ThinkSystem 7400 PRO Read Intensive NVMe PCIe 4.0 SSDs

Product Guide

The ThinkSystem 7400 PRO Read Intensive NVMe SSDs are general-purpose yet high-performance family of NVMe solid-state drives. They are engineered for greater performance and endurance in a cost-effective design, and to support a broader set of workloads. The 7400 PRO SSDs (also known as 7400P drives) are based on the Micron 7400 PRO family of PCIe 4.0 NVMe drives.

Figure 1. ThinkSystem 7400 PRO Read Intensive NVMe SSDs

Did you know?

Lenovo Read Intensive (Entry) SSDs are suitable for read-intensive 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.

Lenovo also offers the 7400 PRO SSDs in an M.2 form factor. See the ThinkSystem M.2 Drives and M.2 Adapters product guide for information, https://lenovopress.com/lp0769.

Part number information

The following table lists the part numbers and feature codes for the 7400 PRO SSDs.

Table 1. Part number information

Part number	Feature	Description	Supplier model number
2.5-inch hot-swap drives			
4XB7A80377	BP25	ThinkSystem 2.5" U.3 7400 PRO 1.92TB Read Intensive NVMe PCIe 4.0 x4 HS SSD	MTFDKCB1T9TDZ-1AZ15ABYY
4XB7A80378	BP26	ThinkSystem 2.5" U.3 7400 PRO 3.84TB Read Intensive NVMe PCIe 4.0 x4 HS SSD	MTFDKCB3T8TDZ-1AZ15ABYY
Trayless drives			
CTO only	BP23	ThinkSystem 2.5" 7mm U.3 7400 PRO 1.92TB Read Intensive NVMe PCIe 4.0 x4 Trayless SSD	MTFDKCB1T9TDZ-1AZ15ABYY
CTO only	BP24	ThinkSystem 2.5" 7mm U.3 7400 PRO 3.84TB Read Intensive NVMe PCIe 4.0 x4 Trayless SSD	MTFDKCB3T8TDZ-1AZ15ABYY

The part numbers include the following items:

- One solid-state drive
- Hot swap drives include a hot-swap tray
- Documentation 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 least 2x more bandwidth and 2x less 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 ThinkSystem 7400 PRO Read Intensive NVMe SSDs have the following features:

- Based on the Micron 7400 PRO family of SSDs
- Micron 96-layer 3D TLC NAND
- NVMe SSD with PCIe 4.0 performance and a U.3 interface
- Direct PCIe 4.0 x4 connection for each NVMe drive, resulting in up to 8 GBps overall throughput.
- Advanced ECC Engine and End-to-End Data Protection
- Protect data integrity from unexpected power loss with advanced power-loss protection architecture
- Adaptive Thermal Monitoring to monitor the internal temperature of the drive with power adjustment to ensure operation within thermal limits
- Supports Self-Monitoring, Analysis and Reporting Technology (S.M.A.R.T).
- Enterprise-level security features:
    - Secure Execution Environment - dedicated security processing hardware with physical isolation
    - Asymmetric Roots of Trust - Enables authenticated revocation of root keys
    - Strong Asymmetric Key Support - Uses standard, NIST-approved algorithms with 208-bit/3072-bit RSA keys
    - RSA Delegation Key Support - Enables customers to maintain ownership of RSA keys

- Secure Boot - Helps ensure firmware integrity on running platform
- Key-Based Firmware Update - Validates firmware using public key-based authentication prior to firmware update
- Key-Based Privileged Access - Protects against unauthorized privileged SSD function execution with public key-based authorization

Read Intensive SSDs and Write Intensive SSDs have similar read IOPS performance, but the key difference between them is their endurance -- how long they can reliably perform write operations. 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) write 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 mixed use (70% read/30% write) environments to ensure that the TBW of the drive will not be exceeded before the required life expectancy.

For example, the 1.92 TB 7400 PRO drive has an endurance of 3,500 TB of total bytes written (TBW). This means that for full operation over five years, write workload must be limited to no more than 1,918 GB of writes per day, which is equivalent to 1.0 full drive writes per day (DWPD). For the device to last three years, the drive write workload must be limited to no more than 3,196 GB of writes per day, which is equivalent to 1.7 full drive writes per day.

Technical specifications

The following table presents technical specifications for the ThinkSystem 7400 PRO Read Intensive NVMe SSDs.

