ThinkSystem RAID 9350-16i and 9350-8i Advanced RAID Adapters
Product Guide

The ThinkSystem RAID 9350 family of internal 12 Gbps SAS RAID controllers are high-performance low-cost RAID-on-chip (ROC) adapters that are manufactured by Lenovo. These adapters support all major RAID levels including RAID-6 and RAID-60, and include support for Lenovo management tools.

The family offers two port-counts:

- The ThinkSystem RAID 9350-8i supports up to eight internal SAS or SATA drives
- The ThinkSystem RAID 9350-16i supports up to 16 internal SAS or SATA drives

The family offers two adapter form factors:

- Low-profile PCIe installed in a standard PCIe slot
- Custom form-factor (CFF) design which is cabled to an onboard PCIe 4.0 x8 port on the server and not occupy a standard PCIe slot.

The ThinkSystem RAID 9350-16i is shown in the following figure.

Figure 1. ThinkSystem RAID 9350-16i 4GB Flash PCIe 12Gb Adapter

Did you know?

RAID on Chip-based controllers such as the RAID 9350 adapters have a dedicated processor that offloads all RAID functions from the server's CPU. With hardware acceleration for RAID 5 and 6 operations plus dedicated memory for caching, the 9350 series adapters are a high-performance low-cost RAID controller for ThinkSystem servers.

Part number information

The following table provides the ordering part numbers for the adapters.

Table 1. Part numbers and feature codes

Part number	Feature code	Description
Low-profile adapters installed in a regular PCIe slot		
4Y37A72485	BJHN	ThinkSystem RAID 9350-16i 4GB Flash PCIe 12Gb Adapter
4Y37A72483	BJHL	ThinkSystem RAID 9350-8i 2GB Flash PCIe 12Gb Adapter
Custom form-factor (CFF) adapters installed in a dedicated internal bay (no PCIe slot required)		
4Y37A72486	BJHP	ThinkSystem RAID 9350-16i 4GB Flash PCIe 12Gb Internal Adapter
4Y37A72484	BJHM	ThinkSystem RAID 9350-8i 2GB Flash PCIe 12Gb Internal Adapter

The part numbers for the regular PCIe adapters include:

- RAID adapter with 3U full-height bracket attached
- 2U low-profile bracket
- Supercap power module

The part numbers for the CFF internal adapters include:

- Supercap power module
- Server-specific power cables

The following figure shows the ThinkSystem RAID 9350-8i.

Figure 2. ThinkSystem RAID 9350-8i 2GB Flash PCIe 12Gb Adapter

Technical specifications

The ThinkSystem RAID 9350 Series internal RAID adapters have the following specifications:

- PCIe 3.0 x8 host interface
- Two (8i adapter) or four (16i adapter) connectors to the drive backplanes
- Two adapter form factors:
  - Low-profile PCIe adapter with broad server compatibility
  - Custom form-factor, designed to not consume a standard PCIe slot
- 12 Gbps SAS/SATA RAID controllers, based on the Adaptec SmartRAID 3152-8i and SmartRAID 3154-16i
- 2GB (8i) or 4GB (16i) of integrated flash-backed cache
- Connectivity for up to 8 (8i) or 16 (16i) internal SAS or SATA drives
- Support for intermixing SAS and SATA HDDs and SSDs. Mixing SAS and SATA drives in the same array is not supported. Mixing of HDDs and SSDs in the same array is not supported.
- Support for intermixing of 12 Gbps and 6 Gbps drives.
- Standard support for RAID 0, 1, 10, 5, 50, 6, 60, RAID 1 Triple, and RAID 10 Triple
- Support for JBOD (non-RAID, called "raw" or "HBA mode" in Adaptec parlance) drive state
- Support for up to 64 virtual disks, up to 128 arrays, up to 16 virtual disks per array
- Support for logical drive sizes greater than 2 TB.
- Configurable stripe size from 16 KB up to 1 MB
- Supports 512e, 512n and 4K sector formatted drives
- RAID ADM through triple mirroring, move array, and split mirroring
- Quick initialization
- Online capacity expansion
- Copyback hot spare
- Dynamic caching algorithm
- Native command queuing (NCQ)
- Background initialization
- Hot-plug drive support
- RAID level migration
- Hot spares—global, dedicated, and pooled
- Automatic/manual rebuild of hot spares
- S.M.A.R.T. support
- Dynamic sector repair
- Staggered drive spin-up
- Bootable array support
- Smart PQI driver with multiple queue and MSI-X support for all device drivers for all supported operating systems
- Secure boot support

The following table compares the specifications of the RAID 9350 adapters.

