IBM ServeRAID Adapter Quick Reference

The ServeRAID family of adapters provides a new level of reliability, availability, and performance to businesses that are facing storage challenges driven by unprecedented data growth. With data transfer rates of up to 6 Gbps per port, the ServeRAID family bring users new features and improved performance, while continuing to support all the benefits of the previous 3 Gbps SAS/SATA generation. The newest members of the ServeRAID line of adapters are ideal for inside-the-box connectivity, employing the latest in RAID on Chip technology, complying with the PCI Express 2.0 specification, and providing additional data security using encryption services with Self-Encrypting Drives (SED).

Looking for older adapters? You can find reference information for older ServeRAID controllers, all the way back to the 1996-vintage ServeRAID I adapter, in the *ServeRAID Adapter Quick Reference - Archive* available at http://www.redbooks.ibm.com/abstracts/tips0784.html.

This document provides a summary of the features and specifications of each of the ServeRAID controllers and SAS HBAs that we currently offer for sale.

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Introduction

Whether you are protecting your storage network, enterprise databases, or application network, the System x ServeRAID family of SAS/SATA Controllers and Host Bus Adapters delivers benefits to fit your requirements. IBM offers the choice of integrated single-port or dual-port RAID controllers. Combining these controllers with internal disk drives or external storage expansion unit increases storage capabilities.

Table 1. Adapter positioning

	Host Bus Adapters	Basic RAID (emphasis on cost)	Enterprise RAID (emphasis on performance)
6 Gbps SAS	IBM 6Gb SSD HBA IBM 6Gb SAS HBA	ServeRAID M1015	ServeRAID M5025 ServeRAID M5015 ServeRAID M5014 ServeRAID B5015 SSD
3 Gbps SAS	IBM 3Gb SAS HBA v2	ServeRAID BR10i ServeRAID BR10il ServeRAID BR10il v2	ServeRAID MR10M ServeRAID MR10is VAULT ServeRAID MR10k ServeRAID MR10i

ServeRAID M5025 SAS/SATA Controller

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 that can 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. ServeRAID M5025 SAS/SATA Controller

Table 2. ServeRAID M5025 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 (for connectivity to external SAS enclosures)	39R6531	3707
IBM 1m SAS Cable (for connectivity to external SAS enclosures)	39R6529	3708

ServeRAID M5025 specifications

The ServeRAID M5025 adapter card has the following specifications:

- Eight external 6 Gbps SAS 2.0 ports implemented through 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 1024 KB
- Compliant with Disk Data Format (DDF) configuration on disk (COD)
- S.M.A.R.T. support
- Supports the optional M5000 Advanced Feature Key, which enables the following features:
  - RAID levels 6 and 60
  - LSI SafeStore: Support for self-encrypting drive services, such as instant secure erase and local key management (which requires the use of self-encrypting drives)

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.

The ServeRAID M5025 Controller supports connectivity to the external SAS expansion enclosures that are 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

Resources:

- ServeRAID M5025 SAS/SATA Controller for IBM System x at-a-glance guide
  http://www.redbooks.ibm.com/abstracts/tips0739.html
- ServeRAID M5025 SAS/SATA Controller Installation Guide
  http://www.ibm.com/support

- ServeRAID software and drivers
  http://www.ibm.com/support/docview.wss?uid=psg1SERV-RAID
- IBM Announcement Letter for the ServeRAID M5025
  US: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS110-172
  EMEA: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=877/ENUSZG10-0252
- IBM Announcement Letter for the M5000 Series Advanced Feature Key:
  US: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS109-739
  EMEA: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=877/ENUSZG09-0870
- IBM System x RAID products home page
  http://www.ibm.com/systems/storage/product/systemx/scsi_raid.html

ServeRAID M5015 SAS/SATA Controller

The ServeRAID M5015 SAS/SATA Controller for IBM System x is the next-generation 6 Gbps SAS 2.0 RAID controllers. The adapter has two internal mini-SAS connectors that can control up to 32 devices and supports global and dedicated hot-spare drives.

The ServeRAID M5015 controller delivers a full RAID 6 Gbps SAS 2.0 solution with 512 MB of cache and a standard battery backup unit (standard when ordering the option part number). With the attachment of the ServeRAID M5000 Advanced Feature Key, the ServeRAID M5015 offers the option of RAID 6, RAID 60, and SED Encryption Key management.

Figure 2. IBM ServeRAID M5015 SAS/SATA Controller with the battery backup unit attached

Table 4. ServeRAID M5015 SAS/SATA Controller part numbers and feature codes

Description	Part number	Feature code
ServeRAID M5015 SAS/SATA Controller	46M0829 (with battery)	0093 (optional battery)
ServeRAID M5000 Series Advanced Feature Key (RAID 6, 60; SED support)	46M0930	5106
ServeRAID M5000 Series Battery Kit	46M0917	5744
ServeRAID M5000 Series Battery Remote Mount Cable	68Y7396	5862

Included components:

- The ServeRAID M5015 option part number 46M0829 includes the M5000 battery; however, the feature code 0093 does not contain the battery. Order feature code 5744 if you want to include the battery in the server configuration.
- The ServeRAID M5000 Series Battery Kit option part number includes a battery but does not include the remote mount cable.
- The ServeRAID M5000 Series Battery Remote Mount Cable is a 24-inch cable and enables the battery to be installed separately from the adapter. The cable is only required for certain systems.

