ThinkSystem RAID 940-8e PCIe Gen4 External RAID Adapter

Product Guide

The ThinkSystem RAID 940-8e 4GB Flash PCIe Gen4 12Gb Adapter is a high-performance 12 Gbps SAS RAID-on-chip (ROC) PCIe 4.0 adapter for connectivity to external disk enclosures. The adapter comes standard with 4 GB of cache, supports RAID levels 0, 1, 10, 5, 50, 6 and 60, and includes an extensive list of RAS and management features.

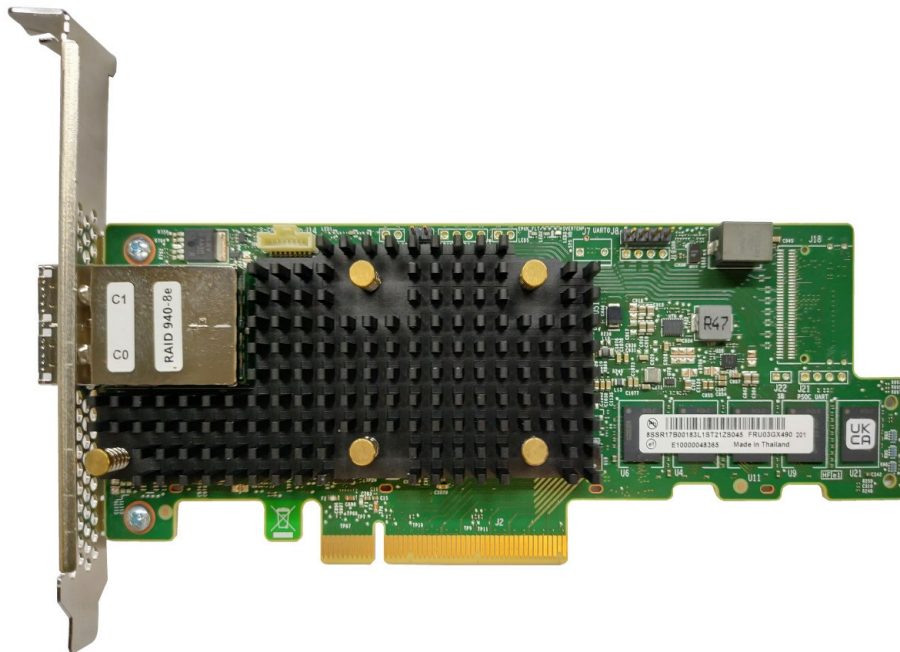The ThinkSystem RAID 940-8e 4GB Flash PCIe Gen4 12Gb Adapter is shown in the following figure.

Figure 1. ThinkSystem RAID 940-8e 4GB Flash PCIe Gen4 12Gb Adapter

Did you know?

RAID on Chip-based controllers such as the 940-8e adapter 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 940-8e offer the ultimate performance for connectivity with external SAS disk enclosures for ThinkSystem servers.

Part number information

The following table provides the ordering part number for the adapter.

Table 1. Part number information

Part number	Feature code	Description
4Y37A78836	BNWJ	ThinkSystem RAID 940-8e 4GB Flash PCIe Gen4 12Gb Adapter

Technical specifications

The ThinkSystem RAID 940-8e 4GB Flash PCIe Gen4 12Gb Adapter has the following specifications:

- PCIe 4.0 x8 host interface, also compatible with a PCIe 3.0 host interface
- 12 Gbps SAS/SATA RAID controllers, based on the Broadcom MegaRAID 9580-8e adapter
- 4GB of integrated flash-backed cache
- Connectivity for up to 240 external 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.
- Support for RAID 0, 1, 10, 5, 50, 6 and 60 standard
- Support for up to 240 virtual drives per controller, 16 virtual drives per drive group
- Support for JBOD (non-RAID) drive state
- Support for logical drive sizes greater than 2 TB.
- Configurable stripe size from 64 KB up to 1 MB
- Supports 512e, 512n and 4K (when available) formatted drives
- Supports UNMAP command for SAS SSDs (JBOD and RAID volumes)
- Supports TRIM command for SATA SSDs (JBOD)
- Compliant with Disk Data Format (DDF) configuration on disk (CoD).
- S.M.A.R.T. support.
- Configuration through
    - XClarity Provisioning Manager UEFI interface
    - XClarity Controller web interface
    - XClarity Administrator Configuration Patterns
    - StorCLI command-line interface
    - LSI Storage Authority (LSA) GUI interface
    - UEFI Human Interface Infrastructure (HII)

Note: CacheCade is not supported by these adapters

The following table lists the specifications of the 940-8e adapter.

