ThinkSystem Vendor Agnostic Read Intensive 6Gb SATA SSDs

Product Guide

The ThinkSystem Vendor Agnostic Read Intensive SATA SSDs are general-purpose SSDs with an average endurance of 1 drive write per day. Vendor Agnostic SSDs are non-vendor-specific drives which can streamline and simplify the ordering and delivery of SATA SSDs. The drives offered in the Vendor Agnostic SSD program consists of SSDs that are readily available, ensuring the shortest supply lead time.

Some part numbers are enabled with SED encryption to help ensure data security, even when the drive is removed from the server.

SED support: Table 1 indicates which drives support SED encryption.



Figure 1. ThinkSystem Vendor Agnostic Read Intensive SATA SSDs

Did you know?

Lenovo Read Intensive SSDs are suitable for read-intensive and general-purpose data center workloads. Overall, these SSDs provide outstanding IOPS/watt and cost/IOPS for enterprise solutions and are an excellent choice for applications such as web serving, hyperscale cloud, content delivery, caching, databases, and analytics.

Self-encrypting drives (SEDs) provide benefits by encrypting data on-the-fly at the drive level with no performance impact, by providing instant secure erasure thereby making the data no longer readable, and by enabling auto-locking to secure active data if a drive is misplaced or stolen from a system while in use. These features are essential for many businesses, especially those storing customer data.

Part number information

VMware vSAN and Microsoft S2D configurations: Vendor Agnostic (VA) drives are based on drives from multiple vendors, and not all vendor variants are VMware vSAN or Microsoft S2D certified. Additionally, ISVs require a single drive vendor per host and cluster to ensure optimal performance; a requirement that VA drives may not consistently meet. To ensure certification compliance, hardware uniformity, and alignment with VMware and Microsoft best practices, use ThinkAgile VX or ThinkAgile FX for all vSAN configurations and ThinkAgile MX for all S2D configurations, instead of general purpose ThinkSystem servers.

The following table lists the part numbers and feature codes.

Table 1. Ordering part numbers and feature codes

Part number	Feature	Description	SED support
2.5-inch hot-swap drives - with SED support			
4XB7B09967	CBVE	ThinkSystem 2.5" VA 480GB Read Intensive SATA 6Gb HS SSD SED	Supported
4XB7B09968	CBVD	ThinkSystem 2.5" VA 960GB Read Intensive SATA 6Gb HS SSD SED	Supported
4XB7B09969	CBVC	ThinkSystem 2.5" VA 1.92TB Read Intensive SATA 6Gb HS SSD SED	Supported
4XB7B09970	CBVB	ThinkSystem 2.5" VA 3.84TB Read Intensive SATA 6Gb HS SSD SED	Supported
4XB7B09971	CBVA	ThinkSystem 2.5" VA 7.68TB Read Intensive SATA 6Gb HS SSD SED	Supported
2.5-inch hot-swap drives - No SED support			
4XB7A90873	BYLR	ThinkSystem 2.5" VA 480GB Read Intensive SATA 6Gb HS SSD v2	No
4XB7A90874	BYLS	ThinkSystem 2.5" VA 960GB Read Intensive SATA 6Gb HS SSD v2	No
4XB7A90875	BYLT	ThinkSystem 2.5" VA 1.92TB Read Intensive SATA 6Gb HS SSD v2	No
4XB7A90876	BYLU	ThinkSystem 2.5" VA 3.84TB Read Intensive SATA 6Gb HS SSD v2	No
4XB7A90877	BYLV	ThinkSystem 2.5" VA 7.68TB Read Intensive SATA 6Gb HS SSD v2	No
3.5-inch hot-swap drives - With SED support			
4XB7B11648	CCZP	ThinkSystem 3.5" VA 480GB Read Intensive SATA 6Gb HS SSD SED	Supported
4XB7B11649	CCZN	ThinkSystem 3.5" VA 960GB Read Intensive SATA 6Gb HS SSD SED	Supported
4XB7B11651	CCZL	ThinkSystem 3.5" VA 3.84TB Read Intensive SATA 6Gb HS SSD SED	Supported
3.5-inch hot-swap drives - No SED support			
4XB7A90879	BYLJ	ThinkSystem 3.5" VA 480GB Read Intensive SATA 6Gb HS SSD v2	No
4XB7A90880	BYLY	ThinkSystem 3.5" VA 960GB Read Intensive SATA 6Gb HS SSD v2	No
4XB7A90881	BYLZ	ThinkSystem 3.5" VA 1.92TB Read Intensive SATA 6Gb HS SSD v2	No
4XB7A90882	BYM0	ThinkSystem 3.5" VA 3.84TB Read Intensive SATA 6Gb HS SSD v2	No
2.5-inch non-hot-swap drives			
4XB7B04138	C8DT	ThinkSystem ST50/ST45 Series 2.5" VA 480GB Read Intensive SATA 6Gb NHS SSD	No
4XB7B04139	C8DS	ThinkSystem ST50/ST45 Series 2.5" VA 960GB Read Intensive SATA 6Gb NHS SSD	No
4XB7B04140	C8DR	ThinkSystem ST50/ST45 Series 2.5" VA 1.92TB Read Intensive SATA 6Gb NHS SSD	No
4XB7B04141	C8DQ	ThinkSystem ST50/ST45 Series 2.5" VA 3.84TB Read Intensive SATA 6Gb NHS SSD	No