ServeRAID M5015 specifications

The ServeRAID M5015 and ServeRAID M5014 adapter cards have the following specifications:

- Eight internal 6 Gbps SAS/SATA ports
- Two Mini-SAS internal connectors (SFF-8087)
- 6 Gbps throughput per port
- 800 MHz PowerPC processor with LSI SAS2108 6 Gbps RAID on Chip (ROC) controller
- x8 PCI Express 2.0 host interface
- 512 MB onboard data cache (DDR2 running at 800 MHz)
- Standard intelligent Li-Ion-based battery backup unit with up to 48 hours of data retention (Note that when ordering the adapter using feature code 0093, the battery is not included and must be added using feature code 5744)
- 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 32 SAS or SATA drives
- 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 1024 KB
- Compliant with Disk Data Format (DDF) configuration on disk (COD)
- S.M.A.R.T. support
- Supports the optional M5000 Advanced Feature Key, which enables the following features:
    - RAID levels 6 and 60
    - LSI SafeStore: Support for self-encrypting drive (SED) services, such as instant secure erase and local key management (which requires the use of self-encrypting drives)

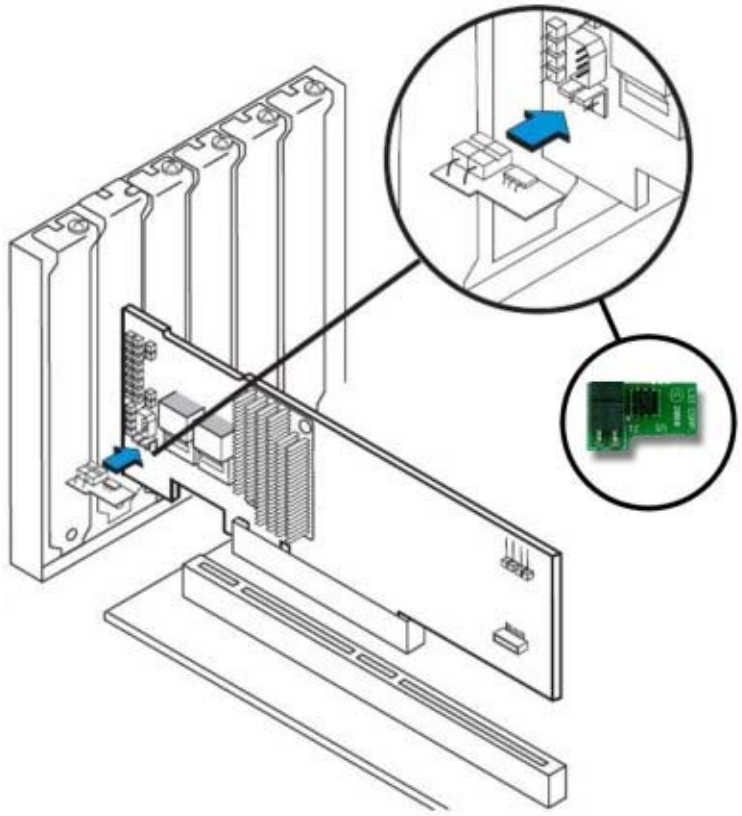

Figure 3. ServeRAID M5000 Series Advanced Feature Key attached to the ServeRAID M5015 Controller

Resources:

- ServeRAID M5015 and M5014 SAS/SATA Controllers for IBM System x at-a-glance guide
  http://www.redbooks.ibm.com/abstracts/tips0738.html
- ServeRAID M5015 and M5014 User's Guide
  http://www.ibm.com/support/docview.wss?uid=psg1MIGR-5083652
- ServeRAID software and drivers
  http://www.ibm.com/support/docview.wss?uid=psg1SERV-RAID
- IBM Announcement Letter for the M5015 and M5014 Controllers
  US: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS109-416
  EMEA: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=877/ENUSZG09-0479
- IBM Announcement Letter for the M5000 Series Advanced Feature Key
  US: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS109-739
  EMEA: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=877/ENUSZG09-0870
- IBM Announcement Letter for the M5000 Series Battery Remote Mount Cable
  US: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS110-013
  EMEA: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=877/ENUSZG10-0011
- IBM System x RAID products home page
  http://www.ibm.com/systems/storage/product/systemx/scsi_raid.html

ServeRAID M5014 SAS/SATA Controller

The ServeRAID M5014 SAS/SATA Controller for IBM System x is a 6 Gbps SAS 2.0 RAID controller. The adapter has two internal mini-SAS connectors to control up to 32 devices and support global and dedicated hot-spare drives.

The ServeRAID M5014 controller delivers a full RAID 6 Gbps SAS 2.0 solution with 256 MB of cache and an optional battery. With the attachment of the ServeRAID M5000 Advanced Feature Key, the ServeRAID M5014 offers the option of RAID 6, RAID 60, and SED Encryption Key management.

Figure 4. IBM ServeRAID M5014 SAS/SATA Controller

Table 5. ServeRAID M5014 Controller part numbers and feature codes

Description	Part number	Feature code
ServeRAID M5014 SAS/SATA Controller (optional battery)	46M0916	3877
ServeRAID M5000 Series Advanced Feature Key (RAID 6, 60; SED support)	46M0930	5106
ServeRAID M5000 Series Battery Kit	46M0917	5744
ServeRAID M5000 Series Battery Remote Mount Cable	68Y7396	5862

Included components:

- The ServeRAID M5000 Series Battery Kit option part number includes a battery but does not include the remote mount cable.
- The ServeRAID M5000 Series Battery Remote Mount Cable is a 24-inch cable and enables the battery to be installed separately from the adapter. The cable is only required for certain systems.

ServeRAID M5014 specifications

The ServeRAID M5014 adapter card has the following specifications:

- Eight internal 6 Gbps SAS/SATA ports
- Two Mini-SAS internal connectors (SFF-8087)
- 6 Gbps throughput per port
- 800 MHz PowerPC processor with LSI SAS2108 6 Gbps RAID on Chip (ROC) controller
- x8 PCI Express 2.0 host interface
- 256 MB onboard data cache (DDR2 running at 800 MHz)
- Optional intelligent Li-Ion-based battery backup unit 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 32 SAS or SATA drives
- 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 1024 KB
- Compliant with Disk Data Format (DDF) configuration on disk (COD)
- S.M.A.R.T. support
- Supports the optional M5000 Advanced Feature Key which enables the following features:
  - RAID levels 6 and 60
  - LSI SafeStore: Support for self-encrypting drive (SED) services, such as instant secure erase and local key management (which requires the use of self-encrypting drives)

Resources:

