



Lenovo Storage D1212 and D1224 Drive Enclosures Product Guide

The Lenovo Storage D1212 and D1224 Disk Expansion Enclosures offer 12 Gbps SAS direct-attached storage expansion capabilities that are designed to provide simplicity, speed, scalability, security, and high availability for small to large businesses. The D1212 and D1224 deliver enterprise-class storage technology in a cost-effective solution with flexible drive configurations and RAID or JBOD (non-RAID) host connectivity.

The D1212 and D1224 expansion units are designed for a wide range of workloads, including big data and analytics, video surveillance, media streaming, private clouds, file and print serving, e-mail and collaboration, and databases. They also well-suited for software defined storage (SDS) and Windows Server solutions with Storage Spaces.



Figure 1. Lenovo Storage D1212 and D1224 Disk Expansion Enclosures

Did you know?

The D1212 and D1224 expansion enclosures offer 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).

With support for daisy chaining, the D1212 can be scaled up to 960 TB for capacity-optimized configurations with HDDs, and the D1224 can be scaled up to 192 drives for performance-optimized configurations.

The D1212 and D1224 expansion units support 12 Gbps SAS connectivity, which doubles the data transfer rate compared to 6 Gb SAS solutions to maximize performance of storage I/O-intensive applications.

Key features

Key features and benefits provided by the D1212 and D1224 storage expansion enclosures include:

- Versatile, scalable storage expansion with dual Environmental service Module (ESM) configurations for high availability and performance
- Flexible host connectivity to match diverse client needs for direct attach storage with support for 12 Gb SAS RAID adapters for advanced data protection or 12 Gb SAS Host Bus Adapter (HBA) for maximum JBOD performance
- 12 Gb SAS drive-side connectivity with support for 12x 3.5-inch large form factor (LFF) drives in the D1212 enclosure or 24x 2.5-inch small form factor (SFF) drives in the D1224 enclosure
- Scalability of up to 96 LFF or 192 SFF drives per RAID adapter or HBA with the attachment of up to eight D1212 or D1224 daisy-chained expansion enclosures, or a combination of both, 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 on a single RAID adapter or HBA to perfectly meet performance and capacity requirements for various workloads
- Self-encrypting drives with a supported RAID adapter allow clients to secure their sensitive data and to comply with various security regulations when required
- Support multiple host attachments and SAS zoning for storage partitioning

The D1212 and D1224 are 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 SAS drives are supported by the D1212:

- High performance solid-state drives (3 drive writes per day [DWD] and 10 DWD): 400 GB
- Performance-optimized, enterprise class disk drives: 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
- High-capacity, archival-class nearline self-encrypting disk drives: 4 TB 7.2K rpm

The following 2.5-inch SAS drives are supported by the D1224:

- 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): 800 GB
- Capacity optimized solid-state drives (3 DWD): 3.84 TB
- Capacity optimized solid-state drives (1 DWD): 3.84 TB and 7.68 TB
- Performance-optimized, enterprise class disk drives
 - 300 GB, 600 GB, and 900 GB 15K rpm
 - 600 GB, 900 GB, 1.2 TB, and 1.8 TB 10K rpm
- Performance-optimized, enterprise class self-encrypting disk drives: 1.2 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 (operating system dependent), helping to quickly and seamlessly respond to growing capacity demands.

The D1212 and D1224 expansion enclosures are designed to offer high levels of system and data availability with the following technologies:

- Dual ESMs provide redundant paths from a supported RAID controller to the drives in the enclosures for I/O load balancing and failover
- Dual-port drives (both HDDs and SSDs) with automatic drive failure detection and RAID rebuild with global hot spares with a supported RAID adapter
- Redundant hardware, including host ports, ESMs, and power and cooling modules (PCMs)
- Hot-swappable and customer replaceable components, including ESMs, PCMs, and drives

Components and connectors

The following figure shows the front of the D1212 drive expansion enclosure.

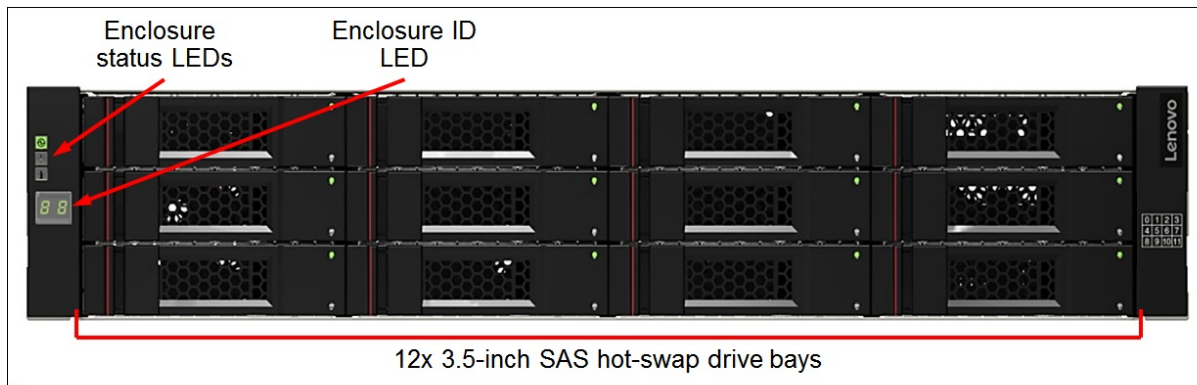


Figure 2. Front view of the D1212 drive enclosure

The following figure shows the front of the D1224 drive expansion enclosure.

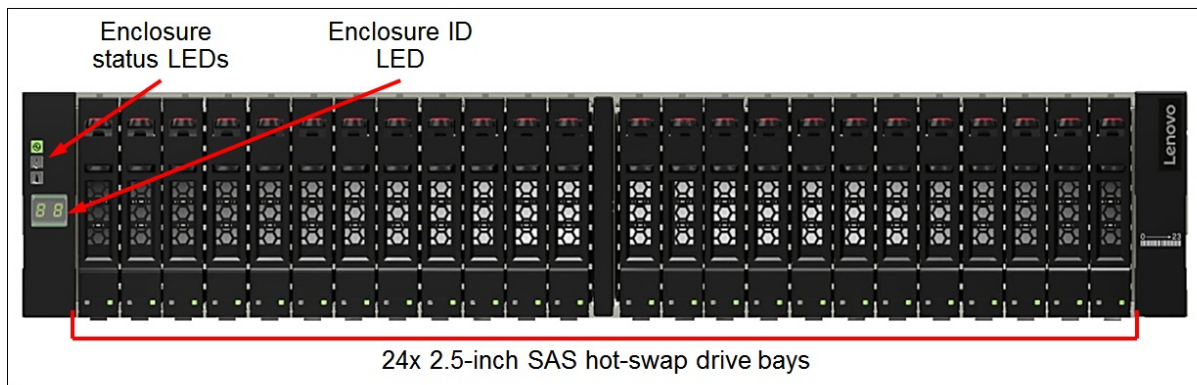


Figure 3. Front view of the D1224 drive enclosure

The following figure shows the rear of the D1212 and D1224 drive enclosures.

