ThinkSystem 5300 Entry 6Gb SATA SSDs
Product Guide

The 5300 Entry SATA solid-state drives (SSDs) are new SSDs for ThinkSystem servers. The drives use Micron 96-layer 3D NAND flash memory technology with a SATA 6Gbps interface and provide an affordable solution for read-intensive applications such as boot, web servers, lower data rate operational databases and analytics.

Figure 1. Lenovo ThinkSystem 5300 Entry SATA SSD

Did you know?

The 5300 Series of SATA SSDs are the follow-on to the 5200 line of SSDs. The two series share the same controller, firmware, interface and features. The key difference is that the 5300 Series uses a new 96-layer 3D NAND storage medium compared to the 64-layer technology in the 5200. The 5300 drives have higher endurance and lower latency compared to the 5200 SSDs.

Lenovo also offers high-performance self-encrypting drives (SEDs) in the 5300 Series. These SSDs adhere to the Trusted Computing Group Enterprise Security Subsystem Class cryptographic standard (TCG Enterprise SSC). Read about them in the ThinkSystem 5300 Entry 6Gb SATA SED SSD product guide .

Part number information

The following table lists the ThinkSystem part numbers.

M.2 drives: The range of Micron 5300 SSDs in M.2 form factor are described in the ThinkSystem M.2 Drives and M.2 Adapters product guide, available from https://lenovopress.com/lp0769.

SED drives: For self-encrypting drives, see the ThinkSystem 5300 Entry 6Gb SATA SED SSDs product guide, https://lenovopress.com/lp1254

Table 1. ThinkSystem ordering information

Part number	Feature	Description
2.5-inch hot-swap drives		
4XB7A17076	B8JM	ThinkSystem 2.5" 5300 480GB Entry SATA 6Gb Hot Swap SSD
4XB7A17079	B8JP	ThinkSystem 2.5" 5300 3.84TB Entry SATA 6Gb Hot Swap SSD
3.5-inch hot-swap drives		
4XB7A17082	B8J9	ThinkSystem 3.5" 5300 480GB Entry SATA 6Gb Hot Swap SSD
4XB7A17085	B8HQ	ThinkSystem 3.5" 5300 3.84TB Entry SATA 6Gb Hot Swap SSD
7mm hot-swap drives		
4XB7A38182	B8JT	ThinkSystem 7mm 5300 480GB Entry SATA 6Gb SSD
2.5-inch non-hot-swap drives for ST50 V2		
4XB7A77457	BME8	ThinkSystem ST50 V2 2.5" 5300 480GB Read Intensive SATA 6Gb NHS SSD
3.5-inch non-hot-swap drives for ST50 V2		
4XB7A77452	BME4	ThinkSystem ST50 V2 3.5" 5300 480GB Read Intensive SATA 6Gb NHS SSD
3.5-inch non-hot-swap drives for ST50		
4XB7A17205	BE3F	ThinkSystem ST50 3.5" 5300 480GB Entry SATA 6Gb Non Hot Swap SSD
Trayless drives for water-cooled systems		
4XB7A17183	BA47	ThinkSystem 5300 2.5" 7mm 480GB Entry SATA 6Gb Trayless SSD

Features

The 5300 Entry SATA SSDs have the following features:

- Industry standard 2.5-inch or 3.5-inch form factors (for M.2 drives, see https://lenovopress.com/lp0769)
- New generation 96-layer 3D TLC NAND flash memory
- Suitable for read-intensive workloads with an endurance of between 0.6 and 1.5 drive writes per day (DWPD) for 5 years
- 6 Gbps SATA host interface
- High reliability and enhanced ruggedness
- MTTF of 3 million device hours - 50% more than most drives
- Absence of moving parts to reduce potential failure points in the server
- S.M.A.R.T. support
- Advanced Encrypting Standard (AES) 256-bit encryption

SSDs have a huge but finite number of program/erase (P/E) cycles, which affect how long they can perform write operations and thus their life expectancy. Entry SSDs typically have a better cost per read IOPS ratio but lower endurance and performance compared to Mainstream and Performance SSDs. SSD write endurance is typically measured by the number of program/erase cycles that the drive can incur over its lifetime, which is listed as total bytes written (TBW) in the device specification.

