

## ThinkServer RAID 520i Adapter Product Guide (withdrawn product)

The ThinkServer RAID 520i Adapter is an entry-level 12 Gb SAS/SATA I/O Controller (IOC) that offers a cost-effective internal RAID solution for small to medium business customers. The adapter supports RAID levels 0, 1 and 10 standard with an option to support cacheless RAID 5 and 50 with the addition of a hardware key.

The following figure shows the ThinkServer RAID 520i Adapter.

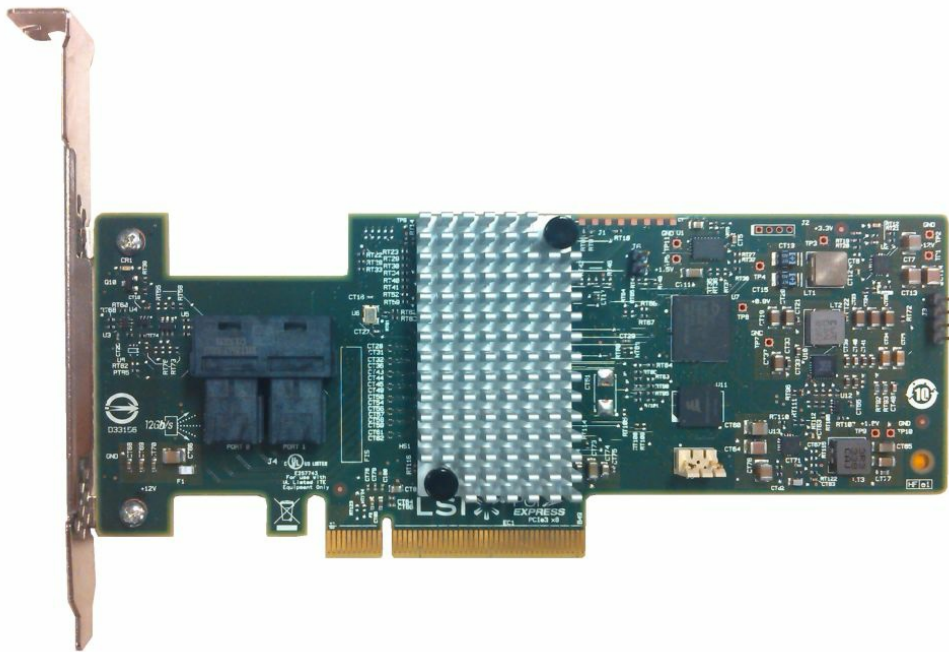


Figure 1. ThinkServer RAID 520i Adapter

### Did you know?

Along with an extensive list of enterprise RAID capabilities, the RAID 520i adapter offers advanced drive diagnostic technologies. In the event of a physical drive failure, the drive is placed in a shielded state and the controller starts drive diagnostics to determine if the drive is indeed failed or can be restored. This saves time, money and server downtime associated with transient drive failures and unnecessary drive replacement.

## Part number information

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

Table 1. Option part numbers

Part number	Description
Adapters	
4XC0G88840*	Lenovo ThinkServer RAID 520i PCIe Adapter
4XC0G88850*	Lenovo ThinkServer RAID 520i PCIe Adapter
Adapter upgrades	
4XC0G88841	Lenovo ThinkServer RAID 520i RAID 5 Upgrade

\* These two RAID 520i option part numbers contain different sets of cables needed for supported servers. See the [Server support](#) section to see where each adapter is supported.

The following figure shows the RAID 5 upgrade hardware key. The key is attached to the adapter to enable RAID 5 and RAID 50.

