ThinkSystem Solidigm P5620 Mixed Use NVMe PCIe 4.0 SSDs

Product Guide

The ThinkSystem Solidigm P5620 Mixed Use NVMe SSDs are advanced data center SSDs optimized for mixed read-write performance, endurance, and strong data protection for Lenovo servers. With a PCIe 4.0 x4 interface, they are designed for greater performance and endurance in a cost-effective design, and to support a broader set of workloads. With SED encryption as standard, these drives help ensure data security, even when the drive is removed from the server.

The P5620 SSDs are based on Intel-developed controller, firmware, and 144-layer TLC 3D NAND technology. Rigorous qualification and compatibility testing by Lenovo ensures a highly reliable SSD.

SED support: All drives listed in this product guide include SED drive encryption. Our naming convention for new drives doesn't include SED in the name.

Figure 1. ThinkSystem Solidigm P5620 Mixed Use NVMe SSDs (without the ThinkSystem hot-swap tray)

Did You Know?

The P5620 SSDs are part of the family of PCIe 4.0 SSDs suitable for ThinkSystem family of servers. By having a Gen 4 host interface, sequential performance is doubled compared to Gen 3 SSDs. The NVMe host interface also maximizes flash storage performance and minimizes latency. The P5620 SSDs drives offer 40% and 60% improvements in latency over SAS and SATA SSDs respectively.

Lenovo Mixed Used SSDs like the P5620 SSDs are suitable for mixed read-write and general-purpose data center workloads, however their NVMe PCIe interface means the drives also offer high performance. Overall, these SSDs provide outstanding IOPS/watt and cost/IOPS for enterprise solutions.

Part number information

The following table lists the ordering part numbers and feature codes for the P5620 SSDs.

Table 1. Ordering information

Part number	Feature	Description	Supplier part number
2.5-inch hot-swap drives			
4XB7B01879	C6M2	ThinkSystem 2.5" U.2 Solidigm P5620 1.6TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	SSDPF2KE016T1O
4XB7B01880	C6M3	ThinkSystem 2.5" U.2 Solidigm P5620 3.2TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	SSDPF2KE032T1O
4XB7B01881	C6M4	ThinkSystem 2.5" U.2 Solidigm P5620 6.4TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	SSDPF2KE064T1O
4XB7B01882	C6M5	ThinkSystem 2.5" U.2 Solidigm P5620 12.8TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	SSDPF2KE128T1O
3.5-inch hot-swap drives			
4XB7B01883	C6M6	ThinkSystem 3.5" U.2 Solidigm P5620 1.6TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	SSDPF2KE016T1O
4XB7B01884	C6M7	ThinkSystem 3.5" U.2 Solidigm P5620 3.2TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	SSDPF2KE032T1O
4XB7B01885	C6M8	ThinkSystem 3.5" U.2 Solidigm P5620 6.4TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	SSDPF2KE064T1O
4XB7B01886	C6M9	ThinkSystem 3.5" U.2 Solidigm P5620 12.8TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	SSDPF2KE128T1O
Trayless drives			
4XB7B01887	C7P5	ThinkSystem 2.5" 15mm U.2 Solidigm P5620 1.6TB Mixed Use NVMe PCIe 4.0 x4 Trayless SSD	SSDPF2KE016T1O
4XB7B01888	C7P6	ThinkSystem 2.5" 15mm U.2 Solidigm P5620 3.2TB Mixed Use NVMe PCIe 4.0 x4 Trayless SSD	SSDPF2KE032T1O
4XB7B01889	C7P7	ThinkSystem 2.5" 15mm U.2 Solidigm P5620 6.4TB Mixed Use NVMe PCIe 4.0 x4 Trayless SSD	SSDPF2KE064T1O

The part numbers for the drives include the following items:

- One drive with a hot-swap tray attached (hot-swap drives only)
- Publication flyer

Features

Non-Volatile Memory Express (NVMe) is PCIe high performance SSD technology that provides high I/O throughput and low latency. NVMe interfaces remove SAS/SATA bottlenecks and unleash all of the capabilities of contemporary NAND flash memory. Each NVMe PCI SSD has direct PCIe x4 connection, which provides at significantly greater bandwidth and lower latency than SATA/SAS-based SSD solutions. NVMe drives are also optimized for heavy multi-threaded workloads by using internal parallelism and many other improvements, such as enlarged I/O queues.