- ServeRAID M5015 and M5014 SAS/SATA Controllers for IBM System x at-a-glance guide
  http://www.redbooks.ibm.com/abstracts/tips0738.html
- ServeRAID M5015 and M5014 User's Guide
  http://www.ibm.com/support/docview.wss?uid=psg1MIGR-5083652
- ServeRAID software and drivers
  http://www.ibm.com/support/docview.wss?uid=psg1SERV-RAID
- IBM Announcement Letter for the M5015 and M5014 Controllers
  US: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS109-416
  EMEA: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=877/ENUSZG09-0479
- IBM Announcement Letter for the M5000 Series Advanced Feature Key
  US: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS109-739
  EMEA: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=877/ENUSZG09-0870
- IBM Announcement Letter for the M5000 Series Battery Remote Mount Cable
  US: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS110-013
  EMEA: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=877/ENUSZG10-0011
- IBM System x RAID products home page
  http://www.ibm.com/systems/storage/product/systemx/scsi_raid.html

ServeRAID M1015 SAS/SATA Controller

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 5. ServeRAID M1015 SAS/SATA Controller

Table 6. ServeRAID M1015 SAS/SATA Controller part numbers and feature codes

Description	Part number	Feature code
ServeRAID M1015 SAS/SATA Controller	46M0831	0095
ServeRAID M1000 Series Advanced Feature Key (RAID 5, 50; SED support)	46M0832	9749

ServeRAID M1015 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
- Maximum stripe size: 64 KB (fixed)
- Supports the optional M1000 Advanced Feature Key which enables the following features:
  - RAID levels 5 and 50
  - LSI SafeStore: Support for self-encrypting drive (SED) services, such as instant secure erase and local key management (which requires the use of self-encrypting drives)

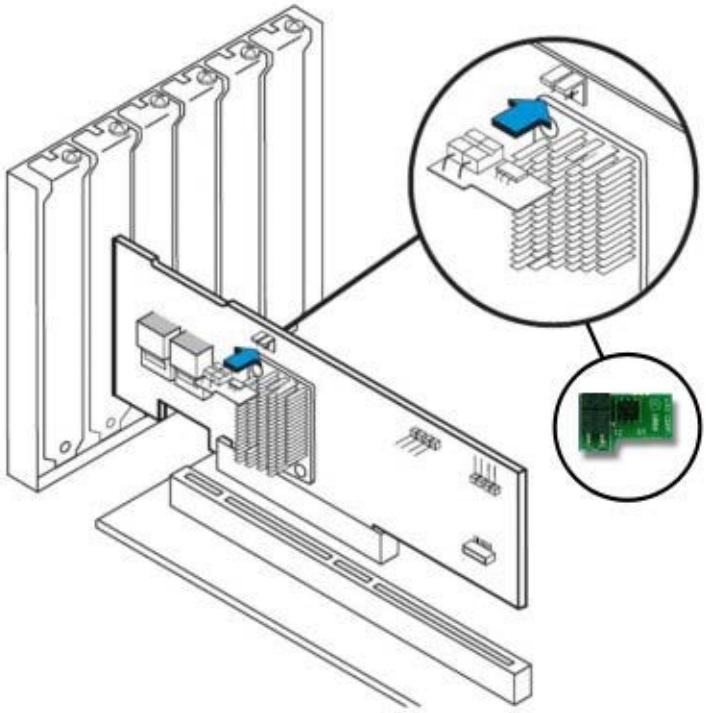

Figure 6. ServeRAID M1000 Series Advanced Feature Key attached to the ServeRAID M1015 controller just above the heat sink

Resources:

- ServeRAID M1015 SAS/SATA Controller for IBM System x at-a-glance guide
  http://www.redbooks.ibm.com/abstracts/tips0740.html
- ServeRAID M1015 User's Guide
  http://www.ibm.com/support/docview.wss?uid=psg1MIGR-5083720
- ServeRAID software and drivers
  http://www.ibm.com/support/docview.wss?uid=psg1SERV-RAID
- IBM Announcement Letter
  US: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS109-739
  EMEA: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=877/ENUSZG09-0870
- IBM System x RAID products home page
  http://www.ibm.com/systems/storage/product/systemx/scsi_raid.html

ServeRAID B5015 SSD Controller

Today's business-critical servers require more protection, performance, and manageability than ever. An enterprise-grade RAID solution needs to provide the greatest level of data protection, the highest performance, and easy-to-use management tools. The ServeRAID B5015 SSD Controller combines the PM8013 maxSAS RAID-on-Chip (RoC) controller and the RAID stack from PMC-Sierra to accommodate the most rigorous server environments and to support high-performing SSDs.

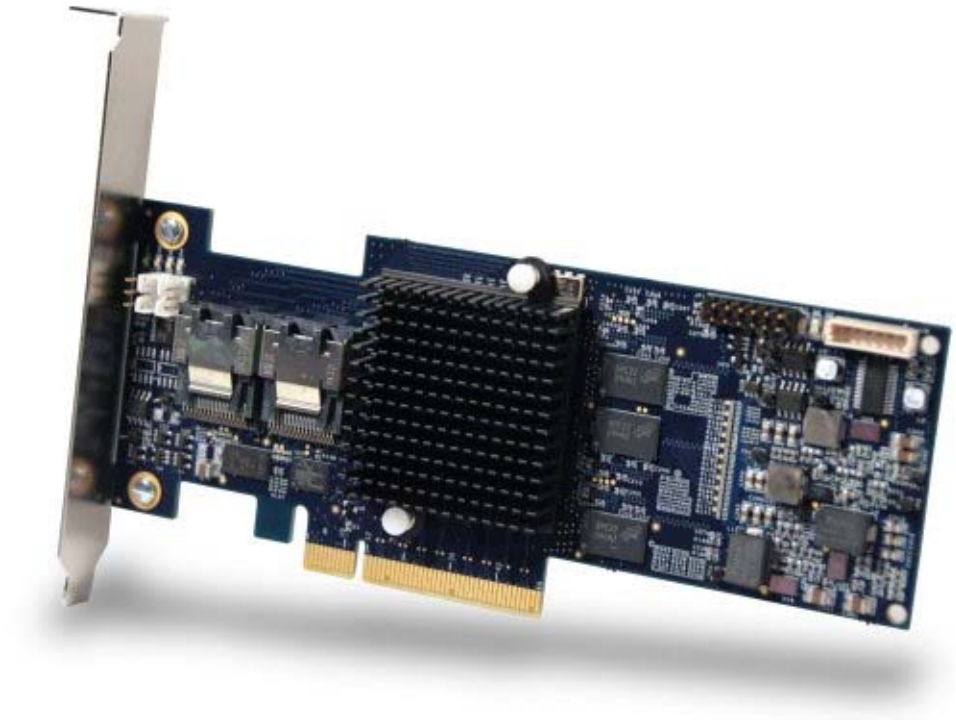

Figure 7. ServeRAID B5015 SSD Controller

Table 7. ServeRAID B5015 SSD Controller part numbers and feature codes

Description	Part number	Feature code
ServeRAID B5015 SSD Controller	46M0969	3889

ServeRAID B5015 specifications

The ServeRAID B5015 SSD Controller has the following specifications:

