ThinkSystem M.2 Drives and M.2 Adapters
Product Guide

M.2 is a solid-state drive (SSD) form factor primarily used as an operating system boot solution. Lenovo ThinkSystem servers support M.2 drives with the addition of a supported M.2 adapter.

The M.2 drives install into an M.2 adapter which in turn is installed in a dedicated slot on the system board of the ThinkSystem server. With two M.2 drives configured, the drives are configured by default as a RAID-1 mirrored pair for redundancy.

There are two M.2 adapters supported:

- Single M.2 Adapter, which supports one M.2 drive; available as the ThinkSystem M.2 Enablement Kit
- Dual M.2 Adapter, which supports one or two M.2 drives; available as the ThinkSystem M.2 with Mirroring Enablement Kit

Tip: The M.2 adapters are also referred to as enablement kits. In the product publications, they are referred to as M.2 backplanes. These terms are interchangable.

A Dual M.2 Adapter with one 128GB M.2 drive partially inserted is shown in the following figure. The second M.2 drive is installed on the other side of the adapter.

Figure 1. Dual M.2 Adapter and a 128 GB M.2 drive

Did you know?

The Dual M.2 Adapter features a Lenovo patented design that provides a tool-less method for attaching back-to-back M.2 modules to the adapter.

The Dual M.2 Adapter also includes a built-in RAID controller and allows two installed M.2 drives to be configured either as RAID-1, RAID-0, or two independent drives (JBOD mode).

Part number information

The following table lists the ThinkSystem part numbers.

Table 1. M.2 components

Part number	Feature code	Description	Maximum Supported
M.2 adapters			
7Y37A01092	AUMU	ThinkSystem M.2 Enablement Kit (contains the Single M.2 Adapter; supports 1 drive)	1
7Y37A01093	AUMV	ThinkSystem M.2 with Mirroring Enablement Kit (contains the Dual M.2 Adapter, supports 1 or 2 drives)	1
M.2 drives			
7N47A00129	AUUL	ThinkSystem M.2 CV1 32GB SATA 6Gbps Non-Hot-Swap SSD	1 / 2*
7N47A00130	AUUV	ThinkSystem M.2 CV3 128GB SATA 6Gbps Non-Hot-Swap SSD	1 / 2*
7SD7A05703	B11V	ThinkSystem M.2 5100 480GB SATA 6Gbps Non-Hot-Swap SSD	1 / 2*

* 7Y37A01092 supports a maximum of one M.2 drive; 7Y37A01093 supports a maximum of two M.2 drives; drives must be identical.

The Single M.2 Adapter is shown in the following photo, with the 32GB M.2 drive installed.

Figure 2. Single M.2 Adapter and a 32 GB M.2 drive

Features

Features of the ThinkSystem M.2 solution:

- Hardened boot media that does not use a drive bay
- Both mechanically & electronically designed to be more robust than any prior implementation
- Design provides hardware mirroring of two M.2 SSDs
- M.2 SSDs have higher mean time between failures (MTBF) than SD cards or USB keys
- Tool-less, patented clip design that supports back to back connector layout, providing simple install in limited space.

Features of the Dual M.2 Adapter:

- PCIe 2.0 x2 host interface (connects to the PCH)
- Based on the Marvell 88SE9230 6 Gbps SATA controller
- Supports one or two 6 Gbps SATA M.2 drives**
- Supports 3 different physical sizes of M.2 drives: 42mm (2242), 60mm (2260) and 80mm (2280)*
- RAID functionality provided by the M.2 adapter
- RAID 1 by default; also supports RAID 0 and JBOD
- UEFI-based settings to enable/disable RAID mode and to review inventory
- Adapter and drive firmware update using Lenovo firmware tools
- Management via I2C interface

Features of the Single M.2 Adapter:

- 6 Gbps SATA host interface (connects to the PCH)
- Supports one 6 Gbps SATA M.2 drive
- Supports 3 different physical sizes of M.2 drives: 42mm (2242), 60mm (2260) and 80mm (2280)*
- Drive firmware update using Lenovo firmware tools
- Management via I2C interface
- VPD reporting of adapter inventory

* 2242, 2260 and 2280 are the industry terms for the M.2 drive dimensions. For example, 2280 corresponds to a drive that is 22mm wide and 80mm long.
** When using configure-to-order (CTO), you will be required to select two M.2 drives when configuring the Dual M.2 Adapter.

Technical specifications of the drives

The following table lists the specifications of the M.2 drives.

