Hardware Maintenance Manual

ThinkThinkThinkServerThink

ThinkServer RS210
Machine Types: 6531, 6532, 6533, and 6534

ThinkServer ThinkServer RS210, Types 6531, 6532,
6533, and 6534

Hardware Maintenance Manual

lenovo

Note: Before using this information and the product it supports, read the general information in "Notices," on page 221 and the *Warranty and Support Information* document on the *ThinkServer Documentation* DVD.

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Chapter 1. About this manual

This *Hardware Maintenance Manual* contains information to help you solve problems that might occur in your server. It describes the diagnostic tools that come with the server, error codes and suggested actions, and instructions for replacing failing components.

Replaceable components are of three types:

- **Self-service customer replaceable unit (CRU):** Replacement of self-service CRUs is your responsibility. If Lenovo® installs a self-service CRU at your request, you will be charged for the installation.
- **Optional-service customer replaceable unit:** You may install an optional-service CRU yourself or request Lenovo to install it, at no additional charge, under the type of warranty service that is designated for the server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

The most recent version of this document is available at http://www.lenovo.com/support.

Before servicing a Lenovo product, be sure to read the Safety Information. See "Important Safety Information."

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

Important Safety Information

Be sure to read all caution and danger statements in this book before performing any of the instructions.

Veuillez lire toutes les consignes de type DANGER et ATTENTION du présent document avant d'exécuter les instructions.

Lesen Sie unbedingt alle Hinweise vom Typ ″ACHTUNG″ oder ″VORSICHT″ in dieser Dokumentation, bevor Sie irgendwelche Vorgänge durchführen

Leggere le istruzioni introdotte da ATTENZIONE e PERICOLO presenti nel manuale prima di eseguire una qualsiasi delle istruzioni

Certifique-se de ler todas as instruções de cuidado e perigo neste manual antes de executar qualquer uma das instruções

Es importante que lea todas las declaraciones de precaución y de peligro de este manual antes de seguir las instrucciones.

تأكد من قراءة كل التحذيرات الموجودة في هذا الكتاب قبل اتباع هذه التعليمات .

执行任何说明之前，请确保已阅读本书中的所有警告和危险声明。

執行任何指示前，請確實閱讀本書中的所有警告及危險聲明。

ודאו שקראתם את כל הודעות האזהרה והסכנה במסמך זה לפני שתבצעו פעולה כלשהי.

본 사용 설명서에 기재된 내용을 실행하기 전에 모든 주의사항 및 위험사항을 숙지하십시오.

Safety statements

Important:

Each caution and danger statement in this document 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 document before you perform the procedures. Read any additional safety information that comes with the server or optional device before you install the device.

Attention: Use No. 26 AWG or larger UL-listed or CSA certified telecommunication line cord.

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.	

Statement 2:

CAUTION:
When replacing the lithium battery, use only a type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

Dispose of the battery as required by local ordinances or regulations.

Statement 3:

CAUTION:
When laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:

- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
- **Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**

DANGER

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.

Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

Class 1 Laser Product
Laser Klasse 1
Laser Klass 1
Luokan 1 Laserlaite
Appareil À Laser de Classe 1

Statement 4:
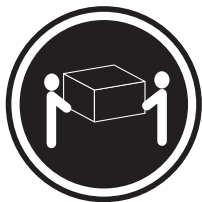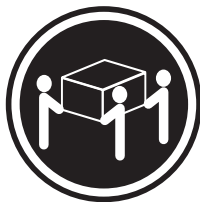
≥ 18 kg (39.7 lb)   ≥ 32 kg (70.5 lb)   ≥ 55 kg (121.2 lb)

CAUTION:
Use safe practices when lifting.

Statement 5:

CAUTION:
The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.
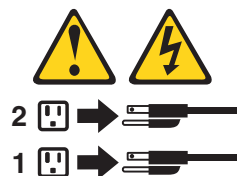
Statement 8:

CAUTION:
Never remove the cover on a power supply or any part that has the following label attached.

Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

Statement 26:

CAUTION:
Do not place any object on top of rack-mounted devices.

Attention: This server is suitable for use on an IT power distribution system whose maximum phase-to-phase voltage is 240 V under any distribution fault condition.

Important: This product is not suitable for use with visual display workplace devices according to Clause 2 of the German Ordinance for Work with Visual Display Units.

Important information about replacing RoHS compliant FRUs

RoHS, The Restriction of Hazardous Substances in Electrical and Electronic Equipment Directive (2002/95/EC) is a European Union legal requirement affecting the global electronics industry. RoHS requirements must be implemented on Lenovo products placed on the market and sold in the European Union after June 2006. Products on the market before June 2006 are not required to have RoHS compliant parts. If the parts are not compliant originally, replacement parts can also be noncompliant, but in all cases, if the parts are compliant, the replacement parts must also be compliant.

Note: RoHS and non-RoHS FRU part numbers with the same fit and function are identified with unique FRU part numbers.

Lenovo plans to transition to RoHS compliance well before the implementation date and expects its suppliers to be ready to support Lenovo's requirements and schedule in the EU. Products sold in 2005 will contain some RoHS compliant FRUs. The following statement pertains to these products and any product Lenovo produces containing RoHS compliant parts.

RoHS compliant ThinkServer RS210 parts have unique FRU part numbers. Before or after June, 2006, failed RoHS compliant parts must always be replaced using RoHS compliant FRUs, so only the FRUs identified as compliant in the system Hardware Maintenance Manual or direct substitutions for those FRUs can be used.

Products marketed before June 2006		Products marketed after June 2006	
Current or original part	**Replacement FRU**	**Current or original part**	**Replacement FRU**
Non-RoHS	Can be Non-RoHS	Must be RoHS	Must be RoHS
Non-RoHS	Can be RoHS		
Non-RoHS	Can sub to RoHS		
RoHS	Must be RoHS		

Note: A direct substitution is a part with a different FRU part number that is automatically shipped by the distribution center at the time of order.

Turkish statement of compliance

The Lenovo product meets the requirements of the Republic of Turkey Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (EEE).

Türkiye EEE Yönetmeliğine Uygunluk Beyanı

Bu Lenovo ürünü, T.C. Çevre ve Orman Bakanlığı'nın "Elektrik ve Elektronik Eşyalarda Bazı Zararlı Maddelerin Kullanımının Sınırlandırılmasına Dair Yönetmelik (EEE)" direktiflerine uygundur.

EEE Yönetmeliğine Uygundur.

Chapter 2. General information

This chapter provides general information that applies to all machine types supported by this publication.

Features and technologies

The server uses the following features and technologies:

- **UEFI-compliant server firmware**

  UEFI replaces the basic input/output system (BIOS) and defines a standard interface between the operating system, platform firmware, and external devices. The server design combines the UEFI capabilities and features with legacy BIOS compatibility. UEFI-compliant servers are capable of starting UEFI-compliant operating systems, BIOS-based operating systems, and BIOS-based adapters as well as UEFI-compliant adapters.

  Note: This server does not support DOS.

- **Dual-core or quad-core processing**

  The server supports one Intel® Xeon® or Celeron® dual-core or quad-core microprocessor.

- **Integrated management module**

  The Integrated management module (IMM) combines service processor functions, video controller, and (when an optional virtual media key is installed) remote presence function in a single chip. The IMM provides advanced service-processor control, monitoring, and alerting function. If an environmental condition exceeds a threshold or if a system component fails, the IMM lights LEDs to help you diagnose the problem, records the error in the event log, and alerts you to the problem. Optionally, the IMM also provides a virtual presence capability for remote server management capabilities. The IMM provides remote server management through the following industry-standard interfaces:

  - Intelligent Platform Management Interface (IPMI) version 2.0
  - Simple Network Management Protocol (SNMP) version 3
  - Common Information Model (CIM)
  - Web browser

  For additional information, see "Using the integrated management module" on page 215.

- **Remote presence capability and blue-screen capture**

  The remote presence and blue-screen capture features are integrated functions of the integrated management module (IMM) and are available with the purchase of the optional Lenovo Virtual Media Key. A virtual media key is required to enable the remote presence and blue-screen capture features. The remote presence feature provides the following functions:

  - Remotely viewing video with graphics resolutions up to 1280 x 1024, regardless of the system state
  - Remotely accessing the server, using the keyboard and mouse from a remote client
  - Mapping the DVD drive, diskette drive, and USB flash drive on a remote client, and mapping ISO and diskette image files as virtual drives that are available for use by the server
  - Uploading a diskette image to the IMM memory and mapping it to the server as a virtual drive

  The blue-screen capture feature captures the video display contents before the IMM restarts the server when the IMM detects an operating-system hang condition. A system administrator can use the blue-screen capture to assist in determining the cause of the hang condition.

  See "Using the remote presence capability and blue-screen capture" on page 218 for additional information.

- **Large system-memory capability**

The memory bus supports up to 24 GB of memory when registered DIMMs are installed. The server supports up to 8 GB if unbuffered DIMMs are installed. The memory controller supports error correcting code (ECC) for up to six industry-standard PC3-8500 or PC3-10600R-999, 1066 and 1333 MHz, DDR3 (third-generation double-data-rate), registered or unbuffered, synchronous dynamic random access memory (SDRAM) dual inline memory modules (DIMMs).

- **Integrated network support**

  The server comes with an integrated Intel Gigabit Ethernet controller, which supports connection to a 10 Mbps, 100 Mbps, or 1000 Mbps network. For more information, see "Configuring the Gigabit Ethernet controllers" on page 219.

- **Integrated Trust Platform Module**

  This integrated security chip performs cryptographic functions and stores private and public secure keys. It provides the hardware support for the Trusted Computing Group (TCG) specification.

- **Large data-storage capacity and hot-swap capability**

  The server supports a maximum of four 2.5-inch hot-swap Serial Attached SCSI (SAS) hard disk drives, two 3.5-inch simple-swap Serial ATA (SATA) hard disk drives, or two 3.5-inch hot-swap SAS or SATA hard disk drives, depending on the server model.

  With the hot-swap feature, you can add, remove, or replace hard disk drives without turning off the server.

- **PCI card capabilities**

  The server has two PCI interface slots (one supports low-profile cards and one supports half-length, full-height cards). Both slots can support PCI Express PCI cards.

- **RAID support**

  The RAID controller provides hardware redundant array of independent disks (RAID) support. The standard RAID controller provides RAID levels 0, 1, and 1E. Optional RAID PCI cards are available for purchase that provide additional RAID levels.

- **Systems-management capabilities**

  The server comes with an Integrated Management Module (IMM). When the IMM is used with the systems-management software that comes with the server, you can manage the functions of the server locally and remotely. The IMM also provides system monitoring, event recording, and network alert capability. The systems-management connector provides additional security by physically separating the management network traffic from the production network. You can use the Setup Utility to configure the server to use a dedicated systems-management network or a shared network.

- **TCP/IP offload engine (TOE) support**

  The Ethernet controllers in the server support TOE, which is a technology that offloads the TCP/IP flow from the microprocessor and I/O subsystem to increase the speed of the TCP/IP flow. When an operating system that supports TOE is running on the server and TOE is enabled, the server supports TOE operation. See the operating-system documentation for information about enabling TOE.

  Note: The Linux operating system does not support TOE.

- **Preboot diagnostics program**

  The preboot diagnostics programs are stored on the integrated USB memory. They collect and analyze system information to aid in diagnosing server problems. The diagnostic programs collect the following information about the server:
  - System configuration
  - Network interfaces and settings
  - Installed hardware
  - Service processor status and configuration
  - Vital product data, firmware, and UEFI (formerly called BIOS) configuration
  - Hard disk drive health
  - RAID controller configuration

– Event logs for RAID controllers and service processors

The diagnostics programs create a merged log that includes events from all collected logs. The information is collected into a file that you can send to the Lenovo technical support team to help diagnose a problem. Additionally, you can view the information locally through a generated text report file. You can also copy the log to a removable medium and view the HTML log from a Web browser.

For additional information about diagnostics, see Chapter 4, "Diagnostics," on page 19.

- **EasyStartup DVD**

  The ThinkServer EasyStartup program guides you through the configuration of RAID controllers and the installation of the operating system and device drivers. See "Using the *EasyStartup* DVD" on page 209 for details.

- **EasyManage DVD**

  The ThinkServer EasyManage program helps you manage and administer your servers through remote problem notification as well as monitoring and alerting.

Specifications

The following information is a summary of the features and specifications of the server. Depending on the server model, some features might not be available, or some specifications might not apply.

Table 1. Features and specifications

Microprocessor:	SATA optical drives:	Integrated functions:

• Supports one Intel® quad-core (Xeon 3400 series) or dual-core (Celeron G1101, Pentium G6950, or core i3 series) processor with the IbexPeak 3420 chip set and Multi-chip Package (MCP) processor architecture
• Designed for LGA 1156 socket
• Scalable up to four cores
• 32 KB instruction cache, 32 KB data cache, and up to 8 MB cache that is shared among the cores
• Support for Intel® Extended Memory 64 Technology (EM64T)
 	
Note:
• Use the Setup utility to determine the type and speed of the microprocessor.
 	
Memory:
• Minimum: 1 GB
• Maximum: 32 GB
  – 16 GB using unbuffered DIMMs (UDIMMs)
  – 32 GB using registered DIMMs (RDIMMs)
• Types: PC3-8500 or PC3-10600R-999 (single-rank or double-rank), 1066, and 1333 MHz, ECC, DDR3 registered or unbuffered SDRAM DIMMs only
• Connectors: Six dual inline memory module (DIMM) connectors, two-way interleaved
• Supports:
  – 1 GB, 2 GB, and 4 GB (when available) unbuffered DIMMS
  – 1 GB, 2 GB, 4 GB, and 8 GB (when available) registered DIMMs
	• UltraSlim DVD-ROM combo (optional)
	• Multi-burner (optional)
	
	Hard disk drive expansion bays (depending on the model):
	
	One of the following configurations:
	• Four 2.5-inch hot-swap SAS hard disk drive bays
	• Two 3.5-inch hot-swap SAS or hot-swap SATA hard disk drive bays
	• Two 3.5-inch simple-swap SAS hard disk drive bays
	
	PCI expansion slots:
	
	Supports two PCI riser slots on the riser card that connects to slots 1 and 2 on the system board:
	• Slot 1 supports low-profile cards (PCI Express Gen2 x8
	• Slot 2 supports 3/4-length, full-height cards (PCI Express Gen2 x8 or PCI-X 1.0a 64-bit/133 MHz)
	
	Power supply:
	
	One 351-watt power supply or one 351-watt high efficiency power supply.
	
	Fans: The server comes standard with five speed-controlled fans.
		• Integrated management module (IMM), which provides service processor control and monitoring functions, video controller, and (when the optional virtual media key is installed) remote keyboard, video, mouse, and remote hard disk drive capabilities
		• Intel 82574L Gb Ethernet controller with TCP/IP Offload Engine (TOE) and Wake on LAN® support
		• Seven Universal Serial Bus (USB) 2.0 ports (two front, four rear, and one internal for the optional USB Hypervisor flash device)
		• Two Ethernet ports
		• Four-port integrated SATA controller
		• Integrated Trusted Platform Module (TPM) support
		• One serial port
		• One VGA port

Table 1. Features and specifications (continued)

RAID controllers:	Video controller (integrated into IMM):	Notes:

• An IBM ServeRAID-BR10il SAS/SATA Controller that provides RAID levels 0, 1, and 1E (comes standard on some hot-swap SAS and hot-swap SATA models).
 	
• An optional IBM ServeRAID-MR10i SAS/SATA Controller SAS/SATA adapter that provides RAID levels 0, 1, 5, 6, and 10 can be ordered.
 	
• An optional IBM ServeRAID-M1015 SAS/SATA controller that provides RAID levels 0,1,10, and 5 can be ordered.
 	
Acoustical noise emissions:
• Sound power, idling: 6.5 bels maximum
• Sound power, operating: 6.5 bels maximum
 	
Environment:
• Air temperature:
  – Server on: 10°C to 35°C (50.0°F to 95.0°F); altitude: 0 to 914.4 m (3000 ft)
  – Server on: 10°C to 32°C (50.0°F to 89.6°F); altitude: 914.4 m (3000 ft) to 2133.6 m (7000.0 ft)
  – Server off: 10°C to 43°C (50°F to 109.4°F); maximum altitude: 2133.6 m (7000.0 ft)
  – Shipping: -40°C to 60°C (-104°F to 140°F)
• Humidity:
  – Server on: 8% to 80%
  – Server off: 8% to 80%
• Particulate contamination:
 	
Attention: Airborne particulates and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the server. For information about the limits for particulates and gases, see "Notices," on page 221.
	• Matrox G200
	• SVGA compatible video controller
	• DDR2 128 MB SDRAM video memory
	• Avocent Digital Video Compression
	• Video memory is not expandable
	
	Note: The maximum video resolution is 1280 x 1024
	
	Size:
	• Height: 43 mm (1.69 inches, 1U)
	• Depth: 560.1 mm (22 inches)
	• Width: 430 mm (17.3 inches)
	• Maximum weight: 11.4 kg (25.1 lb) when fully configured
	
	Heat output:
	
	Approximate heat output:
	• Minimum configuration: 171 BTU per hour (50 watts)
	• Maximum configuration: 1024 BTU per hour (300 watts)
	
	Electrical input:
	• Sine-wave input (50 / 60 Hz) required
	• Input voltage low range:
	  – Minimum: 100 V ac
	  – Maximum: 127 V ac
	• Input voltage high range:
	  – Minimum: 200 V ac
	  – Maximum: 240 V ac
	• Input kilovolt-amperes (kVA), approximately:
	  – Minimum: 0.102 kVA
	  – Maximum: 0.55 kVA
		1. Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use.
		
		2. The sound levels were measured in controlled acoustical environments according to the procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average values stated because of room reflections and other nearby noise sources. The noise emission level stated in the declared (upper limit) sound-power level, in bels, for a random sample of system.
		
		3. There is no keyboard connector or mouse connector on the server. You can connect a USB keyboard and USB mouse to the server by using the USB connectors.

Software

Lenovo provides software to help get your server up and running.

EasyStartup

The ThinkServer EasyStartup program simplifies the process of configuring your RAID controllers and installing supported Microsoft Windows and Linux operating systems and device drivers on your server. The EasyStartup program is provided with your server on DVD. The DVD is self starting (bootable). The User Guide for the EasyStartup program is on the DVD and can be accessed directly from the program interface. For additional information, see "Using the *EasyStartup* DVD" on page 209.

EasyManage

The ThinkServer EasyManage Core server provides centralized hardware and software inventory management and secure automated system management through a centralized console. The ThinkServer EasyManage Agent enables other clients on the network to be managed by the centralized console. The ThinkServer EasyManage Core Server is supported on 32-bit Windows Server 2008 products. The ThinkServer EasyManage Agent is supported on 32-bit and 64-bit Windows, Red Hat, and SUSE operating systems.

Chapter 3. General Checkout

You can solve many problems without outside assistance by following the troubleshooting procedures in this *Hardware Maintenance Manual* and on the Lenovo Web site. This document describes the diagnostic tests that you can perform, troubleshooting procedures, and explanations of error messages and error codes. The documentation that comes with your operating system and software also contains troubleshooting information.

Checkout procedure

The checkout procedure is the sequence of tasks that you should follow to diagnose a problem in the server.

About the checkout procedure

Before you perform the checkout procedure for diagnosing hardware problems, review the following information:

- Read the safety information that begins on page 1.
- The diagnostic programs provide the primary methods of testing the major components of the server, such as the system board, Ethernet controller, keyboard, mouse (pointing device), serial ports, and hard disk drives. You can also use them to test some external devices. If you are not sure whether a problem is caused by the hardware or by the software, you can use the diagnostic programs to confirm that the hardware is working correctly.
- When you run the diagnostic programs, a single problem might cause more than one error message. When this happens, correct the cause of the first error message. The other error messages usually will not occur the next time you run the diagnostic programs.

  Exception: If multiple error codes or system-board LEDs indicate a microprocessor error, the error might be in the microprocessor or in the microprocessor socket. See "Microprocessor problems" on page 58 for information about diagnosing microprocessor problems.
- Before you run the diagnostic programs, you must determine whether the failing server is part of a shared hard disk drive cluster (two or more servers sharing external storage devices). If it is part of a cluster, you can run all diagnostic programs except the ones that test the storage unit (that is, a hard disk drive in the storage unit) or the storage adapter that is attached to the storage unit. The failing server might be part of a cluster if any of the following conditions is true:
  - You have identified the failing server as part of a cluster (two or more servers sharing external storage devices).
  - One or more external storage units are attached to the failing server and at least one of the attached storage units is also attached to another server or unidentifiable device.
  - One or more servers are located near the failing server.

  Important: If the server is part of a shared hard disk drive cluster, run one test at a time. Do not run any suite of tests, such as "quick" or "normal" tests, because this might enable the hard disk drive diagnostic tests.
- If the server is halted and a POST error code is displayed, see "Event logs" on page 19. If the server is halted and no error message is displayed, see "Troubleshooting tables" on page 50 and "Solving undetermined problems" on page 103.
- For information about power-supply problems, see "Solving power problems" on page 102.
- For intermittent problems, check the error log; see "Event logs" on page 19 and "Diagnostic programs and messages" on page 68.

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Performing the checkout procedure

To perform the checkout procedure, complete the following steps:

1. Is the server part of a cluster?
   - **No:** Go to step 2.
   - **Yes:** Shut down all failing servers that are related to the cluster. Go to step 2.
2. Complete the following steps:
   a. Check the power supply LEDs (see "Power-supply LEDs" on page 67).
   b. Turn off the server and all external devices.
   c. Check all internal and external devices for compatibility at http://www.lenovo.com/support.
   d. Check all cables and power cords.
   e. Set all display controls to the middle positions.
   f. Turn on all external devices.
   g. Turn on the server. If the server does not start, see "Troubleshooting tables" on page 50.
   h. Check the system-error LED on the operator information panel. If it is flashing, check the LEDs on the system board (see "System-board LEDs" on page 112).
   i. Check for the following results:
      - Successful completion of POST (see "POST" on page 21 for more information)
      - Successful completion of startup

Diagnosing a problem

Before you contact Lenovo or an approved warranty service provider, follow these procedures in the order in which they are presented to diagnose a problem with your server:

1. **Determine what has changed.**

   Determine whether any of the following items were added, removed, replaced, or updated before the problem occurred:
   - Device drivers
   - Server firmware
   - Hardware components
   - Software

   If possible, return the server to the condition it was in before the problem occurred.
2. **Collect data.**

   Thorough data collection is necessary for diagnosing hardware and software problems.
   a. **Document error codes and system-board LEDs.**
      - **System error codes:** See "POST error codes" on page 21 for information about a specific error code.
      - See "System-board LEDs" on page 112 for the location of the system-board LEDs.
      - **Software or operating-system error codes:** See the documentation for the software or operating system for information about a specific error code. See the manufacturer's Web site for documentation.
   b. **Collect system data.**

      Run the Dynamic System Analysis (DSA) diagnostics program to collect information about the hardware, firmware, software, and operating system. Have this information available when you contact Lenovo or an approved warranty service provider. See "Diagnostic programs and messages" on page 68 for the instructions to run the DSA program.

      If you need to download the latest version of DSA , go to http://www.lenovo.com/support.
3. **Follow the problem-resolution procedures.**

The four problem-resolution procedures are presented in the order in which they are most likely to solve your problem. Follow these procedures in the order in which they are presented:

a. **Check for and apply code updates.**

Most problems that appear to be caused by faulty hardware are actually caused by the server firmware (formerly BIOS firmware), device firmware, or device drivers that are not at the latest levels.

1) **Determine the existing code levels.**

In DSA, click **Firmware/VPD** to view system firmware levels, or click **Software** to view operating-system levels.

2) **Download and install updates of code that is not at the latest level.**

Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.

To display a list of available updates for your server, go to http://www.lenovo.com/support.

When you click an update, an information page is displayed, including a list of the problems that the update fixes. Review this list for your specific problem; however, even if your problem is not listed, installing the update might solve the problem.

b. **Check for and correct an incorrect configuration.**

If the server is incorrectly configured, a system function can fail to work when you enable it; if you make an incorrect change to the server configuration, a system function that has been enabled can stop working.

1) **Make sure that all installed hardware and software are supported.**

See http://www.lenovo.com/support to verify that the server supports the installed operating system, optional devices, and software levels. If any hardware or software component is not supported, uninstall it to determine whether it is causing the problem. You must remove nonsupported hardware before you contact Lenovo or an approved warranty service provider for support.

2) **Make sure that the server, operating system, and software are installed and configured correctly.**

Many configuration problems are caused by loose power or signal cables or incorrectly seated adapters. You might be able to solve the problem by turning off the server, reconnecting cables, reseating adapters, and turning the server back on. See "Checkout procedure" on page 15 for the instructions to perform the checkout procedures.

If the problem is associated with a specific function (for example, if a RAID hard disk drive is marked offline in the RAID array), see the documentation for the associated controller and management or controlling software to verify that the controller is correctly configured.

Problem determination information is available for many devices such as RAID and network adapters.

For problems with operating systems or Lenovo software or devices, complete the following steps.

Note: Changes are made periodically to the Lenovo Web site. The actual procedure might vary slightly from what is described in this document.

a) Go to: http://www.lenovo.com/support.

b) From the **Select your product** list, select **Servers and Storage**.

c) In the **Browse by product** window **Family:** list, select **ThinkServer RS210**.

d) Click **Downloads and drivers** .

e) Click **User's guides and manuals** to look for related documentation.

c. **Check for service bulletins.**

Lenovo service bulletins document known problems and suggested solutions. To search for service bulletins, complete the following steps.

1) Go to: http://www.lenovo.com/support.

2) From the **Select your product** list, select **Servers and Storage**.

3) In the **Browse by product** window **Family:** list, select **ThinkServer RS210**.

4) Click **Downloads and drivers** to look for service information.

Note: Changes are made periodically to the Lenovo Web site. The actual procedure might vary slightly from what is described in this document.

d. **Check for and replace defective hardware.**

If a hardware component is not operating within specifications, it can cause unpredictable results. Most hardware failures are reported as error codes in a system or operating-system log. See "Troubleshooting tables" on page 50 and Chapter 6, "Replacing FRUs," on page 115 for more information. Hardware errors are also indicated by LEDs on the system board (see "System-board LEDs" on page 112 for more information).

Troubleshooting procedures are also provided on the Lenovo Web site. A single problem might cause multiple symptoms. Follow the diagnostic procedure for the most obvious symptom. If that procedure does not diagnose the problem, use the procedure for another symptom, if possible. To locate troubleshooting procedures for your server, complete the following steps.

Note: Changes are made periodically to the Lenovo Web site. The actual procedure might vary slightly from what is described in this document.

1) Go to: http://www.lenovo.com/support.

2) From the **Select your product** list, select **Servers and Storage**.

3) In the **Browse by product** window **Family:** list, select **ThinkServer RS210**.

4) Under **Support & downloads**, click **Troubleshoot**.

5) Under **Diagnostic**, select the troubleshooting procedure for the symptom that you are observing.

For more troubleshooting information, see Chapter 4, "Diagnostics," on page 19.

If the problem remains, contact Lenovo or an approved warranty service provider for assistance with additional problem determination and possible hardware replacement. Be prepared to provide information about any error codes and collected data.

Undocumented problems

If you have completed the diagnostic procedure and the problem remains, the problem might not have been previously identified by Lenovo. After you have verified that all code is at the latest level, all hardware and software configurations are valid, and no LEDs or log entries indicate a hardware component failure, contact Lenovo or an approved warranty service provider for assistance. Be prepared to provide information about any error codes and collected data and the problem determination procedures that you have used.

Chapter 4. Diagnostics

This chapter describes the diagnostic tools that are available to help you solve problems that might occur in the server.

Diagnostic tools

The following tools are available to help you diagnose and solve hardware-related problems:

- **POST error messages and error logs**

  The power-on self-test (POST) generates messages to indicate successful test completion or the detection of a problem. See "POST" on page 21, "Event logs," and "POST error codes" on page 21 for more information.

- **Troubleshooting tables**

  These tables list problem symptoms and actions to correct the problems. See "Troubleshooting tables" on page 50 for more information.

- **Dynamic System Analysis (DSA) Preboot diagnostic programs**

  The DSA Preboot diagnostic programs provide problem isolation, configuration analysis, and error log collection. The diagnostic programs are the primary method of testing the major components of the server and are stored in integrated USB memory. The diagnostic programs collect the following information about the server:
  - System configuration
  - Network interfaces and settings
  - Installed hardware
  - Service processor status and configuration
  - Vital product data, firmware, and UEFI configuration
  - Hard disk drive health
  - RAID controller configuration
  - Controller and service processor event logs, including the following information:
    - System error logs
    - Temperature, voltage, and fan speed information
    - Self-monitoring Analysis, and Reporting Technology (SMART) data
    - Machine check registers
    - USB information
    - Monitor configuration information
    - PCI slot information

  The diagnostic programs create a merged log that includes events from all collected logs. The information is collected into a file that you can send to Lenovo service and support. Additionally, you can view the server information locally through a generated text report file. You can also copy the log to removable media and view the log from a Web browser. See "Running the diagnostic programs" on page 69 for more information.

- **Server LEDs**

  Use the LEDs on the server to diagnose system errors quickly. See "System-board LEDs" on page 112 for more information.

Event logs

Error codes and messages are displayed in the following types of event logs:

- **POST event log:** This log contains the three most recent error codes and messages that were generated during POST. You can view the POST event log through the Setup utility.

- **System-event log:** This log contains messages that were generated during POST and all system status messages from the service processor. You can view the contents of the system-event log from the Setup utility for more information.

  The system-event log is limited in size. When it is full, new entries will not overwrite existing entries; therefore, you must periodically clear the system-event log through the Setup utility. When you are troubleshooting, you might have to clear the system-event log to make the most recent events available for analysis.

  Each system-event log entry is displayed on its own page. Message are listed on the left side of the screen, and details about the selected message is displayed on the right side of the screen. To move from one entry to the next, use the Up Arrow (↑) and Down Arrow (↓) keys.

  The system-event log indicates an assertion event when an event has occurred. It indicates a de-assertion event when the event is no longer occurring.
- **Integrated management module (IMM) event log:** This log contains a filtered subset of all IMM, POST, and system management interrupt (SMI) events. You can view the IMM event log through the IMM Web interface and through the Dynamic System Analysis (DSA) program (as the ASM event log).
- **DSA log:** This log is generated by the Dynamic System Analysis (DSA) program, and it is a chronologically ordered merge of the system-event log (as the IPMI event log), the IMM chassis-event log (as the ASM event log), and the operating-system event logs. You can view the DSA log through the DSA program.

Viewing event logs through the Setup utility

To view the POST event log or system-event log, complete the following steps:

1. Turn on the server.
2. When the prompt `<F1> Setup` is displayed, press F1. If you have set both a power-on password and an administrator password, you must type the administrator password to view the event logs.
3. Select **System Event Logs** and use one of the following procedures:
   - To view the POST event log, select **POST Event Viewer**.
   - To view the IMM system-event log, select **System Event Log**.

Viewing event logs without restarting the server

When the server is not hung and the IMM is connected to a network, methods are available for you to view one or more event logs without having to restart the server.

You can use the DSA Preboot to view the system event log (as the IPMI event log), the IMM event log (as the ASM event log), or the merged DSA log. You must restart the server to use DSA Preboot to view those logs.

You can view the IMM system event log through the **Event Log** link in the integrated management module (IMM) Web interface.

Table 2. Methods for viewing event logs

Condition	Action
The server is not hung and is connected to a network.	• Use IPMItool to view the system-event log.
The server is not hung and is not connected to a network.	Use IPMItool locally to view the system-event log.

Table 2. Methods for viewing event logs (continued)

Condition	Action
The server is hung.	• If DSA Preboot is installed, restart the server and press F2 to start DSA Preboot and view the event logs. • If DSA Preboot is not installed, insert the DSA Preboot CD and restart the server to start DSA Preboot and view the event logs. • Alternatively, you can restart the server and press F1 to start the Setup utility and view the POST event log or system-event log. For more information, see "Viewing event logs without restarting the server" on page 20.

Clearing the event logs

To clear the event logs, complete the following steps.

Note: The POST event log is automatically cleared each time the server is restarted.

1. Turn on the server.

2. When the prompt <F1> Setup is displayed, press F1. If you have set both a power-on password and an administrator password, you must type the administrator password to view the error logs.

3. Use one of the following procedures:

   • To clear the IMM system-event log, select **System Event Logs --> System Event Log**. Select **Clear System Event Log**; then, press **Enter** twice.

POST

When you turn on the server, it performs a series of tests to check the operation of the server components and some optional devices in the server. This series of tests is called the power-on self-test, or POST.

Note: This server does not use beep codes for server status.

If a power-on password is set, you must type the password and press Enter, when you are prompted, for POST to run.

If POST detects a problem, an error message is displayed. See "POST error codes" for more information.

POST error codes

The following table describes the POST error codes and suggested actions to correct the detected problems. These errors can appear as severe, warning, or informational.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Error code	Description	Action

0010002	Microprocessor not supported.	1. (Trained service technician only) Reseat the microprocessor and restart the server.
		2. (Trained service technician only) Remove the microprocessor and install a new microprocessor. Restart the server. If the error is corrected, the old microprocessor is bad and must be replaced.
		3. Replace the following components one at a time, in the order shown, restarting the server each time.
		  a. (Trained service technician only) Microprocessor
		  b. (Trained service technician only) System board

0011000	Invalid microprocessor type.	1. Update the server firmware to the latest level (see "Updating the firmware" on page 212). 2. (Trained service technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see "Installing the microprocessor" on page 141).

0011004	Microprocessor failed BIST.	1. Update the server firmware to the latest level (see "Updating the firmware" on page 212).
		2. (Trained service technician only) Reseat the microprocessor.
		3. Replace the following components one at a time, in the order shown, restarting the server each time:
		  a. (Trained service technician only) Microprocessor
		  b. (Trained service technician only) System board

001100A	Microcode updated failed.	1. Update the server firmware to the latest level (see "Updating the firmware" on page 212). 2. (Trained service technician only) Replace the microprocessor.
0050001	DIMM disabled.	1. If the server fails the POST memory test, reseat the DIMMs. 2. Remove and replace any DIMM for which the associated error LED is lit (see "Removing a memory module" on page 124 and "Installing a memory module" on page 125). 3. Run the Setup utility to enable all the DIMMs. 4. Run the DSA Preboot memory test (see "Running the diagnostic programs" on page 69).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Error code	Description	Action
0051003	Uncorrectable DIMM error	1. If the server failed the POST memory test, reseat the DIMMs. 2. Remove and replace any DIMM for which the associated error LED is lit (see "Removing a memory module" on page 124 and "Installing a memory module" on page 125). 3. Run the Setup utility to enable all the DIMMs. 4. Run the DSA Preboot memory test (see"Running the diagnostic programs" on page 69).
0051006	DIMM mismatch detected	Make sure that the DIMMs match and are installed in the correct sequence (see "Installing a memory module" on page 125).
0051009	No memory detected.	1. Make sure that the server contains DIMMs. 2. Reseat the DIMMs. 3. Install DIMMs in the correct sequence (see "Installing a memory module" on page 125).
005100A	No usable memory detected.	1. Make sure that the server contains DIMMs. 2. Reseat the DIMMs. 3. Install DIMMs in the correct sequence (see "Installing a memory module" on page 125). 4. Clear CMOS memory to re-enable all the memory connectors (see "System-board switches and jumpers" on page 111).
0058001	PFA threshold exceeded	1. Update the server firmware to the latest level (see "Updating the firmware" on page 212). 2. Reseat the DIMMs and run the memory test (see "Running the diagnostic programs" on page 69). 3. Replace the failing DIMM, which is indicated by a lit LED on the system board.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Error code	Description	Action
0058007	DIMM population is unsupported.	1. Reseat the DIMMs, and then restart the server. 2. Remove the lowest-numbered DIMM pair of those that are identified and replace it with an identical pair of known good DIMMs, then restart the server. 3. Return the removed DIMMs, one pair at a time, to their original connectors, restarting the server after each pair, until a pair fails. Replace the DIMMs in the failed pair with identical known good DIMMs, restarting the server after each DIMM is installed. Replace the failed DIMM. Repeat this step until you have tested all removed DIMMs. 4. (Trained service technician only) Replace the system board.

0058008	DIMM failed memory test.	1. Reseat the DIMMs, and then restart the server.
		2. Replace the following components one at a time, in the order shown, then restart the server after each:
		  a. DIMM
		  b. (Trained service technician only) System board

00580A4	Memory population changed.	Information only. Memory has been added, moved, or changed.

0068002	CMOS battery cleared.	1. Reseat the battery.
		2. Clear the CMOS memory (see Table 6 on page 111).
		3. Replace the following components one at a time, in the following order, restarting the server after each one:
		  a. Battery
		  b. (Trained service technician only) System board

2011001	PCI-X PERR	1. Check the riser-card LEDs.
		2. Reseat all affected adapters and riser cards.
		3. Update the PCI adapter firmware.
		4. Remove the adapter from the riser card.
		5. Replace the following components one at a time, in the order shown, restarting the server each time:
		  a. Riser card
		  b. (Trained service technician only) System board

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Error code	Description	Action

2018001	PCI Express uncorrected or uncorrected error	1. Check the riser-card LEDs.
		2. Reseat all affected adapters and riser cards.
		3. Update the PCI adapter firmware.
		4. Remove the adapter from the riser card.
		5. Replace the following components one at a time, in the order shown, restarting the server each time:
		  a. Riser card
		  b. (Trained service technician only) System board

2018002	Option ROM resource allocation failure	Informational message that some devices might not be initialized.
		1. If possible, rearrange the order of the adapters in the PCI slots to change the load order of the optional-device ROM code.
		2. Run the Setup utility, select **Startup Options**, and change the boot priority to change the load order of the optional-device ROM code.
		3. Run the Setup utility and disable some other resources, if their functions are not being used, to make more space available.
		  a. Select **Startup Options → Planar Ethernet (PXE/DHCP)** to disable the integrated Ethernet controller ROM.
		  b. Select **Advanced Functions → PCI Bus Control → PCI ROM Control Execution** to disable the ROM of the adapter in the PCI slots.
		  c. Select **Devices and I/O Ports** to disable any of the integrated devices.
		4. Replace the following components one at a time, in the order shown, restarting the server each time:
		  a. Each adapter
		  b. (Trained service technician only) System board

3*xx*0007 (*xx* can be 00 - 19)	Firmware fault detected, system halted	1. Recover the server firmware to the latest level. 2. Undo any recent configuration changes, or clear CMOS memory to restore the settings to the default values (see Table 6 on page 111). 3. Remove any recently installed hardware.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Error code	Description	Action
3038003	Firmware corrupted	1. Run the Setup utility, select **Load Default Settings**, and save the settings to recover the server firmware. 2. (Trained service technician only) Replace the system board.
3048005	Booted secondary (backup) UEFI image	Information message that the backup UEFI settings are used.
3048006	Booted secondary (backup) UEFI image because of ABR	1. Run the Setup utility, select **Load Default Settings**, and save the settings to recover the primary UEFI settings. 2. Turn off the server and remove it from the power source. 3. Reconnect the server to the power source, then turn on the server.

305000A	RTC date/time is incorrect	1. Adjust the date and time settings in the Setup utility, and then restart the server.
		2. Reseat the battery.
		3. Replace the following components one at a time, in the order shown, restarting the server each time:
		  a. Battery
		  b. (Trained service technician only) System board

3058001	System configuration invalid	1. Run the Setup utility, and select **Save Settings**.
		2. Run the Setup utility, select **Load Default Settings**, and save the settings.
		3. Replace the following components one at a time, in the order shown, restarting the server each time:
		  a. Battery
		  b. Failing device (if the device is a FRU, it must be replaced by a trained service technician only)
		  c. (Trained service technician only) System board

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Error code	Description	Action
3058004	Three boot failure	1. Undo any recent system changes, such as new settings or newly installed devices. 2. Make sure that the server is attached to a reliable power source. 3. Make sure that the operating system is not corrupted. 4. Run the Setup utility, save the configuration, and then restart the server. 5. See "Problem determination tips" on page 104.
3108007	System configuration restored to default settings	Information only. This message is usually associated with the CMOS battery clear event.
3138002	Boot configuration error	1. Remove any recent configuration changes made to the Setup utility. 2. Run the Setup utility, select **Load Default Settings**, and save the settings.
3808000	IMM communication failure	1. Remove power from the server for 30 seconds, and then reconnect the server to power and restart it. 2. Update the IMM firmware to the latest level (see "Updating the firmware" on page 212). 3. Make sure that the virtual media key is seated and not damaged. 4. (Trained service technician only) Replace the system board.
3808002	Error updating system configuration to IMM	1. Remove power from the server, and then reconnect the server to power and restart it. 2. Run the Setup utility and select **Save Settings**. 3. Update the IMM firmware to the latest level (see "Updating the firmware" on page 212).
3808003	Error retrieving system configuration from IMM	1. Remove power from the server, and then reconnect the server to power and restart it. 2. Run the Setup utility and select **Save Settings**. 3. Update the IMM firmware to the latest level (see "Updating the firmware" on page 212).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Error code	Description	Action

3808004	IMM system event log full	• When using out-of-band, use the IMM Web interface or IPMItool to clear the logs from the operating system.
		• When using the local console:
		  1. Run the Setup utility.
		  2. Select **System Event Log**.
		  3. Select **Clear System Event Log**.
		  4. Restart the server.

3818001	Core Root of Trust Measurement (CRTM) update failed	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. (Trained service technician only) Replace the system board.
3818002	Core Root of Trust Measurement (CRTM) update aborted	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. (Trained service technician only) Replace the system board.
3818003	Core Root of Trust Measurement (CRTM) flash lock failed	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. (Trained service technician only) Replace the system board.
3818004	Core Root of Trust Measurement (CRTM) system error	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. (Trained service technician only) Replace the system board.
3818005	Current Bank Core Root of Trust Measurement (CRTM) capsule signature invalid	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. (Trained service technician only) Replace the system board.
3818006	Opposite bank CRTM capsule signature invalid	1. Switch the server firmware bank to the backup bank (see "Starting the backup server firmware" on page 213). 2. Run the Setup utility, select **Load Default Settings**, and save the settings. 3. Switch the bank back to the primary bank. 4. (Trained service technician only) Replace the system board.
3818007	CRTM update capsule signature invalid	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. (Trained service technician only) Replace the system board.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Error code	Description	Action
3828004	AEM power capping disabled	1. Check the settings and the event logs. 2. Make sure that the Active Energy Manager feature is enabled in the Setup utility. Click **System Settings → Power → Active Energy Manager → Capping Enabled** . 3. Update the server firmware to the latest level (see "Updating the firmware" on page 212). 4. Update the IMM firmware to the latest level (see "Updating the firmware" on page 212).

System-event log

The system-event log contains messages of three types:

Information
> Information messages do not require action; they record significant system-level events, such as when the server is started.

Warning
> Warning messages do not require immediate action; they indicate possible problems, such as when the recommended maximum ambient temperature is exceeded.

Error Error messages might require action; they indicate system errors, such as when a fan is not detected.

Each message contains date and time information, and it indicates the source of the message (POST or the IMM).