The TBW value that is assigned to a solid-state device is the total bytes of written data that a drive can be guaranteed to complete. Reaching this limit does not cause the drive to immediately fail; the TBW simply denotes the maximum number of writes that can be guaranteed. A solid-state device does *not* fail upon reaching the specified TBW. However, at some point after surpassing the TBW value (and based on manufacturing variance margins), the drive reaches the end-of-life point, at which time the drive goes into read-only mode. Because of such behavior, careful planning must be done to use SSDs in the application environments to ensure that the TBW of the drive is not exceeded before the required life expectancy.

For example, the 960 GB 5300 Entry drive has an endurance of 2,628 TB of total bytes written (TBW). This means that for full operation over five years, write workload must be limited to no more than 1,440 GB of writes per day, which is equivalent to 1.5 full drive writes per day (DWPD). For the device to last three years, the drive write workload must be limited to no more than 2,400 GB of writes per day, which is equivalent to 2.5 full drive writes per day. .

Technical specifications

The following table presents technical specifications for the 5300 Entry SATA SSDs.

Tip: Drives listed in this product guide are the Lenovo versions of the Micron 5300 PRO family of SSDs.

Table 2. Technical specifications

Feature	240 GB drive	480 GB drive	960 GB drive	1.92 TB drive	3.84 TB drive	7.68 TB drive
Interface	6 Gbps SATA	6 Gbps SATA	6 Gbps SATA	6 Gbps SATA	6 Gbps SATA	6 Gbps SATA
Capacity	240 GB	480 GB	960 GB	1.92 TB	3.84 TB	7.68 TB
SED encryption	None	None	None	None	None	None
Endurance (drive writes per day)	1.5 DWPD	1.5 DWPD	1.5 DWPD	1.5 DWPD	1.2 DWPD	0.6 DWPD
Endurance (total bytes written)	657 TB	1324 TB	2628 TB	5256 TB	8410 TB	9110 TB
Data reliability	< 1 in 10^{17} bits read	< 1 in 10^{17} bits read	< 1 in 10^{17} bits read	< 1 in 10^{17} bits read	< 1 in 10^{17} bits read	< 1 in 10^{17} bits read
MTTF	3,000,000 hours	3,000,000 hours	3,000,000 hours	3,000,000 hours	3,000,000 hours	3,000,000 hours
IOPS reads (4 KB blocks)	67,000	85,000	95,000	95,000	95,000	95,000
IOPS writes (4 KB blocks)	40,000	36,000	35,000	30,000	22,000	11,000
Sequential read rate (128 KB blocks)	540 MBps	540 MBps	540 MBps	540 MBps	540 MBps	540 MBps
Sequential write rate (128 KB blocks)	310 MBps	410 MBps	520 MBps	520 MBps	520 MBps	520 MBps
Read latency (seq)	175 µs	175 µs	175 µs	175 µs	175 µs	175 µs
Write latency (seq)	300 µs	100 µs	100 µs	300 µs	350 µs	650 µs
Shock, non-operating	1,500 G (Max) at 0.5 ms	1,500 G (Max) at 0.5 ms	1,500 G (Max) at 0.5 ms	1,500 G (Max) at 0.5 ms	1,500 G (Max) at 0.5 ms	1,500 G (Max) at 0.5 ms
Vibration, non-operating	3.13 G_{RMS} (5-800 Hz)	3.13 G_{RMS} (5-800 Hz)	3.13 G_{RMS} (5-800 Hz)	3.13 G_{RMS} (5-800 Hz)	3.13 G_{RMS} (5-800 Hz)	3.13 G_{RMS} (5-800 Hz)
Typical power (R/W)	2.5 W / 3.0 W	2.5 W / 3.1 W	2.8 W / 3.4 W	3.0 W / 3.8 W	2.5 W / 3.8 W	2.5 W / 3.9 W

Server support

The following tables list the ThinkSystem servers that are compatible.