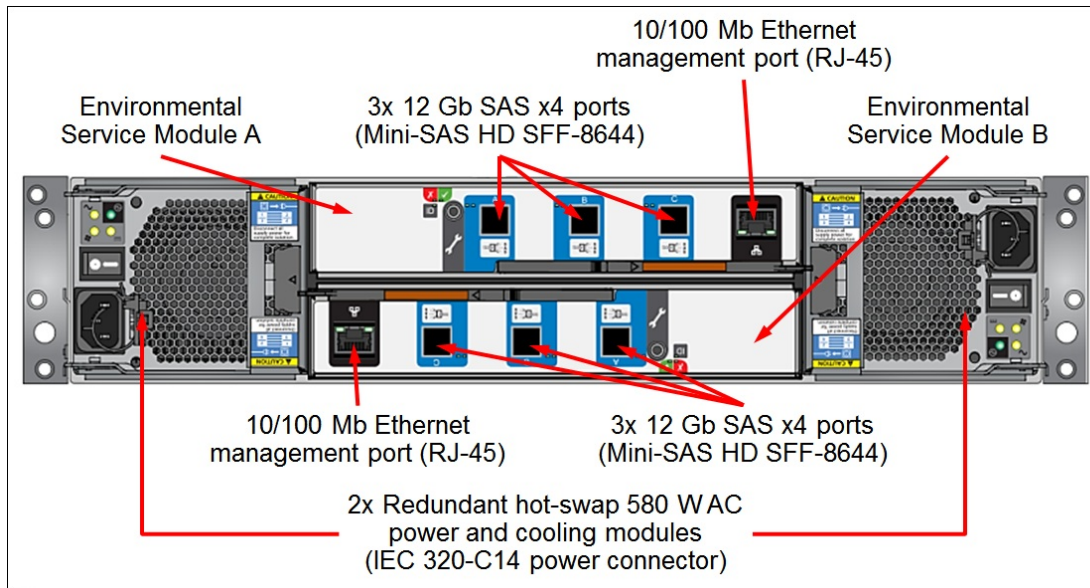


Figure 4. Rear view of the D1212 and D1224 drive enclosures

Note: The ESMs (shown in Figure 4) 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 D1212 and D1224 system specifications.

Table 1. System specifications

Components	Specification
Form factor	2U rack mount
Number of ESMs	2
Expansion ports	3x 12 Gb SAS x4 (Mini-SAS HD SFF-8644) ports (A, B, C) per ESM
Drive bays	<ul style="list-style-type: none"> D1212: 12 LFF hot-swap drive bays; up to 8x D1212 enclosures can be daisy chained on a supported RAID adapter or HBA for a total of up to 96 LFF drives. D1224: 24 SFF hot-swap drive bays; up to 8x D1224 enclosures can be daisy chained on a supported RAID adapter or HBA for a total of up to 192 SFF drives. <p>Intermix of SFF and LFF enclosures is supported.</p>
Drive technologies	SAS and NL SAS HDDs and SEDs; SAS SSDs. Intermix of HDDs, SEDs, and SSDs is supported within an enclosure, but not within a RAID array.
Drive connectivity	Dual-ported 12 Gb SAS drive attachment infrastructure.

Components	Specification
Drives	<p>SFF drives:</p> <ul style="list-style-type: none"> • 400 GB, 800 GB, and 1.6 TB SAS SSDs (3 DWD and 10 DWD) • 800 GB SAS SED SSDs (10 DWD) • 3.84 TB SAS SSDs (3 DWD) • 3.84 TB and 7.68 TB SAS SSDs (1 DWD) • 300 GB, 600 GB, and 900 GB 15K rpm SAS HDDs • 600 GB, 900 GB, 1.2 TB, and 1.8 TB 10K rpm SAS HDDs • 1.2 TB 10K rpm SAS SED HDD • 1 TB and 2 TB 7.2K rpm NL SAS HDDs <p>LFF drives:</p> <ul style="list-style-type: none"> • 400 GB SAS SSDs (3 DWD and 10 DWD) (hybrid tray - 2.5 in. drive in the 3.5-in. tray) • 900 GB 10K rpm SAS HDD (hybrid tray - 2.5 in. drive in the 3.5-in. tray) • 2 TB, 4 TB, 6 TB, 8 TB, and 10 TB 7.2K rpm NL SAS HDDs • 4 TB 7.2K rpm NL SAS SED HDD
Storage capacity	<ul style="list-style-type: none"> • D1212: Up to 960 TB (96x 10 TB LFF NL SAS HDDs) • D1224: Up to 1.47 PB (192x 7.68 TB SFF SAS SSDs)
Host adapters	<p>RAID adapters:</p> <ul style="list-style-type: none"> • ThinkSystem RAID 930-8e (2-port 12 Gb SAS; RAID 0, 1, 10, 5, 50, 6, 60) • ServeRAID M5225 (2-port 12 Gb SAS; RAID 0, 1, 10, 5, 50; optional RAID 6, 60) <p>Host bus adapters (non-RAID)</p> <ul style="list-style-type: none"> • ThinkSystem 430-8e HBA (2-port 12 Gb SAS) • ThinkSystem 430-16e HBA (4-port 12 Gb SAS) • N2225 (2-port 12 Gb SAS) • N2226 (4-port 12 Gb SAS) • ThinkServer 9300-8e (2-port 12 Gb SAS) • ThinkServer 8885e (2-port 12 Gb SAS)
Host operating systems	Microsoft Windows Server 2008 R2, 2012 R2, and 2016; Red Hat Enterprise Linux (RHEL) 6 and 7; SUSE Linux Enterprise Server (SLES) 11 and 12; VMware vSphere 5.5, 6.0, and 6.5.
Cooling	Redundant cooling with two fans built into power and cooling modules (PCMs).
Power supply	Two redundant hot-swap 580 W AC power supplies built into PCMs.
Hot-swap parts	ESMs, drives, PCMs.
Management interfaces	SAS Enclosure Services, 10/100 Mb Ethernet for external management.
Security features	SAS zoning, self-encrypting drives (SEDs).
Warranty	Three-year customer-replaceable unit, parts delivered limited warranty with 9x5 next business day response.
Service and support	Optional warranty service upgrades are available through Lenovo: Technician installed parts, 24x7 coverage, 2-hour or 4-hour response time, 6-hour or 24-hour committed repair, 1-year or 2-year warranty extensions, YourDrive YourData, remote technical support, hardware installation.
Dimensions	Height: 88 mm (3.5 in), width: 443 mm (17.4 in), depth: 630 mm (24.8 in)
Maximum weight	<ul style="list-style-type: none"> • D1212: 26 kg (57.3 lb) • D1224: 24 kg (52.9 lb)

Models

The following table lists the relationship models of the D1212 and D1224 drive enclosures.