Table 2. Specifications

Feature	RAID 9350-8i	RAID 9350-8i Internal	RAID 9350-16i	RAID 9350-16i Internal
Form factor	Low profile	Custom (CFF)	Low profile	Custom (CFF)
Controller	Microchip Luxor ROC PM8204	Microchip Luxor ROC PM8204	Microchip Luxor ROC PM8236	Microchip Luxor ROC PM8236
Adaptec equivalent	Adaptec SmartRAID 3152-8i	Adaptec SmartRAID 3152-8i	Adaptec SmartRAID 3154-16i	Adaptec SmartRAID 3154-16i
Host interface	PCIe 3.0 x8	PCIe 3.0 x8	PCIe 3.0 x8	PCIe 3.0 x8
Port interface	12 Gb SAS	12 Gb SAS	12 Gb SAS	12 Gb SAS
Number of ports	8	8	16	16
Port connectors	2x Mini-SAS HD x4 (SFF-8643)	2x SlimSAS x4 (SFF-8654)	4x Mini-SAS HD x4 (SFF-8643)	4x SlimSAS x4 (SFF-8654)
Drive interface	SAS, SATA	SAS, SATA	SAS, SATA	SAS, SATA
Drive type	HDD, SSD	HDD, SSD	HDD, SSD	HDD, SSD
Hot-swap drives	Yes	Yes	Yes	Yes
Max devices	8	8	16	16
RAID levels	0, 1, 10, 5, 50, 6, 60, 1 Triple, 10 Triple	0, 1, 10, 5, 50, 6, 60, 1 Triple, 10 Triple	0, 1, 10, 5, 50, 6, 60, 1 Triple, 10 Triple	0, 1, 10, 5, 50, 6, 60, 1 Triple, 10 Triple
JBOD drive state (HBA mode / Raw)	Yes	Yes	Yes	Yes
Cache	2GB (Standard)	2GB (Standard)	4GB (Standard)	4GB (Standard)
Supercap cache protection with flash	Yes	Yes	Yes	Yes
SED support	No	No	No	No

To compare these adapters to others in the ThinkSystem portfolio, see the ThinkSystem RAID Adapter and HBA Reference:
https://lenovopress.com/lp1288-thinksystem-raid-adapter-and-hba-reference

The following figure shows the ThinkSystem RAID 9350-16i 4GB Flash PCIe 12Gb Internal Adapter

Figure 3. ThinkSystem RAID 9350-16i 4GB Flash PCIe 12Gb Internal Adapter

Features

Maximum Performance and Flexibility

Data center, Enterprise IT and general consumer server environments have a broad range of requirements —from basic connectivity to extreme data storage capacities. Effective data access and protection is crucial to their ultimate success. The 12 Gbps RAID 9350 Series adapters, coupled with 12 Gbps SSDs, provide maximum read/write bandwidth and IOPS as well as acceleration and latency optimization through caching for the most performance-hungry transactional and database applications.

maxCache 4.0 SSD Caching

maxCache accelerates HDD-based RAID arrays and logical drives, advancing the performance capabilities for a broader set of application workloads. RAID 9350 Series adapters support read- and write-back caching. By caching writes to a redundant SSD cache pool, maxCache 4.0 leverages the performance and latency capabilities of SSD technology for both read and write workloads. Read performance is also improved by caching frequently accessed data on the SSD tier with additional optimizations through the learned-path algorithm, which leverages the aggregate performance of all available storage devices.

Integrated Cache Protection

The RAID 9350 Series integrates flash-based cache backup to enable instant cache protection. The supercap capacitor module supports a five-year lifetime and is continuously monitored by the Smart firmware to make sure that the data can be safely backed up to the Flash memory on the RAID 9350 Series adapter in case of a power loss.

Consistency Check

Consistency check automatically checks your logical drives for bad or inconsistent data, and then fixes any problems. Enabling consistency check ensures that you can recover data if a drive fails. The scanning process checks physical drives in fault-tolerant logical drives for bad sectors. It also verifies the consistency of parity data, if applicable.

