ServeRAID M1115 SAS/SATA Controller for IBM System x

Before using this information and the product it supports, read the *Important Notices* and *Warranty Information* documents that come with the ServeRAID M1115 SAS/SATA Controller for IBM® System x®.

This *Quick Installation Guide* contains information about installing and configuring the controller, the LEDs and connectors, and basic RAID levels. For more information, see the *ServeRAID M1115 SAS/SATA Controller for IBM System x User's Guide* on the *Documentation* CD that comes with the controller.

Statement 1:

DANGER

Electrical current from power, telephone, and communication cables is hazardous.

To avoid a shock hazard:

- **Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**
- **Connect all power cords to a properly wired and grounded electrical outlet.**
- **Connect to properly wired outlets any equipment that will be attached to this product.**
- **When possible, use one hand only to connect or disconnect signal cables.**
- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**
- **Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.**
- **Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.**

To Connect:	**To Disconnect:**
1. Turn everything OFF.	1. Turn everything OFF.
2. First, attach all cables to devices.	2. First, remove power cords from outlet.
3. Attach signal cables to connectors.	3. Remove signal cables from connectors.
4. Attach power cords to outlet.	4. Remove all cables from devices.
5. Turn device ON.	

Notes:

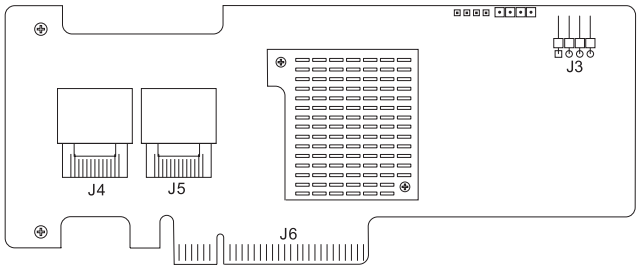
1. Record your controller serial number in a safe location in case you need to contact IBM.
2. The controller supports SAS, SATA, SATA II, and SATA III.

The controller is a PCI Express 2.0, half-size, low-profile RAID controller based on the LSISAS2008 PCI Express-SAS/SATA I/O processor chip. The controller controls eight internal 6 Gbps SAS/SATA ports through two SFF-8087 SAS x4 internal connectors.

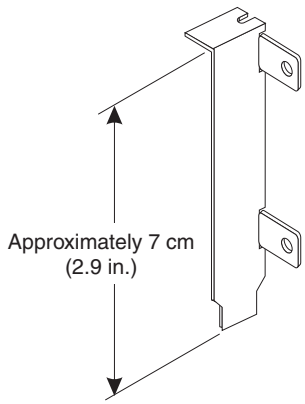
Option kit parts

The controller option kit contains the following parts:

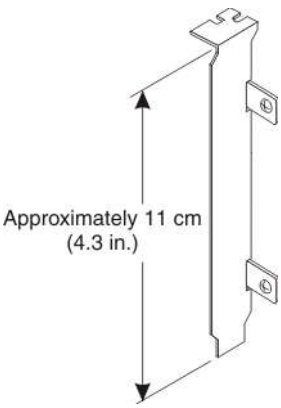
- One ServeRAID M1115 SAS/SATA Controller for IBM System x



- One low-profile expansion-slot bracket



- One full-height expansion-slot bracket



- IBM *ServeRAID M Documentation* CD
- IBM *Warranty Information* document
- IBM *Important Notices* document

Controller connectors

The following illustration shows the connectors on the controller.

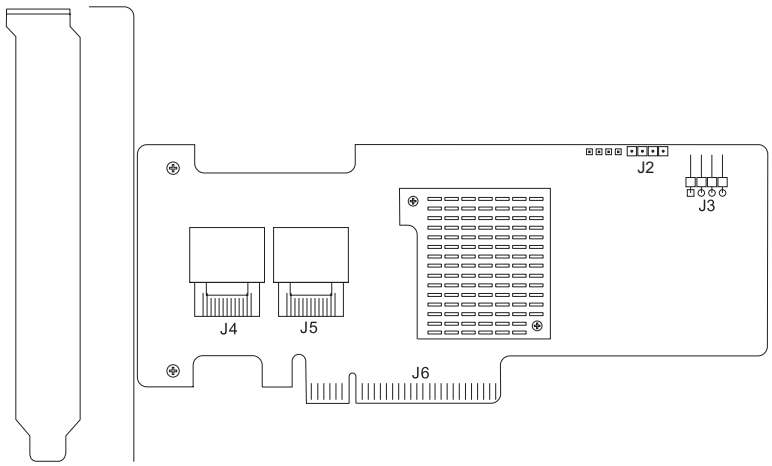


Figure 1. Controller connectors

The connectors on the controller are described in Table 1.