The P5620 SSDs have the following key characteristics:

- Based on the Solidigm D7-P5620 SSDs (formerly known as the Intel D7-P5620 SSDs)

- PCIe 4.0 connection for each NVMe drive
- Also supports PCIe 3.0 host connection for servers with first and second-generation Intel Xeon Scalable processors or with PCIe 3.0 NVMe switch adapters
- Compliant with Trusted Computing Group Opal 2.01 Security Subsystem Class cryptographic standard (TCG Opal 2.01 SSC)
- Intel 144-layer TLC 3D NAND Flash Memory
- Ultra-low I/O latency, with a read latency as low as of 9 µs and write latency as low as 12 µs
- Suitable for mixed read-write workloads
- Available in capacities up to 12.8 TB
- Variable sector size and end-to-end data-path protection
- Enhanced power-loss data protection
- Thermal throttling and monitoring
- SMART health reporting
- Supports the following specifications:
    - PCI Express Base Specification Rev. 4.0
    - NVM Express 1.4
    - NVM Express Management Interface 1.1

VROC support: These drives are Solidigm branded and have a different PCI Identifier compared to the equivalent Intel drives. As a result, they are not classed as Intel drives for the purposes of VROC license support, and cannot be used with the Intel VROC (VMD NVMe RAID) Intel SSD Only offering (feature B9X7) in ThinkSystem V2 servers.

The key metric for solid state drives is their endurance (life expectancy). SSDs have a huge, but finite, number of program/erase (P/E) cycles, which determines how long the drives can perform write operations and thus their life expectancy. Write Intensive SSDs have better endurance than Mixed Use SSDs, which in turn have better endurance than Read Intensive 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 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, but 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 3.2 TB P5620 drive has an endurance of 17,500 TB of total bytes written (TBW). This means that for full operation over five years, write workload must be limited to no more than 9,589 GB of writes per day, which is equivalent to 3.0 full drive writes per day (DWPD). For the device to last three years, the drive write workload must be limited to no more than 15,982 GB of writes per day, which is equivalent to 5.0 full drive writes per day.

The benefits of drive encryption

All ThinkSystem Solidigm P5620 Mixed Use NVMe SSDs support 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 present technical specifications for the P5620 SSDs. Note that the performance data and power consumption is based on a PCIe 4.0 host interface.

Table 2. Technical specifications

Feature	**1.6 TB drive**	**3.2 TB drive**	**6.4 TB drive**	**12.8 TB drive**
Interface	PCIe 4.0 x4	PCIe 4.0 x4	PCIe 4.0 x4	PCIe 4.0 x4
Capacity	1.6 TB	3.2 TB	6.4 TB	12.8 TB
SED encryption	TCG Opal	TCG Opal	TCG Opal	TCG Opal
Endurance (drive writes per day over 5 years)	3 DWPD	3 DWPD	3 DWPD	2.8 DWPD
Endurance (total bytes written)	8.7 PB	17.5 PB	35 PB	65.4 PB
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
MTBF, hours	2,000,000	2,000,000	2,000,000	2,000,000
IOPS read (4 KB blocks)	700,000	1,000,000	1,100,000	1,000,000
IOPS write (4 KB blocks)	200,000	341,000	390,000	374,000
Sequential read rate	5.3 GBps	6.7 GBps	7.1 GBps	7.1 GBps
Sequential write rate	1.9 GBps	3.6 GBps	4.2 GBps	3.7 GBps
Read access latency sequential*	10 µs	10 µs	10 µs	10 µs
Write access latency sequential*	13 µs	13 µs	13 µs	13 µs
Read access latency random*	75 µs	75 µs	75 µs	75 µs
Write access latency random*	15 µs	15 µs	15 µs	15 µs
Shock, operating	1,000 G (Max) at 0.5 ms	1,000 G (Max) at 0.5 ms	1,000 G (Max) at 0.5 ms	1,000 G (Max) at 0.5 ms
Vibration, max, operating	2.17 G_{RMS} (5-700 Hz)	2.17 G_{RMS} (5-700 Hz)	2.17 G_{RMS} (5-700 Hz)	2.17 G_{RMS} (5-700 Hz)
Average power (Active Read / Active Write)	8.5 W / 15 W	15 W / 15 W	18 W / 18 W	25 W / 25 W

* Latency measured using 4 KB transfer size with queue depth = 1 on a random workload.