Advanced Data Protection and Ease of Use

Microchip's industry-leading Smart Storage stack delivers maximum reliability and best-in-class performance that all RAID levels come to expect, plus unique features like Mixed Mode support (RAID and HBA devices can be used simultaneously), adapter power management (reduces power consumption up to 30 percent), and Advanced Data Management (ADM) features that allow data migration from existing RAID arrays to new ones when upgrading old hard disks or worn-out SSDs. Adaptec maxView provides an HTML5 web interface that can be used in standard desktops and mobile browsers for all storage configuration and management needs. It supports local and remote management, and comes with plugins for major storage management software suites for enterprises and data centers.

Additional RAID levels

The adapters support additional RAID levels that offer enhanced redundancy and data protection.

- **RAID 1 Triple** is similar to RAID 1, but creates fault tolerance by maintaining redundant copies of data using three disk drives, rather than two. All three drives contain mirrored duplicated user data. If a drive fails, the remaining drives provide backup copies of the files and normal system operations are not interrupted.

- **RAID 10 Triple** is similar to RAID 10, but creates fault tolerance by maintaining redundant copies of data using at least six disk drives. Data is striped across two or more sets of RAID 1 (Triple) drives for rapid access. If a drive fails, the remaining drives provide backup copies of the files and normal system operations are not interrupted.

Support for Lenovo system management tools is listed in the following table.

Table 3. Support for key management features

Function	Lenovo XClarity Controller	Lenovo XClarity Provisioning Manager	Lenovo XClarity Essentials OneCLI (out-of-band)	Lenovo XClarity Essentials OneCLI (in-band)	Lenovo XClarity Administrator	Bare Metal Update / Bootable Media Creator
Adapter FRU Inventory Details	Supported	Supported	Supported	Supported	Supported	No support
Disk Inventory Details	Supported	Supported	Supported	Supported	Supported	No support
RAID Configuration	Support planned for 4Q/2022	Supported	Support planned for 4Q/2022	Supported	Support planned for 1Q/2023	No support
Firmware Update	Supported	No support	Supported	Supported	Supported	Supported
Monitoring/ Events/ Log Capture	Supported*	Supported	Supported*	Supported	Supported*	No support

* No capture of controller firmware log

Server support

The following tables list the ThinkSystem servers that are compatible.

Table 4. Server support (Part 1 of 2)

Part Number	Description	Edge		1S Intel V2			2S Intel V2				AMD				Dense V2				4S V2		8S
		SE350 (7Z46 / 7D1X)	SE450 (7D8T)	ST50 V2 (7D8K / 7D8J)	ST250 V2 (7D8G / 7D8F)	SR250 V2 (7D7R / 7D7Q)	ST650 V2 (7Z75 / 7Z74)	SR630 V2 (7Z70 / 7Z71)	SR650 V2 (7Z72 / 7Z73)	SR670 V2 (7Z22 / 7Z23)	SR635 (7Y98 / 7Y99)	SR655 (7Y00 / 7Z01)	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)
Low-profile PCIe adapters																					
4Y37A72485	ThinkSystem RAID 9350-16i 4GB Flash PCIe 12Gb Adapter	N	N	N	Y	Y	Y	Y	Y	N	N	N	Y[1]	Y[1]	N	N	N	N	Y	Y	N
4Y37A72483	ThinkSystem RAID 9350-8i 2GB Flash PCIe 12Gb Adapter	N	N	N	Y	Y	Y	Y	Y	Y	N	N	Y[1]	Y[1]	N	N	N	N	Y	Y	N
Custom form-factor (CFF) adapters																					
4Y37A72486	ThinkSystem RAID 9350-16i 4GB Flash PCIe 12Gb Internal Adapter	N	N	N	N	N	Y	Y	Y	N	N	N	Y[1]	Y[1]	N	N	N	N	N	N	N
4Y37A72484	ThinkSystem RAID 9350-8i 2GB Flash PCIe 12Gb Internal Adapter	N	N	N	N	N	Y	Y	Y	N	N	N	Y[1]	Y[1]	N	N	N	N	N	N	N

1. Supported in the SR645 and SR665 only with an EPYC 7003 "Milan" processor. Not supported with an EPYC 7002 "Rome" processor.