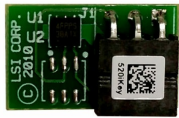


Figure 2. Lenovo ThinkServer RAID 520i RAID 5 Upgrade

## Technical specifications

The ThinkServer RAID 520i adapter has the following specifications:

- LSI SAS3008 12 Gbps I/O controller.
- PCIe low profile adapter, based on the LSI 9340-8i adapter
- 8 internal SAS/SATA ports (supporting 12, 6, or 3 Gbps SAS speeds and 6 or 3 Gbps SATA speeds)
- Two internal x4 HD Mini-SAS connectors (SFF-8643)
- PCI Express 3.0 x8 host interface.
- Support for SAS and SATA HDDs and SSDs.
- 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.
- Operates in integrated MegaRAID (iMR) mode
- Support for RAID 0, 1, 10 standard; optional support for cacheless RAID 5 and 50 with the addition of a hardware key.
- Supports JBOD mode
- 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.
- Stripe size: 64 KB fixed
- Supports 512e and 4K sector formatted drives
- Supports T-10 Protection Information (PI) data protection
- Compliant with Disk Data Format (DDF) configuration on disk (CoD).
- S.M.A.R.T. support.

- LSI MegaRAID management suite: MegaRAID Storage Manager, StorCLI command-line interface, and HII UEFI Human Interface Infrastructure

The following table lists the specs of the RAID 520i adapter.

Table 2. Specifications

Feature	RAID 520i
Part number	4XC0G88850
Form factor	PCIe Low profile
Controller chip	LSI SAS3008
Host interface	PCIe 3.0 x8
Port interface	12 Gbps SAS
Drive interface	SAS, SATA
Includes SAS expander	No
Drive type	HDD, SSD
Number of drives	8
RAID levels	RAID 0, 1, 10; Optional 5, 50 (4XC0G88841)
JBOD mode	Yes
Cache	None
FastPath	No
CacheCade 2.0	No
Internal tape drive support	Yes
M.2 support	No

## Standard software features

The ThinkServer RAID 520i adapter has the following standard features:

- 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. 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.

- Human Interface Infrastructure (HII) configuration utility for pre-boot array configuration and management

HII is a UEFI utility that is built into the RAID adapters that allows you to configure drive groups and logical drives before installing or booting the operating system.

- MegaRAID Storage Manager management software

MegaRAID Storage Manager is an easy-to-use advanced RAID management application. It allows you to configure, monitor, and maintain drive groups, virtual drives, and advanced features with an intuitive GUI, reducing administrative efforts and simplifying troubleshooting.

- Simple migration to enterprise MegaRAID

Volumes created using the RAID 520i adapter can be easily migrated to other MegaRAID adapters such as the ThinkServer RAID 720i family of high-performance RAID adapters.

**Note:** RAID 10 and 50 drive groups do not support Online Capacity Expansion and Online RAID Level Migration. RAID 0, 1, and 5 drive groups do not support Online Capacity Expansion and Online RAID Level Migration if two or more virtual drives are defined on a single drive group.

## Server support

The following tables list the ThinkServer systems that are compatible.

### Support for ThinkServer Gen 5 servers with E5 v4 or E3 v5 processors

Table 3. Support for ThinkServer Generation 5 servers with E5 v4 or E3 v5 processors

Part number	Description	TS150 (E3 v5)	TS450 (E3 v5)	TS460 (E3 v5)	RS160 (E3 v5)	TD350 (E5 v4)	RD350 (E5 v4)	RD450 (E5 v4)	RD550 (E5 v4)	RD650 (E5 v4)
4XC0G88840	RAID 520i PCIe Adapter	Y	Y	Y	Y	N	N	N	N	N
4XC0G88850	RAID 520i PCIe Adapter	N	N	N	N	Y	Y	Y	Y	Y
4XC0G88841	RAID 520i RAID 5 Upgrade	Y	Y	Y	Y	Y	Y	Y	Y	Y

