P line cord	39Y8939
DPI 32amp/250V Front-end PDU with IEC 309 2P+Gnd line cord	39Y8934
DPI 60amp/250V Front-end PDU with IEC 309 2P+Gnd line cord	39Y8940
DPI 63amp/250V Front-end PDU with IEC 309 2P+Gnd line cord	39Y8935
<b>Universal PDUs (7x IEC 320 C13 outlets)</b>	
DPI Universal 7 C13 PDU (with 2 m IEC 320-C19 to C20 rack power cord)	00YE443
<b>NEMA PDUs (6x NEMA 5-15R outlets)</b>	
DPI 100-127V PDU with fixed NEMA L5-15P line cord	39Y8905
<b>Line cords for PDUs that ship without a line cord</b>	
DPI 30a Line Cord (NEMA L6-30P)	40K9614
DPI 32a Line Cord (IEC 309 P+N+G)	40K9612



Description	Part number
DPI 32a Line Cord (IEC 309 3P+N+G)	40K9611
DPI 60a Cord (IEC 309 2P+G)	40K9615
DPI 63a Cord (IEC 309 P+N+G)	40K9613
DPI Australian/NZ 3112 Line Cord (32A)	40K9617
DPI Korean 8305 Line Cord (30A)	40K9618

For more information, see the list of Product Guides in the Power Distribution Units category:  
<http://lenovopress.com/servers/options/pdu>

## Uninterruptible power supply units

The following table list the uninterruptible power supply (UPS) units that are offered by Lenovo that can be used in S3200 storage solutions.

Table 19. Uninterruptible power supply units

Description	Part number
RT1.5kVA 2U Rack or Tower UPS (100-125VAC)	55941AX
RT1.5kVA 2U Rack or Tower UPS (200-240VAC)	55941KX
RT2.2kVA 2U Rack or Tower UPS (100-125VAC)	55942AX
RT2.2kVA 2U Rack or Tower UPS (200-240VAC)	55942KX
RT3kVA 2U Rack or Tower UPS (100-125VAC)	55943AX
RT3kVA 2U Rack or Tower UPS (200-240VAC)	55943KX
RT5kVA 3U Rack or Tower UPS (200-240VAC)	55945KX
RT6kVA 3U Rack or Tower UPS (200-240VAC)	55946KX
RT8kVA 6U Rack or Tower UPS (200-240VAC)	55948KX
RT11kVA 6U Rack or Tower UPS (200-240VAC)	55949KX
RT8kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC)	55948PX
RT11kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC)	55949PX

For more information, see the list of Product Guides in the Uninterruptible Power Supply Units category:  
<http://lenovopress.com/servers/options/ups>

## Lenovo Financial Services

Lenovo Financial Services reinforces Lenovo's commitment to deliver pioneering products and services that are recognized for their quality, excellence, and trustworthiness. Lenovo Financial Services offers financing solutions and services that complement your technology solution anywhere in the world.

We are dedicated to delivering a positive finance experience for customers like you who want to maximize your purchase power by obtaining the technology you need today, protect against technology obsolescence, and preserve your capital for other uses.

We work with businesses, non-profit organizations, governments and educational institutions to finance their entire technology solution. We focus on making it easy to do business with us. Our highly experienced team of finance professionals operates in a work culture that emphasizes the importance of providing outstanding customer service. Our systems, processes and flexible policies support our goal of providing customers with a positive experience.

We finance your entire solution. Unlike others, we allow you to bundle everything you need from hardware and software to service contracts, installation costs, training fees, and sales tax. If you decide weeks or months later to add to your solution, we can consolidate everything into a single invoice.

Our Premier Client services provide large accounts with special handling services to ensure these complex transactions are serviced properly. As a premier client, you have a dedicated finance specialist who manages your account through its life, from first invoice through asset return or purchase. This specialist develops an in-depth understanding of your invoice and payment requirements. For you, this dedication provides a high-quality, easy, and positive financing experience.

For your region specific offers please ask your Lenovo sales representative or your technology provider about the use of Lenovo Financial Services. For more information, see the following Lenovo website: <http://www.lenovofs.com>

## Related publications and links

For more information, see the following documents:

- [Lenovo Storage S3200 product page](http://www.lenovo.com/systems/storage)
- [Lenovo Hardware Configurator:](http://lesc.lenovo.com/products/hardware/configurator/bhui/launchNI.wss)
- [Lenovo Storage S3200 support:](http://support.lenovo.com/us/en/products/Servers/Lenovo-Storage/Lenovo-Storage-S3200)

## Related product families

Product families related to this document are the following:

- [Lenovo Storage](#)
- [External Storage](#)

## Notices

Lenovo may not offer the products, services, or features discussed in this document in all countries. Consult your local Lenovo representative for information on the products and services currently available in your area. Any reference to a Lenovo product, program, or service is not intended to state or imply that only that Lenovo product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any Lenovo intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any other product, program, or service. Lenovo may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

Lenovo (United States), Inc.  
1009 Think Place - Building One  
Morrisville, NC 27560  
U.S.A.  
Attention: Lenovo Director of Licensing

LENOVO PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some jurisdictions do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. Lenovo may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

The products described in this document are not intended for use in implantation or other life support applications where malfunction may result in injury or death to persons. The information contained in this document does not affect or change Lenovo product specifications or warranties. Nothing in this document shall operate as an express or implied license or indemnity under the intellectual property rights of Lenovo or third parties. All information contained in this document was obtained in specific environments and is presented as an illustration. The result obtained in other operating environments may vary. Lenovo may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Any references in this publication to non-Lenovo Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this Lenovo product, and use of those Web sites is at your own risk. Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

**© Copyright Lenovo 2016. All rights reserved.**

This document, TIPS1299, was created or updated on December 6, 2016.

Send us your comments in one of the following ways:

- Use the online Contact us review form found at:  
<http://lenovopress.com/TIPS1299>
- Send your comments in an e-mail to:  
[comments@lenovopress.com](mailto:comments@lenovopress.com)

This document is available online at <http://lenovopress.com/TIPS1299>.

## Trademarks

Lenovo, the Lenovo logo, and For Those Who Do are trademarks or registered trademarks of Lenovo in the United States, other countries, or both. A current list of Lenovo trademarks is available on the Web at <http://www.lenovo.com/legal/copytrade.html>.

The following terms are trademarks of Lenovo in the United States, other countries, or both:

Lenovo®

ThinkServer®

TopSeller™

System x®

Flex System™

RackSwitch™

AnyFabric™

The following terms are trademarks of other companies:

Linux® is a trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft® and Windows® are trademarks of Microsoft Corporation in the United States, other countries, or both.

Other company, product, or service names may be trademarks or service marks of others.