Table 2. D1212 and D1224 relationship models

Description	Part number
LFF models	
Lenovo Storage D1212 LFF Chassis, Dual ESM (US English documentation)	4587A11*
Lenovo Storage D1212 LFF Chassis, Dual ESM (Simplified Chinese documentation)	4587A1C^
Lenovo Storage D1212 LFF Chassis, Dual ESM (Japanese documentation)	4587A1J**
SFF models	
Lenovo Storage D1224 SFF Chassis, Dual ESM (US English documentation)	4587A31*
Lenovo Storage D1224 SFF Chassis, Dual ESM (Simplified Chinese documentation)	4587A3C^
Lenovo Storage D1224 SFF Chassis, Dual ESM (Japanese documentation)	4587A3J**

* Available worldwide (except China and Japan)

^ Available only in China

** Available only in Japan

The following table lists the TopSeller models of the D1212 and D1224 drive enclosures.

Table 3. D1212 and D1224 TopSeller models

Description	Part number
LFF models - North America (NA) and Europe, Middle East, and Africa (EMEA)	
Lenovo Storage D1212 LFF Dual ESM Disk Expansion Enclosure (US English documentation)	4587E11
LFF models - Brazil and Latin America	
Lenovo Storage D1212 LFF Chassis, Dual ESM, 4x 2TB 3.5" HDDs, 4x 0.5m SAS cables	4587EAU
Lenovo Storage D1212 LFF Chassis, Dual ESM, 4x 4TB 3.5" HDDs, 4x 0.5m SAS cables	4587EBU
Lenovo Storage D1212 LFF Chassis, Dual ESM, 4x 6TB 3.5" HDDs, 4x 0.5m SAS cables	4587ECU
Lenovo Storage D1212 LFF Chassis, Dual ESM, 4x 8TB 3.5" HDDs, 4x 0.5m SAS cables	4587EDU
Lenovo Storage D1212 LFF Chassis, Dual ESM, 8x 2TB 3.5" HDDs, 4x 0.5m SAS cables	4587EEU
Lenovo Storage D1212 LFF Chassis, Dual ESM, 8x 4TB 3.5" HDDs, 4x 0.5m SAS cables	4587EFU
Lenovo Storage D1212 LFF Chassis, Dual ESM, 8x 6TB 3.5" HDDs, 4x 0.5m SAS cables	4587EGU
Lenovo Storage D1212 LFF Chassis, Dual ESM, 8x 8TB 3.5" HDDs, 4x 0.5m SAS cables	4587EHU
Lenovo Storage D1212 LFF Chassis, Dual ESM, 12x 2TB 3.5" HDDs, 4x 0.5m SAS cables	4587EIU
Lenovo Storage D1212 LFF Chassis, Dual ESM, 12x 4TB 3.5" HDDs, 4x 0.5m SAS cables	4587EJU
Lenovo Storage D1212 LFF Chassis, Dual ESM, 12x 6TB 3.5" HDDs, 4x 0.5m SAS cables	4587EKU
Lenovo Storage D1212 LFF Chassis, Dual ESM, 12x 8TB 3.5" HDDs, 4x 0.5m SAS cables	4587ELU
SFF models - North America (NA) and Europe, Middle East, and Africa (EMEA)	
Lenovo Storage D1224 SFF Dual ESM Disk Expansion Enclosure (US English documentation)	4587E31
SFF models - Brazil and Latin America	
Lenovo Storage D1224 SFF Chassis, Dual ESM, 9x 1.2TB 10K HDDs, 4x 0.5m SAS cables	4587E6U
Lenovo Storage D1224 SFF, Dual ESM, 9x 1.2TB 10K HDDs, 2x 400GB SSDs, 4x 0.5m SAS cables	4587E2U
Lenovo Storage D1224 SFF, Dual ESM, 9x 1.2TB 10K HDDs, 4x 400GB SSDs, 4x 0.5m SAS cables	4587E4U

Description	Part number
Lenovo Storage D1224 SFF Chassis, Dual ESM, 18x 1.2TB 10K HDDs, 1x 0.5m SAS cable	4587E5U
Lenovo Storage D1224 SFF, Dual ESM, 18x 1.2TB 10K HDDs, 2x 400GB SSDs, 4x 0.5m SAS cables	4587E1U
Lenovo Storage D1224 SFF, Dual ESM, 18x 1.2TB 10K HDDs, 4x 400GB SSDs, 4x 0.5m SAS cables	4587E3U

The part numbers for the D1212 and D1224 drive enclosures include the following items:

- One LFF or SFF chassis with the following components:
 - Dual 3-port environmental service modules
 - Two power and cooling modules
 - Drives (select models; see Table 2 and Table 3 for details)
- Two 1.5m, 10A/100-250V, C13 to IEC 320-C14 rack power cables
- External 0.5m 12Gb SAS cables (select models; see Table 2 and Table 3 for details)
- Lenovo Storage 12Gb SAN Rack Mount Kit - Rails 25"-36"
- Documentation package

Host connectivity

The D1212 and D1224 drive enclosures support dual environmental service module (ESM) configurations. Each ESM has three 12 Gb SAS x4 ports (Mini-SAS HD SFF-8644 connectors) labeled A, B, and C. These ports are used for connections to a supported RAID adapter or HBA installed in a server and for daisy chaining the D1212 and D1224 enclosures between each other.

Port A on each ESM is used for connecting the external SAS ports on the RAID controller or HBA to the enclosure, or for connecting Port C on each ESM in the adjacent enclosure for daisy chaining.

Port B on each ESM is used for connecting the external SAS ports on the RAID controller or HBA to the enclosure. Daisy-chaining does not use Port B for connections between adjacent enclosures.

Port C on each ESM is used for connecting the external SAS ports on the RAID controller or HBA to the enclosure, or for connecting Port A on each ESM in the adjacent enclosure for daisy chaining.

Up to eight D1212 or D1224 drive enclosures, or a combination of both, can be daisy-chained with support for up to four hosts attached to the chain. Without daisy-chaining, a standalone D1224 drive enclosure can support up to six directly attached hosts. In addition, up to two D1212 and up to two D3284 drive enclosures, or one D1224 and up to two D3284 drive enclosures can be daisy-chained with support for up to two hosts attached to the chain.

