

## ServeRAID M1015 SAS/SATA Controller for System x IBM System x at-a-glance guide

The ServeRAID M1015 SAS/SATA Controller for IBM System x is an entry-level 6 Gbps SAS 2.0 PCI Express 2.0 RAID controller. The adapter has two internal mini-SAS connectors to drive up to 32 devices and supports the same base RAID 0, 1, and 10 feature set and drivers as the M5000 series controllers. With the attachment of the ServeRAID M1000 Advanced Feature Key, the ServeRAID M1015 offers the option of RAID 5 and SED Encryption Key management, while still being sensitive to administrator cost concerns in an entry-level RAID environment. This RAID controller provides connectivity to internal direct-attach or expander-attached hard disk, solid-state, or self-encrypting drives.



Figure 1. ServeRAID M1015 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. Regardless of the drive speed, 6 Gbps ServeRAID adapters will deliver significant performance improvements in both read and write applications as compared with their 3 Gbps predecessors.

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, if a drive is removed from its storage system or the server 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.

## Part number information

Table 1. Ordering part number and feature code

Description	Part number	Feature code
ServeRAID M1015 SAS/SATA Controller	46M0831	0095
ServeRAID M1000 Series Advanced Feature Key	46M0832	9749

The ServeRAID M1015 part number includes the following items:

- One ServeRAID M1015 adapter card with full-height bracket
- One replaceable low-profile (2U) bracket
- Documentation CD
- The IBM Important Notices Document

Figure 2 shows the ServeRAID M1000 Series Advanced Feature Key attached to the ServeRAID M1015 controller just above the heat sink.

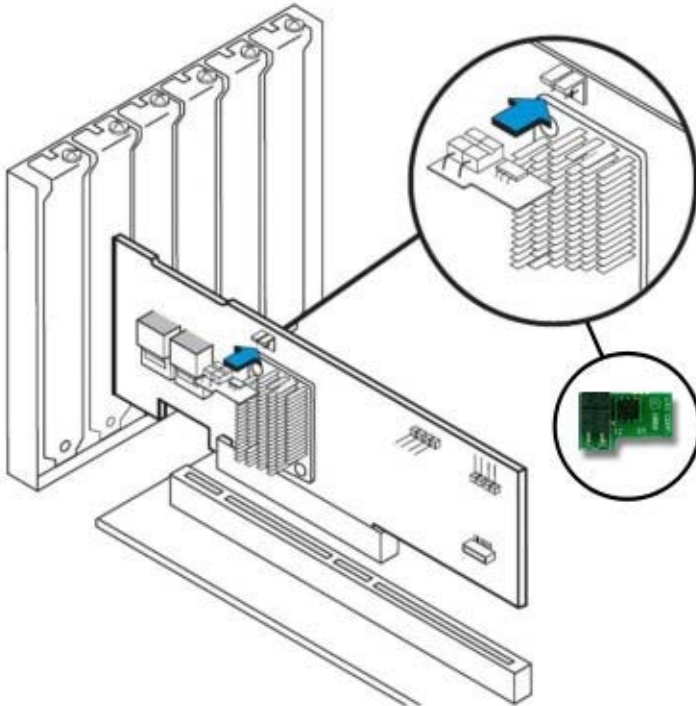


Figure 2. ServeRAID M1000 Series Advanced Feature Key

## Specifications

The ServeRAID M1015 SAS/SATA Controller has the following specifications:

- Eight internal 6 Gbps SAS/SATA ports
- Supports SAS and SATA drives (but not in the same RAID volume)
- Two Mini-SAS internal connectors (SFF-8087)
- 6 Gbps throughput per port
- LSI SAS2008 6 Gbps RAID on Chip (ROC) controller
- x8 PCI Express 2.0 host interface
- Supports RAID levels 0, 1, 10 (RAID levels 5 and 50 with optional ServeRAID M1000 Series Advanced Feature Key)
- Connects to up to 32 SAS or SATA drives
- Supports up to 16 logical volumes
- Supports LUN sizes up to 64 TB
- Configurable stripe size up to 64 KB
- Compliant with Disk Data Format (DDF) configuration on disk (COD)
- S.M.A.R.T. support

## Features

The ServeRAID M1015 SAS/SATA Controller 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 are able to 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. The consistency check will mirror data when an inconsistent stripe is detected for a RAID 1 and recreating the parity from the peer disks when in the case of a RAID 5. 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 plus alerting 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 may 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 M1000 Series Advanced Feature Key enables the following features:

- RAID levels 5 and 50
- LSI SafeStore: support for self-encrypting drive (SED) services
  - Instant secure erase
  - Local key management

LSI SafeStore encryption services offer instant secure erase and local key management for SEDs. 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 M1000 Series Advanced Feature Key, you must use self-encrypting drives as listed in "Supported disk drives" below.

## Operating environment

The ServeRAID M1015 SAS/SATA Controller 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 warranty.

## Supported servers

The ServeRAID M1015 is supported on the IBM System x servers listed in Table 2.

Table 2. Supported servers

	x3200 M2	x3200 M3	x3250 M2	x3250 M3	x3350	x3400	x3400 M2	x3455	x3500	x3500 M2	x3550	x3550 M2	x3650	x3650 T	x3650 M2	x3655	x3755	x3850 M2	x3950 M2
ServeRAID M1015	N	Y	N	Y	N	N	Y	N	N	Y	N	Y	N	N	Y*	N	N	N	N

\* The ServeRAID M1015 also supports the Hot-Swap SAS/SATA 4 Pack HDD Kit option of the x3650 M2, part number 46D2516.

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

## Supported disk drives

The ServeRAID M1015 SAS/SATA Controller supports the disk drives that are supported on the servers listed in Table 2. These drives and the servers that they are supported on are listed in Table 3.

