

ServeRAID M5210 and M5210e SAS/SATA Controllers for IBM System x

IBM Redbooks Product Guide

The ServeRAID M5210 and M5210e SAS/SATA controllers for IBM® System x® are 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. These products are optimized to deliver the performance that is demanded by the ever-growing I/O requirements of today's enterprises. M5210 comes as a small form factor PCIe adapter, and M5210e comes integrated with the IBM System x3650 M4 HD server. They also share a common set of upgrades, simplifying inventory management.

The following figure shows the ServeRAID M5210 Controller with an optional cache installed.



Figure 1. ServeRAID M5210 SAS/SATA Controller (with an optional cache installed)

Did you know?

The ServeRAID M5210 and M5210e SAS/SATA Controllers are optimized for high-performance, internal data storage, with a 12 Gbps SAS controller featuring a DDR3 1866 MHz cache memory interface and PCIe 3.0 host interface.

The ServeRAID M5200 portfolio is designed around several base solutions with upgrades that are rich with features to satisfy a wide range of storage needs while minimizing parts-on-the-floor upgrades.

Upgrade features, such as support for RAID 6 and 60, performance optimization, and caching with solid-state drives (SSDs) no longer require a hardware key. They are implemented through Features-on-Demand (FoD) software licenses.

Part number information

The following table provides the ordering part numbers and feature codes.

Table 1. Ordering part numbers and feature codes

Description	Part number	Feature code
Base controller		
ServeRAID M5210e SAS/SATA Controller for IBM System x	Onboard	Onboard
ServeRAID M5210 SAS/SATA Controller for IBM System x	46C9110	A3YZ
Cache upgrades		
ServeRAID M5200 Series 1GB Cache/RAID 5 Upgrade for IBM Systems	47C8656	A3Z0
ServeRAID M5200 Series 1GB Flash/RAID 5 Upgrade for IBM Systems	47C8660	A3Z1
ServeRAID M5200 Series 2GB Flash/RAID 5 Upgrade for IBM Systems	47C8664	A3Z2
ServeRAID M5200 Series 4GB Flash/RAID 5 Upgrade for IBM Systems	47C8668	A3Z3
Features on Demand upgrades		
ServeRAID M5200 Series Zero Cache/RAID 5 Upgrade for IBM Systems-FoD	47C8708	A3Z6
ServeRAID M5200 Series RAID 6 Upgrade for IBM Systems-FoD	47C8706	A3Z5
ServeRAID M5200 Series Performance Accelerator for IBM Systems-FoD	47C8710	A3Z7
ServeRAID M5200 Series SSD Caching Enabler for IBM Systems-FoD	47C8712	A3Z8

The ServeRAID M5210 option part number includes the following items:

- One ServeRAID M5210 adapter with a full-height (3U) bracket
- One low-profile (2U) bracket
- Warranty Flyer
- ServeRAID M Documentation CD
- Important Notices Flyer

The ServeRAID M5200 Series 1GB Cache/RAID 5 Upgrade option part number includes the following items:

- Cache module
- Important Notices Flyer
- Warranty Flyer
- ServeRAID M Documentation CD

ServeRAID M5200 Series 1GB, 2GB, and 4GB Flash/RAID 5 Upgrade option part numbers include the following items:

- One Flash/Cache module
- One Offload power module
- Two power module cables (425 mm and 925 mm)
- Important Notices Flyer
- Warranty Flyer
- ServeRAID M Documentation CD

ServeRAID M5200 Series Zero Cache/RAID 5 Upgrade, RAID 6 Upgrade, SSD Performance Accelerator, and SSD Caching Enabler option part numbers include the following items:

- One M5200 Series upgrade authorization key
- Feature Activation Instructions

Features

The ServeRAID M5210 and M5210e SAS/SATA controllers have 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, 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 or RAID 6. 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. ServeRAID 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 utility that is built into the ServeRAID controller 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 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 respective upgrade to be purchased:

- Support for RAID 6 and 60 with M5200 Series RAID 6 Upgrade (47C8706)
- 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. This technology represents a 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 by using a simple pass phrase, security key identifier, and security key file that can be set and applied to all SEDs that are assigned to a ServeRAID adapter. This feature removes the complexity of managing each SED's unique encryption key, and it essentially relieves the administrator of most of the daily tasks of securing data. The SafeStore is a part of any M5200 Series RAID 5 upgrade that is available: 47C8708, 47C8656, 47C8660, 47C8664, or 47C8668.
- MegaRAID flash cache protection
MegaRAID flash cache protection uses NAND flash memory, which is powered by a supercapacitor, to protect data that is stored in the controller cache. This module eliminates the need for a lithium-ion battery, which is commonly used to protect DRAM cache memory on PCI RAID controllers. To avoid the possibility of data loss or corruption during a power or server failure, flash cache protection technology transfers the contents of the DRAM cache to NAND flash using power from the offload power module. After the power is restored to the RAID controller, the content of the NAND flash is transferred back to the DRAM, which is flushed to disk.
- MegaRAID FastPath SSD performance acceleration
MegaRAID FastPath software provides high-performance I/O acceleration for SSD-based virtual drives by using a low latency I/O path to increase the maximum I/O per second (IOPS) capability of the controller. This feature boosts the performance of applications with a highly random data storage access pattern, such as transactional databases. The feature is activated by enabling M5200 Series Performance Accelerator (47C8710).