The following figures illustrate different host connectivity topologies.

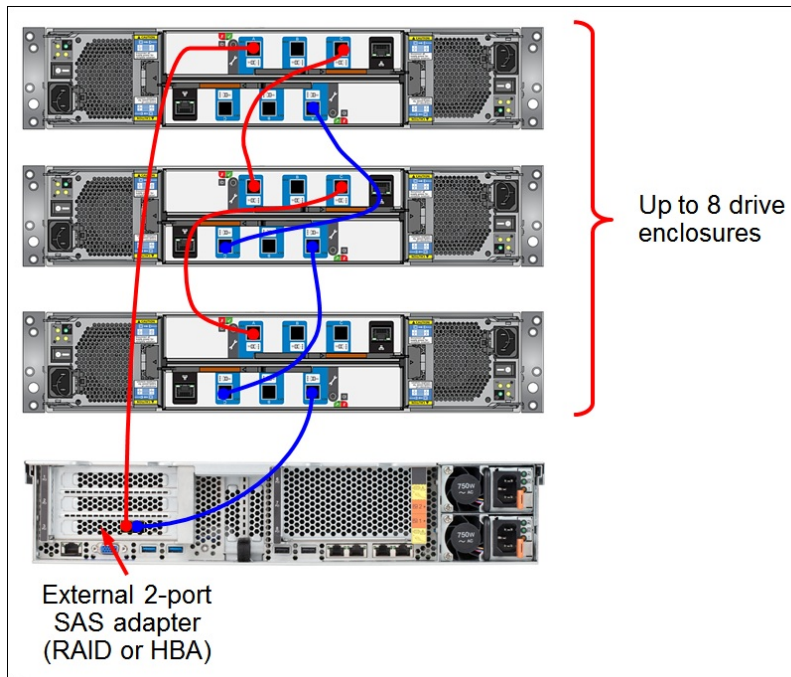


Figure 5. Connectivity topology with one host

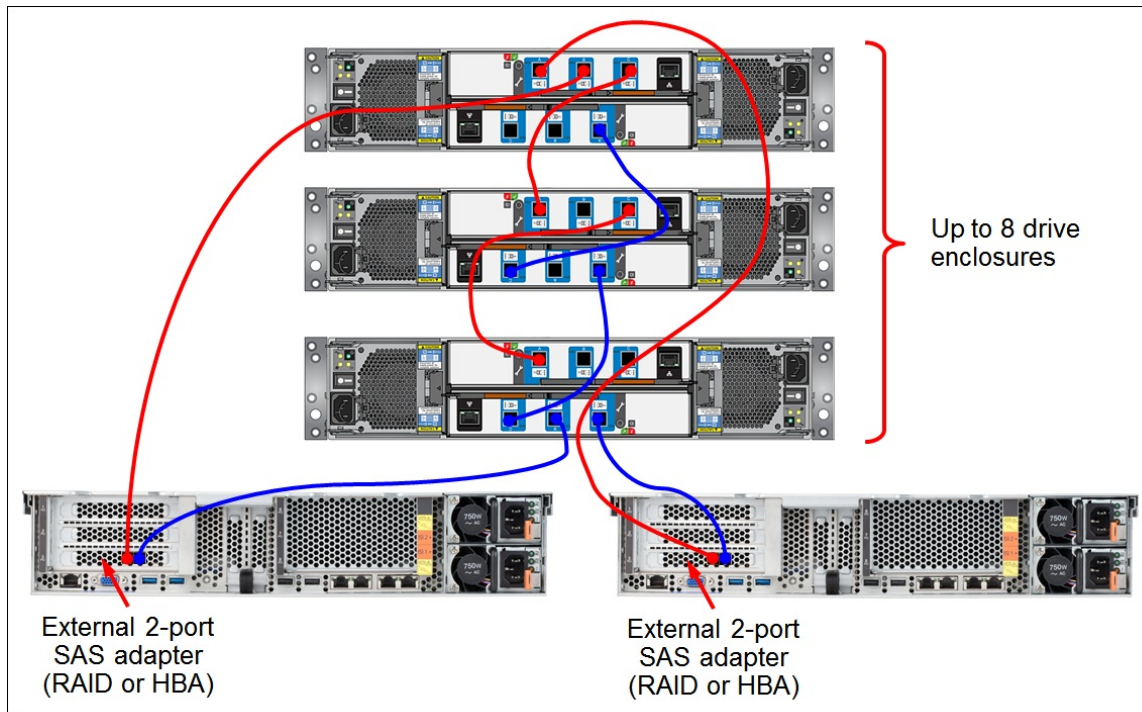


Figure 6. Connectivity topology with two hosts

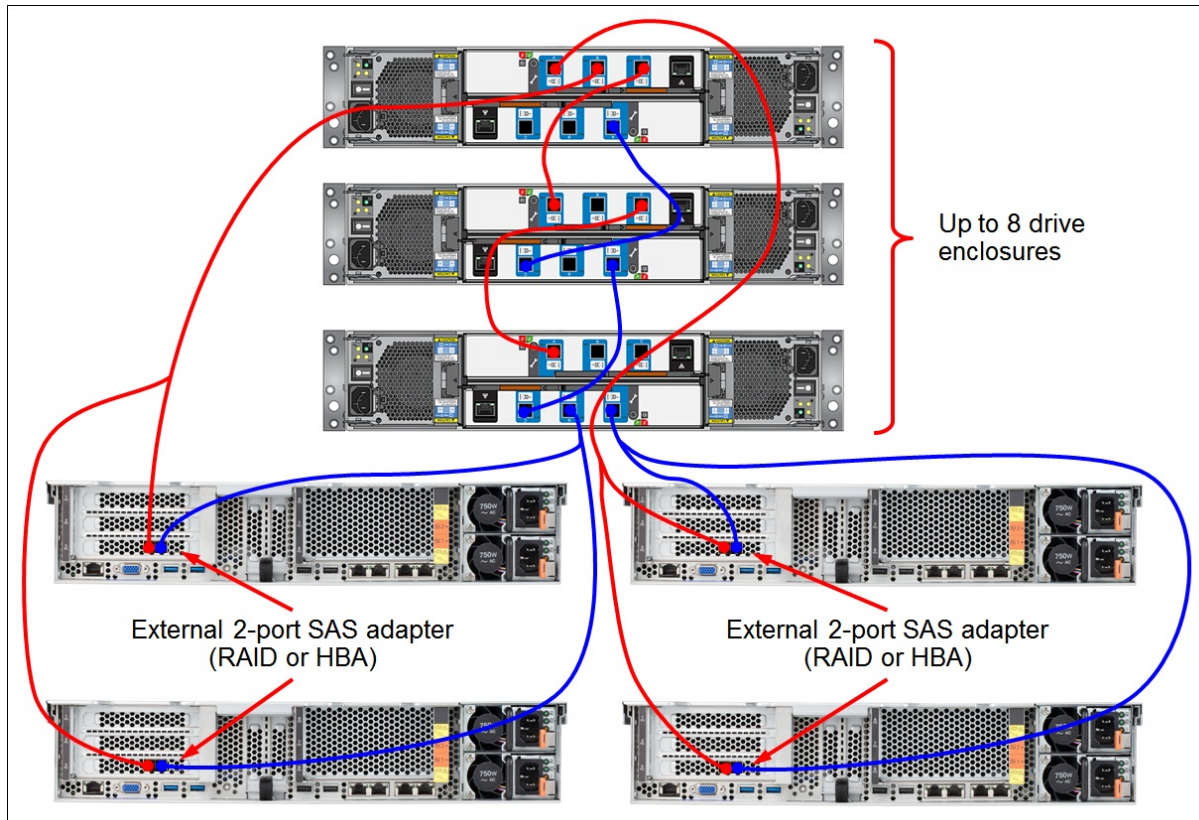


Figure 7. Connectivity topology with four hosts

For topologies with four or more hosts, SAS Y-cables are required to connect the hosts to the drive enclosure. The SAS Y-cable allows two hosts be connected to one SAS port on the ESM. The Y-cables and standard cables are mutually exclusive, that is, either Y-cables or standard cables can be used to connect the hosts to the same drive enclosure, but not both.

The *SAS zoning feature* of the D1212 and D1224 specifies how multiple hosts access drives in the enclosures. If SAS zoning is disabled, all attached hosts can access all drives in the enclosures, which is typically used in standalone single-host or clustered multi-host environments, where all cluster nodes need access to all drives. If SAS zoning is enabled, each connected host has exclusive access to a predefined set of drives, and multiple hosts are isolated from each other.

Note: Attachment of more than one host to the same enclosure without SAS zoning is supported with HBAs only (RAID controllers are not supported). While all attached hosts are capable of accessing all drives in the enclosures, the clustering software running on the hosts controls which cluster nodes have access to the drives at any given time.

The supported zone configurations are shown in the following table.

Note: Mode 0 means that zoning is disabled.

Table 4. D1212 and D1224 zoning configurations

Zoning mode	Number of zones	Maximum number of hosts	Zone number	Host ports	Expansion ports	Drive bays	
						D1212	D1224
Zoning with SAS standard cables							
Mode 0	1	2	1	A, B	C	0-11	0-23
Mode 1	2	2	1	A	C	0-1, 4-5, 8-9	0-11
			2	B		2-3, 6-7, 10-11	12-23
Mode 2	3	3	1	A	N/A	0-3	0-7
			2	B		4-7	8-15
			3	C		8-11	16-23
Zoning with SAS Y-cables							
Mode 0	1	4	1	A.1, A.2, B.1, B.2	C	0-11	0-23
Mode 3	3	3	1	A.1	C	0-3	0-7
			2	A.2		4-7	8-15
			3	B.1		8-11	16-23
Mode 4	4	4	1	A.1	C	0, 4, 8	0-5
			2	A.2		1, 5, 9	6-11