Table 5. Server support (Part 2 of 2)

		1S Intel V1				2S Intel V1								Dense V1				4S V1		
Part Number	**Description**	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)	SR850 (7X18 / 7X19)	SR850P (7D2F / 2D2G)	SR860 (7X69 / 7X70)
Low-profile PCIe adapters																				
4Y37A72485	ThinkSystem RAID 9350-16i 4GB Flash PCIe 12Gb Adapter	N	N	N	N	N	N	Y	N	Y	Y	Y	N	N	N	N	N	N	N	N
4Y37A72483	ThinkSystem RAID 9350-8i 2GB Flash PCIe 12Gb Adapter	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N
Custom form-factor (CFF) adapters																				
4Y37A72486	ThinkSystem RAID 9350-16i 4GB Flash PCIe 12Gb Internal Adapter	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4Y37A72484	ThinkSystem RAID 9350-8i 2GB Flash PCIe 12Gb Internal Adapter	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Note: The use of both an Intel E810 network adapter and an X350 HBA/RAID adapter (9350, 5350 and 4350) is currently not supported in ThinkSystem servers. Planned support for this combination of adapters is 4Q/2022 (22C).

The following figure shows the ThinkSystem RAID 9350-8i 2GB Flash PCIe 12Gb Internal Adapter
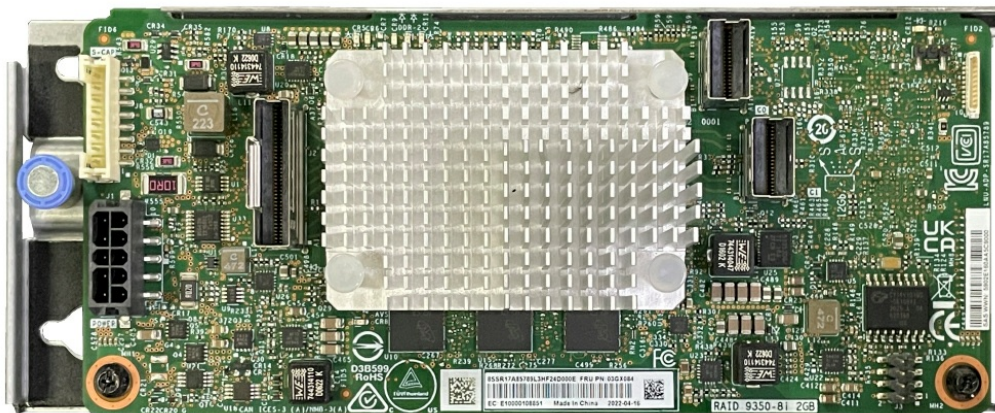
Figure 4. ThinkSystem RAID 9350-8i 2GB Flash PCIe 12Gb Internal Adapter

Operating system support

The following tables list the supported operating systems for the adapters:

- ThinkSystem RAID 9350-8i 2GB Flash PCIe 12Gb Adapter, 4Y37A72483
- ThinkSystem RAID 9350-16i 4GB Flash PCIe 12Gb Adapter, 4Y37A72485
- ThinkSystem RAID 9350-8i 2GB Flash PCIe 12Gb Internal Adapter, 4Y37A72484
- ThinkSystem RAID 9350-16i 4GB Flash PCIe 12Gb Internal Adapter, 4Y37A72486

Table 6. Operating system support for ThinkSystem RAID 9350-8i 2GB Flash PCIe 12Gb Adapter, 4Y37A72483 (Part 1 of 2)

Operating systems	SR250 V2	ST250 V2	SR630 V2	SR650 V2	SR670 V2	SR850 V2	SR860 V2	ST650 V2	SR645	SR665	SR530 (Gen 2)	SR550 (Gen 2)	SR570 (Gen 2)	SR590 (Gen 2)	SR630 (Gen 2)	SR650 (Gen 2)	ST550 (Gen 2)
Microsoft Windows Server 2016	N	N	Y	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2019	Y	Y	Y	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2022	Y	Y	Y	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.7	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.8	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.9	N	N	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.1	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.2	N	N	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.3	N	N	Y	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.4	Y	Y	Y	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.5	N	N	Y	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.6	N	N	Y	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.0	Y	Y	Y	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP3	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
SUSE Linux Enterprise Server 12 SP4	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP5	N	N	Y	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP1	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP2	N	N	Y	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3	Y	Y	Y	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP4	Y	Y	Y	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y
Ubuntu 18.04.5 LTS	N	N	Y	Y	Y	N	N	Y	N	N	N	N	N	N	N	N	N
Ubuntu 20.04 LTS	N	N	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N
Ubuntu 22.04 LTS	N	N	Y	Y	Y	Y	Y	Y	Y [1]	Y [1]	N	N	N	N	Y	Y	N
VMware vSphere Hypervisor (ESXi) 6.7 U2	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7 U3	N	N	Y	Y	Y	N	N	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U1	N	N	N	N	N	Y	Y	N	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U2	N	N	Y	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U3	Y	Y	Y	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y

