# ThinkSystem M.2 ER2 Read Intensive SATA 6Gb SSDs

## Product Guide

The ThinkSystem M.2 ER2 Read Intensive SATA 6Gb SSDs are 6Gb SATA M.2 drives suitable operating system boot purposes and general data storage functions on ThinkSystem servers. The drives are available in capacities of 240GB or 480GB.

**Note**: The drives listed in this product guide are only available to customers in China.

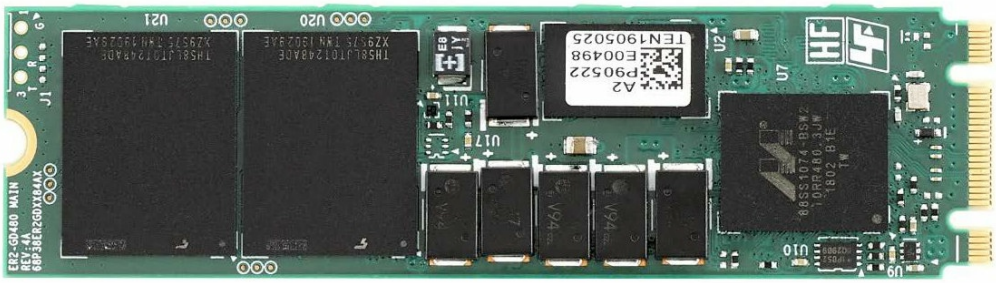

Figure 1. ThinkSystem M.2 ER2 Read Intensive SATA 6Gb SSDs

## Did you know?

The ER2 SATA SSD Seríes delivers affordability and performance with superior random read/write speeds of up to 90,000/45,000 IOPS. With latencies reaching only 36/36 µs, the ER2 ensures fast and consistent command response times. In addition, it offers low active read power consumption at only 3.5W for energy efficiency.

## Part number information

The following tables list the information for ordering part numbers and feature codes.

**PRC only**: The drives listed in this product guide are only available to customers in China.

Table 1. Ordering part numbers and feature codes

| Part number | Feature | Description | Vendor part number |
|---|---|---|---|
| 4XB7A90105 | BXMK | ThinkSystem M.2 ER2 240GB Read Intensive SATA 6Gb NHS SSD | ER2-GD240 |
| 4XB7A90106 | BXMJ | ThinkSystem M.2 ER2 480GB Read Intensive SATA 6Gb NHS SSD | ER2-GD480 |

The part numbers include the following items:

- One M.2 drive
- Documentation flyer

## Features

The ThinkSystem M.2 ER2 Read Intensive SATA 6Gb SSDs have the following features:

- Based on the SSSTC ER2 family of solid state drives
- 3D TLC NAND flash
- End-to-end data protection
- Thermal throttling/sensor
- Power loss protection (PLP)
- High I/O & throughput performance
- Inrush current management
- ROHS-compliant
- Command sets: TRIM, S.M.A.R.T, NCQ

Read Intensive SSDs and Mixed Use 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 typically have a better cost per read IOPS ratio but lower endurance and performance compared to Mixed Use SSDs.

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.

For example, the ER2 480GB drive has an endurance of 870 TB of total bytes written (TBW). This means that for full operation over five years, write workload must be limited to no more than 477 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 795 GB of writes per day, which is equivalent to 1.7 full drive writes per day.

## Technical specifications

The following tables present technical specifications for the ER2 M.2 SSDs.

Table 2. Technical specifications

| **Feature** | **240 GB drive** | **480 GB drive** |
|---|---|---|
| Interface | 6 Gb SATA | 6 Gb SATA |
| Form factor | M.2 2280 | M.2 2280 |
| Capacity | 240 GB | 480 GB |
| SED encryption | None | None |
| Endurance (drive writes per day for 5 years) | 1 DWPD | 1 DWPD |
| Endurance (total bytes written) | 430 TB | 870 TB |
| Data reliability (UBER) | < 1 in $10^{17}$ bits read | < 1 in $10^{17}$ bits read |
| MTBF | 2,000,000 hours | 2,000,000 hours |
| Performance | | |
| IOPS reads (4 KB blocks) | 90,000 | 90,000 |
| IOPS writes (4 KB blocks) | 10,000 | 15,000 |
| Sequential read rate (128 KB blocks) | 520 MB/s | 520 MB/s |
| Sequential write rate (128 KB blocks) | 300 MB/s | 520 MB/s |
| Read latency (random) | 36 µs | 36 µs |
| Write latency (random) | 36 µs | 36 µs |
| Environment | | |
| Shock, non-operating | 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) |
| Typical power (R/W) | 3.5 W / 3.8 W | 3.5 W / 3.8 W |

## Server support

The following tables list the ThinkSystem servers that are compatible.

Table 3. Server support (Part 1 of 4)