Integrated management module error messages

The following table describes the IMM error messages and suggested actions to correct the detected problems.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message	Severity	Description	Action
Numeric sensor Ambient Temp going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	Reduce the ambient temperature.
Numeric sensor Ambient Temp going high (upper non-recoverable) has asserted.	Error	An upper nonrecoverable sensor going high has asserted.	Reduce the ambient temperature.
Numeric sensor Planar 3.3V going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	(Trained service technician only) Replace the system board.
Numeric sensor Planar 3.3V going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	(Trained service technician only) Replace the system board.
Numeric sensor Planar 5V going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	(Trained service technician only) Replace the system board.
Numeric sensor Planar 5V going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	(Trained service technician only) Replace the system board.
Numeric sensor Planar VBAT going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	Replace the 3 V battery.
Numeric sensor Fan n Tach going low (lower critical) has asserted. (n = fan number)	Error	A lower critical sensor going low has asserted.	1. Reseat the failing fan n, which is indicated by a lit LED on the system board (see "System-board LEDs" on page 112). 2. Replace the failing fan. (n = fan number)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

The Processor CPU *n*Status has Failed with IERR. (*n* = microprocessor number)	Error	A processor failed - IERR condition has occurred.	1. Make sure that the latest levels of firmware and device drivers are installed for all adapters and standard devices, such as Ethernet, SCSI, and SAS. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Run the DSA program for the hard disk drives and other I/O devices. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
An Over-Temperature Condition has been detected on the Processor CPU *n*Status. (*n* = microprocessor number)	Error	An overtemperature condition has occurred for microprocessor *n*. (*n* = microprocessor number)	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffle is in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor *n* is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

The Processor CPU *n*Status has Failed with FRB1/BIST condition. (*n* = microprocessor number)	Error	A processor failed - FRB1/BIST condition has occurred.	1. Check for a server firmware update. **Important::** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. (Trained service technician only) Reseat microprocessor *n*. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
The Processor CPU *n*Status has a Configuration Mismatch. (*n* = microprocessor number)	Error	A processor configuration mismatch has occurred.	1. (Trained service technician only) Replace the microprocessor.
An SM BIOS Uncorrectable CPU complex error for Processor CPU *n*Status has asserted. (*n* = microprocessor number)	Error	An SMBIOS uncorrectable CPU complex error has asserted.	1. Check for a server firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. (Trained service technician only) Reseat microprocessor *n*. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Sensor CPU *n*OverTemp has transitioned to critical from a less severe state. (*n* = microprocessor number)	Error	A sensor has changed to Critical state from a less severe state.	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffle is in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor *n* is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
Sensor CPU *n*OverTemp has transitioned to non-recoverable from a less severe state. (*n* = microprocessor number)	Error	A sensor has changed to Nonrecoverable state from a less severe state.	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffle is in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor *n* is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
Sensor CPU *n*OverTemp has transitioned to critical from a non-recoverable state. (*n* = microprocessor number)	Error	A sensor has changed to Critical state from Nonrecoverable state.	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffle is in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor *n* is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Sensor CPU *n*OverTemp has transitioned to non-recoverable. (*n* = microprocessor number)	Error	A sensor has changed to Nonrecoverable state.	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffle is in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor *n* is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
A bus timeout has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A bus timeout has occurred.	1. Remove the adapter from the PCI slot that is indicated by a lit LED. 2. Replace the extender card. 3. Remove all PCI adapters. 4. (Trained service technicians only) Replace the system board.
The System %1 encountered a POST Error. (%1 = CIM_ComputerSystem. ElementName)	Error	A POST error has occurred. (Sensor = ABR Status)	1. Recover the server firmware from the backup page (see "Recovering the server firmware" on page 100). 2. Update the server firmware to the latest level. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

The System %1 encountered a POST Error. (%1 = CIM_ComputerSystem. ElementName)	Error	A POST error has occurred. (Sensor = Firmware Error)	1. Update the server firmware on the primary page. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. (Trained service technician only) Replace the system board.
A Uncorrectable Bus Error has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A bus uncorrectable error has occurred. (Sensor = Critical Int PCI)	1. Check the system-event log. 2. Check the PCI error LEDs. 3. Remove the adapter from the indicated PCI slot. 4. Check for a server firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 5. (Trained service technician only) Replace the system board.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

A Uncorrectable Bus Error has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A bus uncorrectable error has occurred. (Sensor = Critical Int CPU)	1. Check the system-event log. 2. Check the microprocessor error LEDs. 3. (Trained service technician only) Replace microprocessor . 4. Check for a server firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 5. (Trained service technician only) Replace the system board.
A Uncorrectable Bus Error has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A bus uncorrectable error has occurred. (Sensor = Critical Int DIM)	1. Check the system-event log. 2. Check the DIMM error LEDs. 3. Remove the failing DIMM from the system board. 4. Check for a server firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 5. Make sure that the installed DIMMs are supported and configured correctly. 6. (Trained service technician only) Replace the system board.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Sensor Sys Board Fault has transitioned to critical from a less severe state.	Error	A sensor has changed to Critical state from a less severe state.	1. Check the system-event log. 2. Check for an error LED on the system board. 3. Replace any failing device. 4. Check for a server firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 5. (Trained service technician only) Replace the system board.
Sensor RAID Error has transitioned to critical from a less severe state.	Error	A sensor has changed to Critical state from a less severe state.	1. Check the hard disk drive LEDs. 2. Reseat the hard disk drive for which the status LED is lit. 3. Replace the defective hard disk drive.
The Drive *n* Status has been removed from unit Drive 0 Status. (*n* = hard disk drive number)	Error	A drive has been removed.	Reseat hard disk drive *n*. (*n* = hard disk drive number)

The Drive *n* Status has been disabled due to a detected fault. (*n* = hard disk drive number)	Error	A drive has been disabled because of a fault.	1. Run the hard disk drive diagnostic test on drive *n*.
			2. Reseat the following components:
			  a. Hard disk drive
			  b. Cable from the system board to the backplane
			3. Replace the following components one at a time, in the order shown, restarting the server each time:
			  a. Hard disk drive
			  b. Cable from the system board to the backplane
			  c. Hard disk drive backplane
			(*n* = hard disk drive number)

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Array %1 is in critical condition. (%1 = CIM_ComputerSystem. ElementName)	Error	An array is in Critical state. (Sensor = Drive *n* Status) (*n* = hard disk drive number)	Replace the hard disk drive that is indicated by a lit status LED.
Array %1 has failed. (%1 = CIM_ComputerSystem. ElementName)	Error	An array is in Failed state. (Sensor = Drive *n* Status) (*n* = hard disk drive number)	Replace the hard disk drive that is indicated by a lit status LED.
Memory uncorrectable error detected for DIMM All DIMMs on Memory Subsystem All DIMMs.	Error	A memory uncorrectable error has occurred.	1. If the server failed the POST memory test, reseat the DIMMs. 2. Replace any DIMM that is indicated by a lit error LED. **Note:** You do not have to replace DIMMs by pairs. 3. Run the Setup utility to enable all the DIMMs. 4. Run the DSA memory test.
Memory Logging Limit Reached for DIMM All DIMMs on Memory Subsystem All DIMMs.	Error	The memory logging limit has been reached.	1. Update the server firmware to the latest level. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Reseat the DIMMs and run the DSA memory test. 3. Replace any DIMM that is indicated by a lit error LED.
Memory DIMM Configuration Error for All DIMMs on Memory Subsystem All DIMMs.	Error	A DIMM configuration error has occurred.	Make sure that DIMMs are installed in the correct sequence and have the same size, type, speed, and technology.
Memory uncorrectable error detected for DIMM One of the DIMMs on Memory Subsystem One of the DIMMs.	Error	A memory uncorrectable error has occurred.	1. If the server failed the POST memory test, reseat the DIMMs. 2. Replace any DIMM that is indicated by a lit error LED. **Note:** You do not have to replace DIMMs by pairs. 3. Run the Setup utility to enable all the DIMMs. 4. Run the DSA memory test.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Memory Logging Limit Reached for DIMM One of the DIMMs on Memory Subsystem One of the DIMMs.	Error	The memory logging limit has been reached.	1. Update the server firmware to the latest level. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Reseat the DIMMs and run the DSA memory test. 3. Replace any DIMM that is indicated by a lit error LED.
Memory DIMM Configuration Error for One of the DIMMs on Memory Subsystem One of the DIMMs.	Error	A DIMM configuration error has occurred.	Make sure that DIMMs are installed in the correct sequence and have the same size, type, speed, and technology.
Memory uncorrectable error detected for DIMM *n* Status on Memory Subsystem DIMM *n* Status. (*n* = DIMM number)	Error	A memory uncorrectable error has occurred.	1. If the server failed the POST memory test, reseat the DIMMs. 2. Replace any DIMM that is indicated by a lit error LED. **Note:** You do not have to replace DIMMs by pairs. 3. Run the Setup utility to enable all the DIMMs. 4. Run the DSA memory test. 5. (Trained service technician only) Replace the system board.
Memory Logging Limit Reached for DIMM *n*Status on Memory Subsystem DIMM*n*Status. (*n* = DIMM number)	Error	The memory logging limit has been reached.	1. Update the server firmware to the latest level. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Reseat the DIMMs and run the DSA memory test. 3. Replace any DIMM that is indicated by a lit error LED.

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- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
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- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Memory DIMM Configuration Error for DIMM *n*Status on Memory Subsystem DIMM *n*Status. (*n* = DIMM number)	Error	A DIMM configuration error has occurred.	Make sure that DIMMs are installed in the correct sequence and have the same size, type, speed, and technology.
Sensor DIMM *n* Temp has transitioned to critical from a less severe state. (*n* = DIMM number)	Error	A sensor has changed to Critical state from a less severe state.	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. If a fan has failed, complete the action for a fan failure. 3. Replace DIMM *n*. (*n* = DIMM number)
A PCI PERR has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A PCI PERR has occurred. (Sensor = PCI Slot *n*; *n* = PCI slot number)	1. Check the extender-card LEDs. 2. Reseat the affected adapters and extender card. 3. Update the server and adapter firmware (UEFI and IMM). **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove the adapter from slot *n*. 5. Replace the PCIe adapter. 6. Replace extender card *n*. (*n* = PCI slot number)

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- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

A PCI SERR has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A PCI SERR has occurred. (Sensor = PCI Slot *n*; *n* = PCI slot number)	1. Check the extender-card LEDs. 2. Reseat the affected adapters and extender card. 3. Update the server and adapter firmware (UEFI and IMM). **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove the adapter from slot *n*. 5. Replace the PCIe adapter. 6. Replace extender card *n*. (*n* = PCI slot number)
A PCI PERR has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A PCI PERR has occurred. (Sensor = One of PCI Err)	1. Check the extender-card LEDs. 2. Reseat the affected adapters and riser card. 3. Update the server and adapter firmware (UEFI and IMM). **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove both adapters. 5. Replace the PCIe adapter. 6. Replace the extender card. 7. (Trained service technician only) Replace the system board.

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- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

A PCI SERR has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A PCI SERR has occurred. (Sensor = One of PCI Err)	1. Check the extender-card LEDs. 2. Reseat the affected adapters and extender card. 3. Update the server and adapter firmware (UEFI and IMM). **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove both adapters. 5. Replace the PCIe adapter. 6. Replace the extender card. 7. (Trained service technician only) Replace the system board.
Fault in slot System board on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error		1. Check the extender-card LEDs. 2. Reseat the affected adapters and extender card. 3. Update the server and adapter firmware (UEFI and IMM). **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove both adapters. 5. Replace the PCIe adapter. 6. Replace the extender card. 7. (Trained service technician only) Replace the system board.

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- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Redundancy Bckup Mem Status has been reduced.	Error	Redundancy has been lost and is insufficient to continue operation.	1. Check the system-event log for DIMM failure events (uncorrectable or PFA) and correct the failures. 2. Re-enable mirroring in the Setup utility.
IMM Network Initialization Complete.	Info	An IMM network has completed initialization.	No action; information only.
Certificate Authority %1 has detected a %2 Certificate Error. (%1 = IBM_CertificateAuthority. CADistinguishedName; %2 = CIM_PublicKeyCertificate. ElementName)	Error	A problem has occurred with the SSL Server, SSL Client, or SSL Trusted CA certificate that has been imported into the IMM. The imported certificate must contain a public key that corresponds to the key pair that was previously generated by the **Generate a New Key and Certificate Signing Request** link.	1. Make sure that the certificate that you are importing is correct. 2. Try importing the certificate again.
Ethernet Data Rate modified from %1 to %2 by user %3. (%1 = CIM_EthernetPort.Speed; %2 = CIM_EthernetPort.Speed; %3 = user ID)	Info	A user has modified the Ethernet port data rate.	No action; information only.
Ethernet Duplex setting modified from %1 to %2 by user %3. (%1 = CIM_EthernetPort.FullDuplex; %2 = CIM_EthernetPort.FullDuplex; %3 = user ID)	Info	A user has modified the Ethernet port duplex setting.	No action; information only.
Ethernet MTU setting modified from %1 to %2 by user %3. (%1 = CIM_EthernetPort. ActiveMaximumTransmissionUnit; %2 = CIM_EthernetPort. ActiveMaximumTransmissionUnit; %3 = user ID)	Info	A user has modified the Ethernet port MTU setting.	No action; information only.
Ethernet Duplex setting modified from %1 to %2 by user %3. (%1 = CIM_EthernetPort. NetworkAddresses; %2 = CIM_EthernetPort. NetworkAddresses; %3 = user ID)	Info	A user has modified the Ethernet port MAC address setting.	No action; information only.
Ethernet interface %1 by user %2. (%1 = CIM_EthernetPort.EnabledState; %2 = user ID)	Info	A user has enabled or disabled the Ethernet interface.	No action; information only.

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Hostname set to %1 by user %2. (%1 = CIM_DNSProtocolEndpoint. Hostname; %2 = user ID)	Info	A user has modified the host name of the IMM.	No action; information only.
IP address of network interface modified from %1 to %2 by user %3. (%1 = CIM_IPProtocolEndpoint. IPv4Address; %2 = CIM_StaticIPAssignmentSettingData. IPAddress; %3 = user ID)	Info	A user has modified the IP address of the IMM.	No action; information only.
IP subnet mask of network interface modified from %1 to %2 by user %3s. (%1 = CIM_IPProtocolEndpoint. SubnetMask; %2 = CIM_StaticIPAssignmentSettingData. SubnetMask; %3 = user ID)	Info	A user has modified the IP subnet mask of the IMM.	No action; information only.
IP address of default gateway modified from %1 to %2 by user %3s. (%1 = CIM_IPProtocolEndpoint. GatewayIPv4Address; %2 = CIM_StaticIPAssignmentSettingData. DefaultGatewayAddress; %3 = user ID)	Info	A user has modified the default gateway IP address of the IMM.	No action; information only.
OS Watchdog response %1 by %2. (%1 = Enabled or Disabled; %2 = user ID)	Info	A user has enabled or disabled an OS Watchdog.	No action; information only.
DHCP[%1] failure, no IP address assigned. (%1 = IP address, *xxx.xxx.xxx.xxx*)	Info	A DHCP server has failed to assign an IP address to the IMM.	1. Make sure that the network cable is connected. 2. Make sure that there is a DHCP server on the network that can assign an IP address to the IMM.
Remote Login Successful. Login ID: %1 from %2 at IP address %3. (%1 = user ID; %2 = ValueMap(CIM_ProtocolEndpoint. ProtocolIFType; %3 = IP address, *xxx.xxx.xxx.xxx*)	Info	A user has successfully logged in to the IMM.	No action; information only.

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Attempting to %1 server %2 by user %3. (%1 = Power Up, Power Down, Power Cycle, or Reset; %2 = IBM_ComputerSystem. ElementName; %3 = user ID)	Info	A user has used the IMM to perform a power function on the server.	No action; information only.
Security: Userid: '%1' had %2 login failures from WEB client at IP address %3. (%1 = user ID; %2 = MaximumSuccessiveLoginFailures (currently set to 5 in the firmware); %3 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has exceeded the maximum number of unsuccessful login attempts from a Web browser and has been prevented from logging in for the lockout period.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.
Security: Login ID: '%1' had %2 login failures from CLI at %3. (%1 = user ID; %2 = MaximumSuccessiveLoginFailures (currently set to 5 in the firmware); %3 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has exceeded the maximum number of unsuccessful login attempts from the command-line interface and has been prevented from logging in for the lockout period.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.
Remote access attempt failed. Invalid userid or password received. Userid is '%1' from WEB browser at IP address %2. (%1 = user ID; %2 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has attempted to log in from a Web browser by using an invalid login ID or password.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.
Remote access attempt failed. Invalid userid or password received. Userid is '%1' from TELNET client at IP address %2. (%1 = user ID; %2 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has attempted to log in from a Telnet session by using an invalid login ID or password.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.
The Chassis Event Log (CEL) on system %1 cleared by user %2. (%1 = CIM_ComputerSystem. ElementName; %2 = user ID)	Info	A user has cleared the IMM event log.	No action; information only.
IMM reset was initiated by user %1. (%1 = user ID)	Info	A user has initiated a reset of the IMM.	No action; information only.

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ENET[0] DHCP-HSTN=%1, DN=%2, IP@=%3, SN=%4, GW@=%5, DNS1@=%6. (%1 = CIM_DNSProtocolEndpoint. Hostname; %2 = CIM_DNSProtocolEndpoint. DomainName; %3 = CIM_IPProtocolEndpoint. IPv4Address; %4 = CIM_IPProtocolEndpoint. SubnetMask; %5 = IP address, *xxx.xxx.xxx.xxx*; %6 = IP address, *xxx.xxx.xxx.xxx*)	Info	The DHCP server has assigned an IMM IP address and configuration.	No action; information only.
ENET[0] IP-Cfg:HstName=%1, IP@%2, NetMsk=%3, GW@=%4. (%1 = CIM_DNSProtocolEndpoint. Hostname; %2 = CIM_StaticIPSettingData. IPv4Address; %3 = CIM_StaticIPSettingData. SubnetMask; %4 = CIM_StaticIPSettingData. DefaultGatewayAddress)	Info	An IMM IP address and configuration have been assigned using client data.	No action; information only.
LAN: Ethernet[0] interface is no longer active.	Info	The IMM Ethernet interface has been disabled.	No action; information only.
LAN: Ethernet[0] interface is now active.	Info	The IMM Ethernet interface has been enabled.	No action; information only.
DHCP setting changed to by user %1. (%1 = user ID)	Info	A user has changed the DHCP mode.	No action; information only.
IMM: Configuration %1 restored from a configuration file by user %2. (%1 = CIM_ConfigurationData. ConfigurationName; %2 = user ID)	Info	A user has restored the IMM configuration by importing a configuration file.	No action; information only.
Watchdog %1 Screen Capture Occurred. (%1 = OS Watchdog or Loader Watchdog)	Error	An operating-system error has occurred, and the screen capture was successful.	1. Reconfigure the watchdog timer to a higher value. 2. Make sure that the IMM Ethernet over USB interface is enabled. 3. Reinstall the RNDIS or cdc_ether device driver for the operating system. 4. Disable the watchdog. 5. Check the integrity of the installed operating system.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Watchdog %1 Failed to Capture Screen. (%1 = OS Watchdog or Loader Watchdog)	Error	An operating-system error has occurred, and the screen capture failed.	1. Reconfigure the watchdog timer to a higher value. 2. Make sure that the IMM Ethernet over USB interface is enabled. 3. Reinstall the RNDIS or cdc_ether device driver for the operating system. 4. Disable the watchdog. 5. Check the integrity of the installed operating system. 6. Update the IMM firmware. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.
Running the backup IMM main application.	Error	The IMM has resorted to running the backup main application.	Update the IMM firmware. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.
Please ensure that the IMM is flashed with the correct firmware. The IMM is unable to match its firmware to the server.	Error	The server does not support the installed IMM firmware version.	Update the IMM firmware to a version that the server supports. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.
IMM reset was caused by restoring default values.	Info	The IMM has been reset because a user has restored the configuration to its default settings.	No action; information only.
IMM clock has been set from NTP server %1. (%1 = IBM_NTPService.ElementName)	Info	The IMM clock has been set to the date and time that is provided by the Network Time Protocol server.	No action; information only.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

SSL data in the IMM configuration data is invalid. Clearing configuration data region and disabling SSL+H25.	Error	There is a problem with the certificate that has been imported into the IMM. The imported certificate must contain a public key that corresponds to the key pair that was previously generated through the **Generate a New Key and Certificate Signing Request** link.	1. Make sure that the certificate that you are importing is correct. 2. Try to import the certificate again.
Flash of %1 from %2 succeeded for user %3. (%1 = CIM_ManagedElement. ElementName; %2 = Web or LegacyCLI; %3 = user ID)	Info	A user has successfully updated one of the following firmware components: • IMM main application • IMM boot ROM • Server firmware • Diagnostics • Integrated service processor	No action; information only.
Flash of %1 from %2 failed for user %3. (%1 = CIM_ManagedElement. ElementName; %2 = Web or LegacyCLI; %3 = user ID)	Info	An attempt to update a firmware component from the interface and IP address has failed.	Try to update the firmware again.
The Chassis Event Log (CEL) on system %1 is 75% full. (%1 = CIM_ComputerSystem. ElementName)	Info	The IMM event log is 75% full. When the log is full, older log entries are replaced by newer ones.	To avoid losing older log entries, save the log as a text file and clear the log.
The Chassis Event Log (CEL) on system %1 is 100% full. (%1 = CIM_ComputerSystem. ElementName)	Info	The IMM event log is full. When the log is full, older log entries are replaced by newer ones.	To avoid losing older log entries, save the log as a text file and clear the log.
%1 Platform Watchdog Timer expired for %2. (%1 = OS Watchdog or Loader Watchdog; %2 = OS Watchdog or Loader Watchdog)	Error	A Platform Watchdog Timer Expired event has occurred.	1. Reconfigure the watchdog timer to a higher value. 2. Make sure that the IMM Ethernet over USB interface is enabled. 3. Reinstall the RNDIS or cdc_ether device driver for the operating system. 4. Disable the watchdog. 5. Check the integrity of the installed operating system.
IMM Test Alert Generated by %1. (%1 = user ID)	Info	A user has generated a test alert from the IMM.	No action; information only.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Security: Userid: '%1' had %2 login failures from an SSH client at IP address %3. (%1 = user ID; %2 = MaximumSuccessiveLoginFailures (currently set to 5 in the firmware); %3 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has exceeded the maximum number of unsuccessful login attempts from SSH and has been prevented from logging in for the lockout period.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.

Troubleshooting tables

Use the troubleshooting tables to find solutions to problems that have identifiable symptoms.

If you have just added new software or a new optional device and the server is not working, do the following before using the troubleshooting tables:

1. Check the system-error LED on the operator information panel to see if it is lit.
2. Remove the software or device that you just added.
3. Run the diagnostic tests to determine whether the server is running correctly.
4. Reinstall the new software or new device.

EasyStartup problems

Table 3. EasyStartup DVD

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician. • Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.	
Symptom	**Action**
The *EasyStartup* DVD will not start.	• Make sure the server supports the EasyStartup program and has a startable (bootable) DVD drive. • If the startup (boot) sequence settings have been changed, make sure the DVD drive is first in the startup sequence. • If more than one DVD drive is installed, make sure that only one drive is set as the primary drive. Start the EasyStartup DVD from the primary DVD drive.
The operating-system installation program continuously loops.	Make more space available on the hard disk.
The EasyStartup program will not start the operating-system media.	Make sure that the operating-system media is supported by the EasyStartup program. See the EasyStartup User Guide for a list of supported operating-system versions. The EasyStartup User Guide and compatibility notes are available through the EasyStartup program.

DVD drive problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
The optical drive is not recognized.	1. Make sure that: • The SATA connector to which the DVD drive is attached (primary or secondary) is enabled in the Setup utility. • All cables and jumpers are installed correctly. • The correct device driver is installed for the DVD drive. 2. Run the DVD drive diagnostic programs. 3. Reseat the following components: a. DVD drive b. DVD drive cable 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. DVD drive b. DVD drive interface board cable c. DVD interface board d. (Trained service technician only) System board
A CD or DVD is not working correctly.	1. Clean the CD or DVD. 2. Run the DVD drive diagnostic programs. 3. Check the connector and signal cable for bent pins or damage. 4. Reseat the following components: a. DVD drive b. DVD drive cable 5. Replace the following components one at a time, in the order shown, restarting the server each time: a. DVD drive b. DVD drive cable
The DVD drive tray is not working.	1. Make sure that the server is turned on. 2. Insert the end of a straightened paper clip into the manual tray-release opening. 3. Reseat the DVD drive. 4. Replace the DVD drive.

General problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
A cover lock is broken, an LED is not working, or a similar problem has occurred.	If the part is a CRU, replace it. If the part is a FRU, the part must be replaced by a trained service technician.

Hard disk drive problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
A hard disk drive has failed, and the associated amber hard disk drive status LED is lit.	Replace the failed hard disk drive (see "Replacing hard disk drives" on page 126).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
A newly installed hard disk drive is not recognized.	1. Observe the associated amber hard disk drive status LED. If the LED is lit, it indicates a drive fault. 2. If the LED is lit, remove the drive from the bay, wait 45 seconds, and reinsert the drive, making sure that the drive assembly connects to the hard disk drive backplane. 3. Observe the associated green hard disk drive activity LED and the amber status LED: • If the green activity LED is flashing and the amber status LED is not lit, the drive is recognized by the controller and is working correctly. Run the DSA hard disk drive test to determine whether the drive is detected. • If the green activity LED is flashing and the amber status LED is flashing slowly, the drive is recognized by the controller and is rebuilding. • If neither LED is lit or flashing, check the hard disk drive backplane (go to step 4). • If the green activity LED is flashing and the amber status LED is lit, replace the drive. If the activity of the LEDs remains the same, go to step 4. If the activity of the LEDs changes, return to step 1. 4. Make sure that the hard disk drive backplane is correctly seated. When it is correctly seated, the drive assemblies correctly connect to the backplane without bowing or causing movement of the backplane. 5. Reseat the backplane power cable and repeat steps 1 through 3. 6. Reseat the backplane signal cable and repeat steps 1 through 3. 7. Suspect the backplane signal cable or the backplane: • Replace the affected backplane signal cable. • Replace the affected backplane. 8. Run the diagnostic tests for the SAS/SATA controller and hard disk drives (see "Diagnostic tools" on page 19). • If the controller passes the test but the drives are not recognized, replace the backplane signal cable and run the tests again. • Replace the backplane. • If the controller fails the test, disconnect the backplane signal cable from the controller and run the tests again. • If the controller fails the test, replace the controller. 9. See "Problem determination tips" on page 104..
Multiple hard disk drives fail.	Make sure that the hard disk drive, SAS/SATA RAID controller, and server device drivers and firmware are at the latest level. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.
Multiple hard disk drives are offline.	1. Review the storage subsystem logs for indications of problems within the storage subsystem, such as backplane or cable problems. 2. See "Problem determination tips" on page 104.

Symptom	Action
	• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician. • Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.
Symptom	**Action**
A replacement hard disk drive does not rebuild.	1. Make sure that the hard disk drive is recognized by the controller (the green hard disk drive activity LED is flashing). 2. Review the SAS/SATA RAID controller documentation to determine the correct configuration parameters and settings.

A green hard disk drive activity LED does not accurately represent the actual state of the associated drive.	1. If the green hard disk drive activity LED does not flash when the drive is in use, run the DSA disk drive test (see "Diagnostic tools" on page 19.
	2. Use one of the following procedures:
	  • If the drive passes the test, replace the backplane.
	  • If the drive fails the test, replace the drive.

An amber hard disk drive status LED does not accurately represent the actual state of the associated drive.	1. If the amber hard disk drive LED and the RAID controller software do not indicate the same status for the drive, complete the following steps:
	  a. Turn off the server.
	  b. Reseat the SAS/SATA controller.
	  c. Reseat the backplane signal cable and backplane power cable.
	  d. Reseat the hard disk drive.
	  e. Turn on the server and observe the activity of the hard disk drive LEDs.
	2. See "Problem determination tips" on page 104.

Hypervisor problems

Symptom	Action
	• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician. • Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.
Symptom	**Action**
If an optional embedded hypervisor flash device is not listed in the expected boot order, does not appear in the list of boot devices, or a similar problem has occurred.	1. Make sure that the optional embedded hypervisor flash device is selected on the boot manager (<F12> Select Boot Device) at startup. 2. Make sure that the embedded hypervisor flash device is seated in the connector correctly (see "Replacing a USB embedded hypervisor flash device" on page 133. 3. See the documentation that comes with the optional embedded hypervisor flash device for setup and configuration information. 4. Make sure that other software works on the server.

Intermittent problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
A problem occurs only occasionally and is difficult to diagnose.	1. Make sure that: • All cables and cords are connected securely to the rear of the server and attached devices. • When the server is turned on, air is flowing from the fan grille. If there is no airflow, the fan is not working. This can cause the server to overheat and shut down. 2. Check the system-error log or IMM system event log (see "POST" on page 21).
The server resets (restarts) occasionally.	1. If the reset occurs during POST and the POST watchdog timer is enabled (click **System Settings --> Integrated Management Module --> POST Watchdog Timer** in the UEFI Setup Utility program to see the POST watchdog setting), make sure that sufficient time is allowed in the watchdog timeout value (**POST Watchdog Timer**). If the server continues to reset during POST, see "POST" on page 21. 2. If the reset occurs after the operating system starts, disable any automatic server restart (ASR) utilities or ASR devices that may be installed. **Note:** ASR utilities operate as operating-system utilities and are related to the IPMI device driver. If the reset continues to occur after the operating system starts, the operating system might have a problem; see "Software problems" on page 64. 3. If neither condition applies, check the system-error log or IMM system event log (see "POST" on page 21). If the problem remains, call for service.

Keyboard, mouse, or pointing-device problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
- Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Symptom	Action

All or some keys on the keyboard do not work.	1. Make sure that the keyboard cable is securely connected.
	2. If you are using a USB keyboard and it is connected to a USB hub, disconnect the keyboard from the hub and connect it directly to the server.
	3. Replace the following components one at a time, in the order shown, restarting the server each time:
	  a. Keyboard
	  b. (Trained service technician only) System board

The mouse or pointing device does not work.	1. Make sure that:
	  • The mouse or pointing-device cable is securely connected to the server.
	  • The mouse or pointing-device device drivers are installed correctly.
	  • The server and the monitor are turned on.
	  • The mouse option is enabled in the Setup utility.
	2. If you are using a USB mouse or pointing device and it is connected to a USB hub, disconnect the mouse or pointing device from the hub and connect it directly to the server.
	3. Move the mouse or pointing device cable to another USB connector.
	4. Replace the following components one at a time, in the order shown, restarting the server each time:
	  a. Mouse or pointing device
	  b. (Trained service technician only) System board

Memory problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action

The amount of system memory that is displayed is less than the amount of installed physical memory.	1. Make sure that:
	  • No error LEDs are lit on the operator information panel.
	  • The memory modules are seated correctly.
	  • You have installed the correct type of memory.
	  • All banks of memory are enabled. The server might have automatically disabled a memory bank when it detected a problem.
	2. Check the POST error log:
	  • If a DIMM was disabled by a systems-management interrupt (SMI), replace the DIMM.
	3. Run memory diagnostics (see "Diagnostic tools" on page 19).
	4. Make sure that there is no memory mismatch when the server is at the minimum memory configuration.
	5. Add one pair of DIMMs at a time, making sure that the DIMMs in each pair match.
	6. Reseat the DIMM.
	7. Replace the following components one at a time, in the order shown, restarting the server each time:
	  a. DIMMs
	  b. (Trained service technician only) Replace the system board

Multiple rows of DIMMs in a branch are identified as failing.	1. Reseat the DIMMs; then, restart the server. 2. Replace the failing DIMM. 3. (Trained service technician only) Replace the system board.

Microprocessor problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
- Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Symptom	Action

A microprocessor LED is lit during POST, indicating that the microprocessor is not working correctly.	1. Make sure that the server supports the microprocessor.
	2. (Trained service technician only) Make sure that the microprocessor is seated correctly.
	3. (Trained the service technician only) Reseat the microprocessor.
	4. Replace the following components one at a time, in the order shown, restarting the server each time:
	   a. (Trained service technician only) Microprocessor
	   b. (Trained service technician only) System board

Monitor problems

Some monitors have their own self-tests. If you suspect a problem with your monitor, see the documentation that comes with the monitor for instructions for testing and adjusting the monitor. If you cannot diagnose the problem, call for service.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
- Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Symptom	Action
Testing the monitor.	1. Make sure that the monitor cables are firmly connected. 2. Try using a different monitor on the server, or try using the monitor that is being tested on a different server. 3. Run the diagnostic programs. If the monitor passes the diagnostic programs, the problem might be a video device driver. 4. (Trained service technician only) Replace the system board.

The screen is blank.	1. If the server is attached to a KVM switch, bypass the KVM switch to eliminate it as a possible cause of the problem: connect the monitor cable directly to the correct connector on the rear of the server.
	2. Make sure that:
	  • The server is turned on. If there is no power to the server, see "Power problems" on page 62.
	  • The monitor cables are connected correctly.
	  • The monitor is turned on and the brightness and contrast controls are adjusted correctly.
	3. Make sure that the correct server is controlling the monitor, if applicable.
	4. Make sure that damaged server firmware is not affecting the video; see "Updating the firmware" on page 212.
	5. Observe the checkpoint LEDs on the system board; if the codes are changing, go to step 6.
	6. Replace the following components one at a time, in the order shown, restarting the server each time:
	  a. Monitor
	  b. Video PCI card (if one is installed)
	  c. (Trained service technician only) System board
	7. See "Solving undetermined problems" on page 103.

The monitor works when you turn on the server, but the screen goes blank when you start some application programs.	1. Make sure that:
	  • The application program is not setting a display mode that is higher than the capability of the monitor.
	  • You installed the necessary device drivers for the application.
	2. Run video diagnostics (see "Diagnostic tools" on page 19).
	  • If the server passes the video diagnostics, the video is good; see "Solving undetermined problems" on page 103.
	  • (Trained service technician only) If the server fails the video diagnostics, replace the system board.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action

The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted.	1. If the monitor self-tests show that the monitor is working correctly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescents, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor.
	
	Attention: Moving a color monitor while it is turned on might cause screen discoloration.
	
	Move the device and the monitor at least 305 mm (12 in.) apart, and turn on the monitor.
	
	Notes:
	a. To prevent diskette drive read/write errors, make sure that the distance between the monitor and any external diskette drive is at least 76 mm (3 in.).
	b. Non-Lenovo monitor cables might cause unpredictable problems.
	
	2. Reseat the monitor cable.
	3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time:
	  a. Monitor cable
	  b. Video PCI card (if one is installed)
	  c. Monitor
	  d. (Trained service technician only) System board

Wrong characters appear on the screen.	1. If the wrong language is displayed, update the UEFI code (see "Updating the firmware" on page 212) with the correct language.
	2. Reseat the monitor cable.
	3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time:
	  a. Monitor cable
	  b. Monitor
	  c. (Trained service technician only) Replace the system board.

Optional-device problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action

An optional device that was just installed does not work.	1. Make sure that:
	  • The device is designed for the server.
	  • You followed the installation instructions that came with the device and the device is installed correctly.
	  • You have not loosened any other installed devices or cables.
	  • You updated the configuration information in the Setup utility. Whenever memory or any other device is changed, you must update the configuration.
	
	2. Reseat the device that you just installed.
	
	3. Replace the device that you just installed.

An optional device that worked previously does not work now.	1. Make sure that all of the cable connections for the device are secure. 2. If the device comes with test instructions, use those instructions to test the device. 3. Reseat the failing device. 4. Replace the failing device.

Power problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action

The power-control button does not work, and the reset button does work (the server does not start).
Note: The power-control button will not function until approximately 1 to 3 minutes after the server has been connected to ac power.
	1. Make sure that the power-control button is working correctly:
	  a. Disconnect the server power cords.
	  b. Reconnect the power cords.
	  c. (Trained service technician only) Reseat the operator information panel cables, and then repeat steps 1a and 1b.
	    • (Trained service technician only) If the server starts, reseat the operator information panel. If the problem remains, replace the operator information panel.
	    • If the server does not start, bypass the power-control button by using the force power-on jumper (see "System-board switches and jumpers" on page 111). If the server starts, reseat the operator information panel. If the problem remains, replace the operator information panel.
	2. Make sure that the reset button is working correctly:
	  a. Disconnect the server power cords.
	  b. Reconnect the power cords.
	3. Make sure that:
	  • The power cords are correctly connected to the server and to a working electrical outlet.
	  • The type of memory that is installed is correct.
	  • The DIMMs are fully seated.
	  • The LEDs on the power supply do not indicate a problem.
	  • (Trained service technician only) The microprocessor is correctly installed.
	4. Reseat the following components:
	  a. DIMMs
	  b. (Trained service technician only) Power-supply cables to all internal components
	  c. (Trained service technician only) Power switch connector
	5. Replace the following components one at a time, in the order shown, restarting the server each time:
	  a. DIMMs
	  b. Power supply
	  c. (Trained service technician only) System board
	6. If you just installed an optional device, remove it, and restart the server. If the server now starts, you might have installed more devices than the power supply supports.
	7. See "Power-supply LEDs" on page 67.
	8. See "Solving undetermined problems" on page 103.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action

The server does not turn off.	1. Determine whether you are using an Advanced Configuration and Power Interface (ACPI) or a non-ACPI operating system. If you are using a non-ACPI operating system, complete the following steps:
	
	  a. Press Ctrl+Alt+Delete.
	
	  b. Turn off the server by pressing the power-control button and hold it down for 5 seconds.
	
	  c. Restart the server.
	
	  d. If the server fails POST and the power-control button does not work, disconnect the ac power cord for 20 seconds; then, reconnect the ac power cord and restart the server.
	
	2. If the problem remains or if you are using an ACPI-aware operating system, suspect the system board.

The server unexpectedly shuts down, and the LEDs on the operator information panel are not lit.	See "Solving undetermined problems" on page 103.

Serial-device problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action

The number of serial ports that are identified by the operating system is less than the number of installed serial ports.	1. Make sure that:
	  • Each port is assigned a unique address in the UEFI Setup Utility program and none of the serial ports is disabled.
	  • The serial-port (if one is present) is seated correctly.
	
	2. Reseat the serial port PCI card.
	
	3. Replace the serial port PCI card.

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.	
• See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.	
• Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.	

Symptom	Action

A serial device does not work.	1. Make sure that:
	   • The device is compatible with the server.
	   • The serial port is enabled and is assigned a unique address.
	   • The device is connected to the correct connector (see "System-board switches and jumpers" on page 111).
	2. Reseat the following components:
	   a. Failing serial device
	   b. Serial cable
	3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time.
	4. (Trained service technician only) Replace the system board.

Software problems

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.	
• See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.	
• Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.	

Symptom	Action

You suspect a software problem.	1. To determine whether the problem is caused by the software, make sure that:
	   • The server has the minimum memory that is needed to use the software. For memory requirements, see the information that comes with the software. If you have just installed an optional device or memory, the server might have a memory-address conflict.
	   • The software is designed to operate on the server.
	   • Other software works on the server.
	   • The software works on another server.
	2. If you received any error messages when using the software, see the information that comes with the software for a description of the messages and suggested solutions to the problem.
	3. Contact the software vendor.

Universal Serial Bus (USB) port problems

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician. • Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.	
Symptom	**Action**

A USB device does not work.	1. Run USB diagnostics (see "POST" on page 21).
	2. Make sure that:
	  • The correct USB device driver is installed.
	  • The operating system supports USB devices.
	3. Make sure that the USB configuration options are set correctly in the Setup Utility (see "Using the Setup Utility" on page 200 for more information).
	4. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the server.

Video problems

See "Monitor problems" on page 59.

Error LEDs

The illustration shows the system-board LEDs. The system board has error LEDs that will help to locate the source of the error. Run the diagnostic programs to find out the cause of the error (see "Running the diagnostic programs" on page 69).

New graphic to be added in the next draft.

The server is designed so that LEDs remain lit when the server is connected to an ac power source but is not turned on, provided that the power supply is operating correctly. This feature helps you to isolate the problem when the operating system is shut down.

Note: When you disconnect the power source from the server, you lose the ability to view the LEDs because the LEDs are not lit when the power source is removed. Before you disconnect the power source, make a note of which LEDs are lit, including the LEDs that are lit on the operation information panel and LEDs inside the server on the system board.

Many errors are first indicated by a lit system-error LED on the control-panel assembly of the server. If this LED is lit, one or more LEDs elsewhere in the server might also be lit and can direct you to the source of the error.

Before you work inside the server to view the LEDs, read the safety information that begins on page 1.

If an error occurs, view the server LEDs in the following order:
1. Check the control-panel assembly on the front of the server. If the system-error LED is lit, it indicates that an error has occurred.
2. Check the front and rear of the server to determine whether any component LEDs are lit.

3. Remove the server cover and look inside the server for lit LEDs. Certain components inside the server have LEDs that will be lit to indicate the location of a problem. For example, a DIMM error will light the LED next to the failing DIMM on the system board.

   Look at the system service label inside the side cover of the server, which gives an overview of internal components. This information can often provide enough information to correct the error.

The following table describes the LEDs on the system board and PCI extender cards and suggested actions to correct the detected problems.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Component LED	Description	Action

DIMM error LEDs	A memory DIMM has failed or is incorrectly installed.	1. Remove the DIMM that has the lit error LED.
		2. Reseat the DIMM.
		3. Replace the following components one at a time, in the order shown, restarting the server each time:
		  a. DIMM
		  b. (Trained service technician only) System board

CPU error LEDs	Microprocessor has failed, is missing, or has been incorrectly installed.
	Note: (Trained service technician only) Make sure that the microprocessor is installed correctly; see "Installing the microprocessor" on page 141.
		1. Check the system-event log to determine the reason for the lit LED.
		2. (Trained service technician) Reseat the failing microprocessor
		3. Replace the following components one at a time, in the order shown, restarting the server each time:
		  a. (Trained service technician only) Failing microprocessor
		  b. (Trained service technician only) System board

System-board error LED	System-board CPU VRD and/or power voltage regulators have failed.	(Trained service technician only) Replace the system board.
Battery failure LED	Battery low.	1. Replace the CMOS lithium battery, if necessary. 2. (Trained service technician only) Replace the system board.
IMM heartbeat LED	Indicates the status of the boot process of the IMM. When the server is connected to power this LED flashes quickly to indicate that the IMM code is loading. When the loading is complete, the LED stops flashing briefly and then flashes slowly to indicate that the IMM if fully operational and you can press the power-control button to start the server.	If the LED does not begin flashing within 30 seconds of when the server is connected to power, complete the following steps: 1. (Trained service technician only) Rerecover the firmware (see "Recovering the server firmware" on page 100). 2. (Trained service technician only) Replace the system board.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Component LED	Description	Action
PCI slots error LEDs	An error has occurred on a PCI bus or on the system board. An additional LED is lit next to a failing PCI slot.	1. Check the system-event log for information about the error. 2. If you cannot isolate the failing adapter through the LEDs and the information in the system-event log, remove one adapter at a time, and restart the server after each adapter is removed. 3. If the failure remains, go to http://www.lenovo.com/support for additional troubleshooting information.
Enclosure manager heartbeat LED	power-on and power-off sequencing.	1. If the LED flashes at 1Hz, it is functioning properly and no action is necessary. 2. If the LED is not flashing, (trained service technician only) replace the system board.

Power-supply LEDs

The following minimum configuration is required for the DC LED on the power supply to be lit:
- Power supply
- Power cord

The following minimum configuration is required for the server to start:
- One microprocessor in microprocessor socket 1
- One 1 GB DIMM on the system board
- One power supply
- Power cord
- ServeRAID SAS/SATA adapter
- Five cooling fans

The following illustration shows the locations of the power-supply LEDs.
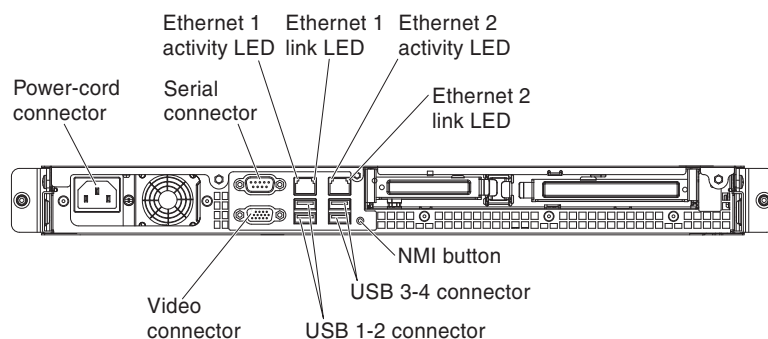
System pulse LEDs

The following LEDs are on the system board and indicates the system power-on and power-off sequencing and boot progress (see "System-board LEDs" on page 112 for the location of these LEDs).

Table 4. System pulse LEDs

LED	Description	Action
Enclosure manager heartbeat	power-on and power-off sequencing.	1. If the LED flashes at 1Hz, it is functioning properly and no action is necessary. 2. If the LED is not flashing, (trained service technician only) replace the system board.
IMM heartbeat	IMM heartbeat boot process.	The following steps describe the different stages of the IMM heartbeat sequencing process. 1. When this LED is flashing fast (approximately 4Hz), the IMM code is in the loading process. 2. When this LED goes off momentarily, this indicates that the IMM code has loaded completely. 3. When this LED goes off momentarily and then starts flashing slowing (approximately 1Hz), theIMM is fully operational. You can now press the power-control button to power-on the server. 4. If this LED does not flash within 30 seconds of connecting a power flash to the server, complete the following steps: a. (Trained service technician only) Use the IMM recovery jumper to recover the firmware (see Table 6 on page 111). b. (Trained service technician only) Replace the system board.

Diagnostic programs and messages

The diagnostic programs are the primary method of testing the major components of the server. As you run the diagnostic programs, text messages are displayed on the screen and are saved in the test log. A diagnostic text message indicates that a problem has been detected and provides the action you should take as a result of the text message.

Make sure that the server has the latest version of the diagnostic programs. To download the latest version, complete the following steps.

Note: Changes are made periodically to the Lenovo Web site. The actual procedure might vary slightly from what is described in this document.

Go to http://www.lenovo.com/support.

Utilities are available to reset and update the diagnostics code on the integrated USB flash device, if the diagnostic partition becomes damaged and does not start the diagnostic programs. For more information and to download the utilities, go to http://www.lenovo.com/support.

Running the diagnostic programs

To run the diagnostic programs, complete the following steps:

1. If the server is running, turn off the server and all attached devices.
2. Turn on all attached devices; then, turn on the server.
3. When the prompt `<F2> Diagnostics` is displayed, press F2.

    Note: The DSA Preboot diagnostic program might appear to be unresponsive for an unusual length of time when you start the program. This is normal operation while the program loads.
4. Optionally, select **Quit to DSA** to exit from the stand-alone memory diagnostic program.

    Note: After you exit from the stand-alone memory diagnostic environment, you must restart the server to access the stand-alone memory diagnostic environment again.
5. Select **gui** to display the graphical user interface, or select **cmd** to display the DSA interactive menu.
6. Follow the instructions on the screen to select the diagnostic test to run.

If the diagnostic programs do not detect any hardware errors but the problem remains during normal server operation, a software error might be the cause. If you suspect a software problem, see the information that comes with your software.

A single problem might cause more than one error message. When this happens, correct the cause of the first error message. The other error messages usually will not occur the next time you run the diagnostic programs.

Exception: If multiple error codes or system-board LEDs indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See "Microprocessor problems" on page 58 for information about diagnosing microprocessor problems.

If the server stops during testing and you cannot continue, restart the server and try running the diagnostic programs again. If the problem remains, replace the component that was being tested when the server stopped.

Diagnostic text messages

Diagnostic text messages are displayed while the tests are running. A diagnostic text message contains one of the following results:

Passed: The test was completed without any errors.

Failed: The test detected an error.

Aborted: The test could not proceed because of the server configuration

Additional information concerning test failures is available in the extended diagnostic results for each test.

Viewing the test log

To view the test log when the tests are completed, type the **view** command in the DSA interactive menu, or select **Diagnostic Event Log** in the graphical user interface. To transfer DSA Preboot collections to an external USB device, type the **copy** command in the DSA interactive menu.

Diagnostic messages

The following table describes the messages that the diagnostic programs might generate and suggested actions to correct the detected problems. Follow the suggested actions in the order in which they are listed in the column.