Table 3. Supported drives

Part	Description	FF	Gbps	GB	RPM	SED	x3200 M3	x3250 M3	x3400 M2	x3500 M2	x3550 M2	x3650 M2
<b>SAS Hot-swap drives</b>												
44W2234	300GB 15K 6Gbps SAS 3.5" HS	3.5"	6	300	15 K	No	Y	Y	Y	Y	N	N
44W2239	450GB 15K 6Gbps SAS 3.5" HS	3.5"	6	450	15 K	No	Y	Y	Y	Y	N	N
44W2244	600GB 15K 6Gbps SAS 3.5" HS	3.5"	6	600	15 K	No	Y	Y	Y	Y	N	N
40K1043	73GB 15K Hot Swap SAS	3.5"	3	73	15 K	No	N	N	Y	N	N	N
40K1044	146GB 15K 3.5" Hot Swap SAS	3.5"	3	146	15 K	No	Y	Y	Y	N	N	N
43X0802	300GB 15K 3.5" Hot-Swap SAS	3.5"	3	300	15 K	No	N	N	Y	N	N	N
42D0519	450GB 15K SAS 3.5" HS HDD	3.5"	3	450	15 K	No	N	N	Y	N	N	N
43W7535	73GB 10K SAS 2.5" SFF Slim-HS	SFF	3	73	10 K	No	N	Y	Y	Y	Y	Y
43W7545	73GB 15K SAS 2.5" SFF Slim-HS	SFF	3	73	15 K	No	N	N	Y	Y	Y	Y
43W7536	146GB 10K SAS 2.5" SFF Slim-HS	SFF	3	146	10 K	No	N	N	Y	Y	Y	Y
42D0672	73GB 15K 6Gbps SAS 2.5" SFF Slim-HS	SFF	6	73	15 K	No	N	Y	Y	Y	Y	Y
44W2294	146GB 15K 6Gb SAS 2.5" SFF Slim-HS SED	SFF	6	146	15 K	Yes*	Y	Y	Y	Y	Y	Y
42D0632	146GB 10K 6Gbps SAS 2.5" SFF Slim-HS	SFF	6	146	10 K	No	N	Y	Y	Y	Y	Y
42D0677	146GB 15K 6Gbps SAS 2.5" SFF Slim-HS	SFF	6	146	15 K	No	N	Y	Y	Y	Y	Y
44W2264	300GB 10K 6Gb SAS 2.5" SFF Slim-HS SED	SFF	6	300	10 K	Yes*	Y	Y	Y	Y	Y	Y
42D0637	300GB 10K 6Gbps SAS 2.5" SFF Slim-HS	SFF	6	300	10 K	No	N	N	Y	Y	Y	Y
<b>SAS NL hot-swap drives</b>												
42D0707	500GB 7200 6Gb NL SAS 2.5" SFF Slim-HS	SFF	6	500	7200	No	N	N	Y	Y	Y	Y
<b>SATA hot-swap drives</b>												
39M4526	250GB 3.5" Hot-Swap SATA II	3.5"	3	250	7200	No	Y	Y	Y	N	N	N
39M4530	500GB Hot-Swap SATA II	3.5"	3	500	7200	No	N	N	Y	N	N	N
43W7576	750GB Hot-Swap SATA II	3.5"	3	750	7200	No	Y	Y	Y	N	N	N
43W7626	IBM Server 1TB 7200 SATA 3.5" HS	3.5"	3	1000	7200	No	Y	Y	Y	N	N	N
43W7670	300GB 10K SATA 2.5" Slim-HS	SFF	3	300	10 K	No	N	N	N	N	Y	Y
<b>SATA simple-swap drives</b>												
39M4522	160GB 3.5" Hot-Swap SATA II	3.5"	3	160	7200	No	N	N	Y	N	N	N
39M4504	160GB 3.5" Simple-Swap SATA II	3.5"	3	160	7200	No	N	N	Y	N	N	N
39M4508	250GB 3.5" Simple-Swap SATA II	3.5"	3	250	7200	No	Y	Y	Y	N	N	N
39M4514	500GB 3.5" Simple-Swap SATA II	3.5"	3	500	7200	No	N	N	Y	N	N	N
43W7572	750GB Simple-Swap SATA II	3.5"	3	750	7200	No	Y	Y	Y	N	N	N
43W7623	IBM Server 1TB 7200 SATA 3.5" SS	3.5"	3	1000	7200	No	Y	Y	N	N	N	N
<b>SATA NL hot-swap drives</b>												
42D0747	IBM 160GB 7200 NL SATA 2.5" SFF Slim-HS	SFF	3	160	7200	No	N	N	Y	Y	Y	Y
42D0752	IBM 500GB 7200 NL SATA 2.5" SFF Slim-HS	SFF	3	500	7200	No	N	N	Y	Y	Y	Y
<b>Solid-state drives</b>												
41Y8264	IBM 31.4GB SATA 2.5" SFF Slim-HS SSD V2	SFF	3	31.4	SSD	No	N	N	N	N	Y	Y
43W7714	IBM 50 SATA 2.5 SFF Slim-HS Hi-IOPS SSD	SFF	3	50	SSD	No	N	N	N	N	Y	Y

\* SEDs require the ServeRAID M1000 Advanced Feature Key.

## Supported operating systems

The ServeRAID M1015 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, 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 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 U1 (planned)
- VMware ESXi 4.0 U1 (planned)

See the IBM ServerProven Web site 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 U.S. Announcement Letter  
<http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS109-739>
- System x RAID products home page:  
[http://www.ibm.com/systems/storage/product/systemx/scsi\\_raid.html](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>



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