| Part Number | Description | 2S AMD V3 | | | | 2S Intel V3 | | | 4S 8S Intel V3 | | | Multi Node | | | GPU Rich | | | | 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) | SR850 V3 (7D97 / 7D96) | SR860 V3 (7D94 / 7D93) | SR950 V3 (7DC5 / 7DC4) | SD535 V3 (7DD8 / 7DD1) | SD530 V3 (7DDA / 7DD3) | SD550 V3 (7DD9 / 7DD2) | SR670 V2 (7Z22 / 7Z23) | SR675 V3 (7D9Q / 7D9R) | SR680a V3 (7DHE) | SR685a V3 (7DHC) | ST250 V3 (7DCF / 7DCE) | SR250 V3 (7DCM / 7DCL) |
| 4XB7A90105 | ThinkSystem M.2 ER2 240GB Read Intensive SATA 6Gb NHS SSD | N | N | N | N | N | N | N | N | N | N | N | N | N | N | N | N | N | N | N |
| 4XB7A90106 | ThinkSystem M.2 ER2 480GB Read Intensive SATA 6Gb NHS SSD | 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 | Edge | | | | | Super Computing | | | | | 1S Intel V2 | | | 2S Intel V2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SE350 (7Z46 / 7D1X) | SE350 V2 (7DA9) | SE360 V2 (7DAM) | SE450 (7D8T) | SE455 V3 (7DBY) | 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) | ST650 V2 (7Z75 / 7Z74) | SR630 V2 (7Z70 / 7Z71) | SR650 V2 (7Z72 / 7Z73) |
| 4XB7A90105 | ThinkSystem M.2 ER2 240GB Read Intensive SATA 6Gb NHS SSD | Y | N | N | N | N | N | N | N | N | N | N | Y | Y | Y | Y | Y |
| 4XB7A90106 | ThinkSystem M.2 ER2 480GB Read Intensive SATA 6Gb NHS SSD | Y | N | N | N | N | N | N | N | N | N | N | Y | Y | Y | Y | Y |

Table 5. Server support (Part 3 of 4)

| Part Number | Description | AMD V1 | | | | | Dense V2 | | | | 4S V2 | | 8S | 4S V1 | | | 1S Intel V1 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 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) | ST50 (7Y48 / 7Y50) | ST250 (7Y45 / 7Y46) | SR150 (7Y54) | SR250 (7Y52 / 7Y51) |
| 4XB7A90105 | ThinkSystem M.2 ER2 240GB Read Intensive SATA 6Gb NHS SSD | Y | Y | Y | Y | Y | Y | N | N | N | N | Y | N | N | N | N | N | N | N | N |
| 4XB7A90106 | ThinkSystem M.2 ER2 480GB Read Intensive SATA 6Gb NHS SSD | Y | Y | Y | Y | Y | Y | N | N | N | N | Y | N | N | N | N | N | N | N | N |

Table 6. Server support (Part 4 of 4)

| Part Number | Description | 2S Intel V1 | | | | | | | | Dense V1 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 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) |
| 4XB7A90105 | ThinkSystem M.2 ER2 240GB Read Intensive SATA 6Gb NHS SSD | N | N | N | N | N | Y | Y | N | N | N | N | N |
| 4XB7A90106 | ThinkSystem M.2 ER2 480GB Read Intensive SATA 6Gb NHS SSD | N | N | N | N | N | Y | Y | N | N | N | N | N |

## Operating system support

SAS 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 ER2 M.2 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 ER2 M.2 SSDs have the following physical specifications:

- Length: 80 mm
- Width: 22 mm
- Thickness: 3.65 mm
- Weight: 10g

## Operating environment

The ER2 M.2 SSDs are supported in the following environment:

- Temperature, operating: 0 - 70 °C (32 - 158 °F)
- Temperature, non-operating: -40 to 85 °C (-40 - 185 °F)
- Relative humidity: 5 - 95% (noncondensing)
- Maximum altitude: -300 - 4,572 m (-1,000 to 15,000 feet)

## Agency approvals

The ER2 M.2 SSDs conform to the following regulations:

- CE
- UL
- BSMI
- RoHS

## Related publications and links

For more information, see the following documents:

- Lenovo Press product guides and papers on RAID adapters and HBAs
  https://lenovopress.com/servers/options/raid
- Lenovo RAID Management Tools and Resources
  https://lenovopress.com/lp0579-lenovo-raid-management-tools-and-resources
- Lenovo RAID Introduction
  https://lenovopress.com/lp0578-lenovo-raid-introduction
- SSSTC product web page
  www.ssstc.com/product/enterprise-data-center-ssd/enterprise-er2-m-2-2280-3d-tlc-sata-ssd

## Related product families

Product families related to this document are the following:

- Drives

## Notices

Lenovo may not offer the products, services, or features discussed in this document in all countries. Consult your local Lenovo representative for information on the products and services currently available in your area. Any reference to a Lenovo product, program, or service is not intended to state or imply that only that Lenovo product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any Lenovo intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any other product, program, or service. Lenovo may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

Lenovo (United States), Inc.
8001 Development Drive
Morrisville, NC 27560
U.S.A.
Attention: Lenovo Director of Licensing

LENOVO PROVIDES THIS PUBLICATION ”AS IS” WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some jurisdictions do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. Lenovo may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

The products described in this document are not intended for use in implantation or other life support applications where malfunction may result in injury or death to persons. The information contained in this document does not affect or change Lenovo product specifications or warranties. Nothing in this document shall operate as an express or implied license or indemnity under the intellectual property rights of Lenovo or third parties. All information contained in this document was obtained in specific environments and is presented as an illustration. The result obtained in other operating environments may vary. Lenovo may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Any references in this publication to non-Lenovo Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this Lenovo product, and use of those Web sites is at your own risk. Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.



This document, LP1781, was created or updated on July 25, 2023.

Send us your comments in one of the following ways:

- Use the online Contact us review form found at:
  https://lenovopress.lenovo.com/LP1781
- Send your comments in an e-mail to:
  comments@lenovopress.com

This document is available online at https://lenovopress.lenovo.com/LP1781.

## Trademarks

Lenovo and the Lenovo logo are trademarks or registered trademarks of Lenovo in the United States, other countries, or both. A current list of Lenovo trademarks is available on the Web at https://www.lenovo.com/us/en/legal/copytrade/.

The following terms are trademarks of Lenovo in the United States, other countries, or both:
Lenovo®
ThinkSystem®

The following terms are trademarks of other companies:

Intel® is a trademark of Intel Corporation or its subsidiaries.

Other company, product, or service names may be trademarks or service marks of others.