ThinkSystem RAID 5450-16i PCIe Gen4 24Gb Adapter
Product Guide

The ThinkSystem RAID 5450-16i PCIe Gen4 24Gb Adapter is an entry-level 24Gb SAS/SATA internal RAID adapter that offers a RAID solution for small to medium business customers. It integrates the latest SAS technology and offer 16 lanes of 24 Gbps SAS (SAS4) with a PCIe 4.0 host interface. This cacheless adapter supports RAID levels 0/1/10/5, and include support for Lenovo management tools.

The following figure shows the ThinkSystem RAID 5450-16i PCIe Gen4 24Gb Adapter.

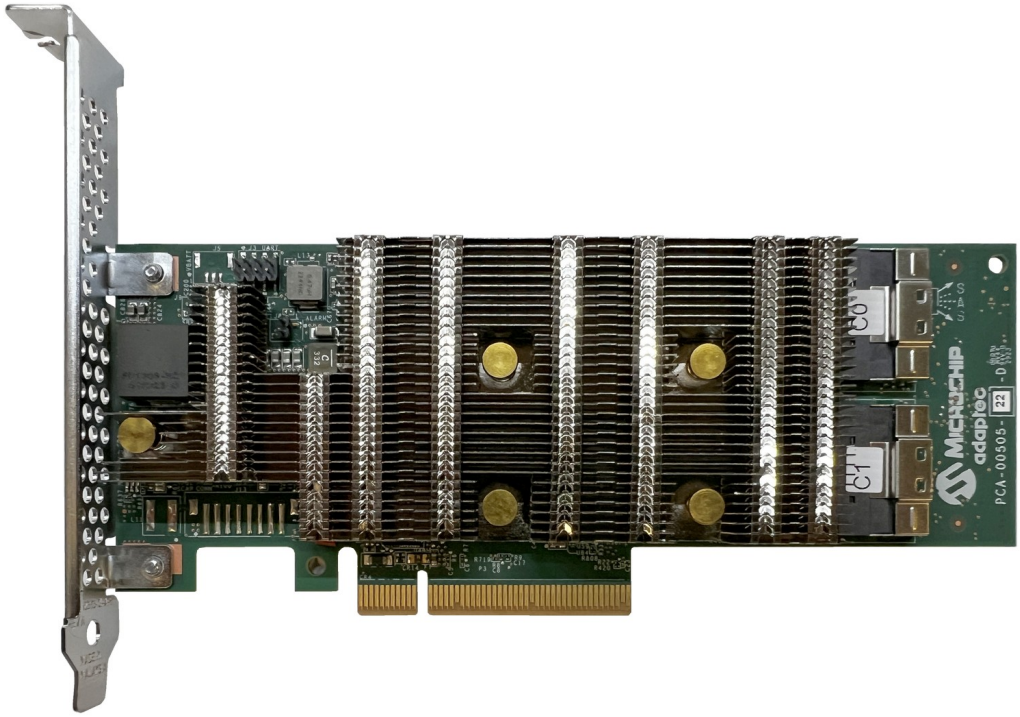

Figure 1. ThinkSystem RAID 5450-16i PCIe Gen4 24Gb Adapter

Did you know?

The ThinkSystem RAID 5450-16i PCIe Gen4 24Gb Adapter combines uncompromised HBA functionality with basic RAID support in hardware using the Microchip SmartIOC 2200 controller. The adapter provides high levels of storage performance and scalability. The 5450-16i can achieve up to 3.4M IOPS (random read using 4KB blocks).

Rigorous testing of the ThinkSystem RAID adapters by Lenovo through the ServerProven program ensures a high degree of confidence in storage subsystem compatibility and reliability. Providing an additional peace of mind, the controller is covered under Lenovo warranty.

Part number information

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

Table 1. Ordering information

Part number	Feature code	Description	Adaptec model
4Y37A97936	C6UJ	ThinkSystem RAID 5450-16i PCIe Gen4 24Gb Adapter	SmartHBA 2200-16i

The part number includes:

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

Technical specifications

The ThinkSystem RAID 5450-16i PCIe Gen4 24Gb Adapter has the following specifications:

- 24 Gbps SAS/SATA RAID controller, based on the Adaptec SmartHBA 2200-16i
- PCIe 4.0 x8 host interface
- PCI low-profile, half-length form factor
- Supports connectivity to SAS or SATA drives (no support for NVMe drives)
- 16 internal 12 Gbps SAS/SATA ports:
  - Supporting connectivity to 16 internal drives natively
  - Supports up to 238 SAS/SATA drives via a SAS expander
- Up to 24 Gbps throughput per port
  - Supports 24, 12, 6, or 3 Gbps SAS speeds
  - Supports 6 or 3 Gbps SATA speeds
  - Support for intermixing of drive speeds
- Two internal Slimline x8 connectors (SFF-8654)
- Cacheless (not upgradeable)
- 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 RAID 0, 1, 10, and 5
- Support for JBOD (non-RAID, known as “raw” or “HBA mode” in Adaptec parlance) drive state
- Support for up to 64 arrays and 64 logical drives (virtual drives)
- Support for logical drive sizes greater than 2 TB.
- Configurable stripe size from 16 KB up to 1 MB
- Hot spares (dedicated, autoreplace)
- Automatic/manual rebuild of hot spares
- Supports 512e, 512n and 4K sector formatted drives
- S.M.A.R.T. support
- High performance adapter:
  - 3.5M IOPS (random reads, 4KB blocks)
  - 15.2 GB/s bandwidth

The following table lists the specifications of the adapter.

