



## Lenovo ThinkServer SA120 Storage Array

### Product Guide

The ThinkServer SA120 direct-attach 2U rack-mount storage array provides high-density expansion and enterprise-grade reliability. It is an ideal tiered storage solution for data center deployments, distributed enterprises, or small businesses.

The SA120 offers 12 3.5-inch hot-swap 6 Gb SAS drive bays at the front of the enclosure plus four optional 2.5-inch hot-swap SATA solid-state drive bays at the rear of the enclosure for data caching to improve throughput. The SA120 also supports two I/O controllers for redundant host connectivity.

Figure 1 shows the SA120.



Figure 1. Lenovo ThinkServer SA120 storage array

#### Did you know?

The SA120 is ideal for applications that need a large amount of direct-attach storage. The SA120 supports 6 TB drives in the front bays and 800 GB solid-state drives (SSDs) in the rear bays, which results in a storage capacity of 75.2 TB. Multiple SA120 enclosures can be daisy-chained together off the one RAID controller if wanted, up to 4 enclosures per port (8 for a dual-port RAID card) and up to 64 drives per port (128 per dual-port RAID card).

The SA120 is now interoperable with ThinkServer and System x servers by using ThinkServer adapters. This interoperability provides all servers a cost-effective solution to expand server capacity without introducing complexity into your server environment.

The use of the ThinkServer Storage Array Tower Conversion Kit enables the SA120 to be deployed as a tower unit, which is ideal for customers that use tower form-factor servers.

## Key features

The SA120 has the following features:

- A total of 12 3.5-inch drive bays that support NL SAS drives operating at 6 Gbps. With 6 TB drives, the total capacity is 72 TB.
- Four optional 2.5-inch drive bays that support solid-state drives operating at 3 Gbps. With 800 GB SSDs, the extra capacity is 3.2 TB.
- With a RAID controller that supports LSI CacheCade, the use of SSDs in the rear drive bays provides more performance improvements through caching of hot data.
- All front-mounted and rear-mounted drives are hot-swap to maximize enclosure uptime.
- One standard 6 Gb SAS I/O module that provides connectivity to all 3.5-inch hard disk drives (HDDs) and 2.5-inch SSDs. Optional second 6 Gb SAS I/O module (standard in some models) for increased performance and fault-tolerance
- SAS host-attachment via mini-SAS x4 port (SFF-8088) can be either of the following configurations:
  - Single cable to a single I/O controller that is installed in the SA120
  - Dual redundant cables to dual I/O controllers to maximize performance and fault tolerance
- Multiple SA120 enclosures can be connected in series to maximize storage capacity connected to each RAID card port. Up to four SA120 units can be connected per port.
- Dual-voltage auto-sensing 550 W power supply. Optional redundant second power supply (standard in some models). Power supplies are 80PLUS Gold certified, which means that the power supplies are at least 92% efficient at 50% load.
- The SA120 is Energy Star 2.0 compliant. Energy Star is the trusted, US government-backed symbol for energy efficiency, with the goal of helping customers save money and protect the environment through energy efficient products and practices.
- Tested and supported to be connected to ThinkServer and System x servers by using ThinkServer RAID adapters.
- Management by using LSI MegaRAID Storage Manager, which provides configuration, monitoring, and control of the drives and I/O modules.
- Servicing the SA120 is easy with tool-less components, hot-swap fans, and power supplies.
- The SA120 shares common parts with ThinkServer rack and tower servers for simplified management.
- Three-year warranty standard (onsite, next business day, nine hours per day, Monday - Friday) with warranty upgrades available.

## Locations of key components

Figure 2 shows the front of the SA120 storage array.

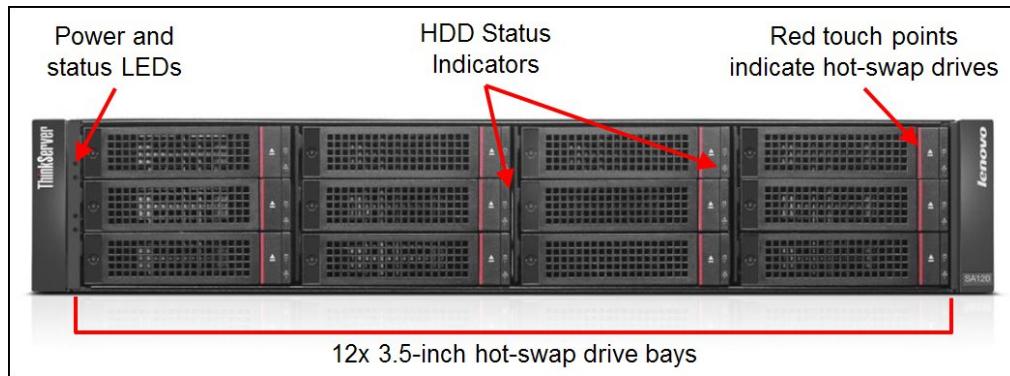


Figure 2. Front view of the SA120

Figure 3 shows the rear view of the SA120 with the optional 2.5-inch SSDs installed.