- RAID 1 and 5 support
- Hot-spare support with automatic rebuild capability
- Background data scrubbing
- 6 Gbps per SAS port
- PCI Express 2.0 x8 host interface
- PCI MD2 low profile form factor
- Two x4 internal (SFF-8087) connectors
- SAS controller: PMC-Sierra PM8013 maxSAS 6 Gbps SAS RoC controller
- Up to 8 disk drives per RAID adapter
- Performance optimized for SSDs
- Three multi-threading MIPS processing cores
- High performance contention-free architecture
- Up to four ServeRAID B5015 adapters supported in a system
- Maximum stripe size: 1024 KB
- Support for up to 4 arrays/logical volumes

Resources:

- ServeRAID B5015 SSD Controller for IBM System x at-a-glance guide
  http://www.redbooks.ibm.com/abstracts/tips0763.html
- ServeRAID B5015 Installation Guide (download the unpack the ISO file)
  http://www.ibm.com/support/docview.wss?uid=psg1MIGR-5085047
- ServeRAID B5015 drivers, maxRAID software, and utilities
  http://www.ibm.com/support/docview.wss?uid=psg1MIGR-5085047
- IBM Announcement Letter
  US: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS110-113
  EMEA: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=877/ENUSZG10-0161

IBM 6Gb SAS HBA

The IBM 6Gb SAS 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 IBM 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.

Figure 8. IBM 6Gb SAS Host Bus Adapter with the PCIe slot bracket removed

Table 8. IBM 6Gb SAS Host Bus Adapter part number and feature code

Description	Part number	Feature code
IBM 6 Gb SAS Host Bus Adapter for System x	46M0907	3875

IBM 6Gb SAS HBA specifications

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

- Four internal SAS x1 connectors (SFF-8087)
- One external SAS x4 connector (SFF-8088)
- PCI Express x8 2.0 host interface
- SAS Controller: LSI SAS2008
- 6 Gbps per port data transfer rate
- MD2 small form factor
- High performance I/O Processor: PowerPC 440 at 533 MHz
- uEFI support
- RAID levels : None (uses RAID as provided by external disk enclosures)
- Maximum endpoint devices: 512
- Power consumption: 13.5 W

Supported tape drives and disk enclosures

The IBM 6Gb SAS Host Bus Adapter supports connectivity to the following tape drives:

- IBM Half High LTO Gen 3 SAS Tape Drive, 43W8478
- IBM Half High LTO Gen 4 SAS Tape Drive, 44E8895
- IBM DDS Gen 5 SATA Tape Drive, 43W8480
- IBM GoVault Internal Dock, 42D8771

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

- IBM System Storage DS3512 Express Single Controller Storage System (1746A2S)
- IBM System Storage DS3512 Express Dual Controller Storage System (1746A2D)
- IBM System Storage DS3524 Express Single Controller Storage System (1746A4S)
- IBM System Storage DS3524 Express Dual Controller Storage System (1746A4D)

The following external cables are supported:

- IBM 3 m SAS Cable, part number 39R6531
- IBM 1 m SAS Cable, part number 39R6529

Note: The adapter does not support internal disk drives.

Resources:

- IBM 6Gb SAS HBA for IBM System x at-a-glance guide
  http://www.redbooks.ibm.com/abstracts/tips0776.html
- IBM 6Gb SAS HBA drivers and utilities
  http://www.ibm.com/support/docview.wss?uid=psg1MIGR-5084922
- IBM Announcement Letter
  US: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS110-013
  EMEA: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=877/ENUSZG10-0011

IBM 6Gb SSD HBA

The IBM 6Gb SSD Host Bus Adapter is an ideal HBA to connect to high-performance solid state drives. With a PCI Express 2.0 x8 interface, two SAS x4 SFF-8087 connectors, and a high performance PowerPC I/O processor, this HBA can support the bandwidth that solid state drives can generate.

Figure 9. IBM 6Gb SSD Host Bus Adapter

Table 9. IBM 6Gb SSD Host Bus Adapter part number and feature code

Description	Part number	Feature code
IBM 6Gb SSD Host Bus Adapter for IBM System x	None*	3876

* The IBM 6Gb SSD Host Bus Adapter is currently not available as a separately orderable option. Use the feature code to add the adapter to a customized order using the configure-to-order (CTO) process. 46M0914 is the L1 manufacturing part number. 46M0983 is the pseudo option number also used in manufacturing.

Table 10 lists the SSDs supported by the 6Gb SSD HBA and what servers they are supported in.

Table 10. List of solid state drives that the IBM 6Gb SSD Host Bus Adapter supports

Solid state drive	Part number	x3550 M2	x3550 M3	x3650 M2	x3650 M3	x3690 X5	x3850 X5
IBM 50 GB SATA 1.8" NHS SSD	43W7734	N	N	N	N	Y	Y
IBM 50 GB SATA 2.5" SFF Slim-HS High IOPS SSD	43W7714	Y	Y	Y	Y	N	N
IBM 31.4 GB SATA 2.5" SFF Slim-HS SSD V2	41Y8264	Y	N	Y	N	N	N

IBM 6Gb SSD HBA specifications

The IBM 6Gb SSD Host Bus Adapter has the following specifications:

- Two internal mini-SAS x4 connectors (SFF-8087)
- PCI Express x8 2.0 host interface
- SAS Controller: LSI SAS2008
- 6 Gbps per port data transfer rate
- MD2 small form factor
- High performance I/O Processor: PowerPC 440 at 533 MHz
- uEFI support
- RAID levels : None
- Maximum endpoint devices: 256
- Power consumption: 13.5 W

Resources:

- IBM 6Gb SSD HBA for IBM System x at-a-glance guide
  http://www.redbooks.ibm.com/abstracts/tips0744.html
- IBM 6Gb SSD HBA drivers and utilities
  http://www.ibm.com/support/docview.wss?uid=psg1MIGR-5084922
- IBM Announcement Letter
  US: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS110-013
  EMEA: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=877/ENUSZG10-0011

IBM 3Gb SAS HBA v2

The IBM 3Gb SAS HBA v2 provides an ideal solution for all servers and workstations needing ultra high-speed data transfer in disk connectivity for data backup and mission critical applications. This HBA provides support for SAS and SATA HDDs and tape drive configurations.

