

ServeRAID M1115 SAS/SATA Controller for IBM System x

IBM Redbooks Product Guide

The ServeRAID M1115 SAS/SATA Controller for IBM® System x® is a part of the IBM ServeRAID M Series family that offers a complete server storage solution consisting of RAID controllers, cache/flash modules, energy packs, and software feature upgrades in an ultra-flexible offerings structure. The M1115 offers a low-cost RAID 0/1/10 solution that can be upgraded to a cacheless RAID 5 with a Features-on-Demand license upgrade.

Figure 1 shows the ServeRAID M1115 Controller.



Figure 1. ServeRAID M1115 SAS/SATA Controller

Did you know

The ServeRAID M1115 SAS/SATA Controller is an entry-level internal data storage solution that provides hardware RAID capabilities and advanced features, such as online capacity expansion and RAID-level migration. The optional RAID 5 upgrade and support for self-encrypting drives no longer require a hardware key, because the upgrade functionality is implemented through Features-on-Demand (FoD) software licenses. With increased demand for performance and advanced features, the M1115 provides a seamless migration path to the full-featured RAID controllers, such as the ServeRAID M5110. The information about existing arrays can be recognized and imported into the new controller without requiring any reconfiguration.

Part number information

Table 1 provides the ordering part numbers and feature codes.

Table 1. Ordering part numbers and feature codes

Description	Part number	Feature code
ServeRAID M1115 SAS/SATA Controller for IBM System x	81Y4448	A1MZ
ServeRAID M1100 Series Zero Cache/RAID 5 Upgrade for IBM System x	81Y4542	A1X1

The ServeRAID M1115 option part number includes the following items:

- One ServeRAID M1115 adapter card
- Full-height (3U) bracket
- Low-profile (2U) bracket
- Warranty Flyer
- ServeRAID M Documentation CD
- Important Notices Flyer

The ServeRAID M1100 Series Zero Cache/RAID 5 Upgrade option part number includes the following items:

- M1100 Series upgrade activation key
- Feature Activation Instructions

Features

The ServeRAID M1115 SAS/SATA Controller has the following standard features:

- Auto-resume on array rebuild or array reconstruction after loss of system power
Auto-resume uses non-volatile RAM (NVRAM) to save rebuild progress during a host reboot or power failure to automatically resume from the last checkpoint. Auto-resume ensures that 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
Fast initialization quickly writes zeroes 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 will mirror data when an inconsistent stripe is detected for a RAID 1 and will recreate the parity from the peer disks in the case of a 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 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 uses 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 allows the user to assign a hot spare drive to a particular array of the same drive type.
- Single controller multipathing (failover) I/O load balancing

The ServeRAID's firmware detects and uses multiple paths from the controllers to the SAS drives that are in enclosures. With redundant paths to the same port of a device, if one path fails, another path can be used to communicate between the controller and the drive. Using multiple paths with load balancing, instead of a single path, can increase reliability through redundancy.
- WebBIOS and Human Interface Infrastructure (HII) configuration utilities for pre-boot array configuration and management

WebBIOS and HII are utilities that allow 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 that is used across the entire family of ServeRAID M controllers. 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.

The following features are optional and require the purchase of an additional upgrade:

- RAID 5, 50 support with Zero Cache/RAID 5 Upgrade (81Y4542)
- MegaRAID SafeStore support for self-encrypting drive (SED) services

MegaRAID SafeStore encryption services offer instant secure erase and local key management for self-encrypting 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 feature removes the complexity of managing each SED's unique encryption key, and essentially, it relieves the administrator of most of the daily tasks of securing data. The SafeStore feature is a part of a RAID 5 upgrade (81Y4542).