Part number	Feature	Description	SED support
3.5-inch non-hot-swap drives			
4XB7B04142	C8DP	ThinkSystem ST50/ST45 Series 3.5" VA 480GB Read Intensive SATA 6Gb NHS SSD	No
4XB7B04143	C8DN	ThinkSystem ST50/ST45 Series 3.5" VA 960GB Read Intensive SATA 6Gb NHS SSD	No
4XB7B04144	C8DM	ThinkSystem ST50/ST45 Series 3.5" VA 1.92TB Read Intensive SATA 6Gb NHS SSD	No
4XB7B04145	C8DL	ThinkSystem ST50/ST45 Series 3.5" VA 3.84TB Read Intensive SATA 6Gb NHS SSD	No
M.2 non-hot-swap drives (can be hot-swap enabled with an enablement kit in supported servers)			
4XB7B07588	CABU	ThinkSystem M.2 VA 480GB Read Intensive SATA 6Gb NHS SSD	Supported
4XB7B07589	CACA	ThinkSystem M.2 VA 960GB Read Intensive SATA 6Gb NHS SSD	Supported
Trayless drives			
4XB7B07591	CAC2	ThinkSystem 2.5" VA 480GB Read Intensive SATA 6Gb Trayless SSD	No
4XB7B07592	CAC4	ThinkSystem 2.5" VA 960GB Read Intensive SATA 6Gb Trayless SSD	No
4XB7B07593	CAC0	ThinkSystem 2.5" VA 1.92TB Read Intensive SATA 6Gb Trayless SSD	No

The part numbers include the following items:

- One 2.5-inch solid-state drive
- Hot-swap drives include either a 2.5-inch or 2.5-inch ThinkSystem hot-swap tray
- Non-hot-swap drives include a drive carrier
- Documentation flyer

Features

The Vendor Agnostic SSDs have the following features:

- Low cost SSD for read-intensive workloads from industry leading SSD vendors
- 6 Gbps SATA interface
- SED drive encryption (TCG Opal or TCG Enterprise) (some part numbers)
- Advanced ECC Engine and End-to-End Data Protection
- TLC V-NAND stacks the vertical NAND layers in three dimensions, solving the cell-to-cell interference that causes data corruption in planar NAND.
- Power Loss Protection (PLP) architecture
- Supports Self-Monitoring, Analysis and Reporting Technology (S.M.A.R.T).

Read-Intensive (Entry) SSDs and Write-Intensive (Performance) SSDs have similar read and write IOPS performance, but the key difference between them is their endurance (or lifetime) (that is, how long they can perform write operations because SSDs have a finite number of program/erase (P/E) cycles). Read-Intensive SSDs have a better cost/IOPS ratio but lower endurance compared to Write-Intensive SSDs. SSD write endurance is typically measured by the number of program/erase (P/E) cycles that the drive incurs over its lifetime, listed as the total bytes of written data (TBW) in the device specification.