Table 2. Specifications

Feature	940-8e
Adapter type	External RAID
Part number	4Y37A78836
Controller chip	SAS3908
Host interface	PCIe 4.0 x8
Port interface	12 Gb SAS
Number of ports	8
Port connectors	Two Mini-SAS HD x4 (SFF-8644) connectors
Drive interface	SAS,SATA
Drive type	HDD, SED, SSD
Hot-swap drives	Yes
Maximum devices	Profile 12: 240 devices Profile 10: 64 devices
RAID levels	0, 1, 10, 5, 50, 6, 60
JBOD mode	Yes
Cache	4GB (Standard)
CacheVault cache protection	Yes (Flash)
Performance Accelerator (FastPath)	Yes
SED support (Safestore)	Yes

To compare the 940-8e to other external adapters, see the Lenovo ThinkSystem RAID Adapter and HBA Reference
https://lenovopress.com/lp1288-lenovo-thinksystem-raid-adapter-and-hba-reference#internal-or-external-ports=External

Features

The 940-8e adapter has the following standard features:

- MegaRAID FastPath SSD performance acceleration

  MegaRAID FastPath software provides high-performance I/O acceleration for SSD-based virtual drives by using a low latency I/O path to increase the maximum I/O per second (IOPS) capability of the controller. This feature boosts the performance of applications with a highly random data storage access pattern, such as transactional databases.

- MegaRAID flash cache protection

  MegaRAID flash cache protection uses NAND flash memory, which is powered by a CacheVault Power Module supercapacitor, to protect data that is stored in the controller cache. This module eliminates the need for a lithium-ion battery, which is commonly used to protect DRAM cache memory on PCI RAID controllers. To avoid the possibility of data loss or corruption during a power or server failure, flash cache protection technology transfers the contents of the DRAM cache to NAND flash using power from the offload power module. After the power is restored to the RAID controller, the content of the NAND flash is transferred back to the DRAM, which is flushed to disk.

- Auto-resume on array rebuild or array reconstruction after the loss of system power

  Auto-resume uses non-volatile RAM (NVRAM) to save the rebuild progress during a host reboot or power failure to automatically resume from the last checkpoint. Auto-resume ensures that data integrity is maintained throughout the process. The card supports a number of features that can be implemented without rebooting the server. Applications, such as email and web server, benefit from avoiding downtime during the transition.

- Online Capacity Expansion

  Online Capacity Expansion (OCE) allows the capacity of a virtual disk to be expanded by adding new physical disks or making use of unused space on existing disks, without requiring a reboot.

- Online RAID Level Migration

  Online RAID Level Migration (RLM), which is also known as logical drive migration, can migrate a virtual disk from any RAID level to any other RAID level without requiring a reboot. System availability and application functionality remain unaffected.

- Fast initialization for quick array setup

  Fast initialization quickly writes zeros to the first and last sectors of the virtual drive. This feature allows you to immediately start writing data to the virtual drive while the initialization is running in the background.

- Consistency check for background data integrity

  Consistency check verifies that all stripes in a virtual disk with a redundant RAID level are consistent. The consistency check mirrors data when an inconsistent stripe is detected for RAID 1 and re-creates the parity from the peer disks for RAID 5 or RAID 6. Consistency checks can be scheduled to take place periodically.

- Extensive online configuration options and advanced monitoring and event notification

  Management tools provide convenience for the configuration of logical volumes and alerting when errors have occurred or are about to occur.

- Patrol read for media scanning and repairing

  Patrol read is a background sentry service that pro-actively discovers and corrects media defects (bad sectors) that arise normally as a disk drive ages. The service issues a series of verify commands, and if a bad block is discovered, the card's firmware uses RAID algorithms to re-create the missing data and remap the sector to a good sector. The task is interruptible based on controller activity and host operations. The firmware also provides an interface where the patrol read task can be initiated, set up for continuous operation, and terminated from a management application. Patrol read can be activated by a manual command or automatically.

- Global and dedicated hot spare with revertible hot spare support

  A hot spare rebuilds data from all virtual disks within the disk group in which it is configured. You can define a physical disk as a hot spare to replace a failed drive. Hot spares can be configured as either global or dedicated. A global hot spare allows any physical drive to be designated as a hot spare. A dedicated hot spare allows the user to assign a hot spare drive to a particular array of the same drive type.

- Drive roaming

  Drive roaming occurs when the physical disks are changed to different ports on the same controller. When the drives are placed on different channels, the controller detects the RAID configuration from the configuration data on the drives.