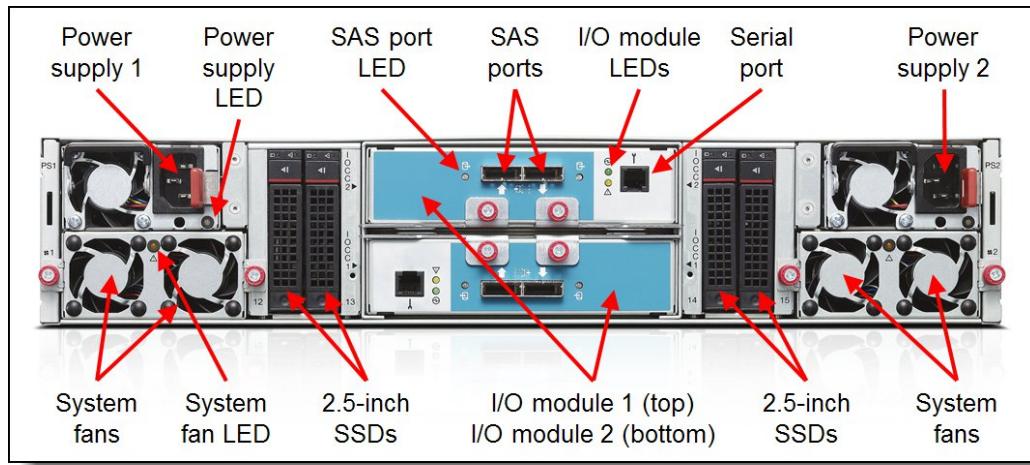


Figure 3. Rear view of the SA120

## Specifications

Table 1 lists the standard specifications of the SA120.

Table 1. Standard specifications

Component	Specification
Form factor	2U rack-mount enclosure; optional conversion to a tower via the ThinkServer Storage Array Tower Conversion Kit
Connection mode	Connects directly to host server via 6 Gb SAS I/O modules, up to four enclosures per port (cascading mode)
I/O module	Supports one or two ThinkServer Storage Array 6Gbps I/O Modules. Second I/O module provides host connection redundancy. Hot-swap
Drive bays	<ul style="list-style-type: none"> <li>Front: 12 x 3.5-inch 6Gb SAS hot-swap hard drive bays.</li> <li>Rear: Optional 4 x 2.5-inch SATA SSD hot-swap disk drive bays operating at 3 Gbps. Requires optional ThinkServer 2.5-inch SATA SSD Cage with SATA Interposers (4XF0F28766, includes two SSD cages for four bays)</li> </ul>
Maximum storage per enclosure	<ul style="list-style-type: none"> <li>Front: 72 TB that uses 12 6 TB NL SAS drives</li> <li>Rear: 3.2 TB for cache that uses four 800 GB SSDs</li> </ul>
RAID support	None; RAID provided by the RAID controller or HBA
Ports	Each I/O module: 2 SAS ports (SFF-8088), RJ11 port for management
Cooling	Two fan modules standard, hot-swap, redundant, two fans per fan module Extra fan provided by each power supply
Power supply	One or two 550 W power supplies standard, two maximum, rear access, hot-swap, 80 PLUS Gold certified, redundant with two power supplies, dual-voltage auto-sensing
Hot-swap components	Front HDDs, rear SSDs, power supplies, fan modules, I/O modules
Systems management	RJ11 port for local management and firmware upgrades. RS232-to-RJ11 cable included. Drive and controller management by using LSI MegaRAID Storage Manager. Fault and state LED indicators on enclosure, drives, power supplies, fan modules, I/O modules. Supports SCSI Enclosure Services (SES) command set for enclosure management.
Limited warranty	Three-year warranty standard (onsite, next business day, nine hours per day, Monday - Friday) with warranty upgrades available
Dimensions	<ul style="list-style-type: none"> <li>Width: 482.6 mm (19 in)</li> <li>Depth: 394.1 mm (15.51 in)</li> <li>Height: 86.6 mm height (3.4 in) (with rack handles)</li> </ul>
Weight	22 kg (48.5 lb) when fully configured

## Models

Table 2 provides the Relationship and TopSeller models of the SA120.

