

ServeRAID M5215 with 2GB Flash Enablement -  
Lenovo Flex System x240 M5



# Installation Guide



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Lenovo Flex System x240 M5



# Installation Guide

**Note**

**Note:** Before using this information and the product it supports, read the general information in “Notices” on page 19; and read the *Safety Information* and the *Systems Environmental Notices and User Guide* on the *Documentation CD*.

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## Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

Antes de instalar este produto, leia as Informações de Segurança.

在安装本产品之前，请仔细阅读 **Safety Information** (安全信息)。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφάλειας (safety information).

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ  
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Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

ཐོན་རྒྱུ་འདི་བདེ་སྲོད་མ་བྱས་གོང་། རྒྱུ་ཡིད་གཟབ་  
བྱ་འདྲ་མིན་ཡོད་པའི་འོད་སྤེར་བལྟ་དགོས།

Bu ürünü kurmadan önce güvenlik bilgilerini okuyun.

مەزكۇر مەھسۇلاتنى ئورنىتىشتىن بۇرۇن بىخەتەرلىك ئۇچۇرلىرىنى ئوقۇپ چىقىڭ.

Youq mwngz yungh canjbinj neix gaxgonq, itding aeu doeg aen  
canjbinj soengq cungj vahgangj ancien siusik.

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## Safety statements

These statements provide the caution and danger information that is used in this documentation.

### Important:

Each caution and danger statement in this documentation is labeled with a number. This number is used to cross reference an English-language caution or danger statement with translated versions of the caution or danger statement in the *Safety Information* document.

For example, if a caution statement is labeled Statement 1, translations for that caution statement are in the *Safety Information* document under Statement 1.



Be sure to read all caution and danger statements in this documentation before you perform the procedures. Read any additional safety information that comes with your system or optional device before you install the device.

## 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:

1. Turn everything OFF.
2. First, attach all cables to devices.
3. Attach signal cables to connectors.
4. Attach power cords to outlet.
5. Turn device ON.

#### To Disconnect:

1. Turn everything OFF.
2. First, remove power cords from outlet.
3. Remove signal cables from connectors.
4. Remove all cables from devices.

## Statement 12



### CAUTION:

The following label indicates a hot surface nearby.



## Statement 21



### **CAUTION:**

Hazardous energy is present when the blade is connected to the power source.  
Always replace the blade cover before installing the blade.

### **UL regulatory information**

This device is for use only with Listed Lenovo Flex System Enterprise Chassis.



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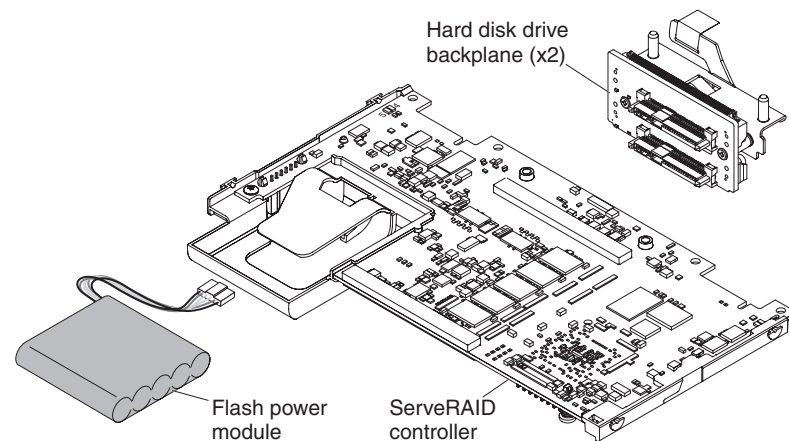
## Chapter 1. Introduction

This *Installation Guide* provides information about installing the ServeRAID™ M5215 with 2GB Flash Enablement option.

ServeRAID M5215 controller has an LSI 3108 SAS controller that supports RAID levels 0 and 1 when installed in a Lenovo Flex System x240 M5 compute node. When an optional ServeRAID M5215 controller is installed in a compute node, it overrides the hard disk drive controller that is on the compute node system board.

You can use the LSI Configuration Utility program to configure the hard disk drives and the ServeRAID M5215 controller. See the documentation for your compute node for information about using the LSI Configuration Utility program.

**Note:** The illustrations in this document might differ slightly from your hardware.



---

### Related documentation

Use this information to identify and locate related compute node documentation.

This *Installation Guide* contains general information about the ServeRAID M5215 with 2GB Flash Enablement option, including how to install and configure it. Documents that are in Portable Document Format (PDF) are on the documentation CD that comes with your product. The following documentation is also available:

- *Safety Information*

This document is in PDF. It contains translated caution and danger statements. Each caution and danger statement that appears in the documentation has a number that you can use to locate the corresponding statement in your language in the *Safety Information* document.