- MegaRAID CacheCade SSD caching for traditional hard disk drives

MegaRAID CacheCade read/write software accelerates the performance of hard disk drive (HDD) arrays with only an incremental investment in solid-state drive (SSD) technology. The software enables SSDs to be configured as a dedicated pool of controller cache to help maximize the I/O performance for transaction-intensive applications, such as databases and web serving. CacheCade software tracks data storage access patterns and identifies the most frequently accessed data. The hot data is then automatically stored on the solid-state storage devices that are assigned as a dedicated cache pool on a ServeRAID controller with the M5200 Series SSD Caching feature (47C8712) enabled.

Note: Not all SSDs support CacheCade feature. For details, refer to the following web page:
<https://www-947.ibm.com/support/entry/myportal/docdisplay?Indocid=MIGR-5094754>

Technical specifications

The ServeRAID M5210 and M5210e SAS/SATA controllers have the following specifications:

- LSI SAS3108 12 Gbps RAID on Chip (ROC) controller.
- PCI low profile, half-length - MD2 form factor (M5210) or onboard chip (M5210e).
- Eight internal 12 Gbps SAS/SATA ports (support for 12, 6, or 3 Gbps SAS speeds and 6 or 3 Gbps SATA speeds). Up to 12 Gbps throughput per port.
- Two internal x4 HD Mini-SAS connectors (SFF-8643).
- PCI Express 3.0 x8 host interface.
- Support for RAID 0, 1, and 10 standard; support for RAID 5, 50, 6, and 60 with optional upgrades.
- Optional onboard data cache (DDR3 running at 1866 MHz) with the choice of the following backup:
 - 1 GB (no battery backup)
 - 1 GB, 2 GB, or 4 GB with flash backup
- Support for SAS and SATA HDDs and SSDs.
- Support for intermixing SAS and SATA HDDs and SSDs. Mixing different types of drives in the same array is not supported.
- Connections to up to 32 internal drives, depending on the server model.
- Optional support for self-encrypting drives (SEDs) with MegaRAID SafeStore.
- Optional support for SSD performance acceleration with MegaRAID FastPath and SSD caching with MegaRAID CacheCade.
- Support for up to 64 virtual disks, up to 128 arrays, up to 16 virtual disks per array, and up to 32 physical drives per array.
- Support for logical drive sizes greater than 2 TB.

- Support for Integrated MegaRAID (iMR) mode (no cache memory upgrades installed) or MegaRAID (MR) mode (requires 1 GB, 2 GB, or 4 GB cache memory upgrade).
 - iMR mode supports (no cache memory upgrades installed) the following features:
 - RAID 0, 1, and 10, and, optionally, 5 and 50
 - Fixed stripe unit size of 64 KB
 - Self-encrypting drives with optional Zero Cache/RAID 5 upgrade
 - Both RAID and JBOD (pass-thru mode with system drives) configurations
 - Up to 16 drives are supported in a RAID configuration.
 - Up to 63 drives are supported in a JBOD configuration. (JBOD drives can be used as bootable drives.)
 - MR mode supports (1 GB, 2 GB, or 4 GB cache memory upgrade required):
 - RAID 0, 1, 10, 5, and 50 and, optionally, 6 and 60 (Non-RAID is not supported.)
 - Configurable stripe unit size from 64 KB up to 1 MB
 - Self-encrypting drives
 - Optional SSD performance features (FastPath and CacheCade)
- 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 M5210 and M5210e provide support for RAID 0, 1, and 10 as standard capabilities. Additional optional functional upgrades are available to expand the standard capabilities. Some upgrades do not depend on other upgrades and can be applied to standard controllers (we call them primary upgrades). Certain upgrades cannot be applied to standard controllers and require that other upgrades are enabled before applying these upgrades (we call them secondary upgrades). There are two types of available upgrades: hardware (HW) and Feature on Demand (FoD). Hardware upgrades contain physical parts (for example, cache module or supercapacitor). FoD upgrades are software licenses. The following table lists the available primary upgrades, their capabilities, and types.