			3	B.1		2, 6, 10	12-17
			4	B.2		3, 7, 11	18-23
Mode 5	6	6	1	A.1	N/A	N/A	0-3
			2	A.2			4-7
			3	B.1			8-11
			4	B.2			12-15
			5	C.1			16-19
			6	C.2			20-23

The following table lists ordering information for the SAS cables.

Table 5. SAS cable options

Description	Part number	Feature code	Maximum quantity per one D1212 or D1224
Connectivity cables - Mini-SAS HD Host Adapter to Expansion			
External MiniSAS HD 8644/MiniSAS HD 8644 0.5M Cable	00YL847	AU16	6
External MiniSAS HD 8644/MiniSAS HD 8644 1M Cable	00YL848	AU17	6
External MiniSAS HD 8644/MiniSAS HD 8644 2M Cable	00YL849	AU18	6
External MiniSAS HD 8644/MiniSAS HD 8644 3M Cable	00YL850	AU19	6
External MiniSAS HD 8644/MiniSAS HD 8644 6M Cable	00KH452	AUJY	6
External MiniSAS HD 8644/2xMiniSAS HD 8644 2M Y-Cable	01DC164	AU1A	6
Connectivity cables - Expansion to Expansion			
External MiniSAS HD 8644/MiniSAS HD 8644 0.5M Cable	00YL847	AU16	2
External MiniSAS HD 8644/MiniSAS HD 8644 1M Cable	00YL848	AU17	2
External MiniSAS HD 8644/MiniSAS HD 8644 2M Cable	00YL849	AU18	2
External MiniSAS HD 8644/MiniSAS HD 8644 3M Cable	00YL850	AU19	2
External MiniSAS HD 8644/MiniSAS HD 8644 6M Cable	00KH452	AUJY	2

Drives

The D1212 drive enclosure supports up to 12 LFF hot-swap drives, and the D1224 drive enclosure supports up to 24 SFF hot-swap drives. The following tables list drive options for the D1212 and D1224 drive enclosures.

Table 6. LFF drive options

Description	Part number	Feature code	Maximum quantity per one D1212
3.5-inch SAS hot-swap HDDs			
Lenovo Storage 900GB 10K SAS Hybrid tray HDD (2.5" in 3.5")	01DC182	AU1G	12
3.5-inch NL SAS hot-swap HDDs			
Lenovo Storage 2TB 7.2K 3.5" NL-SAS HDD	00YH993	AU1F	12
Lenovo Storage 4TB 7.2K 3.5" NL-SAS HDD	01DC487	AU1D	12
Lenovo Storage 6TB 7.2K 3.5" NL-SAS HDD	00YG668	AU1C	12
Lenovo Storage 8TB 7.2K 3.5" NL-SAS HDD	00YG663	AU1B	12
Lenovo Storage 10TB 7.2K 3.5" NL-SAS HDD	01DC626	AU3S	12
3.5-inch NL SAS hot-swap SEDs			
Lenovo Storage 4TB 7.2K 3.5" NL-SAS SED HDD	00YG673	AU1E	12
3.5-inch SAS hot-swap SSDs (10 DWD)			
Lenovo Storage 400GB 3 DWD SAS SSD - Hybrid Tray (2.5" in 3.5")	01GV682	AV2H	
3.5-inch SAS hot-swap SSDs (10 DWD)			
Lenovo Storage 400GB 10 DWD SAS SSD - Hybrid tray (2.5" in 3.5")	01CX642	AV2G	12