Technical specifications

The ServeRAID M1115 SAS/SATA Controller has the following specifications:

- PCI Low Profile, Half-length - MD2 form factor
- Eight internal 6 Gbps SAS/SATA ports
- Two internal Mini-SAS connectors (SFF-8087)
- 6 Gbps throughput per port
- 533 MHz IBM PowerPC® processor with LSI SAS2008 6 Gbps RAID on Chip (ROC) controller
- PCI Express 2.0 x8 host interface
- Support for RAID levels 0, 1, and 10 standard; support for RAID 5, 50 with optional upgrade
- Zero Controller Cache, no battery/flash backup
- Support for SAS and SATA hard disk drives (HDDs) and solid-state drives (SSDs)
- Support for simple swap and hot swap drives
- Support for intermixing SAS and SATA HDDs and SSDs. Mixing different types of drives in the same array (drive group) not recommended
- Connection to up to 32 internal drives, depending on the server model (Up to 16 physical drives, including hot spares, can be used in RAID configurations. The drives beyond the limit of 16 are used as stand-alone HDDs in a non-RAID environment.)
- Optional support for self-encrypting drives (SEDs) with MegaRAID SafeStore
- Support for up to 16 virtual drives, up to 16 drive groups, up to 16 virtual drives per one drive group, and up to 16 physical drives per one drive group
- Support for virtual drive 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
- MegaRAID Storage Manager management software

Feature upgrade matrix

The ServeRAID M1115 SAS/SATA Controller provides support for RAID 0, 1, and 10 as standard, ready to use or "out-of-the-box" capabilities. An optional feature upgrade is available to expand standard capabilities with RAID 5, 50 and self-encrypting drives. This Feature-on-Demand (FoD) upgrade is a software license. The following table lists the available upgrade and its capabilities.

Table 2. ServeRAID M1115 optional upgrade and its features

Option description	Part Number	Feature	RAID 5, 50	SED
		Type		
ServeRAID M1100 Series Zero Cache/RAID 5 Upgrade	81Y4542	FoD	Yes	Yes

Supported servers

The ServeRAID M1115 adapter card is supported on the IBM System x servers that are listed in the following table.

Table 3. Supported System x servers

Product description	x3100 M4 (2582)	x3200 M3 (7327, 7328)	x3250 M3 (4251, 4252)	x3250 M4 (2583)	x3400 M3 (7378, 7379)	x3500 M3 (7380)	x3500 M4 (7383)	x3530 M4 (7160)	x3550 M3 (7944)	x3550 M4 (7914)	x3620 M3 (7376)	x3630 M3 (7377)	x3630 M4 (7158)	x3650 M3 (7945)	x3650 M4 (7915)	x3690 X5 (7147)	x3750 M4 (8722)	x3755 M3 (7164)	x3850 X5 (7143)	dx360 M3 (6391)	dx360 M4 (7912)	
ServeRAID M1115 SAS/SATA Controller	N	N	N	N	N	N	Y	Y	N	Y	N	N	Y	N	N	N	Y	N	N	N	N	Y

See IBM ServerProven® for the latest information about the System x servers that support each adapter:
<http://ibm.com/servers/eserver/serverproven/compat/us/>

Supported operating systems

The ServeRAID M1115 SAS/SATA Controller supports the following operating systems:

- 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
- Red Hat Enterprise Linux 5 Server with Xen x64 Edition
- Red Hat Enterprise Linux 5 Server x64 Edition
- Red Hat Enterprise Linux 6 Server x64 Edition
- SUSE Linux Enterprise Server 10 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 vSphere 5

See the IBM ServerProven® website for the latest information about the specific versions and service levels supported and any other prerequisites:

<http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/nos/matrix.shtml>

Supported drives

The ServeRAID M1115 SAS/SATA Controller supports the drives that are supported in the servers listed in Table 2. The maximum number of drives that can be connected to the RAID controller is limited by the maximum number of internal drive bays for a supported server.

Supported 2.5" simple-swap hard disk drives and the servers with which they are supported are listed in the following table.