- *Lenovo Warranty Information*

This printed document contains the warranty terms and a pointer to the Lenovo® Statement of Limited Warranty.

- *Environmental Notices and User Guide*

This document is in PDF. It contains translated environmental notices.

In addition to the documentation in this library, be sure to review the *Installation and Service Guide* for your compute node for information to help you prepare for option installation and configuration.

To check for updated documentation, go to <http://www.ibm.com/supportportal>.

You can also find documentation that is related to Lenovo Flex System products at <http://pic.dhe.ibm.com/infocenter/flexsys/information/index.jsp>.

---

## Notices and statements in this document

Use this information to understand the most common documentation notices and statements and how they are used.

The caution and danger statements in this document are also in the multilingual *Safety Information* document, which is on the documentation CD that comes with your product. Each statement is numbered for reference to the corresponding statement in the *Safety Information* document.

The following notices and statements are used in this document:

- **Note:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate possible damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage might occur.
- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.
- **Danger:** These statements indicate situations that can be potentially lethal or hazardous to you. A danger statement is placed just before the description of a potentially lethal or hazardous procedure step or situation.

---

## Installation guidelines

Before you remove or replace a replaceable component or install an optional device, read the following information:

- Before you begin, read “Safety” on page v and “Handling static-sensitive devices” on page 3. This information will help you work safely.
- When installing options, take the opportunity to download and apply the most recent firmware updates for your compute node. This step will help to ensure that any known issues are addressed and that your compute node is ready to function at maximum levels of performance.

To download the latest firmware and device drivers, go to <http://www.ibm.com/support/fixcentral> and select **ServeRAID M5215 with 2GB Flash Enablement**.

- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- Back up all important data before you make changes to hard disk drives.
- Before you remove a compute node from the Lenovo Flex System™ chassis, you must shut down the operating system and turn off the compute node. You do not have to shut down the chassis itself.

- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the compute node, open or close a latch, and so on.
- For a list of supported optional devices for the compute node, see <http://www.ibm.com/systems/info/x86servers/serverproven/compat/us>.

## Handling static-sensitive devices

To reduce the possibility of damage from electrostatic discharge, observe these precautions.

**Attention:** Static electricity can damage the compute node and other electronic devices. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them.

- When you work on a Lenovo Flex System chassis that has an electrostatic discharge (ESD) connector, use a wrist strap, especially when you handle modules, optional devices, or compute nodes. To work correctly, the wrist strap must have a good contact at both ends (touching your skin at one end and firmly connected to the ESD connector on the front or back of the Lenovo Flex System chassis).
- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an *unpainted* metal part of the Lenovo Flex System chassis or any *unpainted* metal surface on any other grounded rack component in the rack in which you are installing the device for at least 2 seconds. This drains static electricity from the package and from your body.
- Remove the device from its package and install it directly into the compute node without setting down the device. If it is necessary to set down the device, put it back into its static-protective package. Do not place the device on the compute node cover or on a metal surface.
- Take additional care when you handle devices during cold weather. Heating reduces indoor humidity and increases static electricity.

## Returning a device or component

If you are instructed to return a device or component, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Updating the compute node configuration

Use this information to update the compute node configuration.

Use this information to update the compute node configuration. When the compute node starts for the first time after you add or remove an internal device, you might receive a message that the configuration has changed.

The Setup utility automatically starts so that you can save the new configuration settings. For more information about the Setup utility, see the *Installation and Service Guide* that comes with the compute node.

Some devices have device drivers that you must install. See the documentation that comes with each device for information about installing device drivers.



---

## Chapter 2. Installing, removing, and replacing compute node components

Use this information to install, remove, and replace replaceable components and optional devices in the compute node.

See “Replaceable components” on page 13 to determine whether a component is a consumable part, structural part, Tier 1 CRU, or Tier 2 CRU.

For information about the terms of the warranty and getting service and assistance, see the *Warranty Information* document.

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### Removing a ServeRAID M5215 controller

Use this information to remove a ServeRAID M5215 controller.