[1] Not support with EPYC 7002 processors

Table 7. Operating system support for ThinkSystem RAID 9350-8i 2GB Flash PCIe 12Gb Adapter, 4Y37A72483 (Part 2 of 2)

Operating systems	SR530 (Gen 1)	SR550 (Gen 1)	SR570 (Gen 1)	SR590 (Gen 1)	SR630 (Gen 1)	SR650 (Gen 1)	ST550 (Gen 1)
Microsoft Windows Server 2016	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2019	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2022	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.7	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.8	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.9	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.1	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.2	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.3	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.4	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.5	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.6	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.0	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP3	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP4	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP5	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP1	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP2	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP4	Y	Y	Y	Y	Y	Y	Y
Ubuntu 18.04.5 LTS	N	N	N	N	N	N	N
Ubuntu 20.04 LTS	N	N	N	N	N	N	N
Ubuntu 22.04 LTS	N	N	N	N	Y	Y	N
VMware vSphere Hypervisor (ESXi) 6.7 U2	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7 U3	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U1	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U2	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U3	Y	Y	Y	Y	Y	Y	Y

Table 8. Operating system support for ThinkSystem RAID 9350-16i 4GB Flash PCIe 12Gb Adapter, 4Y37A72485

Operating systems	SR250 V2	ST250 V2	SR630 V2	SR650 V2	SR850 V2	SR860 V2	ST650 V2	SR645	SR665	SR550 (Gen 2)	SR590 (Gen 2)	SR630 (Gen 2)	SR650 (Gen 2)	SR550 (Gen 1)	SR590 (Gen 1)	SR630 (Gen 1)	SR650 (Gen 1)
Microsoft Windows Server 2016	N	N	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2019	Y	Y	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2022	Y	Y	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.7	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.8	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.9	N	N	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.1	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.2	N	N	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.3	N	N	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.4	Y	Y	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.5	N	N	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.6	N	N	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.0	Y	Y	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP3	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP4	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP5	N	N	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP1	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP2	N	N	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3	Y	Y	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP4	Y	Y	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y	Y
Ubuntu 18.04.5 LTS	N	N	Y	Y	N	N	Y	N	N	N	N	N	N	N	N	N	N
Ubuntu 20.04 LTS	N	N	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N
Ubuntu 22.04 LTS	N	N	N	Y	Y	Y	Y	Y [1]	Y [1]	N	N	Y	Y	N	N	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7 U2	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7 U3	N	N	Y	Y	N	N	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U1	N	N	N	N	Y	Y	N	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U2	N	N	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U3	Y	Y	Y	Y	Y	Y	Y	Y [1]	Y [1]	Y	Y	Y	Y	Y	Y	Y	Y

[1] Not support with EPYC 7002 processors

Table 9. Operating system support for ThinkSystem RAID 9350-8i 2GB Flash PCIe 12Gb Internal Adapter, 4Y37A72484

Operating systems	SR630 V2	SR650 V2	ST650 V2	SR645	SR665
Microsoft Windows Server 2019	Y	Y	Y	Y	Y
Microsoft Windows Server 2022	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.7	N	N	N	Y [1]	Y [1]
Red Hat Enterprise Linux 7.8	N	N	N	Y [2]	Y [2]
Red Hat Enterprise Linux 7.9	Y	Y	Y	Y [3]	Y [3]
Red Hat Enterprise Linux 8.1	N	N	N	Y [4]	Y [4]
Red Hat Enterprise Linux 8.2	Y	Y	Y	Y [5]	Y [5]
Red Hat Enterprise Linux 8.3	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.4	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.5	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.6	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.0	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP4	Y	Y	Y	Y	Y
Ubuntu 18.04.5 LTS	Y	Y	Y	N	N
Ubuntu 20.04 LTS	Y	Y	N	N	N
Ubuntu 22.04 LTS	N	N	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7 U3	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0	N	N	N	Y [6]	Y [6]
VMware vSphere Hypervisor (ESXi) 7.0 U1	N	N	N	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U2	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U3	Y	Y	Y	Y	Y