Table 4. Supported 2.5" simple-swap hard disk drives

Product description	Part number	x3500 M4 (7383)	x3530 M4 (7160)	x3550 M4 (7914)	x3630 M4 (7158)	x3750 M4 (8722)	dx360 M4 (7912)
2.5" SAS SS HDDs							
IBM 146GB 15K 6Gbps SAS 2.5" SFF G2SS HDD	90Y8935	N	N	N	N	N	Y
IBM 146GB 15K 6Gbps SAS 2.5" SFF SS HDD	49Y1996	N	N	N	N	N	Y
IBM 300GB 10K 6Gbps SAS 2.5" SFF G2SS HDD	90Y8895	N	N	N	N	N	Y
IBM 300GB 10K 6Gbps SAS 2.5" SFF SS HDD	49Y1991	N	N	N	N	N	Y
IBM 600GB 10K 6Gbps SAS 2.5" SFF G2SS HDD	90Y8890	N	N	N	N	N	Y
IBM 600GB 10K 6Gbps SAS 2.5" SFF SS HDD	49Y2027	N	N	N	N	N	Y
2.5" NL SATA SS HDDs							
IBM 250GB 7.2K 6Gbps NL SATA 2.5" SFF SS HDD	81Y9734	N	N	N	N	N	Y
IBM 500GB 7.2K 6Gbps NL SATA 2.5" SFF SS HDD	81Y9738	N	N	N	N	N	Y
IBM 1TB 7.2K 6Gbps NL SATA 2.5" SFF SS HDD	81Y9742	N	N	N	N	N	Y

Supported 2.5" hot-swap hard disk drives and the servers with which they are supported are listed in the following table.

Table 5. Supported 2.5" hot-swap hard disk drives

Product description	Part number	x3500 M4 (7383)	x3530 M4 (7160)	x3550 M4 (7914)	x3630 M4 (7158)	x3750 M4 (8722)	dx360 M4 (7912)
2.5" SAS HS HDDs							
IBM 73GB 15K 6Gbps SAS 2.5" SFF Slim-HS HDD	42D0672*	N	N	N	N	N	N
IBM 146GB 10K 6Gbps SAS 2.5" SFF Slim-HS HDD	42D0632*	N	N	N	N	N	N
IBM 146GB 15K 6Gbps SAS 2.5" SFF G2HS HDD	90Y8926	Y	N	Y	N	Y	N
IBM 146GB 15K 6Gbps SAS 2.5" SFF G2HS SED	90Y8944	Y	N	Y	N	Y	N
IBM 146GB 15K 6Gbps SAS 2.5" SFF Slim-HS HDD	42D0677	N	N	N	N	N	N
IBM 146GB 15K 6Gbps SAS 2.5" SFF Slim-HS SED	44W2294	N	N	N	N	N	N
IBM 300GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	90Y8877	Y	N	Y	N	Y	N
IBM 300GB 10K 6Gbps SAS 2.5" SFF G2HS SED	90Y8913	Y	N	Y	N	Y	N
IBM 300GB 10K 6Gbps SAS 2.5" SFF Slim-HS HDD	42D0637	N	N	N	N	N	N
IBM 300GB 10K 6Gbps SAS 2.5" SFF Slim-HS SED	44W2264	N	N	N	N	N	N
IBM 300GB 15K 6Gbps SAS 2.5" SFF HS HDD	81Y9670	Y	N	Y	N	Y	N
IBM 600GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	90Y8872	Y	N	Y	N	Y	N
IBM 600GB 10K 6Gbps SAS 2.5" SFF Slim-HS HDD	49Y2003	N	N	N	N	N	N
IBM 900GB 10K 6Gbps SAS 2.5" SFF HS HDD	81Y9650	Y	N	Y	N	Y	N
2.5" NL SAS HS HDDs							
IBM 500GB 7.2K 6Gbps NL SAS 2.5" SFF G2HS HDD	90Y8953	Y	N	Y	N	Y	N
IBM 500GB 7200 6Gbps NL SAS 2.5" SFF Slim-HS HDD	42D0707	N	N	N	N	N	N
IBM 1TB 7.2K 6Gbps NL SAS 2.5" SFF HS HDD	81Y9690	Y	Y	Y	N	Y	N
2.5" NL SATA HS HDDs							
IBM 160GB 7200 NL SATA 2.5" SFF Slim-HS HDD	42D0747*	N	N	N	N	N	N
IBM 250GB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	81Y9722	N	Y	Y	N	Y	N
IBM 500GB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	81Y9726	N	Y	Y	N	Y	N
IBM 500GB 7200 NL SATA 2.5" SFF Slim-HS HDD	42D0752*	N	N	N	N	N	N
IBM 1TB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	81Y9730	Y	Y	Y	N	Y	N

* Withdrawn, not available for ordering.