Table 2. Models

Part number*	I/O modules (sth / max)	12x 3.5-inch front bays	4x 2.5-inch rear bays	3.5-inch drives	2.5-inch SSDs	Power supplies
<b>Relationship models - USA and Canada only</b>						
70F00000xx	1 / 2	Standard	Optional	Open	None	1x 550 W / 2
70F00001xx	1 / 2	Standard	Optional	12 x 1TB 3.5" SAS	None	1x 550 W / 2
70F00002xx	2 / 2	Standard	Optional	12 x 2TB 3.5" SAS	None	2x 550 W / 2
70F00003xx	2 / 2	Standard	Optional	12 x 4TB 3.5" SAS	None	2x 550 W / 2
70F00004UX (USA only)	2 / 2	Standard	Standard	12 x 4TB 3.5" SAS	4x 400GB 2.5" SSD	2x 550 W / 2
<b>TopSeller models - Belgium, France, Germany, Italy, Netherlands, Spain, UK only</b>						
70F10002xx	2 / 2	Standard	Optional	Open	None	2x 550 W / 2
70F10003xx	1 / 2	Standard	Optional	Open	None	1x 550 W / 2
<b>TopSeller models - USA and Canada only</b>						
70F10000xx	1 / 2	Standard	Optional	Open	None	1x 550 W / 2
70F10001xx	2 / 2	Standard	Optional	Open	None	2x 550 W / 2
70F10006xx	2 / 2	Standard	Optional	12 x 2TB 3.5" SAS	None	2x 550 W / 2
70F10007xx	2 / 2	Standard	Optional	12 x 4TB 3.5" SAS	None	2x 550 W / 2
70F1S00100	2 / 2	Standard	Optional	6 x 2TB 3.5" SAS	None	2x 550 W / 2

\* The xx in the last two digits of the part number is the country designator: USA = UX, Canada = CA, Belgium = EU, France = FR, Germany = GE, Italy = IT, Netherlands = ND, Spain = SP, UK = UK)

The SA120 is shipped with the following items:

- Static rail kit
- One country-specific power cord for each power supply
- One 1 m (3.28 ft) External miniSAS Cable (SFF-8088 to SFF-8088) for each I/O module
- One RS232-to-RJ11 serial cable for local management of the I/O modules
- Documentation

## I/O module options

As shown in Table 2, models include one or two I/O modules (IOCC modules) standard. Each I/O module also includes a 1 m (3.28 ft) external miniSAS cable (SFF-8088 to SFF-8088). The second I/O module (includes 1 m cable) and extra SAS cables are listed in Table 3.

Figure 4 shows the I/O module.



Figure 4. ThinkServer Storage Array 6Gb/s IO Module

Table 3. I/O module and SAS cable options

Part number	Description
<b>SA120 Redundant I/O module</b>	
4XF0F28765	ThinkServer Storage Array 6Gb/s IO Module (includes one 1m external miniSAS cable (SFF-8088 to SFF-8088))
<b>SAS cable options - ThinkServer adapters and ServeRAID M5120 adapter</b>	
4X90F31494	0.5 meter (1.64 ft) 26-pin (SFF-8088 to SFF-8088) External mini-SAS cable
4X90F31495	1 meter (3.28 ft) 26 Pin (SFF-8088 to SFF-8088) External mini-SAS cable
4X90F31496	2 meters (6.56 ft) 26 Pin (SFF-8088 to SFF-8088) External mini-SAS cable
4X90F31497	4 meters (13.12 ft) 26 Pin (SFF-8088 to SFF-8088) External mini-SAS cable
4X90F31498	6 meters (19.68 ft) 26 Pin (SFF-8088 to SFF-8088) External mini-SAS cable
<b>SAS cable options - ServeRAID M5225 adapter</b>	
00MJ162	0.6m SAS Cable (mSAS HD to mSAS)
00MJ163	1.5m SAS Cable (mSAS HD to mSAS)
00MJ166	3m SAS Cable (mSAS HD to mSAS)

## Drive options

The SA120 supports up to 12x 3.5-inch SAS drives for data. Table 4 lists the supported drive options. The 12 Gb drive options operate at 6 Gbps when they are installed in the SA120.