Server support

The following tables list the ThinkSystem servers that are compatible.

Table 3. Server support (Part 1 of 4)

Part Number	Description	AMD V3				2S Intel V3/V4				4S 8S Intel V3			Multi Node V3/V4			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)	SR630 V4 (7DG8 / 7DG9)	SR850 V3 (7D97 / 7D96)	SR860 V3 (7D94 / 7D93)	SR950 V3 (7DC5 / 7DC4)	SD535 V3 (7DD8 / 7DD1)	SD530 V3 (7DDA / 7DD3)	SD550 V3 (7DD9 / 7DD2)	ST45 V3 (7DH4 / 7DH5)	ST50 V3 (7DF4 / 7DF3)	ST250 V3 (7DCF / 7DCE)	SR250 V3 (7DCM / 7DCL)
2.5-inch hot-swap drives																			
4XB7B01879	ThinkSystem 2.5" U.2 Solidigm P5620 1.6TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	N	Y	N	N	N	N
4XB7B01880	ThinkSystem 2.5" U.2 Solidigm P5620 3.2TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	N	Y	N	N	N	N
4XB7B01881	ThinkSystem 2.5" U.2 Solidigm P5620 6.4TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	Y	Y	Y	Y	N	Y	Y	N	Y	Y	N	Y	N	Y	N	N	N	N
4XB7B01882	ThinkSystem 2.5" U.2 Solidigm P5620 12.8TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	Y	Y	Y	Y	N	Y	Y	N	Y	Y	N	Y	N	Y	N	N	N	N
3.5-inch hot-swap drives																			
4XB7B01883	ThinkSystem 3.5" U.2 Solidigm P5620 1.6TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	N	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N
4XB7B01884	ThinkSystem 3.5" U.2 Solidigm P5620 3.2TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	N	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N
4XB7B01885	ThinkSystem 3.5" U.2 Solidigm P5620 6.4TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	N	Y	Y	Y	N	Y	Y	N	N	N	N	N	N	N	N	N	N	N
4XB7B01886	ThinkSystem 3.5" U.2 Solidigm P5620 12.8TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	N	Y	Y	Y	N	Y	Y	N	N	N	N	N	N	N	N	N	N	N
Trayless drives																			
4XB7B01887	ThinkSystem 2.5" 15mm U.2 Solidigm P5620 1.6TB Mixed Use NVMe PCIe 4.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7B01888	ThinkSystem 2.5" 15mm U.2 Solidigm P5620 3.2TB Mixed Use NVMe PCIe 4.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7B01889	ThinkSystem 2.5" 15mm U.2 Solidigm P5620 6.4TB Mixed Use NVMe PCIe 4.0 x4 Trayless SSD	N	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	GPU Rich					Edge					Super Computing							1S Intel V2		
		SR670 V2 (7Z22 / 7Z23)	SR675 V3 (7D9Q / 7D9R)	SR680a V3 (7DHE)	SR685a V3 (7DHC)	SR780a V3 (7DJ5)	SE350 (7Z46 / 7D1X)	SE350 V2 (7DA9)	SE360 V2 (7DAM)	SE450 (7D8T)	SE455 V3 (7DBY)	SC750 V4 (7DDJ)	SC777 V4 (7DKA)	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)
2.5-inch hot-swap drives																					
4XB7B01879	ThinkSystem 2.5" U.2 Solidigm P5620 1.6TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	N	Y	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N	N	N	N
4XB7B01880	ThinkSystem 2.5" U.2 Solidigm P5620 3.2TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	N	Y	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N	N	N	N
4XB7B01881	ThinkSystem 2.5" U.2 Solidigm P5620 6.4TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	N	Y	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N	N	N	N
4XB7B01882	ThinkSystem 2.5" U.2 Solidigm P5620 12.8TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	N	Y	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	N	N	N
3.5-inch hot-swap drives																					
4XB7B01883	ThinkSystem 3.5" U.2 Solidigm P5620 1.6TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7B01884	ThinkSystem 3.5" U.2 Solidigm P5620 3.2TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7B01885	ThinkSystem 3.5" U.2 Solidigm P5620 6.4TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7B01886	ThinkSystem 3.5" U.2 Solidigm P5620 12.8TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Trayless drives																					
4XB7B01887	ThinkSystem 2.5" 15mm U.2 Solidigm P5620 1.6TB Mixed Use NVMe PCIe 4.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	Y	N	N	N	Y	Y	Y	N	Y	N	N	N
4XB7B01888	ThinkSystem 2.5" 15mm U.2 Solidigm P5620 3.2TB Mixed Use NVMe PCIe 4.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	Y	N	N	N	Y	Y	Y	N	Y	N	N	N