Table 1. Controller connectors

Connector	Description	Type	Comments
J2	Complex programmable logic device (CPLD) header	10-pin header	Reserved for IBM use.
J3	External LED drive activity/fault header	4-pin connector	Connects to external, bi-color LEDs that indicate drive activity or faults.
J4	Port 1 internal connector	x4 Mini-SAS (SFF-8087)	Connects the controller by cable to SAS drives, SATA, SATA II, SATA III drives, or a SAS expander.
J5	Port 0 internal connector	x4 Mini-SAS (SFF-8087)	Connects the controller by cable to SAS drives, SATA, SATA II, SATA III drives, or a SAS expander.
J6	PCI Express x8	System board edge connector	x8 interface that provides connections on both the top and the bottom of the system board.

Handling the controller

Attention: Static electricity can damage the server and other electronic devices. To avoid damage, keep the controller in its static-protective package until you are ready to install it or change the bracket.

To reduce the possibility of damage from electrostatic discharge, observe the following precautions:

- Limit your movement. Movement can cause static electricity to build up around you.
- The use of a grounding system is recommended but is not required. For example, wear an electrostatic-discharge wrist strap, if one is available.
- Handle the controller carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.

- Do not leave the controller where others can handle and damage it.
- While the controller is still in its static-protective package, touch it to an unpainted metal part of the server for at least 2 seconds. This drains static electricity from the package and from your body.
- If you do not have to attach an expansion-slot bracket, remove the controller from its package and install it directly into the server without setting down the controller. If it is necessary to set down the controller, put it back into its static-protective package. Do not place the controller on the server cover or on a metal surface.
- If you have to attach an expansion-slot bracket, remove the controller from its package and place the controller on a flat, static-protective surface. Do not place the controller on the server cover or on a metal surface.
- Take additional care when you handle the controller during cold weather. Heating reduces indoor humidity and increases static electricity.
- To avoid damage to the server, always remove the controller from the PCIe slot before you relocate or ship the server.

Installing the controller

To install the controller in a server, complete the following steps:

1. Read the safety information that comes with the controller.
2. Turn off the server and peripheral devices and disconnect the power cords. Remove the server cover. For more information, see the installation instructions that come with the server.
3. Touch the static-protective package that contains the controller to any unpainted surface on the outside of the server; then, grasp the controller by the top edge or upper corners, remove it from the package, and inspect it for damage. Contact your IBM marketing representative or authorized reseller if the controller appears to be damaged.
4. Determine which Peripheral Component Interconnect Express (PCIe) slot you will use.

   Notes:

   a. The controller is a PCIe x8 device that can operate in a x8 or a x16 slot. However, some PCIe slots support only PCIe graphics adapters; if you install the controller in a PCIe graphics slot, it will not function. For information about the PCIe slots on the server, see the documentation that comes with the server.

   b. If you are installing the controller in a PCI riser-card assembly, see the *Installation and User's Guide* that comes with the server for more information about installing the controller.

   The controller comes without an expansion-slot bracket. If an expansion-slot bracket is required, install the bracket that is applicable for the PCIe slot in the server. The following expansion-slot brackets come with the controller.

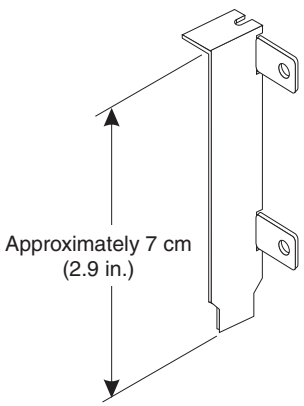


Figure 2. Low-profile expansion-slot bracket

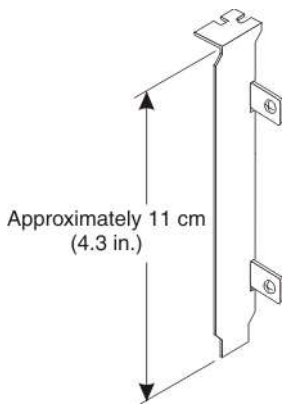


Figure 3. Full-height expansion-slot bracket

To install an expansion-slot bracket, complete the following steps:

a. Orient the controller so that the gold-edge connector is on the bottom and the SAS ports are facing you.