- MegaRAID SafeStore support for self-encrypting drive (SED) services

  MegaRAID SafeStore encryption services offer instant secure erase and local key management for self-encrypting drives. This technology represents a step forward in securing data on a disk drive from any unauthorized access or modification resulting from theft, loss, or repurposing of drives. Instant secure erase permanently removes data when repurposing or decommissioning SEDs. SafeStore local key management provides the necessary management and protection of SEDs by using a simple pass phrase, security key identifier, and security key file that can be set and applied to all SEDs that are assigned to a RAID adapter. This feature removes the complexity of managing each SED's unique encryption key, and it essentially relieves the administrator of most of the daily tasks of securing data.

- Hardware Secure Boot

  The on-board controller incorporates advanced security through hardware secure boot. The hardware secure boot feature permits only authenticated firmware to execute on the adapter. The controller's Internal Boot ROM establishes an initial Root of Trust (RoT). Hardware secure boot authenticates and builds a Chain of Trust (CoT) with succeeding firmware images using the RoT meaning only authorized firmware is executed on the adapter. Lenovo provides the signed firmware images making the use of hardware secure boot transparent to customers, while providing confidence in the security of the solution.

- XClarity Provisioning Manager for pre-boot array configuration and management

  Provisioning Manager is the ThinkSystem UEFI-based application that includes a RAID setup wizard to help you configure drive groups and virtual disks before installing or booting the operating system.

- XClarity Controller web interface for remote storage management

  XClarity Controller (XCC) is the systems management processor integrated in all ThinkSystem servers. The XCC web interface allows you to perform storage inventory, create and edit virtual disks, view events, import a new controller configuration, and perform firmware updates on the adapter.

Note: MegaRAID CacheCade and MegaRAID Storage Manager are not supported.

Server support

The following tables list the ThinkSystem servers that are compatible.

Table 3. Server support (Part 1 of 3)

Part Number	Description	Edge					1S Intel V2			AMD V3					Intel V3					
		SE350 (7Z46 / 7D1X)	SE350 V2 (7DA9)	SE360 V2 (7DAM)	SE450 (7D8T)	SE455 V3 (7DBY)	ST50 V2 (7D8K / 7D8J)	ST250 V2 (7D8G / 7D8F)	SR250 V2 (7D7R / 7D7Q)	SR635 V3 (7D9H / 7D9G)	SR655 V3 (7D9F / 7D9E)	SR645 V3 (7D9D / 7D9C)	SR665 V3 (7D9B / 7D9A)	SR675 V3 (7D9Q / 7D9R)	ST650 V3 (7D7B / 7D7A)	SR630 V3 (7D72 / 7D73)	SR650 V3 (7D75 / 7D76)	SR850 V3 (7D97 / 7D96)	SR860 V3 (7D94 / 7D93)	SR950 V3 (7DC5 / 7DC4)
4Y37A78836	ThinkSystem RAID 940-8e 4GB Flash PCIe Gen4 12Gb Adapter	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N

Table 4. Server support (Part 2 of 3)

Part Number	Description	Dense V3				2S Intel V2				AMD V1					Dense V2				4S V2		8S
		SD665 V3 (7D9P)	SD665-N V3 (7DAZ)	SD650 V3 (7D7M)	SD650-I V3 (7D7L)	ST650 V2 (7Z75 / 7Z74)	SR630 V2 (7Z70 / 7Z71)	SR650 V2 (7Z72 / 7Z73)	SR670 V2 (7Z22 / 7Z23)	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)
4Y37A78836	ThinkSystem RAID 940-8e 4GB Flash PCIe Gen4 12Gb Adapter	N	N	N	N	Y	Y	Y	Y	Y	Y	N	Y	Y	N	N	N	N	Y	Y	Y

Table 5. Server support (Part 3 of 3)

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)
4Y37A78836	ThinkSystem RAID 940-8e 4GB Flash PCIe Gen4 12Gb Adapter	Y	Y	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N

External drive enclosures

The 940-8e adapter supports connectivity to the external drive enclosures that are listed in the following table.

> **Tip**: Enclosure quantities are based on the adapter supporting a maximum of 240 drives.

Table 6. External drive enclosures

Description	Part number	Maximum supported per 940-8e
Lenovo Storage D1212 LFF Chassis, Dual ESM	4587A1x	8
Lenovo Storage D1224 SFF Chassis, Dual ESM	4587A3x	8

> **D3284 support**: Support for the D3284 enclosure is planned for February 2023.

For details about the support, see the Lenovo Storage Interoperation Center (LSIC): https://datacentersupport.lenovo.com/us/en/lsic/result?hostHba=ThinkSystem%20RAID%20940-8e%204GB%20Flash%20PCIe%20Gen4%2012Gb

For details about direct-attach storage enclosures, see the following Lenovo Press web page: https://lenovopress.com/storage/sas

Operating system support

The following table lists the supported operating systems.

