ThinkSystem 5200 Mainstream SATA 6Gb SSDs
Product Guide

The ThinkSystem 5200 Mainstream SATA 6Gb solid-state drives (SSDs) use Micron NAND flash memory technology with a SATA 6Gbps interface. They provide an affordable solution for mixed read/write applications such as cache in transactional applications and high-speed storage for enterprise databases.

The 5200 Mainstream SATA SSD is shown in the following figure.

Figure 1. ThinkSystem 5200 Mainstream SATA 6Gb SSDs

Did you know?

Lenovo also offers high-performance self-encrypting drives (SEDs) in the 5200 Mainstream Series. These SSDs adhere to the Trusted Computing Group Enterprise Security Subsystem Class cryptographic standard (TCG Enterprise SSC). Read about them in the ThinkSystem 5200 Mainstream SATA 6Gb SED SSD product guide.

Rigorous testing of the 5200 Series SSDs by Lenovo through the ServerProven program assures a high degree of storage subsystem compatibility and reliability. Providing additional peace of mind, these drives are covered under Lenovo warranty.

Part number information

The following table lists the ThinkSystem part numbers.

Table 1. ThinkSystem ordering information

Part number	Feature	Description
2.5-inch hot-swap drives - ThinkSystem		
4XB7A10237	B488	ThinkSystem 2.5" 5200 240GB Mainstream SATA 6Gb Hot Swap SSD
4XB7A10238	B489	ThinkSystem 2.5" 5200 480GB Mainstream SATA 6Gb Hot Swap SSD
4XB7A10239	B48A	ThinkSystem 2.5" 5200 960GB Mainstream SATA 6Gb Hot Swap SSD
4XB7A10240	B48B	ThinkSystem 2.5" 5200 1.92TB Mainstream SATA 6Gb Hot Swap SSD
4XB7A10241	B48C	ThinkSystem 2.5" 5200 3.84TB Mainstream SATA 6Gb Hot Swap SSD
3.5-inch hot-swap drives - ThinkSystem		
4XB7A10242	B48D	ThinkSystem 3.5" 5200 240GB Mainstream SATA 6Gb Hot Swap SSD
4XB7A10243	B48E	ThinkSystem 3.5" 5200 480GB Mainstream SATA 6Gb Hot Swap SSD
4XB7A10244	B48F	ThinkSystem 3.5" 5200 960GB Mainstream SATA 6Gb Hot Swap SSD
4XB7A10245	B48G	ThinkSystem 3.5" 5200 1.92TB Mainstream SATA 6Gb Hot Swap SSD
4XB7A10246	B48H	ThinkSystem 3.5" 5200 3.84TB Mainstream SATA 6Gb Hot Swap SSD
3.5-inch simple-swap drives - ThinkSystem		
4XB7A14052	B5Y8	ThinkSystem 3.5" 5200 240GB Mainstream SATA 6Gb Simple Swap SSD
4XB7A14053	B5Y9	ThinkSystem 3.5" 5200 480GB Mainstream SATA 6Gb Simple Swap SSD
4XB7A14054	B5YA	ThinkSystem 3.5" 5200 960GB Mainstream SATA 6Gb Simple Swap SSD

Features

The 5200 Mainstream SATA SSDs have the following features:

- Industry standard 2.5-inch or 3.5-inch form factors
- Innovative 64-layer triple-level cell (TLC) 3D NAND technology
- Suitable for mixed read/write workloads with an endurance of between 2.5 and 5 drive writes per day (DWPD) for 5 years
- 6 Gbps SATA host interface
- High reliability and enhanced ruggedness
- 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. Mainstream SSDs typically have a better cost per read IOPS ratio but lower endurance and performance compared to 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 5200 Mainstream drive in a 960 GB capacity has an endurance of 8.7 PB of total bytes written (TBW). This means that for full operation over five years, write workload must be limited to no more than 4,800 GB of writes per day, which is equivalent to 5.0 full drive writes per day (DWPD). For the device to last three years, the drive write workload must be limited to no more than 8,000 GB of writes per day, which is equivalent to 8.3 full drive writes per day.

Technical specifications

The following table presents technical specifications for the 5200 Mainstream SATA SSDs.

Tip: Drives listed in this product guide with the exception of the 3.84 TB drive are the Lenovo versions of the Micron 5200 MAX family of SSDs. The 3.84 TB drive is the Lenovo version of the Micron 5200 PRO SSD.