Table 4. 3.5-inch drive options

Part number	Description
NL SAS HDDs	
0C19530	3.5-inch 1 TB 7.2 K SAS 6 Gbps Hot Swap Hard Drive
0C19531	3.5-inch 2 TB 7.2 K SAS 6 Gbps Hot Swap Hard Drive
0C19532	3.5-inch 3 TB 7.2 K SAS 6 Gbps Hot Swap Hard Drive
4XB0F28635	3.5-inch 4 TB 7.2 K SAS 6 Gbps Hot Swap Hard Drive
4XB0F28683	3.5-inch 6 TB 7.2 K SAS 12 Gbps Hot Swap Hard Drive
67Y2616	ThinkServer 3.5-inch 300 GB 15 K SAS 6 Gbps Hard Drive (HS)
4XB0F28644	ThinkServer 3.5-inch 600 GB 15 K SAS 6 Gbps Hot Swap Hard Drive

## 2.5-inch SSDs for cache

The SA120 optionally supports four extra SSDs in the rear of the server. These SSDs operate at 3 Gbps and are used primarily to enable caching through the use of LSI CacheCade 2.0 when used with an adapter that supports CacheCade (see supported adapters in Table 6). However, these SSDs are accessible by the operating system as regular drives by using any of the supported adapters and can be used for any of your hot-data needs.

LSI CacheCade is read/write software that is running in the RAID adapter that accelerates the performance of the HDDs. The software enables SSDs to be configured as a dedicated pool of controller cache to help maximize the I/O performance for transaction-intensive applications, such as databases and web serving. CacheCade software tracks data storage access patterns and identifies the most frequently accessed data. The hot data is then automatically stored on the solid-state storage devices that are assigned as a dedicated cache pool on the RAID controller.

### Notes

Consider the following points:

- LSI CacheCade supports a maximum of 512 GB cache pool size, regardless of individual SSD size.
- See Table 6 for the adapters that support LSI CacheCade

The use of SSDs also requires the optional ThinkServer 2.5-inch SATA SSD Cage with SATA Interposer, which includes two SSD cages for four bays.

Figure 5 shows the SSD cage with the SATA-to-SAS interposer card at the rear of the cage. An SSD in a hot-swap tray is shown on the right side of the figure.



Figure 5. ThinkServer 2.5-inch SATA SSD Cage with SATA Interposer and SSD

The following table lists the supported 2.5-inch drives. Note that these drives operate at speeds up to 3 Gbps in the SA120.

Table 5. 2.5-inch drive options

Part number	Description
<b>SSD Cage</b>	
4XF0F28766	ThinkServer 2.5-inch SATA SSD Cage with SATA Interposers (includes two SSD cages for four bays)
<b>Mainstream Multipurpose SATA SSD (operate at 3 Gbps)</b>	
4XB0F28636	2.5-inch 100 GB Mainstream Multipurpose SATA 6 Gbps Hot Swap SSD
4XB0F28637	2.5-inch 200 GB Mainstream Multipurpose SATA 6 Gbps Hot Swap SSD
4XB0F28638	2.5-inch 400 GB Mainstream Multipurpose SATA 6 Gbps Hot Swap SSD
4XB0F28639	2.5-inch 800 GB Mainstream Multipurpose SATA 6 Gbps Hot Swap SSD
<b>Value Read-Optimized SATA SSD (operate at 3 Gbps)</b>	
4XB0F28615	2.5-inch 120 GB Value Read-Optimized SATA 6 Gbps Hot Swap SSD
4XB0F28616	2.5-inch 240 GB Value Read-Optimized SATA 6 Gbps Hot Swap SSD
4XB0F28640	2.5-inch 300 GB Value Read-Optimized SATA 6 Gbps Hot Swap SSD
4XB0F28617	2.5-inch 480 GB Value Read-Optimized SATA 6 Gbps Hot Swap SSD
4XB0F28641	2.5-inch 800 GB Value Read-Optimized SATA 6 Gbps Hot Swap SSD

## Supported RAID controllers and SAS HBAs

The SA120 supports connectivity to ThinkServer and System x servers by using any of the RAID controllers that are listed in the following table.

Table 6. Supported RAID controllers and HBAs

Part number	Description	CacheCode support
<b>ThinkServer adapters</b>		
4XB0F28645	Lenovo ThinkServer 9280-8e 6Gb 8 port RAID adapter by LSI-Avago	No
4XB0F28655	ThinkServer Syncro CS 9286-8e 6Gb High Availability Enablement Kit by LSI Includes two ThinkServer 1 meter (3.28 ft) external mini-SAS cables	No
4XB0F28646	Lenovo ThinkServer 9286CV-8e PCIe 6Gb 8-port RAID adapter by LSI-Avago	Yes
4XB0F28699	Lenovo ThinkServer 9286CV-8e PCIe 6Gb 8-port RAID adapter by LSI	Yes
4XB0G88727	Lenovo ThinkServer 8885e PCIe 12Gb 8 port external SAS Adapter by PMC	No
<b>System x adapters</b>		
81Y4478	ServeRAID M5120 SAS/SATA Controller for System x	Optional*
00AE938	ServeRAID M5225-2GB SAS/SATA Controller for System x	Optional**

\* Enable CacheCode support via Features on Demand option, ServeRAID M5100 Series SSD Caching feature (90Y4318). One FoD option needed per server regardless of the number of adapters installed.