> **Tip**: This table is automatically generated based on data from Lenovo ServerProven.

Table 7. Operating system support for ThinkSystem RAID 940-8e 4GB Flash PCIe Gen4 12Gb Adapter, 4Y37A78836 (Part 1 of 3)

Operating systems	SR630 V3	SR635 V3	SR645 V3	SR650 V3	SR655 V3	SR665 V3	SR675 V3	SR850 V3	SR860 V3	ST650 V3	SR630 V2	SR650 V2	SR670 V2	SR850 V2	SR860 V2	ST650 V2	SR635	SR645	SR655	SR665
Microsoft Windows 10	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y [3]	N
Microsoft Windows 11	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N
Microsoft Windows Server 2019	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2022	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y [2]	Y [2]	Y [2]	Y [2]
Red Hat Enterprise Linux 7.8	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y [2]	Y [2]	Y [2]	Y [2]
Red Hat Enterprise Linux 7.9	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y [2]	Y [2]	Y [2]	Y [2]
Red Hat Enterprise Linux 8.3	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.4	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.5	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.6	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.7	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Operating systems	SR630 V3	SR635 V3	SR645 V3	SR650 V3	SR655 V3	SR665 V3	SR675 V3	SR850 V3	SR860 V3	ST650 V3	SR630 V2	SR650 V2	SR670 V2	SR850 V2	SR860 V2	ST650 V2	SR635	SR645	SR655	SR665
Red Hat Enterprise Linux 8.8	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.9	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	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	N	N	N	N	N	N	N
SUSE Linux Enterprise Server 12 SP3 with Xen	N	N	N	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	N	N	N	N	N	N	Y [2]	N	Y [2]	N
SUSE Linux Enterprise Server 12 SP4 with Xen	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y [2]	N	Y [2]	N
SUSE Linux Enterprise Server 12 SP5	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP5 with Xen	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP1	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y [2]	Y [2]	Y [2]	Y [2]
SUSE Linux Enterprise Server 15 SP1 with Xen	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y [2]	Y [2]	Y [2]	Y [2]
SUSE Linux Enterprise Server 15 SP2	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP2 with Xen	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3 with Xen	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP4 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP5 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Ubuntu 18.04.5 LTS	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	N	N	N	N
Ubuntu 20.04 LTS	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N	N
Ubuntu 20.04.5 LTS	N	Y	Y	N	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N
Ubuntu 22.04 LTS	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7 U3	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U2	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0	Y	Y	Y	Y	Y	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Operating systems	SR630 V3	SR635 V3	SR645 V3	SR650 V3	SR655 V3	SR665 V3	SR675 V3	SR850 V3	SR860 V3	ST650 V3	SR630 V2	SR650 V2	SR670 V2	SR850 V2	SR860 V2	ST650 V2	SR635	SR645	SR655	SR665
VMware vSphere Hypervisor (ESXi) 8.0 U1	Y [1]	Y	Y	Y [1]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0 U2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

[1] For limitation, please refer Support Tip 104278

[2] The OS is not supported with EPYC 7003 processors.

[3] ISG will not sell/preload this OS, but compatibility and cert only.

Table 8. Operating system support for ThinkSystem RAID 940-8e 4GB Flash PCIe Gen4 12Gb Adapter, 4Y37A78836 (Part 2 of 3)

Operating systems	SR530 (Xeon Gen 2)	SR550 (Xeon Gen 2)	SR570 (Xeon Gen 2)	SR590 (Xeon Gen 2)	SR630 (Xeon Gen 2)	SR650 (Xeon Gen 2)	SR850 (Xeon Gen 2)	SR850P (Xeon Gen 2)	SR860 (Xeon Gen 2)	SR950 (Xeon Gen 2)	ST550 (Xeon Gen 2)
Microsoft Windows 10	N	N	N	N	N	N	N	N	N	N	N
Microsoft Windows 11	N	N	N	N	N	N	N	N	N	N	N
Microsoft Windows Server 2019	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2022	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.7	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.8	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.9	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.6	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.7	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.8	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.9	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP3	N	N	N	N	N	N	N	Y	N	N	N
SUSE Linux Enterprise Server 12 SP3 with Xen	N	N	N	N	N	N	N	Y	N	N	N
SUSE Linux Enterprise Server 12 SP4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP4 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Operating systems	SR530 (Xeon Gen 2)	SR550 (Xeon Gen 2)	SR570 (Xeon Gen 2)	SR590 (Xeon Gen 2)	SR630 (Xeon Gen 2)	SR650 (Xeon Gen 2)	SR850 (Xeon Gen 2)	SR850P (Xeon Gen 2)	SR860 (Xeon Gen 2)	SR950 (Xeon Gen 2)	ST550 (Xeon Gen 2)
SUSE Linux Enterprise Server 12 SP5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP5 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP1 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP2 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP4 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP5 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Ubuntu 18.04.5 LTS	N	N	N	N	N	N	N	N	N	N	N
Ubuntu 20.04 LTS	N	N	N	N	N	N	N	N	N	N	N
Ubuntu 20.04.5 LTS	N	N	N	N	N	N	N	N	N	N	N
Ubuntu 22.04 LTS	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7 U3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0 U1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0 U2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Table 9. Operating system support for ThinkSystem RAID 940-8e 4GB Flash PCIe Gen4 12Gb Adapter, 4Y37A78836 (Part 3 of 3)