[1] RHEL7.7 Not support with EPYC 7003 processors

[2] RHEL7.8 Not support with EPYC 7003 processors

[3] RHEL7.9 Not support with EPYC 7003 processors

[4] RHEL8.1 Not support with EPYC 7003 processors

[5] RHEL8.2 Not support with EPYC 7003 processors

[6] VMware 7.0 Not support with EPYC 7003 processors

Table 10. Operating system support for ThinkSystem RAID 9350-16i 4GB Flash PCIe 12Gb Internal Adapter, 4Y37A72486

Operating systems	SR630 V2	SR650 V2	ST650 V2	SR645	SR665
Microsoft Windows Server 2019	Y	Y	Y	Y	Y
Microsoft Windows Server 2022	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.7	N	N	N	Y [1]	Y [1]
Red Hat Enterprise Linux 7.8	N	N	N	Y [2]	Y [2]
Red Hat Enterprise Linux 7.9	Y	Y	Y	Y [3]	Y [3]
Red Hat Enterprise Linux 8.1	N	N	N	Y [4]	Y [4]
Red Hat Enterprise Linux 8.2	Y	Y	Y	Y [5]	Y [5]
Red Hat Enterprise Linux 8.3	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.4	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.5	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.6	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.0	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP4	Y	Y	Y	Y	Y
Ubuntu 18.04.5 LTS	Y	Y	Y	N	N
Ubuntu 20.04 LTS	Y	Y	N	N	N
Ubuntu 22.04 LTS	N	N	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7 U3	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0	N	N	N	Y [6]	Y [6]
VMware vSphere Hypervisor (ESXi) 7.0 U1	N	N	N	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U2	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U3	Y	Y	Y	Y	Y

[1] RHEL7.7 Not support with EPYC 7003 processors

[2] RHEL7.8 Not support with EPYC 7003 processors

[3] RHEL7.9 Not support with EPYC 7003 processors

[4] RHEL8.1 Not support with EPYC 7003 processors

[5] RHEL8.2 Not support with EPYC 7003 processors

[6] VMware 7.0 Not support with EPYC 7003 processors

Warranty

The adapters carry a 1-year limited warranty. When installed in a supported ThinkSystem server, the adapter assumes the server's base warranty and any warranty upgrades.

Physical specification

The PCIe low profile adapters have the following dimensions:

- Height: 64 mm (2.5 inches)
- Length: 167 mm (6.6 inches)

Operating environment

The adapters are supported in the following environment:

- Operating:
    - Temperature: 0°C to 55°C (32°F to 131°F)
    - Relative humidity: 20% to 80% (non-condensing)
    - Altitude: Up to 3,000 meters

Agency approvals

The adapters have the following agency approvals:

- FCC Part 15 Class A
- Australia/New Zealand (AS/NZS 3548)
- Canada (ICES-003 Class B)
- Europe (EN55032/EN55024)
- Japan VCCI
- Korea KCC
- RoHS compliant
- EN/IEC/UL 60950
- USA (FCC 47 CFR part 15 Subpart B class B)

Related publications and links

For more information, see the following documents:

- Product publications:
    - Adapter Hardware Installation Guide
    - Adapter Software User Guide
- Lenovo ThinkSystem product publications:
  http://thinksystem.lenovofiles.com/help/index.jsp
- ServerProven hardware compatibility:
  http://www.lenovo.com/us/en/serverproven
- 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
- Lenovo ThinkSystem RAID Adapter and HBA Reference
  https://lenovopress.com/lp1288-thinksystem-raid-adapter-and-hba-reference

Related product families

Product families related to this document are the following:

- RAID Adapters

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, LP1437, was created or updated on August 23, 2022.

Send us your comments in one of the following ways:

- Use the online Contact us review form found at:
  https://lenovopress.lenovo.com/LP1437

- Send your comments in an e-mail to:
  comments@lenovopress.com

This document is available online at https://lenovopress.lenovo.com/LP1437.

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®
Bootable Media Creator
ServerProven®
ThinkSystem
XClarity®

The following terms are trademarks of other companies:

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

Linux® is the trademark of Linus Torvalds in the U.S. and other countries.

Microsoft®, Windows Server®, and Windows® are trademarks of Microsoft Corporation in the United States, other countries, or both.

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