Table 2. ServeRAID M5210 and M5210e primary upgrades and their features

Feature			RAID 5 and 50	SED	1 GB cache	2 GB cache	4 GB cache	Flash-backed cache
Option description	Part number	Type						
Zero Cache/RAID 5 Upgrade	47C8708	FoD	Yes	Yes	No	No	No	No
1GB Cache/RAID 5 Upgrade	47C8656	HW	Yes	Yes	Yes	No	No	No
1GB Flash/RAID 5 Upgrade	47C8660	HW	Yes	Yes	Yes	No	No	Yes
2GB Flash/RAID 5 Upgrade	47C8664	HW	Yes	Yes	No	Yes	No	Yes
4GB Flash/RAID 5 Upgrade	47C8668	HW	Yes	Yes	No	No	Yes	Yes

The following table shows the secondary upgrades, their capabilities, types, and dependencies. The primary feature upgrades, on which the secondary upgrades depend, are listed in their respective columns. "Required" means that the primary upgrade that is listed in the column must be enabled before enabling the secondary feature that is listed in that particular row.

Table 3. ServeRAID M5210 and M5210e secondary upgrades, their features, and dependencies

Primary feature upgrades		Option description		Zero Cache/ RAID 5	1GB Cache/ RAID 5	1GB Flash/ RAID 5	2GB Flash/ RAID 5	4GB Flash/ RAID 5
Secondary feature upgrades		Part number		47C8708	47C8656	47C8660	47C8664	47C8668
		Upgrade type		FoD	HW	HW	HW	HW
Feature	Option description	Part number	Type					
RAID 6 and 60	RAID 6 Upgrade	47C8706	FoD	No support	Required	Required	Required	Required
FastPath	SSD Performance Accelerator	47C8710	FoD	No support	Required	Required	Required	Required
CacheCade	SSD Caching Enabler	47C8712	FoD	No support	Required	Required	Required	Required

Supported servers

The following table lists the compatibility information for the ServeRAID M5210 and M5210e controllers and IBM System x and IBM iDataPlex® servers.

Note: M5210 and M5210e controllers do not support 6 Gb SAS/SATA internal storage expansion options that can be installed in x3500 M4, x3550 M4, and x3650 M4 servers.

Table 3. System x, iDataPlex, and NeXtScale compatibility (Part 1)

Part number	Description	x3250 M5 (5458)	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)	x3850 X6/x3950 X6 (3837)	dx360 M4 (7912, E5-2600 v2)	nx360 M4 (5455)
46C9110	ServeRAID M5210 SAS/SATA Controller	N	Y	N	Y	N	Y	Y	Y	Y	Y	N	N
Onboard	ServeRAID M5210e SAS/SATA Controller	N	N	N	N	N	N	N	Y	Y	N	N	N
47C8708	ServeRAID M5200 Series Zero Cache/RAID 5 Upgrade	N	Y	N	Y	N	Y	Y	Y	Y	Y	N	N
47C8656	ServeRAID M5200 Series 1GB Cache/RAID 5 Upgrade	N	Y	N	Y	N	Y	Y	Y	Y	Y	N	N
47C8660	ServeRAID M5200 Series 1GB Flash/RAID 5 Upgrade	N	Y	N	Y	N	Y	Y	Y	Y	Y	N	N
47C8664	ServeRAID M5200 Series 2GB Flash/RAID 5 Upgrade	N	Y	N	Y	N	Y	Y	Y	Y	Y	N	N
47C8668	ServeRAID M5200 Series 4GB Flash/RAID 5 Upgrade	N	Y	N	Y	N	Y	Y	Y	Y	Y	N	N
47C8706	ServeRAID M5200 Series RAID 6 Upgrade	N	Y	N	Y	N	Y	Y	Y	Y	Y	N	N
47C8710	ServeRAID M5200 Series Performance Accelerator	N	Y	N	Y	N	Y	Y	Y	Y	Y	N	N
47C8712	ServeRAID M5200 Series SSD Caching Enabler	N	Y	N	Y	N	Y	Y	Y	Y	Y	N	N

Table 4. System x, iDataPlex, and NeXtScale compatibility (Part 2)

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/x3950 X5 (7143)	dx360 M4 (7912, E5-2600)
46C9110	ServeRAID M5210 SAS/SATA Controller	N	N	N	Y	N	Y	N	Y	N	N	N	N
Onboard	ServeRAID M5210e SAS/SATA Controller	N	N	N	N	N	N	N	N	N	N	N	N
47C8708	ServeRAID M5200 Series Zero Cache/RAID 5 Upgrade	N	N	N	Y	N	Y	N	Y	N	N	N	N
47C8656	ServeRAID M5200 Series 1GB Cache/RAID 5 Upgrade	N	N	N	Y	N	Y	N	Y	N	N	N	N
47C8660	ServeRAID M5200 Series 1GB Flash/RAID 5 Upgrade	N	N	N	Y	N	Y	N	Y	N	N	N	N
47C8664	ServeRAID M5200 Series 2GB Flash/RAID 5 Upgrade	N	N	N	Y	N	Y	N	Y	N	N	N	N
47C8668	ServeRAID M5200 Series 4GB Flash/RAID 5 Upgrade	N	N	N	Y	N	Y	N	Y	N	N	N	N
47C8706	ServeRAID M5200 Series RAID 6 Upgrade	N	N	N	Y	N	Y	N	Y	N	N	N	N
47C8710	ServeRAID M5200 Series Performance Accelerator	N	N	N	Y	N	Y	N	Y	N	N	N	N
47C8712	ServeRAID M5200 Series SSD Caching Enabler	N	N	N	Y	N	Y	N	Y	N	N	N	N

