

ServeRAID M5025 SAS/SATA Controller for IBM System x

IBM System x at-a-glance guide

The ServeRAID M5025 SAS/SATA Controller for IBM System x is the next-generation 6 Gbps SAS 2.0 external RAID controller. This adapter has two external mini-SAS connectors to control up to 240 devices and supports global and dedicated hot-spare drives. The ServeRAID M5025 controller delivers a full 6-Gbps SAS 2.0 RAID solution with the performance advantages of an extended cache and a standard battery backup unit. With the attachment of the ServeRAID M5000 Advanced Feature Key, the ServeRAID M5025 offers the option of RAID 6, RAID 60 and SED Encryption Key Management.

Figure 1 shows the ServeRAID M5025 with its standard battery backup unit.



Figure 1. ServeRAID M5025 SAS/SATA Controller

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.

Part number information

Table 1. Ordering part numbers and feature codes

Description	Part number	Feature code
ServeRAID M5025 SAS/SATA Controller	46M0830	0094
ServeRAID M5000 Series Advanced Feature Key	46M0930	5106
IBM 3m SAS Cable	39R6531	3707
IBM 1m SAS Cable	39R6529	3708

The ServeRAID M5025 includes the following items:

- One ServeRAID M5025 adapter card with full-height (3U) bracket
- Low-profile (2U) bracket
- ServeRAID M5000 battery (attached)
- Battery Remote Mount Cable
- Documentation CD
- The *IBM Important Notices* Document

Specifications

The ServeRAID M5025 adapter card has the following specifications:

- Eight external 6 Gbps SAS 2.0 ports implemented via two four-lane (x4) connectors
- Two mini-SAS external connectors (SFF-8088)
- 6 Gbps throughput per SAS port
- 800 MHz PowerPC processor with LSI SAS2108 6 Gbps RAID on Chip (ROC) controller
- PCI Express 2.0 x8 host interface
- 512 MB onboard data cache (DDR2 running at 800 MHz)
- Intelligent lithium polymer battery backup unit standard with up to 48 hours of data retention
- Supports RAID levels 0, 1, 5, 10, and 50 (RAID 6 and 60 support with the optional M5000 Advanced Feature Key)
- Connects to
 - Up to 240 SAS or SATA drives
 - Up to 9 daisy-chained enclosures per port
- SAS and SATA drives are supported, but the mixing of SAS and SATA in the same RAID array is not supported
- Supports up to 64 logical volumes
- Supports LUN sizes up to 64 TB
- Configurable stripe size up to 1 MB
- Compliant with Disk Data Format (DDF) configuration on disk (COD)
- S.M.A.R.T. support

The key difference between the ServeRAID M5025 and M5015 RAID controllers is that the M5025 has two external SAS 2.0 x4 connectors and the M5015 has two internal SAS 2.0 x4 connectors.

Features

The ServeRAID M5025 adapter card has the following features:

- **Auto-resume on array rebuild or array reconstruction after loss of system power**
Auto-resume uses non-volatile NVRAM to save rebuild progress during a host reboot or power failure to automatically resume from the last checkpoint. Auto-resume will ensure data integrity is maintained through 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 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 (also known as logical drive migration) provides the ability to 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**
- **Consistency check for background data integrity**
Consistency Check verifies that all stripes in a virtual disk with a redundant RAID level are consistent. For RAID 1, the consistency check will mirror data when an inconsistent stripe is detected. For RAID 5 or RAID 6, the consistency check will recreate the parity from the peer disks. Consistency checks can be scheduled to take place periodically.
- **Extensive online configuration options: advanced monitoring and event notification**
Management tools provide convenience for configuration of logical volumes and alerts when errors have occurred or are about to occur.
- **Patrol Read for media scanning and repairing**
Patrol read is a background sentry service designed to proactively discover and correct 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 will use RAID algorithms to recreate 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 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. ServeRAID provides the ability to 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 will allow the user to assign a hot spare drive to a particular array of the same drive type.

The ServeRAID M5000 Series Advanced Feature Key enables the following features:

- RAID levels 6 and 60
- LSI SafeStore: support for self-encrypting drive services:
 - Instant secure erase
 - Local key management

LSI SafeStore encryption services offer instant secure erase and local key management for self-encrypting drives. This technology represents a significant 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 using a simple pass phrase, security key identifier, and security key file that can be set and applied to all SEDs assigned to a ServeRAID adapter. This removes the complexity of managing each SED's unique encryption key, and essentially relieves the administrator from most of the daily tasks of securing data.