Part Number	Description	GPU Rich					Edge					Super Computing							1S Intel V2		
		SR670 V2 (7Z22 / 7Z23)	SR675 V3 (7D9Q / 7D9R)	SR680a V3 (7DHE)	SR685a V3 (7DHC)	SR780a V3 (7DJ5)	SE350 (7Z46 / 7D1X)	SE350 V2 (7DA9)	SE360 V2 (7DAM)	SE450 (7D8T)	SE455 V3 (7DBY)	SC750 V4 (7DDJ)	SC777 V4 (7DKA)	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)
4XB7B01889	ThinkSystem 2.5" 15mm U.2 Solidigm P5620 6.4TB Mixed Use NVMe PCIe 4.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N

Table 5. Server support (Part 3 of 4)

Part Number	Description	2S Intel V2			AMD V1					Dense V2				4S V2		8S	4S V1		
		ST650 V2 (7Z75 / 7Z74)	SR630 V2 (7Z70 / 7Z71)	SR650 V2 (7Z72 / 7Z73)	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)
2.5-inch hot-swap drives																			
4XB7B01879	ThinkSystem 2.5" U.2 Solidigm P5620 1.6TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	Y	Y	Y	Y	Y	N	Y	Y	N	N	N	N	N	N	N	N	N	N
4XB7B01880	ThinkSystem 2.5" U.2 Solidigm P5620 3.2TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	Y	Y	Y	Y	Y	N	Y	Y	N	N	N	N	N	N	N	N	N	N
4XB7B01881	ThinkSystem 2.5" U.2 Solidigm P5620 6.4TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	Y	Y	Y	Y	Y	N	Y	Y	N	N	N	N	N	N	N	N	N	N
4XB7B01882	ThinkSystem 2.5" U.2 Solidigm P5620 12.8TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	Y	Y	Y	Y	Y	N	Y	Y	N	N	N	N	N	N	N	N	N	N
3.5-inch hot-swap drives																			
4XB7B01883	ThinkSystem 3.5" U.2 Solidigm P5620 1.6TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	Y	Y	Y	N	Y	N	Y	Y	N	N	N	N	N	N	N	N	N	N
4XB7B01884	ThinkSystem 3.5" U.2 Solidigm P5620 3.2TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	Y	Y	Y	N	Y	N	Y	Y	N	N	N	N	N	N	N	N	N	N
4XB7B01885	ThinkSystem 3.5" U.2 Solidigm P5620 6.4TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	Y	Y	Y	N	Y	N	Y	Y	N	N	N	N	N	N	N	N	N	N
4XB7B01886	ThinkSystem 3.5" U.2 Solidigm P5620 12.8TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	Y	Y	Y	N	Y	N	Y	Y	N	N	N	N	N	N	N	N	N	N
Trayless drives																			
4XB7B01887	ThinkSystem 2.5" 15mm U.2 Solidigm P5620 1.6TB Mixed Use NVMe PCIe 4.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7B01888	ThinkSystem 2.5" 15mm U.2 Solidigm P5620 3.2TB Mixed Use NVMe PCIe 4.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7B01889	ThinkSystem 2.5" 15mm U.2 Solidigm P5620 6.4TB Mixed Use NVMe PCIe 4.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Table 6. Server support (Part 4 of 4)