The TBW value assigned to a solid-state device is the total bytes of written data (based on the number of P/E cycles) that a drive can be guaranteed to complete (% of remaining P/E cycles = % of remaining TBW). Reaching this limit does not cause the drive to immediately fail. It simply denotes the maximum number of writes that can be guaranteed. A solid-state device will not fail upon reaching the specified TBW. At some point based on manufacturing variance margin, after surpassing the TBW value, the drive will reach the end-of-life point, at which the drive will go into a read-only mode. Because of such behavior

by Read-Intensive solid-state drives, careful planning must be done to use them only in read-intensive or mix-use up to 70% read/30% write environments to ensure that the TBW of the drive will not be exceeded before the required life expectancy.

The benefits of drive encryption

Self-encrypting drives (SEDs) provide benefits in three main ways:

- By encrypting data on-the-fly at the drive level with no performance impact
- By providing instant secure erasure (cryptographic erasure, thereby making the data no longer readable)
- By enabling auto-locking to secure active data if a drive is misplaced or stolen from a system while in use

The following sections describe the benefits in more details.

Automatic encryption

It is vital that a company keep its data secure. With the threat of data loss due to physical theft or improper inventory practices, it is important that the data be encrypted. However, challenges with performance, scalability, and complexity have led IT departments to push back against security policies that require the use of encryption. In addition, encryption has been viewed as risky by those unfamiliar with key management, a process for ensuring a company can always decrypt its own data. Self-encrypting drives comprehensively resolve these issues, making encryption both easy and affordable.

When the self-encrypting drive is in normal use, its owner need not maintain authentication keys (otherwise known as credentials or passwords) in order to access the data on the drive. The self-encrypting drive will encrypt data being written to the drive and decrypt data being read from it, all without requiring an authentication key from the owner.

Drive retirement and disposal

When hard drives are retired and moved outside the physically protected data center into the hands of others, the data on those drives is put at significant risk. IT departments retire drives for a variety of reasons, including:

- Returning drives for warranty, repair, or expired lease agreements
- Removal and disposal of drives
- Repurposing drives for other storage duties

Nearly all drives eventually leave the data center and their owner's control. Corporate data resides on such drives, and when most leave the data center, the data they contain is still readable. Even data that has been striped across many drives in a RAID array is vulnerable to data theft because just a typical single stripe in today’s high-capacity arrays is large enough to expose for example, hundreds of names and bank account numbers.

In an effort to avoid data breaches and the ensuing customer notifications required by data privacy laws, companies use different methods to erase the data on retired drives before they leave the premises and potentially fall into the wrong hands. Current retirement practices that are designed to make data unreadable rely on significant human involvement in the process, and are thus subject to both technical and human failure.

The drawbacks of today's drive retirement practices include the following:

- Overwriting drive data is expensive, tying up valuable system resources for days. No notification of completion is generated by the drive, and overwriting won't cover reallocated sectors, leaving that data exposed.
- Methods that include degaussing or physically shredding a drive are expensive. It is difficult to ensure the degauss strength is optimized for the drive type, potentially leaving readable data on the drive. Physically shredding the drive is environmentally hazardous, and neither practice allows the drive to be returned for warranty or expired lease.
- Some companies have concluded the only way to securely retire drives is to keep them in their control, storing them indefinitely in warehouses. But this is not truly secure because a large volume of drives coupled with human involvement inevitably leads to some drives being lost or stolen.
- Professional disposal services is an expensive option and includes the cost of reconciling the services as well as internal reports and auditing. Transporting of the drives also has the potential of putting the data at risk.

Self-encrypting drives eliminate the need to overwrite, destroy, or store retired drives. When the drive is to be retired, it can be cryptographically erased, a process that is nearly instantaneous regardless of the capacity of the drive.

Instant secure erase

The self-encrypting drive provides instant data encryption key destruction via cryptographic erasure. When it is time to retire or repurpose the drive, the owner sends a command to the drive to perform a cryptographic erasure. Cryptographic erasure simply replaces the encryption key inside the encrypted drive, making it impossible to ever decrypt the data encrypted with the deleted key.

Self-encrypting drives reduce IT operating expenses by reducing asset control challenges and disposal costs. Data security with self-encrypting drives helps ensure compliance with privacy regulations without hindering IT efficiency. So called "Safe Harbor" clauses in government regulations allow companies to not have to notify customers of occurrences of data theft if that data was encrypted and therefore unreadable.