Operating systems	SR530 (Xeon Gen 1)	SR550 (Xeon Gen 1)	SR570 (Xeon Gen 1)	SR590 (Xeon Gen 1)	SR630 (Xeon Gen 1)	SR650 (Xeon Gen 1)	SR850 (Xeon Gen 1)	SR860 (Xeon Gen 1)	SR950 (Xeon Gen 1)	ST550 (Xeon Gen 1)
Microsoft Windows 10	N	N	N	N	N	N	N	N	N	N
Microsoft Windows 11	N	N	N	N	N	N	N	N	N	N
Microsoft Windows Server 2019	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2022	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.7	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Operating systems	SR530 (Xeon Gen 1)	SR550 (Xeon Gen 1)	SR570 (Xeon Gen 1)	SR590 (Xeon Gen 1)	SR630 (Xeon Gen 1)	SR650 (Xeon Gen 1)	SR850 (Xeon Gen 1)	SR860 (Xeon Gen 1)	SR950 (Xeon Gen 1)	ST550 (Xeon Gen 1)
Red Hat Enterprise Linux 7.8	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.9	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.6	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.7	Y	Y	Y	Y	Y	Y	Y	Y	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	N	N	N	N	N
Red Hat Enterprise Linux 9.0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.1	Y	Y	Y	Y	Y	Y	Y	Y	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	N	N	N	N	N
SUSE Linux Enterprise Server 12 SP3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP3 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP4 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP5 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP1 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP2 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP4 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP5 with Xen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Ubuntu 18.04.5 LTS	N	N	N	N	N	N	N	N	N	N
Ubuntu 20.04 LTS	N	N	N	N	N	N	N	N	N	N
Ubuntu 20.04.5 LTS	N	N	N	N	N	N	N	N	N	N
Ubuntu 22.04 LTS	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.7 U3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Operating systems	SR530 (Xeon Gen 1)	SR550 (Xeon Gen 1)	SR570 (Xeon Gen 1)	SR590 (Xeon Gen 1)	SR630 (Xeon Gen 1)	SR650 (Xeon Gen 1)	SR850 (Xeon Gen 1)	SR860 (Xeon Gen 1)	SR950 (Xeon Gen 1)	ST550 (Xeon Gen 1)
VMware vSphere Hypervisor (ESXi) 7.0 U3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0 U1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0 U2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Warranty

The 940-8e adapter carries a 1-year limited warranty. When installed in a supported ThinkSystem server, the adapter assumes the server's base warranty and any warranty upgrades.

Operating environment

The 940-8e adapter is supported in the following environment:

- Operating:
    - Temperature: 0°C to 55°C (32°F to 131°F)
    - Relative humidity: 5% to 90% (non-condensing)
- Storage
    - Temperature with package: -45°C to 105°C (-49°F to 221°F)
    - Relative humidity: 5% to 95% (non-condensing)

Agency approvals

The 940-8e adapter has the following agency approvals:

- USA: FCC 47 CFR part 15 Subpart B, class B
- Canada: ICES -003, Class B
- Taiwan: CNS 13438
- Japan: VCCI V-3
- Australia/New Zealand: AS/NZS CISPR 22
- Korea: RRA no 2013-24 & 25
- Europe: EN55022/EN55024
- Safety: EN/IEC/UL60950
- RoHS
- WEEE

Related publications and links

For more information, see the following documents:

- Lenovo ThinkSystem RAID Adapter and HBA Reference
  https://lenovopress.com/lp1288-lenovo-thinksystem-raid-adapter-and-hba-reference
- 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

Related product families

Product families related to this document are the following:

- RAID Adapters

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