#### Before you begin

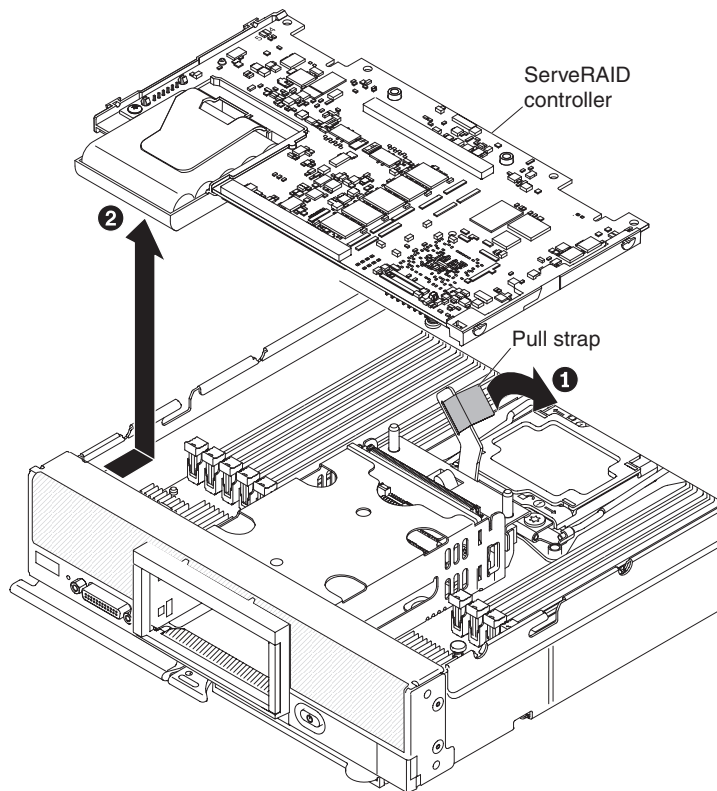
When the ServeRAID controller is removed, software RAID is not supported. The compute node does not support downgrading to the software RAID function from the hardware RAID configuration.

Before you remove the ServeRAID M5215 controller, complete the following steps:

1. Read “Safety” on page v and “Installation guidelines” on page 2.
2. If the compute node is installed in an Lenovo Flex System chassis, remove it (see the documentation for your compute node for instructions).
3. Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.

## Procedure

To remove the ServeRAID M5215 controller, complete the following steps.



1. Remove the compute node cover (see the documentation for your compute node for instructions).
2. Locate the ServeRAID controller installed in the compute node.
3. Remove the ServeRAID controller.
  - a. Lift and rotate the lever on the hard disk drive backplane to disengage the ServeRAID controller from its connector.
  - b. Lift the ServeRAID controller and remove it from the compute node.

## What to do next

If you are instructed to return the ServeRAID controller, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

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## Installing the ServeRAID M5215 controller

Use this information to install a ServeRAID M5215 controller.

### Before you begin

Before you install the ServeRAID M5215 controller, complete the following steps:

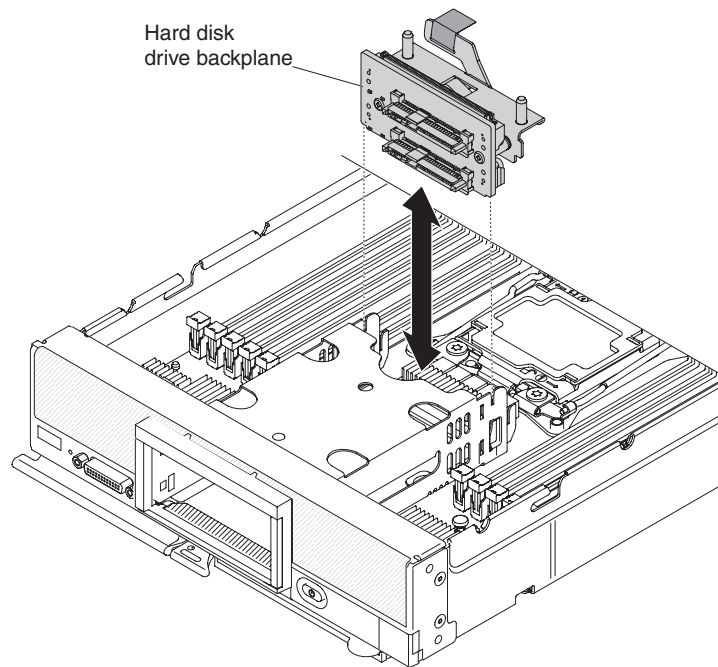
1. Read “Safety” on page v and “Installation guidelines” on page 2.
2. If the compute node is installed in an Lenovo Flex System chassis, remove it (see the documentation for your compute node for instructions).

3. Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.