Furthermore, self-encrypting drives simplify decommissioning and preserve hardware value for returns and repurposing by:

- Eliminating the need to overwrite or destroy the drive
- Securing warranty returns and expired lease returns
- Enabling drives to be repurposed securely

Auto-locking

Insider theft or misplacement is a growing concern for businesses of all sizes; in addition, managers of branch offices and small businesses without strong physical security face greater vulnerability to external theft. Self-encrypting drives include a feature called auto-lock mode to help secure active data against theft.

Using a self-encrypting drive when auto-lock mode is enabled simply requires securing the drive with an authentication key. When secured in this manner, the drive's data encryption key is locked whenever the drive is powered down. In other words, the moment the self-encrypting drive is switched off or unplugged, it automatically locks down the drive's data.

When the self-encrypting drive is then powered back on, it requires authentication before being able to unlock its encryption key and read any data on the drive, thus protecting against misplacement and theft.

While using self-encrypting drives just for the instant secure erase is an extremely efficient and effective means to help securely retire a drive, using self-encrypting drives in auto-lock mode provides even more advantages. From the moment the drive or system is removed from the data center (with or without

authorization), the drive is locked. No advance thought or action is required from the data center administrator to protect the data. This helps prevent a breach should the drive be mishandled and helps secure the data against the threat of insider or outside theft.

Technical specifications

The following table lists the technical specifications for the 2.5-inch and 3.5-inch drives.

Performance and endurance values: The numbers listed in these tables for performance and endurance are the minimums for Vendor Agnostic SSDs.

Table 2. Technical specifications for 2.5-inch and 3.5-inch drives

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	See Table 1	See Table 1	See Table 1	See Table 1	See Table 1	See Table 1
Endurance (drive writes per day for 5 years)	1.5 DWPD	1 DWPD	1 DWPD	1 DWPD	1 DWPD	0.6 DWPD
Endurance (total bytes written)	657 TB	876 TB	1752 TB	3504 TB	7008 TB	8410 TB
Data reliability (UBER)	< 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
MTBF	2,000,000 hours	2,000,000 hours	2,000,000 hours	2,000,000 hours	2,000,000 hours	2,000,000 hours
IOPS reads (4 KB blocks)	39,500	71,000	81,000	82,000	83,000	77,000
IOPS writes (4 KB blocks)	10,000	15,000	28,000	28,000	27,000	9,500
Sequential read rate (128 KB blocks)	420 MBps	480 MBps	480 MBps	480 MBps	480 MBps	480 MBps
Sequential write rate (128 KB blocks)	210 MBps	320 MBps	460 MBps	460 MBps	460 MBps	460 MBps
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	20 G (20-2000 Hz)	20 G (20-2000 Hz)	20 G (20-2000 Hz)	20 G (20-2000 Hz)	20 G (20-2000 Hz)	20 G (20-2000 Hz)

The following table lists the technical specifications for the M.2 drives.

Tip: The M.2 drives support SED drive encryption.

Table 3. Technical specifications for M.2 drives

Feature	**240 GB drive**	**480 GB drive**	**960 GB drive**
Interface	6 Gbps SATA	6 Gbps SATA	6 Gbps SATA
Capacity	240 GB	480 GB	960 GB
SED encryption	Supported	Supported	Supported
Endurance (drive writes per day for 5 years)	1 DWPD	1 DWPD	1 DWPD
Endurance (total bytes written)	430 TB	870 TB	1750 TB
Data reliability (UBER)	< 1 in 10^{17} bits read	< 1 in 10^{17} bits read	< 1 in 10^{17} bits read
MTBF	2,000,000 hours	2,000,000 hours	2,000,000 hours
IOPS reads (4 KB blocks)	70,000	81,000	81,000
IOPS writes (4 KB blocks)	9,000	14,000	14,000
Sequential read rate (128 KB blocks)	470 MBps	470 MBps	470 MBps
Sequential write rate (128 KB blocks)	250 MBps	470 MBps	470 MBps
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
Vibration, non-operating	20 G (20-2000 Hz)	20 G (20-2000 Hz)	20 G (20-2000 Hz)

Server support

The following tables list the ThinkSystem servers that are compatible.