Table 3. Server support (Part 1 of 4)

Part Number	Description	2S AMD V3				2S Intel V3			4S 8S Intel V3			Multi Node			GPU Rich		1S V3	
		SR635 V3 (7D9H / 7D9G)	SR655 V3 (7D9F / 7D9E)	SR645 V3 (7D9D / 7D9C)	SR665 V3 (7D9B / 7D9A)	ST650 V3 (7D7B / 7D7A)	SR630 V3 (7D72 / 7D73)	SR650 V3 (7D75 / 7D76)	SR850 V3 (7D97 / 7D96)	SR860 V3 (7D94 / 7D93)	SR950 V3 (7DC5 / 7DC4)	SD535 V3 (7DD8 / 7DD1)	SD530 V3 (7DDA / 7DD3)	SD550 V3 (7DD9 / 7DD2)	SR670 V2 (7Z22 / 7Z23)	SR675 V3 (7D9Q / 7D9R)	ST250 V3 (7DCF / 7DCE)	SR250 V3 (7DCM / 7DCL)
2.5-inch hot-swap drives																		
4XB7A17076	ThinkSystem 2.5" 5300 480GB Entry SATA 6Gb Hot Swap SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N
4XB7A17079	ThinkSystem 2.5" 5300 3.84TB Entry SATA 6Gb Hot Swap SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N
3.5-inch hot-swap drives																		
4XB7A17082	ThinkSystem 3.5" 5300 480GB Entry SATA 6Gb Hot Swap SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N
4XB7A17085	ThinkSystem 3.5" 5300 3.84TB Entry SATA 6Gb Hot Swap SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N
7mm hot-swap drives																		
4XB7A38182	ThinkSystem 7mm 5300 480GB Entry SATA 6Gb SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
2.5-inch non-hot-swap drives for ST50 V2																		
4XB7A77457	ThinkSystem ST50 V2 2.5" 5300 480GB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
3.5-inch non-hot-swap drives for ST50 V2																		
4XB7A77452	ThinkSystem ST50 V2 3.5" 5300 480GB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
3.5-inch non-hot-swap drives for ST50																		
4XB7A17205	ThinkSystem ST50 3.5" 5300 480GB Entry SATA 6Gb Non Hot Swap SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Trayless drives for water-cooled systems																		
4XB7A17183	ThinkSystem 5300 2.5" 7mm 480GB Entry SATA 6Gb Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Table 4. Server support (Part 2 of 4)

Part Number	Description	Edge					Super Computing					1S Intel V2			2S Intel V2		
		SE350 (7Z46 / 7D1X)	SE350 V2 (7DA9)	SE360 V2 (7DAM)	SE450 (7D8T)	SE455 V3 (7DBY)	SD665 V3 (7D9P)	SD665-N V3 (7DAZ)	SD650 V3 (7D7M)	SD650-I V3 (7D7L)	SD650-N V3 (7D7N)	ST50 V2 (7D8K / 7D8J)	ST250 V2 (7D8G / 7D8F)	SR250 V2 (7D7R / 7D7Q)	ST650 V2 (7Z75 / 7Z74)	SR630 V2 (7Z70 / 7Z71)	SR650 V2 (7Z72 / 7Z73)
2.5-inch hot-swap drives																	
4XB7A17076	ThinkSystem 2.5" 5300 480GB Entry SATA 6Gb Hot Swap SSD	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y
4XB7A17079	ThinkSystem 2.5" 5300 3.84TB Entry SATA 6Gb Hot Swap SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y
3.5-inch hot-swap drives																	
4XB7A17082	ThinkSystem 3.5" 5300 480GB Entry SATA 6Gb Hot Swap SSD	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	Y	Y
4XB7A17085	ThinkSystem 3.5" 5300 3.84TB Entry SATA 6Gb Hot Swap SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y
7mm hot-swap drives																	
4XB7A38182	ThinkSystem 7mm 5300 480GB Entry SATA 6Gb SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y
2.5-inch non-hot-swap drives for ST50 V2																	
4XB7A77457	ThinkSystem ST50 V2 2.5" 5300 480GB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N
3.5-inch non-hot-swap drives for ST50 V2																	
4XB7A77452	ThinkSystem ST50 V2 3.5" 5300 480GB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N
3.5-inch non-hot-swap drives for ST50																	
4XB7A17205	ThinkSystem ST50 3.5" 5300 480GB Entry SATA 6Gb Non Hot Swap SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Trayless drives for water-cooled systems																	
4XB7A17183	ThinkSystem 5300 2.5" 7mm 480GB Entry SATA 6Gb Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Table 5. Server support (Part 3 of 4)