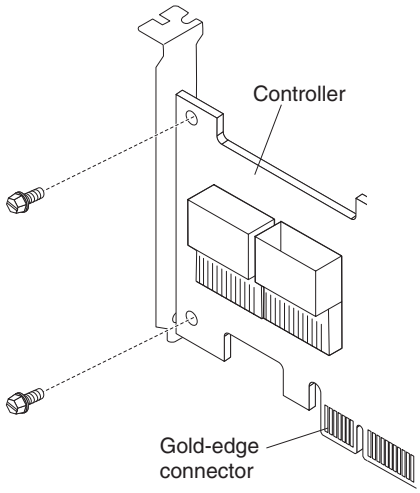


Figure 4. Attaching an expansion-slot bracket to the controller

b. Place the expansion-slot bracket screw tabs behind the controller and align the two holes on the left side of the controller with the two expansion-slot bracket screw tabs.

c. Secure the expansion-slot bracket to the controller with the two screws that come in the expansion-slot bracket kit.

5. Depending on the server model, you might have to remove the expansion-slot cover for the selected PCIe slot. To remove the expansion-slot cover, you might have to remove the expansion-slot bracket screw. For detailed instructions for installing the controller in your server, see the *Installation and User's Guide* that comes with the server.

6. Position the controller by aligning the PCIe x8 connector (gold-edge connector) with the PCIe x8 slot on the system board. Insert the controller firmly into the connector. Replace the expansion-slot bracket screw if you removed it in step 5 on page 5.

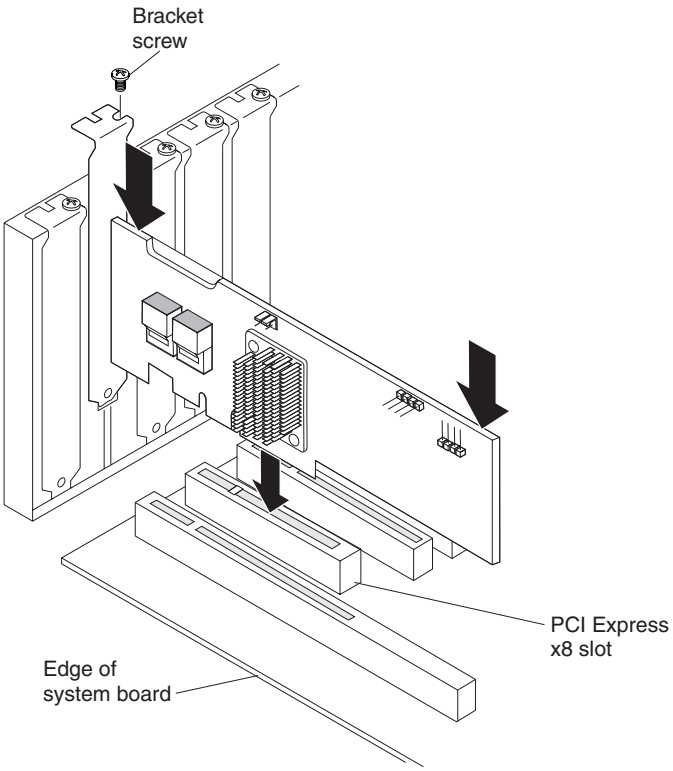


Figure 5. Installing the controller in the server

7. Configure and install the SAS and SATA III devices in the server. For preinstallation configuration requirements, see the documentation that comes with each device.
8. Connect the controller to the SAS and SATA III devices in the server. Use SAS cables to connect the controller to SAS and SATA III devices. See Figure 1 on page 3 for the connector locations.
9. Replace the server cover, reconnect the power cords, and turn on the server.

   Notes:

   a. Make sure that the power is turned on to the SAS and SATA III devices before or at the same time that the power is turned on to the server. If the power is turned on to the server before it is turned on to the devices, the server might not recognize the devices.

   b. The firmware takes several seconds to initialize. During this time, the controller scans the ports.
10. Use the Human Infrastructure Interface (HII) to configure the controller. To open the HII, turn on the server and when the prompt `<F1> Setup` is displayed, press F1. Select **System Settings –> Storage**, and then select the controller.

    You can also run the WebBIOS Configuration Utility to configure the drive groups and the virtual drives. To run the utility, turn on the server and when the message `Press <Ctrl><H> for WebBIOS` is displayed on the screen, immediately press Ctrl+H.

    For detailed information about configuring drive groups and virtual drives, see the *ServeRAID M Software User's Guide*.

11. Install the operating-system device driver.

    To view the operating systems that support the controller and to download the latest device drivers, go to http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/. For updates, go to http://www.ibm.com/supportportal/.

    Be sure to use the latest service pack for the operating system and review the readme file that accompanies the device driver. Be sure to install the software device drivers before you operate the controller.

Supported RAID levels

The controller supports 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 10 (RAID 1 and RAID 0 in spanned groups):** Mirrored pairs of drives provide complete data redundancy. RAID 10 provides high data throughput rates.
- **RAID 50 (RAID 5 and RAID 0 in spanned groups):** RAID 50 includes both parity and disk striping across multiple drive groups. RAID 50 provides high data throughput rates.