For more information about the System x servers that support each adapter, see the IBM ServerProven® website:

<http://ibm.com/servers/eserver/serverproven/compat/us/>

Supported drives

The ServeRAID M5210 and M5210e SAS/SATA controllers support the drives that are supported in the servers that are listed in the following table. 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.

Table 5. Drive compatibility (Part 1)

Part number	Description	x3500 M4 (7383, E5-2600)	x3500 M4 (7383, E5-2600 v2)	x3550 M4 (7914, E5-2600)	x3550 M4 (7914, E5-2600 v2)	x3650 M4 (7915, E5-2600)	x3650 M4 (7915, E5-2600 v2)	x3650 M4 BD (5466)	x3650 M4 HD (5460)	x3750 M4 (8752)	x3850 X6/x3950 X6 (3837)
1.8-inch SATA SSDs											
49Y5834	IBM 64GB SATA 1.8" MLC Enterprise Value SSD	N	N	N	N	Y	Y	N	Y	N	N
00W1222	IBM 128GB SATA 1.8" MLC Enterprise Value SSD	N	N	N	N	Y	Y	N	Y	N	N
00W1227	IBM 256GB SATA 1.8" MLC Enterprise Value SSD	N	N	N	N	Y	Y	N	Y	N	N
49Y5993	IBM 512GB SATA 1.8" MLC Enterprise Value SSD	N	N	N	N	Y	Y	N	Y	N	N
00AJ335	IBM 120GB SATA 1.8" MLC Enterprise Value SSD	N	N	N	N	Y	Y	N	Y	N	Y
00AJ340	IBM 240GB SATA 1.8" MLC Enterprise Value SSD	N	N	N	N	Y	Y	N	Y	N	Y
00AJ345	IBM 480GB SATA 1.8" MLC Enterprise Value SSD	N	N	N	N	Y	Y	N	Y	N	Y
00AJ350	IBM 800GB SATA 1.8" MLC Enterprise Value SSD	N	N	N	N	Y	Y	N	Y	N	Y
00W1120	IBM 100GB SATA 1.8" MLC Enterprise SSD	N	N	N	N	Y	Y	N	Y	N	N
49Y6119	IBM 200GB SATA 1.8" MLC Enterprise SSD	N	N	N	N	Y	Y	N	Y	N	N
49Y6124	IBM 400GB SATA 1.8" MLC Enterprise SSD	N	N	N	N	Y	Y	N	Y	N	N
00AJ040	S3500 80GB SATA 1.8" MLC Enterprise Value SSD	N	N	N	N	Y	Y	N	Y	Y	N
00AJ045	S3500 240GB SATA 1.8" MLC Enterprise Value SSD	N	N	N	N	Y	Y	N	Y	Y	N
00AJ050	S3500 400GB SATA 1.8" MLC Enterprise Value SSD	N	N	N	N	Y	Y	N	Y	Y	N
00AJ455	S3500 800GB SATA 1.8" MLC Enterprise Value SSD	N	N	N	N	Y	Y	N	Y	Y	Y
41Y8366	S3700 200GB SATA 1.8" MLC Enterprise SSD	N	N	N	N	Y	Y	N	Y	Y	Y
41Y8371	S3700 400GB SATA 1.8" MLC Enterprise SSD	N	N	N	N	Y	Y	N	Y	Y	Y

Table 5. Drive compatibility (Part 2)