Part Number	Description	AMD V1					Dense V2				4S V2		8S	4S V1			1S Intel V1			
		SR635 (7Y98 / 7Y99)	SR655 (7Y00 / 7Z01)	SR655 Client OS	SR645 (7D2Y / 7D2X)	SR665 (7D2W / 7D2V)	SD630 V2 (7D1K)	SD650 V2 (7D1M)	SD650-N V2 (7D1N)	SN550 V2 (7Z69)	SR850 V2 (7D31 / 7D32)	SR860 V2 (7Z59 / 7Z60)	SR950 (7X11 / 7X12)	SR850 (7X18 / 7X19)	SR850P (7D2F / 2D2G)	SR860 (7X69 / 7X70)	ST50 (7Y48 / 7Y50)	ST250 (7Y45 / 7Y46)	SR150 (7Y54)	SR250 (7Y52 / 7Y51)
2.5-inch hot-swap drives																				
4XB7A17076	ThinkSystem 2.5" 5300 480GB Entry SATA 6Gb Hot Swap SSD	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y
4XB7A17079	ThinkSystem 2.5" 5300 3.84TB Entry SATA 6Gb Hot Swap SSD	Y	Y	Y	Y	Y	N	N	N	N	Y	Y	Y	Y	Y	N	N	Y	N	N
3.5-inch hot-swap drives																				
4XB7A17082	ThinkSystem 3.5" 5300 480GB Entry SATA 6Gb Hot Swap SSD	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y
4XB7A17085	ThinkSystem 3.5" 5300 3.84TB Entry SATA 6Gb Hot Swap SSD	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	Y	N	N
7mm hot-swap drives																				
4XB7A38182	ThinkSystem 7mm 5300 480GB Entry SATA 6Gb SSD	N	N	N	Y	Y	Y	N	N	N	Y	Y	N	N	N	N	N	N	N	N
2.5-inch non-hot-swap drives for ST50 V2																				
4XB7A77457	ThinkSystem ST50 V2 2.5" 5300 480GB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
3.5-inch non-hot-swap drives for ST50 V2																				
4XB7A77452	ThinkSystem ST50 V2 3.5" 5300 480GB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
3.5-inch non-hot-swap drives for ST50																				
4XB7A17205	ThinkSystem ST50 3.5" 5300 480GB Entry SATA 6Gb Non Hot Swap SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N
Trayless drives for water-cooled systems																				
4XB7A17183	ThinkSystem 5300 2.5" 7mm 480GB Entry SATA 6Gb Trayless SSD	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N	N	N	N	N

Table 6. Server support (Part 4 of 4)

Part Number	Description	2S Intel V1								Dense V1			
		ST550 (7X09 / 7X10)	SR530 (7X07 / 7X08)	SR550 (7X03 / 7X04)	SR570 (7Y02 / 7Y03)	SR590 (7X98 / 7X99)	SR630 (7X01 / 7X02)	SR650 (7X05 / 7X06)	SR670 (7Y36 / 7Y37)	SD530 (7X21)	SD650 (7X58)	SN550 (7X16)	SN850 (7X15)
2.5-inch hot-swap drives													
4XB7A17076	ThinkSystem 2.5" 5300 480GB Entry SATA 6Gb Hot Swap SSD	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y
4XB7A17079	ThinkSystem 2.5" 5300 3.84TB Entry SATA 6Gb Hot Swap SSD	Y	Y	Y	N	N	Y	Y	Y	N	N	N	Y
3.5-inch hot-swap drives													
4XB7A17082	ThinkSystem 3.5" 5300 480GB Entry SATA 6Gb Hot Swap SSD	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N
4XB7A17085	ThinkSystem 3.5" 5300 3.84TB Entry SATA 6Gb Hot Swap SSD	Y	Y	Y	N	N	Y	Y	N	N	N	N	N
7mm hot-swap drives													
4XB7A38182	ThinkSystem 7mm 5300 480GB Entry SATA 6Gb SSD	N	N	N	N	N	N	N	N	N	N	N	N
2.5-inch non-hot-swap drives for ST50 V2													
4XB7A77457	ThinkSystem ST50 V2 2.5" 5300 480GB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	N	N	N	N	N	N
3.5-inch non-hot-swap drives for ST50 V2													
4XB7A77452	ThinkSystem ST50 V2 3.5" 5300 480GB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	N	N	N	N	N	N
3.5-inch non-hot-swap drives for ST50													
4XB7A17205	ThinkSystem ST50 3.5" 5300 480GB Entry SATA 6Gb Non Hot Swap SSD	N	N	N	N	N	N	N	N	N	N	N	N
Trayless drives for water-cooled systems													
4XB7A17183	ThinkSystem 5300 2.5" 7mm 480GB Entry SATA 6Gb Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N