Table 4. Server support - Current servers (Part 1 of 2)

Part Number	Description	AMD V3					2S Intel V3/V4						1S V3				4S 8S Intel V3/V4				
		SR635 V3 (7D9H / 7D9G)	SR655 V3 (7D9F / 7D9E)	SR645 V3 (7D9D / 7D9C)	SR665 V3 (7D9B / 7D9A)	SD535 V3 (7DD8 / 7DD1)	ST650 V3 (7D7B / 7D7A)	SR630 V3 (7D72 / 7D73)	SR650 V3 (7D75 / 7D76)	SR630 V4 (7DG8 / 7DG9)	SR650 V4 (7DGC / 7DGD)	SR650a V4 (7DGC / 7DGD)	ST45 V3 (7DH4 / 7DH5)	ST50 V3 (7DF4 / 7DF3)	ST250 V3 (7DCF / 7DCE)	SR250 V3 (7DCM / 7DCL)	SR850 V3 (7D97 / 7D96)	SR860 V3 (7D94 / 7D93)	SR950 V3 (7DC5 / 7DC4)	SR850 V4 (7DJT / 7DJS)	SR860 V4 (7DJQ / 7DJN)
2.5-inch hot-swap drives - with SED support																					
4XB7B09967	ThinkSystem 2.5" VA 480GB Read Intensive SATA 6Gb HS SSD SED	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y	Y
4XB7B09968	ThinkSystem 2.5" VA 960GB Read Intensive SATA 6Gb HS SSD SED	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y	Y
4XB7B09969	ThinkSystem 2.5" VA 1.92TB Read Intensive SATA 6Gb HS SSD SED	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y	Y
4XB7B09970	ThinkSystem 2.5" VA 3.84TB Read Intensive SATA 6Gb HS SSD SED	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y	Y
4XB7B09971	ThinkSystem 2.5" VA 7.68TB Read Intensive SATA 6Gb HS SSD SED	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y	Y
2.5-inch hot-swap drives - No SED support																					
4XB7A90873	ThinkSystem 2.5" VA 480GB Read Intensive SATA 6Gb HS SSD v2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y	Y
4XB7A90874	ThinkSystem 2.5" VA 960GB Read Intensive SATA 6Gb HS SSD v2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y	Y
4XB7A90875	ThinkSystem 2.5" VA 1.92TB Read Intensive SATA 6Gb HS SSD v2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y	Y
4XB7A90876	ThinkSystem 2.5" VA 3.84TB Read Intensive SATA 6Gb HS SSD v2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y	Y
4XB7A90877	ThinkSystem 2.5" VA 7.68TB Read Intensive SATA 6Gb HS SSD v2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y	Y
3.5-inch hot-swap drives - With SED support																					
4XB7B11648	ThinkSystem 3.5" VA 480GB Read Intensive SATA 6Gb HS SSD SED	N	Y	Y	Y	N	Y	Y	Y	N	Y	N	N	N	Y	Y	N	N	N	N	N
4XB7B11649	ThinkSystem 3.5" VA 960GB Read Intensive SATA 6Gb HS SSD SED	N	Y	Y	Y	N	Y	Y	Y	N	Y	N	N	N	Y	Y	N	N	N	N	N
4XB7B11651	ThinkSystem 3.5" VA 3.84TB Read Intensive SATA 6Gb HS SSD SED	N	Y	Y	Y	N	Y	Y	Y	N	Y	N	N	N	Y	Y	N	N	N	N	N
3.5-inch hot-swap drives - No SED support																					