Supported 3.5" hot-swap hard disk drives and the servers with which they are supported are listed in the following table.

Table 6. Supported 3.5" hot-swap hard disk drives

Product description	Part number	x3500 M4 (7383)	x3530 M4 (7160)	x3550 M4 (7914)	x3630 M4 (7158)	x3750 M4 (8722)	dx360 M4 (7912)
3.5" SAS HS HDDs							
IBM 300GB 15K 6Gbps SAS 3.5" G2HS HDD	49Y6092	Y	Y	Y	Y	N	N
IBM 450GB 15K 6Gbps SAS 3.5" G2HS HDD	49Y6097	Y	Y	Y	Y	N	N
IBM 600GB 15K 6Gbps SAS 3.5" G2HS HDD	49Y6102	Y	Y	Y	Y	N	N
IBM 300GB 15K 6Gbps SAS 3.5" Hot-Swap HDD	44W2234	N	N	N	N	N	N
IBM 450GB 15K 6Gbps SAS 3.5" Hot-Swap HDD	44W2239	N	N	N	N	N	N
IBM 600GB 15K 6Gbps SAS 3.5" Hot-Swap HDD	44W2244	N	N	N	N	N	N
3.5" NL SAS HS HDDs							
IBM 1TB 7.2K 6Gbps NL SAS 3.5" G2HS HDD	90Y8567	Y	Y	Y	Y	N	N
IBM 1TB 7.2K 6Gbps NL SAS 3.5" HS HDD	42D0777	N	N	N	N	N	N
IBM 2TB 7.2K 6Gbps NL SAS 3.5" G2HS HDD	90Y8572	Y	N	Y	N	N	N
IBM 2TB 7.2K 6Gbps NL SAS 3.5" HS HDD	42D0767	N	N	N	N	N	N
IBM 3TB 7.2K 6Gbps NL SAS 3.5" G2HS HDD	90Y8577	Y	Y	Y	Y	N	N
IBM 3TB 7.2K 6Gbps NL SAS 3.5" HS HDD	81Y9758	N	N	N	N	N	N
3.5" NL SATA HS HDDs							
IBM 250GB 7.2K SATA 3.5" Hot-Swap HDD	43W7754	N	N	N	N	N	N
250GB 3.5" Hot-Swap SATA II HDD	39M4526*	N	N	N	N	N	N
500GB 3.5" Hot-Swap SATA II HDD	39M4530	N	N	N	N	N	N
IBM 500GB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	81Y9786	Y	Y	Y	Y	N	N
IBM 1TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	81Y9790	Y	Y	Y	Y	N	N
IBM 2TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	81Y9794	Y	Y	Y	Y	N	N
IBM 2TB 7200 NL SATA 3.5" HS HDD	42D0782	N	N	N	N	N	N
IBM 3TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	81Y9798	Y	Y	Y	Y	N	N
IBM 3TB 7.2K 6Gbps NL SATA 3.5" HS HDD	81Y9774	N	N	N	N	N	N

* Withdrawn, not available for ordering.

Supported 3.5" simple-swap hard disk drives and the servers with which they are supported are listed in the following table.