\*\* Enable CacheCode support via Features on Demand option, ServeRAID M5200 Series SSD Caching Enabler (47C8712). One FoD option needed per server regardless of the number of adapters installed.

The Lenovo ThinkServer 9280-8e 6Gb 8-port RAID adapter features the following specifications:

- MD2 Low profile adapter
- PCIe 2.0 x8 host interface
- Two Mini-SAS SFF-8088 external connectors
- LSI SAS2108 RAID-on-Chip (ROC)
- Optional intelligent battery backup module

- Eight external 6 Gbps SAS ports implemented via two four-lane (x4) connectors
- 512 MB onboard data cache (DDR2 running at 800 MHz)
- Supports RAID levels 0, 1, 5, 10, 50, 6, and 60

The Lenovo ThinkServer Syncro CS 9286-8e 6Gb High Availability Enablement Kit by LSI creates a two-server high-availability cluster from standard servers. The kit contains the following components:

- 2x Syncro CS 9286-8e RAID adapters
- 2x CacheVault Flash Modules (pre-installed on the RAID cards)
- 2x CacheVault Super Capacitor Modules
- 2x CacheVault 750mm remote cables
- 2x 1 m (3.28 ft) SAS cables
- Documentation

For more information about the kit, see this website:

<http://shop.lenovo.com/us/en/itemdetails/4XB0F28655/460/41E9A3C3FB5A45A9AC47C56812E4188C>

The Lenovo ThinkServer 9286CV-8e PCIe 6Gb 8-port RAID adapter features the following specifications:

- MD2 Low profile adapter
- PCI Express 3.0 x8 host interface
- Two Mini-SAS SFF-8088 external connectors
- LSI SAS2208 Dual-Core RAID on Chip (ROC)
- Optional MegaRAID CacheVault flash cache protection (flash memory and supercap)
- Optional support CacheCade and FastPath
- Eight external 6 Gbps SAS ports implemented via two four-lane (x4) connectors
- 1 GB onboard data cache (DDR3 running at 1333 MHz)
- Supports RAID levels 0, 1, 5, 10, 50, 6, and 60

The ServeRAID M5120 SAS/SATA Controller has the following specifications:

- Eight external 6 Gbps SAS/SATA ports
- Up to 6 Gbps throughput per port
- Two external x4 mini-SAS connectors (SFF-8088)
- Based on the LSI SAS2208 6 Gbps ROC controller
- Supports RAID 0, 1, and 10
- Supports RAID 5 and 50 with optional M5100 Series RAID 5 upgrades
- Supports RAID 6 and 60 with the optional M5100 Series RAID 6 upgrade
- Supports 512 MB battery-backed cache or 512 MB or 1 GB flash-backed cache (cache)
- PCIe 3.0 x8 host interface

For more information, see the Lenovo Press Product Guide *ServeRAID M5120 SAS/SATA Controller for System x, TIPS0858*:

<http://lenovopress.com/tips0858>

The ServeRAID M5225 SAS/SATA Controller has the following specifications:

- Eight external 12 Gbps SAS/SATA ports
- Supports 12, 6, and 3 Gbps SAS and 6 and 3 Gbps SATA data transfer rates
- Two external x4 mini-SAS HD connectors (SFF-8644)
- Based on the LSI SAS3108 12 Gbps ROC controller
- Supports 2 GB flash-backed cache (standard)

- Supports RAID levels 0, 1, 5, 10, and 50 (standard)
- Supports RAID 6 and 60 with the optional M5200 Series RAID 6 Upgrade
- Supports optional M5200 Series Performance Accelerator and SSD Caching upgrades
- PCIe x8 Gen 3 host interface

For more information, see the Lenovo Press Product Guide *ServeRAID M5225-2GB SAS/SATA Controller* at: <http://lenovopress.com/tips1258>

## Supported servers

The ThinkServer SA120 is interoperable with ThinkServer and System x. This interoperability provides all servers a cost-effective solution to expand server capacity without introducing complexity into your server environment.

Table 7 lists the System x servers that support each of the supported RAID adapters.