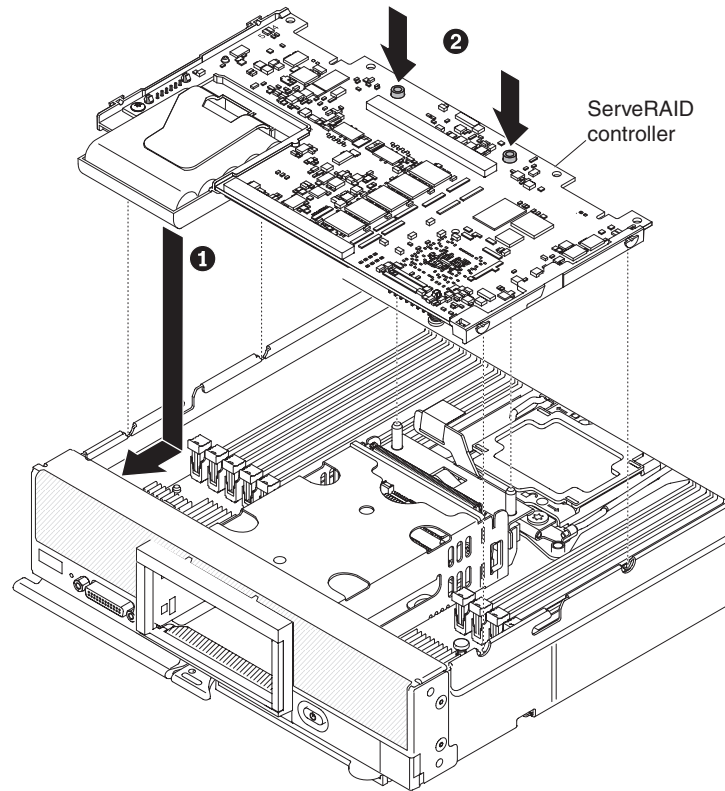
## Procedure

To install the ServeRAID M5215 controller, complete the following steps.

1. Remove the compute node cover (see the documentation for your compute node for instructions).
2. If a hard disk drive backplane is installed in the compute node that is not compatible with the ServeRAID M5215 controller, remove it (see “Removing a hard disk drive backplane” on page 8 and the documentation for your compute node for instructions).



3. Install the ServeRAID M5215 controller hard disk drive backplane in the system-board assembly (see “Installing a hard disk drive backplane” on page 9). The ServeRAID M5215 controller hard disk drive backplane goes in the rear alignment slots on the hard disk drive cage.
4. Touch the static-protective package that contains the ServeRAID controller to an *unpainted* metal surface on any grounded rack component; then, remove the controller from the package.
5. Locate the ServeRAID controller connector on the hard disk drive backplane.



6. Orient the connector on the ServeRAID controller with the connector on the hard disk drive backplane; then, press the controller into the connector.
7. Firmly press on the indicated locations to seat the ServeRAID controller.

**Note:** Install storage drives in the same bay locations as from which they were removed.

8. Install any removed storage drives and hard disk drive bay fillers (see the documentation for your compute node for instructions).

### What to do next

After you install the ServeRAID M5215 controller, complete the following steps:

1. Install the cover on the compute node (see the documentation for your compute node for instructions).
2. Install the compute node into the chassis (see the documentation for your compute node for instructions).

---

## Removing a hard disk drive backplane

Use this information to remove a hard disk drive backplane.

### Before you begin

Before you remove the hard disk drive backplane, complete the following steps:

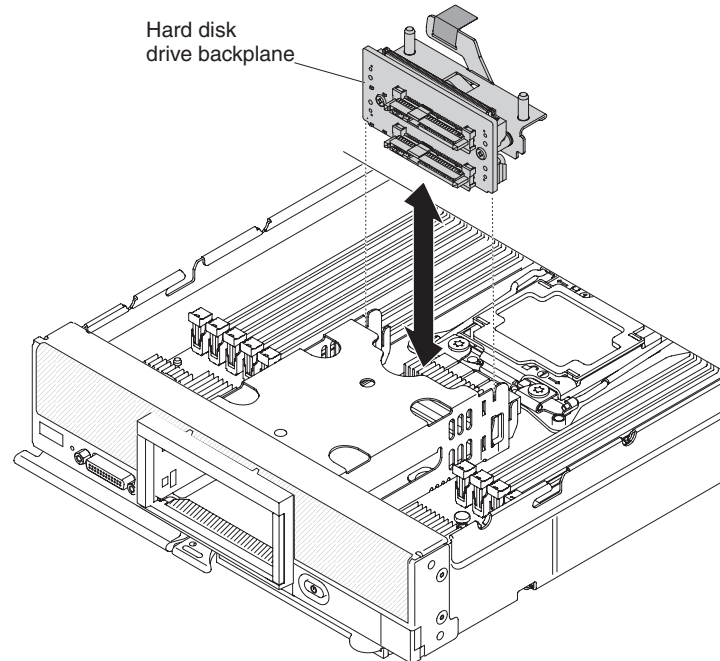
1. Read “Safety” on page v and “Installation guidelines” on page 2.
2. If the compute node is installed in a chassis, remove it (see the documentation for your compute node for instructions).

3. Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.

**Note:** Several different types of hard disk drive backplane can be installed in the compute node: all are removed and installed in a similar manner. The hard disk drive backplane shown in the illustrations might differ slightly from the backplane installed in your compute node.

## Procedure

To remove a hard disk drive backplane, complete the following steps.



1. Remove the cover (see the documentation for your compute node for instructions).
2. Remove the ServeRAID controller (see “Removing a ServeRAID M5215 controller” on page 5).
3. Remove any storage drives and hard disk drive bay fillers and set them aside on a static-protective surface (see the documentation for your compute node for instructions).

**Note:** Install storage drives and solid state drive mounting sleeves in the same bay locations as from which they were removed.

4. Lift and remove ServeRAID hard disk drive backplane from the system-board assembly.

## What to do next

If you are instructed to return the ServeRAID controller backplane, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

---

## Installing a hard disk drive backplane

Use this information to install a hard disk drive backplane.

## Before you begin

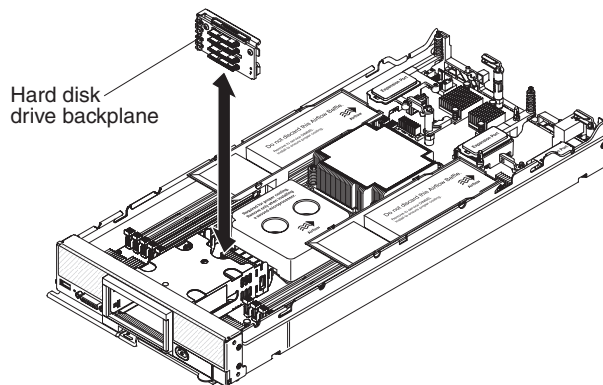
Before you install a hard disk drive backplane, complete the following steps:

1. Read “Safety” on page v and “Installation guidelines” on page 2.
2. If the compute node is installed in a chassis, remove it (see the documentation for your compute node for instructions).
3. Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.

**Note:** Several different types of hard disk drive backplane can be installed in the compute node: all are removed and installed in a similar manner. The hard disk drive backplane shown in the illustrations might differ slightly from the backplane installed in your compute node.

## Procedure

To install a hard disk drive backplane, complete the following steps.



1. Remove the cover (see the documentation for your compute node for instructions).

**Note:** All hard disk drive backplanes use the same connector on the system board; however, there are two alignment slots in the hard disk drive cage to accommodate different backplane types. Make sure that you align the backplane and system board connectors when inserting the backplane in the hard disk drive cage.

2. Align the backplane with the hard disk drive cage and the connector on the system board and press the backplane into position until it is fully seated in the connector. The ServeRAID M5215 controller hard disk drive backplane goes in the rear alignment slots on the hard disk drive cage.
3. Install the ServeRAID controller (see “Installing the ServeRAID M5215 controller” on page 6).
4. Insert the hot-swap hard disk drives, solid state drive mounting sleeves, and hard disk drive bay fillers.

## What to do next

After you install the hard disk drive backplane, complete the following steps:

1. Install the cover onto the compute node (see the documentation for your compute node for instructions).
2. Install the compute node into the chassis (see the documentation for your compute node for instructions).

---

## Removing the flash power module

Use this information to remove the flash power module.

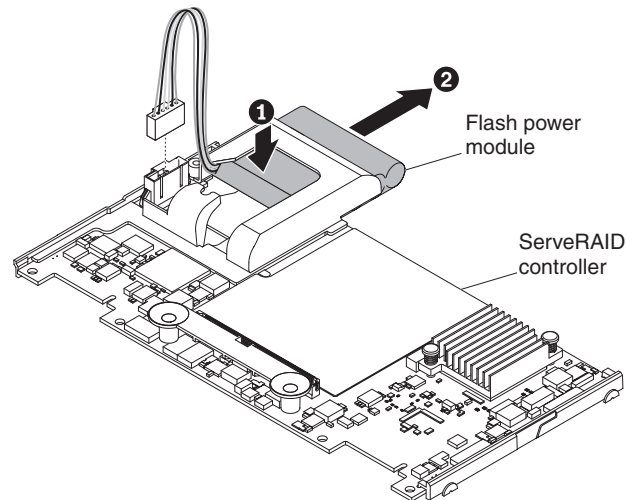
### Before you begin

Before you remove the flash power module, complete the following steps:

1. Read “Safety” on page v and “Installation guidelines” on page 2.
2. If the compute node is installed in a chassis, remove it (see the documentation for your compute node for instructions).
3. Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.