Table 7. SFF drive options

Description	Part number	Feature code	Maximum quantity per one D1224
2.5-inch SAS hot-swap HDDs			
Lenovo Storage 300GB 15K 2.5" SAS HDD	01DC197	AU1J	24
Lenovo Storage 600GB 10K 2.5" SAS HDD	01DC427	AU1Q	24
Lenovo Storage 600GB 15K 2.5" SAS HDD	01DC192	AU1H	24
Lenovo Storage 900GB 10K 2.5" SAS HDD	01DC417	AU1N	24
Lenovo Storage 900GB 15K 2.5" SAS HDD	01KP040	AVP5	24
Lenovo Storage 1.2TB 10K 2.5" SAS HDD	01DC407	AU1L	24
Lenovo Storage 1.8TB 10K 2.5" SAS HDD	01DC402	AU1K	24
2.5-inch SAS hot-swap SED HDDs			
Lenovo Storage 1.2TB 10K 2.5" SAS SED HDD	01DC412	AU1M	24
2.5-inch NL SAS hot-swap HDDs			
Lenovo Storage 1TB 7.2K 2.5" NL-SAS HDD	01DC442	AU1S	24
Lenovo Storage 2TB 7.2K 2.5" NL-SAS HDD	01DC437	AU1R	24
2.5-inch SAS hot-swap SSDs (1 DWD)			
Lenovo Storage 3.84TB 1 DWD 2.5" SAS SSD (1200.2)	01CX632	AV2F	24
Lenovo Storage 3.84TB 1 DWD 2.5" SAS SSD (PM1633a)	01KP065	AVPA	24
Lenovo Storage 7.68TB 1 DWD 2.5" SAS SSD (PM1633a)	01KP060	AVP9	24
2.5-inch SAS hot-swap SSDs (3 DWD)			
Lenovo Storage 400GB 3 DWD 2.5" SAS SSD	01DC482	AU1V	24
Lenovo Storage 800GB 3 DWD 2.5" SAS SSD	01DC477	AU1U	24
Lenovo Storage 1.6TB 3 DWD 2.5" SAS SSD	01DC472	AU1T	24
2.5-inch SAS hot-swap SSDs (10 DWD)			
Lenovo Storage 400GB 10 DWD 2.5" SAS SSD	01DC462	AUDK	24
Lenovo Storage 800GB 10 DWD 2.5" SAS SSD	01DC452	AUDH	24
Lenovo Storage 1.6TB 10 DWD 2.5" SAS SSD	01DC447	AUDG	24
2.5-inch SAS hot-swap SED SSDs (10 DWD)			
Lenovo Storage 800GB 10 DWD 2.5" SAS SSD (SED)	01DC457	AUDJ	24

Power cables

The D1212 and D1224 ship standard with two 1.5m, 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 are listed in the following table (two power cables are required per each D1212 and D1224).

Table 8. Power cable options

Description	Part number	Feature code
Rack power cables		
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
Country-specific power cords		
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 D1212 and D1224 have the following dimensions and weight (approximate):

- Height: 88 mm (3.5 in.)
- Width: 443 mm (17.4 in.)
- Depth: 630 mm (24.8 in.)
- Maximum weight
 - D1212: 26 kg (57.3 lb)
 - D1224: 24 kg (52.9 lb)

Operating environment

The D1212 and D1224 are supported in the following environment:

- Air temperature:
 - Operating: 5 °C to 40 °C (41 °F to 104 °F)
 - Storage: -40 °C to +60 °C (-40 °F to 140 °F)
 - Maximum altitude: 3,045 m (10,000 ft)
- Humidity:
 - Operating: 20% to 80% (non-condensing)
 - Storage: 5% to 100% (no precipitation)
- Electrical:
 - 100 to 127 (nominal) V AC; 50 Hz to 60 Hz; 6.11 A
 - 200 to 240 (nominal) V AC; 50 Hz to 60 Hz; 3.05 A
- BTU output: 1979 BTU/hr (580 W)
- Noise level: 6.5 bels

Warranty

The D1212 and D1224 have a three-year customer-replaceable unit (CRU) warranty with standard call center support during normal business hours and 9x5 Next Business Day Parts Delivered. 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 Lenovo Enterprise Solutions Configurator (LESC):

<http://lesc.lenovo.com>

The following table explains warranty service definitions for the D1212 and D1224 drive enclosures.

Table 9. Warranty service definitions

Term	Description
Parts Delivered	If a problem with your product cannot be resolved via telephone and a CRU part is required, Lenovo will send a replacement CRU to arrive at your location.
Technician Installed Parts	If a problem with your product cannot be resolved via telephone, a Service Technician will be dispatched to arrive at your location.
Hours of coverage	<ul style="list-style-type: none">• 9x5: 9 hours per day, 5 days per week, during normal business hours, excluding local public and national holidays• 24x7: 24 hours per day, 7 days per week, 365 days per year.

Term	Description
Response time target	2 hours, 4 hours or Next Business Day: The time period from when the telephone based troubleshooting is completed and logged, to the delivery of the CRU or arrival of a Service Technician and part at the Customer's location for repair.
Committed Repair	6 hours or 24 hours: The time period between the service request registration in Lenovo's call management system and the restoration of the product to conformance with its specification by a Service Technician.

The following Lenovo warranty service upgrades are available:

- Warranty and maintenance service upgrades:
 - Three, four, or five years of 9x5 or 24x7 service coverage
 - Parts delivered or technician installed parts from next business day to 4 or 2 hours
 - Committed repair service
 - Warranty extension of up to 5 years
 - Post warranty extensions
- Committed Repair Service

Committed Repair Services enhances the level of Warranty Service Upgrade or Post Warranty/Maintenance Service offering associated with the selected systems. Offerings vary and are available in select countries.

 - Priority handling to meet defined time frames to restore the failing machine to good working condition
 - 24x7x6: Service performed 24 hours per day, 7 days per week, within 6 hours
 - 24x7x24: Service performed 24 hours per day, 7 days per week, within 24 hours
- YourDrive YourData

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

Lenovo Remote Technical Support provides comprehensive technical call center "how to" support for covered servers, storage, operating systems, and applications. Support staff can help answer troubleshooting and diagnostic questions, address product compatibility and interoperability issues, isolate causes of problems, and more.
- Hardware Installation Services

Lenovo experts can seamlessly manage the physical installation of your server, storage, or networking hardware. Working at a time convenient for you (business hours or off shift), the technician will unpack and inspect the systems on your site, install options, mount in a rack cabinet, connect to power and network, check and update firmware to the latest levels, verify operation, and dispose of the packaging, allowing your team to focus on other priorities. Your new systems will be configured and ready for your software installation.