Part number	Description	x3500 M4 (7383, E5-2600)	x3500 M4 (7383, E5-2600 v2)	x3550 M4 (7914, E5-2600)	x3550 M4 (7914, E5-2600 v2)	x3650 M4 (7915, E5-2600)	x3650 M4 (7915, E5-2600 v2)	x3650 M4 BD (5466)	x3650 M4 HD (5460)	x3750 M4 (8752)	x3850 X6/x3950 X6 (3837)
2.5-inch NL SAS HS HDDs											
90Y8953	IBM 500GB 7.2K 6Gbps NL SAS 2.5" SFF G2HS HDD	Y	Y	Y	Y	Y	Y	N	Y	Y	N
00AJ121	IBM 500GB 7.2K 6Gbps NL SAS 2.5" G3HS HDD	N	N	N	N	N	N	N	N	N	Y
81Y9690	IBM 1TB 7.2K 6Gbps NL SAS 2.5" SFF HS HDD	Y	Y	Y	Y	Y	Y	N	Y	Y	N
00AJ086	IBM 1TB 7.2K 6Gbps NL SAS 2.5" G3HS HDD	N	N	N	N	N	N	N	N	N	Y
2.5-inch NL SATA HS HDDs											
81Y9722	IBM 250GB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	Y	Y	Y	Y	Y	Y	N	N	Y	N
00AJ131	IBM 250GB 7.2K 6Gbps NL SATA 2.5" G3HS HDD	N	N	N	N	N	N	N	N	N	Y
81Y9726	IBM 500GB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	Y	Y	Y	Y	Y	Y	N	N	Y	N
00AJ136	IBM 500GB 7.2K 6Gbps NL SATA 2.5" G3HS HDD	N	N	N	N	N	N	N	N	N	Y
81Y9730	IBM 1TB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	Y	Y	Y	Y	Y	Y	N	N	Y	N
00AJ141	IBM 1TB 7.2K 6Gbps NL SATA 2.5" G3HS HDD	N	N	N	N	N	N	N	N	N	Y

Table 5. Drive compatibility (Part 3)

Part number	Description										
		x3500 M4 (7383, E5-2600)	x3500 M4 (7383, E5-2600 v2)	x3550 M4 (7914, E5-2600)	x3550 M4 (7914, E5-2600 v2)	x3650 M4 (7915, E5-2600)	x3650 M4 (7915, E5-2600 v2)	x3650 M4 BD (5466)	x3650 M4 HD (5460)	x3750 M4 (8752)	x3850 X6/x3950 X6 (3837)
2.5-inch SAS HS HDDs											
00AJ111	IBM 146GB 15K 6Gbps SAS 2.5" G3HS HDD	N	N	N	N	N	N	N	N	N	Y
00AJ116	IBM 146GB 15K 6Gbps SAS 2.5" G3HS SED	N	N	N	N	N	N	N	N	N	Y
90Y8926	IBM 146GB 15K 6Gbps SAS 2.5" SFF G2HS HDD	Y	Y	Y	Y	Y	Y	N	Y	Y	N
90Y8944	IBM 146GB 15K 6Gbps SAS 2.5" SFF G2HS SED	Y	Y	Y	Y	Y	Y	N	N	Y	N
00AJ096	IBM 300GB 10K 6Gbps SAS 2.5" G3HS HDD	N	N	N	N	N	N	N	N	N	Y
00AJ106	IBM 300GB 10K 6Gbps SAS 2.5" G3HS SED	N	N	N	N	N	N	N	N	N	Y
90Y8877	IBM 300GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	Y	Y	Y	Y	Y	Y	N	Y	Y	N
90Y8913	IBM 300GB 10K 6Gbps SAS 2.5" SFF G2HS SED	Y	Y	Y	Y	Y	Y	N	N	Y	N
81Y9670	IBM 300GB 15K 6Gbps SAS 2.5" SFF HS HDD	Y	Y	Y	Y	Y	Y	N	Y	Y	N
00AJ081	IBM 300GB 15K 6Gbps SAS 2.5" G3HS HDD	N	N	N	N	N	N	N	N	N	Y
00AD102	IBM 600GB 10K 6Gbps SAS 2.5" G2HS Hybrid	Y	Y	Y	Y	Y	Y	N	Y	Y	N
00AJ091	IBM 600GB 10K 6Gbps SAS 2.5" G3HS HDD	N	N	N	N	N	N	N	N	N	Y
00AJ101	IBM 600GB 10K 6Gbps SAS 2.5" G3HS SED	N	N	N	N	N	N	N	N	N	Y
90Y8872	IBM 600GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	Y	Y	Y	Y	Y	Y	N	Y	Y	N
90Y8908	IBM 600GB 10K 6Gbps SAS 2.5" SFF G2HS SED	Y	Y	Y	Y	Y	Y	N	N	Y	N
00AJ126	IBM 600GB 15K 6Gbps SAS 2.5" G3HS HDD	N	N	N	N	N	N	N	N	N	Y
00AJ071	IBM 900GB 10K 6Gbps SAS 2.5" G3HS HDD	N	N	N	N	N	N	N	N	N	Y
00AJ076	IBM 900GB 10K 6Gbps SAS 2.5" G3HS SED	N	N	N	N	N	N	N	N	N	Y
81Y9662	IBM 900GB 10K 6Gbps SAS 2.5" SFF G2HS SED	Y	Y	Y	Y	Y	Y	N	Y	Y	N
81Y9650	IBM 900GB 10K 6Gbps SAS 2.5" SFF HS HDD	Y	Y	Y	Y	Y	Y	N	Y	Y	N
00AD075	IBM 1.2TB 10K 6Gbps SAS 2.5" G2HS HDD	Y	Y	Y	Y	Y	Y	N	Y	Y	N
00AJ146	IBM 1.2TB 10K 6Gbps SAS 2.5" G3HS HDD	N	N	N	N	N	N	N	N	N	Y
00AD085	IBM 1.2TB 10K 6Gbps SAS 2.5" G2HS SED	Y	Y	Y	Y	Y	Y	N	Y	Y	N
00AJ151	IBM 1.2TB 10K 6Gbps SAS 2.5" G3HS SED	N	N	N	N	N	N	N	N	N	Y