### Procedure

To remove the flash power module, complete the following steps.



1. Remove the cover (see the documentation for your compute node for instructions).
2. Remove the ServeRAID controller (see “Removing a ServeRAID M5215 controller” on page 5).
3. Disconnect the flash power module cable from the ServeRAID controller.
4. Press down on the rear of the flash power module; then, slide the flash power module out of its holder on the ServeRAID controller.

### What to do next

If you are instructed to return the flash power module, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you; otherwise, dispose of the flash power module as required by local ordinances or regulations.

---

## Installing the flash power module

Use this information to install the flash power module.

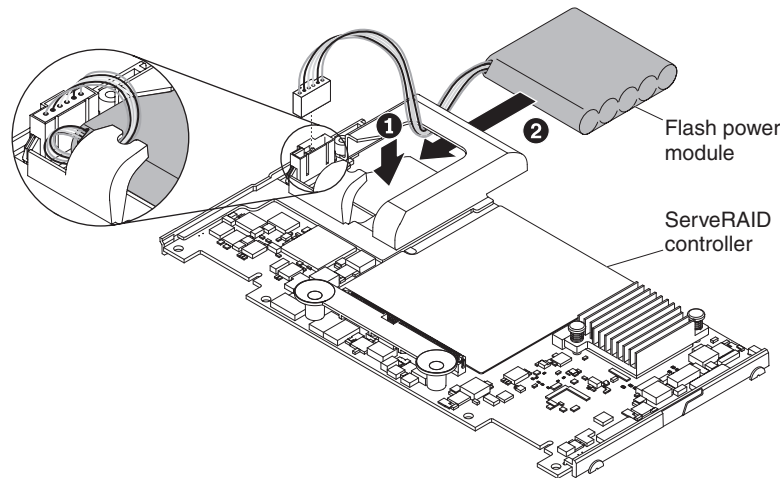
## Before you begin

Before you install the flash power module, complete the following steps:

1. Read “Safety” on page v and “Installation guidelines” on page 2.
2. If the compute node is installed in a chassis, remove it (see the documentation for your compute node for instructions).
3. Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.

## Procedure

To install the flash power module, complete the following steps.



1. Remove the cover (see the documentation for your compute node for instructions).
2. Orient the flash power module with the cable side toward its connector on the ServeRAID controller; then, feed the cable up through the flash power module holder on the ServeRAID controller.
3. Press down on the flash power module holder retaining tab; then, slide the module into the holder.
4. Route the flash power module cable through the indent on the retaining clip; then, press the flash power module forward to seat it in the holder.
5. Connect the flash power module cable to its connector on the ServeRAID controller. The connector is keyed. Press the cable into the connector until the retaining clip snaps in place.
6. Install the ServeRAID controller in the compute node (see “Installing the ServeRAID M5215 controller” on page 6).

## What to do next

After you install the flash power module, complete the following steps:

1. Install the cover onto the compute node (see the documentation for your compute node for instructions).
2. Install the compute node into the chassis (see the documentation for your compute node for instructions).



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## Replaceable components

The following replaceable components are available for the ServeRAID M5215 with 2GB Flash Enablement - Lenovo Flex System x240 M5.

**Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If Lenovo installs a Tier 1 CRU at your request without a service contract, you will be charged for the installation.

For information about the terms of the warranty and getting service and assistance, see the *Warranty Information* document.

For an updated list of replaceable components on the web, go to <http://www.ibm.com/supportportal>.

*Table 1. Replaceable components for the ServeRAID M5215 with 2GB Flash Enablement option*

| Description                                     | CRU part number (Tier 1) |
|---|--------------------------|
| ServeRAID controller                            | 00JX139                  |
| Hard disk drive backplane, ServeRAID controller | 00JY707                  |
| Flash power module                              | 00JY023                  |



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## Appendix. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about Lenovo products, you will find a wide variety of sources available from Lenovo to assist you.

Use this information to obtain additional information about Lenovo and Lenovo products, and determine what to do if you experience a problem with your Lenovo system or optional device.

**Note:** This section includes references to IBM web sites and information about obtaining service. IBM is Lenovo's preferred service provider for the System x, Flex System, and NeXtScale System products.

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### Before you call

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

If you believe that you require warranty service for your Lenovo product, the service technicians will be able to assist you more efficiently if you prepare before you call.