Note: For more information about RAID levels, see the *ServeRAID M Software User's Guide*.

Replaceable components

Field replaceable units (FRUs) must be replaced only by a trained service technician, unless they are classified as customer replaceable units (CRUs).

Tier 1 CRU: Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request without a service contract, you will be charged for the installation.

Tier 2 CRU: You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for your product.

For more information about the terms of the warranty and getting service and assistance, see the *Warranty Information* document that comes with the controller.

Table 2. Field replaceable units for the ServeRAID M1115 SAS/SATA Controller for IBM System x

Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number (trained service technician only)
ServeRAID M1115 SAS/SATA Controller for IBM System x	81Y4449		

Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. Use this information to obtain additional information about IBM and IBM products, determine what to do if you experience a problem with your IBM system or optional device, and determine whom to call for service, if it is necessary.

Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Check for updated firmware and operating-system device drivers for your IBM product. The IBM Warranty terms and conditions state that you, the owner of the IBM product, are responsible for maintaining and updating all software and firmware for the product (unless it is covered by an additional maintenance contract). Your IBM service technician will request that you upgrade your software and firmware if the problem has a documented solution within a software upgrade.
- If you have installed new hardware or software in your environment, check http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ to make sure that the hardware and software is supported by your IBM product.
- Go to http://www.ibm.com/supportportal/ to check for information to help you solve the problem.
- Gather the following information to provide to IBM Support. This data will help IBM Support quickly provide a solution to your problem and ensure that you receive the level of service for which you might have contracted.
  - Hardware and Software Maintenance agreement contract numbers, if applicable
  - Machine type number (IBM 4-digit machine identifier)
  - Model number
  - Serial number
  - Current system UEFI and firmware levels
  - Other pertinent information such as error messages and logs
- Go to http://www.ibm.com/support/entry/portal/Open_service_request/ to submit an Electronic Service Request. Submitting an Electronic Service Request will start the process of determining a solution to your problem by making the pertinent information available to IBM Support quickly and efficiently. IBM service technicians can start working on your solution as soon as you have completed and submitted an Electronic Service Request.

You can solve many problems without outside assistance by following the troubleshooting procedures that IBM provides in the online help or in the documentation that is provided with your IBM product. The documentation that comes with IBM systems also describes the diagnostic tests that you can perform. Most systems, operating systems, and programs come with documentation that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

Using the documentation

Information about your IBM system and preinstalled software, if any, or optional device is available in the documentation that comes with the product. That documentation can include printed documents, online documents, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to http://www.ibm.com/supportportal/. Also, some documents are available through the IBM Publications Center at http://www.ibm.com/shop/publications/order/.

Getting help and information from the World Wide Web

On the World Wide Web, up-to-date information about IBM systems, optional devices, services, and support is available at http://www.ibm.com/supportportal/. The address for IBM System x information is http://www.ibm.com/systems/x/. The address for IBM BladeCenter® information is http://www.ibm.com/systems/bladecenter/. The address for IBM IntelliStation® information is http://www.ibm.com/systems/intellistation/.

How to send Dynamic System Analysis data to IBM

Use the IBM Enhanced Customer Data Repository to send diagnostic data to IBM. Before you send diagnostic data to IBM, read the terms of use at http://www.ibm.com/de/support/ecurep/terms.html.

You can use any of the following methods to send diagnostic data to IBM:

- **Standard upload:** http://www.ibm.com/de/support/ecurep/send_http.html
- **Standard upload with the system serial number:** http://www.ecurep.ibm.com/app/upload_hw
- **Secure upload:** http://www.ibm.com/de/support/ecurep/send_http.html#secure
- **Secure upload with the system serial number:** https://www.ecurep.ibm.com/app/upload_hw

Creating a personalized support web page

At http://www.ibm.com/support/mynotifications/, you can create a personalized support web page by identifying IBM products that are of interest to you. From this personalized page, you can subscribe to weekly email notifications about new technical documents, search for information and downloads, and access various administrative services.

Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with your IBM products. For information about which products are supported by Support Line in your country or region, see http://www.ibm.com/services/supline/products/.

For more information about Support Line and other IBM services, see http://www.ibm.com/services/, or see http://www.ibm.com/planetwide/ for support telephone numbers. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

Hardware service and support

You can receive hardware service through your IBM reseller or IBM Services. To locate a reseller authorized by IBM to provide warranty service, go to http://www.ibm.com/partnerworld/ and click **Find Business Partners** on the right side of the page. For IBM support telephone numbers, see http://www.ibm.com/planetwide/. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

In the U.S. and Canada, hardware service and support is available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9 a.m. to 6 p.m.

IBM Taiwan product service

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