Table 2. M.2 drive specifications

Specification	**32 GB M.2**	**128 GB M.2**	**480 GB M.2**
Part number	7N47A00129	7N47A00130	7SD7A05703
Recommended use	Boot drive*	Boot drive*	Boot drive Read-intensive applications
Interface	6Gb SATA	6Gb SATA	6Gb SATA
Flash Type	MLC NAND	TLC NAND	3D TLC NAND
Endurance - total bytes written	37.92TB	63.9 TB	1300 TB
Endurance - drive writes per day	0.66 DWPD	0.28 DWPD	1.5 DWPD
4KB random read performance	25,000 IOPS	72,000 IOPS	93,000
4KB random write performance	10,500 IOPS	32,000 IOPS	43,000
Sequential read performance	260 MB/s	530 MB/s	540 MB/s
Sequential write performance	40 MB/s	470 MB/s	410 MB/s
Vendor model	LiteOn CV1	LiteOn CV3	Micron 5100 PRO
Dimensions	42 x 22 mm	80 x 22 mm	80 x 22 mm

* These drive options do not have power-loss capacitors, which means they do not have protection against a potential loss of data when a write operation is underway just as a power outage occurs. As a result, these drives are not recommended for general purpose storage functions.

Server support

The M.2 adapters and drives are supported by ThinkSystem servers as shown in the following table.

Table 3. ThinkSystem server support

Part number	Description	2S Rack & Tower							4S Rack			Dense/ Blade		
		ST550 (7X09/7X10)	SR530 (7X07/7X08)	SR550 (7X03/7X04)	SR570 (7Y03/7Y04)	SR590 (7X98/7X99)	SR630 (7X01/7X02)	SR650 (7X05/7X06)	SR850 (7X18/7X19)	SR860 (7X69/7X70)	SR950 (7X11/12/13)	SD530 (7X21)	SN550 (7X16)	SN850 (7X15)
7Y37A01092	ThinkSystem M.2 Enablement Kit	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y†	Y
7Y37A01093	ThinkSystem M.2 with Mirroring Enablement Kit	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
7N47A00129	ThinkSystem M.2 CV1 32GB SATA 6Gbps Non-Hot Swap SSD	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
7N47A00130	ThinkSystem M.2 CV3 128GB SATA 6Gbps Non-Hot Swap SSD	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
7SD7A05703	ThinkSystem M.2 5100 480GB SATA 6Gbps Non-Hot-Swap SSD	Y	N	N	N	N	Y*	Y*	Y*	N	N	N	Y	Y

† Support for the SN550 is configure-to-order only
* See the configuration rules below

Configuration rules:

- For use with the SN550:
  - The ThinkSystem M.2 Enablement Kit, 7Y37A01092, cannot be installed into the SN550 as a field upgrade option. It is only supported configure-to-order.
- For use in the SR630 and SR850:
  - Requires the ThinkSystem M.2 with Mirroring Enablement Kit, 7Y37A01093. Not supported with ThinkSystem M.2 Enablement Kit, 7Y37A01092.
- For use in the SR650:
  - Requires the ThinkSystem M.2 with Mirroring Enablement Kit, 7Y37A01093. Not supported with ThinkSystem M.2 Enablement Kit, 7Y37A01092.
  - For air flow reasons, an adapter must be installed in slot 6, and to use slot 6, the second processor must be installed.

Operating system support

The M.2 drives operate transparently to users, storage systems, applications, databases, and operating systems.

The M.2 adapters are supported with the following operating systems:

- Microsoft Windows Server 2012 R2
- Microsoft Windows Server 2016
- Red Hat Enterprise Linux 6.9
- Red Hat Enterprise Linux 7.3
- SUSE LINUX Enterprise Server 11 SP4
- SUSE LINUX Enterprise Server 11 SP4 with Xen
- SUSE LINUX Enterprise Server 12 SP2
- SUSE LINUX Enterprise Server 12 SP2 with Xen
- VMware vSphere ESXi 6.0 U3
- VMware vSphere ESXi 6.5 U1

Warranty

The M.2 drives and M.2 adapters carry a one-year, customer-replaceable unit (CRU) limited warranty. When the drives and adapters are installed in a supported server, these drives assume the server'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.

Physical specifications

M.2 drives have the following dimensions and weight:

- 2242 form factor drives: 22 mm x 42 mm, 5 g
- 2280 form factor drives: 22 mm x 80 mm, 10 g

M.2 adapters have the following dimensions and weight:

- Single M.2 Adapter: 117 mm x 30 mm, 17 g
- Dual M.2 Adapter: 117 mm x 30 mm, 18 g

Related publications and links

For more information, see these resources:

- Human Factors Engineer Tim Meserth shows the Lenovo M.2 offering: https://www.youtube.com/watch?v=ibtMAHihTPw&list=PLLQcIfVNrqze7qYOrEMPsuHqs4JEHi0aG&index=5
- Lenovo ThinkSystem product publications: http://thinksystem.lenovofiles.com/help/index.jsp
  - Quick Start
  - Rack Installation Guide
  - Setup Guide
  - Hardware Maintenance Manual
  - Messages and Codes Reference
  - Memory Population Reference
- ServerProven hardware compatibility: http://www.lenovo.com/us/en/serverproven

Related product families

Product families related to this document are the following:

- Drives

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