Table 2. Technical specifications - 2.5-inch and trayless drives

Feature	**960 GB drive**	**1.92 TB drive**	**3.84 TB drive**
Interface	PCIe 4.0 x4	PCIe 4.0 x4	PCIe 4.0 x4
Capacity	960 GB	1.92 TB	3.84 TB
SED encryption	None	None	None
Endurance (drive writes per day for 5 years)	1.0 DWPD	1.0 DWPD	1.0 DWPD
Endurance (total bytes written)	1700 TB	3500 TB	7000 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)	240,000	430,000	800,000
IOPS writes (4 KB blocks)	60,000	81,000	125,000
Sequential read rate (128 KB blocks)	6600 MBps	6600 MBps	6600 MBps
Sequential write rate (128 KB blocks)	1000 MBps	2200 MBps	3500 MBps
Latency (random R/W)	75 µs / 25 µs	75 µs / 15 µs	75 µs / 15 µs
Typical power (R/W)	10.0 / 7.0 W	10.0 / 8.9 W	10.8 / 12.8 W

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)	SR650 V4 (7DGC / 7DGD)	SR650a V4 (7DGC / 7DGD)	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)
Trayless drives																					
4XB7A13975	ThinkSystem 2.5" 7mm U.3 7450 PRO 960GB Read Intensive 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	N	N

Table 4. Server support (Part 2 of 4)

Part Number	Description	GPU Rich					Edge						Super Computing						
		SR670 V2 (7Z22 / 7Z23)	SR675 V3 (7D9Q / 7D9R)	SR680a V3 (7DHE)	SR685a V3 (7DHC)	SR780a V3 (7DJ5)	SE100 (7DGR)	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)
Trayless drives																			
4XB7A13975	ThinkSystem 2.5" 7mm U.3 7450 PRO 960GB Read Intensive NVMe PCIe 4.0 x4 Trayless SSD	N	N	N	N	N	N	N	N	N	Y	N	N	N	Y	Y	Y	Y	Y

Table 5. Server support (Part 3 of 4)

Part Number	Description	1S Intel V2			2S Intel V2			AMD V1					Dense V2				4S V2		8S
		ST50 V2 (7D8K / 7D8J)	ST250 V2 (7D8G / 7D8F)	SR250 V2 (7D7R / 7D7Q)	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)
Trayless drives																			
4XB7A13975	ThinkSystem 2.5" 7mm U.3 7450 PRO 960GB Read Intensive 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

Table 6. Server support (Part 4 of 4)

Part Number	Description	4S V1			1S Intel V1				2S Intel V1								Dense V1			
		SR850 (7X18 / 7X19)	SR850P (7D2F / 2D2G)	SR860 (7X69 / 7X70)	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)
Trayless drives																				
4XB7A13975	ThinkSystem 2.5" 7mm U.3 7450 PRO 960GB Read Intensive 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	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) 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.

Operating system support

The following tables list the supported operating systems:

- ThinkSystem 2.5" U.3 7400 PRO 3.84TB Read Intensive NVMe PCIe 4.0 x4 HS SSD, 4XB7A80378
- ThinkSystem 2.5" 7mm U.3 7450 PRO 960GB Read Intensive NVMe PCIe 4.0 x4 Trayless SSD, 4XB7A13975

Tip: These tables are automatically generated based on data from Lenovo ServerProven.

VMware vSAN certification: The drives listed in this product guide are VMware vSAN certified, however in the VMware Compatibility Guide (VCG), they are listed under the drive vendor company name instead of Lenovo. To check a drive for vSAN certification, search the VCG using the Supplier part number as listed in Table 1 in the Part number information section.

Table 7. Operating system support for ThinkSystem 2.5" U.3 7400 PRO 3.84TB Read Intensive NVMe PCIe 4.0 x4 HS SSD, 4XB7A80378

Operating systems	SE450
Microsoft Windows Server 2019	Y
Microsoft Windows Server 2022	Y
Microsoft Windows Server 2025	Y
Red Hat Enterprise Linux 7.9	Y
Red Hat Enterprise Linux 8.10	Y
Red Hat Enterprise Linux 8.4	Y
Red Hat Enterprise Linux 8.5	Y
Red Hat Enterprise Linux 8.6	Y
Red Hat Enterprise Linux 8.7	Y
Red Hat Enterprise Linux 8.8	Y
Red Hat Enterprise Linux 8.9	Y
Red Hat Enterprise Linux 9.0	Y
Red Hat Enterprise Linux 9.1	Y
Red Hat Enterprise Linux 9.2	Y
Red Hat Enterprise Linux 9.3	Y
Red Hat Enterprise Linux 9.4	Y
Red Hat Enterprise Linux 9.5	Y
SUSE Linux Enterprise Server 15 SP4	Y
SUSE Linux Enterprise Server 15 SP5	Y
SUSE Linux Enterprise Server 15 SP6	Y
Ubuntu 18.04.6 LTS	Y
Ubuntu 20.04.5 LTS	Y
Ubuntu 22.04 LTS	Y
Ubuntu 24.04 LTS	Y
VMware vSphere Hypervisor (ESXi) 7.0 U3	Y
VMware vSphere Hypervisor (ESXi) 8.0	Y
VMware vSphere Hypervisor (ESXi) 8.0 U1	Y
VMware vSphere Hypervisor (ESXi) 8.0 U2	Y
VMware vSphere Hypervisor (ESXi) 8.0 U3	Y

Table 8. Operating system support for ThinkSystem 2.5" 7mm U.3 7450 PRO 960GB Read Intensive NVMe PCIe 4.0 x4 Trayless SSD, 4XB7A13975