Table 7. Supported System x servers, part 1 (M5 systems with v3 processors)

Part number	Description	x3100 M5 (5457)	x3250 M5 (5458)	x3500 M5 (5464)	x3550 M5 (5463)	x3650 M5 (5462)	nx360 M5 (5465)
4XB0F28645	9280-8e 6Gb 8-port RAID adapter	N	N	N	N	N	N
4XB0F28646	9286CV-8e PCIe 6Gb 8-port RAID adapter	N	Y	N	Y	Y	N
4XB0F28699	9286CV-8e PCIe 6Gb 8-port RAID adapter	N	N	N	N	N	N
4XB0G88727	8885e PCIe 12Gb 8-port SAS HBA	N	N	N	N	N	N
81Y4478	ServeRAID M5120 RAID adapter	Y	Y	N	N	N	N
00AE938	ServeRAID M5225-2GB RAID adapter	Y	Y	Y	Y	Y	N

Table 7. Supported System x servers, part 2 (M4 and X6 systems with v2 processors)

Part number	Description											
4XB0F28645	9280-8e 6Gb 8-port RAID adapter	N	N	N	N	N	N	N	N	N	N	N
4XB0F28646	9286CV-8e PCIe 6Gb 8-port RAID	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4XB0F28699	9286CV-8e PCIe 6Gb 8-port RAID	N	N	N	N	N	N	N	N	N	N	N
4XB0G88727	8885e PCIe 12Gb 8-port SAS HBA	N	N	N	N	N	N	N	N	N	N	N
81Y4478	ServeRAID M5120 RAID adapter	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
00AE938	ServeRAID M5225-2GB RAID adapter	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N

Table 7. Supported System x servers, part 3 (M4 and X5 systems with v1 processors)

Part number	Description												
4XB0F28645	9280-8e 6Gb 8-port RAID adapter	N	Y	N	N	N	N	N	N	Y	N	Y	
4XB0F28646	9286CV-8e PCIe 6Gb 8-port RAID adapter	N	N	N	N	N	Y	Y	Y	Y	N	Y	
4XB0F28699	9286CV-8e PCIe 6Gb 8-port RAID adapter	N	N	N	N	N	N	N	N	N	N	N	
4XB0G88727	8885e PCIe 12Gb 8-port SAS HBA	N	N	N	N	N	N	N	N	N	N	N	
81Y4478	ServeRAID M5120 RAID adapter	N	N	Y	Y	Y	Y	Y	Y	N	Y	N	
00AE938	ServeRAID M5225-2GB RAID adapter	N	N	N	N	N	N	N	Y	N	N	N	
		x3100 M4 (2582)	x3250 M4 (2583)	x3300 M4 (7382)	x3500 M4 (7383, E5-2600)	x3530 M4 (7160)	x3550 M4 (7914, E5-2600)	x3630 M4 (7158)	x3650 M4 (7915, E5-2600)	x3690 X5 (7147)	x3750 M4 (8722)	x3850 X5 (7143)	dx360 M4 (7912, E5-2600)

Table 8 lists the ThinkServer systems that support each of the supported RAID adapters.

Table 8. Supported ThinkServer systems

Part number	Description	RD340	RD440	RD540	RD640	RS140	TS440	TD340	TD350	RD350	RD450	RD550	RD650
4XB0F28645	9280-8e 6Gb 8-port RAID adapter	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N
4XB0F28646	9286CV-8e PCIe 6Gb 8-port RAID adapter	Y	Y	Y	Y	N	Y	Y	N	N	N	N	N
4XB0F28699	9286CV-8e PCIe 6Gb 8-port RAID adapter	N	N	N	N	N	N	N	Y	Y	Y	Y	Y
4XB0G88727	8885e PCIe 12Gb 8-port SAS HBA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
81Y4478	ServeRAID M5120 RAID adapter	N	N	N	N	N	N	N	N	N	N	N	N
00AE938	ServeRAID M5225-2GB RAID adapter	N	N	N	N	N	N	N	N	N	N	N	N

## Power supplies

The SA120 supports up to two 550 W hot-swap power supplies. When two power supplies are installed, the second power supply offers full redundancy. Models have one or two power supplies standard, as listed in Table 2.

The power supplies feature the following specifications:

- Power capacity: 550 W
- Energy Star 2.0 certified
- 80 PLUS Gold certified
- Dual-voltage auto-sensing
- Voltage range: 100 - 127 VAC to 200 - 240 VAC
- Input frequency: 50 - 60 Hz
- Compliant Standards: UL, TUV, CB, EMC, FCC

For models with only one power supply standard, the second can be ordered as listed in Table 2.

Table 9. Power supply option

Part number	Description
4X20E54689	ThinkServer 550W Hot Swap Redundant Power Supply

Each power supply ships with one country-specific 1.8 m (5.9 ft) 10 A line cord.