Part Number	Description	1S Intel V1				2S Intel V1								Dense V1			
		ST50 (7Y48 / 7Y50)	ST250 (7Y45 / 7Y46)	SR150 (7Y54)	SR250 (7Y52 / 7Y51)	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																	
4XB7B01879	ThinkSystem 2.5" U.2 Solidigm P5620 1.6TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7B01880	ThinkSystem 2.5" U.2 Solidigm P5620 3.2TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7B01881	ThinkSystem 2.5" U.2 Solidigm P5620 6.4TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7B01882	ThinkSystem 2.5" U.2 Solidigm P5620 12.8TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
3.5-inch hot-swap drives																	
4XB7B01883	ThinkSystem 3.5" U.2 Solidigm P5620 1.6TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7B01884	ThinkSystem 3.5" U.2 Solidigm P5620 3.2TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7B01885	ThinkSystem 3.5" U.2 Solidigm P5620 6.4TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7B01886	ThinkSystem 3.5" U.2 Solidigm P5620 12.8TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Trayless drives																	
4XB7B01887	ThinkSystem 2.5" 15mm U.2 Solidigm P5620 1.6TB Mixed Use NVMe PCIe 4.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7B01888	ThinkSystem 2.5" 15mm U.2 Solidigm P5620 3.2TB Mixed Use NVMe PCIe 4.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XB7B01889	ThinkSystem 2.5" 15mm U.2 Solidigm P5620 6.4TB Mixed Use NVMe PCIe 4.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Storage controller support

NVMe PCIe SSDs require a NVMe drive backplane and some form of PCIe connection to processors. PCIe connections can take the form of either an adapter (PCIe Interposer or PCIe extender/switch adapter) or simply a cable that connects to an onboard NVMe connector.

Consult the relevant server product guide for details about required components for NVMe drive support.

IBM SKLM Key Management support

[illegible]

To effectively manage a large deployment of SEDs in Lenovo servers, IBM Security Key Lifecycle Manager (SKLM) offers a centralized key management solution. Certain Lenovo servers support Features on Demand (FoD) license upgrades that enable SKLM support.

The following table lists the part numbers and feature codes to enable SKLM support in the management processor of the server.

Table 7. FoD upgrades for SKLM support

Part number	Feature code	Description
Security Key Lifecycle Manager - FoD (United States, Canada, Asia Pacific, and Japan)		
00D9998	A5U1	SKLM for System x/ThinkSystem w/SEDs - FoD per Install w/1Yr S&S
00D9999	AS6C	SKLM for System x/ThinkSystem w/SEDs - FoD per Install w/3Yr S&S
Security Key Lifecycle Manager - FoD (Latin America, Europe, Middle East, and Africa)		
00FP648	A5U1	SKLM for System x/ThinkSystem w/SEDs - FoD per Install w/1Yr S&S
00FP649	AS6C	SKLM for System x/ThinkSystem w/SEDs - FoD per Install w/3Yr S&S

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

Table 8. 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

The following tables list the ThinkSystem servers that support the FoD upgrades for SKLM support.

Table 9. IBM SKLM Key Management support (Part 1 of 4)

Part Number	Description	AMD V3				2S Intel V3/V4				4S 8S Intel V3			Multi Node V3/V4			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)	SR630 V4 (7DG8 / 7DG9)	SR850 V3 (7D97 / 7D96)	SR860 V3 (7D94 / 7D93)	SR950 V3 (7DC5 / 7DC4)	SD535 V3 (7DD8 / 7DD1)	SD530 V3 (7DDA / 7DD3)	SD550 V3 (7DD9 / 7DD2)	ST45 V3 (7DH4 / 7DH5)	ST50 V3 (7DF4 / 7DF3)	ST250 V3 (7DCF / 7DCE)	SR250 V3 (7DCM / 7DCL)
A5U1	SKLM for System x w/SEDs - FoD per Install w/1Yr S&S	N	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	Y	Y
AS6C	SKLM for System x w/SEDs - FoD per Install w/3Yr S&S	N	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	Y	Y