Table 7. Supported 3.5" simple-swap hard disk drives

Product description	Part number	x3500 M4 (7383)	x3530 M4 (7160)	x3550 M4 (7914)	x3630 M4 (7158)	x3750 M4 (8722)	dx360 M4 (7912)
3.5" NL SATA SS HDDs							
250GB 3.5" Simple-Swap SATA II HDD	39M4508*	N	N	N	N	N	N
IBM 250GB 7.2K SATA 3.5" Simple-Swap HDD	43W7750	N	N	N	N	N	N
500GB 3.5" Simple-Swap SATA II HDD	39M4514	N	N	N	N	N	N
IBM 500GB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	81Y9802	Y	Y	Y	Y	N	Y
IBM 1TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	81Y9806	Y	Y	Y	Y	N	Y
IBM 1TB 7.2K SATA 3.5" Simple-Swap HDD	43W7622	N	N	N	N	N	N
IBM 2TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	81Y9810	Y	Y	Y	Y	N	Y
IBM 2TB 7200 NL SATA 3.5" SS HDD	42D0787	N	N	N	N	N	N
IBM 3TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	81Y9814	Y	Y	Y	Y	N	Y
IBM 3TB 7.2K 6Gbps NL SATA 3.5" SS HDD	81Y9778	N	N	N	N	N	N

* Withdrawn, not available for ordering.

Supported solid-state drives (SSDs) and the servers with which they are supported are listed in the following table.

Table 8. Supported solid-state drives

Product description	Part number	x3500 M4 (7383)	x3530 M4 (7160)	x3550 M4 (7914)	x3630 M4 (7158)	x3750 M4 (8722)	dx360 M4 (7912)
SATA HS SSDs							
IBM 50GB SATA 2.5" SFF Slim-HS High IOPS SSD	43W7714	N	N	N	N	N	N
IBM 50GB SATA 1.8" MLC SSD	43W7726	N	N	N	N	Y	N
IBM 200GB SATA 2.5" MLC HS SSD	43W7718	N	N	N	N	Y	N
IBM 200GB SATA 1.8" MLC SSD	43W7746	N	N	N	N	Y	N
IBM 128GB SATA 2.5" MLC HS Enterprise Value SSD	90Y8648	Y	N	Y	N	Y	N
IBM 256GB SATA 2.5" MLC HS Enterprise Value SSD	90Y8643	Y	N	Y	N	Y	N
SATA SS SSDs							
IBM 50GB SATA 1.8" NHS SSD	43W7734*	N	N	N	N	N	N
IBM 200GB SATA 2.5" MLC SS SSD	43W7742	N	N	N	N	N	Y
IBM 128GB SATA 2.5" MLC SS Enterprise Value SSD	90Y8668	N	N	N	N	N	Y
IBM 256GB SATA 2.5" MLC SS Enterprise Value SSD	90Y8663	N	N	N	N	N	Y

* Withdrawn, not available for ordering.

Physical specifications

The ServeRAID M1115 SAS/SATA Controller has the following physical specifications:

Dimensions (approximate):

- Height: 15 mm (0.6 in.)
- Width: 69 mm (2.7 in.)
- Depth: 168 mm (6.6 in.)
- Weight: 77 g (0.2 lb.)

Shipping dimensions (approximate):

- Height: 51 mm (2.0 in.)
- Width: 143.0 mm (5.6 in.)
- Depth: 238 mm (9.4 in.)
- Weight: 222 g (0.5 lb.)

Operating environment

The ServeRAID M1115 SAS/SATA Controller is supported in the following environment:

- Temperature:
 - 10 to 35 degrees C (50 to 95 F) at 0 to 914 m (0 to 3,000 ft)
 - 10 to 32 degrees C (50 to 90 F) at 914 to 2,133 m (3,000 to 7,000 ft)
- Relative humidity: 20% to 80% (noncondensing)
- Maximum altitude: 2,133 m (7,000 ft)

Warranty

There is a one-year limited warranty. When installed on a System x server, the adapter assumes your system's base warranty and any IBM ServicePac® upgrade.

Agency approvals

The adapter conforms to the following standards:

- EN55022
- EN55024
- EN60950 / CE
- EN 61000-3-2
- EN 61000-3-3
- IEC 950 CB Scheme
- FCC Part 15 Class A, and Class B
- UL 1950
- CSA C22.2 950-95
- VCCI
- NZ AS3548 / C-tick
- RRL for MIC (KCC)
- BSMI
- UL 94-/V

Related publications

For more information, see the following documents:

- IBM US Announcement Letter:
<http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS112-048>
- 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>

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