Table 5. DSA Preboot messages

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
• See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
• Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action

089-801-xxx	CPU	CPU Stress Test	Aborted	Internal program error.	1. Turn off and restart the system.
					2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support.
					3. Run the test again.
					4. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212.
					5. Run the test again.
					6. Turn off and restart the system if necessary to recover from a hung state.
					7. Run the test again.
					8. Replace the following components one at a time, in the order shown, and run this test again to determine whether the problem has been solved:
					  a. (Trained service technician only) Microprocessor board
					  b. (Trained service technician only) Microprocessor
					9. If the failure remains, go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Table 5. DSA Preboot messages (continued)

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
• See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
• Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
089-802-xxx	CPU	CPU Stress Test	Aborted	System resource availability error.	1. Turn off and restart the system. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 3. Run the test again. 4. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.lenovo.com/support and select your system to display a matrix of available firmware. 5. Run the test again. 6. Turn off and restart the system if necessary to recover from a hung state. 7. Run the test again. 8. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 9. Run the test again.

089-802-xxx	CPU	CPU Stress Test	Aborted	System resource availability error.	1. Replace the following components one at a time, in the order shown, and run this test again to determine whether the problem has been solved:
					   a. (Trained service technician only) Microprocessor board
					   b. (Trained service technician only) Microprocessor
					 2. If the failure remains, go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Table 5. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action

089-901-xxx	CPU	CPU Stress Test	Failed	Test failure.	1. Turn off and restart the system if necessary to recover from a hung state.
					2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support.
					3. Run the test again.
					4. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212.
					5. Run the test again.
					6. Turn off and restart the system if necessary to recover from a hung state.
					7. Run the test again.
					8. Replace the following components one at a time, in the order shown, and run this test again to determine whether the problem has been solved:
					  a. (Trained service technician only) Microprocessor board
					  b. (Trained service technician only) Microprocessor
					9. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

166-801-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: the IMM returned an incorrect response length.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

•	Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
•	See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
•	If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
•	Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
166-802-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: the test cannot be completed for an unknown reason.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
166-803-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: the node is busy; try later.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

•	Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
•	See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
•	If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
•	Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
166-804-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: invalid command.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
166-805-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: invalid command for the given LUN.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
• See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
• Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
166-806-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: timeout while processing the command.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
166-807-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: out of space.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

•	Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
•	See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
•	If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
•	Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
166-808-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: reservation canceled or invalid reservation ID.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
166-809-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: request data was truncated.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

•	Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
•	See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
•	If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
•	Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
166-810-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: request data length is invalid.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
166-811-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: request data field length limit is exceeded.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

•	Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
•	See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
•	If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
•	Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
166-812-xxx	IMM	IMM I2C Test	Aborted	IMM I2C Test stopped: a parameter is out of range.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
166-813-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: cannot return the number of requested data bytes.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

•	Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
•	See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
•	If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
•	Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
166-814-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: requested sensor, data, or record is not present.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
166-815-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: invalid data field in the request.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.					
• See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).					
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.					
• Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.					

Message number	Component	Test	State	Description	Action
166-816-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: the command is illegal for the specified sensor or record type.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
166-817-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: a command response could not be provided.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

•	Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
•	See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
•	If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
•	Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
166-818-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: cannot execute a duplicated request.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
166-819-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: a command response could not be provided; the SDR repository is in update mode.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

•	Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
•	See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
•	If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
•	Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
166-820-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: a command response could not be provided; the device is in firmware update mode.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code and IMM firmware are at the latest level. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
166-821-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: a command response could not be provided; IMM initialization is in progress.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
• See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
• Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
166-822-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: the destination is unavailable.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
166-823-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: cannot execute the command; insufficient privilege level.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.	
• See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.	
• Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.	

Message number	Component	Test	State	Description	Action
166-824-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: cannot execute the command.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
166-901-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the H8 bus (Bus 0)	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. Remove power from the system. 8. (Trained service technician only) Replace the system board. 9. Reconnect the system to power and turn on the system. 10. Run the test again. 11. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
166-902-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the memory bus.	1. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
• See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
• Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
166-903-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the DIMM bus (Bus 2).	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. Disconnect the system from the power source. 8. Replace the DIMMs one at a time, and run the test again after replacing each DIMM. 9. Reconnect the system to the power source and turn on the system. 10. Run the test again. 11. Turn off the system and disconnect it from the power source. 12. Reseat all of the DIMMs. 13. Reconnect the system to the power source and turn on the system. 14. Run the test again. 15. Turn off the system and disconnect it from the power source. 16. (Trained service technician only) Replace the system board. 17. Reconnect the system to the power source and turn on the system. 18. Run the test again. 19. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

•	Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
•	See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
•	If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
•	Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
166-904-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the power supply bus (Bus 3).	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. Reseat the power supply. 8. Run the test again. 9. Turn off the system and disconnect it from the power source. 10. Trained service technician only) Replace the system board. 11. Reconnect the system to the power source and turn on the system. 12. Run the test again. 13. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

•	Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
•	See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
•	If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
•	Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
166-905-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the HDD bus (Bus 4).	**Note:** Ignore the error if the hard disk drive backplane is not installed. 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. Turn off the system and disconnect it from the power source. 8. Reseat the hard disk drive backplane. 9. Reconnect the system to the power source and turn on the system. 10. Run the test again. 11. Turn off the system and disconnect it from the power source. 12. (Trained service technician only) Replace the system board. 13. Reconnect the system to the power source and turn on the system. 14. Run the test again. 15. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

•	Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
•	See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
•	If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
•	Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
166-906-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the memory configuration bus (Bus 5).	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. Turn off the system and disconnect it from the power source. 8. Trained service technician only) Replace the system board. 9. Reconnect the system to the power source and turn on the system. 10. Run the test again. 11. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
201-801-xxx	Memory	Memory Test	Aborted	Test canceled: the system UEFI programmed the memory controller with an invalid CBAR address	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 4. Run the test again. 5. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
201-802-xxx	Memory	Memory Test	Aborted	Test canceled: the end address in the E820 function is less than 16 MB.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that all DIMMs are enabled in the Setup utility. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Run the test again. 6. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

•	Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
•	See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
•	If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
•	Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
201-803-xxx	Memory	Memory Test	Aborted	Test canceled: could not enable the processor cache.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 4. Run the test again. 5. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
201-804-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller buffer request failed.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 4. Run the test again. 5. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
201-805-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller display/alter write operation was not completed.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 4. Run the test again. 5. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
201-806-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller fast scrub operation was not completed.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 4. Run the test again. 5. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
• **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**	
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**	
• **Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.**	

Message number	Component	Test	State	Description	Action
201-807-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller buffer free request failed.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 4. Run the test again. 5. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
201-808-xxx	Memory	Memory Test	Aborted	Test canceled: memory controller display/alter buffer execute error.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 4. Run the test again. 5. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
201-809-xxx	Memory	Memory Test	Aborted	Test canceled program error: operation running fast scrub.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 5. Run the test again. 6. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

•	Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
•	See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
•	If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
•	Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
201-810-xxx	Memory	Memory Test	Aborted	Test stopped: unknown error code xxx received in COMMONEXIT procedure.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 5. Run the test again. 6. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
201-901-xxx	Memory	Memory Test	Failed	Test failure: single-bit error, failing DIMM z.	1. Turn off the system and disconnect it from the power source. 2. Reseat DIMM z. 3. Reconnect the system to power and turn on the system. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. Replace the failing DIMMs. 8. Re-enable all memory in the Setup utility (see "Using the Setup Utility" on page 200). 9. Run the test again. 10. Replace the failing DIMM. 11. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

•	Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
•	See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
•	If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
•	Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
201-902-xxx	Memory	Memory Test	Failed	Test failure: single-bit and multi-bit error, failing DIMM z	1. Turn off the system and disconnect it from the power source. 2. Reseat DIMM z. 3. Reconnect the system to power and turn on the system. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 6. Run the test again. 7. Replace the failing DIMMs. 8. Re-enable all memory in the Setup utility see "Using the Setup Utility" on page 200). 9. Run the test again. 10. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
202-801-xxx	Memory	Memory Stress Test	Aborted	Internal program error.	1. Turn off and restart the system. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 4. Run the test again. 5. Turn off and restart the system if necessary to recover from a hung state. 6. Run the memory diagnostics to identify the specific failing DIMM. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
202-802-xxx	Memory	Memory Stress Test	Failed	General error: memory size is insufficient to run the test.	1. Make sure that all memory is enabled by checking the Available System Memory in the Resource Utilization section of the DSA event log. If necessary, enable all memory in the Setup utility (see "Using the Setup Utility" on page 200). 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 3. Run the test again. 4. Run the standard memory test to validate all memory. 5. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
202-901-xxx	Memory	Memory Stress Test	Failed	Test failure.	1. Run the standard memory test to validate all memory. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 3. Turn off the system and disconnect it from power. 4. Reseat the DIMMs. 5. Reconnect the system to power and turn on the system. 6. Run the test again. 7. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

•	Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
•	See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
•	If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
•	Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
215-801-xxx	DVD Drive	• Verify Media Installed • Read/Write Test • Self-Test Messages and actions apply to all three tests.	Aborted	Unable to communicate with the device driver.	1. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 2. Run the test again. 3. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. For additional troubleshooting information, go to http://www.lenovo.com/support. 6. Run the test again. 7. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 8. Run the test again. 9. Replace the DVD drive. 10. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
215-802-xxx	DVD Drive	• Verify Media Installed • Read/Write Test • Self-Test Messages and actions apply to all three tests.	Aborted	The media tray is open.	1. Close the media tray and wait 15 seconds. 2. Run the test again. 3. Insert a new CD/DVD into the drive and wait for 15 seconds for the media to be recognized. 4. Run the test again. 5. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 6. Run the test again. 7. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 8. Run the test again. 9. For additional troubleshooting information, go to http://www.lenovo.com/support. 10. Run the test again. 11. Replace the DVD drive. 12. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

•	Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
•	See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
•	If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
•	Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
215-803-xxx	DVD Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Failed	The disc might be in use by the system.	1. Wait for the system activity to stop. 2. Run the test again 3. Turn off and restart the system. 4. Run the test again. 5. Replace the DVD drive. 6. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
215-901-xxx	DVD Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Aborted	Drive media is not detected.	1. Insert a CD/DVD into the drive or try a new media, and wait for 15 seconds. 2. Run the test again. 3. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. For additional troubleshooting information, go to http://www.lenovo.com/support. 6. Run the test again. 7. Replace the DVD drive. 8. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
215-902-xxx	DVD Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Failed	Read miscompare.	1. Insert a CD/DVD into the drive or try a new media, and wait for 15 seconds. 2. Run the test again. 3. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. For additional troubleshooting information, go to http://www.lenovo.com/support. 6. Run the test again. 7. Replace the DVD drive. 8. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
•	**Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
215-903-xxx	DVD Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Aborted	Could not access the drive.	1. Insert a CD/DVD into the drive or try a new media, and wait for 15 seconds. 2. Run the test again. 3. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.lenovo.com/support. 6. Run the test again. 7. For additional troubleshooting information, go to http://www.lenovo.com/support. 8. Run the test again. 9. Replace the DVD drive. 10. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
215-904-xxx	DVD Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Failed	A read error occurred.	1. Insert a CD/DVD into the drive or try a new media, and wait for 15 seconds. 2. Run the test again. 3. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. For additional troubleshooting information, go to http://www.lenovo.com/support. 6. Run the test again. 7. Replace the DVD drive. 8. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
217-901-xxx	SAS/SATA Hard Drive	Disk Drive Test	Failed		1. Reseat all hard disk drive backplane connections at both ends. 2. Reseat all drives. 3. Run the test again. 4. Make sure that the firmware is at the latest level. 5. Run the test again. 6. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

•	Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
•	See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
•	If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
•	Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
405-901-xxx	BroadCom Ethernet Device	Test Control Registers	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 2. Run the test again. 3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 4. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
405-901-xxx	BroadCom Ethernet Device	Test MII Registers	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 2. Run the test again. 3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 4. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
405-902-xxx	BroadCom Ethernet Device	Test EEPROM	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 2. Run the test again. 3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 4. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
•	**Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
405-903-xxx	BroadCom Ethernet Device	Test Internal Memory	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 2. Run the test again. 3. Check the interrupt assignments in the PCI Hardware section of the DSA event log. If the Ethernet device is sharing interrupts, if possible, use the Setup utility see "Using the Setup Utility" on page 200) to assign a unique interrupt to the device. 4. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 5. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
405-904-xxx	BroadCom Ethernet Device	Test Interrupt	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 2. Run the test again. 3. Check the interrupt assignments in the PCI Hardware section of the DSA event log. If the Ethernet device is sharing interrupts, if possible, use the Setup utility see "Using the Setup Utility" on page 200) to assign a unique interrupt to the device. 4. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 5. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Table 5. DSA Preboot messages (continued)

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
• See Chapter 7, "Parts listing, RS210 Types 6531, 6532, 6533, and 6534," on page 177 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
• Go to the Lenovo support Web site at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
405-906-xxx	BroadCom Ethernet Device	Test Loop back at Physical Layer	Failed		1. Check the Ethernet cable for damage and make sure that the cable type and connection are correct. 2. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 3. Run the test again. 4. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 5. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
405-907-xxx	BroadCom Ethernet Device	Test Loop back at MAC-Layer	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 2. Run the test again. 3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 4. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..
405-908-xxx	BroadCom Ethernet Device	Test LEDs	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 212. 2. Run the test again. 3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 4. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support..

Recovering the server firmware

Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.

If the server firmware has become corrupted, such as from a power failure during an update, you can recover the server firmware in one of two ways:

- **In-band method:** Recover server firmware, using either the boot block jumper (Automated Boot Recovery) and a server Firmware Update Package Service Pack.
- **Out-of-band method:** Use the IMM Web Interface to update the firmware, using the latest server firmware update package.

Note: You can obtain a server update package from one of the following sources:

- Download the server firmware update from the World Wide Web.
- Contact your Lenovo service representative.

To download the server firmware update package from the World Wide Web, go to http://www.lenovo.com/support.

The flash memory of the server consists of a primary bank and a backup bank. It is essential that you maintain the backup bank with a bootable firmware image. If the primary bank becomes corrupted, you can either manually boot the backup bank with the boot block jumper, or in the case of image corruption, this will occur automatically with the Automated Boot Recovery function.

In-band manual recovery method

To recover the server firmware and restore the server operation to the primary bank, complete the following steps:

1. Turn off the server, and disconnect all power cords and external cables.
2. Remove the server cover. See "Removing and installing the cover" on page 119 for more information.
3. Locate the UEFI boot recovery jumper block (JP6) on the system board.

Boot block
jumper (JP6)

Clear CMOS
jumper (JP1)
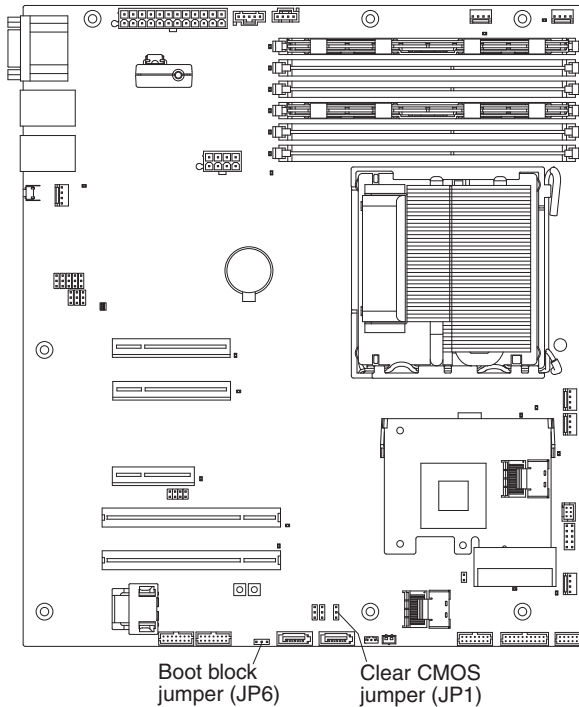
4. Move the jumper from pins 1 and 2 to pins 2 and 3 to enable the UEFI recovery mode.

5. Reinstall the server cover; then, reconnect all power cords.

6. Restart the server. The power-on self-test (POST) starts.

7. Boot the server to an operating system that is supported by the firmware update package that you downloaded.

8. Perform the firmware update by following the instructions that are in the firmware update package readme file.

9. Copy the downloaded firmware update package into a directory.

10. From a command line, type `filename`-s, where *filename* is the name of the executable file that you downloaded with the firmware update package.

11. Turn off the server and disconnect all power cords and external cables, and then remove the server cover.

12. Move the UEFI boot recovery jumper back to the primary position (pins 1 and 2).

13. Reinstall the server cover, and then reconnect all the power cables.

14. Restart the server.

In-band automated boot recovery method

Note: Use this method if the system board error LED is lit and there is a log entry or `Booting Backup Image` is displayed on the firmware splash screen; otherwise, use the in-band manual recovery method.

1. Boot the server to an operating system that is supported by the firmware update package that you downloaded.

2. Perform the firmware update by following the instructions that are in the firmware update package readme file.

3. Restart the server.

4. At the firmware splash screen, press F3 when you are prompted to restore to the primary bank. The server boots from the primary bank.

Out-of-band method: See the IMM documentation.

Automated boot recovery (ABR)

If the server is booting up and the IMM detect problems with the server firmware in the primary bank, it will automatically switch to the backup firmware bank and give you the opportunity to recover the primary bank. To recover to the server firmware primary bank, complete the following steps.

1. Restart the server.
2. When the prompt press F3 to restore to primary is displayed, press F3 to recover the primary bank. Pressing F3 will restart the server.

Three boot failure

Configuration changes, such as added devices or adapter firmware updates can cause the server to fail POST (power-on self-test). If this occurs on three consecutive boot attempts, the server will temporarily use the default configuration values and automatically goes to F1 Setup. To solve the problem, complete the following steps:

1. Undo any configuration changes that you made recently and restart the server.
2. Remove any devices that you added recently and restart the server.
3. If the problem remains, go to Setup and select **Load Default Settings**, and then click **Save** to restore the server factory settings.

Solving power problems

Power problems can be difficult to solve. For example, a short circuit can exist anywhere on any of the power distribution buses. Usually, a short circuit will cause the power subsystem to shut down because of an overcurrent condition. To diagnose a power problem, use the following general procedure:

1. Turn off the server and disconnect all ac power cords.
2. Check the power-fault LEDs on the system board (see "Power problems" on page 62).
3. Check for loose cables in the power subsystem. Also check for short circuits, for example, if a loose screw is causing a short circuit on a circuit board.
4. Remove the adapters and disconnect the cables and power cords to all internal and external devices until the server is at the minimum configuration that is required for the server to start (see "Solving undetermined problems" on page 103 for the minimum configuration).
5. Reconnect all ac power cords and turn on the server. If the server starts successfully, reseat the adapters and devices one at a time until the problem is isolated.

If the server does not start from the minimum configuration, see "Power-supply LEDs" on page 67 to replace the components in the minimum configuration one at a time until the problem is isolated.

Solving Ethernet controller problems

The method that you use to test the Ethernet controller depends on which operating system you are using. See the operating-system documentation for information about Ethernet controllers, and see the Ethernet controller device-driver readme file.

Try the following procedures:
- Make sure that the correct device drivers, which come with the server are installed and that they are at the latest level.
- Make sure that the Ethernet cable is installed correctly.
  - The cable must be securely attached at all connections. If the cable is attached but the problem remains, try a different cable.
  - If you set the Ethernet controller to operate at 100 Mbps, you must use Category 5 cabling.

- If you directly connect two servers (without a hub), or if you are not using a hub with X ports, use a crossover cable. To determine whether a hub has an X port, check the port label. If the label contains an X, the hub has an X port.
- Determine whether the hub supports auto-negotiation. If it does not, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the hub.
- Check the Ethernet controller LEDs on the rear panel of the server. These LEDs indicate whether there is a problem with the connector, cable, or hub.
  - The Ethernet link status LED is lit when the Ethernet controller receives a link pulse from the hub. If the LED is off, there might be a defective connector or cable or a problem with the hub.
  - The Ethernet transmit/receive activity LED is lit when the Ethernet controller sends or receives data over the Ethernet network. If the Ethernet transmit/receive activity is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Check the LAN activity LED on the rear of the server. The LAN activity LED is lit when data is active on the Ethernet network. If the LAN activity LED is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Check for operating-system-specific causes of the problem.
- Make sure that the device drivers on the client and server are using the same protocol.

If the Ethernet controller still cannot connect to the network but the hardware appears to be working, the network administrator must investigate other possible causes of the error.

Solving undetermined problems

If the diagnostic tests did not diagnose the failure or if the server is inoperative, use the information in this section.

If you suspect that a software problem is causing failures (continuous or intermittent), see "Software problems" on page 64.

Damaged data in CMOS memory or damaged server firmware can cause undetermined problems. To reset the CMOS data, use the CMOS jumper to clear the CMOS memory and override the power-on password; see "System-board switches and jumpers" on page 111. If you suspect that the server firmware is damaged, see "Recovering the server firmware" on page 100.

If the power supplies are working correctly, complete the following steps:
1. Turn off the server.
2. Make sure that the server is cabled correctly.
3. Remove or disconnect the following devices, one at a time, until you find the failure. Turn on the server and reconfigure it each time.
   - Any external devices.
   - Surge-suppressor device (on the server).
   - Printer, mouse, and non-Lenovo devices.
   - Each adapter.
   - Hard disk drives.
   - Memory modules. The minimum configuration requirement is 1 GB DIMM in slots 3.
4. Turn on the server. If the problem remains, suspect the following components in the following order:
   - Memory module
   - Microprocessor
   - System board

If the problem is solved when you remove an adapter from the server but the problem recurs when you reinstall the same adapter, suspect the adapter; if the problem recurs when you replace the adapter with a different one, suspect the riser card.

If you suspect a networking problem and the server passes all the system tests, suspect a network cabling problem that is external to the server.

Chapter 4. Diagnostics **103**

Problem determination tips

Because of the variety of hardware and software combinations that can encounter, use the following information to assist you in problem determination. If possible, have this information available when requesting assistance from Lenovo.

The model number and serial number of the server are located on an ID label **1** on the bezel.
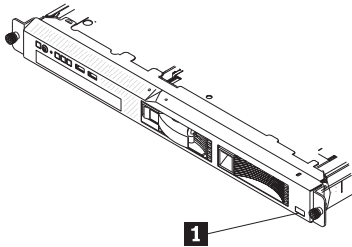
- Machine type and model
- Microprocessor or hard disk drive upgrades
- Failure symptom
  - Does the server fail the diagnostic tests?
  - What occurs? When? Where?
  - Does the failure occur on a single server or on multiple servers?
  - Is the failure repeatable?
  - Has this configuration ever worked?
  - What changes, if any, were made before the configuration failed?
  - Is this the original reported failure?
- Diagnostic program type and version level
- Hardware configuration (print screen of the system summary)
- IMM firmware level
- Operating system software

You can solve some problems by comparing the configuration and software setups between working and nonworking servers. When you compare servers to each other for diagnostic purposes, consider them identical only if all the following factors are exactly the same in all the servers:

- Machine type and model
- IMM firmware level
- Adapters and attachments, in the same locations
- Address jumpers, terminators, and cabling
- Software versions and levels
- Diagnostic program type and version level
- Configuration option settings
- Operating-system control-file setup

Chapter 5. Locating Server Controls and connectors

This section describes the controls, light-emitting diodes (LEDs), and connectors on the front and rear of the server, and how to turn the server on and off. For the location of the LEDs on the system board, see "System-board LEDs" on page 112.

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

Front view

The following illustration shows the controls, LEDs, and connectors The following illustration shows the controls, LEDs, and connectors on the front of the various models of the server.

3.5-inch simple-swap SAS server model
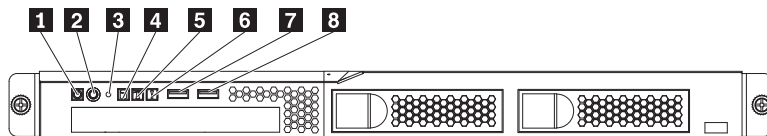
3.5-inch hot-swap SAS/SATA server model
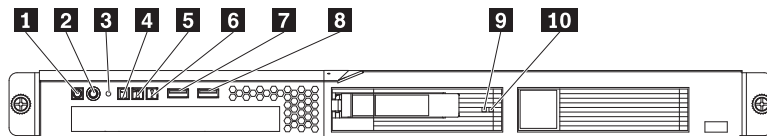
2.5-inch hot-swap SAS server model

1	Power-on LED	**6**	System-error LED
2	Power-control button	**7**	USB 1 connector
3	Reset button	**8**	USB 2 connector
4	Hard disk drive activity LED	**9**	Hard disk drive activity LED (green) (on 3.5-inch hot-swap SAS server model) Hard disk drive status LED (amber) (on 2.5-inch hot-swap SAS server model)
5	Locator LED	**10**	Hard disk drive status LED (amber) (on 3.5-inch hot-swap SAS server model) Hard disk drive activity LED (green) (on 2.5-inch hot-swap SAS server model)

Rear view

1	Power-cord connector	9	NMI button
2	Serial connector	10	USB 3-4 connector
3	Ethernet 1 activity LED	11	USB 1-2 connector
4	Ethernet 1 link LED	12	Video connector
5	Ethernet 2 activity LED	13	Power supply error LED (amber)
6	Ethernet 2 link LED	14	DC power LED (green)
7	PCI slot 1	15	AC power LED (green)
8	PCI slot 2		

System-board internal connectors

The following illustration shows the internal connectors on the system board.
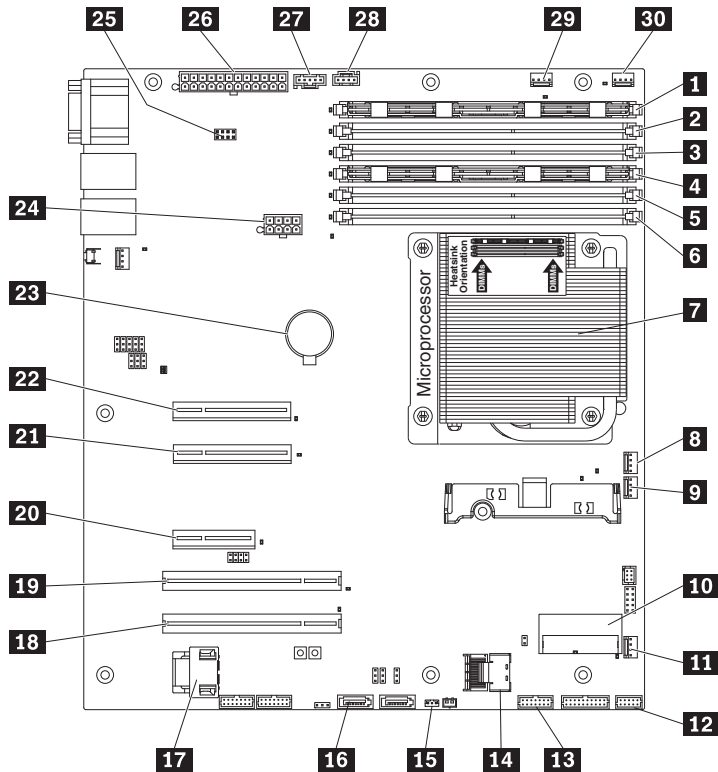
1	DIMM 1	**11**	Fan 1 connector	**21**	Riser-card connector 2
2	DIMM 2	**12**	Hard disk backplane configuration connector	**22**	Riser-card connector 1
3	DIMM 3	**13**	Operator information panel connector	**23**	Battery
4	DIMM 4	**14**	Simple-swap HDD backplane signal connector	**24**	Power 2 connector
5	DIMM 5	**15**	Wake-on-LAN connector	**25**	Virtual media key connector
6	DIMM 6	**16**	DVD drive connector	**26**	Power 1 connector
7	Microprocessor	**17**	Hypervisor flash device connector	**27**	Power 3 connector
8	Fan 3 connector	**18**	Reserved	**28**	Power 4 connector
9	Fan 2 connector	**19**	Reserved	**29**	Fan 5 connector
10	ServeRAD-BR10il controller connector	**20**	Reserved	**30**	Fan 4 connector

System-board external connectors

The following illustration shows the external connectors on the system-board.
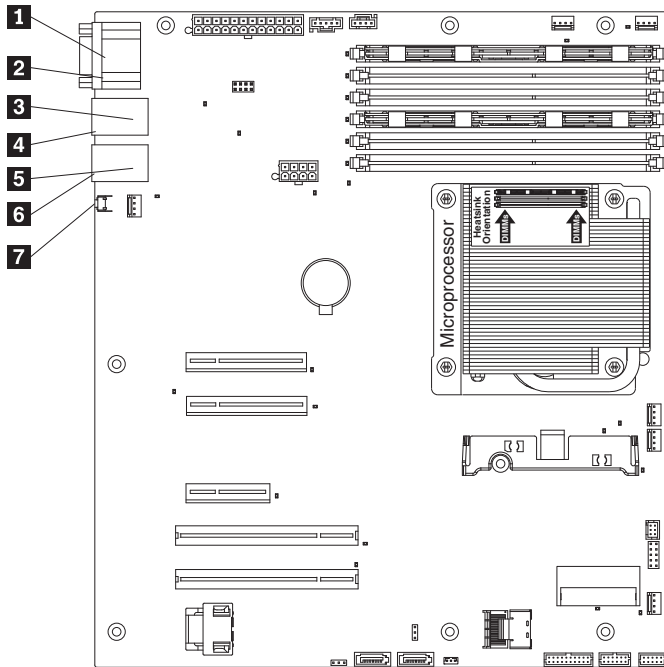
1	Serial (com 1) connector	**5**	Ethernet connector 2
2	Video connector	**6**	USB connectors 3 and 4
3	Ethernet connector 1	**7**	SW1 (NMI button)
4	USB connectors 1 and 2		

System-board optional-device connectors

The following illustration shows the connectors on the system board for user-installable optional devices.
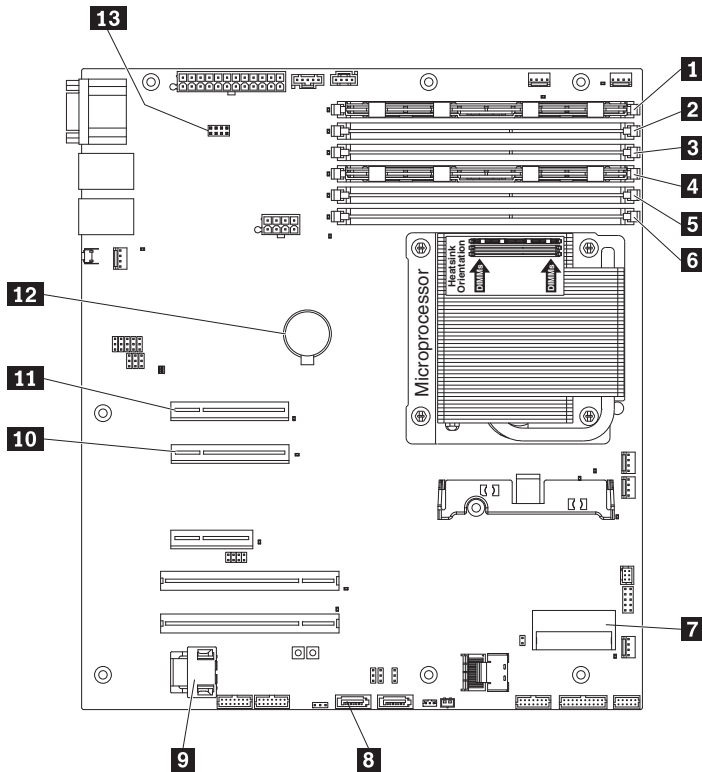
1	DIMM 1	**8**	DVD drive connector
2	DIMM 2	**9**	Hypervisor flash device connector
3	DIMM 3	**10**	Riser-card connector 2
4	DIMM 4	**11**	Riser-card connector 1
5	DIMM 5	**12**	Battery
6	DIMM 6	**13**	Virtual media key connector
7	ServeRAID BR10il SAS/SATA controller connector		

The following illustration shows the locations of the PCI Express slots on the riser-card assembly.
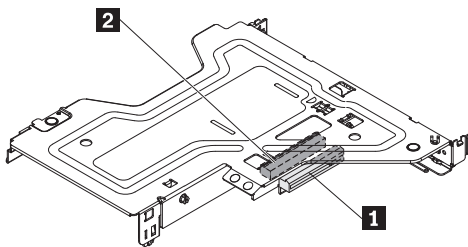
1	PCI Express x8 slot 1	**2**	PCI Express x8 slot 2

The following illustration shows the location of the PCI-X slot on the optional PCI-X riser-card assembly.
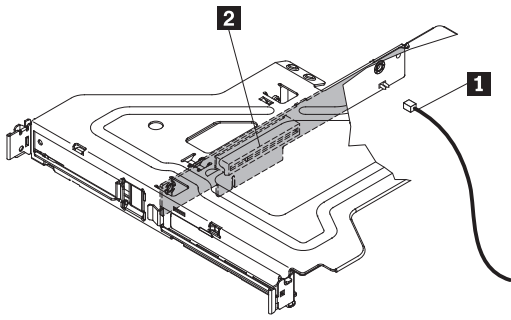
| 1 | PCI-X power cable | 2 | PCI-X slot |

System-board switches and jumpers

The following illustration shows the switches and jumpers on the system board.
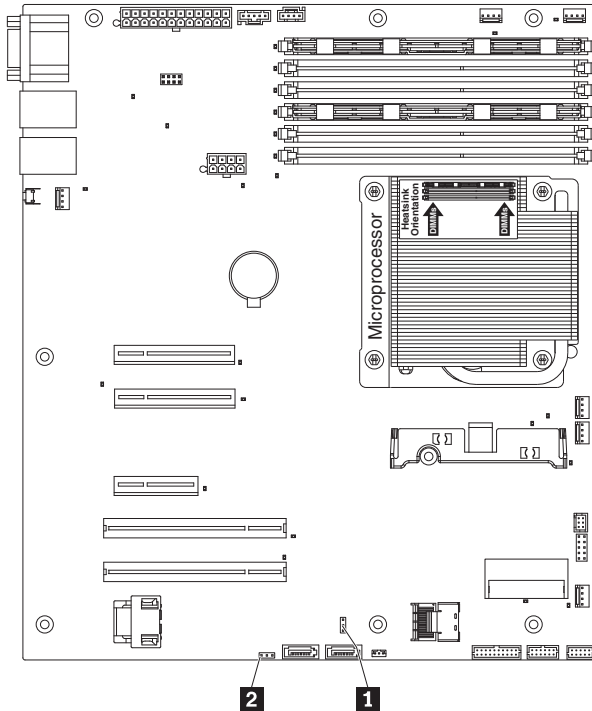
The following table describes the jumpers on the system board.

Table 6. System board jumpers

Jumper number	Jumper name	Jumper setting
JP1	Clear CMOS jumper **1**	• Pins 1 and 2: Keep CMOS data (default). • Pins 2 and 3: Clear CMOS data (including power-on password and administrator password)
JP6	Boot block jumper **2**	• Pins 1 and 2: Boot from primary BIOS page (default) . • Pins 2 and 3: Boot from backup BIOS page.

Notes:

1. If no jumper is present, the server responds as if the pins are set to 1 and 2.
2. Changing the position of the UEFI boot recovery jumper from pins 1 and 2 to pins 2 and 3 before the server is turned on alters which flash ROM page is loaded. Do not change the jumper pin position after the server is turned on. This can cause an unpredictable problem.

Important:

1. Before you change any switch settings or move any jumpers, turn off the server; then, disconnect all power cords and external cables. Review the information in "Guidelines for trained service technicians" on page 115, "Handling static-sensitive devices" on page 117, and "Turning off the server" on page 113.
2. Any system-board switch or jumper blocks that are not shown in the illustrations in this document are reserved.

System-board LEDs

The following illustration shows the light-emitting diodes (LEDs) on the system board.
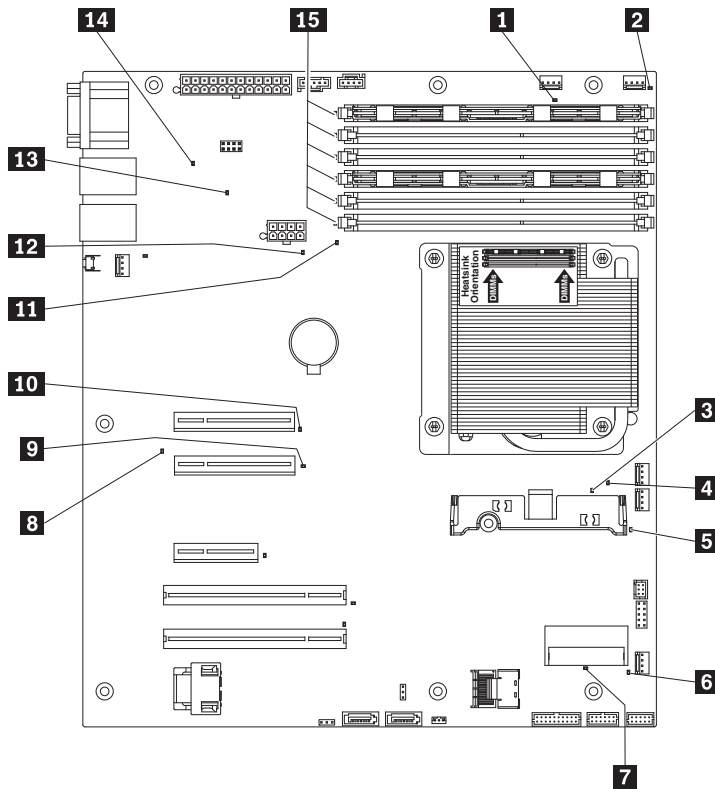
1	Fan 5 error LED	**9**	PCI Express slot 2 error LED
2	Fan 4 error LED	**10**	PCI Express slot 1 error LED
3	H8 Heartbeat LED	**11**	Microprocessor error LED
4	Fan 3 error LED	**12**	Battery error LED
5	Fan 2 error LED	**13**	Standby power LED
6	Fan 1 error LED	**14**	System board error LED
7	SAS/SATA Controller LED	**15**	DIMM 1-6 error LEDs
8	IMM heart beat LED		

Table 7. System-board LEDs

LED	Description
Error LEDs	When one of these LEDs is lit, it indicates that the associated component has failed.
Baseboard management controller heartbeat LED	This LED flashes to indicate that the IMM is functioning normally.
Standby power LED	When this LED is lit, it indicates that the server is connected to ac power.

Server power features

When the server is connected to an ac power source but is not turned on, the operating system does not run, and all core logic except for the service processor (the integrated management module) is shut down; however, the server can respond to requests to the service processor, such as a remote request to turn on the server. The power-on LED flashes to indicate that the server is connected to ac power but is not turned on.

Turning on the server

Approximately 5 seconds after the server is connected to ac power, one or more fans might start running to provide cooling while the server is connected to power and the power-on button LED flashes quickly. Approximately 1 to 3 minutes after the server is connected to ac power, the power-control button becomes active (the power-on LED flashes slowly), and one or more fans might start running to provide cooling while the server is connected to power. You can turn on the server by pressing the power-control button.

The server can also be turned on in any of the following ways:
- If a power failure occurs while the server is turned on, the server will restart automatically when power is restored.
- If your operating system supports the Wake on LAN feature, the Wake on LAN feature can turn on the server.

Note: When 4 GB or more of memory (physical or logical) is installed, some memory is reserved for various system resources and is unavailable to the operating system. The amount of memory that is reserved for system resources depends on the operating system, the configuration of the server, and the configured PCI devices.

Turning off the server

When you turn off the server and leave it connected to ac power, the server can respond to requests to the service processor, such as a remote request to turn on the server. While the server remains connected to ac power, one or more fans might continue to run. To remove all power from the server, you must disconnect it from the power source.

Some operating systems require an orderly shutdown before you turn off the server. See your operating-system documentation for information about shutting down the operating system.

Statement 5:

CAUTION:
The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.
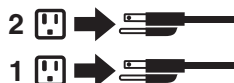
The server can be turned off in any of the following ways:

- You can turn off the server from the operating system, if your operating system supports this feature. After an orderly shutdown of the operating system, the server will turn off automatically.
- You can press the power-control button to start an orderly shutdown of the operating system and turn off the server, if your operating system supports this feature.
- If the operating system stops functioning, you can press and hold the power-control button for more than 4 seconds to turn off the server.
- The server can be turned off by the Shutdown on LAN feature.
- The integrated management module (IMM) can turn off the server as an automatic response to a critical system failure.

Chapter 6. Replacing FRUs

Guidelines for trained service technicians

This section contains information for trained service technicians.

Inspecting for unsafe conditions

Use the information in this section to help you identify potential unsafe conditions in a Lenovo product that you are working on. Each Lenovo product, as it was designed and manufactured, has required safety items to protect users and service technicians from injury. The information in this section addresses only those items. Use good judgment to identify potential unsafe conditions that might be caused by non-Lenovo alterations or attachment of non-Lenovo features or options that are not addressed in this section. If you identify an unsafe condition, you must determine how serious the hazard is and whether you must correct the problem before you work on the product.

Consider the following conditions and the safety hazards that they present:

- Electrical hazards, especially primary power. Primary voltage on the frame can cause serious or fatal electrical shock.
- Explosive hazards, such as a damaged CRT face or a bulging capacitor.
- Mechanical hazards, such as loose or missing hardware.

To inspect the product for potential unsafe conditions, complete the following steps:

1. Make sure that the power is off and the power cord is disconnected.
2. Make sure that the exterior cover is not damaged, loose, or broken, and observe any sharp edges.
3. Check the power cord:
    - Make sure that the third-wire ground connector is in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
    - Make sure that the power cord is the correct type.
    - Make sure that the insulation is not frayed or worn.
4. Remove the cover.
5. Check for any obvious non-Lenovo alterations. Use good judgment as to the safety of any non-Lenovo alterations.
6. Check inside the server for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Guidelines for servicing electrical equipment

Observe the following guidelines when servicing electrical equipment:

- Check the area for electrical hazards such as moist floors, nongrounded power extension cords, power surges, and missing safety grounds.
- Use only approved tools and test equipment. Some hand tools have handles that are covered with a soft material that does not provide insulation from live electrical currents.
- Regularly inspect and maintain your electrical hand tools for safe operational condition. Do not use worn or broken tools or testers.

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- Do not touch the reflective surface of a dental mirror to a live electrical circuit. The surface is conductive and can cause personal injury or equipment damage if it touches a live electrical circuit.
- Some rubber floor mats contain small conductive fibers to decrease electrostatic discharge. Do not use this type of mat to protect yourself from electrical shock.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Locate the emergency power-off (EPO) switch, disconnecting switch, or electrical outlet so that you can turn off the power quickly in the event of an electrical accident.
- Disconnect all power before you perform a mechanical inspection, work near power supplies, or remove or install main units.
- Before you work on the equipment, disconnect the power cord. If you cannot disconnect the power cord, have the customer power-off the wall box that supplies power to the equipment and lock the wall box in the off position.
- Never assume that power has been disconnected from a circuit. Check it to make sure that it has been disconnected.
- If you have to work on equipment that has exposed electrical circuits, observe the following precautions:
  - Make sure that another person who is familiar with the power-off controls is near you and is available to turn off the power if necessary.
  - When you are working with powered-on electrical equipment, use only one hand. Keep the other hand in your pocket or behind your back to avoid creating a complete circuit that could cause an electrical shock.
  - When you use a tester, set the controls correctly and use the approved probe leads and accessories for that tester.
  - Stand on a suitable rubber mat to insulate you from grounds such as metal floor strips and equipment frames.
- Use extreme care when you measure high voltages.
- To ensure proper grounding of components such as power supplies, pumps, blowers, fans, and motor generators, do not service these components outside of their normal operating locations.
- If an electrical accident occurs, use caution, turn off the power, and send another person to get medical aid.

Working inside the server with the power on

Attention: Static electricity that is released to internal server components when the server is powered-on might cause the server to halt, which might result in the loss of data. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding system when you work inside the server with the power on.

You might be instructed to turn on the server while the cover is off, to look at system-board LEDs. Follow these guidelines when you work inside a server that is turned on:
- Avoid wearing loose-fitting clothing on your forearms. Button long-sleeved shirts before working inside the server; do not wear cuff links while you are working inside the server.
- Do not allow your necktie or scarf to hang inside the server.
- Remove jewelry, such as bracelets, necklaces, rings, and loose-fitting wrist watches.
- Remove items from your shirt pocket, such as pens and pencils, that could fall into the server as you lean over it.
- Avoid dropping any metallic objects, such as paper clips, hairpins, and screws, into the server.

Handling static-sensitive devices

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

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. For example, wear an electrostatic-discharge wrist strap, if one is available.
- 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 server 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 server 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 server cover or on a metal surface.
- Take additional care when you handle devices during cold weather. Heating reduces indoor humidity and increases static electricity.

This chapter provides detailed instructions for replacing FRUs in the server.

Major components of the server

The following illustrations show the major components in the server. The illustrations in this document might differ slightly from your hardware.

1	Riser card assembly	**12**	Bezel
2	DIMM air baffle	**13**	DVD drive filler
3	DIMM	**14**	Operator information panel
4	Power supply	**15**	Fans
5	SAS/SATA backplane (some models)	**16**	System board
6	SATA simple-swap back panel (some models)	**17**	Microprocessor
7	3.5-inch drive cage	**18**	Heat sink
8	3.5-inch simple-swap SATA hard disk drive (some models)	**19**	Cover
9	Simple-swap SATA filler		
10	Hot-swap hard disk drive filler		
11	3.5-inch or 2.5-inch hot-swap hard disk drive (depending on model)		

Removing and installing the cover

Use the following procedures to remove and install the cover:

Removing the cover

To remove the server cover, do the following:

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables, if necessary.

   Note: When you disconnect the power source from the server, you will lose the ability to view the LEDs because the LEDs will not be lit with the power source removed. Before disconnecting the power source, make sure to note which LEDs are lit, including the LEDs that are lit on the operator information panel and LEDs that are lit inside the server on the system board.

