6Gb SAS Host Bus Adapter

Product Guide (withdrawn product)

The 6Gb SAS Host Bus Adapter (HBA) is an economical storage enabler to attach RAID-capable external storage enclosures and provide 3 Gbps or 6 Gbps tape storage connectivity for data archiving applications to achieve a higher level of performance.

The PCIe small form-factor 6Gb SAS HBA is based on the LSI SAS2008 controller and can handle medium to large capacity server storage applications by connecting an 8-lane PCI Express adapter with one external x4 SFF-8088 connector and four internal SATA connectors.

The 6Gb SAS Host Bus Adapter is shown in Figure 1 (with the 3U bracket removed).

Figure 1. 6Gb SAS Host Bus Adapter

Did you know?

6 Gbps SAS 2.0 technology has been introduced to address data off-load bottlenecks in the direct-access storage environment. This new throughput doubles the transfer rate of the previous generation. SAS 2.0 is designed for backward compatibility with 3 Gbps SAS as well as with 3 Gbps SATA hard drives and tape drives.

Part number information

Table 1 shows the part number to order these HBAs.

Withdrawn: This adapter is now withdrawn from marketing.

Table 1. Part number and feature code for ordering

Description	Part number	Feature code
6Gb SAS HBA	46M0907	5982

Part number 46M0907 includes the following items:

- One 6Gb SAS Host Bus Adapter with full-height (3U) bracket attached
- Low-profile (2U) bracket
- Documentation package

Features and specifications

The 6Gb SAS Host Bus Adapter has the following specifications:

- SAS Controller: LSI SAS2008
- Eight SAS/SATA ports (four external, four internal)
- Up to 6 Gbps per port data transfer rate
- Four internal SATA x1 connectors
- One external SAS x4 connector (SFF-8088)
- PCI Express x8 2.0 host interface
- MD2 small form factor
- High performance I/O Processor: PowerPC 440 @ 533 MHz
- UEFI support
- RAID levels: None (uses RAID as provided by external disk enclosures)
- Maximum endpoint devices: 512
- Power consumption: 13.5 W

The 6Gb SAS Host Bus Adapter has the following key features:

- Connection to supported internal and external tape drives
- Connection to supported external storage controllers
- Power management support
- Support for SSP, SMP, STP and SATA protocols - flexible to optimize costs
- Environmentally friendly due to low power consumption
- LSI Fusion-MPT architecture drives more than 290,000 I/Os per second
- End-to-End CRC with Advanced Error Reporting
- T-10 Protection Model for early detection of and recovery from data corruption
- Spread Spectrum Clocking for EMI reductions

Server support

The 6Gb SAS Host Bus Adapter is supported in servers as listed in the following tables.

Support for System x and dense servers with Xeon E5/E7 v4 and E3 v5 processors

Table 1. Support for System x and dense servers with Xeon E5/E7 v4 and E3 v5 processors

Part number	Description	x3250 M6 (3943)	x3250 M6 (3633)	x3550 M5 (8869)	x3650 M5 (8871)	x3850 X6/x3950 X6 (6241, E7 v4)	nx360 M5 (5465, E5-2600 v4)	sd350 (5493)
46M0907	6Gb SAS HBA	N	N	N	N	N	N	N

Support for servers with Intel Xeon v3 processors

Table 2. Support for servers with Intel Xeon v3 processors

Part number	Description	x3100 M5 (5457)	x3250 M5 (5458)	x3500 M5 (5464)	x3550 M5 (5463)	x3650 M5 (5462)	x3850 X6/x3950 X6 (6241, E7 v3)	nx360 M5 (5465)
46M0907	6Gb SAS HBA	Y	N	N	N	N	N	N

Support for servers with Intel Xeon v2 processors

Table 3. Support for servers with Intel Xeon v2 processors

Part number	Description	x3500 M4 (7383, E5-2600 v2)	x3530 M4 (7160, E5-2400 v2)	x3550 M4 (7914, E5-2600 v2)	x3630 M4 (7158, E5-2400 v2)	x3650 M4 (7915, E5-2600 v2)	x3650 M4 BD (5466)	x3650 M4 HD (5460)	x3750 M4 (8752)	x3750 M4 (8753)	x3850 X6/x3950 X6 (3837)	x3850 X6/x3950 X6 (6241, E7 v2)	dx360 M4 (E5-2600 v2)	nx360 M4 (5455)
46M0907	6Gb SAS HBA	Y	Y	Y	Y	Y	N	N	N	N	N	N	Y	N

