ThinkSystem 4450-16i SAS/SATA PCIe Gen4 24Gb HBA

Product Guide

The ThinkSystem 4450-16i SAS/SATA PCIe Gen4 24Gb HBA is a high performance 24Gb SAS host bus adapter for internal storage connectivity in ThinkSystem servers. It integrates the latest SAS technology and offer 16 lanes of 24 Gbps SAS (SAS4) with a PCIe 4.0 host interface. The adapter has a low-profile PCIe form-factor design with two Slimline x8 (SFF-8654) connectors.

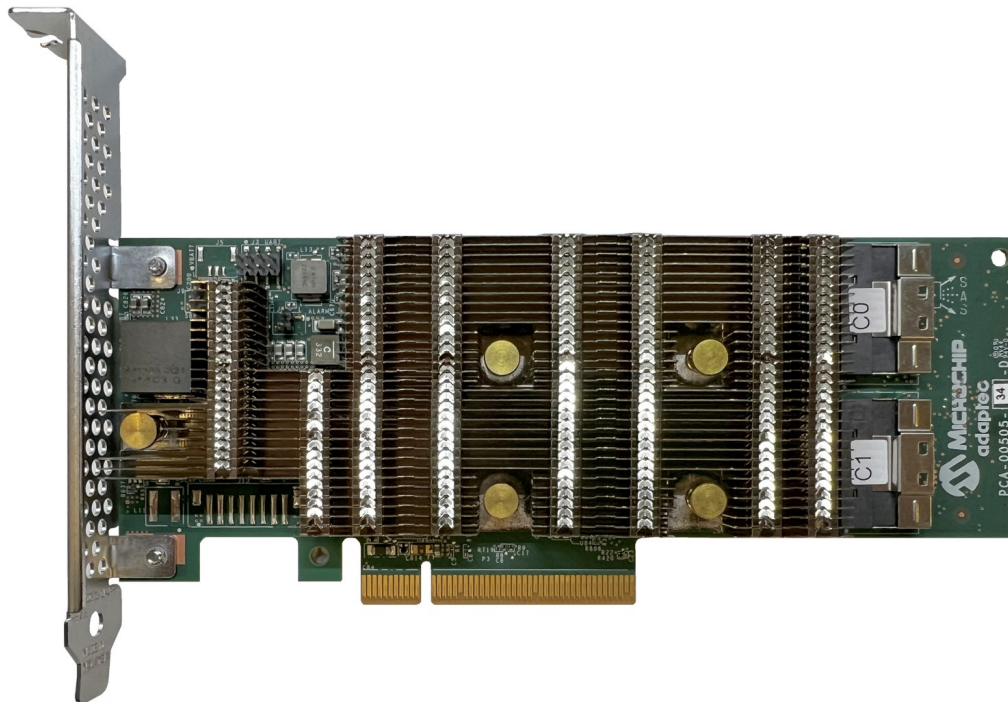The following figure shows the ThinkSystem 4450-16i SAS/SATA PCIe Gen4 24Gb HBA.

Figure 1. ThinkSystem 4450-16i SAS/SATA PCIe Gen4 24Gb HBA

Did you know?

When combined with 24Gb SAS drives and drive backplanes, the ThinkSystem 4450-16i SAS/SATA PCIe Gen4 24Gb HBA provides an end-to-end 24Gb SAS storage solution to maximize internal storage performance.

Rigorous testing of the ThinkSystem HBAs 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 adapters.

Table 1. Part numbers and feature codes

Part number	Feature code	Description	Adaptec model
4Y37A97938	C6UL	ThinkSystem 4450-16i SAS/SATA PCIe Gen4 24Gb HBA	HBA 1200-16i

The part number includes:

- Host Bus Adapter with 3U full-height bracket attached
- 2U low-profile bracket

Technical specifications

The 4450-16i has the following features and specifications:

- 24 Gbps SAS/SATA host bus adapter, based on the Adaptec HBA 1200-16i
- 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 24 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)
- Non-RAID (JBOD mode, known as "raw" or "HBA mode" in Adaptec parlance) support for SAS and SATA HDDs and SSDs (RAID not supported)
- Optimized for SSD performance
- High performance architecture with a queue depth of up to 1014
- Advanced power management support
- Supports 512e, 512n and 4K sector formatted drives
- TLR
- SATA Native Command Queuing (NCQ)
- S.M.A.R.T. support
- Secure Boot and Root of Trust

The specifications of the adapters are listed in the following table.

Table 2. Specifications

Feature	4450-16i
Form factor	PCIe low profile
Controller chip	Adaptec SmartIOC 2200
Adaptec equivalent	Adaptec HBA 1200-16i
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
Maximum devices	16 (238 with expander)
RAID levels	No RAID
JBOD mode (HBA mode / Raw)	Yes
Cache	No
SED support (pass-through)	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

High-Speed Connectivity

Equipped with a PCIe Gen 4 interface, the 4450-16i 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 4450-16i, 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 4450-16i provides peace of mind for users who need to safeguard sensitive data and maintain compliance with industry standards.

The 4450-16i 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 4450-16i 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 4450-16i 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)
4Y37A97938	ThinkSystem 4450-16i SAS/SATA PCIe Gen4 24Gb HBA	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)
4Y37A97938	ThinkSystem 4450-16i SAS/SATA PCIe Gen4 24Gb HBA	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)
4Y37A97938	ThinkSystem 4450-16i SAS/SATA PCIe Gen4 24Gb HBA	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)

		1S Intel V1				2S Intel V1								Dense 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)
4Y37A97938	ThinkSystem 4450-16i SAS/SATA PCIe Gen4 24Gb HBA	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Warranty

The adapters carry a 1-year limited warranty. When installed in a supported ThinkSystem server, the adapters assume the server's base warranty and any warranty service upgrade.

Physical specification

The 4450-16i has the following dimensions:

- Height: 69 mm (2.7 inches)
- Length: 167 mm (6.6 inches)
- Weight: 180g

Operating environment

The adapters are supported in the following environment:

- Operating:
  - Temperature: 0°C to 55°C (32°F to 131°F)
  - Relative humidity: 10% to 90% (non-condensing)
  - Altitude: Up to 3,000 meters

Agency approvals

The 4450-16i 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-1200-16i/
- 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:

- Host Bus Adapters

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