## Management

The SA120 supports the SCSI Enclosure Services (SES) command set for enclosure management. Drive and controller management is performed by using LSI MegaRAID Storage Manager (MSM). MSM has the following characteristics:

- GUI tool that also is used to manage ThinkServer and System x ServeRAID internal RAID adapters
- Capability for configuration of RAID groups, monitoring, and optimization
- Can be run locally or remotely
- Scriptable command line interface (CLI) also is available

The SA120 also offers LEDs on the front and rear of the unit to show when faults occurred, as shown in Figure 6.

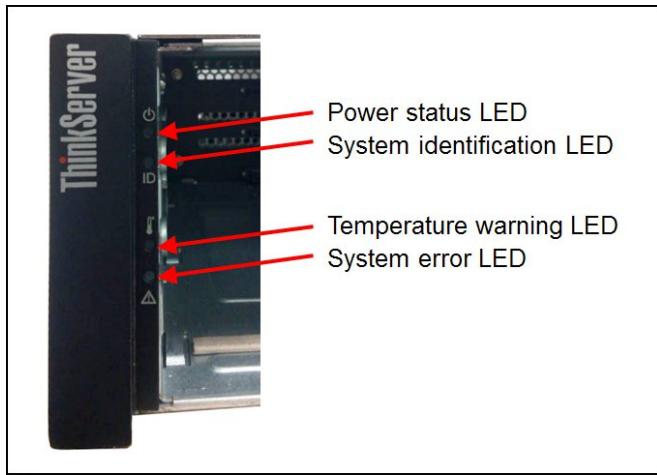


Figure 6. System LEDs on the left side of the front of the enclosure

On the rear of the enclosure, each I/O module provides status LEDs, as shown in Figure 7.

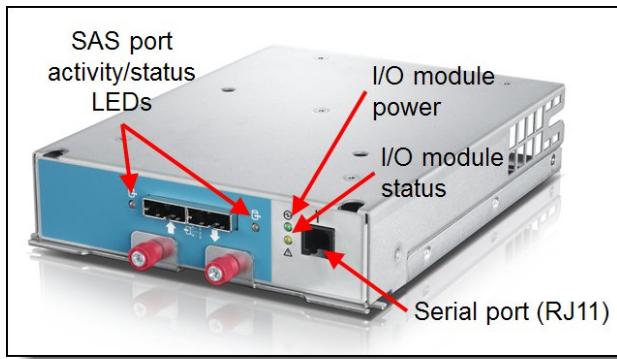


Figure 7. I/O module LEDs

In addition, the SA120 offers LEDs on the following components:

- On each drive: Drive status and drive error LEDs
- On each power supply: Status LED
- On each system fan module: Status LED

As shown in Figure 7, each I/O module has an RJ11 port for firmware upgrades. A 3 m (9 ft) RS232-to-RJ11 serial cable is provided with the SA120. Firmware upgrades can be completed by using one of the following methods:

- The provided serial cable and an SSH serial console client.
- ThinkServer Storage Array Utility program, which is available at this website: <http://support.lenovo.com/en/downloads/ds040947>.

## Tower conversion kit

The SA120 supports a tower kit that enables the enclosure to be placed vertically. This placement is useful if the SA120 is connected to a tower server. Table 10 shows the ordering information for the conversion kit.

Table 10. Tower conversion kit

Part number	Description
4XF0F28768	ThinkServer Rack to Tower Kit for SFF

Figure 8 shows the main components of the tower conversion kit.