Table 2. Specifications

Feature	RAID 5450-16i
Form factors	PCIe low profile
Controller chip	SmartHBA 2200-16i
Adaptec equivalent	Adaptec SmartHBA 2200-16i
Host interface	PCIe 4.0 x8
Port interface	24 Gb SAS
Number of ports	16
Port connectors	2x Slimline x8 (SFF-8654)
Drive interface	SAS, SATA
Drive type	HDD, SSD
Hot-swap drives	Yes
Max devices	16 (238 with expander)
RAID levels	0, 1, 10, 5
JBOD mode (HBA mode / Raw)	Yes
Cache	None
SED support	Yes

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

Features

Entry-Level RAID Functionality

The Adaptec SmartHBA 2200-16i adapter offers RAID capabilities, supporting RAID levels 0, 1, 5, and 10. This versatility allows users to configure their storage arrays for optimal performance and data protection. RAID 5, in particular, provides a balance of high data availability and efficient storage utilization by distributing parity information across all drives in the array. This ensures that data can be recovered in the event of a single drive failure, enhancing the reliability of the storage system. Additionally, the adapter includes advanced management tools for easy configuration and monitoring of RAID arrays, making it a robust solution for enterprise environments that require both high-speed data access and robust data protection.

High-Speed Connectivity

Equipped with a PCIe Gen 4 interface, the 5450-16i provides high-speed connectivity with up to 24 Gbps for SAS-4 devices. This ensures rapid data transfer rates and low latency, making it ideal for data-intensive tasks and high-performance computing environments. The adapter's advanced architecture supports the latest storage technologies, delivering exceptional throughput and efficiency.

Advanced Security Features

Security is a top priority for the 5450-16i, which includes features like secure boot, secure updates, and attestation. These security measures help protect the system from unauthorized access and ensure the integrity of the firmware and software. By incorporating robust security protocols, the 5450-16i provides peace of mind for users who need to safeguard sensitive data and maintain compliance with industry standards.

The 5450-16i also offers robust support for Self-Encrypting Drives (SEDs), accommodating SAS and SATA SEDs. The adapter can manage SEDs by providing the necessary credentials to unlock them, ensuring data security. It supports the use of SEDs as boot drives or MaxCache logical drives, offering flexibility in deployment. Additionally, the adapter has the capability to revert secured SEDs to their original factory state, which effectively erases all data on the drives, ensuring that sensitive information is not recoverable. This comprehensive SED support enhances data protection and security for various storage applications.

Dynamic Power Management

The 5450-16i features dynamic power management, which can save up to 30% power compared to traditional adapters. This energy-efficient design not only reduces operational costs but also minimizes the environmental impact of data centers. By intelligently managing power consumption, the 5450-16i helps maintain optimal performance while conserving energy.

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
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 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)	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)
4Y37A97936	ThinkSystem RAID 5450-16i PCIe Gen4 24Gb Adapter	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	N	N	N	N	N	N	N

Table 5. Server support (Part 2 of 4)

Part Number	Description	GPU Rich					Edge					Super Computing							1S Intel V2		
		SR670 V2 (7Z22 / 7Z23)	SR675 V3 (7D9Q / 7D9R)	SR680a V3 (7DHE)	SR685a V3 (7DHC)	SR780a V3 (7DJ5)	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)	ST50 V2 (7D8K / 7D8J)	ST250 V2 (7D8G / 7D8F)	SR250 V2 (7D7R / 7D7Q)
4Y37A97936	ThinkSystem RAID 5450-16i PCIe Gen4 24Gb Adapter	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Table 6. Server support (Part 3 of 4)

Part Number	Description	2S Intel V2			AMD V1					Dense V2				4S V2		8S	4S V1		
		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)	SR850 (7X18 / 7X19)	SR850P (7D2F / 2D2G)	SR860 (7X69 / 7X70)
4Y37A97936	ThinkSystem RAID 5450-16i PCIe Gen4 24Gb Adapter	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Table 7. Server support (Part 4 of 4)

Part Number	Description	1S Intel V1				2S Intel V1								Dense V1			
		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)
4Y37A97936	ThinkSystem RAID 5450-16i PCIe Gen4 24Gb Adapter	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Warranty

The 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.

Physical specification

The 5450-16i has the following dimensions:

- Height: 69 mm (2.7 inches)
- Length: 167 mm (6.6 inches)
- Weight: 178g

Operating environment

The 5450-16i is 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 5450-16i has 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:

- Adaptec product page and user guides:
  https://storage.microsemi.com/en-us/support/sas/sas/aha-2200-16i/
- Lenovo ThinkSystem product publications:
  http://pubs.lenovo.com
- ServerProven hardware compatibility:
  https://serverproven.lenovo.com/
- 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

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