Support for servers with Intel Xeon v1 processors

Table 4. Support for servers with Intel Xeon v1 processors

Part number	Description	x3100 M4 (2582)	x3250 M4 (2583)	x3300 M4 (7382)	x3500 M4 (7383, E5-2600)	x3530 M4 (7160, E5-2400)	x3550 M4 (7914, E5-2600)	x3630 M4 (7158, E5-2400)	x3650 M4 (7915, E5-2600)	x3690 X5 (7147)	x3750 M4 (8722)	x3850 X5 (7143)	dx360 M4 (7912, E5-2600)
46M0907	6Gb SAS HBA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

See the ServerProven Web site for the latest information about the adapters supported by each System x server type: http://www.lenovo.com/us/en/serverproven/xseries/controllers/matrix.shtml

Internal tape support

The 6Gb SAS Host Bus Adapter supports connectivity to the internal tape drives listed in the following table.

Table 5. Internal tape drives

Part number	Description
43W8478	Half High LTO Gen 3 SAS Tape Drive
44E8895	Half High LTO Gen 4 SAS Tape Drive
49Y9898	Half-High LTO Generation 5 SAS Tape Drive
00D8924	Half High LTO Ultrium Gen 6 Internal SAS Tape Drive
43W8480	DDS Gen 5 SATA Tape Drive

Internal tape drives are connected to the 6Gb SAS HBA using the internal SAS or SATA cable supplied with the tape drive.

Note: The adapter does not support internal disk drives.

External storage system support

The adapter supports connectivity to the following 6 Gbps SAS external storage systems:

Table 6. External storage systems

Part number	Description
IBM Storwize for Lenovo (mini-SAS HD interface)	
6096CU2	IBM Storwize V3500 3.5-inch Dual Control Storage Controller Unit
6096CU3	IBM Storwize V3500 2.5-inch Dual Control Storage Controller Unit
6099L2C	IBM Storwize V3700 3.5-inch Storage Controller Unit
6099S2C	IBM Storwize V3700 2.5-inch Storage Controller Unit
6099T2C	IBM Storwize V3700 2.5-inch DC Storage Controller Unit
6194L2C	IBM Storwize V5000 LFF Control Enclosure
6194S2C	IBM Storwize V5000 SFF Control Enclosure

The cables needed to connect the adapter (mini-SAS connector) to IBM Storwize units (mini-SAS HD connector) are listed in the following table.

Table 7. SAS cables for IBM Storwize connectivity

Part number	Description
SAS cables for IBM Storwize (mini-SAS HD to mini-SAS)	
00MJ162	0.6m SAS Cable (mSAS HD to mSAS)
00MJ163	1.5m SAS Cable (mSAS HD to mSAS)
00MJ166	3m SAS Cable (mSAS HD to mSAS)

For more information about IBM Storage products, see the list of Lenovo Press Product Guides listed in the following web page:
https://lenovopress.com/storage/san/ibm

For a detailed listing of supported end-to-end storage configurations, see the System Storage Interoperation Center (SSIC) website:
http://ibm.com/systems/support/storage/ssic

External tape support

The adapter can be used for connectivity to the external tape backup units listed in the following table.

Table 8. External tape backup units

Part number	Description
External tape enclosures (mini-SAS interface)	
61901UX	IBM Multimedia Backup Enclosure
Backup drives for IBM Multimedia Backup Enclosure (mini-SAS interface)	
00NV402	6190 HH LTO5 SAS Tape Drive
00NV404	6190 HH LTO6 SAS Tape Drive
Tape backup units (mini-SAS interface)	
6160S5E	IBM TS2250 Tape Drive Model H5S
6160S6E	IBM TS2260 Tape Drive Model H6S
6160S6X	IBM TS2360 Tape Drive Model S63
6171S4R	IBM TS2900 Tape Autoloader w/LT04 HH SAS Drive
6171S5R	IBM TS2900 Tape Autoloader w/LT05 HH SAS Drive
6171S6R	IBM TS2900 Tape Autoloader w/LT06 HH SAS Drive
Tape libraries	
61732UL	IBM TS3100 Tape Library Model L2U (Driveless)
61734UL	IBM TS3200 Tape Library Model L4U (Driveless)
SAS tape drive options for TS3100/TS3200 Tape Libraries (mini-SAS interface)	
00NA121	6173 LTO Ultrium 4 SAS Drive Sled
00NA105	6173 LTO Ultrium 4 Half High SAS DriveV2 Sled
00NA109	6173 LTO Ultrium 5 SAS Drive Sled
00NA111	6173 LTO Ultrium 5 Half High SAS Drive Sled
00NA117	6173 LTO Ultrium 6 Half High SAS Drive Sled