3. If the server has been installed in a rack, slide the server out from the rack enclosure. See the *Rack Installation Instructions* that come with the server for information about removing the server from the rack.
4. Press down firmly on the two blue tabs **1** on each side of the top of the cover and slide the cover toward the rear of the server until the cover has disengaged from the chassis.
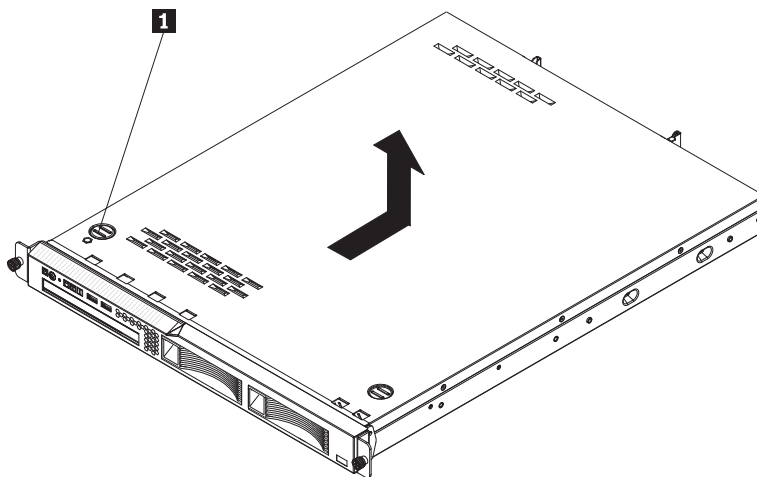
5. Lift the server cover off the server and set it aside.

Installing the cover

Attention: For proper cooling and airflow, replace the server cover before you turn on the server.

To replace the server cover, do the following:

1. Align the cover over the server (toward the rear of the server) until the cover edges slip in position over the chassis.
2. Press down on the two blue tabs on the front of the cover, while sliding the cover forward toward the front of the server until the cover is completely closed.
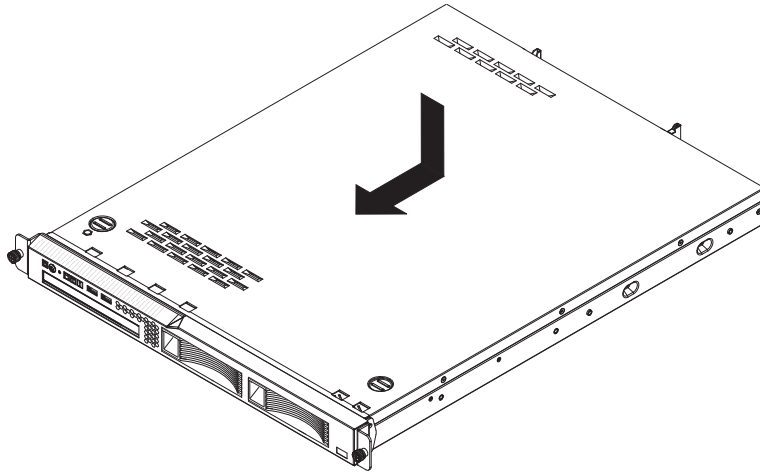
Removing and installing the bezel

To remove the bezel, complete the following steps:

1. Remove the server from the rack and remove the cover (see "Removing and installing the cover" on page 119).

2. From inside the server, press the bezel release latch **1** toward the left side of the server.

3. Pivot the bezel **2** forward and pull it away from the server.
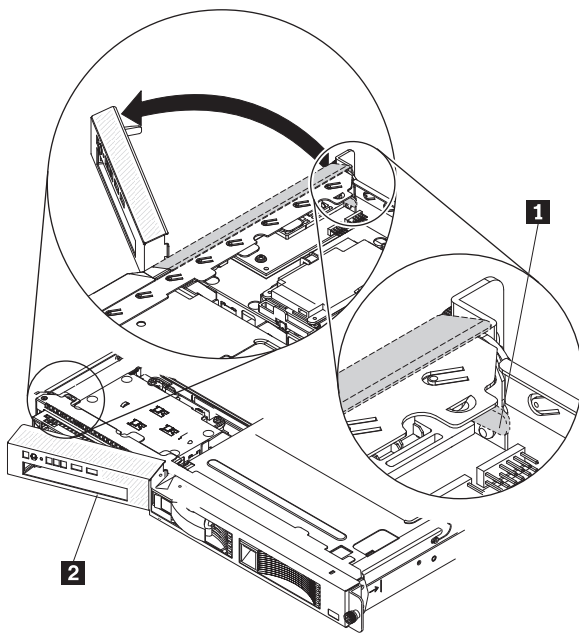
4. If you are instructed to return the bezel, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Attention: For proper cooling and airflow, replace the bezel and server cover before you turn on the server.

To install the bezel, insert the tab at the right end of the bezel into the front of the chassis and pivot the bezel until it snaps into place.

Attention: For proper cooling and airflow, replace the server cover before you turn on the server.

Removing and installing the DIMM air baffle

The DIMM air baffle must be removed to allow access to some of the server components. To remove and install the DIMM air baffle, complete the following procedures:

Removing the DIMM air baffle

To remove the DIMM air baffle, complete the following steps:

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the server from the rack and remove the cover (see "Removing and installing the cover" on page 119).
4. Lift the DIMM air baffle **1** up and out of the server.

   Attention: For proper cooling and airflow, reinstall the DIMM air baffle before you turn on the server. Operating the server with the air baffle removed might damage server components.
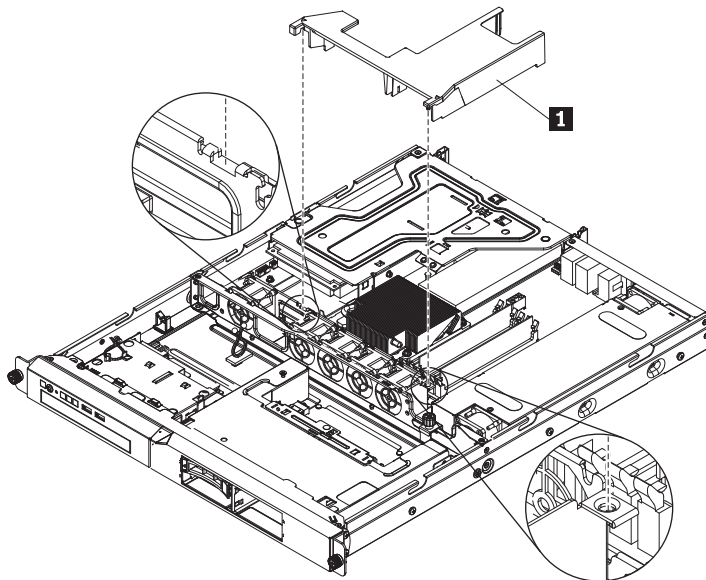
Installing the DIMM air baffle

To install the DIMM air baffle, complete the following steps:

1. Align the DIMM air baffle **1** as shown above.
2. Lower the DIMM air baffle into position until it clicks into place.

   Attention: For proper cooling and airflow, the air baffle must be installed before turning on the server. Operating the server with an air baffle removed might damage server components.

3. Go to "Completing the FRU replacement" on page 173.

Replacing a memory module (DIMM)

To replace a dual inline memory module (DIMM), use the following information and procedures:

Supported memory types

Following is information that describes the types of dual inline memory modules (DIMMs) that the server supports and other information that you must consider when you install DIMMs (see "System-board internal connectors" on page 107 for the location of the DIMM connectors).

- The server supports only industry-standard double-data-rate 3 (DDR3), 1066 or 1333 MHz, PC3-6400, PC3-8500, or PC3-10600 (single-rank, dual-rank, or quad-rank), registered or unbuffered, synchronous dynamic random-access memory (SDRAM) dual inline memory modules (DIMMs) with error correcting code (ECC). See http://www.lenovo.com/thinkserver for a list of supported memory modules for the server.

  - The specifications of a DDR3 DIMM are on a label on the DIMM, in the following format.

    *ggg e*R*xff*-PC3-*wwwwwm-aa-bb-cc*

    where:

    > *ggg* is the total capacity of the DIMM (for example, 1GB, 2GB, or 4GB)
    >
    > *e* is the number of ranks
    >
    > > 1 = single-rank
    > >
    > > 2 = dual-rank
    > >
    > > 4 = quad-rank
    >
    > *ff* is the device organization (bit width)
    >
    > > 4 = x4 organization (4 DQ lines per SDRAM)
    > >
    > > 8 = x8 organization
    > >
    > > 16 = x16 organization
    >
    > *wwwww* is the DIMM bandwidth, in MBps
    >
    > > 6400 = 6.40 GBps (PC3-800 SDRAMs, 8-byte primary data bus)
    > >
    > > 8500 = 8.53 GBps (PC3-1066 SDRAMs, 8-byte primary data bus)
    > >
    > > 10600 = 10.66 GBps (PC3-1333 SDRAMs, 8-byte primary data bus)
    > >
    > > 12800 = 12.80 GBps PC3-1600 SDRAMs, 8-byte primary data bus)
    >
    > *m* is the DIMM type
    >
    > > E = Unbuffered DIMM (UDIMM) with ECC (x72-bit module data bus)
    > >
    > > R = Registered DIMM (RDIMM)
    > >
    > > U = Unbuffered DIMM with no ECC (x64-bit primary data bus)
    >
    > *aa* is the CAS latency, in clocks at maximum operating frequency
    >
    > *bb* is the JEDEC SPD Revision Encoding and Additions level
    >
    > *cc* is the reference design file for the design of the DIMM
    >
    > *d* is the revision number of the reference design of the DIMM

- The server supports unbuffered DIMMs (UDIMM) or registered DIMMs (RDIMM).
- The server supports a maximum of six single-rank or dual-rank DIMMs, depending on the type of DIMM you install in the server.

  Note: To determine the type of a DIMM, see the label on the DIMM. The information on the label is in the format xxxxx nRxxx PC3-xxxxx-xx-xx-xxx. The numeral in the sixth numerical position indicates whether the DIMM is single-rank (n=1) or dual-rank (n=2).

- The server supports up to two UDIMMs or three RDIMMs per channel. The following table shows an example of the maximum amount of memory that you can install, using ranked DIMMs.

Unbuffered DIMMs (UDIMMs)

The following notes provide information that you must configure when you install UDIMMs:

- The memory channels run at the fastest common frequency of the DIMMs installed.
- Do not use both UDIMMs and RDIMMs in the same server.
- Using ECC and non-ECC UDIMMs in the server will cause the server to run in non-ECC mode.
- The UDIMM options that are available for the server are 1 GB, 2 GB, and 4 GB (when available) DIMMs.
- You can install a maximum of 16 GB of memory in some server models when you use UDIMMs.
- The server supports up to two single-rank or dual-rank UDIMMs per channel.
- DIMM slots 3 and 6 are not supported when you install UDIMMs in the server. Do not install DIMMs in these connectors.
- The following table lists the supported UDIMM population.

Table 8. Supported UDIMM population per channel

DIMM connectors per channel	DIMMs installed in each channel	DIMM type	DIMM speed	Ranks per DIMM (any combination)
2	1	Unbuffered DDR3 ECC	1066, 1333	Single-rank, dual-rank
2	2	Unbuffered DDR3 ECC	1066, 1333	Single-rank, dual-rank

- The following table lists the maximum DIMM population using ranked UDIMMs.

Table 9. Maximum memory population using ranked UDIMMs (depending on your model)

Number of UDIMMs	DIMM type	Size	Total memory
4	Single-rank UDIMMs	1 GB	4 GB
4	Single-rank UDIMMs	2 GB	8 GB
4	Dual-rank UDIMMs	2 GB	8 GB
4	Dual-rank UDIMMs	4 GB (when available)	16 GB

- The following table shows the UDIMM memory population rule to optimize the system performance.

Table 10. UDIMM population rule for dual-channel symmetric mode

DIMM connector 1	DIMM connector 2	DIMM connector 3	DIMM connector 4	DIMM connector 5	DIMM connector 6
Populated	Empty	Empty	Empty	Empty	Empty
Populated	Empty	Empty	Populated	Empty	Empty
Populated	Populated	Empty	Populated	Populated	Empty

Registered DIMMs (RDIMMs)

The following notes provide information that you must consider when you install RDIMMs:

- The memory channels run at the fastest common frequency of the installed DIMMs.
- RDIMMs are supported in models with an Xeon 3400 series processor.
- Do not use both RDIMMs and UDIMMs in the same server.
- The server supports up to three single-rank, dual-rank, or quad-rank RDIMMs per channel.
- The RDIMM options that are available for the server are 1 GB, 2 GB, 4 GB, and 8 GB (when available) DIMMs.
- You can install a maximum of 32 GB of memory in the server when you use RDIMMs.

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- The following table lists the supported RDIMM population.

Table 11. Supported RDIMM population per channel

DIMM connectors per channel	DIMMs installed in each channel	DIMM type	DIMM speed	Ranks per DIMM (any combination)
3	1	Registered DDR3 ECC	1066, 1333	Single-rank, dual-rank
3	2	Registered DDR3 ECC	1066, 1333	Single-rank, dual-rank
3	3	Registered DDR3 ECC	800	Single-rank, dual-rank
3	1	Registered DDR3 ECC	1066	Quad-rank
3	2	Registered DDR3 ECC	800	Quad-rank

- The following table lists the maximum DIMM population using ranked RDIMMs.

Table 12. Maximum memory population using ranked RDIMMs (depending on your model)

Number of RDIMMs	DIMM type	Size	Total memory
6	Single-rank RDIMMs	1 GB	6 GB
6	Single-rank RDIMMs	2 GB	12 GB
6	Dual-rank RDIMMs	2 GB	12 GB
4	Dual-rank RDIMMs	4 GB	16 GB
4	Quad-rank RDIMMs	4 GB	16 GB
6	Dual-rank RDIMMs	4 GB	24 GB
4	Quad-rank RDIMMs	8 GB (when available)	32 GB

- The following table shows the RDIMM memory population rule to optimize the system performance.

Table 13. RDIMM population rule for dual-channel symmetric mode

DIMM connector 1	DIMM connector 2	DIMM connector 3	DIMM connector 4	DIMM connector 5	DIMM connector 6
Populated	Empty	Empty	Empty	Empty	Empty
Populated	Empty	Empty	Populated	Empty	Empty
Populated	Populated	Empty	Populated	Populated	Empty
Populated	Populated	Populated	Populated	Populated	Populated

Note: The amount of usable memory is reduced, depending on the system configuration. A certain amount of memory must be reserved for system resources. To view the total amount of installed memory and the amount of configured memory, run the Setup utility.

Removing a memory module

To remove a DIMM, complete the following steps:

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables, if necessary.
3. Remove the cover (see "Removing and installing the cover" on page 119).

Attention: To ensure proper cooling and airflow, do not operate the server for more than 30 minutes with the cover removed.

4. Remove the DIMM air baffle (see "Removing and installing the DIMM air baffle" on page 121).

5. Carefully open the retaining clips **2** on each end of the DIMM connector and remove the DIMM **1**

    Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, open and close the clips gently.
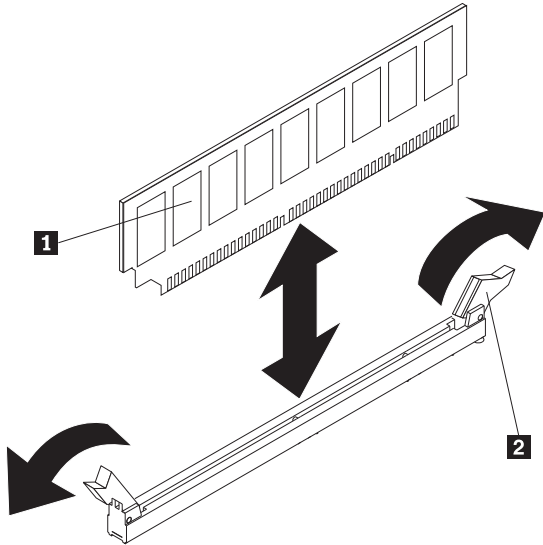
6. If you are instructed to return the DIMM, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a memory module

- The maximum operating speed of the server is determined by the slowest DIMM in the server.
- If you install a pair of DIMMs in DIMM connectors 2 and 5, the size and speed of the DIMMs that you install in DIMM connectors 2 and 5 must match each other. How ever, they do not have to be the same size and speed as the DIMMs that are installed in DIMM connectors 1 and 4.
- You can use compatible DIMMs from various manufacturers in the same pair.
- When you install or remove DIMMs, the server configuration information changes. When you restart the server, the system displays a message that indicates that the memory configuration has changed.

See "System-board internal connectors" on page 107 for the location of the DIMM connectors on the system board.
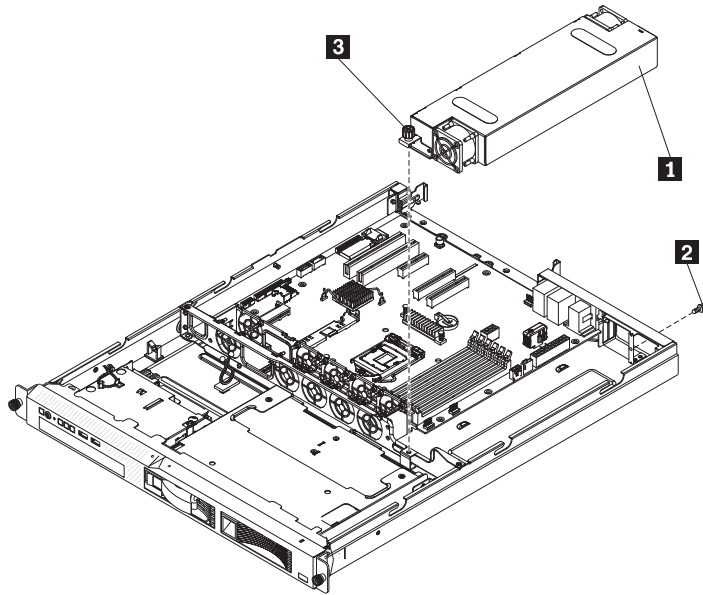
To install a DIMM, complete the following steps:

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables, if necessary.
3. Remove the cover (see "Removing and installing the cover" on page 119).
4. Remove the DIMM air baffle (see "Removing and installing the DIMM air baffle" on page 121).
5. Open the retaining clip **2** on each end of the DIMM connector.

    Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, open and close the clips gently.
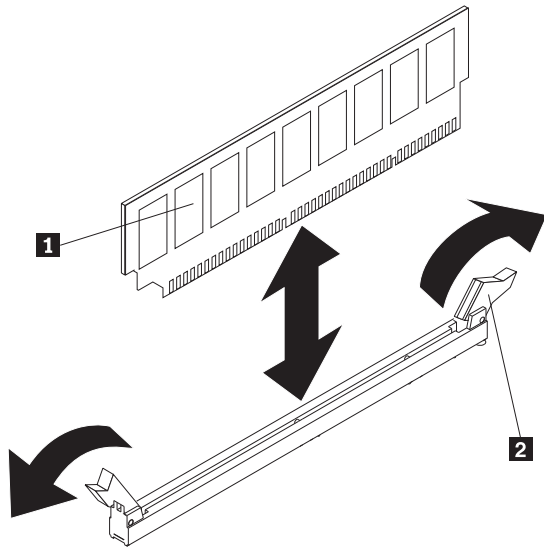
6. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the outside of the server. Then, remove the DIMM from the package.

7. Turn the DIMM **1** so that the DIMM keys align correctly with the connector (see "System-board internal connectors" on page 107 for the locations of the DIMM connectors).

8. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector .

9. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips **2** snap into the locked position when the DIMM is firmly seated in the connector.

   Note: If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly inserted; open the retaining clips, remove the DIMM, and then reinsert it.

10. Go to "Completing the FRU replacement" on page 173.

Replacing hard disk drives

Locate the documentation that comes with the hard disk drive and first follow those instructions. Determine if you are working with a simple-swap or a hot-swap hard disk drive.

To replace a hard disk drive, complete the appropriate procedures for your drive:

Attention: To avoid damage to the hard disk drive connectors, make sure that the server cover is in place and fully closed whenever you install or remove a hard disk drive.

Note: If a RAID controller or PCI card is installed, you might have to reconfigure the disk arrays after you install or remove hard disk drives. See the documentation that comes with the PCI card for more information.

Removing a simple-swap Serial ATA (SATA) hard disk drive

Attention: Simple-swap hard disk drives are not hot-swappable. Disconnect all power from the server before you remove or install a simple-swap hard disk drive.

To remove a simple-swap SATA drive from the bay, complete the following steps.

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.

2. Make sure that the server cover is in place and fully closed.

3. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.

4. Remove the filler panel **2** from the bay.

5. Pull the loops of the drive tray toward each other and pull the tray **3** out of the bay.
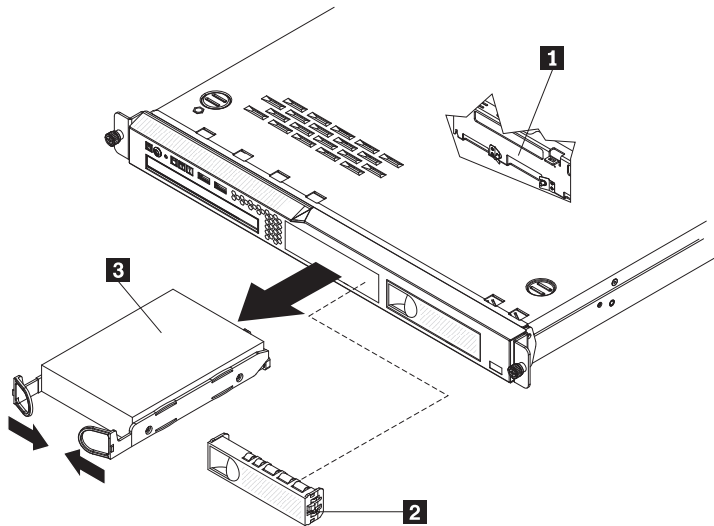
Installing a simple-swap Serial ATA (SATA) hard disk drive

Attention: Simple-swap hard disk drives are not hot-swappable. Disconnect all power from the server before you remove or install a simple-swap hard disk drive.

To install a simple-swap SATA hard disk drive, complete the following steps.

Note: If your server has only one simple-swap hard disk drive, make sure it is installed in the left drive bay.

Attention: To avoid damage to the hard disk drive connectors, make sure that the server cover is in place and fully closed whenever you install or remove a hard disk drive.

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.

2. Make sure that the server cover is in place and fully closed.

3. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.

4. Remove the filler panel **2** from the bay if necessary.

5. Pull the loops of the drive tray toward each other, and slide the drive **3** into the server until the drive connects to the back plate **1** .
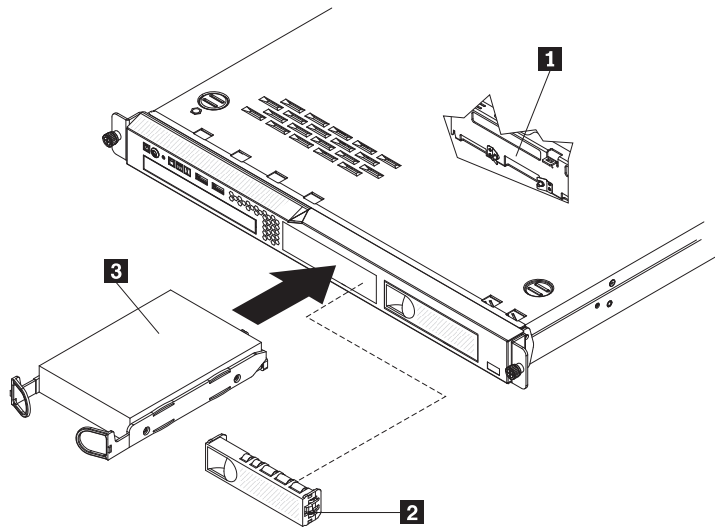
6. Release the loops of the drive tray.

7. Insert the filler panel into the bay to cover the drive.

   Note: If the server is configured for RAID operation using a RAID controller, you might have to reconfigure your disk arrays after you install hard disk drives. See the RAID controller documentation for additional information about RAID operation and complete instructions for using the RAID controller.

8. Go to "Completing the FRU replacement" on page 173.

Removing a hot-swap hard disk drive

The 3.5-inch drive hot-swap server models support either two SAS 3.5-inch hard disk drives or two SATA 3.5-inch hard disk drives. The 2.5-inch drive hot-swap server models support four 2.5-inch SAS hard disk drives.
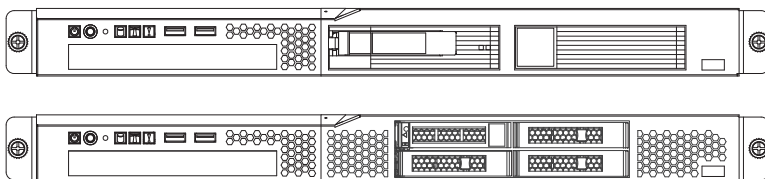
The removal and installation procedures are the same for any of these drives. The illustrations in this procedure show 3.5-inch SAS drives.

To remove a hot-swap hard disk drive, complete the following steps.

Attention: To avoid damage to the hard disk drive connectors, make sure that the server cover is in place and fully closed whenever you install or remove a hard disk drive.

1. Move the handle **1** on the drive to the open position (perpendicular to the drive).

2. Slide the release latch (gray on 3.5-inch hard drives and orange on 2.5-inch hard drives) gently to the left to unlock the drive handle.
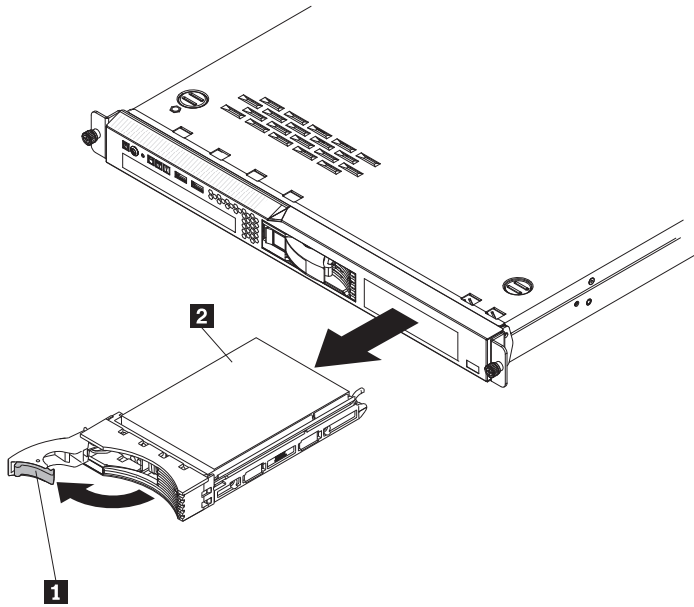
3. Grasp the handle and pull the hot-swap drive assembly **2** out of the drive bay.

Installing a hot-swap hard disk drive

To install a hot-swap hard disk drive, complete the following steps.

Note: If your server has only one hot-swap hard disk drive, install it in the left or upper-left drive bay.
Attention: To avoid damage to the hard disk drive connectors, make sure that the server cover is in place and fully closed whenever you install or remove a hard disk drive.

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.
2. Make sure that the server cover is in place and fully closed.

   Attention: To maintain proper system cooling, do not operate the server for more than 10 minutes without either a drive or filler panel installed in each bay.

3. Remove the filler panel from the empty drive bay if necessary.
4. Touch the static-protective package that contains the drive to any unpainted metal surface on the server. Then, remove the drive from the static-protective package and place it on a static-protective surface.
5. Install the hard disk drive in the hot-swap bay:

   a. Make sure that the tray handle is open (that is, perpendicular to the front of the drive).

   b. Align the drive assembly **3** with the guide rails in the bay.
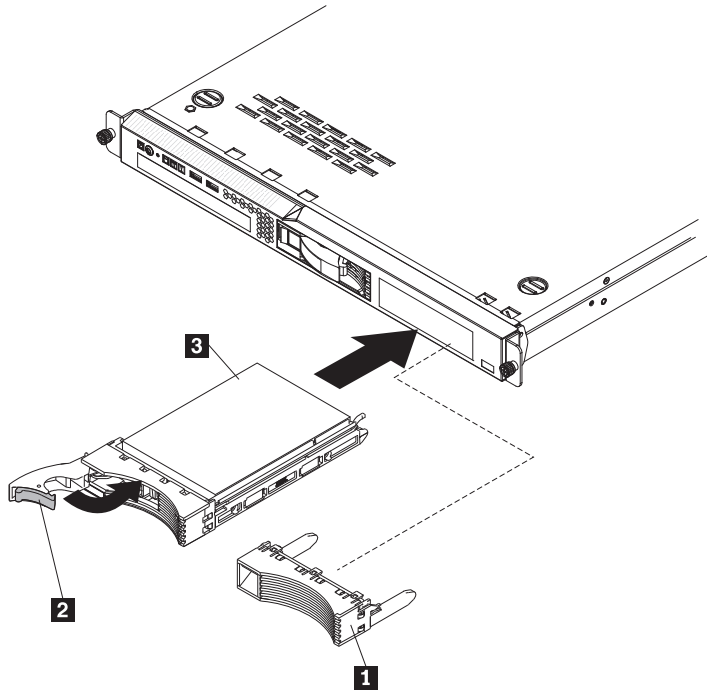
c. Gently push the drive assembly into the bay until the drive stops.

d. Push the tray handle **2** to the closed (locked) position.

e. Check the hard disk drive status LED to make sure that the hard disk drive is operating correctly. If the amber hard disk drive status LED for a drive is lit continuously, that drive is faulty and must be replaced. If the green hard disk drive activity LED is flashing, the drive is being accessed.

Note: If the server is configured for RAID operation using a RAID controller, you might have to reconfigure your disk arrays after you install hard disk drives. See the RAID controller documentation for additional information about RAID operation and complete instructions for using the RAID controller.

6. Go to "Completing the FRU replacement" on page 173.

Replacing a PCI card

To replace a PCI card, use the following procedures:

Removing a PCI card

To remove a PCI card, complete the following steps:

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.

2. Turn off the server and peripheral devices and disconnect all power cords.

3. Remove the server from the rack and remove the cover (see "Removing and installing the cover" on page 119).

4. Disconnect any cables from the PCI card.

5. Remove the riser-card assembly (see "Removing the riser-card assembly" on page 157).

6. If the riser-card assembly is an optional PCI-X riser-card assembly, disconnect the riser-card power cable from the riser-card assembly.
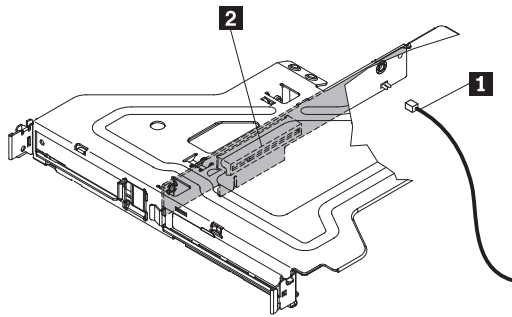
1	PCI-X power cable	**2**	PCI-X slot

7. Grasp the riser-card assembly at the front grip point and rear edges and lift to remove it from the server.
8. Place the riser-card assembly on a flat, static-protective surface.
9. Carefully grasp the PCI card by its top edge or upper corners, and pull the PCI card from the riser-card assembly.
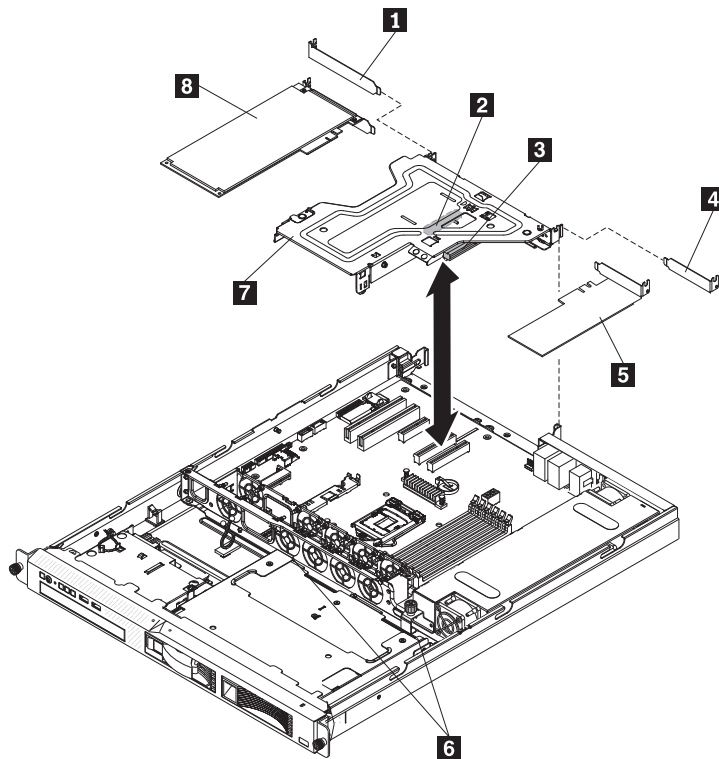
1	Expansion-slot cover	**5**	PCI card
2	Expansion slot 2	**6**	Guide channels
3	Expansion slot 1	**7**	Riser-card assembly
4	Expansion-slot cover	**8**	PCI card

10. If you are instructed to return the PCI card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.
11. Go to "Completing the FRU replacement" on page 173.

Installing a PCI card

To install a PCI card, complete the following steps:

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.

2. Turn off the server and peripheral devices and disconnect the power cords and all external cables; then, remove the server cover (see "Removing and installing the cover" on page 119).

3. If you have installed an optional PCI-X riser-card assembly **2**, disconnect the riser-card power cable **1** from the riser-card assembly.
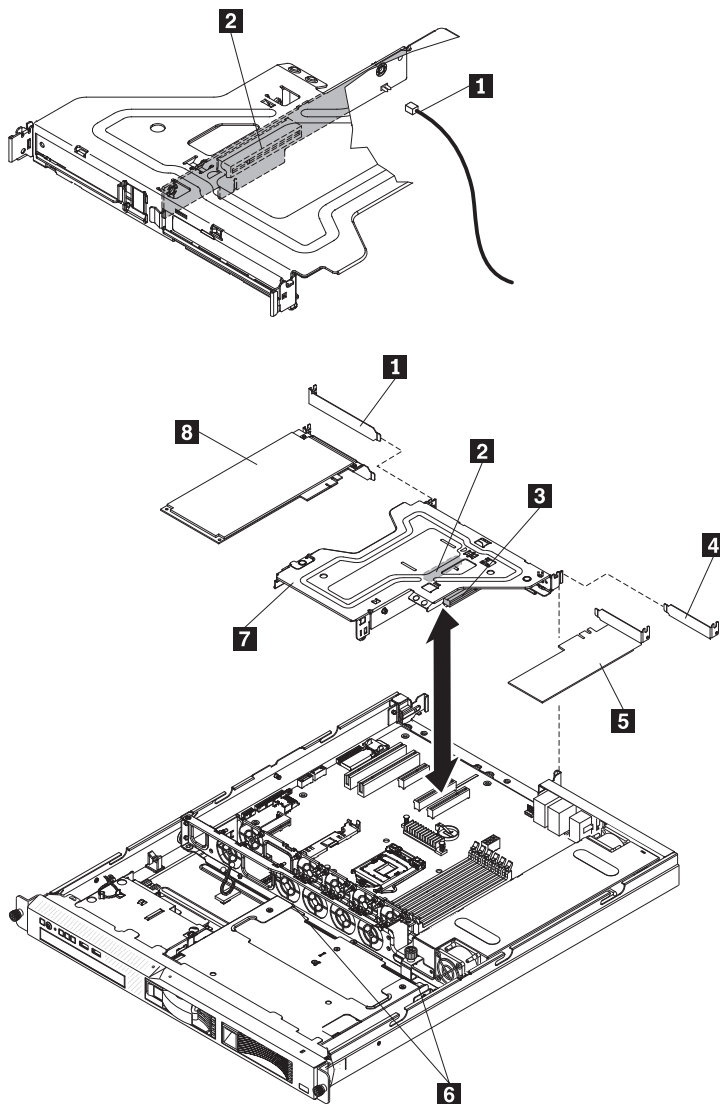
1	Expansion-slot cover	**5**	PCI card
2	Expansion slot 2	**6**	Guide channels
3	Expansion slot 1	**7**	Riser-card assembly
4	Expansion-slot cover	**8**	PCI card

4. Grasp the riser card at the front grip point and rear edges; then, lift to remove the riser-card assembly. Place the riser-card assembly **7** on a flat, static-protective surface.

5. Remove the expansion-slot cover on the slot that you intend to use.

   Attention: PCI expansion-slot covers must be installed on all vacant slots. This maintains the electronic emissions characteristics of the server and ensures proper cooling of server components.

6. Follow the instructions that come with the PCI card to set any jumpers or switches.

   Attention: When you install an PCI card, make sure that it is completely and correctly seated in the expansion slot in the riser card. Incomplete insertion might cause damage to the riser card, system board, or the PCI card when you turn on the server.

7. Insert the PCI card **5** into the riser-card assembly, aligning the edge connector on the PCI card with the connector on the riser-card assembly. Press the edge of the connector *firmly* into the riser-card assembly. Make sure that the PCI card snaps into the riser-card assembly securely.

   Important: Make sure that the U-shaped opening in the metal PCI card bracket **4** engages the tab **2** on the expansion-slot bracket **1** .
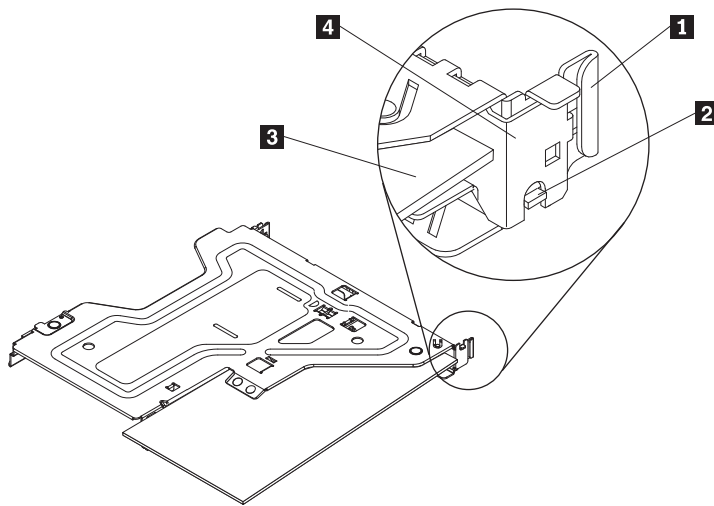
   Attention: When you install an PCI card, make sure that the PCI card is correctly seated in the riser-card assembly and that the riser-card assembly is securely seated in the riser-card connector on the system board before you turn on the server. An incorrectly seated PCI card might cause damage to the system board, the riser-card assembly, or the PCI card.

8. Reinstall the riser-card assembly in the server (see "Installing the riser-card assembly" on page 158).

9. If you have installed a PCI-X riser-card assembly **2** in the server, reconnect the riser-card power cable **2** to the riser-card assembly.
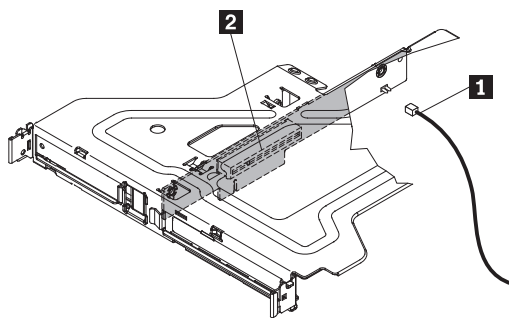
10. Go to "Completing the FRU replacement" on page 173.

Replacing a USB embedded hypervisor flash device

To replace a hypervisor flash device, complete the following procedures:

Removing a USB embedded hypervisor flash device

To remove a hypervisor flash device, complete the following steps:

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.

2. Turn off the server and peripheral devices and disconnect the power cords.

3. Remove the cover (see "Removing and installing the cover" on page 119).

4. Remove the riser-card assembly (see "Removing the riser-card assembly" on page 157).

5. Unlock the retention latch on the USB connector by squeezing the two retention clips toward each other (see "System-board internal connectors" on page 107.

6. Grasp the flash device and pull to remove it from the connector.

7. Press down on the retention latch to return it to the locked position.

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

Installing a USB embedded hypervisor flash device

To install a hypervisor flash device, complete the following steps:

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.

2. Turn off the server and peripheral devices and disconnect the power cords.

3. Remove the cover (see "Removing and installing the cover" on page 119).

4. Remove the riser-card assembly (see "Removing the riser-card assembly" on page 157) (see "System-board internal connectors" on page 107.

5. Unlock the retention latch on the USB connector by squeezing the two retention clips toward each other (see "System-board internal connectors" on page 107.

6. Align the flash device with the USB connector on the system board and push it into the USB connector until it is firmly seated.

7. Press down on the retention latch to lock the flash device into the USB connector.

8. Install the riser-card assembly (see "Installing the riser-card assembly" on page 158).

9. Go to "Completing the FRU replacement" on page 173.

Replacing the operator information panel assembly

To replace the operator information panel assembly, use the following procedures:

Removing the operator information panel assembly

To remove the operator information panel assembly, complete the following steps.

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.

2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.

3. Remove the server from the rack and remove the cover (see "Removing and installing the cover" on page 119).

4. Disconnect both cables from the operator information panel assembly.

5. Remove the screws that secure the operator information panel assembly to the DVD bay housing.
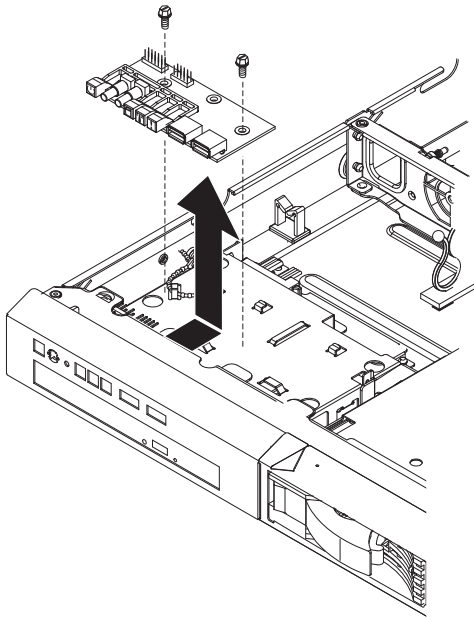
6. Lift the operator information panel assembly out of the server.

7. If you are instructed to return the operator information panel assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing the operator information panel assembly

To install the replacement operator information panel assembly, complete the following steps:

1. Guide the operator information panel assembly into position on top of the DVD bay housing. Make sure that the LEDs and the USB connectors are aligned with the openings in the bezel and that the holes in the board align with the screw holes in the top of the bay housing.

2. Use the screws that you removed earlier to secure the operator information panel assembly onto the top of the DVD bay housing.

3. Reconnect both cables to the operator information panel assembly.
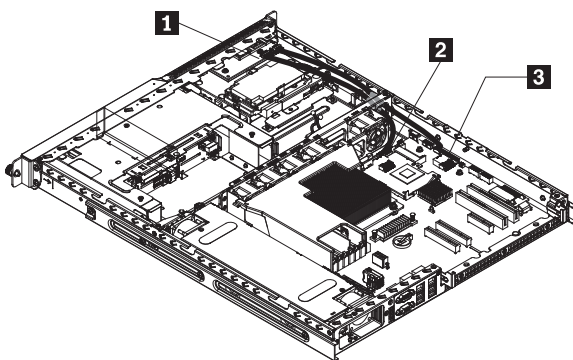
1	Operator information panel assembly
2	Front panel USB connector
3	Operator information panel connector

4. Go to "Completing the FRU replacement" on page 173.

Replacing the drive cage

To replace the drive cage, use the following procedures:

Removing the drive cage

The following illustration shows removing a simple-swap 3.5-inch drive cage.
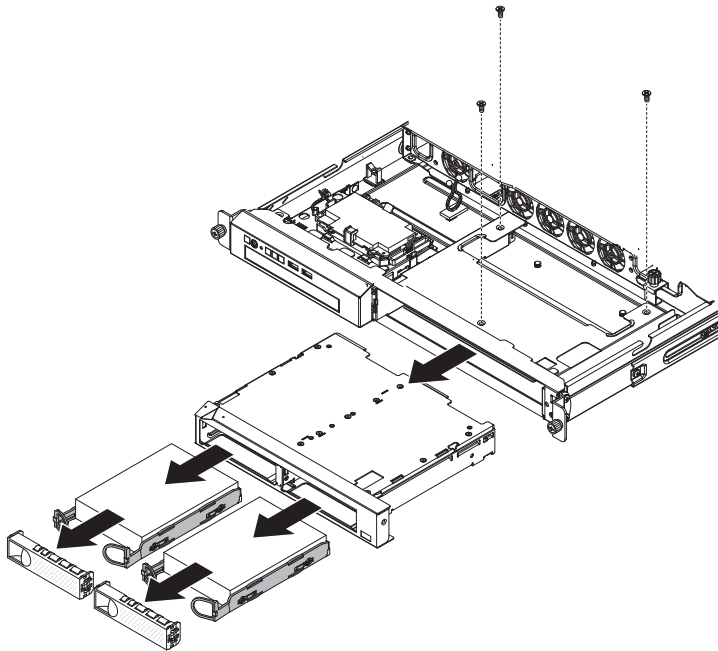
The following illustration shows removing a hot-swap 3.5-inch drive cage.
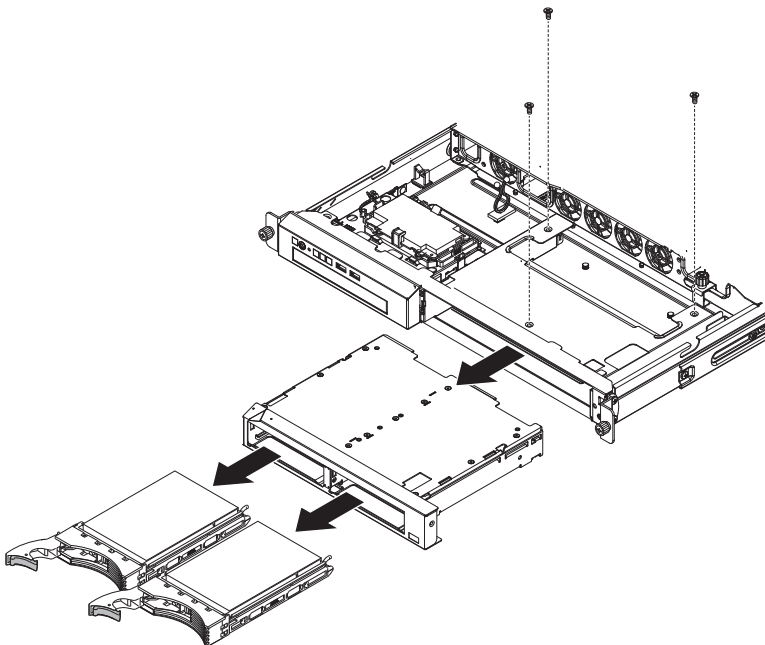
The following illustration shows removing a hot-swap 2.5-inch drive cage.
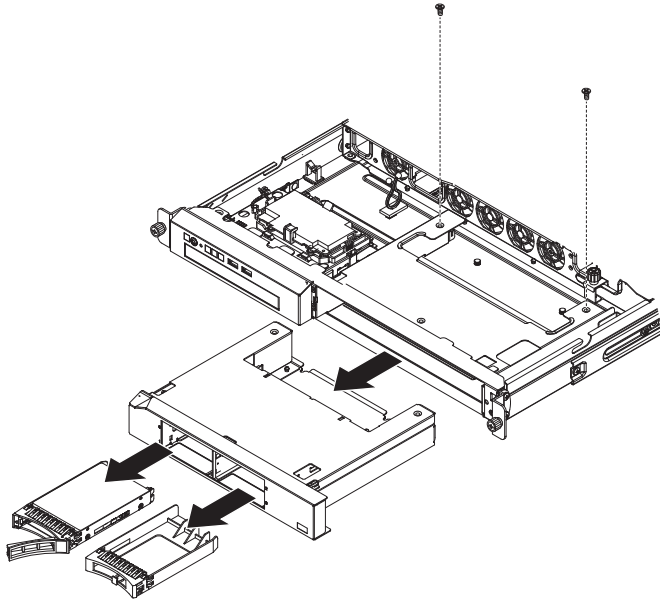
To remove a drive cage, complete the following steps:

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove the hard disk drives from the cage (see "Replacing hard disk drives" on page 126.
4. Remove the cover (see "Removing and installing the cover" on page 119).