- 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 software, firmware, and operating-system device drivers for your Lenovo product. The Lenovo Warranty terms and conditions state that you, the owner of the Lenovo product, are responsible for maintaining and updating all software and firmware for the product (unless it is covered by an additional maintenance contract). Your 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 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 the service technician. This data will help the service technician 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 (Lenovo 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](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 the service technicians. The 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 Lenovo provides in the online help or in the Lenovo product documentation. The Lenovo product documentation also describes the diagnostic tests that you can perform. The documentation for most systems, operating systems, and programs 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 Lenovo system and preinstalled software, if any, or optional device is available in the product documentation. 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. Lenovo 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>.

---

## Getting help and information from the World Wide Web

Up-to-date information about Lenovo products and support is available on the World Wide Web.

On the World Wide Web, up-to-date information about Lenovo systems, optional devices, services, and support is available at <http://www.ibm.com/supportportal>. The most current version of the product documentation is available in the following product-specific Information Centers:

**Flex System products:**

<http://pic.dhe.ibm.com/infocenter/flexsys/information/index.jsp>

**System x products:**

<http://www.ibm.com/systems/x>

**NeXtScale System products:**

<http://pic.dhe.ibm.com/infocenter/nxtscale/documentation/index.jsp>

---

## How to send DSA data

You can use the 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:

- **Standard upload:** [http://www.ibm.com/de/support/ecurep/send\\_http.html](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](http://www.ecurep.ibm.com/app/upload_hw)

- **Secure upload:** [http://www.ibm.com/de/support/ecurep/send\\_http.html#secure](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](https://www.ecurep.ibm.com/app/upload_hw)

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## Creating a personalized support web page

You can create a personalized support web page by identifying Lenovo products that are of interest to you.

To create a personalized support web page, go to <http://www.ibm.com/support/mynotifications>. 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 Lenovo 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).

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## Hardware service and support

IBM is Lenovo's preferred service provider for the System x, Flex System and NeXtScale System products.

You can receive hardware service through your Lenovo reseller or from IBM. To locate a reseller authorized by Lenovo to provide warranty service, go to <http://www.ibm.com/partnerworld> and click **Business Partner Locator**. 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.

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## Taiwan product service

Use this information to contact IBM Taiwan product service.

台灣 IBM 產品服務聯絡方式：  
台灣國際商業機器股份有限公司  
台北市松仁路7號3樓  
電話：0800-016-888

IBM Taiwan product service contact information:

IBM Taiwan Corporation  
3F, No 7, Song Ren Rd.  
Taipei, Taiwan  
Telephone: 0800-016-888

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Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

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## Trademarks

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Internet Explorer, Microsoft, and Windows are trademarks of the Microsoft group of companies.

Linux is a registered trademark of Linus Torvalds.

Other company, product, or service names may be trademarks or service marks of others.

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## Important notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1 024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard-disk-drive bays with the largest currently supported drives that are available from Lenovo.

Maximum memory might require replacement of the standard memory with an optional memory module.

Each solid-state memory cell has an intrinsic, finite number of write cycles that the cell can incur. Therefore, a solid-state device has a maximum number of write cycles that it can be subjected to, expressed as total bytes written (TBW). A device that has exceeded this limit might fail to respond to system-generated commands or might be incapable of being written to. Lenovo is not responsible for replacement of a device that has exceeded its maximum guaranteed number of program/erase cycles, as documented in the Official Published Specifications for the device.



Lenovo makes no representations or warranties with respect to non-Lenovo products. Support (if any) for the non-Lenovo products is provided by the third party, not Lenovo.

Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

---

## Recycling information

Lenovo encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. Lenovo offers a variety of programs and services to assist equipment owners in recycling their IT products. For information on recycling Lenovo products, go to:  
<http://www.lenovo.com/recycling>.

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## Particulate contamination

**Attention:** Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the device that is described in this document.

Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the device to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If Lenovo determines that the levels of particulates or gases in your environment have caused damage to the device, Lenovo may condition provision of repair or replacement of devices or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility.

*Table 2. Limits for particulates and gases*

| Contaminant | Limits   |
|-------------|--|
| Particulate | <ul style="list-style-type: none"><li>• The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2<sup>1</sup>.</li><li>• Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282.</li><li>• The deliquescent relative humidity of the particulate contamination must be more than 60%<sup>2</sup>.</li><li>• The room must be free of conductive contamination such as zinc whiskers.</li></ul> |
| Gaseous     | <ul style="list-style-type: none"><li>• Copper: Class G1 as per ANSI/ISA 71.04-1985<sup>3</sup></li><li>• Silver: Corrosion rate of less than 300 Å in 30 days</li></ul>   |

Table 2. Limits for particulates and gases (continued)

| Contaminant | Limits  |
|-------------|---|
|             | <p><sup>1</sup> ASHRAE 52.2-2008 - <i>Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size</i>. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.</p> <p><sup>2</sup> The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.</p> <p><sup>3</sup> ANSI/ISA-71.04-1985. <i>Environmental conditions for process measurement and control systems: Airborne contaminants</i>. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.</p> |

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## Telecommunication regulatory statement

This product may not be certified in your country for connection by any means whatsoever to interfaces of public telecommunications networks. Further certification may be required by law prior to making any such connection. Contact a Lenovo representative or reseller for any questions.