Regulatory compliance

The D1212 and D1224 drive enclosures conform to the following regulations:

- BSMI CNS 13438, Class A; CNS 14336 (Taiwan)
- CCC GB 4943.1, GB 17625.1, GB 9254 Class A (China)
- CE Mark (European Union)
- CISPR 22, Class A
- EAC (Russia)
- EN55022, Class A
- EN55024
- FCC Part 15, Class A (United States)
- ICES-003/NMB-03, Class A (Canada)
- IEC/EN60950-1
- KC Mark (Korea)
- NOM-019 (Mexico)
- Reduction of Hazardous Substances (ROHS)
- UL/CSA IEC 60950-1
- VCCI, Class A (Japan)

Interoperability

Lenovo provides end-to-end storage compatibility testing to deliver interoperability throughout the network. The Lenovo Storage D1212 and D1224 support attachment to Lenovo ThinkSystem, System x, and ThinkServer hosts.

For end-to-end storage configuration support, refer to the Lenovo Storage D1212 and D1224 Interoperability Matrix that can be found on the following documentation pages:

- Lenovo Storage D1212 Documentation
<http://datacentersupport.lenovo.com/us/en/products/storage/lenovo-storage/d1212/4587/documentation>
- Lenovo Storage D1224 Documentation
<http://datacentersupport.lenovo.com/us/en/products/storage/lenovo-storage/d1224/4587/documentation>

The following sections list adapters, servers, and operating systems supported by Lenovo that can be used with the Lenovo Storage D1212 and D1224:

- [RAID controllers and HBAs](#)
- [Servers](#)
- [Operating systems](#)

Important: Information that is provided in these sections is for order reference purposes only. Not all possible combinations might be supported. End-to-end storage configuration support *must* be verified through the Lenovo Storage D1212 and D1224 Interoperability Matrix.

RAID controllers and HBAs

The D1212 and D1224 expansion enclosures are supported with the RAID adapters and HBAs that are listed in the following table.

Table 10. RAID controllers and HBAs

Description	Part number	Maximum quantity of enclosures per adapter
ThinkSystem adapters		
ThinkSystem RAID 930-8e 4GB Flash PCIe 12Gb Adapter	7Y37A01087	8
ThinkSystem 430-8e SAS/SATA 12Gb HBA	7Y37A01090	8
ThinkSystem 430-16e SAS/SATA 12Gb HBA	7Y37A01091	8
System x adapters		
ServeRAID M5225-2GB SAS/SATA Controller	00AE938	8
N2225 SAS/SATA HBA	00AE912	8
N2226 SAS/SATA HBA	00AE916	8
ThinkServer adapters		
ThinkServer 9300-8e PCIe 12Gb 8-port External SAS Adapter by LSI	4XB0F28703	8
ThinkServer 8885e PCIe 12Gb 8-port External SAS Adapter by PMC	4XB0G88727	8

The following tables summarize features of supported adapters.

Table 11. ThinkSystem adapter features and specifications summary

Feature	RAID 930-8e	430-8e HBA	430-16e HBA
Form factor	PCIe LP	PCIe LP	PCIe LP
SAS controller chip	SAS3508	SAS3408	SAS3416
Host interface	PCIe 3.0 x8	PCIe 3.0 x8	PCIe 3.0 x8
Port interface	12 Gb SAS	12 Gb SAS	12 Gb SAS
Number of ports	8	8	16
Connector type	SFF-8644 x4	SFF-8644 x4	SFF-8644 x4
Number of connectors	2	2	4
Drive interface	SAS, SATA	SAS, SATA	SAS, SATA
Drive type	HDD, SSD, SED	HDD, SSD, SED*	HDD, SSD, SED*
Number of devices	480	2048	4096
RAID levels	0/1/10/5/50/6/60	None	None
JBOD mode	Yes	Yes	Yes
Cache	4 GB (Included)	None	None
Cache protection	Flash backup (Included)	None	None
SED key management (SafeStore)	Yes	No	No
SSD I/O acceleration (FastPath)	Yes	No	No
SSD Caching (CacheCade Pro 2.0)	No**	No	No

* HBAs do not support key management for SEDs; third-party host software is responsible for managing the keys.

** The SSD caching feature has been phased out in the new generation of advanced RAID controllers.

Table 12. System x and ThinkServer adapter features and specifications summary

Feature	M5225-2GB	N2225	N2226	9300-8e	8885e
Form factor	Low profile	Low profile	Low profile	Low profile	Low profile
SAS controller chip	SAS3108	SAS3008	SAS3008	SAS3008	PM8063
Host interface	PCIe 3.0 x8	PCIe 3.0 x8	PCIe 3.0 x8	PCIe 3.0 x8	PCIe 3.0 x8
Port interface	12 Gbps SAS	12 Gbps SAS	12 Gbps SAS	12 Gbps SAS	12 Gbps SAS
Number of ports	8	8	16	8	8
Connector type	SFF-8644 x4	SFF-8644 x4	SFF-8644 x4	SFF-8644 x4	SFF-8644 x4
Number of connectors	2	2	4	2	2
Drive interface	SAS	SAS	SAS	SAS	SAS
Drive type	HDD, SSD, SED	HDD, SSD, SED*	HDD, SSD, SED*	HDD, SSD, SED*	HDD, SSD, SED*
Number of devices	240	1024	1024	1024	256
RAID levels	0/1/10/5/50; Optional 6/60 (PN 47C8706)	None	None	None	None
JBOD mode	No	Yes	Yes	Yes	Yes
Cache	2 GB (Included)	None	None	None	1 GB
Cache protection	Flash backup (Included)	None	None	None	None
SED key management (SafeStore)	Yes	No	No	No	No
SSD I/O acceleration (FastPath)	Optional (47C8710)	No	No	No	No
SSD Caching (CacheCade Pro 2.0)	Optional (47C8712)	No	No	No	No

* HBAs do not support key management for SEDs; third-party host software is responsible for managing the keys.