Part Number	Description	AMD V3					2S Intel V3/V4						1S V3				4S 8S Intel V3/V4				
		SR635 V3 (7D9H / 7D9G)	SR655 V3 (7D9F / 7D9E)	SR645 V3 (7D9D / 7D9C)	SR665 V3 (7D9B / 7D9A)	SD535 V3 (7DD8 / 7DD1)	ST650 V3 (7D7B / 7D7A)	SR630 V3 (7D72 / 7D73)	SR650 V3 (7D75 / 7D76)	SR630 V4 (7DG8 / 7DG9)	SR650 V4 (7DGC / 7DGD)	SR650a V4 (7DGC / 7DGD)	ST45 V3 (7DH4 / 7DH5)	ST50 V3 (7DF4 / 7DF3)	ST250 V3 (7DCF / 7DCE)	SR250 V3 (7DCM / 7DCL)	SR850 V3 (7D97 / 7D96)	SR860 V3 (7D94 / 7D93)	SR950 V3 (7DC5 / 7DC4)	SR850 V4 (7DJT / 7DJS)	SR860 V4 (7DJQ / 7DJN)
4XB7A90879	ThinkSystem 3.5" VA 480GB Read Intensive SATA 6Gb HS SSD v2	N	Y	Y	Y	N	Y	Y	Y	N	Y	N	N	N	Y	Y	N	N	N	N	N
4XB7A90880	ThinkSystem 3.5" VA 960GB Read Intensive SATA 6Gb HS SSD v2	N	Y	Y	Y	N	Y	Y	Y	N	Y	N	N	N	Y	Y	N	N	N	N	N
4XB7A90881	ThinkSystem 3.5" VA 1.92TB Read Intensive SATA 6Gb HS SSD v2	N	Y	Y	Y	N	Y	Y	Y	N	Y	N	N	N	Y	Y	N	N	N	N	N
4XB7A90882	ThinkSystem 3.5" VA 3.84TB Read Intensive SATA 6Gb HS SSD v2	N	Y	Y	Y	N	Y	Y	Y	N	Y	N	N	N	Y	Y	N	N	N	N	N
2.5-inch non-hot-swap drives																					
4XB7B04138	ThinkSystem ST50/ST45 Series 2.5" VA 480GB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N
4XB7B04139	ThinkSystem ST50/ST45 Series 2.5" VA 960GB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N
4XB7B04140	ThinkSystem ST50/ST45 Series 2.5" VA 1.92TB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N
4XB7B04141	ThinkSystem ST50/ST45 Series 2.5" VA 3.84TB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N
3.5-inch non-hot-swap drives																					
4XB7B04142	ThinkSystem ST50/ST45 Series 3.5" VA 480GB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N
4XB7B04143	ThinkSystem ST50/ST45 Series 3.5" VA 960GB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N
4XB7B04144	ThinkSystem ST50/ST45 Series 3.5" VA 1.92TB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N
4XB7B04145	ThinkSystem ST50/ST45 Series 3.5" VA 3.84TB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N
M.2 non-hot-swap drives (can be hot-swap enabled with an enablement kit in supported servers)																					
4XB7B07588	ThinkSystem M.2 VA 480GB Read Intensive SATA 6Gb NHS SSD	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y	Y
4XB7B07589	ThinkSystem M.2 VA 960GB Read Intensive SATA 6Gb NHS SSD	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y

Part Number	Description	AMD V3					2S Intel V3/V4						1S V3				4S 8S Intel V3/V4				
		SR635 V3 (7D9H / 7D9G)	SR655 V3 (7D9F / 7D9E)	SR645 V3 (7D9D / 7D9C)	SR665 V3 (7D9B / 7D9A)	SD535 V3 (7DD8 / 7DD1)	ST650 V3 (7D7B / 7D7A)	SR630 V3 (7D72 / 7D73)	SR650 V3 (7D75 / 7D76)	SR630 V4 (7DG8 / 7DG9)	SR650 V4 (7DGC / 7DGD)	SR650a V4 (7DGC / 7DGD)	ST45 V3 (7DH4 / 7DH5)	ST50 V3 (7DF4 / 7DF3)	ST250 V3 (7DCF / 7DCE)	SR250 V3 (7DCM / 7DCL)	SR850 V3 (7D97 / 7D96)	SR860 V3 (7D94 / 7D93)	SR950 V3 (7DC5 / 7DC4)	SR850 V4 (7DJT / 7DJS)	SR860 V4 (7DJQ / 7DJN)
Trayless drives																					
4XB7B07591	ThinkSystem 2.5" VA 480GB Read Intensive SATA 6Gb Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7B07592	ThinkSystem 2.5" VA 960GB Read Intensive SATA 6Gb Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7B07593	ThinkSystem 2.5" VA 1.92TB Read Intensive SATA 6Gb Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Table 5. Server support - Current servers (Part 2 of 2)