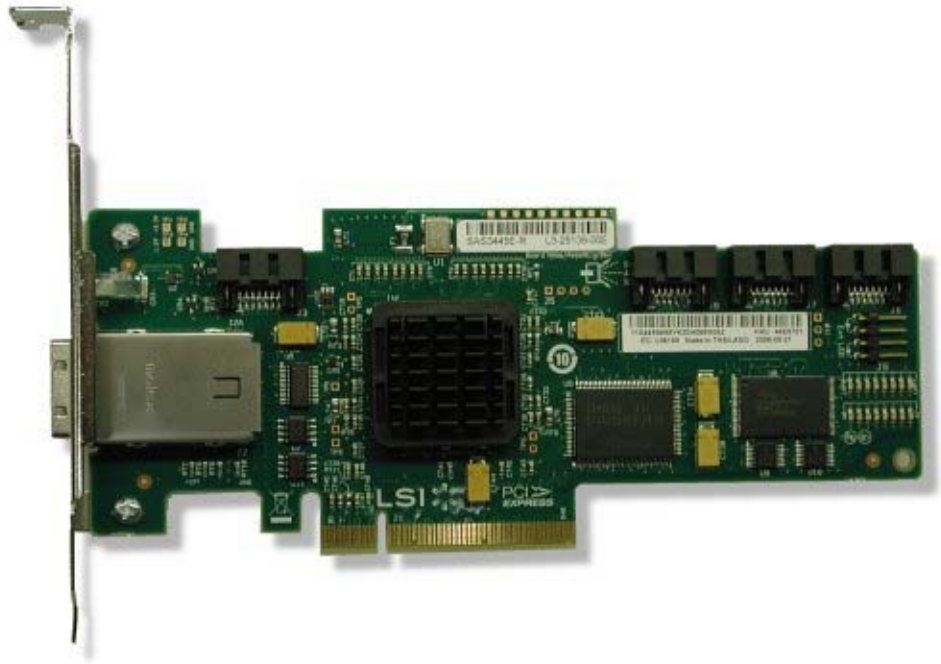

Figure 10. IBM 3Gb SAS HBA v2

Table 11. IBM 3Gb SAS HBA v2 part number and feature code

Description	Part number	Feature code
IBM 3Gb SAS HBA v2	44E8700	3583

IBM 3Gb SAS HBA v2 specifications:

- 1 external Mini-SAS x4 connector (SFF-8088)
- 4 internal SATA x1 connectors
- LSI 1068E SAS controller
- PCI Express x8 host interface
- RAID levels: None*

* The 3Gb SAS HBA v2 supports RAID but only on the System x3455 (RAID levels 0, 1, 1E are supported). All other supported systems support tape connectivity only. See the announcement letter (link below) for details.

Resources:

- IBM 3Gb SAS HBA User's Guide
  http://www.ibm.com/support/docview.wss?uid=psg1MIGR-5084130
- IBM Announcement Letter
  US: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS109-099
  EMEA: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=877/ENUSZG09-0132

ServeRAID MR10M SAS/SATA Controller

The ServeRAID-MR10M SAS/SATA Controller is a high performance PCIe RAID Controller for external direct-attached storage, including IBM System Storage EXP3000. This RAID adapter provides investment protection by supporting SAS and SATA hard drive configurations, and providing performance enhancements enabled by a standard battery. The battery enables cached data protection during unexpected power outages when the controller is operating in its higher performance, write back mode.

Figure 11. ServeRAID-MR10M SAS/SATA Controller

Table 12. ServeRAID-MR10M SAS/SATA Controller part number and feature code

Description	Part number	Feature code
ServeRAID MR10M SAS/SATA Controller	44E8825 43W4339*	3559

* Part number 43W4339 is withdrawn

ServeRAID MR10M specifications

The ServeRAID MR10M has the following specifications:

- MD2 form factor card (2U low profile height)
- Two SFF-8088 SAS x4 external connectors
- PCI Express x8 host interface
- SAS Controller: LSI 1078e
- 3 Gbps per port data transfer rate
- Supports SAS 3 Gbps and SATA 2
- 256 MB cache
- Li-Ion battery backup
- Maximum stripe size: 1024 KB
- RAID levels : RAID 0, 1, 5, 6, 10, 50, 60

Resources:

- ServeRAID MR10M User's Guide
  http://www.ibm.com/support/docview.wss?uid=psg1MIGR-5074105
- ServeRAID software and drivers
  http://www.ibm.com/support/docview.wss?uid=psg1SERV-RAID
- IBM Announcement Letter
  US: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS107-594
  EMEA: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=877/ENUSZG08-0660

ServeRAID MR10i SAS/SATA Controller

The ServeRAID-MR10i SAS/SATA Controller is a low-cost PCIe RAID controller for Internal System RAID 0, 1, 10, 5, 50, 6, 60. This full height, half length adapter uses an LSI 1078 controller with an x8 PCI Express host interface and eight internal SAS/SATA II 3 Gb/s ports. MegaRAID Storage Manager (MSM), included with ServeRAID-MR10i, is a robust RAID management, configuration, and reporting application.

Figure 12. ServeRAID-MR10i SAS/SATA Controller

Table 13. ServeRAID-MR10i SAS/SATA Controller part numbers and feature codes.