Servers

The D1212 and D1224 expansion enclosures are supported with Lenovo servers that support the RAID controllers and HBAs listed in the [SAS RAID controllers and HBAs](#) section, including the following Lenovo rack-mount servers:

- ThinkSystem
 - ThinkSystem SR530 Types 7X07 and 7X08
 - ThinkSystem SR550 Types 7X03 and 7X04
 - ThinkSystem SR630 Types 7X01 and 7X02
 - ThinkSystem SR650 Types 7X05 and 7X06
 - ThinkSystem SR850 7X18 and 7X19
 - ThinkSystem SR950 7X11, 7X12, and 7X13
- System x
 - System x3250 M5 Type 5458
 - System x3550 M5 Type 5463
 - System x3550 M5 Type 8869
 - System x3650 M5 Type 5462
 - System x3650 M5 Type 8871
 - System x3750 M4 Type 8753
 - System x3850 X6 Type 6241 (E7 v2, E7 v3, and E7 v4)
 - System x3950 X6 Type 6241 (E7 v2, E7 v3, and E7 v4)
- ThinkServer
 - ThinkServer RS160 (E3-1200 v5, E3-1200 v6, Core i3, Pentium G, and Celeron G Series)
 - ThinkServer RD350 (E5-2600 v3 and E5-2600 v4)
 - ThinkServer RD450 (E5-2600 v3 and E5-2600 v4)
 - ThinkServer RD550 (E5-2600 v3 and E5-2600 v4)
 - ThinkServer RD650 (E5-2600 v3 and E5-2600 v4)

For RAID adapters and HBAs support details for a particular server, refer to a Lenovo Press product guide for the server, found at: <http://lenovopress.com>

Operating systems

The D1212 and D1224 expansion enclosures support the following operating systems:

- Microsoft:
 - Microsoft Windows Server 2016
 - Microsoft Windows Server 2012 R2
 - Microsoft Windows Server 2008 R2
- Red Hat:
 - Red Hat Enterprise Linux 7.3
 - Red Hat Enterprise Linux 7.2
 - Red Hat Enterprise Linux 6.8 Server x64 Edition
 - Red Hat Enterprise Linux 6.7 Server x64 Edition
- SUSE:
 - SUSE Linux Enterprise Server 12 SP2
 - SUSE Linux Enterprise Server 12 SP1
 - SUSE Linux Enterprise Server 12
 - SUSE Linux Enterprise Server 11 SP4 for AMD64/EM64T
- VMware:
 - VMware vSphere 6.5 (ESXi)
 - VMware vSphere 6.0 (ESXi) Update 3
 - VMware vSphere 6.0 (ESXi) Update 2
 - VMware vSphere 6.0 (ESXi) Update 1
 - VMware vSphere 6.0 (ESXi)
 - VMware vSphere 5.5 (ESXi) Update 3

For information about operating system compatibility with Lenovo servers, refer to the Operating System Interoperability Guide: <http://lenovopress.com/osig>

Rack cabinets

The following table lists the rack cabinets that are offered by Lenovo that can be used in D1212 and D1224 storage expansion solutions.

Table 13. Rack cabinets

Description	Part number
25U S2 Standard Rack (1000 mm deep; 2 sidewall compartments)	93072RX
25U Static S2 Standard Rack (1000 mm deep; 2 sidewall compartments)	93072PX
42U S2 Standard Rack (1000 mm deep; 6 sidewall compartments)	93074RX
42U 1100mm Enterprise V2 Dynamic Rack (6 sidewall compartments)	93634PX
42U 1100mm Enterprise V2 Dynamic Expansion Rack (6 sidewall compartments)	93634EX
42U 1200mm Deep Dynamic Rack (6 sidewall compartments)	93604PX
42U 1200mm Deep Static Rack (6 sidewall compartments)	93614PX
42U Enterprise Rack (1105 mm deep; 4 sidewall compartments)	93084PX
42U Enterprise Expansion Rack (1105 mm deep; 4 sidewall compartments)	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 power distribution units (PDUs) that are offered by Lenovo that can be used in D1212 and D1224 storage expansion solutions.

Table 14. Power distribution units

Description	Part number
0U Basic PDUs	
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
Switched and Monitored PDUs	
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
Ultra Density Enterprise PDUs (9x IEC 320 C13 + 3x IEC 320 C19 outlets)	
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
C13 Enterprise PDUs (12x IEC 320 C13 outlets)	
DPI C13 Enterprise PDU+ (without line cord)	39M2816
DPI Single Phase C13 Enterprise PDU (without line cord)	39Y8941
C19 Enterprise PDUs (6x IEC 320 C19 outlets)	
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
Front-end PDUs (3x IEC 320 C19 outlets)	
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
Universal PDUs (7x IEC 320 C13 outlets)	
DPI Universal 7 C13 PDU (with 2 m IEC 320-C19 to C20 rack power cord)	00YE443
NEMA PDUs (6x NEMA 5-15R outlets)	
DPI 100-127V PDU with fixed NEMA L5-15P line cord	39Y8905
Line cords for PDUs that ship without a line cord	
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 PDU category:
<http://lenovopress.com/servers/options/pdu>

Uninterruptible power supply units

The following table lists the uninterruptible power supply (UPS) units that are offered by Lenovo that can be used in D1212 and D1224 storage expansion solutions.

Table 15. Uninterruptible power supply units

Description	Part number
RT1.5kVA 2U Rack or Tower UPS (100-125VAC) (8x NEMA5-15R 12A outlets)	55941AX
RT1.5kVA 2U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A outlets)	55941KX
RT2.2kVA 2U Rack or Tower UPS (100-125VAC) (8x NEMA 5-20R 16A outlets)	55942AX
RT2.2kVA 2U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A, 1x IEC 320 C19 16A outlets)	55942KX
RT3kVA 2U Rack or Tower UPS (100-125VAC) (6x NEMA5-20R 16A, 1x NEMA L5-30R 24A outlets)	55943AX
RT3kVA 2U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A, 1x IEC 320 C19 16A outlets)	55943KX
RT5kVA 3U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A, 2x IEC 320 C19 16A outlets)	55945KX
RT6kVA 3U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A, 2x IEC 320 C19 16A outlets)	55946KX
RT8kVA 6U Rack or Tower UPS (200-240VAC) (4x IEC 320-C19 16A outlets)	55948KX
RT11kVA 6U Rack or Tower UPS (200-240VAC) (4x IEC 320-C19 16A outlets)	55949KX
RT8kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC) (4x IEC 320-C19 16A outlets)	55948PX
RT11kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC) (4x IEC 320-C19 16A outlets)	55949PX

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

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Related publications and links

For more information, see the following documents:

- Lenovo Storage product page
<http://www.lenovo.com/systems/storage>
- Lenovo Enterprise Solutions Configurator
<http://lesc.lenovo.com>
- Lenovo Storage support
<http://support.lenovo.com/us/en/products/servers/lenovo-storage>
- Lenovo Storage D1224 Drive Enclosure for SAP HANA Product Guide
<http://lenovopress.com/lp0590>

Related product families

Product families related to this document are the following:

- [Direct-Attached Storage](#)

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