Part Number	Description	AI Servers					Edge		Super computing		
		SR675 V3 (7D9Q / 7D9R)	SR680a V3 B200 (7DM9)	SR685a V3 (7DHC)	SR780a V3 (7DJ5)	SR680a V4 (7DMK)	SE100 (7DGR)	SE455 V3 (7DBY)	SC750 V4 (7DDJ)	SC777 V4 (7DKA)	SD665 V3 (7D9P)
2.5-inch hot-swap drives - with SED support											
4XB7B09967	ThinkSystem 2.5" VA 480GB Read Intensive SATA 6Gb HS SSD SED	Y	N	N	N	N	N	Y	N	N	N
4XB7B09968	ThinkSystem 2.5" VA 960GB Read Intensive SATA 6Gb HS SSD SED	Y	N	N	N	N	N	Y	N	N	N
4XB7B09969	ThinkSystem 2.5" VA 1.92TB Read Intensive SATA 6Gb HS SSD SED	Y	N	N	N	N	N	Y	N	N	N
4XB7B09970	ThinkSystem 2.5" VA 3.84TB Read Intensive SATA 6Gb HS SSD SED	Y	N	N	N	N	N	Y	N	N	N
4XB7B09971	ThinkSystem 2.5" VA 7.68TB Read Intensive SATA 6Gb HS SSD SED	Y	N	N	N	N	N	Y	N	N	N
2.5-inch hot-swap drives - No SED support											
4XB7A90873	ThinkSystem 2.5" VA 480GB Read Intensive SATA 6Gb HS SSD v2	Y	N	N	N	N	N	Y	N	N	N
4XB7A90874	ThinkSystem 2.5" VA 960GB Read Intensive SATA 6Gb HS SSD v2	Y	N	N	N	N	N	Y	N	N	N

Part Number	Description	AI Servers					Edge		Super computing		
		SR675 V3 (7D9Q / 7D9R)	SR680a V3 B200 (7DM9)	SR685a V3 (7DHC)	SR780a V3 (7DJ5)	SR680a V4 (7DMK)	SE100 (7DGR)	SE455 V3 (7DBY)	SC750 V4 (7DDJ)	SC777 V4 (7DKA)	SD665 V3 (7D9P)
4XB7A90875	ThinkSystem 2.5" VA 1.92TB Read Intensive SATA 6Gb HS SSD v2	Y	N	N	N	N	N	Y	N	N	N
4XB7A90876	ThinkSystem 2.5" VA 3.84TB Read Intensive SATA 6Gb HS SSD v2	Y	N	N	N	N	N	Y	N	N	N
4XB7A90877	ThinkSystem 2.5" VA 7.68TB Read Intensive SATA 6Gb HS SSD v2	Y	N	N	N	N	N	Y	N	N	N
3.5-inch hot-swap drives - With SED support											
4XB7B11648	ThinkSystem 3.5" VA 480GB Read Intensive SATA 6Gb HS SSD SED	N	N	N	N	N	N	N	N	N	N
4XB7B11649	ThinkSystem 3.5" VA 960GB Read Intensive SATA 6Gb HS SSD SED	N	N	N	N	N	N	N	N	N	N
4XB7B11651	ThinkSystem 3.5" VA 3.84TB Read Intensive SATA 6Gb HS SSD SED	N	N	N	N	N	N	N	N	N	N
3.5-inch hot-swap drives - No SED support											
4XB7A90879	ThinkSystem 3.5" VA 480GB Read Intensive SATA 6Gb HS SSD v2	N	N	N	N	N	N	N	N	N	N
4XB7A90880	ThinkSystem 3.5" VA 960GB Read Intensive SATA 6Gb HS SSD v2	N	N	N	N	N	N	N	N	N	N
4XB7A90881	ThinkSystem 3.5" VA 1.92TB Read Intensive SATA 6Gb HS SSD v2	N	N	N	N	N	N	N	N	N	N
4XB7A90882	ThinkSystem 3.5" VA 3.84TB Read Intensive SATA 6Gb HS SSD v2	N	N	N	N	N	N	N	N	N	N
2.5-inch non-hot-swap drives											
4XB7B04138	ThinkSystem ST50/ST45 Series 2.5" VA 480GB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	N	N	N	N
4XB7B04139	ThinkSystem ST50/ST45 Series 2.5" VA 960GB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	N	N	N	N
4XB7B04140	ThinkSystem ST50/ST45 Series 2.5" VA 1.92TB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	N	N	N	N
4XB7B04141	ThinkSystem ST50/ST45 Series 2.5" VA 3.84TB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	N	N	N	N
3.5-inch non-hot-swap drives											
4XB7B04142	ThinkSystem ST50/ST45 Series 3.5" VA 480GB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	N	N	N	N
4XB7B04143	ThinkSystem ST50/ST45 Series 3.5" VA 960GB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	N	N	N	N
4XB7B04144	ThinkSystem ST50/ST45 Series 3.5" VA 1.92TB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	N	N	N	N