Operating systems	SD650 V3	SD650 V3 (5th Gen Xeon)	SD650-I V3 (4th Gen Xeon)	SD650-N V3 (4th Gen Xeon)	SD650-N V3 (5th Gen Xeon)	SD665 V3	SD665-N V3	SD650-I V3 (5th Gen Xeon)	SD650 V2	SD650-N V2
Microsoft Windows Server 2019	N	N	N	N	N	N	N	N	Y	N
Microsoft Windows Server 2022	N	N	N	N	N	N	N	N	Y	N
Red Hat Enterprise Linux 7.9	N	N	N	N	N	N	N	N	Y	Y
Red Hat Enterprise Linux 8.10	Y	Y	N	N	N	Y	Y	N	Y	Y
Red Hat Enterprise Linux 8.2	N	N	N	N	N	N	N	N	Y	Y
Red Hat Enterprise Linux 8.3	N	N	N	N	N	N	N	N	Y	Y
Red Hat Enterprise Linux 8.4	N	N	N	N	N	N	N	N	Y	Y
Red Hat Enterprise Linux 8.5	N	N	N	N	N	N	N	N	Y	Y
Red Hat Enterprise Linux 8.6	Y	N	Y	N	N	Y	Y	N	Y	Y
Red Hat Enterprise Linux 8.7	N	N	N	N	N	N	N	N	Y	Y
Red Hat Enterprise Linux 8.8	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.9	N	N	N	N	N	Y	N	N	Y	Y
Red Hat Enterprise Linux 9.0	Y	N	N	N	N	Y	Y	N	Y	Y
Red Hat Enterprise Linux 9.1	N	N	N	N	N	N	N	N	Y	Y
Red Hat Enterprise Linux 9.2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.3	N	N	N	N	N	Y	N	N	Y	Y
Red Hat Enterprise Linux 9.4	Y	Y	N	N	N	Y	Y	N	Y	Y
SUSE Linux Enterprise Server 12 SP5	N	N	N	N	N	N	N	N	Y	Y
SUSE Linux Enterprise Server 15 SP2	N	N	N	N	N	N	N	N	Y	Y
SUSE Linux Enterprise Server 15 SP3	N	N	N	N	N	N	N	N	Y	Y
SUSE Linux Enterprise Server 15 SP4	Y	N	Y	N	N	Y	Y	N	Y	Y
SUSE Linux Enterprise Server 15 SP5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP6	Y	Y	N	N	N	Y	Y	N	Y	Y
Ubuntu 20.04.5 LTS	N	N	N	N	N	Y	Y	N	N	N
Ubuntu 22.04 LTS	Y	N	N	N	N	Y	Y	N	N	N
Ubuntu 22.04.3 LTS	N	Y	N	Y	Y	N	N	N	N	N
Ubuntu 24.04 LTS	Y	Y	N	N	N	Y	Y	N	N	N

Warranty

The ThinkSystem 7400 PRO Read Intensive NVMe 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 ThinkSystem 7400 PRO Read Intensive NVMe SSDs have the following physical specifications:

Dimensions and weight (approximate, without the drive 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)

Operating environment

The ThinkSystem 7400 PRO Read Intensive NVMe SSDs are supported in the following environment:

- Temperature:
  - Operating: 0 to 70 °C (32 to 158 °F)
  - Non-operating: -40 to 85 °C (-40 to 185 °F)
- Relative humidity, Non-operating: 5 to 95% (noncondensing)
- Maximum altitude: 3,050 m (10,000 ft)
- Shock, non-operating: 1,500 G (Max) at 0.5 ms
- Vibration, non-operating: 20 G_{RMS} (5-3000 Hz)

Agency approvals

The ThinkSystem 7400 PRO Read Intensive NVMe SSDs conform to the following regulations:

- CE (Europe): EN55032, EN55024 Class B, RoHS
- FCC: CFR Title 47, Part 15, Class B
- UL/cUL: approval to UL-60950-1, 2nd Edition, IEC 60950-1:2005 (2nd Edition); EN 60950-1 (2006) + A11:2009+ A1:2010 + A12:2011 + A2:2013
- BSMI (Taiwan): approval to CNS 13438, Class B, CNS 15663
- RCM (Australia, New Zealand): AS/NZS CISPR32 Class B
- KC RRL (Korea): approval to KN32 Class B, KN 35 Class B
- W.E.E.E.: Compliance with EU WEEE directive 2012/19/EC.
- TUV (Germany): approval to IEC60950/EN60950
- VCCI (Japan): 2015-04 Class B
- IC (Canada): ICES-003 Class B
- Morocco: EN55032, EN55024 Class B
- UkrSEPRO (Ukraine): EN55032 Class B, IEC60950/EN60950, RoHS (Resolution 2017 No. 139)
- UKCA (UK): SI 2016/1091 Class B and SI 2012/3032 RoHS

Related publications and links

For more information, see the following documents:

- Lenovo ThinkSystem storage options product web page
  https://lenovopress.com/lp0761-storage-options-for-thinksystem-servers
- Micron 7400 product page
  https://www.micron.com/products/ssd/product-lines/7400

Related product families

Product families related to this document are the following:

- Drives

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