Table 2. Technical specifications

Feature	**240 GB drive**	**480 GB drive**	**960 GB drive**	**1.92 TB drive**	**3.84 TB drive**
Interface	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
Endurance (drive writes per day)	5.0 DWPD	5.0 DWPD	5.0 DWPD	5.0 DWPD	2.5 DWPD
Endurance (total bytes written)	2200 TB	4380 TB	8760 TB	17,520 TB	17,600 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
MTBF	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)	81,000	93,000	95,000	95,000	95,000
IOPS writes (4 KB blocks)	53,000	70,000	75,000	70,000	24,500
Sequential read rate (128 KB blocks)	540 MBps	540 MBps	540 MBps	540 MBps	540 MBps
Sequential write rate (128 KB blocks)	310 MBps	460 MBps	520 MBps	520 MBps	520 MBps
Read latency (seq)	200 µs	200 µs	200 µs	200 µs	200 µs
Write latency (seq)	300 µs	300 µs	300 µs	300 µs	900 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
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)
Typical power (Read / Write)	2.5 / 3.0 W	2.5 / 3.1 W	2.8 / 3.4 W	3.0 / 3.6 W	2.5 / 3.3 W

Server support

The following table lists the ThinkSystem servers that are compatible.

Table 3. ThinkSystem server support

Part number	Description	1S Rack & Tower				2S Rack & Tower								4S Rack			Dense/ Blade			
		ST50 (7Y48/7Y50)	ST250 (7Y45/7Y46)	SR150 (7Y54)	SR250 (7Y51/7Y52)	ST550 (7X09/7X10)	SR530 (7X07/7X08)	SR550 (7X03/7X04)	SR570 (7Y02/7Y03)	SR590 (7X98/7X99)	SR630 (7X01/7X02)	SR650 (7X05/7X06)	SR670 (7Y36/7Y37/7Y38)	SR850 (7X18/7X19)	SR860 (7X69/7X70)	SR950 (7X11/12/13)	SD530 (7X21)	SD650 (7X58)	SN550 (7X16)	SN850 (7X15)
4XB7A10237	ThinkSystem 2.5" 5200 240GB Mainstream SATA 6Gb Hot Swap SSD	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y
4XB7A10238	ThinkSystem 2.5" 5200 480GB Mainstream SATA 6Gb Hot Swap SSD	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y
4XB7A10239	ThinkSystem 2.5" 5200 960GB Mainstream SATA 6Gb Hot Swap SSD	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y
4XB7A10240	ThinkSystem 2.5" 5200 1.92TB Mainstream SATA 6Gb Hot Swap SSD	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y
4XB7A10241	ThinkSystem 2.5" 5200 3.84TB Mainstream SATA 6Gb Hot Swap SSD	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y
4XB7A10242	ThinkSystem 3.5" 5200 240GB Mainstream SATA 6Gb Hot Swap SSD	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N
4XB7A10243	ThinkSystem 3.5" 5200 480GB Mainstream SATA 6Gb Hot Swap SSD	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N
4XB7A10244	ThinkSystem 3.5" 5200 960GB Mainstream SATA 6Gb Hot Swap SSD	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N
4XB7A10245	ThinkSystem 3.5" 5200 1.92TB Mainstream SATA 6Gb Hot Swap SSD	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N
4XB7A10246	ThinkSystem 3.5" 5200 3.84TB Mainstream SATA 6Gb Hot Swap SSD	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N
4XB7A14052	ThinkSystem 3.5" 5200 240GB Mainstream SATA 6Gb Simple Swap SSD	N	N	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Part number	Description	1S Rack & Tower				2S Rack & Tower								4S Rack			Dense/ Blade			
		ST50 (7Y48/7Y50)	ST250 (7Y45/7Y46)	SR150 (7Y54)	SR250 (7Y51/7Y52)	ST550 (7X09/7X10)	SR530 (7X07/7X08)	SR550 (7X03/7X04)	SR570 (7Y02/7Y03)	SR590 (7X98/7X99)	SR630 (7X01/7X02)	SR650 (7X05/7X06)	SR670 (7Y36/7Y37/7Y38)	SR850 (7X18/7X19)	SR860 (7X69/7X70)	SR950 (7X11/12/13)	SD530 (7X21)	SD650 (7X58)	SN550 (7X16)	SN850 (7X15)
4XB7A14053	ThinkSystem 3.5" 5200 480GB Mainstream SATA 6Gb Simple Swap SSD	N	N	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7A14054	ThinkSystem 3.5" 5200 960GB Mainstream SATA 6Gb Simple Swap SSD	N	N	Y	Y	N	N	N	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 5200 Mainstream 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 5200 Mainstream 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 for ThinkSystem 5200 Mainstream SATA 6Gb SED SSDs
  https://lenovopress.com/LP1173
- Lenovo ThinkSystem storage options product page
  https://lenovopress.com/lp0761-storage-options-for-thinksystem-servers
- Micron 5200 series product page
  https://www.micron.com/products/solid-state-storage/product-lines/5200
- ServerProven for SSDs
  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
- ServeRAID Adapter Quick Reference
  http://lenovopress.com/tips0054

Related product families

Product families related to this document are the following:

- Drives

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