Table 10. IBM SKLM Key Management support (Part 2 of 4)

Part Number	Description	GPU Rich					Edge					Super Computing							1S Intel V2		
		SR670 V2 (7Z22 / 7Z23)	SR675 V3 (7D9Q / 7D9R)	SR680a V3 (7DHE)	SR685a V3 (7DHC)	SR780a V3 (7DJ5)	SE350 (7Z46 / 7D1X)	SE350 V2 (7DA9)	SE360 V2 (7DAM)	SE450 (7D8T)	SE455 V3 (7DBY)	SC750 V4 (7DDJ)	SC777 V4 (7DKA)	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)
A5U1	SKLM for System x w/SEDs - FoD per Install w/1Yr S&S	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y
AS6C	SKLM for System x w/SEDs - FoD per Install w/3Yr S&S	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y

Table 11. IBM SKLM Key Management support (Part 3 of 4)

Part Number	Description	2S Intel V2			AMD V1					Dense V2				4S V2		8S	4S V1		
		ST650 V2 (7Z75 / 7Z74)	SR630 V2 (7Z70 / 7Z71)	SR650 V2 (7Z72 / 7Z73)	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)
A5U1	SKLM for System x w/SEDs - FoD per Install w/1Yr S&S	N	Y	Y	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	N
AS6C	SKLM for System x w/SEDs - FoD per Install w/3Yr S&S	N	Y	Y	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	N

Table 12. IBM SKLM Key Management support (Part 4 of 4)

Part Number	Description	1S Intel V1				2S Intel V1								Dense V1			
		ST50 (7Y48 / 7Y50)	ST250 (7Y45 / 7Y46)	SR150 (7Y54)	SR250 (7Y52 / 7Y51)	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)
A5U1	SKLM for System x w/SEDs - FoD per Install w/1Yr S&S	N	N	N	N	Y	Y	Y	Y	Y	N	Y	N	N	N	N	N
AS6C	SKLM for System x w/SEDs - FoD per Install w/3Yr S&S	N	N	N	N	Y	Y	Y	Y	Y	N	Y	N	N	N	N	N

Warranty

The SSDs carry a 1-year, customer-replaceable unit (CRU) limited warranty. When installed in a supported Lenovo server, these drives assume the server's base warranty and any warranty upgrade.

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 P5620 SSDs have the following physical dimensions and weight:

- Height: 15 mm (0.6 in.)
- Width: 70 mm (2.8 in.)
- Depth: 100 mm (4.0 in.)
- Weight: 146 g (5.15 oz)

Operating environment

The P5620 SSDs are supported in the following environment:

- Temperature (operational): 0 to 70 °C (32 to 158 °F) at 0 to 3,048 m (0 to 10,000 ft)
- Relative humidity: 5 to 90% (non-condensing)
- Maximum altitude (operational): 3,048 m (10,000 ft)
- Shock: 1,000 G (Max) at 0.5 ms
- Vibration: 2.17 G_{RMS} (5-700 Hz)

Agency approvals

The P5620 SSDs conform to the following regulations:

- FCC Title 47, Part 15B, Class B
- CA/CSA-CEI/IEC CISPR 22:02
- EN 55024: 1998
- EN 55022: 2006
- EN-60950-1 2nd Edition
- UL/CSA EN-60950-1 2nd Edition
- Low Voltage Directive 2006/95/EC
- C-Tick: AS/NZS3584
- BSMI: CNS 13438
- KCC Article 11.1
- RoHS DIRECTIVE 2011/65/EU
- WEEE Directive 2002/96/EC

Related publications and links

For more information, see the following documents:

- Storage Options for ThinkSystem Servers
  https://lenovopress.com/lp0761-storage-options-for-thinksystem-servers
- ServerProven
  http://www.lenovo.com/us/en/serverproven
- Solidigm D7 Series product page
  https://www.solidigm.com/us/en/products/data-center/d7.html

Related product families

Product families related to this document are the following:

- Drives

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