### Support for ThinkServer Gen 5 servers with E5 v3 processors

Table 4. Support for ThinkServer Generation 5 servers with E5 v3 processors

Part number	Description	TD350 (E5 v3)	RD350 (E5 v3)	RD450 (E5 v3)	RD550 (E5 v3)	RD650 (E5 v3)	RQ750 (E5 v3)
4XC0G88840	RAID 520i PCIe Adapter	N	N	N	N	N	N
4XC0G88850	RAID 520i PCIe Adapter	Y	Y	Y	Y	Y	N
4XC0G88841	RAID 520i RAID 5 Upgrade	Y	Y	Y	Y	Y	N

### Support for ThinkServer Gen 4 servers

Table 5. Support for ThinkServer Generation 4 servers

Part number	Description	TS140 (E3 v3)	TS440 (E3 v3)	RS140 (E5 v2)	TD340 (E5 v2)	RD340 (E5 v2)	RD440 (E5 v2)	RD540 (E5 v2)	RD640 (E5 v2)
4XC0G88840	RAID 520i PCIe Adapter	N	N	N	N	N	N	N	N
4XC0G88850	RAID 520i PCIe Adapter	N	N	N	N	N	N	N	N
4XC0G88841	RAID 520i RAID 5 Upgrade	N	N	N	N	N	N	N	N

## Operating system support

The adapters support the following operating systems:

- Citrix XenServer 7.0
- Microsoft Windows 10 (x86 & x86\_64)
- Microsoft Windows 8 (x86 & x86\_64)
- Microsoft Windows 8.1 (x86 & x86\_64)
- Microsoft Windows Server 2016 (x86\_64)
- Microsoft Windows Server Version 1709
- Microsoft Windows Server Version 1803
- Red Hat Enterprise Linux 6.10 (x86 & x86\_64)
- Red Hat Enterprise Linux 6.8 (x86 & x86\_64)
- Red Hat Enterprise Linux 6.9 (x86 & x86\_64)
- Red Hat Enterprise Linux 7.3 (x86\_64)
- Red Hat Enterprise Linux 7.4 (x86\_64)
- Red Hat Enterprise Linux 7.5 (x86\_64)
- SUSE Linux Enterprise Server 12.2 (x86\_64)
- SUSE Linux Enterprise Server 12.3 (x86\_64)
- SUSE Linux Enterprise Server 15 (x86\_64)
- VMware ESXi 6.0 U3
- VMware ESXi 6.5
- VMware ESXi 6.5 U1
- VMware ESXi 6.5 U2
- VMware ESXi 6.5 U3
- VMware ESXi 6.7
- VMware ESXi 6.7 U1

## Warranty

The ThinkServer RAID 520i adapter carries a 1-year limited warranty. When installed in a supported ThinkServer system, the adapter assumes the system's base warranty and any warranty upgrades.

## Operating environment

The ThinkServer RAID 520i adapter is supported in the following environment:

- Temperature operating: 0°C to 70°C (32°F to 158°F)
- Storage temperature with package: -45°C to 105°C (-49°F to 221°F)
- Relative humidity: 5% to 90% (non-condensing)

## Agency approvals

The ThinkServer RAID 520i adapter has the following agency approvals:

- FCC Part 15 Class A
- CAN ICES-3(A)/NMB-3(A)
- EU Council Directive 2004/108/EC
- European Standard EN 55022 Class A
- European Standard EN 55024
- Korea Class A
- Japan VCCI Class A
- Taiwan Class A
- Australia/New Zealand (AS/NZS 3548)
- WEEE
- RoHS Directive 2011/65/EU

## Related publications and links

For more information, see the following documents:

- ThinkServer 12 Gb/s MegaRAID SAS Software User Guide  
[https://download.lenovo.com/pccbbs/thinkservers/megaraidsasswug\\_en\\_12gb.pdf](https://download.lenovo.com/pccbbs/thinkservers/megaraidsasswug_en_12gb.pdf)
- Lenovo Press documents related to RAID:  
<https://lenovopress.com/servers/options/raid>

## Related product families

Product families related to this document are the following:

- [RAID Adapters](#)

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