The cables needed to connect the adapter (mini-SAS connector) to external tape units (mini-SAS connector) are listed in the following table.

Table 9. SAS cables for tape drive connectivity (mini-SAS)

Part number	Description
SAS cables (mini-SAS to mini-SAS)	
39R6531	3m SAS Cable
39R6529	1m SAS Cable

For more information, see the list of Lenovo Press Product Guides in the Backup units category:
https://lenovopress.com/servers/options/backup

For a detailed listing of supported end-to-end storage configurations, see the System Storage Interoperation Center (SSIC) website:
http://ibm.com/systems/support/storage/ssic

Operating system support

The adapter supports the following operating systems:

- Microsoft Windows Server 2008 Foundation
- Microsoft Windows Server 2008 R2
- Microsoft Windows Server 2008, Datacenter x64 Edition
- Microsoft Windows Server 2008, Datacenter x86 Edition
- Microsoft Windows Server 2008, Enterprise x64 Edition
- Microsoft Windows Server 2008, Enterprise x86 Edition
- Microsoft Windows Server 2008, Standard x64 Edition
- Microsoft Windows Server 2008, Standard x86 Edition
- Microsoft Windows Server 2008, Web x64 Edition
- Microsoft Windows Server 2008, Web x86 Edition
- Microsoft Windows Server 2012
- Microsoft Windows Server 2012 R2
- Red Hat Enterprise Linux 5 Server Edition
- Red Hat Enterprise Linux 5 Server with Xen x64 Edition
- Red Hat Enterprise Linux 5 Server x64 Edition
- Red Hat Enterprise Linux 6 Server Edition
- Red Hat Enterprise Linux 6 Server x64 Edition
- SUSE LINUX Enterprise Server 10 for AMD64/EM64T
- SUSE LINUX Enterprise Server 10 for x86
- SUSE LINUX Enterprise Server 10 with Xen for AMD64/EM64T
- SUSE LINUX Enterprise Server 11 for AMD64/EM64T
- SUSE LINUX Enterprise Server 11 for x86
- SUSE LINUX Enterprise Server 11 with Xen for AMD64/EM64T
- VMware ESX 4.1
- VMware ESXi 4.1
- VMware vSphere 5.0 (ESXi)
- VMware vSphere 5.1 (ESXi)
- VMware vSphere 5.5 (ESXi)

See the ServerProven Web site for the latest information about the specific versions and service packs supported: http://www.lenovo.com/us/en/serverproven/xseries/controllers/matrix.shtml. Click the check mark that is associated with the System x server in question to see details about the operating system support.

Operating environment

The 6Gb SAS Host Bus Adapter is supported in the following environment:

Temperature:

- 10 to 35 °C (50 to 95 °F) at an altitude of 0 to 914 m (0 to 3,000 ft)
- 10 to 32 °C (50 to 90 °F) at an altitude of 0 to 2,100 m (0 to 7,000 ft)

Humidity: 20% to 80%, non-condensing

Maximum altitude: 2,100 m (7,000 ft)

Warranty

One-year limited warranty. When installed in a supported System x® server, this adapter assumes the server's base warranty and any warranty upgrade.

Related publications

For more information refer to the following documents:

- US Announcement Letter
  http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS110-013
- 6Gb SAS Host Bus Adapter Installation and User's Guide
  http://ibm.com/support/entry/portal/docdisplay?lndocid=MIGR-5084780
- System x Configuration and Options Guide:
  http://www.ibm.com/systems/xbc/cog/
- IBM System Storage Interoperation Center (SSIC)
  http://www.ibm.com/systems/support/storage/config/ssic

Related product families

Product families related to this document are the following:

- Host Bus Adapters

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