Description	Part number	Feature code
ServeRAID MR10i SAS/SATA Controller	43W4296	3571
ServeRAID-MR10i NiMH Battery	43W4299*	None
ServeRAID-MR10i Li-Ion Battery	44E8826	5864

* Withdrawn from marketing

ServeRAID MR10i specifications

The ServeRAID MR10i has the following specifications:

- Full height (3U), half length card
- Two internal x4 SFF-8087 connectors
- PCI Express x8 host interface
- SAS Controller: LSI 1078e
- 3 Gbps per port data transfer rate
- Supports SAS 3 Gbps and SATA 2
- 256 MB cache
- Optional battery backup; two options: NiMH (now withdrawn from marketing) or Li-Ion
- Maximum stripe size: 1024 KB
- RAID levels : RAID 0, 1, 5, 6, 10, 50, 60

Note: Not all servers that support this controller also support the battery. See ServerProven for details.

Resources:

- ServeRAID MR10i User's Guide
  http://www.ibm.com/support/docview.wss?uid=psg1MIGR-5074114
- ServeRAID software and drivers
  http://www.ibm.com/support/docview.wss?uid=psg1SERV-RAID
- IBM Announcement Letter
  US: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS108-055
  EMEA: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=877/ENUSZG08-0114

ServeRAID MR10is VAULT SAS/SATA Controller

The ServeRAID-MR10is VAULT SAS/SATA Controller is a RAID controller with built-in crypto engine to encrypt data written to the hard drives. With an easy to use GUI, it simplifies the complexity of key management, setup and configuration. The ServeRAID-MR10is kit enables you to use data encryption for internal system RAID 0, 1, 10, 5, 50, 6, or 60.

Figure 13. ServeRAID-MR10is VAULT SAS/SATA Controller

The ServeRAID-MR10is Controller offers data protection using the Data Encryption (DE) feature. This feature protects data from theft and helps meet regulatory compliance. The DE feature allows you to enable or disable security through management of the keys on the controller and physical drives

As it applies to data encryption, the DE feature satisfies the Federal Information Processing Standard (FIPS197) requirements set forth by the National Institute of Standards and Technology (IEEEP1619). These standards are used by non-military government agencies and contractors.

Table 14. ServeRAID-MR10is VAULT SAS/SATA Controller part number and feature code

Description	Part number	Feature code
ServeRAID MR10is VAULT SAS/SATA Controller	44E8695	3584

ServeRAID MR10is specifications

The ServeRAID MR10is has the following specifications:

- Stored data encryption
- Full height (3U), half length card
- Two internal x4 SFF-8087 connectors
- PCI Express x8 host interface
- SAS Controller: LSI 1078DE
- 3 Gbps per port data transfer rate
- Supports SAS 3 Gbps and SATA 2
- 256 MB cache

- Li-Ion battery backup
- Maximum stripe size: 1024 KB
- RAID levels : RAID 0, 1, 5, 6, 10, 50, 60

Resources:

- ServeRAID MR10is User's Guide
  http://www.ibm.com/support/docview.wss?uid=psg1MIGR-5077755
- ServeRAID software and drivers
  http://www.ibm.com/support/docview.wss?uid=psg1SERV-RAID
- IBM Announcement Letter
  US: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS108-444
  EMEA: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=877/ENUSZG08-0536
- IBM System x RAID products home page
  http://www.ibm.com/systems/storage/product/systemx/scsi_raid.html

ServeRAID MR10k SAS/SATA Controller

The ServeRAID MR10k SAS/SATA Controller enables the IBM System x3850 M2 / x3950 M2 onboard LSI 1078 controller with battery backed DDR2 cache (iTBB) write back, and the ability to support additional RAID levels 10, 5, 50, 6, and 60 (as with the onboard 1078, 0 and 1 are also supported). This RAID adapter provides investment protection by supporting SAS and SATA hard drive configurations.

The figure below shows the ServeRAID MR10k key (in the form factor of a DIMM) installed in an x3850 M2. The external battery is installed in the white plastic bracket and connected to the RAID controller using a cable.

Figure 14. ServeRAID MR10k SAS/SATA Controller

Table 15. ServeRAID MR10k SAS/SATA Controller part number and feature code

Description	Part number	Feature code
ServeRAID MR10k SAS/SATA Controller	43W4280	3557

ServeRAID MR10k specifications

The ServeRAID MR10k has the following specifications:

- Installs in a dedicated connector on the system planar
- DIMM form factor (uses existing SAS connections as provided by the server)
- PCI Express x8 host interface
- SAS Controller: LSI 1078E

- 3 Gbps per port data transfer rate
- Supports SAS 3 Gbps and SATA 2
- 256 MB cache
- External Intelligent Transportable Battery Backup (iTBBU) connected via wires (FRU 44W4283)
- Maximum stripe size: 1024 KB
- RAID levels : RAID 0, 1, 5, 6, 10, 50, 60

Resources:

- ServeRAID MR10k User's Guide
  http://www.ibm.com/support/docview.wss?uid=psg1MIGR-5074104
- ServeRAID software and drivers
  http://www.ibm.com/support/docview.wss?uid=psg1SERV-RAID
- IBM Announcement Letter
  US: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS107-594
  EMEA: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=877/ENUSZG07-0681

ServeRAID BR10i SAS/SATA Controller

The ServeRAID-BR10i SAS/SATA Controller provides an ideal solution for all servers requiring solid performance with RAID 0, 1 and 1E capability. This RAID adapter provides investment protection by supporting SAS and SATA hard drive and tape drive configurations.

Figure 15. ServeRAID-BR10i SAS/SATA Controller

Table 16. ServeRAID-BR10i SAS/SATA Controller part number and feature code

Description	Part number	Feature code
ServeRAID BR10i SAS/SATA Controller	44E8689	3577

ServeRAID BR10i specifications

The ServeRAID BR10i has the following specifications:

- Low-profile MD2 half-length 2U form factor adapter card
- Two internal x4 SFF-8087 connectors
- PCI Express x8 host interface
- SAS Controller: LSI 1068e
- 3 Gbps per port data transfer rate
- Supports SAS 3 Gbps and SATA 2
- Cache: None
- uEFI support
- Maximum stripe size: 64 KB (fixed)
- RAID levels : RAID 0, 1, 1E

Resources:

- ServeRAID BR10i User's Guide
  http://www.ibm.com/support/docview.wss?uid=psg1MIGR-5084255

- ServeRAID BR10 software and drivers
  http://www.ibm.com/support/docview.wss?uid=psg1MIGR-65666
- IBM Announcement Letter
  US: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS109-099
  EMEA: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=877/ENUSZG09-0132

ServeRAID BR10il SAS/SATA Controller

The IBM ServeRAID-BR10il SAS/SATA PCIe Controller enables you to upgrade to RAID 0, 1, or 1E for server models with simple-swap drives. It can be configured for two or four HDDs.

