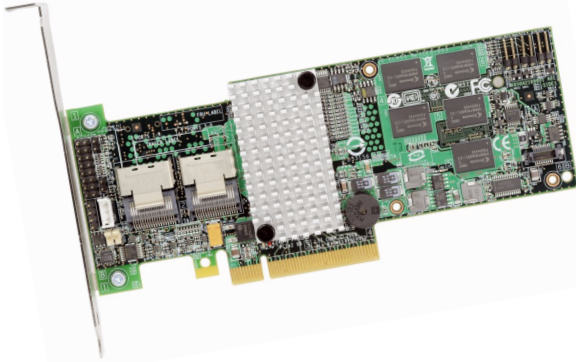# ServeRAID M5014/M5015 SAS/SATA Controllers

Quick Install Guide

IBM ®

Thank you for purchasing the ServeRAID M5014® or ServeRAID M5015 SAS/SATA controller. Please take a few minutes to read this Quick Install Guide before you install your controller. For more information about any topic covered in this guide, refer to the other documents on your *ServeRAID-M Support* CD.

The ServeRAID M5014 and ServeRAID M5015 SAS/SATA (Serial Attached SCSI/Serial ATA II) controllers are PCI-Express 2.0, low-profile RAID controllers based on the SAS2108ROC, which is a SAS/SATA RAID-On-Chip device. They control eight internal 6 Gb/s SAS/SATA ports through two SFF-8087 Mini SAS 4i internal connectors.

Note: Record your controller serial number in a safe location in case you need to contact IBM.

The ServeRAID M5000 Series Battery Assembly can be mounted directly to the controller using a daughtercard.

For more information about this controller and the battery assembly, refer to the *ServeRAID M5015 SAS/SATA Controller User's Guide* on the *ServeRAID-M Support* CD.

Note: SATA II is the only type of SATA supported by this RAID controller.

ServeRAID CONTROLLER INSTALLATION

Attention: Back up your data before you change your system configuration. Otherwise, you might lose data.

Perform the following steps to install your ServeRAID M5014 or ServeRAID M5015 SAS/SATA controller.

Step 1   Unpack the Controller

Important: When you handle static-sensitive devices, take precautions to avoid damage from static.

Unpack the controller in a static-free environment. Remove the controller from the antistatic bag and inspect it for damage.

If the controller appears to be damaged, or if the *ServeRAID-M Support* CD is missing, contact your place of purchase.

The CD contains the following documents:

- *ServeRAID M5014/M5015 SAS/SATA Controllers User's Guide*
- *ServeRAID-M Software User's Guide*
- *ServeRAID-M Device Driver Installation User's Guide*

Step 2   Prepare the Computer

Review all safety information provided with the computer. Unplug the power cords from the power supplies, disconnect the computer from the network, and remove the computer cover. See the documentation provided with the computer for instructions.

Attention: Before you install the controller, make sure that the computer is disconnected from the power and from any networks.

Step 3   Review the Connectors

Figure 1 shows the location of the connectors.

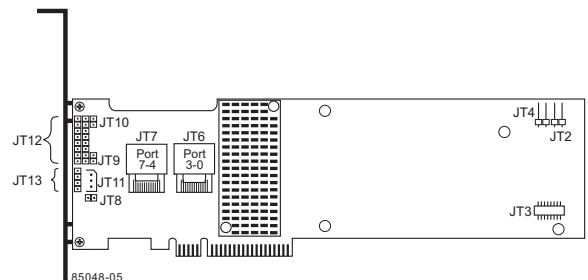**Figure 1   ServeRAID M5014/M5015 Card Layout**

Table 1 describes the connectors on the ServeRAID M5014 controller and the ServeRAID M5015 controller.