Table 5. Drive compatibility (Part 4)

Part number	Description										
		x3500 M4 (7383, E5-2600)	x3500 M4 (7383, E5-2600 v2)	x3550 M4 (7914, E5-2600)	x3550 M4 (7914, E5-2600 v2)	x3650 M4 (7915, E5-2600)	x3650 M4 (7915, E5-2600 v2)	x3650 M4 BD (5466)	x3650 M4 HD (5460)	x3750 M4 (8752)	x3850 X6/x3950 X6 (3837)
2.5-inch SAS HS SSDs											
00AJ207	IBM 200GB SAS 2.5" MLC G3HS Enterprise SSD	N	N	N	N	N	N	N	N	N	Y
49Y6129	IBM 200GB SAS 2.5" MLC HS Enterprise SSD	Y	Y	Y	Y	Y	Y	N	Y	Y	N
00AJ212	IBM 400GB SAS 2.5" MLC G3HS Enterprise SSD	N	N	N	N	N	N	N	N	N	Y
49Y6134	IBM 400GB SAS 2.5" MLC HS Enterprise SSD	Y	Y	Y	Y	Y	Y	N	Y	Y	N
00AJ217	IBM 800GB SAS 2.5" MLC G3HS Enterprise SSD	N	N	N	N	N	N	N	N	N	Y
49Y6139	IBM 800GB SAS 2.5" MLC HS Enterprise SSD	Y	Y	Y	Y	Y	Y	N	Y	Y	N
00AJ222	IBM 1.6TB SAS 2.5" MLC G3HS Enterprise SSD	N	N	N	N	N	N	N	N	N	Y
49Y6195	IBM 1.6TB SAS 2.5" MLC HS Enterprise SSD	Y	Y	Y	Y	Y	Y	N	Y	Y	N
2.5-inch SATA SS SSDs											
90Y8668	IBM 128GB SATA 2.5" MLC SS Enterprise Value SSD	N	N	Y	Y	Y	Y	N	N	N	N
90Y8663	IBM 256GB SATA 2.5" MLC SS Enterprise Value SSD	N	N	Y	Y	Y	Y	N	N	N	N
00AJ375	IBM 120GB SATA 2.5" MLC SS Enterprise Value SSD	N	N	Y	Y	Y	Y	N	N	N	N
00AJ380	IBM 240GB SATA 2.5" MLC SS Enterprise Value SSD	N	N	Y	Y	Y	Y	N	N	N	N
00AJ385	IBM 480GB SATA 2.5" MLC SS Enterprise Value SSD	N	N	Y	Y	Y	Y	N	N	N	N
00AJ390	IBM 800GB SATA 2.5" MLC SS Enterprise Value SSD	N	N	Y	Y	Y	Y	N	N	N	N
00AJ020	S3500 120GB SATA 2.5" MLC SS Enterprise Value SSD	N	N	N	N	Y	Y	N	N	N	N
00AJ025	S3500 240GB SATA 2.5" MLC SS Enterprise Value SSD	N	N	N	N	Y	Y	N	N	N	N
00AJ030	S3500 480GB SATA 2.5" MLC SS Enterprise Value SSD	N	N	N	N	Y	Y	N	N	N	N
00AJ035	S3500 800GB SATA 2.5" MLC SS Enterprise Value SSD	N	N	N	N	Y	Y	N	N	N	N

Table 5. Drive compatibility (Part 5)