   Attention: To ensure proper cooling and airflow, do not operate the server for more than 30 minutes with the cover removed.

5. Remove the hard disk drive backplane or back plate:
   - **2.5-inch drive models:** Remove the hard disk drive backplane from the cage. See "Replacing the SAS/SATA hard disk drive back plate or backplane" on page 154 for instructions.
   - **3.5-inch drive models:** Remove the hard disk drive backplane or back plate from the cage. See "Replacing the SAS/SATA hard disk drive back plate or backplane" on page 154 for instructions.
6. Remove the screws that hold the drive cage in place.
7. Slide the drive cage forward and remove it from the server.
8. If you are instructed to return the drive cage, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the drive cage

The following illustration shows installing a simple-swap 3.5-inch drive cage.
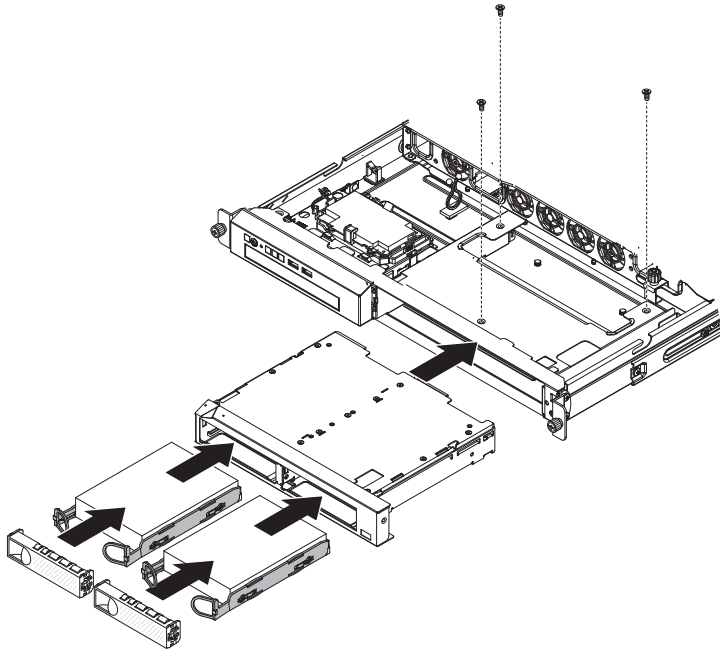
The following illustration shows installing a hot-swap 3.5-inch drive cage.
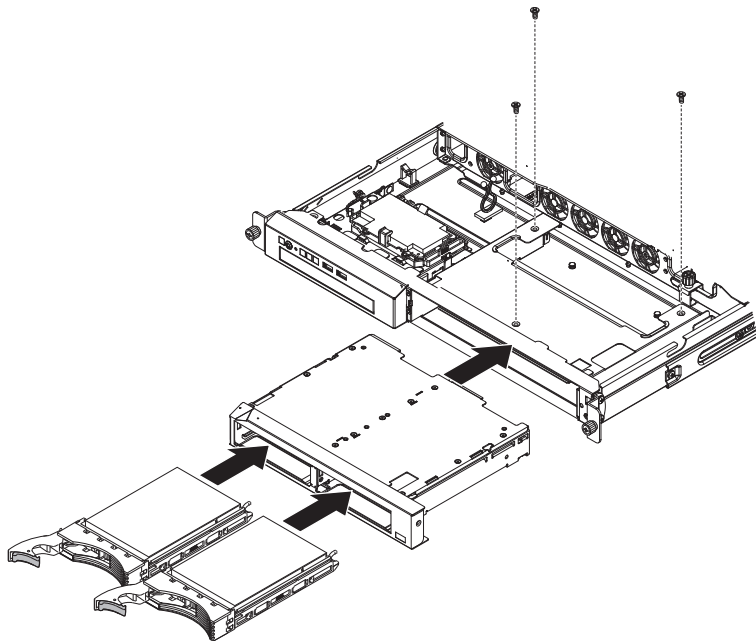
The following illustration shows installing a hot-swap 2.5-inch drive cage.
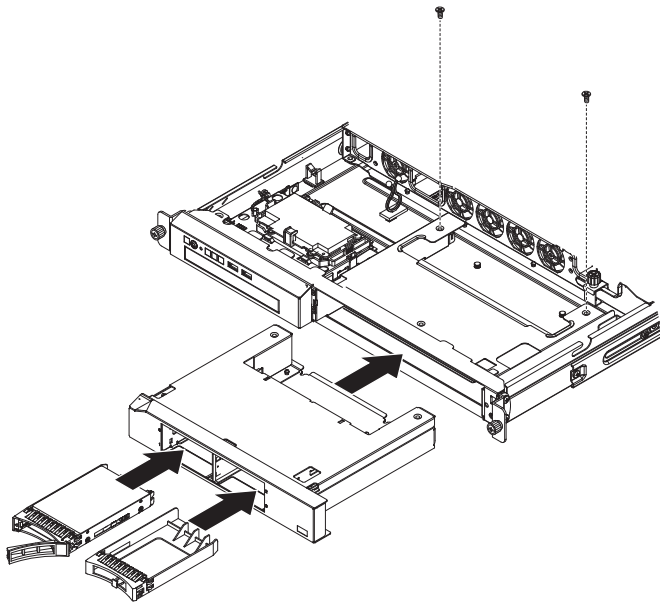
To install a drive cage, complete the following steps:

1. Make sure that the backplane or back plate is removed from the drive cage. (See "Removing the backplane or back plate (3.5-inch drives)" on page 154 or "Removing the SAS backplane (2.5-inch drives)" on page 156 for instructions, as applicable.)

2. Line up the drive cage with the drive bays on the front of the server.

3. Push the drive cage into the server until it stops.

4. Align the holes in the top of the drive cage with the holes in the top of the chassis; then, insert the screws that secure the drive cage to the chassis.

5. Install the backplane or back plate. (See "Installing the backplane or back plate (3.5-inch drives)" on page 154 or "Installing the SAS backplane (2.5-inch drives)" on page 157 for instructions, as applicable.)

6. Install the hard disk drives.

7. Go to "Completing the FRU replacement" on page 173.

Replacing the microprocessor and heat sink

The following notes describe the type of microprocessor that the server supports and other information that you must consider when you install a microprocessor:

- The server supports one Intel land grid array (LGA) 1156 dual-core or quad-core microprocessor. The type, speed, and L3 cache of the microprocessor depends on the server model.

- Read the documentation that comes with the microprocessor to determine whether you have to update the server firmware. To download the most current level of server firmware, go to

http://www.lenovo.com/support.

- The microprocessor uses an integrated voltage regulator on the system board.

Removing the microprocessor

To remove the microprocessor, complete the following steps.

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the server from the rack; then, remove the cover (see "Removing and installing the cover" on page 119).
4. Remove the DIMM air baffle (see "Removing and installing the DIMM air baffle" on page 121).
5. Remove the heat sink.

   CAUTION:
   The heat sink may become very hot during normal operation. Allow time for the heat sink to cool down before you touch it.

   a. Loosen the screw on one side of the heat sink to break the seal with the microprocessor.
   b. Press firmly on the captive screws and loosen them with a screwdriver.
   c. Use your fingers to gently pull the heat sink from the microprocessor.
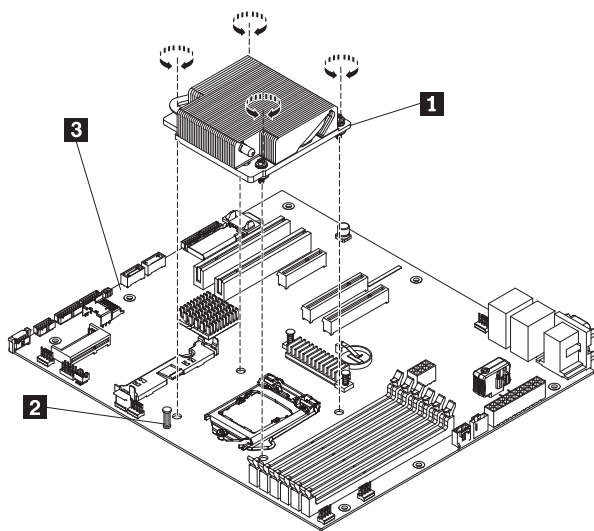
6. Lift the heat sink out of the server. After removal, place the heat sink on its side on a clean, flat surface.
7. Release the microprocessor retention latch **2** by pressing down on the end, moving it to the side, and releasing it to the open (up) position.
8. Open the microprocessor bracket frame **3** by lifting up the tab on the top edge. Keep the bracket frame in the open position.

   Attention: Handle the microprocessor carefully. Dropping the microprocessor during removal can damage the contacts. Also, contaminants on the microprocessor contacts, such as oil from your skin, can cause connection failures between the contacts and the socket.
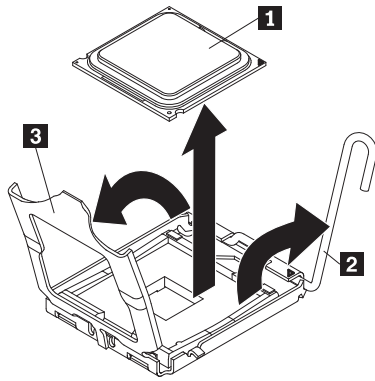
9. Remove the microprocessor:

    a. Carefully lift the microprocessor **1** straight up and out of the socket, without touching the microprocessor contacts.

    b. Place the microprocessor on a static-protective surface

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

Installing the microprocessor

The following notes describe the type of microprocessor that the server supports and other information that you must consider when you install a microprocessor and heat sink:

*   If you have to replace a microprocessor, call for service.

*   Read the documentation that comes with the microprocessor, so that you can determine whether you have to update the server firmware. To download the latest level of server firmware and other code updates for your server, go to http://www.lenovo.com/support.

*   The microprocessor speeds are automatically set for this server; therefore, you do not have to set any microprocessor frequency-selection jumpers or switches.

*   If the thermal-grease protective cover (for example, a plastic cap or tape liner) is removed from the heat sink, do not touch the thermal grease on the bottom of the heat sink or set down the heat sink. For more information about applying or working with thermal grease, see "Thermal grease" on page 143.

    Note: Removing the heat sink from the microprocessor destroys the even distribution of the thermal grease and requires replacing the thermal grease.

To install the replacement microprocessor, complete the following steps:

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.

2. Make sure that the microprocessor bracket frame and release latch are both fully open.

    Attention:

    *   When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details about handling these devices, see "Handling static-sensitive devices" on page 117.

    *   The microprocessor contacts are fragile; handle the microprocessor very carefully. Do not touch the microprocessor contacts with your skin.

    *   The microprocessor fits only one way on the socket.

3. Align the microprocessor **1** with the socket (note the alignment mark **2** and the position of the notches); then, carefully place the microprocessor on the socket, close the microprocessor bracket frame **4** , and close the microprocessor release latch **3** .
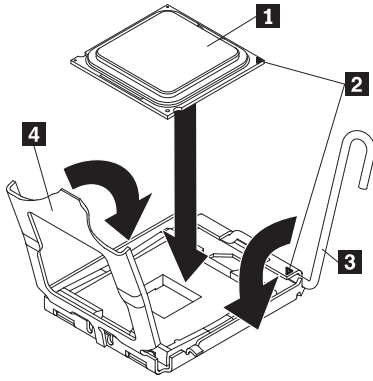
4. Gently lower the heat sink on the microprocessor.
5. Install the heat sink on the microprocessor.

   Attention: Do not touch the thermal material on the bottom of the heat sink. Touching the thermal material will contaminate it. If the thermal material on the microprocessor or heat sink becomes contaminated, contact your service technician.

   a. Make sure that the thermal material is still on the bottom of the heat sink; then, align the heat sink so that the arrows on the label point toward the DIMMs and place the heat sink on top of the microprocessor, thermal material side down.

   b. Align the screw holes **1** on the heat sink with the holes on the system board **3** Following is an illustration of the heat sink orientation.
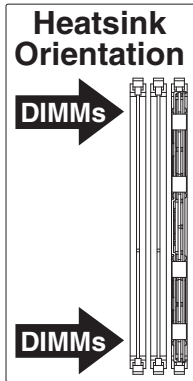
   c. Tighten the screws with a screwdriver, alternating among the screws until they are tight. If possible, each screw should be rotated two full rotations at a time. Repeat until the screws are tight. Do not overtighten the screws by using excessive force.
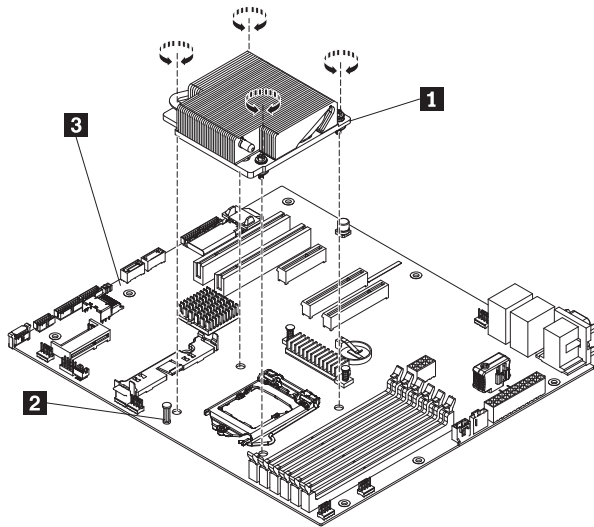
6. Go to "Completing the FRU replacement" on page 173.

Thermal grease

The thermal grease must be replaced whenever the heat sink has been removed from the top of the microprocessor and is going to be reused or when debris is found in the grease.

When you are installing the heat sink on the same microprocessor that is was removed from, make sure that the following requirements are met:

- The thermal grease on the heat sink and microprocessor is not contaminated.
- Additional thermal grease is not added to the existing thermal grease on the heat sink and microprocessor.

Note:

1. Read the safety information at "Important Safety Information" on page 1.
2. Read "Guidelines for trained service technicians" on page 115.
3. Read "Handling static-sensitive devices" on page 117.

To replace damaged or contaminated thermal grease on the microprocessor and heat sink, complete the following steps:

1. Place the heat sink on a clean work surface.
2. Remove the cleaning pad from its package and unfold it completely.
3. Use the cleaning pad to wipe the thermal grease from the bottom of the heat sink.

   Note: Make sure that all of the thermal grease is removed.
4. Use a clean area of the cleaning pad to wipe the thermal grease from the microprocessor; then, dispose of the cleaning pad after all of the thermal grease is removed.
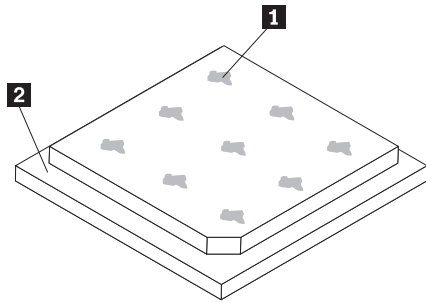
5. Use the thermal-grease syringe to place 9 uniformly spaced dots **1** of 0.02 mL each on the top of the microprocessor **2**. Make sure that the outermost dots are within 5 mm of the edge, to ensure even distribution.
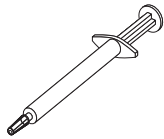
Note: 0.01mL is one tick mark on the syringe. If the grease is properly applied, approximately half (0.22 mL) of the grease will remain in the syringe.

6. Install the heat sink onto the microprocessor as described in "Installing the microprocessor" on page 141.

Replacing the system board

To replace the system board, use the following procedures:

Removing the system board

Note: When you replace the system board, you must either update the server with the latest firmware or restore the pre-existing firmware that the customer provides on a diskette or CD image. Make sure that you have the latest firmware or a copy of the pre-existing firmware before you proceed.

To remove the system board, complete the following steps

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.
2. Turn off the server and any attached devices.
3. Turn off the peripheral devices and disconnect all power cords; then, remove the cover (see "Removing and installing the cover" on page 119).

   Note: When you replace the system board, you must either update the server with the latest firmware or restore the pre-existing firmware that the customer provides on a diskette or CD image. Make sure that you have the latest firmware or a copy of the pre-existing firmware before you proceed.
4. Remove the riser-card assembly (see "Removing the riser-card assembly" on page 157).
5. Remove the IBM ServeRAID-BR10il SAS/SATA controller if one is installed (see "Removing an IBM ServeRAID-BR10il SAS/SATA Controller" on page 159).
6. Remove the DIMM air baffle (see "Removing and installing the DIMM air baffle" on page 121).
7. Remove the heat sink and microprocessor, and set them aside on a static-protective surface for reinstallation (see "Removing the microprocessor" on page 140).

8. Remove the memory modules and set them aside on a static-protective surface for reinstallation (see "Replacing a memory module (DIMM)" on page 122).

    Note: Make a note of the location of each DIMM as you remove it, so that you can later reinstall it in the same connector.

9. Remove the virtual media key from the system board and set it aside (see "Replacing the virtual media key" on page 167). You must reinstall the virtual media key on the new system board.

10. Remove the hypervisor flash device from the USB connector on the system board and set it aside (see "Replacing a USB embedded hypervisor flash device" on page 133). You must reinstall the hypervisor flash device on the new system board.

11. Disconnect all cables from the system board. Make a list of each cable as you disconnect it; you can then use this as a checklist when you install the new system board.

12. Remove the screws **1** that secure the system board to the chassis, and put them in a safe place.
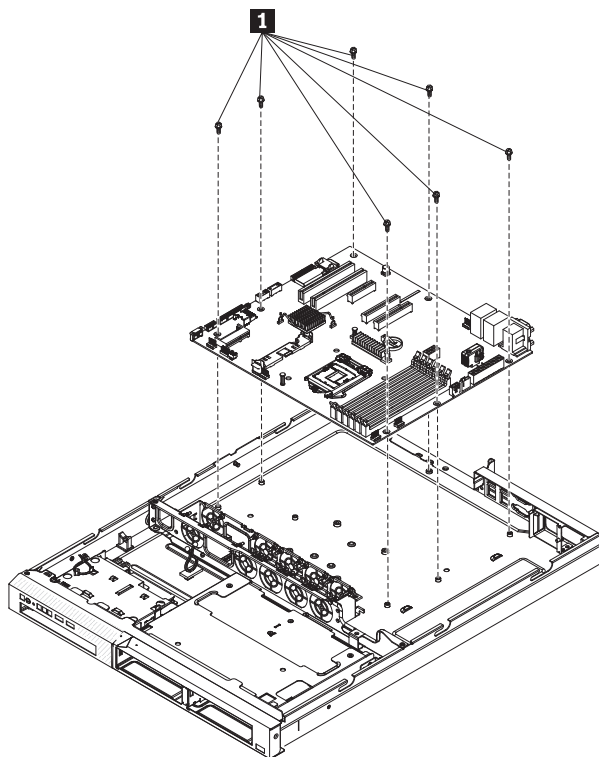
13. Lift up the system board and carefully remove it from the server, being careful not to damage any surrounding components.

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

Installing the system board

Note: When you reassemble the components in the server, be sure to route all cables carefully so that they are not exposed to excessive pressure.

Notes:

1. When you reassemble the components in the server, be sure to route all cables carefully so that they are not exposed to excessive pressure.

2. When you replace the system board, you must either update the server with the latest firmware or restore the pre-existing firmware that the customer provides on a diskette or CD image. Make sure that you have the latest firmware or a copy of the pre-existing firmware before you proceed. See

Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code

To install the system board, complete the following steps:

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.
2. Align the system board with the chassis, and replace the screws that secure the system board.
3. Reinstall the microprocessor and heat sink (see "Installing the microprocessor" on page 141).
4. Reinstall the DIMMs (see "Installing a memory module" on page 125).
5. Reinstall the DIMM air baffle (see "Removing and installing the DIMM air baffle" on page 121).
6. If necessary, reinstall ServeRAID-BR10il SAS/SATA controller (see "Installing an IBM ServeRAID-BR10il SAS/SATA controller" on page 160).
7. Reinstall the PCI riser-card assemblies and PCI cards, if any were installed (see "Installing the riser-card assembly" on page 158 and "Installing a PCI card" on page 132).
8. Reinstall the virtual media key (see "Replacing the virtual media key" on page 167).
9. Reinstall the hypervisor flash device (see "Installing a USB embedded hypervisor flash device" on page 134).
10. Reconnect all cables to the system board that were disconnected.
11. Install the cover (see "Removing and installing the cover" on page 119).
12. Slide the server into the rack.
13. Reconnect the power cords and any cables that you removed.
14. Turn on the peripheral devices and the server.

Important: Perform the following updates:

- Either update the server with the latest RAID firmware or restore the pre-existing firmware from a diskette or CD image.
- Update the UUID (see "Updating the Universal Unique Identifier (UUID)" on page 169.
- Update the DMI/SMBIOS (see "Updating the DMI/SMBIOS data" on page 171).

Replacing the power supply

This procedure is used when replacing a defective power supply.

When you remove or install the power supply, observe the following precautions.

Statement 5:

CAUTION:
The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.
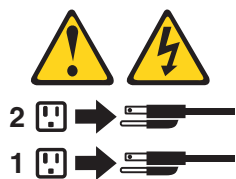
Statement 8:

CAUTION:
Never remove the cover on a power supply or any part that has the following label attached.

Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

Removing the power supply

To remove the power supply, complete the following steps.

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.
2. Disconnect the ac power cord from the connector on the power supply. Disconnect all external cables from the server.
3. Remove the server from the rack and remove the cover (see "Removing and installing the cover" on page 119).

   Attention: To ensure proper cooling and airflow, do not operate the server for more than 30 minutes with the cover removed.
4. Remove the DIMM air baffle (see "Removing and installing the DIMM air baffle" on page 121).
5. Disconnect the power-supply cables from the connectors on the system board and from all devices; then, disengage the cables from any retention-clips that secure them to the side of the power-supply.

   Note: Note the routing of all power-supply cables; you will route the power-supply cables the same way when you install the power supply.
6. Remove the screw **2** that holds the power supply **1** to the rear of the chassis.

7. Loosen the captive thumbscrew **3** that secures the power supply to the chassis bottom.
8. Lift the power supply out of the bay.
9. If you are instructed to return the power supply, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the power supply

To install the replacement power supply, complete the following steps:

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.
2. Place the new power supply into the chassis.
3. Tighten the captive thumbscrew that secures the power supply to the chassis bottom.
4. Replace the screw that holds the power supply to the rear of the chassis.
5. Connect the internal power-supply cables from the power supply to the power connectors on the system board. See "System-board internal connectors" on page 107 for the locations of the power connectors on the system board.
   - For power supply without advanced energy management, connect the power cables to power connectors 1 and 2 on the system board.
   - For high-efficient power supply with advanced energy manage, connect the power cables to power connectors 1, 2, 3, and 4 on the system board.
6. Route the internal power-supply cables, securing them with the retention-clips.
7. Test the power supply:
   a. Connect one end of the ac power cord for the new power supply into the connector on the back of the power supply, and connect the other end of the power cord into a properly grounded electrical outlet.
   b. Make sure that the standby power LED on the system board is lit (see "System-board LEDs" on page 112); if the standby power LED is not lit, discontinue this procedure and obtain a new power supply.
   c. Press the power-control button. Make sure that the power-on LED on the front of the server is lit.

   If the server starts, proceed to step 8. If the server does not start, disconnect the ac power cord and call for service.
8. Turn off the server and disconnect the ac power cord.

9. Connect the cables from the power supply to the internal devices.

10. Install the DIMM air baffle (see "Removing and installing the DIMM air baffle" on page 121).

11. Install the cover (see "Removing and installing the cover" on page 119).

12. Slide the server into the rack.

13. Reconnect the ac power cord into the connector on the back of the power supply.

14. Reconnect all external cables that were disconnected.

15. Connect the other end of the ac power cord into a properly grounded electrical outlet.

16. Press the power-control button (see "Turning on the server" on page 113.

17. Make sure that the power-on LED on the front of the server is lit.

Replacing a fan assembly

The server comes with five replaceable cooling fans. Use the following procedures to replace a fan.

Removing a fan assembly

To remove any of the five replaceable fans, complete the following steps:

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.

2. Turn off the server and all peripheral devices, and disconnect the power cords and all external cables.

3. Remove the server from the rack and remove the cover (see "Removing and installing the cover" on page 119).

4. Reconnect the power cord; then, turn on the server.

   Attention: Operating the server for extended periods of time (more than 30 minutes) with the cover removed might damage server components.

5. Determine which fan to replace by checking the LEDs on the system board (see "System-board LEDs" on page 112); a lit LED indicates the fan to replace.

6. Turn off the server; then, disconnect the power cord again.

7. Remove the DIMM air baffle (see "Removing and installing the DIMM air baffle" on page 121).

8. Remove the failed fan from the server:

   a. Disconnect the fan cable from the system board (see "System-board internal connectors" on page 107). You may need to disengage the cables from cable retention clips. Note the routing of the fan cable to the connector; you will have to route the fan cable the same way when you install the fan.

   b. Grasp the top of the fan with your index finger and thumb and lift the fan out of the server.
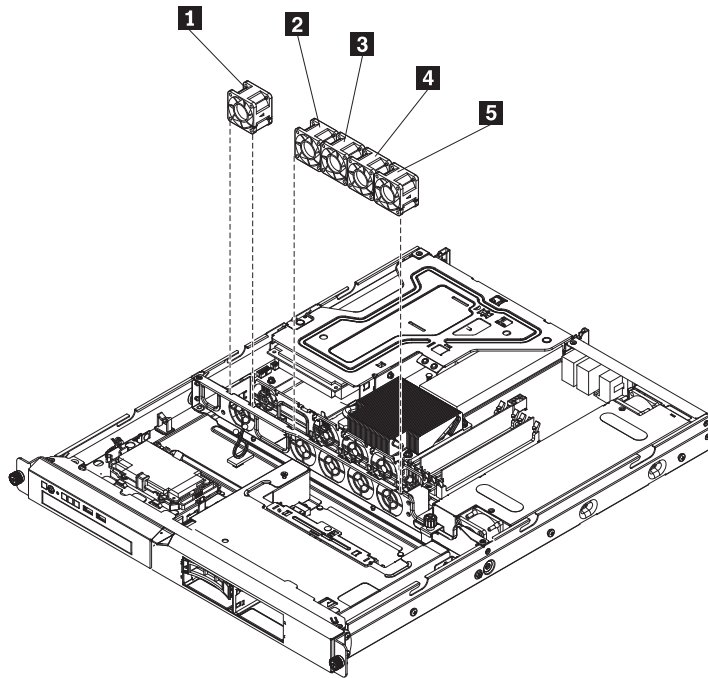
Table 14. Removing the fan

1	Fan 1	**4**	Fan 4
2	Fan 2	**5**	Fan 5
3	Fan 3		

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

Installing a fan assembly

To install the replacement fan, complete the following steps:

1. Position the replacement fan so that the airflow arrow on the fan points toward the rear of the server.

   Note: Correct airflow is from the front to the rear of the server.

2. Install the replacement fan in the bracket:

   a. Make sure that the fan cable **1** sits in the channel on the side of the fan.
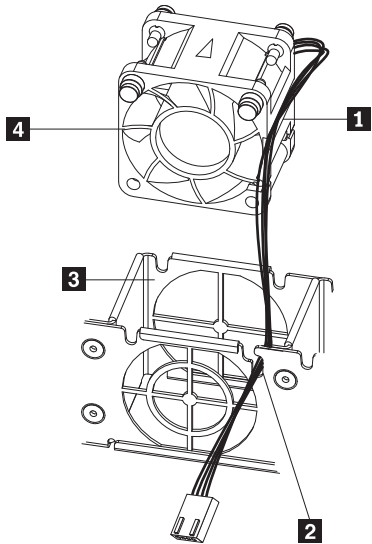
b. In the location from which you removed the failed fan, route the fan cable into its slot **2** in the fan bracket top.

c. Insert the fan **4** into the bracket **3** .

d. Make sure that each of the grey soft tabs on the fan is fully seated in its slot in the fan bracket.

3. Connect the replacement fan cable to the system board.

4. Go to "Completing the FRU replacement" on page 173.

Replacing the system-board battery

To replace the system-board battery, complete the following procedures:

Removing the battery

To remove the battery, complete the following steps.

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.

2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.

3. Remove the cover (see "Removing and installing the cover" on page 119).

4. If necessary, lift the riser-card assembly out of the way (see "Removing the riser-card assembly" on page 157).

5. Remove the battery:
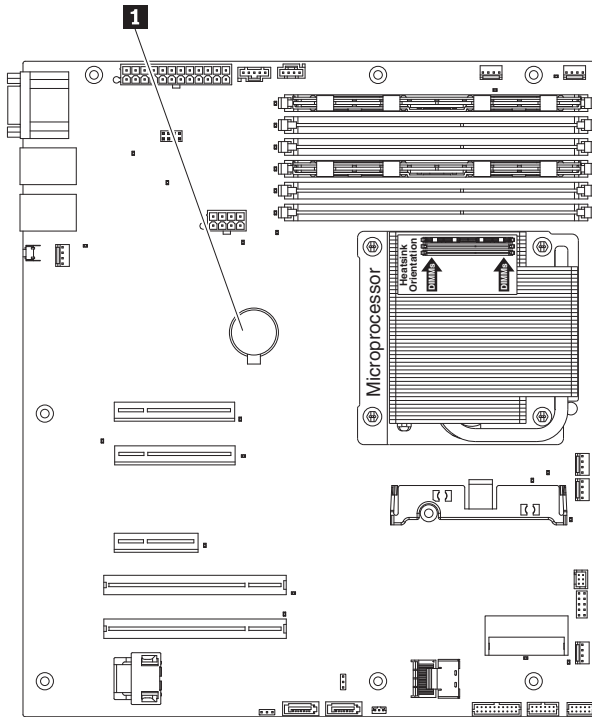
a. Use a fingernail to press the top of the battery clip away from the battery. The battery pops up when released.
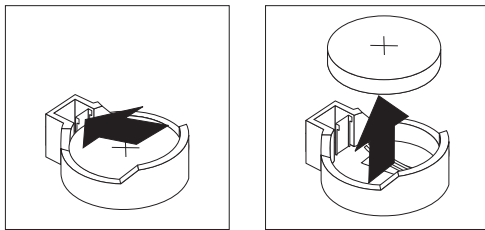
b. Use your thumb and index finger to lift the battery from the socket.

6. Dispose of the battery as required by local ordinances or regulations. See "Battery return program" on page 225 for more information.

Installing the battery

The following notes describe information that you must consider when replacing the system-board battery in the server.

- When replacing the system-board battery, you must replace it with a lithium battery of the same type from the same manufacturer.
- After you replace the system-board battery, you must reconfigure the server and reset the system date and time.
- To avoid possible danger, read and follow the following safety statement.

Statement 2:

CAUTION:
When replacing the lithium battery, use only an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:
- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

Dispose of the battery as required by local ordinances or regulations.

To install the replacement battery, complete the following steps:

1. Follow any special handling and installation instructions that come with the replacement battery.
2. Insert the new battery:
   a. Orient the battery so that the positive side faces up.
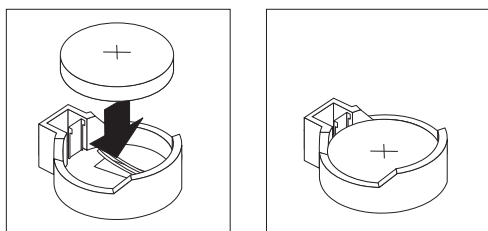
   b. Tilt the battery so that you can insert it into the socket on the side opposite the battery clip.
   c. Press the battery down into the socket until it clicks into place. Make sure that the battery clip holds the battery securely.
3. Make sure that the riser-card assembly is fully seated in the connectors on the system board.
4. If the riser-card assembly is an optional PCI-X riser-card assembly, make sure that the riser-card power cable **1** is connected to the riser-card assembly.
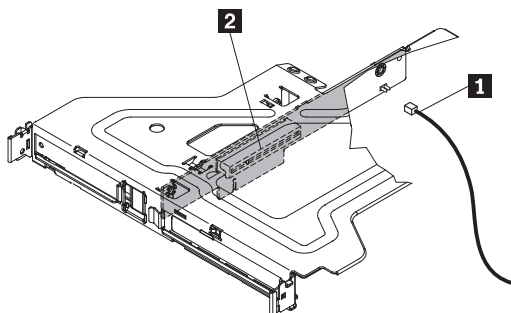
5. Install the cover (see "Removing and installing the cover" on page 119).
6. Slide the server into the rack.
7. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

   Note: You must wait approximately 1 to 3 minutes after you connect the power cord of the server to an electrical outlet before the power-control button becomes active.
8. Start the Setup utility and reset the configuration (see "Starting the Setup Utility" on page 200 for details).
   - Set the system date and time.

- Set the power-on password.
- Reconfigure the server.

Replacing the SAS/SATA hard disk drive back plate or backplane

To replace the SAS/SATA hard disk drive backplane or back plate, complete the following procedures:

Removing the backplane or back plate (3.5-inch drives)

To remove the Serial Attached SCSI (SAS) backplane, which is also referred to as the hot-swap SAS/SATA backplane, or to remove the simple-swap SATA back plate, complete the following steps.

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the server from the rack and place it on a flat, static-protective surface.
4. Pull the hard disk drives out of the server slightly to disengage them from the backplane or back plate.
5. Remove the cover (see "Removing and installing the cover" on page 119).
6. Lift the backplane or back plate **1** out of the server.
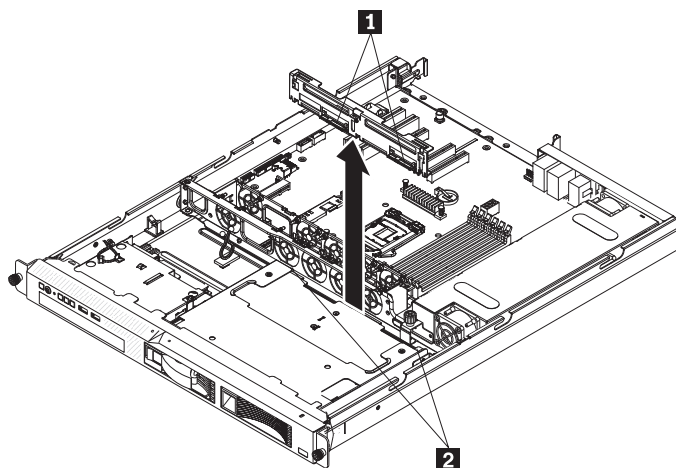
7. Disconnect the backplane or back plate cables:
   - If the server is a hot-swap model, disconnect the SAS/SATA controller signal cable from the backplane.

     Note: You might want to disconnect the cable from the SAS/SATA controller first, or remove the SAS/SATA controller from its connector, to make it easier to disconnect the cable from the backplane or back plate.
   - If the server is a simple-swap mode that contains a standard SATA back plate, disconnect the SATA cable from the system board.
   - If the server is a simple-swap model that contains a SATA RAID back plate, disconnect the SAS signal cable from the SAS/SATA controller.
8. If you are instructed to return the backplane or back plate, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the backplane or back plate (3.5-inch drives)

To install the replacement 3.5-inch hot-swap drives backplane or simple-swap SATA drives back plate, complete the following steps.

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Note: The following illustration shows installing the hot-swap SAS/SATA backplane.
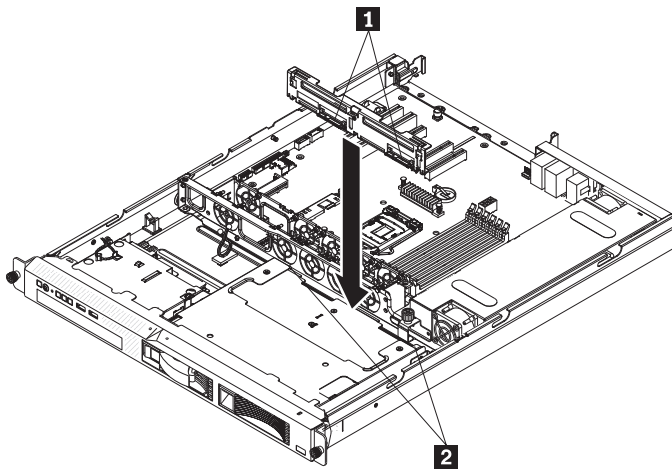
1	Connectors
2	Guide channels

1. Connect the power cable to the replacement backplane or back plate.
2. Reconnect the backplane or back plate cables:
   - If the server is a hot-swap model, reconnect the SAS/SATA controller signal cable to the backplane.
   - If the server is a simple-swap model that contains a standard SATA back plate, reconnect the SATA cable to the system board. See "System-board internal connectors" on page 107 for the location of the SATA connectors on the system board.

     Note: Make sure that the cable drive number on the back plate matches the SATA connector number on the system board.
   - If the server is a simple-swap model that contains a SATA RAID back plate, reconnect the SAS signal cable to the SAS/SATA controller.
3. Slide the backplane or back plate into the card guides, making sure that any nearby wires or cables are not trapped or pinched.
4. Press firmly until the backplane or back plate is fully seated.
5. Install the hard disk drives.
6. Go to "Completing the FRU replacement" on page 173.

Removing the SAS backplane (2.5-inch drives)
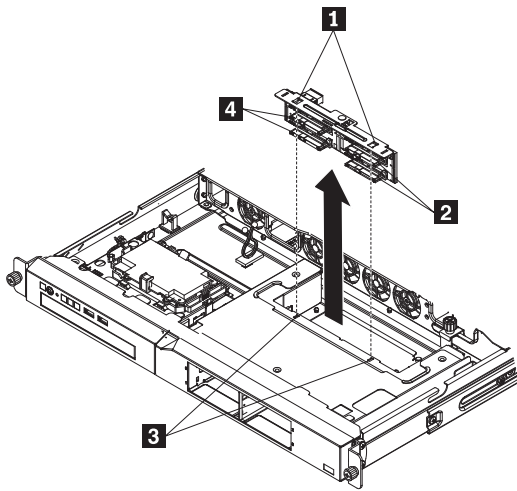
1	Alignment tabs	**3**	Alignment slots
2	Connectors	**4**	Connectors

To remove the 2.5-inch drives backplane, complete the following steps:

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the server from the rack and place it on a flat, static-protective surface.
4. Pull the hard disk drives out of the server slightly to disengage them from the backplane.
5. Remove the cover (see "Removing and installing the cover" on page 119).
6. Lift the backplane or back plate out of the server.
7. Disconnect the backplane cables:
   - Disconnect the SAS/SATA controller cable from the backplane.
   - Disconnect the power cable from the backplane.
   - Disconnect the system board cable from the backplane.
8. If you are instructed to return the backplane or back plate, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the SAS backplane (2.5-inch drives)

To install the replacement 2.5-inch hot-swap drives backplane, complete the following steps.
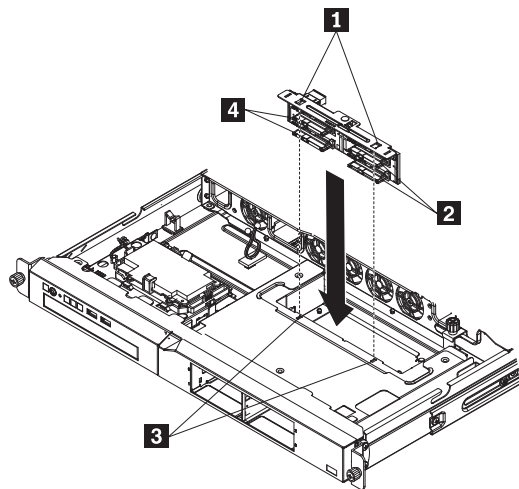
1	Alignment tabs	**3**	Alignment slots
2	Drive connectors	**4**	Drive connectors

1. Connect the cables to the replacement backplane.
2. Slide the backplane into the card guides, making sure that any nearby wires or cables are not trapped or pinched.
3. Press firmly until the backplane is fully seated and clicks into place.
4. Install the hard disk drives.
5. Go to "Completing the FRU replacement" on page 173.

Replacing the PCI riser-card assembly

To replace the PCI riser-card assembly, use the following procedures:

Removing the riser-card assembly

To remove the riser-card assembly, complete the following steps:

To remove the riser-card assembly, complete the following steps:

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove the server from the rack and place it on a flat, static-protective surface.
4. Remove the cover (see "Removing and installing the cover" on page 119).
5. Grasp the riser-card assembly **1** at the front and rear edges and lift to remove it from the server. Place the riser-card assembly on a flat, static-protective surface.
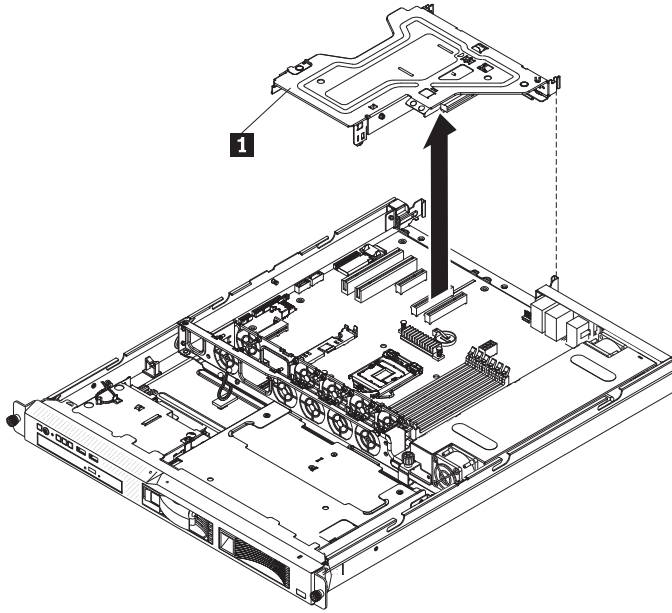
6. If the riser-card assembly is an optional PCI-X riser-card assembly, disconnect the riser-card power cable **1** from the riser-card assembly.
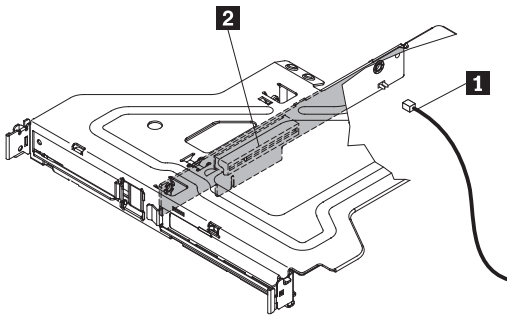
7. Disconnect any cables from the PCI cards in the riser-card assembly.
8. If you are instructed to return the riser-card assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the riser-card assembly

To remove the riser-card assembly, complete the following steps:

The server comes with one riser-card assembly that contains two PCI Express connectors.