Table 1   Jumpers and Connectors

Jumper/Connector	Type	Description
JT2	SAS Activity LED header	2-pin connector Connects to an LED that indicates drive activity.
JT3	Battery Backup connector	20-pin connector Connects the ServeRAID M5000 Series Battery Assembly directly to the controller.
JT4	Global Drive Fault LED header	2-pin connector Connects to an LED that indicates whether a drive is in a fault condition.
JT6	x4 SAS Ports 3–0 Mini SAS 4i connector	Connects the cables from the controller to SAS drives or SATA II drives, or a SAS expander.
JT7	x4 SAS Ports 7–4 Mini SAS 4i connector	Connects the cables from the controller to SAS drives or SATA II drives, or a SAS expander.
JT8	Modular RAID Key header	2-pin connector Reserved for IBM use.
JT9	Set Factory Defaults connector	2-pin connector Returns the board settings to the defaults set in the factory.
JT10	Test header	2-pin connector Reserved for IBM use.
JT11	IPMI-style SMBus (System Management)/I^2C header	3-pin shielded header Provides enclosure management support.
JT12	Individual Drive Fault LED header for Eight Phys (0-7)	16-pin connector Indicates drive faults. There is one LED per port. When lit, each LED indicates the corresponding drive has failed or is in the Unconfigured-Bad state. Refer to the *ServeRAID-M Software User's Guide* for more information. The LEDs function in a direct-attach configuration (there are no SAS expanders). Direct attach is defined as a maximum of one drive connected directly to each port.This header is used for controllers with internal SAS ports.
JT13	Universal Asynchronous Receiver/Transmitter (UART) debugging	4-pin connector Reserved for IBM use.

Note: JT1, JT2, and JT4 are behind the ServeRAID M5000 Series Battery Assembly when it is installed, but they are still accessible.

Step 4   Install the Controller on the Motherboard

Insert the controller in a PCI Express slot on the motherboard, as shown in Figure 2.

Press down gently but firmly to seat the card correctly in the slot. Secure the controller to the computer chassis with the bracket screw.

Note: This is a PCI Express x8 card and it can operate in x8 or x16 slots. However, some PCI-E slots support only PCI-E graphics cards; if a RAID controller is installed, it will not function.

Note: Refer to your motherboard guide for information about the PCI Express slot.

Figure 2   Installing the ServeRAID M5014/M5015 SAS/SATA Controller
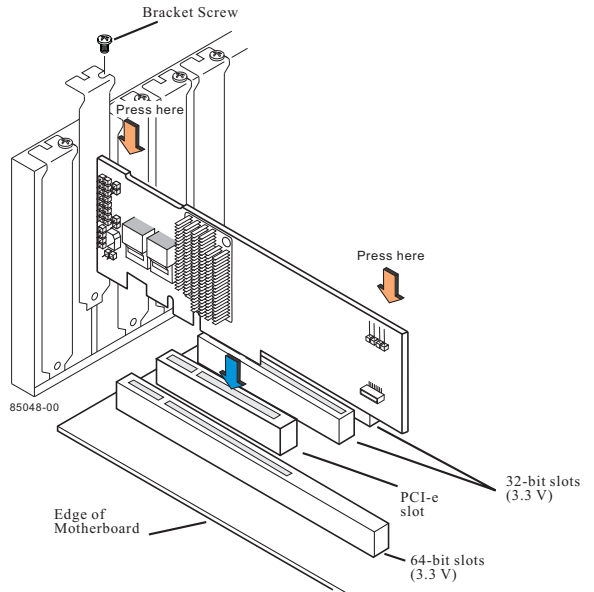
Step 5   Configure and Install the SAS Devices, SATA II Devices or Both

Configure the SAS devices, SATA II devices, or both, and install them in the external enclosure.

Note: Refer to the documentation for the external devices for pre-installation configuration requirements.

Note: The controllers support SATA II protocols but not SATA I protocols. All references to SATA in this guide are to SATA II

Step 6 **Connect the Controller to the SAS Devices, SATA II Devices, or Both**

Connect the cables between the controller and the SAS devices, SATA II devices, or both. Refer to the external device documentation to view connector locations for the external devices.

Note: Refer to the *ServeRAID M5014/M5015 SAS/ SATA Controller User's Guide* for information about the cables and the connectors.

Step 7 **Turn on the Power to the Computer**

Install the computer cover and reconnect the power cords. Turn on the power to the computer, making sure that the power is turned on to the SAS devices and the SATA II devices before or at the same time as the host computer. If the power is turned on to the computer before it is turned on to the devices, the computer might not recognize the devices.