Intended specifically for the small to medium business (SMB) market, as well as departments of a large enterprise (LE), the solution is ideal for supporting server and workgroup applications where high levels of sustained read and write operations are required.

Figure 16. IBM ServeRAID-BR10il SAS/SATA PCIe Controller

Table 17. IBM ServeRAID-BR10il SAS/SATA PCIe Controller part number and feature code

Description	Part number	Feature code
ServeRAID BR10il SAS/SATA Controller	44X0411	

ServeRAID BR10il specifications

The ServeRAID BR10il has the following specifications:

- Form factor: Rectangular card with mini-PCIe connector
- One internal x4 SFF-8087 connectors
- PCI Express x4 host interface
- SAS Controller: LSI 1064e
- 3 Gbps per port data transfer rate
- Supports SAS 3 Gbps and SATA 2
- Cache: None
- Maximum stripe size: 64 KB (fixed)
- RAID levels : RAID 0, 1, 1E

Resources:

- ServeRAID BR10 software and drivers
  http://www.ibm.com/support/docview.wss?uid=psg1MIGR-65666
- IBM Announcement Letter
  US: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS108-352
  EMEA: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=877/ENUSZG08-0384

ServeRAID BR10il SAS/SATA Controller v2

The ServeRAID-BR10il SAS/SATA Controller v2 (BR10il v2) offers a low-cost, enterprise-grade RAID solution for internal HDDs and integrates SAS technology into an organization's storage infrastructure. This controller supports RAID levels 0, 1, and 1E.

Intended specifically for the small to medium business (SMB) market, as well as departments of a large enterprise (LE), the solution is ideal for supporting server and workgroup applications where high levels of sustained read and write operations are required.

Figure 17. ServeRAID-BR10il SAS/SATA Controller v2 (BR10il v2)

Table 18. ServeRAID-BR10il SAS/SATA Controller v2 (BR10il v2) part number and feature code

Description	Part number	Feature code
ServeRAID BR10il SAS/SATA Controller v2	49Y4731	9742

ServeRAID BR10il v2 specifications

The ServeRAID BR10il has the following specifications:

- Form factor: Rectangular card with mini-PCIe connector
- One internal x4 SFF-8087 connectors
- PCI Express 2.0 x4 host interface
- SAS Controller: LSI 1064e
- 3 Gbps per port data transfer rate
- Supports SAS 3 Gbps and SATA 2
- Cache: None
- Maximum stripe size: 64 KB (fixed)
- RAID levels : RAID 0, 1, 1E
- Max number of disks without a SAS expander: 4
- Max number of disks with a SAS expander (where supported): 63
- Max number of disks per logical volume: 14
- Max number of logical volumes: 2

Resources:

- ServeRAID BR10 software and drivers
  http://www.ibm.com/support/docview.wss?uid=psg1MIGR-65666
- IBM Announcement Letter
  US: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS109-589
  EMEA: http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=877/ENUSZG09-0697

Supported servers

Table 19. Supported System x servers

	ServeRAID M5025	ServeRAID M5015	ServeRAID M5014	ServeRAID M1015	ServeRAID B5015 SSD	IBM 6Gb SAS HBA	IBM 6Gb SSD HBA	IBM 3Gb SAS HBA v2	ServeRAID MR10M	ServeRAID MR10i	ServeRAID MR10is	ServeRAID MR10k	ServeRAID BR10i	ServeRAID BR10il	ServeRAID BR10il v2
IBM System x3200 M2	N	N	N	N	N	Y	N	Y†	N	Y	Y	N	N	Y	N
IBM System x3200 M3	Y	Y	Y	Y	N	Y	N	Y†	Y	Y	Y	N	N	N	Y
IBM System x3250 M2	N	N	N	N	N	Y	N	Y†	Y	Y	Y	N	N	Y	N
IBM System x3250 M3	Y	Y	Y	Y	N	Y	N	Y†	Y	Y‡	Y	N	N	N	Y
IBM System x3350	N	N	N	N	N	Y	N	Y†	Y	Y	Y	N	N	Y	N
IBM System x3400	N	N	N	N	N	Y	N	Y†	Y	Y	Y	N	N	N	N
IBM System x3400 M2	Y	Y	Y	Y	N	Y	N	Y†	Y	Y	Y	N	Y	N	Y
IBM System x3400 M3	Y	Y	Y	Y	N	N	N	Y†	Y	Y	N	N	Y	N	Y
IBM System x3455	N	N	N	N	N	Y	N	Y†	N	N	N	N	N	N	N
IBM System x3500	N	N	N	N	N	Y	N	Y†	Y	Y	Y	N	N	N	N
IBM System x3500 M2	Y	Y	Y	Y	N	Y	N	Y†	Y	Y	Y	N	Y	N	N
IBM System x3500 M3	Y	Y	Y	Y	N	N	N	Y†	Y	Y	N	N	Y	N	N
IBM System x3550	N	N	N	N	N	Y	N	Y†	Y	Y	Y	N	N	N	N
IBM System x3550 M2	Y	Y	Y	Y	Y	Y	Y	Y†	Y	Y	Y	N	Y	N	N
IBM System x3550 M3	Y	Y	Y	Y	Y	Y	Y	Y†	Y	Y	N	N	Y	N	Y
IBM System x3610	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
IBM System x3620 M3	N	Y	Y	Y	N	N	N	Y†	N	N	N	N	N	N	Y
IBM System x3630 M3	N	Y	Y	Y	N	Y	N	N	N	N	N	N	N	N	N
IBM System x3650	N	N	N	N	N	Y	N	Y†	Y	Y	Y	N	N	N	N
IBM System x3650 T	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
IBM System x3650 M2	Y	Y	Y	Y*	Y	Y	Y	Y†	Y	Y	Y	N	Y	N	N
IBM System x3650 M3	Y	Y	Y	Y	Y	Y	Y	Y†	Y	Y	N	N	Y	N	Y
IBM System x3655	N	N	N	N	N	Y	N	Y†	N	N	N	N	N	N	N
IBM System x3690 X5	Y	Y	Y	Y	N	Y	Y	Y	N	N	N	N	Y	N	N
IBM System x3755	N	N	N	N	N	Y	N	Y†	Y	N	N	N	N	N	N
IBM System x3755 M3	N	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N
IBM System x3850 M2	N	N	N	N	N	Y	Y	Y†	Y	N	Y	Y	N	N	N
IBM System x3950 M2	N	N	N	N	N	Y	Y	Y†	Y	N	Y	Y	N	N	N
IBM System x3850 X5	Y	Y	Y	Y	Y	Y	Y	Y†	N	N	N	N	Y	N	N
IBM System x3950 X5	Y	Y	Y	Y	Y	Y	Y	Y†	N	N	N	N	Y	N	N