Part number	Description										
		x3500 M4 (7383, E5-2600)	x3500 M4 (7383, E5-2600 v2)	x3550 M4 (7914, E5-2600)	x3550 M4 (7914, E5-2600 v2)	x3650 M4 (7915, E5-2600)	x3650 M4 (7915, E5-2600 v2)	x3650 M4 BD (5466)	x3650 M4 HD (5460)	x3750 M4 (8752)	x3850 X6/x3950 X6 (3837)
2.5-inch SATA HS SSDs											
00W1125	IBM 100GB SATA 2.5" MLC HS Enterprise SSD	Y	Y	Y	Y	Y	Y	N	Y	N	N
49Y5839	IBM 64GB SATA 2.5" MLC HS Enterprise Value SSD	Y	Y	Y	Y	Y	Y	N	Y	N	N
90Y8648	IBM 128GB SATA 2.5" MLC HS Enterprise Value SSD	Y	Y	Y	Y	Y	Y	N	Y	N	N
90Y8643	IBM 256GB SATA 2.5" MLC HS Enterprise Value SSD	Y	Y	Y	Y	Y	Y	N	Y	N	N
49Y5844	IBM 512GB SATA 2.5" MLC HS Enterprise Value SSD	Y	Y	Y	Y	Y	Y	N	Y	N	N
00AJ395	IBM 120GB SATA 2.5" MLC G3HS Enterprise Value SSD	N	N	N	N	N	N	N	N	N	Y
00AJ355	IBM 120GB SATA 2.5" MLC HS Enterprise Value SSD	Y	Y	Y	Y	Y	Y	N	Y	N	N
00AJ400	IBM 240GB SATA 2.5" MLC G3HS Enterprise Value SSD	N	N	N	N	N	N	N	N	N	Y
00AJ360	IBM 240GB SATA 2.5" MLC HS Enterprise Value SSD	Y	Y	Y	Y	Y	Y	N	Y	N	N
00AJ405	IBM 480GB SATA 2.5" MLC G3HS Enterprise Value SSD	N	N	N	N	N	N	N	N	N	Y
00AJ365	IBM 480GB SATA 2.5" MLC HS Enterprise Value SSD	Y	Y	Y	Y	Y	Y	N	Y	N	N
00AJ410	IBM 800GB SATA 2.5" MLC G3HS Enterprise Value SSD	N	N	N	N	N	N	N	N	N	Y
00AJ370	IBM 800GB SATA 2.5" MLC HS Enterprise Value SSD	Y	Y	Y	Y	Y	Y	N	Y	N	N
00AJ000	S3500 120GB SATA 2.5" MLC HS Enterprise Value SSD	Y	Y	Y	Y	Y	Y	N	N	Y	N
00AJ005	S3500 240GB SATA 2.5" MLC HS Enterprise Value SSD	Y	Y	Y	Y	Y	Y	N	N	Y	N
00AJ010	S3500 480GB SATA 2.5" MLC HS Enterprise Value SSD	Y	Y	Y	Y	Y	Y	N	N	Y	N
00AJ015	S3500 800GB SATA 2.5" MLC HS Enterprise Value SSD	Y	Y	Y	Y	Y	Y	N	N	Y	N
41Y8331	S3700 200GB SATA 2.5" MLC HS Enterprise SSD	N	N	N	N	N	N	N	N	N	Y
00AJ156	S3700 200GB SATA 2.5" MLC G3HS Enterprise SSD	Y	Y	Y	Y	Y	Y	N	Y	Y	N
41Y8336	S3700 400GB SATA 2.5" MLC HS Enterprise SSD	N	N	N	N	N	N	N	N	N	Y
00AJ161	S3700 400GB SATA 2.5" MLC G3HS Enterprise SSD	Y	Y	Y	Y	Y	Y	N	Y	Y	N
41Y8341	S3700 800GB SATA 2.5" MLC HS Enterprise SSD	N	N	N	N	N	N	N	N	N	Y
00AJ166	S3700 800GB SATA 2.5" MLC G3HS Enterprise SSD	Y	Y	Y	Y	Y	Y	N	Y	Y	N

Table 5. Drive compatibility (Part 6)

Part number	Description	x3500 M4 (7383, E5-2600)	x3500 M4 (7383, E5-2600 v2)	x3550 M4 (7914, E5-2600)	x3550 M4 (7914, E5-2600 v2)	x3650 M4 (7915, E5-2600)	x3650 M4 (7915, E5-2600 v2)	x3650 M4 BD (5466)	x3650 M4 HD (5460)	x3750 M4 (8752)	x3850 X6/x3950 X6 (3837)
3.5-inch NL SAS HS HDDs											
90Y8567	IBM 1TB 7.2K 6Gbps NL SAS 3.5" G2HS HDD	Y	Y	Y	Y	Y	Y	Y	N	N	N
00W1533	IBM 2TB 7.2K 6Gbps NL SAS 3.5" G2HS SED	Y	Y	Y	Y	Y	Y	N	N	N	N
90Y8572	IBM 2TB 7.2K 6Gbps NL SAS 3.5" G2HS HDD	Y	Y	Y	Y	Y	Y	Y	N	N	N
90Y8577	IBM 3TB 7.2K 6Gbps NL SAS 3.5" G2HS HDD	Y	Y	Y	Y	Y	Y	Y	N	N	N
00W1543	IBM 4TB 7.2K 6Gbps NL SAS 3.5" G2HS SED	Y	Y	Y	Y	Y	Y	N	N	N	N
49Y6210	IBM 4TB 7.2K 6Gbps NL SAS 3.5" G2HS HDD	Y	Y	Y	Y	Y	Y	Y	N	N	N
3.5-inch NL SATA HS HDDs											
81Y9786	IBM 500GB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	Y	Y	Y	Y	Y	Y	Y	N	N	N
81Y9790	IBM 1TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	Y	Y	Y	Y	Y	Y	Y	N	N	N
81Y9794	IBM 2TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	Y	Y	Y	Y	Y	Y	Y	N	N	N
81Y9798	IBM 3TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	Y	Y	Y	Y	Y	Y	Y	N	N	N
49Y6002	IBM 4TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	Y	Y	Y	Y	Y	Y	Y	N	N	N
3.5-inch NL SATA SS HDDs											
81Y9802	IBM 500GB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	Y	Y	Y	Y	Y	Y	N	N	N	N
81Y9806	IBM 1TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	Y	Y	Y	Y	Y	Y	N	N	N	N
81Y9810	IBM 2TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	Y	Y	Y	Y	Y	Y	N	N	N	N
81Y9814	IBM 3TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	Y	Y	Y	Y	Y	Y	N	N	N	N
49Y6012	IBM 4TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	Y	Y	Y	Y	Y	Y	N	N	N	N
3.5-inch SAS HS HDDs											
49Y6092	IBM 300GB 15K 6Gbps SAS 3.5" G2HS HDD	Y	Y	Y	Y	Y	Y	Y	N	N	N
49Y6097	IBM 450GB 15K 6Gbps SAS 3.5" G2HS HDD	Y	Y	Y	Y	Y	Y	Y	N	N	N
49Y6102	IBM 600GB 15K 6Gbps SAS 3.5" G2HS HDD	Y	Y	Y	Y	Y	Y	Y	N	N	N