For the United Extensible Firmware Interface (uEFI), no BIOS message displays. Press F1 to enter System Setup. Refer to your system user's guide for specific configuration information.

Under other interfaces or operating systems, a BIOS message similar to the following displays during boot:

```
LSI MEGARAID BIOS VERSION xxxx [date]
Copyright(c) 2009, LSI Corporation
HA-1 (Bus x Dev y) ServeRAID M5015
PCI-Express RAID Controller
Standard FW xxxx DRAM=xxx MB(SDRAM)
```

The firmware takes several seconds to initialize. During this time the adapter scans the bus(es).

Attention: The battery in the ServeRAID M5000 Series Battery Assembly must charge for at least six hours under normal operating conditions. To protect your data, the firmware changes the Write Policy to *write-through* until the battery unit is sufficiently charged. When the battery unit is charged, the controller firmware changes the Write Policy to *write-back* to take advantage of the performance benefits of data caching.

Step 8 **Run the WebBIOS Configuration Utility**

Run the WebBIOS Configuration Utility to configure the physical arrays and the logical drives. When the message Press <Ctrl><H> for

WebBIOS displays on the screen, press CTRL+H immediately to run the utility.

For systems using uEFI, refer to the system publications for instructions on how to access WebBIOS.

Note: Refer to the *ServeRAID-M Software User's Guide* on the *ServeRAID-M Support* CD for detailed steps on configuring the physical arrays and the logical drives.

Step 9 **Install the Operating System Driver**

The controller can operate under various operating systems. To operate under these operating systems, you must install software drivers.

View the supported operating systems and download the latest drivers for the controller at http://www.ibm.com/support/. For updates, click **Downloads and drivers**. Access the download center and follow the steps to download the driver.

Refer to the *ServeRAID-M Device Driver Installation User's Guide* on the CD for details on installing the driver. Be sure to use the latest Service Packs provided by the operating system manufacturer and review the readme file that accompanies the driver.

SUPPORTED RAID LEVELS

The ServeRAID M5014 controller and the ServeRAID M5015 controller support drive groups using the following RAID levels:

- **RAID 0 (data striping):** Data is striped across all drives in the group, enabling very fast data throughput. There is no data redundancy. All data is lost if any drive fails.
- **RAID 1 (drive mirroring):** Data is written simultaneously to both drives in the drive group, providing complete data redundancy if one drive fails. RAID 1 supports an even number of drives from 2 to 32 in a single span.
- **RAID 5 (drive striping with distributed parity):** Data is striped across all drives in the group. Part of the capacity of each drive stores parity information that reconstructs data if a drive fails. RAID 5 provides good data throughput for applications with high read request rates.
- **RAID 00 (data striping across RAID 0 drive groups):** RAID 00 is a spanned drive group that creates a striped set from a series of RAID 0 drive groups.

- **RAID 10 (RAID 1 and RAID 0 in spanned groups):**
  RAID 10 uses mirrored pairs of drives to provide complete data redundancy. RAID 10 provides high data throughput rates.
- **RAID 50 (RAID 5 and RAID 0 in spanned groups):**
  RAID 50 uses both parity and drive striping across multiple drives to provide complete data redundancy. RAID 50 provides high data throughput rates.

  Note: Refer to the *ServeRAID-M Software User's Guide* on the *ServeRAID-M Support* CD for more information about RAID levels.

DISPOSAL OF BATTERY BACKUP UNITS

<u>Warning</u>: **If the battery pack is damaged in any way, toxic chemicals may be released.**

The material in the battery pack contains heavy metals that can contaminate the environment. Federal, state, and local regulations prohibit the disposal of rechargeable batteries in public landfills. Be sure to recycle the old battery packs properly. IBM reminds you that you must comply with all applicable battery disposal and hazardous material handling laws and regulations in the country or other jurisdiction where you are using the battery unit.

See the *Warranty and Support Information* document for battery-disposal instructions.

Important: Replace your battery only with the same or equivalent type recommended by the manufacturer. See the *Warranty and Support Information* document for the replacement battery part number.

TECHNICAL SUPPORT

Refer to the *Warranty and Support Information* document for information about the technical support available for this product.