To install the riser-card assembly, complete the following steps:

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.
2. Install the PCI cards in the riser-card assembly.
3. Reconnect any PCI card cables that you disconnected when you removed the riser-card assembly.
4. If the riser-card assembly is an optional PCI-X riser-card assembly, reconnect the riser-card power cable **1** to the riser-card assembly.
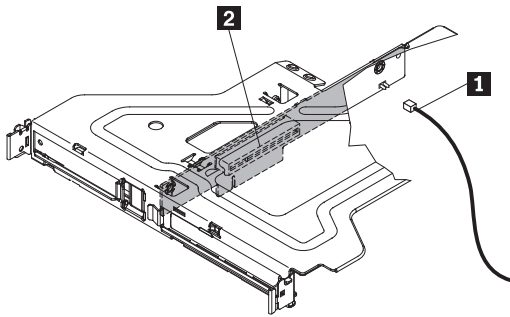
5. Carefully align the riser-card assembly with the guides on the rear of the server and with the riser-card connectors on the system board; then, press down on the assembly. Make sure that the riser-card assembly **1** is fully seated in the connector on the system board.
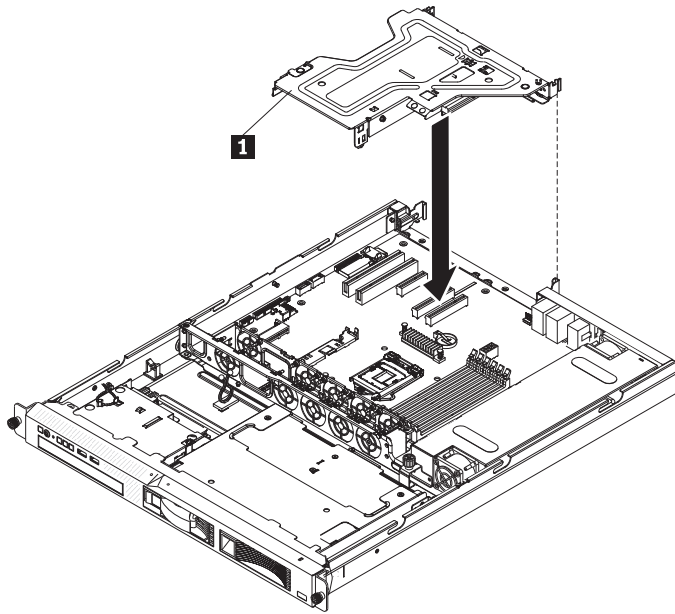
6. Go to "Completing the FRU replacement" on page 173.

Replacing an IBM ServeRAID-BR10il SAS/SATA Controller

To replace an IBM ServeRAID-BR10il SAS/SATA Controller, use the following procedures:

Removing an IBM ServeRAID-BR10il SAS/SATA Controller

To remove an IBM ServeRAID-BR10il SAS/SATA controller from the system board, complete the following steps:

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.

   Note: When you disconnect the power source from the server, you lose the ability to view the LEDs because the LEDs are not lit when the power source is removed. Before you disconnect the power source, make a note of which LEDs are lit, including the LEDs that are lit on the operation information panel and LEDs inside the server on the system board.

3. Remove the server from the rack and place it on a flat, static-protective surface.
4. Remove the cover (see "Removing and installing the cover" on page 119).
5. Remove the riser-card assembly (see "Removing the riser-card assembly" on page 157).

6. Disconnect the signal cables that are attached to the SAS/SATA controller.

7. Grasp the SAS/SATA controller **1** while you press outward on the plastic tabs.

8. Pull out the SAS/SATA controller from the connector **2** on the system board.
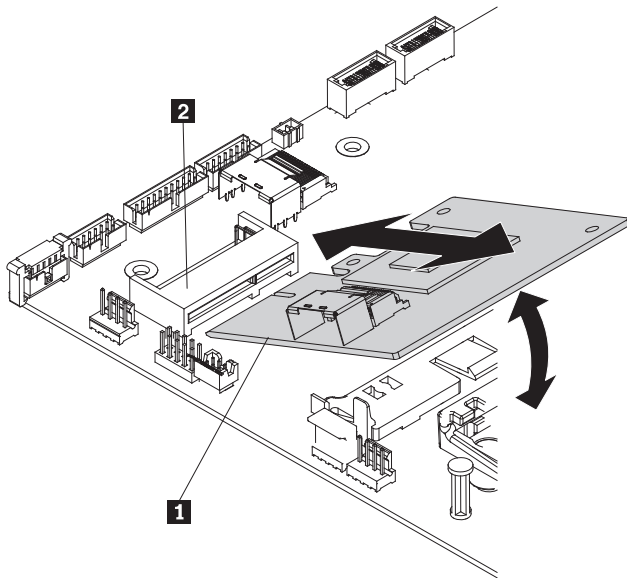
9. If you are instructed to return the SAS/SATA controller, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing an IBM ServeRAID-BR10il SAS/SATA controller

Read the following notes before installing the ServeRAID-BR10il SAS/SATA controller.

Notes:

1. Some server models come with an IBM ServeRAID-BR10il SAS/SATA Controller installed. The controller can be installed only in the dedicated slot on the system board (see "System-board optional-device connectors" on page 109 for the location of the connector). Use the following procedures to install the controller if your server model did not come with this controller installed or to replace a failing controller.

2. The IBM ServeRAID-BR10il SAS/SATA controller enables integrated RAID levels 0, 1, and 1E capability on hot-swap hard disk drives. For configuration information, see the RAID documentation at http://www.lenovo.com/support.

3. **Important:** To ensure that any of your ServeRAID controllers function properly on UEFI-based servers, make sure that the controller firmware and supporting device drivers are updated to at least 11.x.x-XXX.

Attention: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.

2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.

   Note: When you disconnect the power source from the server, you lose the ability to view the LEDs because the LEDs are not lit when the power source is removed. Before you disconnect the power source, make a note of which LEDs are lit, including the LEDs that are lit on the operation information panel and LEDs inside the server on the system board.

3. Remove the server from the rack and place it on a flat, static-protective surface.

4. Remove the cover (see "Removing and installing the cover" on page 119).
5. Remove the riser-card assembly (see "Removing the riser-card assembly" on page 157).
6. Touch the static-protective package that contains the new ServeRAID-BR10il SAS/SATA controller to any unpainted surface on the outside of the server; then, grasp the controller by the top edge or upper corners of the controller and remove it from the package.
7. Align the ServeRAID controller **1** so that the keys align correctly with the connector **2** on the system board.
8. Insert the ServeRAID controller into the connector on the system board until it is firmly seated. The retention bracket secures the ServeRAID controller in place when the controller is firmly seated into the connector on the system board.

   Attention: Incomplete insertion might cause damage to the server or the controller.
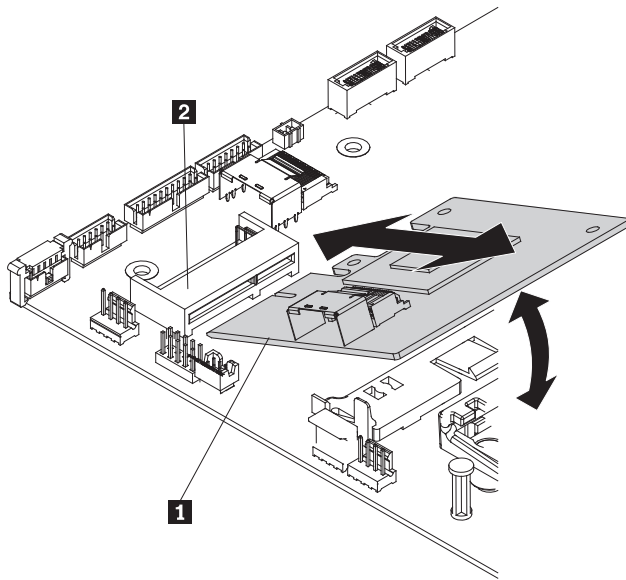
9. Route the signal cables from the drive backplane through the fan cage hole (between fans 1 and 2) as shown in the following illustration.
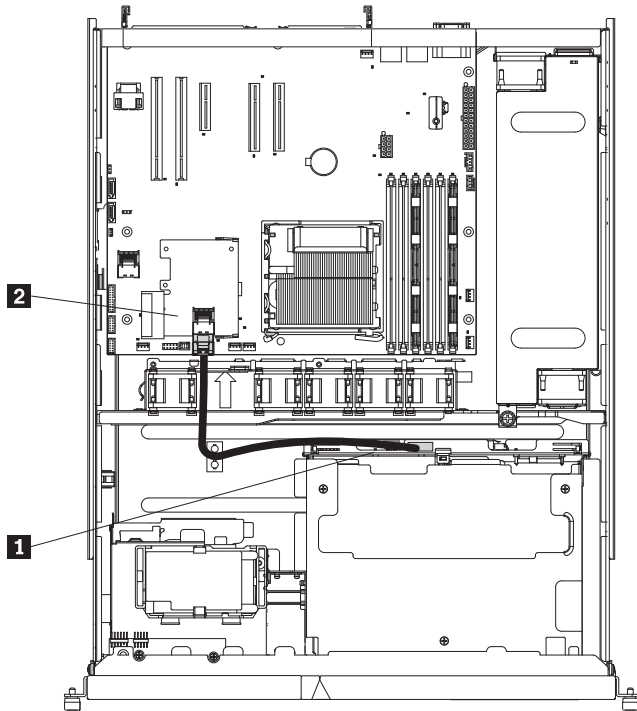
10. Connect the signal cable that is attached to the drive backplane **1** to the ServeRAID controller connector **2** .

11. Replace the riser-card assembly (see "Installing the riser-card assembly" on page 158).

    Note: When you restart the server, you are prompted to import the existing RAID configuration to the new ServeRAID controller.

12. Go to "Completing the FRU replacement" on page 173.

Replacing the DVD drive cable

To replace the optical drive cable, complete the following procedures:

Removing the DVD drive cable

To remove the DVD drive cable, complete the following steps:

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.

2. Turn off the server and peripheral devices and disconnect all power cords.

3. Remove the cover (see "Removing and installing the cover" on page 119).

4. Remove the riser-card assembly (see "Replacing the PCI riser-card assembly" on page 157).

5. Remove the DVD drive (see "Replacing a DVD drive" on page 164).

6. From the front of the server, press the cable connector latch **1** and slide the DVD drive cable to the unlock position; then, slide the cable connector to the right and pull the cable out from the connector.
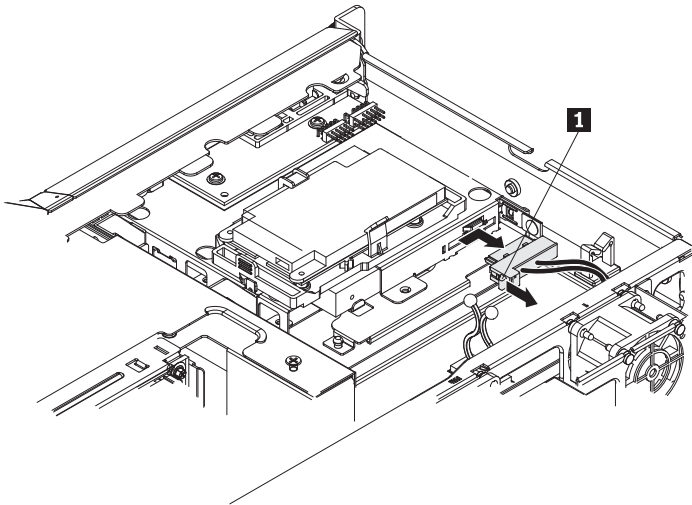
7. Remove the cable from the DVD drive cage connector.

8. Disconnect the DVD drive power cable from the power supply cable.

9. If you are instructed to return the DVD drive cable, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the DVD drive cable

To install the DVD drive cable, complete the following steps:

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.

2. Turn off the server and peripheral devices and disconnect the power cords and all external cables.

3. Align the cable connector with the connector on the rear of the DVD drive cage and press the cable connector into the DVD drive cage connector until it is firmly seated.

4. Pull the cable connector latch **2** up and hold it there while you slide the cable connector to the lock position; then, slide the cable connector latch down to lock the cable in place.
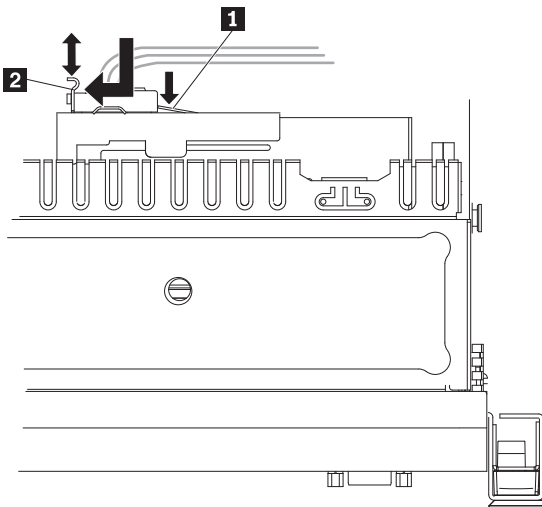
The following illustration shows cable routing for the DVD drive cable.

Note: Route the DVD drive cable **2** through the fan cage hole on the left of fan 1.
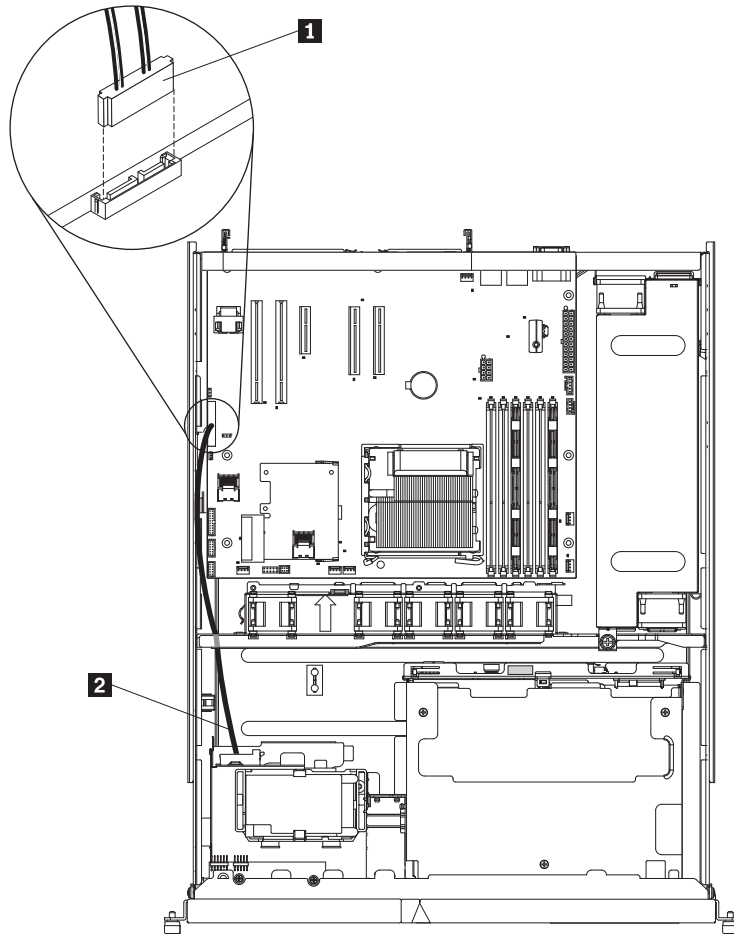
5. Connect the DVD drive cable to the system board connector **1** .
6. Reconnect the DVD drive power cable to the power supply cable.
7. Reinstall the DVD drive (see "Replacing a DVD drive").
8. Reinstall the riser-card assembly (see "Installing the riser-card assembly" on page 158).
9. Go to "Completing the FRU replacement" on page 173.

Replacing a DVD drive

To replace a DVD drive, complete the following procedures:

Removing a DVD drive

To remove a DVD drive, complete the following steps:

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.
2. Turn off the server and peripheral devices and disconnect all power cords.
3. Remove the cover (see "Removing and installing the cover" on page 119).
4. Pull the release tab **1** (the rear of the drive-retention clip) toward the right side of the server to release the clip; then, while you pull the tab, push the drive out of the bay.

   Note: You might have to push the right-rear corner of the drive toward the front of the server to move the drive initially.
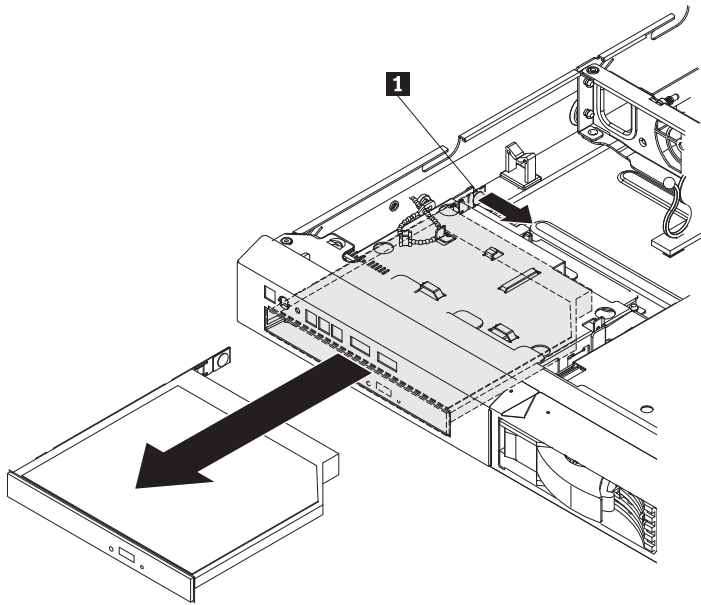
5. Remove the retention clip ▮1 from the drive and save for future use.
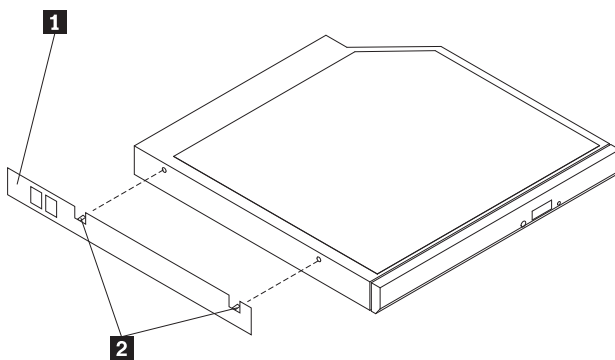
6. If you are instructed to return the DVD drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a DVD drive

The following notes describe the type of drives that the server supports and other information that you must consider when you install a DVD drive.

- Locate the documentation that comes with the drive and follow those instructions in addition to the instructions in this chapter.
- Make sure that you have all the cables and other equipment that are specified in the documentation that comes with the drive.
- The server supports one ultra-slim SATA DVD drive.

To install a DVD drive, complete the following steps:

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables.
3. Remove the cover (see "Removing and installing the cover" on page 119).
4. Touch the static-protective package that contains the new DVD drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
5. Follow the instructions that come with the drive to set any jumpers or switches.

6. Attach the drive-retention clip **1** that you removed from the failing drive to the side of the new DVD drive.
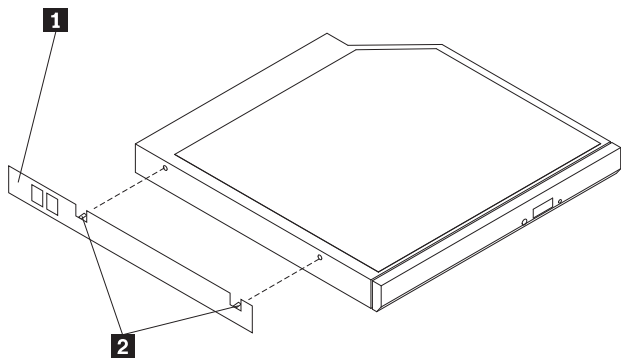
Note: If you are installing a drive that contains a laser, observe the following safety precaution. **Statement 3:**

CAUTION:
When laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:
- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
- **Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**

DANGER

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.

Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

Class 1 Laser Product
Laser Klasse 1
Laser Klass 1
Luokan 1 Laserlaite
Appareil À Laser de Classe 1

7. Slide the drive into the DVD drive bay until the drive clicks into place.
8. Go to "Completing the FRU replacement" on page 173.

Replacing the virtual media key

To replace the virtual media key, complete the following procedures:

Removing the virtual media key

To remove the virtual media key, complete the following steps:

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.
2. Turn off the server and peripheral devices and disconnect all power cords; then, remove the cover (see "Removing and installing the cover" on page 119).
3. Grasp the virtual media key **4** and gently slide it up and off of the mounting tab **2**.
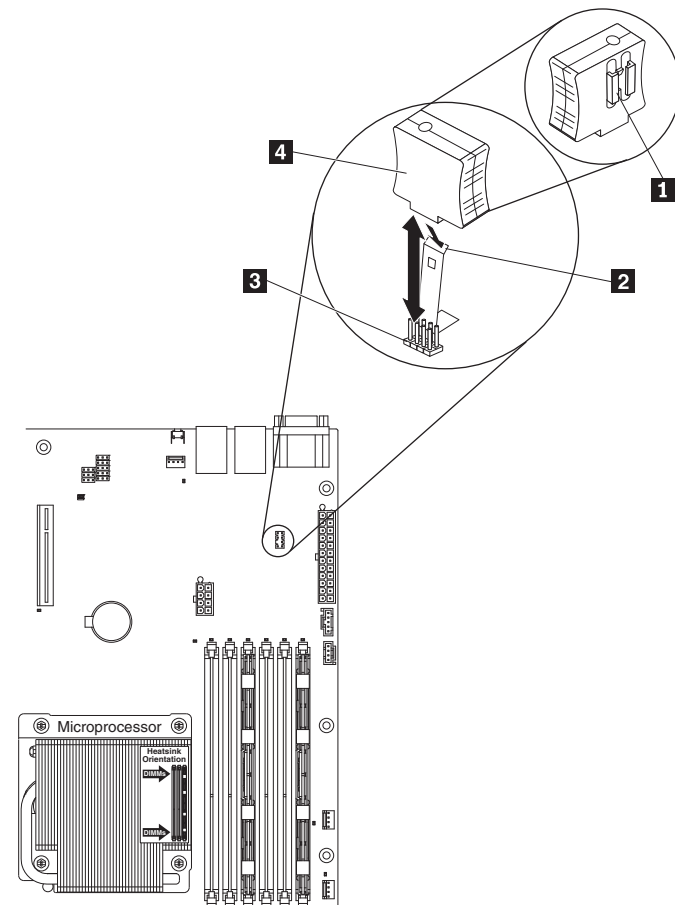
4. If you are instructed to return the virtual media key, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the virtual media key

To install the virtual media key, complete the following steps:

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.
2. Remove the cover (see "Removing and installing the cover" on page 119).
3. Align the virtual media key **4** with the mounting tab **2** and **1**; then slide it down the tab onto the connector **3** on the system board. Press the virtual media key down into the connector until it is firmly seated on the system board.
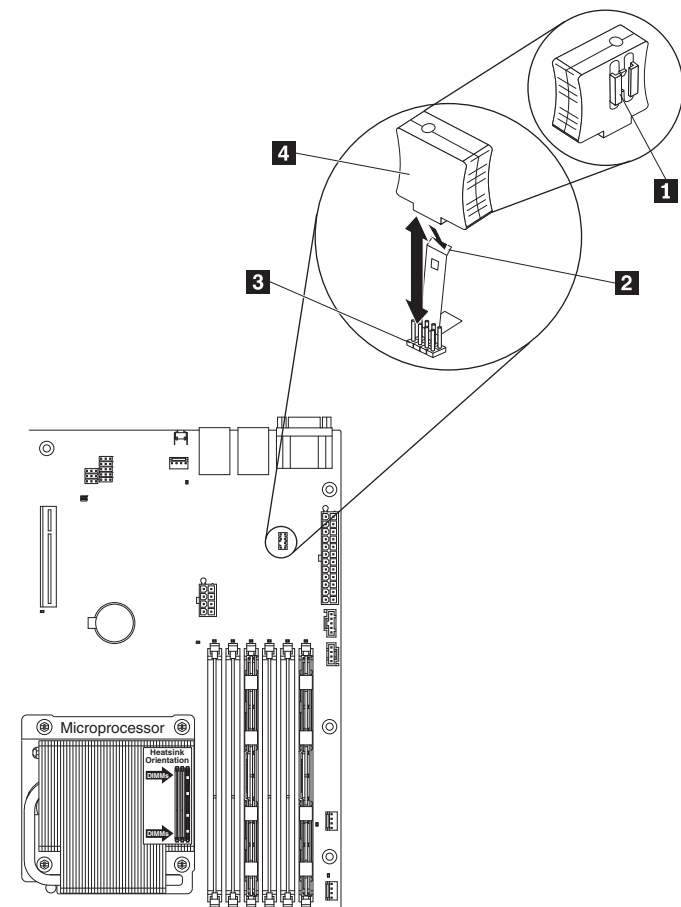
4. Go to "Completing the FRU replacement" on page 173.

Replacing the PCI-X riser-card power cable

To replace the PCI-X riser-card power cable, use the following procedures:

Removing the PCI-X riser-card power cable

If an optional PCI-X riser-card assembly is installed in the server, an internal power cable for the assembly is also installed.

To remove the PCI-X riser-card power cable, complete the following steps:

1. Read the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove the server from the rack and place it on a flat, static-protective surface.
4. Remove the cover (see "Removing and installing the cover" on page 119).
5. Remove the riser-card assembly (see "Replacing the PCI riser-card assembly" on page 157).
6. Remove the PCI card from the riser-card assembly if one is installed (see "Removing a PCI card" on page 130).
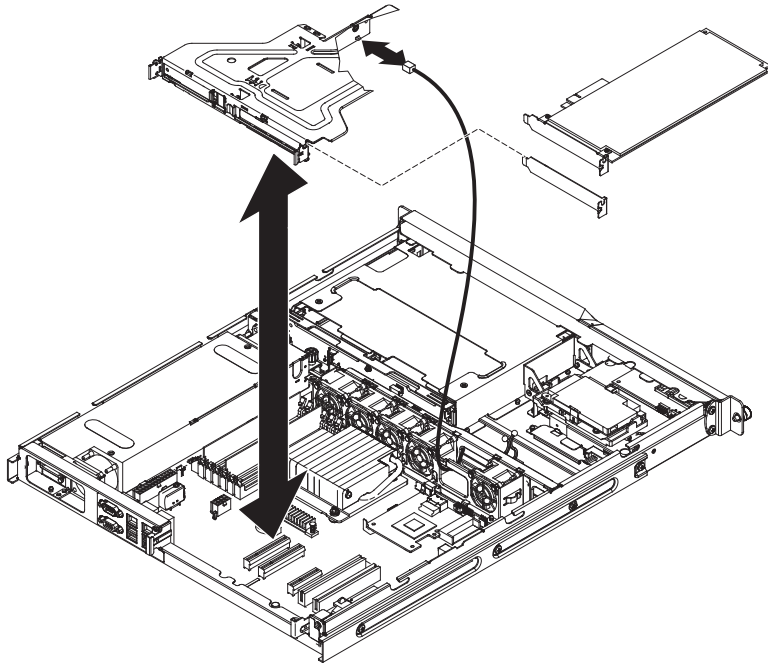
7. Disconnect the riser-card power cable from the PCI-X riser card.

8. If you are instructed to return the PCI-X riser-card power cable, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the PCI-X riser-card power cable

To install the replacement PCI-X riser-card power cable, complete the following steps.

1. Connect the riser-card power cable to the PCI-X riser-card assembly.

2. Install the adapter in the riser-card assembly (see "Installing a PCI card" on page 132).

3. Install the riser-card assembly (see "Installing the riser-card assembly" on page 158).

4. Go to "Completing the FRU replacement" on page 173.

Updating the Universal Unique Identifier (UUID)

The Universal Unique Identifier (UUID) must be updated when the system board is replaced. Use the Advanced Settings Utility to update the UUID in the UEFI-based server. The ASU is an online tool that supports several operating systems. Make sure that you download the version for your operating system. To download the ASU and update the UUID, complete the following steps:

1. Download the Advanced Settings Utility (ASU):

   a. Go to http://www.lenovo.com/support.

   b. Enter your product number (machine type and model number) or select **Servers and Storage** from the **Select your product** list.

   c. From **Family** list, select **ThinkServer RS210;**, and click **Continue**.

   d. Click **Downloads and drivers** to link to the ASU program.

2. ASU sets the UUID in the Integrated Management Module (IMM). Select one of the following methods to access the Integrated Management Module (IMM) to set the UUID:

   • Online from the target system (LAN or keyboard console style (KCS) access)

   • Remote access to the target system (LAN based)

3. Copy and unpack the ASU package, which also includes other required files, to the server. Make sure that you unpack the ASU and the required files to the same directory. In addition to the application executable (asu or asu64), the following files are required:

- For Windows based operating systems:
  - ibm_rndis_server_os.inf
  - device.cat
- For Linux based operating systems:
  - cdc_interface.sh
4. After you install ASU, use the following command syntax to set the UUID:

   `asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value> [access_method]`

   Where:

   <uuid_value>
   > Up to 16-byte hexadecimal value assigned by you.

   [access_method]
   > The access method that you selected to use from the following methods:

- Online authenticated LAN access, type the command:

   `[host <imm_internal_ip>] [user <imm_user_id>][password <imm_password>]`

   Where:

   imm_internal_ip
   > The IMM internal LAN/USB IP address. The default value is 169.254.95.118.

   imm_user_id
   > The IMM `account` (1 of 12 accounts). The default value is USERID.

   imm_password
   > The IMM account password (1 of 12 accounts). The default value is PASSW0RD (with a zero 0 not an O).

   Note: If you do not specify any of these parameters, ASU will use the default values. When the default values are used and ASU is unable to access the IMM using the online authenticated LAN access method, ASU will automatically use the unauthenticated KCS access method.

   The following commands are examples of using the userid and password default values and not using the default values:

   Example that does not use the userid and password default values:
   `asu set SYSTEM_PROD_DATA.SYsInfoUUID <uuid_value> user <user_id>`
   `password <password>`

   Example that does use the userid and password default values:
   `asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value>`

- Online KCS access (unauthenticated and user restricted):

   You do not need to specify a value for *access_method* when you use this access method.

   Example:
   `asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value>`

   The KCS access method uses the IPMI/KCS interface. This method requires that the IPMI driver be installed. Some operating systems have the IPMI driver installed by default. ASU provides the corresponding mapping layer. See the *Advanced Settings Utility Users Guide* for more details. You can access the ASU Users Guide from the Lenovo support Web site.

   a. Go to http://www.lenovo.com/support.

   b. Enter your product number (machine type and model number) or select **Servers and Storage** from the **Select your product** list.

   c. From **Family** list, select **ThinkServer RS210;**, and click **Continue**.

   d. Click **Downloads and drivers**.

e. Click **User's guides and manuals** to link to the ASU Users Guide.

- Remote LAN access, type the command:

  Note: When using the remote LAN access method to access IMM using the LAN from a client, the *host* and the *imm_external_ip* address are required parameters.

  host <imm_external_ip> [user <imm_user_id>[[password <imm_password>]

  Where:

  imm_external_ip
  > The external IMM LAN IP address. There is no default value. This parameter is required.

  imm_user_id
  > The IMM `account` (1 of 12 accounts). The default value is USERID.

  imm_password
  > The IMM account password (1 of 12 accounts). The default value is PASSW0RD (with a zero 0 not an O).

  The following commands are examples of using the user ID and password default values and not using the default values:

  Example that does not use the user ID and password default values:
  asu set SYSTEM_PROD_DATA.SYsInfoUUID <uuid_value> host <imm_ip>
  user <user_id> password <password>

  Example that does use the userid and password default values:
  asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value> host <imm_ip>

5. Restart the server.

Updating the DMI/SMBIOS data

The Desktop Management Interface (DMI) must be updated when the system board is replaced. Use the Advanced Settings Utility to update the DMI in the UEFI-based server. The ASU is an online tool that supports several operating systems. Make sure that you download the version for your operating system. To download the ASU and update the DMI, complete the following steps.

1. Download the Advanced Settings Utility (ASU):
   a. Go to http://www.lenovo.com/support.
   b. Enter your product number (machine type and model number) or select **Servers and Storage** from the **Select your product** list.
   c. From **Family** list, select **ThinkServer RS210;**, and click **Continue**.
   d. Click **Downloads and drivers** to link to the ASU program.
2. ASU sets the DMI in the Integrated Management Module (IMM). Select one of the following methods to access the Integrated Management Module (IMM) to set the DMI:
   - Online from the target system (LAN or keyboard console style (KCS) access)
   - Remote access to the target system (LAN based)
3. Copy and unpack the ASU package, which also includes other required files, to the server. Make sure that you unpack the ASU and the required files to the same directory. In addition to the application executable (asu or asu64), the following files are required:
   - For Windows based operating systems:
     – ibm_rndis_server_os.inf
     – device.cat
   - For Linux based operating systems:
     – cdc_interface.sh

4. After you install ASU, Type the following commands to set the DMI:

```
asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> [access_method]
asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> [access_method]
asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> [access_method]
```

Where:

<m/t_model>
> The server machine type and model number. Type `mtm xxxxyy`, where *xxxx* is the machine type and *yyy* is the server model number.

<s/n> The serial number on the server. Type `sn zzzzzzz`, where *zzzzzzz* is the serial number.

<asset_method>
> The server asset tag number. Type `asset aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa`, where *aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa* is the asset tag number.

[access_method]
> The access method that you select to use from the following methods:

- Online authenticated LAN access, type the command:

```
[host <imm_internal_ip>] [user <imm_user_id>][password <imm_password>]
```

Where:

imm_internal_ip
> The IMM internal LAN/USB IP address. The default value is 169.254.95.118.

imm_user_id
> The IMM account (1 of 12 accounts). The default value is USERID.

imm_password
> The IMM account password (1 of 12 accounts). The default value is PASSW0RD (with a zero 0 not an O).

Note: If you do not specify any of these parameters, ASU will use the default values. When the default values are used and ASU is unable to access the IMM using the online authenticated LAN access method, ASU will automatically use the following unauthenticated KCS access method.

The following commands are examples of using the userid and password default values and not using the default values:

Examples that do not use the userid and password default values:
```
asu set SYSTEM_PROD_DATA.SYsInfoProdName <m/t_model>
user <imm_user_id> password <imm_password>
asu set SYSTEM_PROD_DATA.SYsInfoSerialNum <s/n> user <imm_user_id>
password <imm_password>
asu set SYSTEM_PROD_DATA.SYsEncloseAssetTag <asset_tag>
user <imm_user_id> password <imm_password>
```

Examples that do use the userid and password default values:
```
asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model>
asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n>
asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag>
```

- Online KCS access (unauthenticated and user restricted):

You do not need to specify a value for *access_method* when you use this access method.

The KCS access method uses the IPMI/KCS interface. This method requires that the IPMI driver be installed. Some operating systems have the IPMI driver installed by default. ASU provides the corresponding mapping layer. To see the *Advanced Settings Utility Users Guide*. You can access the ASU Users Guide from the Lenovo support Web site.

a. Go to http://www.lenovo.com/support.

b. Enter your product number (machine type and model number) or select **Servers and Storage** from the **Select your product** list.

c. From **Family** list, select **ThinkServer RS210;**, and click **Continue**.

d. Click **Downloads and drivers**.

e. Click **User's guides and manuals** to link to the ASU Users Guide.

The following commands are examples of using the userid and password default values and not using the default values:

Examples that do not use the userid and password default values:
```
asu set SYSTEM_PROD_DATA.SYsInfoProdName <m/t_model>
asu set SYSTEM_PROD_DATA.SYsInfoSerialNum <s/n>
asu set SYSTEM_PROD_DATA.SYsEncloseAssetTag <asset_tag>
```

- Remote LAN access, type the command:

  Note: When using the remote LAN access method to access IMM using the LAN from a client, the *host* and the *imm_external_ip* address are required parameters.

  ```
  host <imm_external_ip> [user <imm_user_id>[[password <imm_password>]
  ```

  Where:

  imm_external_ip
  > The external IMM LAN IP address. There is no default value. This parameter is required.

  imm_user_id
  > The IMM account (1 of 12 accounts). The default value is USERID.

  imm_password
  > The IMM account password (1 of 12 accounts). The default value is PASSW0RD (with a zero 0 not an O).

  The following commands are examples of using the userid and password default values and not using the default values:

  Examples that do not use the userid and password default values:
  ```
  asu set SYSTEM_PROD_DATA.SYsInfoProdName <m/t_model> host <imm_ip>
  user <imm_user_id> password <imm_password>
  asu set SYSTEM_PROD_DATA.SYsInfoSerialNum <s/n> host <imm_ip>
  user <imm_user_id> password <imm_password>
  asu set SYSTEM_PROD_DATA.SYsEncloseAssetTag <asset_tag> host <imm_ip>
  user <imm_user_id> password <imm_password>
  ```

  Examples that do use the userid and password default values:
  ```
  asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> host <imm_ip>
  asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> host <imm_ip>
  asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> host <imm_ip>
  ```

5. Restart the server.

Completing the FRU replacement

To complete the installation, do the following:

1. If the DIMM air baffle was removed, reinstall it now (see "Removing and installing the DIMM air baffle" on page 121).

2. Reinstall the cover if it was removed (see "Removing and installing the cover" on page 119).

3. Reinstall the server in the rack cabinet.

4. Reconnect all cables and power cords (see "Connecting the cables" on page 174.

5. Update the server configuration (see "Updating the server configuration" on page 175).

6. Slide the server back into the rack, if necessary.

7. Turn on the peripheral devices and the server.

Connecting the cables

The following illustration shows the locations of the input and output connectors on the front of the server.
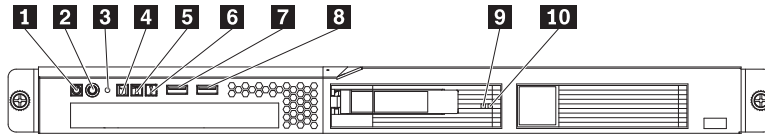
1	Power-on LED	**6**	System-error LED
2	Power-control button	**7**	USB 1 connector
3	Reset button	**8**	USB 2 connector
4	Hard disk drive activity LED	**9**	Hard disk drive activity LED (green)
5	Locator LED	**10**	Hard disk drive status LED (amber)

The following illustration shows the connectors and LEDs on the rear of the server.

1	Power-cord connector	**9**	NMI button
2	Serial connector	**10**	USB 3-4 connector
3	Ethernet 1 activity LED	**11**	USB 1-2 connector
4	Ethernet 1 link LED	**12**	Video connector
5	Ethernet 2 activity LED	**13**	Power supply error LED (amber)
6	Ethernet 2 link LED	**14**	DC power LED (green)
7	PCI slot 1	**15**	AC power LED (green)
8	PCI slot 2		

You must turn off the server before you connect or disconnect cables.

See the documentation that comes with any external devices for additional cabling instructions. It might be easier for you to route cables before you connect the devices to the server.

Cable identifiers are printed on the cables that come with the server and optional devices. Use these identifiers to connect the cables to the correct connectors.

Updating the server configuration

When you start the server for the first time after you add or remove an internal option or external device, you might receive a message that the configuration has changed. The UEFI Setup Utility program starts automatically so that you can save the new configuration settings.

Some options have device drivers that you must install. For information about installing device drivers, see the documentation that comes with each option.

If the server has an optional RAID and you have installed or removed a hard disk drive, see the documentation that comes with the RAID for information about reconfiguring the disk arrays.

For information about configuring the integrated Gigabit Ethernet controller, see "Configuring the Gigabit Ethernet controllers" on page 219.

Chapter 7. Parts listing, RS210 Types 6531, 6532, 6533, and 6534

The following replaceable components are available for the ThinkServer RS210 Types 6531, 6532, 6533, and 6534 servers. To check for an updated parts listing on the Web, complete the following steps:

1. Go to http://www.lenovo.com/support.
2. Enter your product number (machine type and model number) or select **Servers and Storage** from the **Select your product** list.
3. From **Family** list, select **ThinkServer RS210**, and click **Continue**.

1	Riser card assembly	**12**	Bezel
2	DIMM air baffle	**13**	DVD drive filler
3	DIMM	**14**	Operator information panel
4	Power supply	**15**	Fans
5	SAS/SATA backplane (some models)	**16**	System board
6	SATA simple-swap back panel (some models)	**17**	Microprocessor
7	3.5-inch drive cage	**18**	Heat sink
8	3.5-inch simple-swap SATA hard disk drive (some models)	**19**	Cover
9	Simple-swap SATA filler		
10	Hot-swap hard disk drive filler		
11	3.5-inch or 2.5-inch hot-swap hard disk drive (depending on model)		

Replaceable server components

Replaceable components are of three types:

- **Self-service customer replaceable unit (CRU):** Replacement of self-service CRUs is your responsibility. If Lenovo installs a self-service CRU at your request, you will be charged for the installation.
- **Optional-service customer replaceable unit:** You may install an optional-service CRU yourself or request Lenovo to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

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

The following table lists the part numbers for the server components.