Part Number	Description	AI Servers					Edge		Super computing		
		SR675 V3 (7D9Q / 7D9R)	SR680a V3 B200 (7DM9)	SR685a V3 (7DHC)	SR780a V3 (7DJ5)	SR680a V4 (7DMK)	SE100 (7DGR)	SE455 V3 (7DBY)	SC750 V4 (7DDJ)	SC777 V4 (7DKA)	SD665 V3 (7D9P)
4XB7B04145	ThinkSystem ST50/ST45 Series 3.5" VA 3.84TB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	N	N	N	N
M.2 non-hot-swap drives (can be hot-swap enabled with an enablement kit in supported servers)											
4XB7B07588	ThinkSystem M.2 VA 480GB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	Y	N	N	N
4XB7B07589	ThinkSystem M.2 VA 960GB Read Intensive SATA 6Gb NHS SSD	N	N	N	N	N	N	Y	N	N	N
Trayless drives											
4XB7B07591	ThinkSystem 2.5" VA 480GB Read Intensive SATA 6Gb Trayless SSD	N	N	N	N	N	N	N	N	N	Y
4XB7B07592	ThinkSystem 2.5" VA 960GB Read Intensive SATA 6Gb Trayless SSD	N	N	N	N	N	N	N	N	N	Y
4XB7B07593	ThinkSystem 2.5" VA 1.92TB Read Intensive SATA 6Gb Trayless SSD	N	N	N	N	N	N	N	N	N	Y

Operating system support

SAS and 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 product guide for more information:

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

IBM SKLM Key Management support

To effectively manage a large deployment of SEDs in Lenovo servers, IBM Security Key Lifecycle Manager (SKLM) offers a centralized key management solution.

The IBM Security Key Lifecycle Manager software is available from Lenovo using the ordering information listed in the following table.

Table 10. IBM Security Key Lifecycle Manager licenses

Part number	Description
7S0A007FWW	IBM Security Key Lifecycle Manager Basic Edition Install License + SW Subscription & Support 12 Months
7S0A007HWW	IBM Security Key Lifecycle Manager For Raw Decimal Terabyte Storage Resource Value Unit License + SW Subscription & Support 12 Months
7S0A007KWW	IBM Security Key Lifecycle Manager For Raw Decimal Petabyte Storage Resource Value Unit License + SW Subscription & Support 12 Months
7S0A007MWW	IBM Security Key Lifecycle Manager For Usable Decimal Terabyte Storage Resource Value Unit License + SW Subscription & Support 12 Months
7S0A007PWW	IBM Security Key Lifecycle Manager For Usable Decimal Petabyte Storage Resource Value Unit License + SW Subscription & Support 12 Months

Warranty

The ThinkSystem Vendor Agnostic Read Intensive 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 Vendor Agnostic SSDs have the following dimensions (without the hot-swap tray):

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

Operating environment

The Vendor Agnostic SSDs are supported in the following environment:

- Temperature:
  - Operating: 0 to 70 °C (32 to 158 °F)
  - Non-operating: -40 °C to 85 °C (-40 to 185 °F)
- Relative humidity: 5 to 95% (noncondensing)
- Maximum altitude: 3,050 m (10,000 ft)

Agency approvals

The Vendor Agnostic SSDs conform to the following regulations:

- UL
- TUV
- FCC
- CE Mark
- C-Tick Mark
- BSMI (Taiwan)
- KCC (Korea EMI)

Related publications and links

For more information, see the following documents:

- Lenovo ThinkSystem SSD Portfolio comparison:
  https://lenovopress.com/lp1261-lenovo-thinksystem-ssd-portfolio
- Lenovo RAID Introduction
  https://lenovopress.com/lp0578-lenovo-raid-introduction

Related product families

Product families related to this document are the following:

- Drives

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