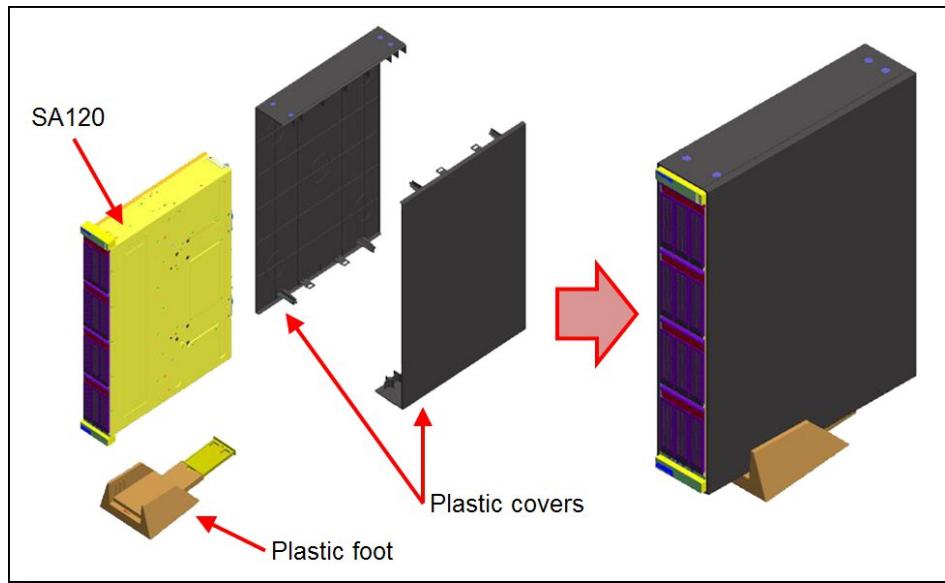


Figure 8. Tower conversion kit

## Physical and operating environment specifications

The storage array features the following physical and operating environment specifications:

- Physical specifications:
  - Width: 482.6mm (19 in)
  - Depth: 394.1 mm (15.51 in)
  - Height 86.6 mm (3.4 in); two-rack units
  - Weight 16 kg (35.3 lb) without drives; 22 kg (48.5 lb) when fully configured
- Air temperature:
  - Operating: 10°C - 35°C (50°F - 95°F)
  - Storage: -40°C - 70°C (-40°F - 158°F) in original package
  - Altitude: 0 - 3048 m (0 - 10000 ft), un-pressurized
- Humidity:
  - Operating: 8% - 80% (non-condensing)
  - Storage without package: 8% - 80% (non-condensing)
  - Storage with package: 8% - 90% (non-condensing)

## Warranty and service options

The SA120 has a three-year warranty standard. The terms are onsite next business day support, 9 hours per day (8 AM - 5 PM), Monday - Friday.

The following warranty upgrades are available, but vary from country to country. For more information, contact your local business partner:

- Upgraded warranty period: 4 years or 5 years
- Upgraded warranty response time: 4 or 8 hour onsite response
- Upgraded warranty coverage: 24 hours per day, 7 days per week

**4 Hour Onsite Response Time 9x5:** 4 hour onsite response time available in a 9x5 service window for hardware and software with fast, expert telephony support and Technician Installed CRUs. The response time is counted during the service window Monday - Friday, 8 AM - 5 PM.

**4 Hour Onsite Response Time 24x7:** 4 hour onsite response time available in a 24x7 service window for hardware and software with fast, expert telephony support and Technician Installed CRUs

The following other service options are available:

- Priority Support
- Asset Recovery
- Keep Your Drive (Multi-Drive)
- Asset Tagging

Priority Support is an enhanced warranty plan that provides direct access to advanced technical support, which includes the following features:

- Priority call routing to advanced technicians for faster response, usually under 1 minute.
- Dedicated support phone numbers
- 24x7 telephone tech-to-tech support
- Web-based ticket registration and ticket tracking
- Escalation Management
- Support in Local Language

With the Keep Your Drive service, if a drive fails, you can ensure the data is protected because you keep the failed drive after the repair. Our offering covers all of the drives in the SA120 for complete data protection. You can then dispose of the failed drive by using your own security procedures.

## Regulatory compliance

The SA120 meets the following agency regulations:

- FCC - Verified to comply with Part 15 of the FCC Rules, Class A
- Canada ICES-003, issue 5, Class A
- UL/IEC 60950-1
- CSA C22.2 No. 60950-1
- NOM-019
- Australia/New Zealand AS/NZS CISPR 22, Class A; AS/NZS 60950.1
- IEC 60950-1 (CB Certificate and CB Test Report)
- CE Mark (EN55022 Class A, EN60950-1, EN55024, EN61000-3-2, EN61000-3-3)
- CISPR 22, Class A
- TUV-GS (EN60950-1/IEC60950-1,EK1-ITB2000)

## Related publications and links

- Lenovo Quick Pick for ThinkServer SA120 (USA)  
<http://www.lenovoquickpick.com/usa/system/thinkserver/storage/sa120/70f1#allaccessories>
- Lenovo Support – ThinkServer SA120 (includes user's guide and firmware updates)  
<http://support.lenovo.com/en/documents/pd030701>
- Lenovo ThinkServer High-Availability Solutions with Lenovo ThinkServer SA120 DAS Array, LSI Syncro® CS 9286-8e, and Microsoft Windows Server 2012  
[http://www.lenovo.com/images/products/server/pdfs/whitepapers/thinkserver\\_HASyncrosolutions\\_wp.pdf](http://www.lenovo.com/images/products/server/pdfs/whitepapers/thinkserver_HASyncrosolutions_wp.pdf)
- PSREF – Product Specifications Reference  
<http://psref.lenovo.com/>

## Related product families

Product families related to this document are the following:

- [Direct-Attached Storage](#)

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