Operating system support

SATA SSDs operate transparently to users, storage systems, applications, databases, and operating systems.

Operating system support is based on the controller used to connect to the drives. Consult the controller propduct guide for more information:

- RAID controllers: https://lenovopress.com/servers/options/raid
- SAS HBAs: https://lenovopress.com/servers/options/hba

Warranty

The 5300 Entry SATA SSDs carry a one-year, customer-replaceable unit (CRU) limited warranty. When the SSDs are installed in a supported server, these drives assume the system's base warranty and any warranty upgrades.

Solid State Memory cells have an intrinsic, finite number of program/erase cycles that each cell can incur. As a result, each solid state device has a maximum amount of program/erase cycles to which it can be subjected. The warranty for Lenovo solid state drives (SSDs) is limited to drives that have not reached the maximum guaranteed number of program/erase cycles, as documented in the Official Published Specifications for the SSD product. A drive that reaches this limit may fail to operate according to its Specifications.

Physical specifications

The drives have the following physical specifications (approximate, without the tray):

- Height: 7 mm (0.3 in.)
- Width: 70 mm (2.8 in.)
- Depth: 100 mm (4.0 in.)
- Weight: 70 g (2.5 oz)

Shipping dimensions and weight - 2.5-inch drives (approximate, including the tray):

- Height: 63 mm (2.5 in.)
- Width: 174 mm (6.9 in.)
- Depth: 133 mm (5.2 in.)
- Weight: 434 g (1.0 lb)

Shipping dimensions and weight - 3.5-inch drives (approximate, including the tray):

- Height: 95 mm (3.7 in.)
- Width: 257 mm (10.1 in.)
- Depth: 193 mm (7.6 in.)
- Weight: 484 g (1.1 lb)

Operating environment

The SSDs are supported in the following environment:

- Operating temperature: 0 to 70°C (32 to 158°F)
- Non-operating temperature: -40 to 85°C (-40 to 185°F)
- Relative humidity: 5 to 95% (non-condensing)

Agency approvals

The 5300 Entry SATA SSDs conform to the following regulations:

- Micron Green Standard
- Built with sulfur resistant resistors
- CE (Europe): EN 55032 Class B, RoHS
- FCC: CFR Title 47, Part 15 Class B
- UL: UL-60950-1, 2nd Edition
- BSMI (Taiwan): approval to CNS 13438
- RCM (Australia, New Zealand): AS/NZS CISPR32 Class B
- KCC RRL (Korea): approval to KN 32 Class B, KN 35 Class B
- W.E.E.E.: Compliance with EU WEEE directive 2002/96/EC.
- TUV (Germany): approval to IEC60950/EN60950
- VCCI (Japan): 2015-04 Class B
- IC (Canada): CISPR32 Class B: Canadian ICES-003:2016

Related publications and links

For more information, see the following documents:

- Product Guide on ThinkSystem 5300 Entry 6Gb SATA SED SSDs
  https://lenovopress.com/lp1254
- Lenovo ThinkSystem storage options product web page
  https://lenovopress.com/lp0761-storage-options-for-thinksystem-servers
- Micron 5300 series product page
  https://www.micron.com/5300
- ServerProven support
  http://www.lenovo.com/us/en/serverproven
- Lenovo RAID Introduction
  https://lenovopress.com/lp0578-lenovo-raid-introduction
- Lenovo RAID Management Tools and Resources
  https://lenovopress.com/lp0579-lenovo-raid-management-tools-and-resources

Related product families

Product families related to this document are the following:

- Drives

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