* The ServeRAID M1015 also supports the Hot-Swap SAS/SATA 4 Pack HDD Kit option of the x3650 M2, part number 46D2516.
† The IBM 3Gb SAS HBA v2 supports disk connectivity on the x3455 only. All other supported systems support tape connectivity only.

‡ The ServeRAID MR10i is only supported on models of the x3250 M2 with 2.5" drive bays. The MR10i is not supported on models with 3.5" drive bays.

Table 20. Supported iDataPlex servers

	ServeRAID M5025	ServeRAID M5015	ServeRAID M5014	ServeRAID M1015	ServeRAID B5015 SSD	IBM 6Gb SAS HBA	IBM 6Gb SSD HBA	IBM 3Gb SAS HBA v2	ServeRAID MR10M	ServeRAID MR10i	ServeRAID MR10is	ServeRAID MR10k	ServeRAID BR10i	ServeRAID BR10il	ServeRAID BR10il v2
iDataPlex dx320	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
iDataPlex dx340	N	N	N	N	N	N	N	N	N	Y	N	N	Y	N	N
iDataPlex dx360	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N
iDataPlex dx360 M2	N	N	N	N	N	N	N	N	N	Y	N	N	Y	Y	N
iDataPlex dx360 M3	N	Y	N	Y	N	N	Y	N	N	N	N	N	N	Y	N

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

Feature comparison

Table 21. Feature comparison

Feature	M5025	M5015	M5014	M1015	B5015 SSD	6Gb SAS	6Gb SSD	3Gb SASv2	MR10M	MR10i	MR10is	MR10k	BR10i	BR10il	BR10il v2
6Gb SAS	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N
PCIe 2.0	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N
PCIe lanes	x8	x8	x8	x8	x8	x8	x8	x8	x8	x8	x8	x8	x8	x4	x4
Int. connectors	0	2	2	2	2	4	2	4	0	2	2	0	2	1	1
Ext. connectors	2	0	0	0	0	1	0	1	2	0	0	0†	0	0	0
SAS controller	SAS 2108	SAS 2108	SAS 2108	SAS 2008	PMC 8013	SAS 2008	SAS 2008	1068	1078	1078	1078 DE	1078	1068	1064	1064
Cache (MB)	512	512	256	None	None	None	None	None	256	256	256	256	None	None	None
Battery (Opt=optional)	Y	Y	Opt	N	N	N	N	N	Y	Opt	Y	Y	N	N	N
Data encryption	Opt	Opt	Opt	Opt	N	N	N	N	N	N	Y	N	N	N	N
Max stripe size (KB) (F=fixed)	1024	1024	1024	64	1024	N/A	N/A	N/A	1024	1024	1024	1024	64-F	64-F	64-F
Mixing SAS & SATA drives‡	Y	Y	Y												
Max volumes	64	64	64	16	4	N/A	N/A	N/A							
Max LUN size	64TB	64TB	64TB	64TB		N/A	N/A	N/A							
Patrol read (data scrubbing)	Y	Y	Y	Y		N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	Y
Online RAID Level Migration**	Y	Y	Y	Y		N/A	N/A	N/A	Y			Y			
Online Capacity Expansion	Y	Y	Y	Y		N/A	N/A	N/A							
AutoSync	Y	Y	Y	Y		N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	Y
FlashCopy	N	N	N	N		N	N	N	N	N	N	N	N	N	N
Copyback	N	N	N	N		N	N	N	N	N	N	N	N	N	N
Tape support	N	N	N	N	N	Y	N	Y	N	N	N	N	N	N	N
UEFI support	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
RAID-0	Y	Y	Y	Y	N	N	N	Y*	Y	Y	Y	Y	Y	Y	Y
RAID-1	Y	Y	Y	Y	Y	N	N	Y*	Y	Y	Y	Y	Y	Y	Y
RAID-1E	N	N	N	N	N	N	N	Y*	N	N	N	N	Y	Y	Y
RAID-5	Y	Y	Y	Opt	Y	N	N	N	Y	Y	Y	Y	N	N	N
RAID-6	Opt	Opt	Opt	N	N	N	N	N	Y	Y	Y	Y	N	N	N
RAID-10	Y	Y	Y	Y	N	N	N	N	Y	Y	Y	Y	N	N	N
RAID-50	Y	Y	Y	Opt	N	N	N	N	Y	Y	Y	Y	N	N	N
RAID-60	Opt	Opt	Opt	N	N	N	N	N	Y	Y	Y	Y	N	N	N

* The IBM 3Gb SAS HBA v2 only supports RAID on the System x3455. All other supported systems support tape connectivity only.

† The ServeRAID-MR10k does not have an external connector; however, the System x3850 M2 and x3950 M2 servers have a SFF-8088 external SAS port to which the MR10k connects .

‡ Support for arrays comprised of SAS drives connected to the same controller as arrays comprised of SATA drives (but not SAS & SATA drives in the same array). Requires that the server also supports the mixing of SAS & SATA.

** Online RAID Level Migration (RLM) is also known as Logical Drive Migration (LDM)

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