Note: To use the SED services of the ServeRAID M5000 Series Advanced Feature Key, you must use self-encrypting drives as listed in "Supported disk drives" below.

Self-encrypting drives are based on a new technology that helps prevent data from being accessed without authorization. These drives adhere to the Trusted Computing Group (TCG) Enterprise Security Subsystem Class specification and are National Security Agency qualified to provide government-grade encryption. With self-encrypting drives (SEDs), if a drive is removed from its storage system or the server that it is housed in, the data on that drive is encrypted and useless to anyone who attempts to access it without the appropriate security authorization.

Figure 2 shows the ServeRAID M5000 Series Advanced Feature Key.

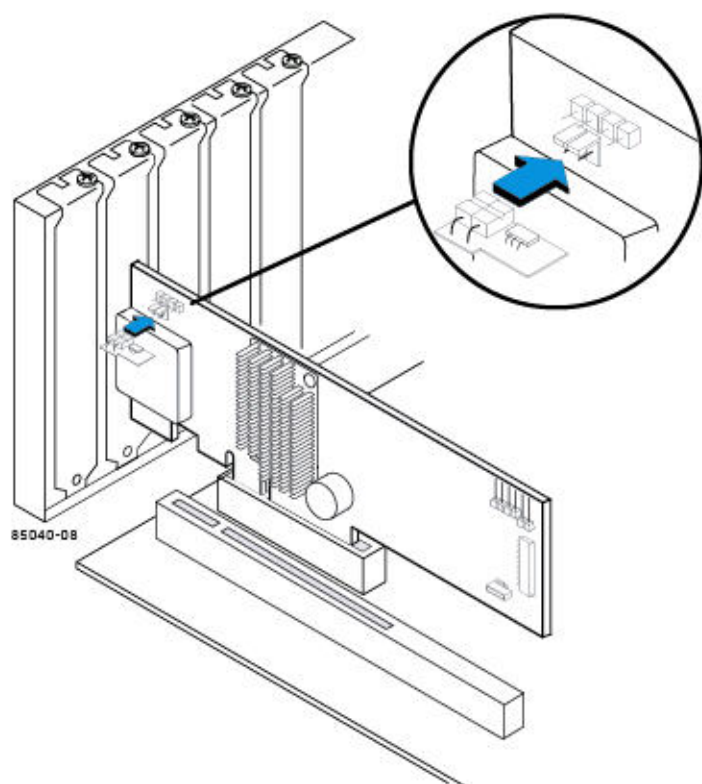


Figure 2. ServeRAID M5000 Series Advanced Feature Key

Operating environment

The ServeRAID M5025 adapter card is supported in the following environment:

- Temperature:
 - At 0-1000 m (0-3000 ft): 10-35° C (50-95° F)
 - At 1000-2100 m (3000-7000 ft): 10-32° C (50-90° F)
- Relative humidity: 20-80% (non-condensing)

Warranty

One-year limited warranty. When installed on a System x server, these cards assume your system's base warranty and any IBM ServicePac upgrade. Batteries are consumables and therefore are not covered under the warranty.

Supported servers

The ServeRAID M5025 adapter card is supported on the IBM System x servers listed in Table 2.

Table 2. Supported System x servers (Part 1)

Adapter	Part number	x3100 M3	x3200 M2	x3200 M3	x3250 M2	x3250 M3	x3350	x3400	x3400 M2	x3400 M3	x3455	x3500	x3500 M2	x3500 M3
ServeRAID M5025 Controller	46M0830	N	N	Y	N	Y	N	N	Y	Y	N	N	Y	Y

Table 2. Supported System x servers (Part 2)

Adapter	x3550	x3550 M2	x3550 M3	x3620 M3	x3630 M3	x3650	x3650 T	x3650 M2	x3650 M3	x3655	x3690 X5	x3755	x3755 M3	x3850 M2	x3950 M2	x3850 X5
ServeRAID M5025 Controller	N	Y	Y	N	N	N	N	Y	Y	N	Y	N	N	N	N	Y

See the IBM ServerProven website for the latest information about the adapters supported by each System x server type: <http://ibm.com/servers/eserver/serverproven/compat/us/>.

Supported external enclosures

The ServeRAID M5025 controller supports connectivity to the external SAS expansion enclosures listed in Table 3.