Table 15. Parts listing, Types 6531

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Riser PCIX (models CTO All Models)	49Y4675		
1	Riser PCI-E LP (models CTO All Models)	46C6796		
1	Riser PCI-E FH (models CTO All Models)	49Y4673		
2	Air Duct (models CTO All Models)	46C6798		
3	Memory module, 1GB DDR3-1333 1Rx8 LP RDIMM (models CTO)	46U1991		
3	Memory module, 1GB (1x1GB, Single Rankx8) PC3-10600 CL9 ECC DDR3 1333MHz LP UDIMM (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J)	46U2906		
3	Memory module, 2GB DDR3-1333 2Rx8 LP UDIMM (models CTO)	46U2907		
3	Memory module, 2GB DDR3-1333 2Rx8 LP RDIMM (models CTO)	46U1992		
3	Memory module, 4GB (1x4GB, Quad Rankx8) PC3-8500 CL7 ECC DDR3 1066MHz LP RDIMM (models CTO)	46U2941		
3	Memory module, 8GB (1x8GB, Quad Rankx8) PC3-8500 CL7 ECC DDR3 1066MHz LP RDIMM (models CTO)	46U2942		
4	Power supply, 351W-LE PSU (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J)			49Y4663
4	Power supply, 351W-HE PSU (models CTO)			49Y4664
5	SAS HS BACKPLANE 3.5″ (models CTO All Models)		46C6756	
6	SAS Backplane 2.5″ (models CTO All Models)		46C6757	
7	3.5″ DASD CAGE (models CTO All Models)	59Y3226		
9	SATA Filler 3.5″ (models CTO All Models)	39M4343		
10	SAS Filler 3.5″ (models CTO All Models)	39M4375		
11	Hard disk drive, 250GB 7200 RPM 3.5″ Hot-Swap SATA II (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J)	45J9642		
11	Hard disk drive, 500GB 7200 RPM 3.5″ Hot-Swap SATA II (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J)	45J9644		

Table 15. Parts listing, Types 6531 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
11	Hard disk drive, 146GB 15K 3.5″ Hot-Swap SAS (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J)	45J9658		
11	Hard disk drive, 750GB 7200 RPM 3.5″ Hot-Swap SATA II (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J)	45J9646		
11	Hard disk drive, IBM 1TB 7200 SATA 3.5″ HS HDD (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J)	45J9648		
11	IBM 146GB 10K 6Gbps SAS 2.5″ SFF Slim-HS HDD (models CTO 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J)	46U2120		
11	IBM 300GB 10K 6Gbps SAS 2.5″ SFF Slim-HS HDD (models CTO 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J)	46U2124		
11	IBM 73GB 15K 6Gbps SAS 2.5″ SFF Slim-HS HDD (models CTO 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J)	46U2128		
11	IBM 146GB 15K 6Gbps SAS 2.5″ SFF Slim-HS HDD (models CTO 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J)	46U2117		
11	IBM 500GB 7200 6Gbps NL SAS 2.5″ SFF Slim-HS HDD (models CTO 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J)	46U2758		
11	ThinkServer 300GB 6Gbps 15K 3.5′ Hot-Swap SAS drive (models CTO All Models)	46U3014		
11	ThinkServer 450GB 6Gbps 15K 3.5′ Hot-Swap SAS drive (models CTO All Models)	46U3015		
11	ThinkServer 600GB 6Gbps 15K 3.5′ Hot-Swap SAS drive (models CTO All Models)	46U3016		
12	Front Bezel (models CTO All Models)	46U2944		
13	DVD Blank (models CTO All Models)	49Y4868		
15	SYSTEM FAN (models CTO All Models)	59Y3212		
16	System board, Planar (models CTO All Models)			69Y1013
17	Microprocessor, Celeron G1101 2.26GHz/1066MHz-2MB 2C (models CTO)			49Y4645
17	Microprocessor, Xeon X3460 2.8GHz/1333MHz-8MB 4C (models CTO)			49Y4646
17	Microprocessor, Xeon X3430 2.4GHz/1333MHz-8MB 4C (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J)			49Y4647
17	Microprocessor, Xeon X3440 2.53GHz/1333MHz-8MB 4C (models CTO)			49Y4648
17	Microprocessor, Xeon X3450 2.67GHz/1333MHz-8MB 4C (models CTO)			49Y4649
17	Microprocessor, Pentium G6950 2.8 GHz/1066MHz-3MB 2C (models CTO)			49Y4668
17	Microprocessor, Xeon X3470 2.93GHz/1333MHz-8MB 4C (models CTO)			46C6775
17	Microprocessor, Core i3-540 3.06 GHz/1333MHz-4MB 2C (models CTO)			59Y3175
17	Microprocessor, Core i3-530 2.93 GHz/1333MHz-4MB 2C (models CTO)			59Y3176

Table 15. Parts listing, Types 6531 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
18	Heat Sink (models CTO All Models)		59Y3221	
19	TOP-COVER (models CTO All Models)	59Y3223		
	System battery (models CTO All Models)	33F8354		
	1U Tool-Less Rail Kit (models CTO All Models)	24P1121		
	EAR Bracket (models CTO All Models)	39M4351		
	Cable, miniSAS Cable (models CTO All Models)	41Y3884		
	Cable, Backplane cable (models CTO All Models)	59Y3210		
	Cable, 500mm SAS Cable (models CTO All Models)	59Y3214		
	Cable, Front I/O Cable (models CTO All Models)	59Y3228		
	Cable, 3.5″ SS SATA Cable (models CTO All Models)	59Y3230		
	Blank EMC Shield (models CTO All Models)	44T2248		
	Fornt I/O Board (models CTO All Models)	46C6797		
	HD InstCaution Label (models CTO All Models)	59Y3218		
	Low case (models CTO All Models)	59Y3225		
	2.5″ DASD cage (models CTO All Models)	59Y3227		
	NetXtreme II 1000 Express Ethernet Adapter (models CTO All Models)	39Y6070		
	PRO/1K PT Dual (models CTO All Models)	39Y6128		
	PRO/1K PT Quad (models CTO All Models)	39Y6138		
	2Post Rail Kit (models CTO All Models)	42C1069		
	PRO/1K PF Srvr (models CTO All Models)	42C1752		
	QLogic 10Gb adapter (models CTO All Models)	42C1802		
	SATA DVD-ROM (models CTO)	44W3254		
	SATA CD-RW DVD (models CTO)	44W3255		
	SATA Mulitburn (models CTO)	44W3256		
	ServeRAID-MR10i SAS/SATA Controller (models CTO)	43W4297		
	ServeRAID-MR10is VAULT SAS/SATA Controller (models CTO)	44E8696		
	IBM 3Gb SAS HBA Controller v2 (models CTO)	44E8701		
	ServeRAID-BR10il SAS/SATA Controller v2 (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J)	49Y4737		
	ServeRAID M5015 SAS/SATA Controller (models CTO)	46M0851		
	ServeRAID M5025 SAS/SATA Controller (models CTO)	46M0854		
	ServeRAID M1015 SAS/SATA Controller (models CTO)	46M0862		
	ServeRAID-MR10i Li-Ion Battery (models CTO)	43W4301		
	ServeRAID-MR10M SAS/SATA Controller with Remote Battery Kit (models CTO)	43W4341		
	ServeRAID M1015 RAID 5 Upgrade Key (models CTO)	46M0864		
	ServeRAID M5014 SAS/SATA Controller (models CTO)	46M0922		

6531 Software FRU	FRU#
EasyManage (models CTO All Models)	69Y9937
Documentation DVD (models CTO All Models)	90Y1164
EasyStartup (models CTO All Models)	90Y1165
WS2008 R2 FOUND 64bit US (models CTO All Models)	90Y1166
WS2008 R2 FOUND 64bit NL (models CTO All Models)	90Y1167
WS2008 R2 FOUND 64bit FR (models CTO All Models)	90Y1168
WS2008 R2 FOUND 64bit GR (models CTO All Models)	90Y1169
WS2008 R2 FOUND 64bit IT (models CTO All Models)	90Y1170
WS2008 R2 FOUND 64bit JP (models CTO All Models)	90Y1171
WS2008 R2 FOUND 64bit SP (models CTO All Models)	90Y1172
WS2008 R2 FOUND 64bit TR (models CTO All Models)	90Y1173
WS 2008 SBS SP2 STD 64bit US (models CTO All Models)	90Y1174
WS 2008 SBS SP2 STD 64bit NL (models CTO All Models)	90Y1175
WS 2008 SBS SP2 STD 64bit FR (models CTO All Models)	90Y1176
WS 2008 SBS SP2 STD 64bit GR (models CTO All Models)	90Y1177
WS 2008 SBS SP2 STD 64bit IT (models CTO All Models)	90Y1178
WS 2008 SBS SP2 STD 64bit JP (models CTO All Models)	90Y1179
WS 2008 SBS SP2 STD 64bit SP (models CTO All Models)	90Y1180
WS 2008 SBS SP2 STD 64bit TR (models CTO All Models)	90Y1181
WS 2008 SBS SP2 PREM 64bit US (models CTO All Models)	90Y1182
WS 2008 R2 STD 64bit US (models CTO All Models)	90Y1183
WS 2008 R2 STD 64bit FR (models CTO All Models)	90Y1184
WS 2008 R2 STD 64bit GR (models CTO All Models)	90Y1185
WS 2008 R2 STD 64bit JP (models CTO All Models)	90Y1186
WS 2008 R2 STD 64bit SP (models CTO All Models)	90Y1187
WS 2008 R2 STD 64bit IT (models CTO All Models)	90Y1188
WS 2008 R2 STD 64bit TR (models CTO All Models)	90Y1189
WS 2008 R2 STD 64bit NL (models CTO All Models)	90Y1190
WS 2008 R2 ENT 64bit US (models CTO All Models)	90Y1191
WS 2008 R2 ENT 64bit NL (models CTO All Models)	90Y1192
WS 2008 R2 ENT 64bit FR (models CTO All Models)	90Y1193
WS 2008 R2 ENT 64bit GR (models CTO All Models)	90Y1194
WS 2008 R2 ENT 64bit IT (models CTO All Models)	90Y1195
WS 2008 R2 ENT 64bit JP (models CTO All Models)	90Y1196
WS 2008 R2 ENT 64bit SP (models CTO All Models)	90Y1197
WS 2008 R2 ENT 64bit TR (models CTO All Models)	90Y1198
ROK WS2008 FOUND 64bit MUI EN/JP (models CTO All Models)	90Y1199
ROK WS2008 FOUND 64bit MUI EN/FR/GR/SP/IT (models CTO All Models)	90Y1200

Table 16. Parts listing, Types 6532

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Riser PCIX (models CTO All Models)	49Y4675		
1	Riser PCI-E LP (models CTO All Models)	46C6796		
1	Riser PCI-E FH (models CTO All Models)	49Y4673		
2	Air Duct (models CTO All Models)	46C6798		
3	Memory module, 1GB DDR3-1333 1Rx8 LP RDIMM (models CTO)	46U1991		
3	Memory module, 1GB (1x1GB, Single Rankx8) PC3-10600 CL9 ECC DDR3 1333MHz LP UDIMM (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J)	46U2906		
3	Memory module, 2GB DDR3-1333 2Rx8 LP UDIMM (models CTO)	46U2907		
3	Memory module, 2GB DDR3-1333 2Rx8 LP RDIMM (models CTO)	46U1992		
3	Memory module, 4GB (1x4GB, Quad Rankx8) PC3-8500 CL7 ECC DDR3 1066MHz LP RDIMM (models CTO)	46U2941		
3	Memory module, 8GB (1x8GB, Quad Rankx8) PC3-8500 CL7 ECC DDR3 1066MHz LP RDIMM (models CTO)	46U2942		
4	Power supply, 351W-LE PSU (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J)			49Y4663
4	Power supply, 351W-HE PSU (models CTO)			49Y4664
5	SAS HS BACKPLANE 3.5″ (models CTO All Models)		46C6756	
6	SAS Backplane 2.5″ (models CTO All Models)		46C6757	
7	3.5″ DASD cage (models CTO All Models)	59Y3226		
9	SATA Filler 3.5″ (models CTO All Models)	39M4343		
10	SAS Filler 3.5″ (models CTO All Models)	39M4375		
11	Hard disk drive, 250GB 7200 RPM 3.5″ Hot-Swap SATA II (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J)	45J9642		
11	Hard disk drive, 500GB 7200 RPM 3.5″ Hot-Swap SATA II (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J)	45J9644		
11	Hard disk drive, 146GB 15K 3.5″ Hot-Swap SAS (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J)	45J9658		
11	Hard disk drive, 750GB 7200 RPM 3.5″ Hot-Swap SATA II (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J)	45J9646		
11	Hard disk drive, IBM 1TB 7200 SATA 3.5″ HS HDD (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J)	45J9648		
11	IBM 146GB 10K 6Gbps SAS 2.5″ SFF Slim-HS HDD (models CTO 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J)	46U2120		
11	IBM 300GB 10K 6Gbps SAS 2.5″ SFF Slim-HS HDD (models CTO 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J)	46U2124		
11	IBM 73GB 15K 6Gbps SAS 2.5″ SFF Slim-HS HDD (models CTO 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J)	46U2128		

Table 16. Parts listing, Types 6532 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
11	IBM 146GB 15K 6Gbps SAS 2.5" SFF Slim-HS HDD (models CTO 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J)	46U2117		
11	IBM 500GB 7200 6Gbps NL SAS 2.5" SFF Slim-HS HDD (models CTO 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J)	46U2758		
11	ThinkServer 300GB 6Gbps 15K 3.5' Hot-Swap SAS drive (models CTO All Models)	46U3014		
11	ThinkServer 450GB 6Gbps 15K 3.5' Hot-Swap SAS drive (models CTO All Models)	46U3015		
11	ThinkServer 600GB 6Gbps 15K 3.5' Hot-Swap SAS drive (models CTO All Models)	46U3016		
12	Front Bezel (models CTO All Models)	46U2944		
13	DVD Blank (models CTO All Models)	49Y4868		
15	System fan (models CTO All Models)	59Y3212		
16	System board, Planar (models CTO All Models)			69Y1013
17	Microprocessor, Celeron G1101 2.26GHz/1066MHz-2MB 2C (models CTO)			49Y4645
17	Microprocessor, Xeon X3460 2.8GHz/1333MHz-8MB 4C (models CTO)			49Y4646
17	Microprocessor, Xeon X3430 2.4GHz/1333MHz-8MB 4C (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J)			49Y4647
17	Microprocessor, Xeon X3440 2.53GHz/1333MHz-8MB 4C (models CTO)			49Y4648
17	Microprocessor, Xeon X3450 2.67GHz/1333MHz-8MB 4C (models CTO)			49Y4649
17	Microprocessor, Pentium G6950 2.8 GHz/1066MHz-3MB 2C (models CTO)			49Y4668
17	Microprocessor, Xeon X3470 2.93GHz/1333MHz-8MB 4C (models CTO)			46C6775
17	Microprocessor, Core i3-540 3.06 GHz/1333MHz-4MB 2C (models CTO)			59Y3175
17	Microprocessor, Core i3-530 2.93 GHz/1333MHz-4MB 2C (models CTO)			59Y3176
18	Heat Sink (models CTO All Models)		59Y3221	
19	Top cover (models CTO All Models)	59Y3223		
	System battery (models CTO All Models)	33F8354		
	1U Tool-Less Rail Kit (models CTO All Models)	24P1121		
	EAR Bracket (models CTO All Models)	39M4351		
	Cable, mini SAS cable (models CTO All Models)	41Y3884		
	Cable, backplane cable (models CTO All Models)	59Y3210		
	Cable, 500mm SAS cable (models CTO All Models)	59Y3214		
	Cable, Front I/O cable (models CTO All Models)	59Y3228		
	Cable, 3.5" SS SATA cable (models CTO All Models)	59Y3230		

Table 16. Parts listing, Types 6532 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
	Blank EMC shield (models CTO All Models)	44T2248		
	Fornt I/O board (models CTO All Models)	46C6797		
	HD InstCaution Label (models CTO All Models)	59Y3218		
	Low case (models CTO All Models)	59Y3225		
	2.5″ DASD cage (models CTO All Models)	59Y3227		
	NetXtreme II 1000 Express Ethernet Adapter (models CTO All Models)	39Y6070		
	PRO/1K PT Dual (models CTO All Models)	39Y6128		
	PRO/1K PT Quad (models CTO All Models)	39Y6138		
	2Post Rail Kit (models CTO All Models)	42C1069		
	PRO/1K PF Srvr (models CTO All Models)	42C1752		
	QLogic 10Gb adapter (models CTO All Models)	42C1802		
	SATA DVD-ROM (models CTO)	44W3254		
	SATA CD-RW DVD (models CTO)	44W3255		
	SATA Mulitburn (models CTO)	44W3256		
	ServeRAID-MR10i SAS/SATA Controller (models CTO)	43W4297		
	ServeRAID-MR10is VAULT SAS/SATA controller (models CTO)	44E8696		
	IBM 3Gb SAS HBA controller v2 (models CTO)	44E8701		
	ServeRAID-BR10il SAS/SATA controller v2 (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J)	49Y4737		
	ServeRAID M5015 SAS/SATA controller (models CTO)	46M0851		
	ServeRAID M5025 SAS/SATA controller (models CTO)	46M0854		
	ServeRAID M1015 SAS/SATA controller (models CTO)	46M0862		
	ServeRAID-MR10i Li-Ion Battery (models CTO)	43W4301		
	ServeRAID-MR10M SAS/SATA controller with Remote Battery Kit (models CTO)	43W4341		
	ServeRAID M1015 RAID 5 Upgrade Key (models CTO)	46M0864		
	ServeRAID M5014 SAS/SATA Controller (models CTO)	46M0922		

6532 Software FRU	FRU#
EasyManage (models CTO All Models)	69Y9937
Documentation DVD (models CTO All Models)	90Y1164
EasyStartup (models CTO All Models)	90Y1165
WS2008 R2 FOUND 64bit US (models CTO All Models)	90Y1166
WS2008 R2 FOUND 64bit NL (models CTO All Models)	90Y1167
WS2008 R2 FOUND 64bit FR (models CTO All Models)	90Y1168
WS2008 R2 FOUND 64bit GR (models CTO All Models)	90Y1169
WS2008 R2 FOUND 64bit IT (models CTO All Models)	90Y1170

6532 Software FRU	FRU#
WS2008 R2 FOUND 64bit JP (models CTO All Models)	90Y1171
WS2008 R2 FOUND 64bit SP (models CTO All Models)	90Y1172
WS2008 R2 FOUND 64bit TR (models CTO All Models)	90Y1173
WS 2008 SBS SP2 STD 64bit US (models CTO All Models)	90Y1174
WS 2008 SBS SP2 STD 64bit NL (models CTO All Models)	90Y1175
WS 2008 SBS SP2 STD 64bit FR (models CTO All Models)	90Y1176
WS 2008 SBS SP2 STD 64bit GR (models CTO All Models)	90Y1177
WS 2008 SBS SP2 STD 64bit IT (models CTO All Models)	90Y1178
WS 2008 SBS SP2 STD 64bit JP (models CTO All Models)	90Y1179
WS 2008 SBS SP2 STD 64bit SP (models CTO All Models)	90Y1180
WS 2008 SBS SP2 STD 64bit TR (models CTO All Models)	90Y1181
WS 2008 SBS SP2 PREM 64bit US (models CTO All Models)	90Y1182
WS 2008 R2 STD 64bit US (models CTO All Models)	90Y1183
WS 2008 R2 STD 64bit FR (models CTO All Models)	90Y1184
WS 2008 R2 STD 64bit GR (models CTO All Models)	90Y1185
WS 2008 R2 STD 64bit JP (models CTO All Models)	90Y1186
WS 2008 R2 STD 64bit SP (models CTO All Models)	90Y1187
WS 2008 R2 STD 64bit IT (models CTO All Models)	90Y1188
WS 2008 R2 STD 64bit TR (models CTO All Models)	90Y1189
WS 2008 R2 STD 64bit NL (models CTO All Models)	90Y1190
WS 2008 R2 ENT 64bit US (models CTO All Models)	90Y1191
WS 2008 R2 ENT 64bit NL (models CTO All Models)	90Y1192
WS 2008 R2 ENT 64bit FR (models CTO All Models)	90Y1193
WS 2008 R2 ENT 64bit GR (models CTO All Models)	90Y1194
WS 2008 R2 ENT 64bit IT (models CTO All Models)	90Y1195
WS 2008 R2 ENT 64bit JP (models CTO All Models)	90Y1196
WS 2008 R2 ENT 64bit SP (models CTO All Models)	90Y1197
WS 2008 R2 ENT 64bit TR (models CTO All Models)	90Y1198
ROK WS2008 FOUND 64bit MUI EN/JP (models CTO All Models)	90Y1199
ROK WS2008 FOUND 64bit MUI EN/FR/GR/SP/IT (models CTO All Models)	90Y1200

Table 17. Parts listing, Types 6533

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Riser PCIX (models CTO All Models)	49Y4675		
1	Riser PCI-E LP (models CTO All Models)	46C6796		
1	Riser PCI-E FH (models CTO All Models)	49Y4673		
2	Air Duct (models CTO All Models)	46C6798		
3	Memory module, 1GB DDR3-1333 1Rx8 LP RDIMM (models CTO)	46U1991		

Table 17. Parts listing, Types 6533 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
3	Memory module, 1GB (1x1GB, Single Rankx8) PC3-10600 CL9 ECC DDR3 1333MHz LP UDIMM (models CTO)	46U2906		
3	Memory module, 2GB DDR3-1333 2Rx8 LP UDIMM (models CTO 11G 11M 11A 11J)	46U2907		
3	Memory module, 2GB DDR3-1333 2Rx8 LP RDIMM (models CTO)	46U1992		
3	Memory module, 4GB (1x4GB, Quad Rankx8) PC3-8500 CL7 ECC DDR3 1066MHz LP RDIMM (models CTO)	46U2941		
3	Memory module, 8GB (1x8GB, Quad Rankx8) PC3-8500 CL7 ECC DDR3 1066MHz LP RDIMM (models CTO)	46U2942		
4	Power supply, 351W-LE PSU (models CTO 11G 11M 11A 11J)			49Y4663
4	Power supply, 351W-HE PSU (models CTO)			49Y4664
5	SAS HS BACKPLANE 3.5″ (models CTO All Models)		46C6756	
6	SAS Backplane 2.5″ (models CTO All Models)		46C6757	
7	3.5″ DASD cage (models CTO All Models)	59Y3226		
8	Hard disk drive, 250GB 7200 RPM 3.5″ Simple-Swap SATA II (models CTO 11G 11M 11A 11J)	45J9634		
8	Hard disk drive, 500GB 7200 RPM 3.5″ Simple-Swap SATA II (models CTO 11G 11M 11A 11J)	46U1024		
8	Hard disk drive, 750GB 7200 RPM 3.5″ Simple-Swap SATA II (models CTO 11G 11M 11A 11J)	45J9638		
8	Hard disk drive, IBM Server 1TB 7200 SATA 3.5″ Simple Swap HDD (models CTO 11G 11M 11A 11J)	46U2916		
9	SATA Filler 3.5″ (models CTO All Models)	39M4343		
10	SAS Filler 3.5″ (models CTO All Models)	39M4375		
12	Front Bezel (models CTO All Models)	46U2944		
13	DVD Blank (models CTO All Models)	49Y4868		
15	System fan (models CTO All Models)	59Y3212		
16	System board, Planar (models CTO All Models)			69Y1013
17	Microprocessor, Celeron G1101 2.26GHz/1066MHz-2MB 2C (models CTO)			49Y4645
17	Microprocessor, Xeon X3460 2.8GHz/1333MHz-8MB 4C (models CTO)			49Y4646
17	Microprocessor, Xeon X3430 2.4GHz/1333MHz-8MB 4C (models CTO 11G 11M 11A 11J)			49Y4647
17	Microprocessor, Xeon X3440 2.53GHz/1333MHz-8MB 4C (models CTO)			49Y4648
17	Microprocessor, Xeon X3450 2.67GHz/1333MHz-8MB 4C (models CTO)			49Y4649
17	Microprocessor, Pentium G6950 2.8 GHz/1066MHz-3MB 2C (models CTO)			49Y4668
17	Microprocessor, Xeon X3470 2.93GHz/1333MHz-8MB 4C (models CTO)			46C6775

Table 17. Parts listing, Types 6533 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
17	Microprocessor, Core i3-540 3.06 GHz/1333MHz-4MB 2C (models CTO)			59Y3175
17	Microprocessor, Core i3-530 2.93 GHz/1333MHz-4MB 2C (models CTO)			59Y3176
18	Heat Sink (models CTO All Models)		59Y3221	
19	Top cover (models CTO All Models)	59Y3223		
	System battery (models CTO All Models)	33F8354		
	1U Tool-Less Rail Kit (models CTO All Models)	24P1121		
	EAR Bracket (models CTO All Models)	39M4351		
	Cable, mini SAS cable (models CTO All Models)	41Y3884		
	Cable, backplane cable (models CTO All Models)	59Y3210		
	Cable, 500mm SAS cable (models CTO All Models)	59Y3214		
	Cable, Front I/O cable (models CTO All Models)	59Y3228		
	Cable, 3.5″ SS SATA cable (models CTO All Models)	59Y3230		
	Blank EMC shield (models CTO All Models)	44T2248		
	Fornt I/O board (models CTO All Models)	46C6797		
	HD InstCaution Label (models CTO All Models)	59Y3218		
	Low case (models CTO All Models)	59Y3225		
	2.5″ DASD cage (models CTO All Models)	59Y3227		
	NetXtreme II 1000 Express Ethernet Adapter (models CTO All Models)	39Y6070		
	PRO/1K PT Dual (models CTO All Models)	39Y6128		
	PRO/1K PT Quad (models CTO All Models)	39Y6138		
	2Post Rail Kit (models CTO All Models)	42C1069		
	PRO/1K PF Srvr (models CTO All Models)	42C1752		
	QLogic 10Gb adapter (models CTO All Models)	42C1802		
	SATA DVD-ROM (models CTO)	44W3254		
	SATA CD-RW DVD (models CTO)	44W3255		
	SATA Mulitburn (models CTO)	44W3256		
	ServeRAID-MR10i SAS/SATA Controller (models CTO)	43W4297		
	ServeRAID-MR10is VAULT SAS/SATA controller (models CTO)	44E8696		
	IBM 3Gb SAS HBA controller v2 (models CTO)	44E8701		
	ServeRAID-BR10il SAS/SATA controller v2 (models CTO)	49Y4737		
	ServeRAID M5015 SAS/SATA controller (models CTO)	46M0851		
	ServeRAID M5025 SAS/SATA controller (models CTO)	46M0854		
	ServeRAID M1015 SAS/SATA controller (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J)	46M0862		
	ServeRAID-MR10i Li-Ion Battery (models CTO)	43W4301		

Table 17. Parts listing, Types 6533 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
	ServeRAID-MR10M SAS/SATA controller with Remote Battery Kit (models CTO)	43W4341		
	ServeRAID M1015 RAID 5 Upgrade Key (models CTO)	46M0864		
	ServeRAID M5014 SAS/SATA Controller (models CTO)	46M0922		

6533 Software FRU	FRU#
EasyManage (models CTO All Models)	69Y9937
Documentation DVD (models CTO All Models)	90Y1164
EasyStartup (models CTO All Models)	90Y1165
WS2008 R2 FOUND 64bit US (models CTO All Models)	90Y1166
WS2008 R2 FOUND 64bit NL (models CTO All Models)	90Y1167
WS2008 R2 FOUND 64bit FR (models CTO All Models)	90Y1168
WS2008 R2 FOUND 64bit GR (models CTO All Models)	90Y1169
WS2008 R2 FOUND 64bit IT (models CTO All Models)	90Y1170
WS2008 R2 FOUND 64bit JP (models CTO All Models)	90Y1171
WS2008 R2 FOUND 64bit SP (models CTO All Models)	90Y1172
WS2008 R2 FOUND 64bit TR (models CTO All Models)	90Y1173
WS 2008 SBS SP2 STD 64bit US (models CTO All Models)	90Y1174
WS 2008 SBS SP2 STD 64bit NL (models CTO All Models)	90Y1175
WS 2008 SBS SP2 STD 64bit FR (models CTO All Models)	90Y1176
WS 2008 SBS SP2 STD 64bit GR (models CTO All Models)	90Y1177
WS 2008 SBS SP2 STD 64bit IT (models CTO All Models)	90Y1178
WS 2008 SBS SP2 STD 64bit JP (models CTO All Models)	90Y1179
WS 2008 SBS SP2 STD 64bit SP (models CTO All Models)	90Y1180
WS 2008 SBS SP2 STD 64bit TR (models CTO All Models)	90Y1181
WS 2008 SBS SP2 PREM 64bit US (models CTO All Models)	90Y1182
WS 2008 R2 STD 64bit US (models CTO All Models)	90Y1183
WS 2008 R2 STD 64bit FR (models CTO All Models)	90Y1184
WS 2008 R2 STD 64bit GR (models CTO All Models)	90Y1185
WS 2008 R2 STD 64bit JP (models CTO All Models)	90Y1186
WS 2008 R2 STD 64bit SP (models CTO All Models)	90Y1187
WS 2008 R2 STD 64bit IT (models CTO All Models)	90Y1188
WS 2008 R2 STD 64bit TR (models CTO All Models)	90Y1189
WS 2008 R2 STD 64bit NL (models CTO All Models)	90Y1190
WS 2008 R2 ENT 64bit US (models CTO All Models)	90Y1191
WS 2008 R2 ENT 64bit NL (models CTO All Models)	90Y1192
WS 2008 R2 ENT 64bit FR (models CTO All Models)	90Y1193
WS 2008 R2 ENT 64bit GR (models CTO All Models)	90Y1194
WS 2008 R2 ENT 64bit IT (models CTO All Models)	90Y1195

6533 Software FRU	FRU#
WS 2008 R2 ENT 64bit JP (models CTO All Models)	90Y1196
WS 2008 R2 ENT 64bit SP (models CTO All Models)	90Y1197
WS 2008 R2 ENT 64bit TR (models CTO All Models)	90Y1198
ROK WS2008 FOUND 64bit MUI EN/JP (models CTO All Models)	90Y1199
ROK WS2008 FOUND 64bit MUI EN/FR/GR/SP/IT (models CTO All Models)	90Y1200

Table 18. Parts listing, Types 6534

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Riser PCIX (models CTO All Models)	49Y4675		
1	Riser PCI-E LP (models CTO All Models)	46C6796		
1	Riser PCI-E FH (models CTO All Models)	49Y4673		
2	Air Duct (models CTO All Models)	46C6798		
3	Memory module, 1GB DDR3-1333 1Rx8 LP RDIMM (models CTO)	46U1991		
3	Memory module, 1GB (1x1GB, Single Rankx8) PC3-10600 CL9 ECC DDR3 1333MHz LP UDIMM (models CTO)	46U2906		
3	Memory module, 2GB DDR3-1333 2Rx8 LP UDIMM (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J 15G 15M 15A 15J)	46U2907		
3	Memory module, 2GB DDR3-1333 2Rx8 LP RDIMM (models CTO 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J 13U 13F 13S 13L 13D 13Y 13G 13M 13A 13J)	46U1992		
3	Memory module, 4GB (1x4GB, Quad Rankx8) PC3-8500 CL7 ECC DDR3 1066MHz LP RDIMM (models CTO)	46U2941		
3	Memory module, 8GB (1x8GB, Quad Rankx8) PC3-8500 CL7 ECC DDR3 1066MHz LP RDIMM (models CTO)	46U2942		
4	Power supply, 351W-LE PSU (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J 13U 13F 13S 13L 13D 13Y 13G 13M 13A 13J)			49Y4663
4	Power supply, 351W-HE PSU (models CTO 14U 14F 14S 14L 14D 14Y 14G 14M 14A 14J 15G 15M 15A 15J)			49Y4664
5	SAS HS BACKPLANE 3.5″ (models CTO All Models)		46C6756	
6	SAS Backplane 2.5″ (models CTO All Models)		46C6757	
7	3.5″ DASD cage (models CTO All Models)	59Y3226		
9	SATA Filler 3.5″ (models CTO All Models)	39M4343		
10	SAS Filler 3.5″ (models CTO All Models)	39M4375		
11	Hard disk drive, 250GB 7200 RPM 3.5″ Hot-Swap SATA II (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J)	45J9642		
11	Hard disk drive, 500GB 7200 RPM 3.5″ Hot-Swap SATA II (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J)	45J9644		

Table 18. Parts listing, Types 6534 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
11	Hard disk drive, 146GB 15K 3.5″ Hot-Swap SAS (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J)	45J9658		
11	Hard disk drive, 750GB 7200 RPM 3.5″ Hot-Swap SATA II (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J)	45J9646		
11	Hard disk drive, IBM 1TB 7200 SATA 3.5″ HS hard disk drive (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J)	45J9648		
11	IBM 146GB 10K 6Gbps SAS 2.5″ SFF Slim-HS HDD (models CTO 13U 13F 13S 13L 13D 13Y 13G 13M 13A 13J 14U 14F 14S 14L 14D 14Y 14G 14M 14A 14J 15G 15M 15A 15J)	46U2120		
11	IBM 300GB 10K 6Gbps SAS 2.5″ SFF Slim-HS HDD (models CTO 13U 13F 13S 13L 13D 13Y 13G 13M 13A 13J 14U 14F 14S 14L 14D 14Y 14G 14M 14A 14J 15G 15M 15A 15J)	46U2124		
11	IBM 73GB 15K 6Gbps SAS 2.5″ SFF Slim-HS HDD (models CTO 13U 13F 13S 13L 13D 13Y 13G 13M 13A 13J 14U 14F 14S 14L 14D 14Y 14G 14M 14A 14J 15G 15M 15A 15J)	46U2128		
11	IBM 146GB 15K 6Gbps SAS 2.5″ SFF Slim-HS HDD (models CTO 13U 13F 13S 13L 13D 13Y 13G 13M 13A 13J 14U 14F 14S 14L 14D 14Y 14G 14M 14A 14J 15G 15M 15A 15J)	46U2117		
11	IBM 500GB 7200 6Gbps NL SAS 2.5″ SFF Slim-HS HDD (models CTO 13U 13F 13S 13L 13D 13Y 13G 13M 13A 13J 14U 14F 14S 14L 14D 14Y 14G 14M 14A 14J 15G 15M 15A 15J)	46U2758		
11	ThinkServer 300GB 6Gbps 15K 3.5′ Hot-Swap SAS drive (models CTO All Models)	46U3014		
11	ThinkServer 450GB 6Gbps 15K 3.5′ Hot-Swap SAS drive (models CTO All Models)	46U3015		
11	ThinkServer 600GB 6Gbps 15K 3.5′ Hot-Swap SAS drive (models CTO All Models)	46U3016		
12	Front Bezel (models CTO All Models)	46U2944		
13	DVD Blank (models CTO All Models)	49Y4868		
15	System fan (models CTO All Models)	59Y3212		
16	System board, Planar (models CTO All Models)			69Y1013
17	Microprocessor, Celeron G1101 2.26GHz/1066MHz-2MB 2C (models CTO)			49Y4645
17	Microprocessor, Xeon X3460 2.8GHz/1333MHz-8MB 4C (models CTO 15G 15M 15A 15J)			49Y4646
17	Microprocessor, Xeon X3430 2.4GHz/1333MHz-8MB 4C (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J)			49Y4647
17	Microprocessor, Xeon X3440 2.53GHz/1333MHz-8MB 4C (models CTO)			49Y4648

Table 18. Parts listing, Types 6534 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
17	Microprocessor, Xeon X3450 2.67GHz/1333MHz-8MB 4C (models CTO 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J 13U 13F 13S 13L 13D 13Y 13G 13M 13A 13J 14U 14F 14S 14L 14D 14Y 14G 14M 14A 14J)			49Y4649
17	Microprocessor, Pentium G6950 2.8 GHz/1066MHz-3MB 2C (models CTO)			49Y4668
17	Microprocessor, Xeon X3470 2.93GHz/1333MHz-8MB 4C (models CTO)			46C6775
17	Microprocessor, Core i3-540 3.06 GHz/1333MHz-4MB 2C (models CTO)			59Y3175
17	Microprocessor, Core i3-530 2.93 GHz/1333MHz-4MB 2C (models CTO)			59Y3176
18	Heat Sink (models CTO All Models)		59Y3221	
19	Top cover (models CTO All Models)	59Y3223		
	System battery (models CTO All Models)	33F8354		
	1U Tool-Less Rail Kit (models CTO All Models)	24P1121		
	EAR Bracket (models CTO All Models)	39M4351		
	Cable, mini SAS cable (models CTO All Models)	41Y3884		
	Cable, backplane cable (models CTO All Models)	59Y3210		
	Cable, 500mm SAS cable (models CTO All Models)	59Y3214		
	Cable, Front I/O cable (models CTO All Models)	59Y3228		
	Cable, 3.5″ SS SATA cable (models CTO All Models)	59Y3230		
	Blank EMC shield (models CTO All Models)	44T2248		
	Fornt I/O board (models CTO All Models)	46C6797		
	HD InstCaution Label (models CTO All Models)	59Y3218		
	Low case (models CTO All Models)	59Y3225		
	2.5″ DASD cage (models CTO All Models)	59Y3227		
	NetXtreme II 1000 Express Ethernet Adapter (models CTO All Models)	39Y6070		
	PRO/1K PT Dual (models CTO All Models)	39Y6128		
	PRO/1K PT Quad (models CTO All Models)	39Y6138		
	2Post Rail Kit (models CTO All Models)	42C1069		
	PRO/1K PF Srvr (models CTO All Models)	42C1752		
	QLogic 10Gb adapter (models CTO All Models)	42C1802		
	SATA DVD-ROM (models CTO)	44W3254		
	SATA CD-RW DVD (models CTO)	44W3255		
	SATA Mulitburn (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J 13U 13F 13S 13L 13D 13Y 13G 13M 13A 13J 14U 14F 14S 14L 14D 14Y 14G 14M 14A 14J 15G 15M 15A 15J)	44W3256		
	ServeRAID-MR10i SAS/SATA Controller (models CTO)	43W4297		

Table 18. Parts listing, Types 6534 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
	ServeRAID-MR10is VAULT SAS/SATA controller (models CTO)	44E8696		
	IBM 3Gb SAS HBA controller v2 (models CTO)	44E8701		
	ServeRAID-BR10il SAS/SATA controller v2 (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11A 11J)	49Y4737		
	ServeRAID M5015 SAS/SATA controller (models CTO 14U 14F 14S 14L 14D 14Y 14G 14M 14A 14J 15G 15M 15A 15J)	46M0851		
	ServeRAID M5025 SAS/SATA controller (models CTO)	46M0854		
	ServeRAID M1015 SAS/SATA controller (models CTO 12U 12F 12S 12L 12D 12Y 12G 12M 12A 12J 13U 13F 13S 13L 13D 13Y 13G 13M 13A 13J)	46M0862		
	ServeRAID-MR10i Li-Ion Battery (models CTO)	43W4301		
	ServeRAID-MR10M SAS/SATA controller with Remote Battery Kit (models CTO)	43W4341		
	ServeRAID M1015 RAID 5 Upgrade Key (models CTO)	46M0864		
	ServeRAID M5014 SAS/SATA Controller (models CTO)	46M0922		

6534 Software FRU	FRU#
EasyManage (models CTO All Models)	69Y9937
Documentation DVD (models CTO All Models)	90Y1164
EasyStartup (models CTO All Models)	90Y1165
WS2008 R2 FOUND 64bit US (models CTO All Models)	90Y1166
WS2008 R2 FOUND 64bit NL (models CTO All Models)	90Y1167
WS2008 R2 FOUND 64bit FR (models CTO All Models)	90Y1168
WS2008 R2 FOUND 64bit GR (models CTO All Models)	90Y1169
WS2008 R2 FOUND 64bit IT (models CTO All Models)	90Y1170
WS2008 R2 FOUND 64bit JP (models CTO All Models)	90Y1171
WS2008 R2 FOUND 64bit SP (models CTO All Models)	90Y1172
WS2008 R2 FOUND 64bit TR (models CTO All Models)	90Y1173
WS 2008 SBS SP2 STD 64bit US (models CTO All Models)	90Y1174
WS 2008 SBS SP2 STD 64bit NL (models CTO All Models)	90Y1175
WS 2008 SBS SP2 STD 64bit FR (models CTO All Models)	90Y1176
WS 2008 SBS SP2 STD 64bit GR (models CTO All Models)	90Y1177
WS 2008 SBS SP2 STD 64bit IT (models CTO All Models)	90Y1178
WS 2008 SBS SP2 STD 64bit JP (models CTO All Models)	90Y1179
WS 2008 SBS SP2 STD 64bit SP (models CTO All Models)	90Y1180
WS 2008 SBS SP2 STD 64bit TR (models CTO All Models)	90Y1181
WS 2008 SBS SP2 PREM 64bit US (models CTO All Models)	90Y1182
WS 2008 R2 STD 64bit US (models CTO All Models)	90Y1183
WS 2008 R2 STD 64bit FR (models CTO All Models)	90Y1184

6534 Software FRU	FRU#
WS 2008 R2 STD 64bit GR (models CTO All Models)	90Y1185
WS 2008 R2 STD 64bit JP (models CTO All Models)	90Y1186
WS 2008 R2 STD 64bit SP (models CTO All Models)	90Y1187
WS 2008 R2 STD 64bit IT (models CTO All Models)	90Y1188
WS 2008 R2 STD 64bit TR (models CTO All Models)	90Y1189
WS 2008 R2 STD 64bit NL (models CTO All Models)	90Y1190
WS 2008 R2 ENT 64bit US (models CTO All Models)	90Y1191
WS 2008 R2 ENT 64bit NL (models CTO All Models)	90Y1192
WS 2008 R2 ENT 64bit FR (models CTO All Models)	90Y1193
WS 2008 R2 ENT 64bit GR (models CTO All Models)	90Y1194
WS 2008 R2 ENT 64bit IT (models CTO All Models)	90Y1195
WS 2008 R2 ENT 64bit JP (models CTO All Models)	90Y1196
WS 2008 R2 ENT 64bit SP (models CTO All Models)	90Y1197
WS 2008 R2 ENT 64bit TR (models CTO All Models)	90Y1198
ROK WS2008 FOUND 64bit MUI EN/JP (models CTO All Models)	90Y1199
ROK WS2008 FOUND 64bit MUI EN/FR/GR/SP/IT (models CTO All Models)	90Y1200

Power cords

For your safety, Lenovo provides a power cord with a grounded attachment plug to use with this Lenovo product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.

Lenovo power cords used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA).

For units intended to be operated at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.

For units intended to be operated at 230 volts (U.S. use): Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts.

For units intended to be operated at 230 volts (outside the U.S.): Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.

Lenovo power cords for a specific country or region are usually available only in that country or region.

Table 19. Power cords, Type 6531

Lenovo Power cord part number	Used in these countries and regions
39M5247	Taiwan 2.8M (models CTO)
39M5102	ANZ 2.8M (models CTO 11M 12M)
39M5123	Europe 2.8M (models CTO)
39M5130	Denmark 2.8M (models CTO 11G 12G)
39M5144	S. Africa 2.8M (models CTO 11G 11M 11A 12G 12M 12A)
39M5151	UK 2.8M (models CTO 11G 11A 12G 12A)
39M5158	Switzerland 2.8M (models CTO 11G 12G)
39M5165	Italy 2.8M (models CTO 11S 11L 11Y 11G 12S 12L 12Y 12G)
39M5172	Israel 2.8M (models CTO 11G 12G)
39M5219	Korea 2.8M (models CTO)
39M5199	Japan 2.8M (models CTO 11J 12J)
39M5068	Argentina 2.8M (models CTO 11L 11Y 12L 12Y)
39M5081	US/Canada 2.8M (models CTO 11U 11F 11S 11L 11D 11A 12U 12F 12S 12L 12D 12A)
39M5226	India 2.8M (models CTO)
39M5179	Europe 2.8M (models CTO)
39M5233	Brazil 2.8M (models CTO)
39M5206	China 2.8M (models CTO)

Table 20. Power cords, Type 6532

Lenovo Power cord part number	Used in these countries and regions
39M5247	Taiwan 2.8M (models CTO)
39M5102	ANZ 2.8M (models CTO 11M 12M)
39M5123	Europe 2.8M (models CTO)
39M5130	Denmark 2.8M (models CTO 11G 12G)
39M5144	S. Africa 2.8M (models CTO 11G 11M 11A 12G 12M 12A)
39M5151	UK 2.8M (models CTO 11G 11A 12G 12A)
39M5158	Switzerland 2.8M (models CTO 11G 12G)
39M5165	Italy 2.8M (models CTO 11S 11L 11Y 11G 12S 12L 12Y 12G)
39M5172	Israel 2.8M (models CTO 11G 12G)
39M5219	Korea 2.8M (models CTO)
39M5199	Japan 2.8M (models CTO 11J 12J)
39M5068	Argentina 2.8M (models CTO 11L 11Y 12L 12Y)
39M5081	US/Canada 2.8M (models CTO 11U 11F 11S 11L 11D 11A 12U 12F 12S 12L 12D 12A)
39M5226	India 2.8M (models CTO)
39M5179	Europe 2.8M (models CTO)
39M5233	Brazil 2.8M (models CTO)
39M5247	Taiwan 2.8M (models CTO)

Table 21. Power cords, Type 6533

Lenovo Power cord part number	Used in these countries and regions
39M5247	Taiwan 2.8M (models CTO)
39M5102	ANZ 2.8M (models CTO 11M)
39M5123	Europe 2.8M (models CTO)
39M5130	Denmark 2.8M (models CTO 11G)
39M5144	S. Africa 2.8M (models CTO 11G 11M 11A)
39M5151	UK 2.8M (models CTO 11G 11A)
39M5158	Switzerland 2.8M (models CTO 11G)
39M5165	Italy 2.8M (models CTO 11G)
39M5172	Israel 2.8M (models CTO 11G)
39M5219	Korea 2.8M (models CTO)
39M5199	Japan 2.8M (models CTO 11J)
39M5068	Argentina 2.8M (models CTO)
39M5081	US/Canada 2.8M (models CTO 11A)
39M5226	India 2.8M (models CTO)
39M5179	Europe 2.8M (models CTO)
39M5233	Brazil 2.8M (models CTO)
39M5247	Taiwan 2.8M (models CTO)

Table 22. Power cords, Type 6534

Lenovo Power cord part number	Used in these countries and regions
39M5247	Taiwan 2.8M (models CTO)
39M5102	ANZ 2.8M (models CTO 11M 12M 13M 14M 15M)
39M5123	Europe 2.8M (models CTO)
39M5130	Denmark 2.8M (models CTO 11G 12G 13G 14G 15G)
39M5144	S. Africa 2.8M (models CTO 11G 11M 11A 12G 12M 12A 13G 13M 13A 14G 14M 14A 15G 15M 15A)
39M5151	UK 2.8M (models CTO 11G 11A 12G 12A 13G 13A 14G 14A 15G 15A)
39M5158	Switzerland 2.8M (models CTO 11G 12G 13G 14G 15G)
39M5165	Italy 2.8M (models CTO 11S 11L 11Y 11G 12S 12L 12Y 12G 13S 13L 13Y 13G 14S 14L 14Y 14G 15G)
39M5172	Israel 2.8M (models CTO 11G 12G 13G 14G 15G)
39M5219	Korea 2.8M (models CTO)
39M5199	Japan 2.8M (models CTO 11J 12J 13J 14J 15J)
39M5068	Argentina 2.8M (models CTO 11L 11Y 12L 12Y 13L 13Y 14L 14Y)
39M5081	US/Canada 2.8M (models CTO 11U 11F 11S 11L 11D 11A 12U 12F 12S 12L 12D 12A 13U 13F 13S 13L 13D 13A 14U 14F 14S 14L 14D 14A 15A)
39M5226	India 2.8M (models CTO)
39M5179	Europe 2.8M (models CTO)
39M5233	Brazil 2.8M (models CTO)

Table 22. Power cords, Type 6534 (continued)

Lenovo Power cord part number	Used in these countries and regions
39M5206	China 2.8M (models CTO)

Chapter 8. Configuring the server

The following configuration programs come with the server:

- **Setup Utility program**

  The Setup Utility program is part of the UEFI. Use it to configure serial port assignments, change interrupt request (IRQ) settings, change the startup-device sequence, set the date and time, and set passwords.

- **Boot Manager program**

  The Boot Manager program is part of the server firmware. Use it to override the startup sequence that is set in the Setup Utility and temporarily assign a device to be first in the startup sequence.

- **ThinkServer EasyStartup program**

  This program simplifies the process of configuring your RAID controllers and installing your operating system. It is on the *ThinkServer EasyStartup* DVD provided with your server. For details, see "Using the *EasyStartup* DVD" on page 209.

- **Integrated Management Module**

  Use the integrated management module (IMM) for configuration, to update the firmware and sensor data record/field replaceable unit (SDR/FRU) data, and to remotely manage a network.

- **ThinkServer EasyManage products**

  ThinkServer EasyManage Core Server and ThinkServer EasyManage Agent work together to provide centralized hardware and software inventory management and secure automated system management through a single console. See "Installing ThinkServer EasyManage software" on page 216.

- **Remote presence capability and blue-screen capture**

  The remote presence and blue-screen capture feature are integrated into the Integrated Management Module (IMM). The virtual media key is required to enable the remote presence functions. When the optional virtual media key is installed in the server, it activates the remote presence functions. Without the virtual media key, you will not be able to access the network remotely to mount or unmount drives or images on the client system. However, you will still be able to access the Web interface without the virtual media key. You can order the optional Lenovo Virtual Media Key, if one did not come with your server. For more information about how to enable the remote presence function, see "Using the remote presence capability and blue-screen capture" on page 218.

- **LSI Configuration Utility program**

  Use the LSI Configuration Utility program to configure the integrated SAS/SATA controller with RAID capabilities and the devices that are attached to it. For information about using this program, see "Using LSI Configuration Utility program" on page 206.

- **Ethernet controller configuration**

  For information about configuring the Ethernet controller, see "Configuring the Gigabit Ethernet controllers" on page 219.

- **IBM Advanced Settings Utility (ASU) program**

  Use this program as an alternative to the Setup utility for modifying UEFI settings and IMM settings. Use the ASU program online or out of band to modify UEFI settings from the command line without the need to restart the server to access the Setup utility. For more information about using this program, see .

Using the Setup Utility

The Setup Utility program is part of the UEFI. You can use it to perform the following tasks:

- View configuration information
- View and change assignments for devices and I/O ports
- Set the date and time
- Set and change passwords
- View and change the startup characteristics of the server and the order of startup devices (startup-drive sequence)
- View and change settings for advanced hardware features
- View and clear the event and error logs
- Change interrupt request (IRQ) settings
- Resolve configuration conflicts

Starting the Setup Utility

To start the Setup Utility, do the following:

1. Turn on the server.

   Note: Approximately 1 to 3 minutes after the server is connected to power, the power-control button becomes active.

2. When the prompt <F1> Setup is displayed, press F1. If you have set an administrator password, you must type the administrator password to access the full Setup Utility menu. If you do not type the administrator password, a limited Setup Utility menu is available.

3. Select settings to view or change.

Setup Utility menu choices

The following choices are on the Setup Utility main menu for the UEFI. Depending on the version of the firmware, some menu choices might differ slightly from these descriptions.

- **System Information**

  Select this choice to view information about the server. When you make changes through other choices in the Setup Utility, some of those changes are reflected in the system information; you cannot change settings directly in the system information. This choice is on the full Setup Utility menu only.

  – **System Summary**

  Select this choice to view configuration information, including the ID, speed, and cache size of the microprocessors, machine type and model of the server, the serial number, the system UUID, and the amount of installed memory. When you make configuration changes through other options in the Setup Utility, the changes are reflected in the system summary; you cannot change settings directly in the system summary.

  – **Product Data**

  Select this choice to view the system-board identifier, the revision level or issue date of the firmware, the integrated management module and diagnostics code, and the version and date.

  This choice is on the full Setup Utility menu only.

- **System Settings**

  Select this choice to view or change the server component settings.

  – **Processors**

  Select this choice to view or change the processor settings.

  – **Memory**

  Select this choice to view or change the memory settings.