Table 5. Drive compatibility (Part 7)

Part number	Description	x3500 M4 (7383, E5-2600)	x3500 M4 (7383, E5-2600 v2)	x3550 M4 (7914, E5-2600)	x3550 M4 (7914, E5-2600 v2)	x3650 M4 (7915, E5-2600)	x3650 M4 (7915, E5-2600 v2)	x3650 M4 BD (5466)	x3650 M4 HD (5460)	x3750 M4 (8752)	x3850 X6/x3950 X6 (3837)
3.5-inch SATA HS SSDs											
00W1286	IBM 64GB SATA 3.5" MLC HS Enterprise Value SSD	N	N	N	N	N	N	Y	N	N	N
00W1291	IBM 128GB SATA 3.5" MLC HS Enterprise Value SSD	N	N	N	N	N	N	Y	N	N	N
00W1296	IBM 256GB SATA 3.5" MLC HS Enterprise Value SSD	N	N	N	N	N	N	Y	N	N	N
00W1301	IBM 512GB SATA 3.5" MLC HS Enterprise Value SSD	N	N	N	N	N	N	Y	N	N	N
00AJ435	IBM 120GB SATA 3.5" MLC HS Enterprise Value SSD	N	N	N	N	N	N	Y	N	N	N
00AJ440	IBM 240GB SATA 3.5" MLC HS Enterprise Value SSD	N	N	N	N	N	N	Y	N	N	N
00AJ445	IBM 480GB SATA 3.5" MLC HS Enterprise Value SSD	N	N	N	N	N	N	Y	N	N	N
00AJ450	IBM 800GB SATA 3.5" MLC HS Enterprise Value SSD	N	N	N	N	N	N	Y	N	N	N

Supported operating systems

The ServerRAID M5210 and M5210e SAS/SATA Controllers support the following operating systems:

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

For more information about the specific versions and service levels that are supported and any other prerequisites, see the IBM ServerProven website:

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

Warranty

The ServeRAID M5210 SAS/SATA Controller carries a 1-year limited warranty. When installed in a supported System x server, the adapter assumes your system's base warranty and any IBM ServicePac® upgrade.

Physical specifications

The ServeRAID M5210 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: 99 g (0.2 lb)

Shipping dimensions (approximate):

- Height: 51 mm (2.0 in.)
- Width: 143 mm (5.6 in.)
- Depth: 238 mm (9.4 in.)
- Weight: 320 g (0.7 lb)

Operating environment

The ServeRAID M5210 SAS/SATA Controller is supported in the following environment:

- Temperature: 5 - 40 °C (41 - 104 °F) at 0 - 5,000 m (0 - 16,404 ft)
- Relative humidity: 8% - 93% (non-condensing)
- Maximum altitude: 5,000 m (16,404 ft)

Agency approvals

The ServeRAID M5210 SAS/SATA Controller conforms to the following regulations:

- UL
- cUL
- IEC60950
- EMC
- FCC
- TUV
- CE
- VCCI
- BSMI
- C-tick
- KC

Related publications and links

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/ENUS113-142>
- System x RAID products home page:
http://www.ibm.com/systems/storage/product/systemx/scsi_raid.html
- ServeRAID M5210 support
http://ibm.com/support/entry/portal/search_results?q=M5210
- IBM ServeRAID software matrix:
<http://ibm.com/support/entry/portal/docdisplay?Indocid=SERV-RAID>
- IBM System x Configuration and Options Guide:
<http://ibm.com/systems/xbc/cog/>

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