Table 3. Supported expansion enclosures

Expansion Enclosure	Part number	Supported with ServeRAID M5025	Maximum number of enclosures*
IBM System Storage EXP3000	172701X / 39R6464	Yes	18
IBM System Storage EXP3512 Express	1746A2E	No	None
IBM System Storage EXP3524 Express	1746A4E	No	None
IBM System Storage EXP2512 Express	174712X	Yes	18
IBM System Storage EXP2524 Express	174724X	Yes	9

* This refers the maximum number of enclosures supported connected to one ServeRAID M5025

Supported operating systems

The ServeRAID M5025 adapter card supports the following operating systems:

- Microsoft Windows Server 2003, Web Edition
- Microsoft Windows Server 2003/2003 R2, Datacenter Edition
- Microsoft Windows Server 2003/2003 R2, Datacenter x64 Edition
- Microsoft Windows Server 2003/2003 R2, Enterprise Edition
- Microsoft Windows Server 2003/2003 R2, Enterprise x64 Edition
- Microsoft Windows Server 2003/2003 R2, Standard Edition
- Microsoft Windows Server 2003/2003 R2, Standard x64 Edition
- 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 Small Business Server 2003/2003 R2 Premium Edition
- Microsoft Windows Small Business Server 2003/2003 R2 Standard Edition
- Red Hat Enterprise Linux 4 AS for AMD64/EM64T
- Red Hat Enterprise Linux 4 AS for x86
- Red Hat Enterprise Linux 4 ES for AMD64/EM64T
- Red Hat Enterprise Linux 4 ES for x86
- Red Hat Enterprise Linux 4 WS/HPC for AMD64/EM64T
- Red Hat Enterprise Linux 4 WS/HPC for x86
- Red Hat Enterprise Linux 5 Server Edition
- Red Hat Enterprise Linux 5 Server Edition with Xen
- Red Hat Enterprise Linux 5 Server with Xen x64 Edition
- Red Hat Enterprise Linux 5 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 4.0
- VMware ESXi 4.0

See the IBM ServerProven website for the latest information about the specific versions and service packs supported: <http://ibm.com/servers/eserver/serverproven/compat/us/>. Click **System x servers**, then **Disk controllers** to see the support matrix. Click the check mark that is associated with the System x server in question to see the details of the operating system support.

Related publications

For more information refer to the following documents:

- IBM US Announcement Letter
<http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS110-172>
- IBM US Announcement Letter for the M5000 Series Advanced Feature Key:
<http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS109-739>
- ServeRAID M5025 Quick Install Guide
<http://ibm.com/support/entry/portal/docdisplay?Indocid=MIGR-5086113>
- ServeRAID M5025 Installation and User's Guide
<http://ibm.com/support/entry/portal/docdisplay?Indocid=MIGR-5086123>
- System x RAID products home page:
http://www.ibm.com/systems/storage/product/systemx/scsi_raid.html
- IBM ServeRAID software matrix:
<http://www.ibm.com/support/docview.wss?uid=psg1SERV-RAID>
- IBM System x Configuration and Options Guide:
<http://www.ibm.com/support/docview.wss?uid=psg1SCOD-3ZVQ5W>

Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service. IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing, IBM Corporation, North Castle Drive, Armonk, NY 10504-1785 U.S.A.

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you. This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk. IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you. Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products. This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurement may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs.

© Copyright International Business Machines Corporation 2010. All rights reserved.

Note to U.S. Government Users Restricted Rights -- Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

This document was created or updated on November 30, 2010.

Send us your comments in one of the following ways:

- Use the online **Contact us** review form found at:
ibm.com/redbooks
- Send your comments in an e-mail to:
redbook@us.ibm.com
- Mail your comments to:
IBM Corporation, International Technical Support Organization
Dept. HYTD Mail Station P099
2455 South Road
Poughkeepsie, NY 12601-5400 U.S.A.

This document is available online at <http://www.ibm.com/redbooks/abstracts/tips0739.html> .

Trademarks

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both. These and other IBM trademarked terms are US registered or common law trademarks owned by IBM at the time this information was published. Such trademarks may also be registered or common law trademarks in other countries. A current list of IBM trademarks is available on the Web at <http://www.ibm.com/legal/copytrade.shtml>

The following terms are trademarks of the International Business Machines Corporation in the United States, other countries, or both:

IBM®
PowerPC®
Redpaper™
Redbooks (logo)®
ServerProven®
ServicePac®
System x®

The following terms are trademarks of other companies:

Microsoft, Windows, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

Linux is a trademark of Linus Torvalds in the United States, other countries, or both.

Other company, product, or service names may be trademarks or service marks of others.