---

## Electronic emission notices

When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are supplied with the monitor.

### Federal Communications Commission (FCC) statement

**Note:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Lenovo is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that might cause undesired operation.

### Industry Canada Class A emission compliance statement

This Class A digital apparatus complies with Canadian ICES-003.

## **Avis de conformité à la réglementation d'Industrie Canada**

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

## **Australia and New Zealand Class A statement**

**Attention:** This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

## **European Union EMC Directive conformance statement**

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. Lenovo cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the installation of option cards from other manufacturers.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

Lenovo, Einsteinova 21, 851 01 Bratislava, Slovakia

## **Germany Class A statement**

**Deutschsprachiger EU Hinweis: Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit**

**Deutschsprachiger EU Hinweis: Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit** Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG (früher 89/336/EWG) zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse A ein.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der Lenovo empfohlene Kabel angeschlossen werden. Lenovo übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der Lenovo verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der Lenovo gesteckt/eingebaut werden.

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**Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Betriebsmitteln** Dieses Produkt entspricht dem „Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln“ EMVG (früher „Gesetz über die elektromagnetische Verträglichkeit von Geräten“). Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG (früher 89/336/EWG) in der Bundesrepublik Deutschland.

**Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln, EMVG vom 20. Juli 2007**

(früher Gesetz über die elektromagnetische Verträglichkeit von Geräten), bzw. der EMV EG Richtlinie 2004/108/EC (früher 89/336/EWG), für Geräte der Klasse A.

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen. Verantwortlich für die Konformitätserklärung nach Paragraph 5 des EMVG ist die Lenovo (Deutschland) GmbH, Gropiusplatz 10, D-70563 Stuttgart.

Informationen in Hinsicht EMVG Paragraph 4 Abs. (1) 4: **Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.**

Nach der EN 55022: „Dies ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funkstörungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen durchzuführen und dafür aufzukommen.“

Nach dem EMVG: „Geräte dürfen an Orten, für die sie nicht ausreichend entstört sind, nur mit besonderer Genehmigung des Bundesministers für Post und Telekommunikation oder des Bundesamtes für Post und Telekommunikation betrieben werden. Die Genehmigung wird erteilt, wenn keine elektromagnetischen Störungen zu erwarten sind.“ (Auszug aus dem EMVG, Paragraph 3, Abs. 4). Dieses Genehmigungsverfahren ist nach Paragraph 9 EMVG in Verbindung mit der entsprechenden Kostenverordnung (Amtsblatt 14/93) kostenpflichtig.

Anmerkung: Um die Einhaltung des EMVG sicherzustellen sind die Geräte, wie in den Handbüchern angegeben, zu installieren und zu betreiben.

## Japan VCCI Class A statement

この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用する  
と電波妨害を引き起こすことがあります。この場合には使用者が適切な対策  
を講ずるよう要求されることがあります。 VCCI-A

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

## Japan Electronics and Information Technology Industries Association (JEITA) statement

高調波ガイドライン準用品

Japan Electronics and Information Technology Industries Association (JEITA)  
Confirmed Harmonics Guidelines with Modifications (products greater than 20 A  
per phase)

## Korea Communications Commission (KCC) statement

이 기기는 업무용(A급)으로 전자파적합기기로  
서 판매자 또는 사용자는 이 점을 주의하시기  
바라며, 가정외의 지역에서 사용하는 것을 목  
적으로 합니다.

This is electromagnetic wave compatibility equipment for business (Type A). Sellers and users need to pay attention to it. This is for any areas other than home.

## Russia Electromagnetic Interference (EMI) Class A statement

ВНИМАНИЕ! Настоящее изделие относится к классу А.  
В жилых помещениях оно может создавать радиопомехи, для  
снижения которых необходимы дополнительные меры

## People's Republic of China Class A electronic emission statement

中华人民共和国“A类”警告声明

声明

此为A级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

## Taiwan Class A compliance statement

警告使用者：  
這是甲類的資訊產品，在  
居住的環境中使用時，可  
能會造成射頻干擾，在這  
種情況下，使用者會被要  
求採取某些適當的對策。



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