– **Devices and I/O Ports**

Select this choice to view or change assignments for devices and input/output (I/O) ports. You can configure the serial ports; configure remote console redirection; enable or disable integrated Ethernet controllers, the SAS/SATA controller, SATA DVD drive channels, and PCI slots; and view the system Ethernet MAC addresses. If you disable a device, it cannot be configured, and the operating system will not be able to detect it (this is equivalent to disconnecting the device).

– **Power**

Select this choice to view or change power capping to control consumption, processors, and performance states.

– **Legacy Support**

Select this choice to view or set legacy support.

- **Force Legacy Video on Boot**

Select this choice to force INT video support, if the operating system does not support UEFI video output standards.

- **Rehook INT**

Select this choice to enable or disable devices from taking control of the boot process. The default is **Disable**.

- **Legacy Thunk Support**

Select this choice to enable or disable UEFI to interact with PCI mass storage devices that are non-UEFI compliant.

– **Integrated Management Module**

Select this choice to view or change the settings for the integrated management module.

- **POST Watchdog Timer**

Select this choice to view or enable the POST watchdog timer.

- **POST Watchdog Timer Value**

Select this choice to view or set the POST loader watchdog timer value.

- **Reboot System on NMI**

Enable or disable restarting the system whenever a nonmaskable interrupt (NMI) occurs. **Disabled** is the default.

- **Commands on USB Interface Preference**

Select this choice to enable or disable the Ethernet over USB interface on IMM.

- **Network Configuration**

Select this choice to view the system management network interface port, the IMM MAC address, the current IMM IP address, and the host name; define the static IMM IP address, subnet mask, and gateway address; specify whether to use the static IP address or have DHCP assign the IMM IP address; save the network changes; and reset the IMM.

- **Reset IMM to Defaults**

Select this choice to view or reset IMM to the default settings.

- **Reset IMM**

Select this choice to reset IMM.

– **System Security**

Select this choice to view or configure Trusted Platform Module (TPM) support.

– **Adapters and UEFI Drivers**

Select this choice to view information about the UEFI 1.10 and UEFI 2.0 compliant controllers and drivers installed in the server.

– **Network**

Select this choice to view or configure the network device options, such as iSCSI, PXE, and network devices.

Note: The configuration forms for UEFI 2.1 and greater compliant add-on network devices might be located here.

- **Date and Time**

  Select this choice to set the date and time in the server, in 24-hour format (*hour*:*minute*:*second*).

  This choice is on the full Setup Utility menu only.

- **Start Options**

  Select this choice to view or change the start options, including the startup sequence, keyboard NumLock state, PXE boot option, and PCI device boot priority. Changes in the startup options take effect when you start the server.

  The startup sequence specifies the order in which the server checks devices to find a boot record. The server starts from the first boot record that it finds. For example, you can define a startup sequence that checks for a disc in the DVD drive, then checks the hard disk drive, and then checks a network adapter.

  This choice is on the full Setup Utility menu only.

- **Boot Manager**

  Select this choice to view, add, delete, or change the device boot priority, boot from a file, select a one-time boot, or reset the boot order to the default setting.

  If the server has Wake on LAN hardware and software and the operating system supports Wake on LAN functions, you can specify a startup sequence for the Wake on LAN functions. For example, you can define a startup sequence that checks for a disc in the CD-RW/DVD drive, then checks the hard disk drive, and then checks a network adapter.

- **System Event Logs**

  Select this choice to enter the System Event Manager, where you can view the error messages in the system event logs. You can use the arrow keys to move between pages in the error log.

  The system event logs contain all event and error messages that have been generated during POST, by the systems-management interface handler, and by the system service processor. Run the diagnostic programs to get more information about error codes that occur.

  Important: If the system-error LED on the front of the server is lit but there are no other error indications, clear the IMM system-event log. Also, after you complete a repair or correct an error, clear the IMM system-event log to turn off the system-error LED on the front of the server.

  - **POST Event Viewer**

    Select this choice to enter the POST event viewer to view the POST error messages.

  - **System Event Log**

    Select this choice to view the IMM system event log.

  - **Clear System Event Log**

    Select this choice to clear the IMM system event log.

- **User Security**

  Select this choice to set, change, or clear passwords. See "Passwords" on page 203 for more information.

  This choice is on the full and limited Setup Utility menu.

  - **Power-on Password**

    Select this choice to set or change a power-on password. See "Power-on password" on page 203 for more information.

  - **Administrator Password**

    Select this choice to set or change an administrator password. An administrator password is intended to be used by a system administrator; it limits access to the full Setup Utility menu. If an administrator password is set, the full Setup Utility menu is available only if you type the administrator password at the password prompt. For more information, see "Administrator password" on page 204.

- **Save Settings**

Select this choice to save the changes that you have made in the settings.

- **Restore Settings**

  Select this choice to cancel the changes that you have made in the settings and restore the previous settings.

- **Load Default Settings**

  Select this choice to cancel the changes that you have made in the settings and restore the factory settings.

- **Exit Setup**

  Select this choice to exit from the Setup Utility. If you have not saved the changes that you have made in the settings, you are asked whether you want to save the changes or exit without saving them.

Passwords

From the **System Security** choice, you can set, change, and delete a power-on password and an administrator password. The **System Security** choice is on the full Configuration/Setup Utility menu only.

If you set only a power-on password, you must type the power-on password to complete the system startup; you have access to the full Configuration/Setup Utility menu.

An administrator password is intended to be used by a system administrator; it limits access to the full Configuration/Setup Utility menu. If you set only an administrator password, you do not have to type a password to complete the system startup, but you must type the administrator password to access the Configuration/Setup Utility menu.

If you set a power-on password for a user and an administrator password for a system administrator, you can type either password to complete the system startup. A system administrator who types the administrator password has access to the full Configuration/Setup Utility menu; the system administrator can give the user authority to set, change, and delete the power-on password. A user who types the power-on password has access to only the limited Configuration/Setup Utility menu; the user can set, change, and delete the power-on password, if the system administrator has given the user that authority.

Power-on password

If a power-on password is set, when you turn on the server, the system startup will not be completed until you type the power-on password. You can use any combination of up to seven characters (A - Z, a - z, and 0 - 9) for the password.

If a power-on password is set, you can enable the Unattended Start mode, in which the keyboard and mouse remain locked but the operating system can start. You can unlock the keyboard and mouse by typing the power-on password.

If you forget the power-on password, you can regain access to the server in any of the following ways:

- If an administrator password is set, type the administrator password at the password prompt (see "Administrator password" on page 204). Start the Configuration/Setup Utility program and reset the power-on password.
- Remove the battery from the server and then reinstall it. For instructions for removing the battery, see "Replacing the system-board battery" on page 151.
- Change the position of the clear CMOS jumper on the system board to bypass the power-on password check. See "Power-on password" for additional information.

Attention: Before you change any switch settings or move any jumpers, turn off the server; then, disconnect all power cords and external cables. See the safety information in "Important Safety Information" on page 1 and "Guidelines for trained service technicians" on page 115. Do not change settings or move jumpers on any system-board switch or jumper block that is not shown in this document.

Administrator password

If an administrator password is set, you must type the administrator password for access to the full Setup utility menu. You can use any combination of up to seven characters (A - Z, a - z, and 0 - 9) for the password.

If you forget the administrator password, you can reset it after you change the position of the clear CMOS jumper.

Resetting passwords

If you forget the power-on password or administrator password, you can move the clear-CMOS jumper block on the system board to pins 2 and 3, to clear CMOS memory and bypass the power-on or administrator password check. The jumper location is shown in the following illustration.

Table 23. System board jumpers

Jumper number	Jumper name	Jumper setting
JP1	Clear CMOS jumper **1**	• Pins 1 and 2: Keep CMOS data (default). • Pins 2 and 3: Clear CMOS data (including power-on password and administrator password)
JP6	Boot block jumper **2**	• Pins 1 and 2: Boot from primary BIOS page (default) . • Pins 2 and 3: Boot from backup BIOS page.

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Table 23. System board jumpers (continued)

Jumper number	Jumper name	Jumper setting

Notes:

1. If no jumper is present, the server responds as if the pins are set to 1 and 2.

2. Changing the position of the UEFI boot recovery jumper from pins 1 and 2 to pins 2 and 3 before the server is turned on alters which flash ROM page is loaded. Do not change the jumper pin position after the server is turned on. This can cause an unpredictable problem.

Using the Boot Manager program

The Boot Manager program is a built-in, menu-driven configuration utility program that you can use to temporarily redefine the first startup device without changing settings in the Setup Utility.

To use the Boot Manager program, do the following:

1. Turn off the server.

2. Restart the server.

3. When the prompt `<F12> Select Boot Device` is displayed, press F12. If a bootable USB mass storage device is installed, a submenu item (**USB Key/Disk**) is displayed.

4. Use the Up arrow and Down arrow keys to select an item from the **Boot Selection Menu** and press Enter. The server attempts to boot from the selected device.

The next time the server starts, it returns to the startup sequence that is set in the Setup Utility.

Configuring RAID controllers

The following table lists the various utilities available to configure RAID controllers before an operating system is installed.

Table 24. RAID configuration utilities

RAID configuration utility	Description	Location	Where to find more information
EasyStartup RAID configuration utility	• For use with all factory-supported RAID controllers except ServeRAID-BR10i • Automatically detects hardware and lists all supported RAID configurations • Configures one or more disk arrays per controller depending on the number of drives attached to the controller and the RAID level selected • Supports hot-spare drives • Creates a RAID response file that can be used to configure RAID controllers on similarly configured Lenovo servers.	EasyStartup DVD	"Using the *EasyStartup* DVD" on page 209

Table 24. RAID configuration utilities (continued)

RAID configuration utility	Description	Location	Where to find more information
MegaRAID BIOS Configuration Utility (WebBIOS)	For: • IBM ServeRAID-BR10il SAS/SATA Controller • IBM ServeRAID-MR10i SAS/SATA Controller • IBM ServeRAID-M1015 SAS/SATA controller	In system firmware. To access: • Use UEFI Setup Utility. • Press Ctrl + H at the WebBIOS prompt during startup.	"Using the WebBIOS utility" on page 208
LSI Configuration Utility	For: • IBM ServeRAID-BR10il SAS/SATA Controller • IBM ServeRAID-MR10i SAS/SATA Controller • IBM ServeRAID-M1015 SAS/SATA controller	In system firmware. To access: • Use UEFI Setup Utility. • Press Ctrl + C at the LSI prompt during startup.	"Using LSI Configuration Utility program"

Using LSI Configuration Utility program

Use the LSI Configuration Utility program to configure and manage redundant array of independent disks (RAID) arrays. Be sure to use this program as described in this document.

• Use the LSI Configuration Utility program to perform the following tasks:
  – Perform a low-level format on a hard disk drive
  – Create an array of hard disk drives with or without a hot-spare drive
  – Set protocol parameters on hard disk drives

The integrated SAS/SATA controller with RAID capabilities supports RAID arrays. You can use the LSI Configuration Utility program to configure RAID 1 (IM), RAID 1E (IME), and RAID 0 (IS) for a single pair of attached devices. If you install a different type of RAID controller, follow the instructions in the documentation that comes with the adapter to view or change settings for attached devices.

When you are using the LSI Configuration Utility program to configure and manage arrays, consider the following information:

• The integrated SAS/SATA controller with RAID capabilities supports the following features:
  – Integrated Mirroring (IM) with hot-spare support (also known as RAID 1)

    Use this option to create an integrated array of two disks plus up to two optional hot spares. All data on the primary disk can be migrated.
  – Integrated Mirroring Enhanced (IME) with hot-spare support (also known as RAID 1E)

    Use this option to create an integrated mirror enhanced array of three to eight disks, including up to two optional hot spares. All data on the array disks will be deleted.
  – Integrated Striping (IS) (also known as RAID 0)

    Use this option to create an integrated striping array of two to eight disks. All data on the array disks will be deleted.
• Hard disk drive capacities affect how you create arrays. The drives in an array can have different capacities, but the RAID controller treats them as if they all have the capacity of the smallest hard disk drive.
• If you use an integrated SAS/SATA controller with RAID capabilities to configure a RAID 1 (mirrored) array after you have installed the operating system, you will lose access to any data or applications that were previously stored on the secondary drive of the mirrored pair.

- If you install a different type of RAID controller, see the documentation that comes with the controller for information about viewing and changing settings for attached devices.

Starting the LSI Configuration Utility program

To start the LSI Configuration Utility program, complete the following steps:

1. Turn on the server.

   Note: Approximately 1 to 3 minutes after the server is connected to ac power, the power-control button becomes active.

2. When the prompt <F1 Setup> is displayed, press F1. If you have set an administrator password, you are prompted to type the password.

3. Select **System Settings → Adapters and UEFI drivers**.

4. Select **Please refresh this page on the first visit** and press Enter.

5. Select **LSI** *controller_driver_name Driver* and press Enter, where *controller_driver_name* is the name of the SAS/SATA controller driver. For the SAS/SATA controller driver name, see the documentation that comes with your controller.

6. To perform storage-management tasks, follow the procedures in the documentation that comes with the SAS/SATA controller.

When you have finished changing settings, press Esc to exit from the program; select **Save** to save the settings that you have changed.

Formatting a hard disk drive

Low-level formatting removes all data from the hard disk. If there is data on the disk that you want to save, back up the hard disk before you perform this procedure.

Note: Before you format a hard disk, make sure that the disk is not part of a mirrored pair.

To format a drive, complete the following steps:

1. From the list of adapters, select the controller (channel) for the drive that you want to format and press Enter.

2. Select **SAS Topology** and press Enter.

3. Select **Direct Attach Devices** and press Enter.

4. To highlight the drive that you want to format, use the Up Arrow and Down Arrow keys. To scroll left and right, use the Left Arrow and Right Arrow keys or the End key. Press Alt+D.

5. To start the low-level formatting operation, select **Format** and press Enter.

Creating a RAID array of hard disk drives

To create a RAID array of hard disk drives, complete the following steps:

1. From the list of adapters, select the controller (channel) for the drives that you want to mirror.

2. Select **RAID Properties**.

3. Select the type of array that you want to create.

4. Use the arrow keys to highlight the first drive in the pair; then, press the Minus (-) or Plus (+) key to change the mirror value to **Primary**.

5. Continue to select the next drive using the Minus (-) or Plus (+) key until you have selected all the drives for your array.

6. Press C to create the disk array.

7. Select **Apply changes and exit menu** to create the array.

Using the WebBIOS utility

The WebBIOS configuration utility enables you to create and manage RAID configurations on LSI SAS controllers. The WebBIOS utility resides in the SAS controller BIOS and operates independently of the operating system. The WebBIOS utility provides a configuration wizard to guide you through the configuration of virtual disks and physical arrays.

Starting the WebBIOS utility

Perform the following steps to start the WebBIOS utility and access the main menu:

1. After you turn on the power and when the computer is starting, you are prompted to press Ctrl + H when the following message is displayed:

   ```
   Copyright© LSI Logic Corporation
   Press <Ctrl><H> for WebBIOS
   ```

2. Select a controller from the list.

3. Click **Start**. The main WebBIOS utility interface is displayed. You can toggle between the physical view and logical view of the storage devices that are connected to the controller. Click **Physical View** or **Logical View** on the menu in the left pane to change the view.

Main menu of the WebBIOS utility

The main menu includes the following options:

Adapter Properties
> From this view, you can display and modify the properties of the SAS controller that is currently selected.

Scan Devices
> From this view, you can re-scan the physical and virtual disks for any changes in the drive status or physical configuration.

Virtual Disks
> From this view, you can display and modify the virtual disk properties, delete virtual disks, initialize disks, and perform other tasks.

Physical Drives
> From this view, you can view the physical drive properties, create hot spare disks, and perform other tasks.

Configuration Wizard
> Select this to start the Configuration Wizard and create a new storage configuration, clear a configuration, or add a new configuration.

Adapter Selection
> From this view, you can select a different SAS adapter. Then, you can view information about the adapter and the drives connected to it, or create a new configuration for the adapter.

Physical View or Logical View
> Select this to toggle between the Physical View and Logical View.

Events
> From this view, you can display the system events in the Event Information page.

Exit Select this to exit the WebBIOS utility and continue with the system boot.

Creating a storage configuration using the Configuration Wizard

Follow these steps to start create a storage configuration:

1. Click **Configuration Wizard** to start the wizard.

2. Select a configuration option:

Attention: If you select **Clear Configuration** or **New Configuration**, all existing data in the configuration is deleted. Make a backup copy of any data that you want to keep before selecting these options.

Clear Configuration
> Clears the existing configuration.

New Configuration
> Clears the existing configuration and lets you create a new configuration.

Add Configuration
> Retains the existing storage configuration and adds new drives to it (this does not cause any data loss).

3. Click **Next**.
4. Select a configuration mode from the following options:

Custom Configuration
> In this mode, you can control all attributes of the new storage configuration.

Auto Configuration and Redundancy
> This mode automatically creates an optimal RAID 1 or RAID 5 configuration, providing data redundancy.

Auto Configuration without Redundancy
> This mode automatically creates a non-redundant RAID 0 configuration.

5. Click **Next** to continue.

Viewing and changing properties

You can view information for one LSI SAS at a time. If your system has multiple LSI SAS adapters, you can view information for a different adapter, click **Adapter Selection** on the main view. To view the properties for the currently selected adapter, click **Adapter Properties** on the main WebBIOS screen.

Viewing and changing virtual disk properties

On the WebBIOS main screen, select a virtual disk from the list and click **Virtual Disk**.

The Properties panel displays the RAID level, state, size, and stripe size.

The Policies panel lists the virtual disk policies that were defined when the storage configuration was created. To change any of these policies, select a policy from the menu and click **Change**. The Operations panel lists operations that can be performed on the virtual disk. Select the operation and click **Go**. Then choose from the following operations:

- Select **Del** to delete this virtual disk.
- Select **Locate** and the LEDs flash on the physical drives used by this virtual disk.
- Select **Fast** or **Slow** to initialize this virtual disk.

   Attention: Before you run an initialization, back up any data on the virtual disk that you want to save. All data on the virtual disk is lost when you initialize it.

Using the *EasyStartup* DVD

The *EasyStartup* DVD simplifies the process of configuring your RAID controllers and installing an operating system. The program works in conjunction with your Windows or Linux operating-system installation disc to automate the process of installing the operating system and associated device drivers.

If you did not receive an *EasyStartup* DVD with your server, you can download an image from the Lenovo Support Web site at: http://www.lenovo.com/support

The EasyStartup program has the following features:

- Self-booting DVD
- Easy-to-use, language-selectable interface
- Integrated help system
- Automatic hardware detection
- RAID configuration utility
- Device drivers (based on the server model and detected devices)
- Selectable partition size and file system type
- Support for Windows, Red Hat, and SUSE Server operating systems
- Installs the operating system and device drivers in an unattended mode to save time
- Creates a reusable response file that can be used with similarly configured Lenovo servers to make future installations even faster

Before you use the *EasyStartup* DVD

Functionality and supported operating systems can vary with different versions of the EasyStartup program. To learn more about the version you have, do the following:

1. Insert the *EasyStartup* DVD and restart the server.
2. Advance to the Home screen.
3. Click **Compatibility notes**. The compatibility notes feature provides detailed information about the RAID controllers, operating systems, and server configurations supported by that version of the EasyStartup program.
4. Click **User Guide**. The user guide provides an overview of the various functions provided by that version of the EasyStartup program.

Before using the EasyStartup program to install an operating system, make sure any external storage devices and fiber channels are configured correctly.

EasyStartup overview

The EasyStartup program requires a supported Lenovo server with an enabled, startable (bootable) DVD drive. In addition to the *EasyStartup* DVD, you also must have the operating-system installation CD or DVD and the product key or installation number for the operating system (if provided).

The EasyStartup program performs the following tasks:

- Detects installed hardware devices
- Guides you through the process of configuring one or more RAID controllers
- Guides you through the process of creating a response file for the unattended installation of the operating system
- Enables you to create scripts or commands that run at the end of the operating system installation process
- Facilitates the installation of the ThinkServer EasyManage products and DVD-burning software (Windows installation only)
- Prepares the hard disk for installation
- Prompts you to insert the operating-system installation disc
- Initiates an unattended installation of the operating system and device drivers

Setup and configuration

When you start the *EasyStartup* DVD, you will be prompted for the following:

- Select the language in which you want to view the program.
- Select the language of the keyboard you will be using with the program.

Note: The following language keyboards are supported: English, Dutch, French, German, Italian, Japanese, Spanish, and Turkish.

You will then see one or more reminders about configuring storage devices, and then you will be presented with the Lenovo License Agreement. Read the license agreement carefully. You must agree with terms in order to continue.

After agreeing to the license agreement, you will be given the following choices:

- Continue to the main program interface
- Use a shortcut to install an operating system based on a response file that you previously created using the EasyStartup program
- Use a short cut to configure RAID controllers based on a RAID response file that you previously created using the EasyStartup program

If you continue to the main program interface, you will have the following selectable options:

- **Compatibility notes:** This selection provides information about the RAID controllers, operating systems, and server configurations supported by that version of the EasyStartup program.
- **User Guide:** This selection provides information about the features provided by that version of the EasyStartup program.
- **Hardware list:** This selection displays a list of hardware devices detected by the EasyStartup program.
- **Configure RAID:** This selection enables you to view the current RAID configuration for each installed RAID controller and make changes if needed.
- **Install operating system:** This selection displays a series of choices and prompts to collect information required for installation, prepares the hard disk for installation, and then initiates the installation process using the user-provided operating-system installation CD or DVD.
- **About:** This selection displays version information and legal notices.

Configuring RAID

The RAID configuration feature that is part of the EasyStartup program enables you to view and change RAID settings for supported RAID controllers. Through this feature, you have the ability to configure each installed controller. The program automatically detects the number of discs currently attached to the controller, determines the possible RAID configurations that can be configured, and prompts you through the steps to configure one or more disc arrays with or without hot-spare drives. As you configure each controller you will be given the option to save the RAID configuration settings to a RAID response file, which you can use on other similarly configured Lenovo servers. This method satisfies most users' needs.

Note: The EasyStartup program provides limited support for the IBM ServeRAID-BR10il SAS/SATA Controller. You must use the LSI Configuration Utility to configure the disc array for this controller. However, after the disc arrays are configured, you can use the EasyStartup program to install the operating system and associated device driver. See "Using LSI Configuration Utility program" on page 206 for details.

Typical operating system installation

When you select **Install operating system**, you will be prompted for information required for the installation. The prompts vary depending on the operating system selected. This section describes the tasks associated with a typical Windows operating system installation. Each task must be completed in order before moving to the next task.

Note: Ensure that your RAID controller is correctly configured before you select an operating system to install.

- **Select operating system:** This task enables you to select the operating system that you will be installing.
- **Select disk:** This task enables you to select the disk where you want to install the operating system.

Note: The disk that you select must be set as the boot disk in UEFI.

- **Partitions options:** This task enables you to choose whether you want to repartition the selected drive or use an existing partition.
- **Partition settings:** This task enables you to choose the file system type and define the partition size.
- **Installation settings:** This task prompts you for user and system settings, the operating system product key, and the administrator password.
- **Network settings:** This task prompts you for domain and workgroup settings, Ethernet controller type, IP address settings, DNS settings, and WINS address settings.
- **Install applications:** This task enables you to run custom commands or scripts at the end of the installation process. It also facilitates the installation of DVD-burning software and ThinkServer EasyManage software products.
- **Install Windows components:** This task enables you to install optional Windows components such as IIS, ASP.NET, and SNMP.
- **Confirm settings:** This task enables you to review all of the information you provided.
- **Save response file:** This task gives you the option of saving the information on a diskette or USB device as a response file for future installations on similarly configured Lenovo servers.
- **Start installation:** This task starts the actual installation process. First, the disk is prepared using the disk and partition information you specified. Then you are prompted to insert the operating system disk, and the operating system is installed using the information that you specified.

Installing your operating system without using EasyStartup

If you have already configured the server hardware and you are not using the EasyStartup program to install your operating system, do the following to download the latest operating-system installation instructions from the Lenovo Support Web site:

Note: Changes are made periodically to the Lenovo Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to http://www.lenovo.com/support.
2. Enter your product number (machine type and model number) or select **Servers and Storage** from the **Select your product** list.
3. From **Family** list, select **ThinkServer RS210**, and click **Continue**.
4. Select the operating system that you want from the **Operating system** list, and click **Continue**.
5. Click **Operating system installation** to download instructions to install the operating system.

Updating the firmware

The firmware in the server is periodically updated and is available for download on the Lenovo Support Web site. Go to http://www.lenovo.com/support to check for the latest level of firmware, such as unified extensible firmware interface (UEFI) code, vital product data (VPD) code, device drivers, and service processor firmware.

When you replace a device in the server, you might have to either update the server with the latest version of the firmware that is stored in memory on the device or restore the pre-existing firmware from a diskette or CD image.

- UEFI code is stored in programmable ROM (flash memory) on the system board.
- IMM firmware is stored in ROM on the baseboard management controller on the system board.
- Ethernet firmware is stored in ROM on the Ethernet controller.
- ServeRAID firmware is stored in ROM on the RAID controller.
- Major components contain VPD code. You can use the IBM Advanced Settings Utility program to update the VPD code (see "IBM Advanced Settings Utility program" on page 216).

The following items are downloadable at http://www.lenovo.com/support:
- Diagnostics programs
- IMM firmware
- Ethernet firmware

Using the EasyUpdate Firmware Updater tool

ThinkServer EasyUpdate Firmware Updater is a software application that enables you to maintain your system firmware up to date and helps you avoid unnecessary outages. Firmware Updater updates the server firmware in two steps, by updating system firmware, adapter firmware, and hard disk drive (HDD) firmware.

To update your system, first go to the Lenovo Support Web site and obtain the ISO file.

1. Go to http://www.lenovo.com/support.
2. Enter your product number (machine type and model number) or select **Servers and Storage** from the **Select your product** list.
3. From **Family** list, select **ThinkServer RS210**, and click **Continue**.
4. Click **Downloads and drivers** to download firmware updates.
5. Download the ThinkServer firmware update media ISO file.
6. Burn the ISO image on to a CD or DVD.
7. Insert the media in the server DVD drive, and start the server to that drive.
8. The application starts automatically. Hardware detection runs, and a list of applicable firmware updates is displayed.

   Note: You need to boot the CD or DVD two times; one time to update the system and adapter firmware and one time to update the HDD firmware.
9. Select the firmware updates that you want to install.

Before distributing the firmware update to other servers, ensure that your server can restart successfully without encountering hardware problems.

Starting the backup server firmware

The system board contains a backup copy area for the server firmware. This is a secondary copy of the server firmware that you update only during the process of updating the server firmware. If the primary copy of the server firmware becomes damaged, use this backup copy.

To force the server to start from the backup copy, turn off the server; then, place the JP6 jumper in the backup position (pins 2 and 3).

Use the backup copy of the server firmware until the primary copy is restored. After the primary copy is restored, turn off the server; then, move the JP6 jumper back to the primary position (pins 1 and 2).

Recovering the UEFI firmware

If the UEFI firmware has become damaged, such as from a power failure during an update, you can recover the UEFI firmware using the boot block jumper and a UEFI recovery diskette.

The system board contains a backup copy area for the server firmware. This is a secondary copy of the server firmware that you update only during the process of updating the server firmware. If the primary copy of the server firmware becomes damaged, use this backup copy.

To force the server to start from the backup copy, turn off the server; then, place jumper JP6 in the backup position (pins 2 and 3).

- Pins 1 and 2: Boot from primary BIOS page (default) .
- Pins 2 and 3: Boot from backup BIOS page.

Use the backup copy of the server firmware until the primary copy is restored. After the primary copy is restored, turn off the server; then, move jumper JP6 back to the primary position (pins 1 and 2).
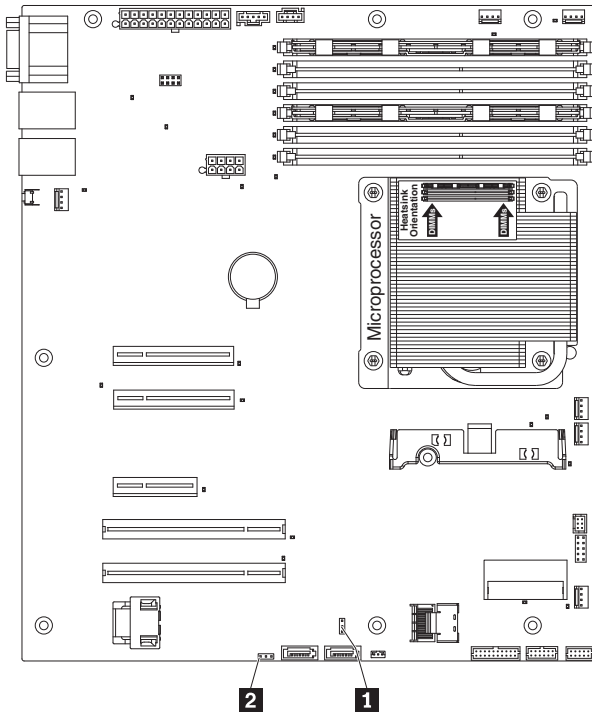
The following table describes the jumpers on the system board.

Table 25. System board jumpers

Jumper number	Jumper name	Jumper setting
JP1	Clear CMOS jumper **1**	• Pins 1 and 2: Keep CMOS data (default). • Pins 2 and 3: Clear CMOS data (including power-on password and administrator password)
JP6	Boot block jumper **2**	• Pins 1 and 2: Boot from primary BIOS page (default) . • Pins 2 and 3: Boot from backup BIOS page.
Notes: 1. If no jumper is present, the server responds as if the pins are set to 1 and 2. 2. Changing the position of the UEFI boot recovery jumper from pins 1 and 2 to pins 2 and 3 before the server is turned on alters which flash ROM page is loaded. Do not change the jumper pin position after the server is turned on. This can cause an unpredictable problem.		

Using the integrated management module

The integrated management module (IMM) is a second generation of the functions that were formerly provided by the baseboard management controller hardware. It combines service processor functions, video controller, and (when an optional virtual media key is installed) remote presence function in a single chip.

The IMM supports the following basic systems-management features:

- Environmental monitor with fan speed control for temperature, voltages, fan failure, and power supply failure.
- DIMM error assistance. The Unified Extensible Firmware Interface (UEFI) disables a failing DIMM that is detected during POST, and the IMM lights the associated system error LED and the failing DIMM error LED.
- System-event log (SEL).
- ROM-based IMM firmware flash updates.
- Auto Boot Failure Recovery (ABR).
- A virtual media key, which enables remote presence support (remote video, remote keyboard/mouse, and remote storage).
- Nonmaskable interrupt (NMI) detection and reporting.
- Automatic Server Restart (ASR) when POST is not complete or the operating system hangs and the operating system watchdog timer times-out. The IMM might be configured to watch for the operating system watchdog timer and reboot the system after a timeout, if the ASR feature is enabled. Otherwise, the IMM allows the administrator to generate a nonmaskable interrupt (NMI) by pressing an NMI button on the system board for an operating-system memory dump. ASR is supported by IPMI.
- Intelligent Platform Management Interface (IPMI) Specification V2.0 and Intelligent Platform Management Bus (IPMB) support.
- Invalid system configuration (CNFG) LED support.
- Serial port redirection over Telnet or SSH.
- Serial over LAN (SOL).
- Query power-supply input power.
- PECI 2 support.
- Power/reset control (power-on, hard and soft shutdown, hard and soft reset, schedule power control).
- Alerts (in-band and out-of-band alerting, PET traps - IPMI style, SNMP, e-mail).
- Operating-system failure blue screen capture.
- Command-line interface.
- Configuration save and restore.
- PCI configuration data.
- Boot sequence manipulation.

The IMM also provides the following remote server management capabilities through the OSA SMBridge management utility program:

- **Command-line interface (IPMI Shell)**

  The command-line interface provides direct access to server management functions through the IPMI 2.0 protocol. Use the command-line interface to issue commands to control the server power, view system information, and identify the server. You can also save one or more commands as a text file and run the file as a script.

- **Serial over LAN**

  Establish a Serial over LAN (SOL) connection to manage servers from a remote location. You can remotely view and change the UEFI settings, restart the server, identify the server, and perform other management functions. Any standard Telnet client application can access the SOL connection.

IBM Advanced Settings Utility program

The IBM Advanced Settings Utility (ASU) program is an alternative to the UEFI Setup Utility program for modifying UEFI settings. Use the ASU program online or out of band to modify UEFI settings from the command line without the need to restart the system to access the UEFI Setup Utility program.

You also can use the ASU program to configure the optional remote presence features or other IMM settings. The remote presence features provide enhanced systems-management capabilities.

In addition, the ASU program provides limited settings for configuring the IPMI function in the IMM through the command-line interface.

Use the command-line interface to issue setup commands. You can save any of the settings as a file and run the file as a script. The ASU program supports scripting environments through a batch-processing mode.

Installing ThinkServer EasyManage software

You can install the ThinkServer EasyManage Core Server program from the ThinkServer EasyManage CD or you can download and install the program from http://www.lenovo.com/support. After one instance of the ThinkServer EasyManage Core Server has been installed, you can use the ThinkServer EasyManage Agent installer to install the agent on other servers and clients on the network.

Also, the ThinkServer EasyStartup program provides an option to either install the ThinkServer EasyManage Agent as part of the operating system installation process or install a desktop icon to assist with the installation of the ThinkServer EasyManage Core Server after the operating system has been installed.

Installation requirements

Before installing ThinkServer EasyManage software on your server, your environment must meet the following requirements:
* Microsoft® Windows Server 2008 is installed on the server where you intend to install the Core Server.
* The original Windows Server operating system installation CDs are available in case files are needed while installing the prerequisites.
* The server has Internet access to obtain prerequisites and to activate the software after the installation is complete.
* The server has a static IP address.
* The server is not a domain controller. However, it is recommended to have the server join a domain.
* The account that you use to log in and to install the Core Server has Administrator privileges on the server with full read/write access. Ideally, this account is also a Domain Administrator account. This account will be used to create the initial administrator-level account used to log in to the ThinkServer EasyManage console.
* Any previous agent from EasyManage or LANDesk must be removed prior to installing the Core Server and Management Console.

Installation order

The order in which you install the operating system and Windows Components is critical to install ThinkServer EasyManage software successfully. To ensure a clean, working installation of ThinkServer EasyManage software, use the following installation order:

1. Install Microsoft Windows Server 2008 32-bit with the latest Service Pack.
2. Install the Windows Components: See "Installing Windows 2008 32-bit components" on page 217.
3. Use Windows Update to install all available critical updates.

4. Download Microsoft Web Services Enhancement 2.0 Service Pack 3 (LANDesk Process Manager only) from the following Web site: http://www.microsoft.com/downloads/details.aspx?FamilyID=1ba1f631-c3e7-420a-bc1e-ef18bab66122&DisplayLang=en. Install the software using the default settings.

   Note: This specific version is required.
5. Use Windows Update to install all available critical updates.
6. Launch the EasyManage installation.
7. After ThinkServer EasyManage is installed, enable Security and Patch Manager to obtain the LANDesk 8.8 Software Updates. In the console application, click **Help -> LANDesk -> Security Updates** for a guide to configuring Security and Patch Manager.
8. Install Adobe® Flash Player 9 if you plan to use the Management Console functions from the same server on which the Core Server is installed. You can obtain Adobe Flash Player 9 from the Adobe Web site: http://www.adobe.com/products/flashplayer/

Installing Windows 2008 32-bit components

To install the Windows Server 2008 32-bit components necessary for a ThinkServer EasyManage core server installation, complete the steps in this section.

Installing Web Server Role (IIS)

To install the Web Server Role (IIS), do the following:
1. Click **Start** -> **Server Manager**.
2. Under Roles Summary, click **Add Roles**. The **Add Roles** wizard appears.
3. Click **Next**.
4. Select the checkbox next to **Web Server (IIS)**. A dialog box displays the additional features that are required.
5. Click **Add Required Features**, then click **Next**. In the list of additional role services that can be installed, ensure that the following are selected:
   - HTTP Redirection
   - Static Content
   - ASP.NET
   - ASP
   - CGI
   - Server Side Includes
   - Windows Authentication
   - IIS 6 Metabase Compatibility

   Note: When you select **ASP.Net** or **ASP**, a dialog box displays the additional role services required. Click **Add Required Role Services**.
6. Click **Install**.

   Note: If IIS is already installed and certain Role Services are still required, expand **Roles** in the tree view on the left in Server Manager and click on **Web Server (IIS)**, then click on **Add Role Services**. Select the necessary role services and click **Install**.

Installing Microsoft SNMP services

To install Microsoft SNMP services, do the following:
1. Click **Add Features** in the **Features Summary** section on the main page of Server Manager.
2. Select the **SNMP Services** checkbox.
3. Click **Next,** then **Install**.

Uninstalling the LANDesk Software Agent

If the Core Server has LANDesk agents on it from a previous Management Suite release, it will fail the autorun prerequisite check. You must remove the old agents by running uninstallwinclient.exe file from the \Program Files\LANDesk\ManagementSuite folder.

Using the remote presence capability and blue-screen capture

The remote presence and blue-screen capture features are integrated functions of the integrated management module (IMM). When the optional Lenovo Virtual Media Key is installed in the server, it activates the remote presence functions. The virtual media key is required to enable the integrated remote presence and blue-screen capture features. Without the virtual media key, you will not be able to access the network remotely to mount or unmount drives or images on the client system. However, you can still access the Web interface without the key.

After the virtual media key is installed in the server, it is authenticated to determine whether it is valid. If the key is not valid, you receive a message from the Web interface (when you attempt to start the remote presence feature) indicating that the hardware key is required to use the remote presence feature.

The virtual media key has an LED. When this LED is lit and green, it indicates that the key is installed and functioning correctly. When the LED is not lit, it indicates that the key might not be installed correctly.

The remote presence feature provides the following functions:
- Remotely viewing video with graphics resolutions up to 1280 x 1024 at 75 Hz, regardless of the system state
- Remotely accessing the server, using the keyboard and mouse from a remote client
- Mapping the DVD drive, diskette drive, and USB flash drive on a remote client, and mapping ISO and diskette image files as virtual drives that are available for use by the server
- Uploading a diskette image to the IMM memory and mapping it to the server as a virtual drive

The blue-screen capture feature captures the video display contents before the IMM restarts the server when the IMM detects an operating-system hang condition. A system administrator can use the blue-screen capture to assist in determining the cause of the hang condition.

Enabling the remote presence feature

To enable the remote presence feature, complete the following steps:
1. Install the virtual media key into the dedicated slot on the system board (see "Installing the virtual media key" on page 167).
2. Turn on the server.

   Note: Approximately 1 to 3 minutes after the server is connected to ac power, the power-control button becomes active.

Obtaining the IP address for the IMM

To access the Web interface, you need the IP address for the IMM. You can obtain the IMM IP address through the Setup utility. The server comes with a default IP address for the IMM of 192.168.70.125. To locate the IP address, complete the following steps:
1. Turn on the server.

   Note: Approximately 1 to 3 minutes after the server is connected to ac power, the power-control button becomes active.

2. When the prompt `<F1> Setup` is displayed, press F1. (This prompt is displayed on the screen for only a few seconds. You must press F1 quickly.) If you have set both a power-on password and an administrator password, you must type the administrator password to access the full Setup utility menu.

3. From the Setup utility main menu, select **System Settings**.

4. On the next screen, select **Integrated Management Module**.

5. On the next screen, select **Network Configuration**.

6. Find the IP address and write it down.

7. Exit from the Setup utility.

Logging on to the Web interface

To log on to the Web interface to use the remote presence functions, complete the following steps:

1. Open a Web browser and in the **address** or **URL** field, type the IP address or host name of the IMM to which you want to connect.

   Note: The IMM defaults to DHCP. If a DHCP host is not available, the IMM assigns a static IP address of 192.168.70.125.

2. On the Login page, type the user name and password. If you are using the IMM for the first time, you can obtain the user name and password from your system administrator. All login attempts are documented in the event log.

   Note: The IMM is set initially with a user name of USERID and password of PASSW0RD (passw0rd with a zero, not a the letter O). You have read/write access. You must change the default password the first time you log on.

3. On the Welcome page, type a timeout value (in minutes) in the field that is provided. The IMM will log you off of the Web interface if your browser is inactive for the number of minutes that you entered for the timeout value.

4. Click **Continue** to start the session. The System Health page provides a quick view of the system status.

Enabling the Intel Gigabit Ethernet Utility program

The Intel Gigabit Ethernet Utility program is part of the server firmware. You can use it to configure the network as a startable device, and you can customize where the network startup option appears in the startup sequence. Enable and disable the Intel Gigabit Ethernet Utility program from the Setup utility.

Configuring the Gigabit Ethernet controllers

The Ethernet controllers are integrated on the system board. They provide an interface for connecting to a 10 Mbps, 100 Mbps, or 1 Gbps network and provide full-duplex (FDX) capability, which enables simultaneous transmission and reception of data on the network. If the Ethernet ports in the server support auto-negotiation, the controllers detect the data-transfer rate (10BASE-T, 100BASE-TX, or 1000BASE-T) and duplex mode (full-duplex or half-duplex) of the network and automatically operate at that rate and mode.

You do not have to set any jumpers or configure the controllers. However, you must install a device driver to enable the operating system to address the controllers. For device drivers and information about configuring the Ethernet controllers, see the *Intel Hartwell 82574L Gigabit Ethernet Software* CD that comes with the server. To find updated information about configuring the controllers, complete the following steps.

Note: Changes are made periodically to the Lenovo Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to http://www.lenovo.com/support.
2. Enter your product number (machine type and model number) or select **Servers and Storage** from the **Select your product** list.
3. From **Family** list, select **ThinkServer RS210**, and click **Continue**.

Enabling and configuring Serial over LAN (SOL)

Establish a Serial over LAN (SOL) connection to manage servers from a remote location. You can remotely view and change the BIOS settings, restart the server, identify the server, and perform other management functions. Any standard Telnet client application can access the SOL connection.

To enable and configure the server for SOL, you must update and configure the UEFI code; update and configure the integrated management module (IMM) firmware; update and configure the Ethernet controller firmware; and enable the operating system for an SOL connection.

UEFI update and configuration

To update and configure the UEFI code to enable SOL, complete the following steps:

1. Update the UEFI code:
   a. Download the latest version of the UEFI code from http://www.lenovo.com/support.
   b. Update the UEFI code, following the instructions that come with the update file that you downloaded.
2. Update the IMM firmware:
   a. Download the latest version of the IMM firmware from http://www.lenovo.com/support.
   b. Update the IMM firmware, following the instructions that come with the update file that you downloaded.
3. Configure the UEFI settings:
   a. When you are prompted to start the Configuration/Setup Utility program, restart the server and press F1.
   b. Select **System Settings** → **Devices and I/O Ports**.
   c. Select **Console Redirection Settings**; then, make sure that the values are set as follows:
      - **COM Port 1**: Enable
      - **Remote Console**: Enable
      - **Serial Port Sharing**: Enable
      - **Serial Port Access Mode**: Dedicated COM1 Settings
      - **Baud Rate**: 115200
      - **Data Bits**: 8
      - **Parity**: None Stop
      - **Bits**: 1
      - **Thermal Emulation**: ANSI
      - **Active After Boot**: Enable
      - **Flow Control**: Hardware
   d. Press Esc twice to exit the **Devices and I/O Ports** section of the Configuration/Setup Utility program.
   e. Select **Save Settings**; then, press Enter.
   f. Press Enter to confirm.
   g. Select **Exit Setup**; then, press Enter.
   h. Make sure that Yes, exit the Setup Utility is selected; then, press Enter.

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Important notes

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

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 1024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 bytes.

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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.

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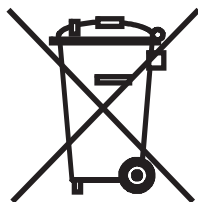
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注意: このマークは EU 諸国およびノルウェーにおいてのみ適用されます。

この機器には、EU 諸国に対する廃電気電子機器指令 2002/96/EC(WEEE) のラベルが貼られています。この指令は、EU 諸国に適用する使用済み機器の回収とリサイクルの骨子を定めています。このラベルは、使用済みになった時に指令に従って適正な処理をする必要があることを知らせるために種々の製品に貼られています。

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L'etiquette du système respecte la Directive européenne 2002/96/EC en matière de Déchets des Equipements Electriques et Electroniques (DEEE), qui détermine les dispositions de retour et de recyclage applicables aux systèmes utilisés à travers l'Union européenne. Conformément à la directive, ladite étiquette précise que le produit sur lequel elle est apposée ne doit pas être jeté mais être récupéré en fin de vie.

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EEE Yönetmeliğine Uygundur.

Recycling statements for Japan

日本のリサイクルに関して

本機器またはモニターの回収リサイクルについて

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URL にアクセスしてください。
http://www.ibm.com/jp/pc/service/recycle/personal

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本機器のプリント基板等には微量の重金属(鉛など) が使用されています。使用後は適切な処理を行うため、上記「本機器またはモニターの回収リサイクルについて」に従って廃棄してください。

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This product may contain a lithium or lithium ion battery. Consult your user manual or service manual for specific battery information. The battery must be recycled or disposed of properly. Recycling facilities may not be available in your area. For information on disposal or batteries outside the United States, go to http://www.lenovo.com/lenovo/environment or contact your local waste disposal facility.

For Taiwan: Please recycle batteries.

For the European Union:

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The product is not suitable for use with visual display work place devices according to clause 2 of the German Ordinance for Work with Visual Display Units.

Das Produkt ist nicht für den Einsatz an Bildschirmarbeitsplätzen im Sinne § 2 der Bildschirmarbeitsverordnung geeignet.

Electronic emission notices

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.

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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 may 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.

United Kingdom telecommunications safety requirement

Notice to Customers

This apparatus is approved under approval number NS/G/1234/J/100003 for indirect connection to public telecommunication systems in the United Kingdom.

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 fitting of non-Lenovo option cards

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22/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.

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Germany Class A compliance statement

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.

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Deutschland:

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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.

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