lenovo

Hardware Maintenance Manual

ThinkThinkThinkServerThink

ThinkServer TD200x
Machine Types: 3719, 3821, 3822, and 3823

ThinkServer TD200x Types 3719, 3821, 3822, and 3823

Hardware Maintenance Manual

Note: Before using this information and the product it supports, read the general information in Appendix B, "Notices," on page 279 and the *Warranty and Support Information* document on the Lenovo® *ThinkServer Documentation* DVD.

Contents

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 Chapter 2, "Safety information," on page 5.

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。

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

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

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 ThinkCentre 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 HMM 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. Safety information

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

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

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

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

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.

- 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.

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)
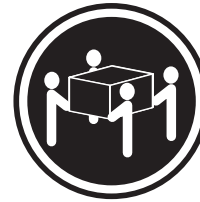
CAUTION:
Use safe practices when lifting.

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:

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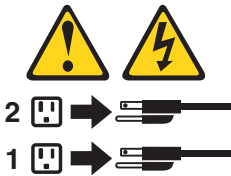
CAUTION:
Never remove the cover on a power supply or any part that has the following label attached.

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.

Chapter 3. General information

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

Features and technologies

The TD200x server offers the following features and technologies:

- **UEFI-compliant server firmware**

  The server firmware offers several features, including Unified Extensible Firmware Interface (UEFI) 2.1 compliance, enhanced RAS capabilities, and BIOS compatibility support. UEFI replaces the basic input/output system (BIOS) and defines a standard interface between the operating system, platform firmware, and external devices. 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: The server does not support DOS.

- **Integrated Management Module**

  The integrated management module (IMM) combines service processor functions, video controller, and 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. The IMM also provides a virtual presence capability for remote server management capabilities. The IMM provides remote server management through industry-standard interfaces:

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

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

  The remote presence feature provides the following functions:

  - Remotely viewing video with graphics resolutions up to 1600 x 1200 at 85 Hz, regardless of the system state
  - Remotely accessing the server, using the keyboard and mouse from a remote client
  - Mapping the CD or 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.

- **Preboot diagnostics programs**

  The preboot diagnostics programs are stored on the integrated USB memory. It collects and analyzes system information to aid in diagnosing server problems. The diagnostics programs collect the following information about the server:

- System configuration
- Network interfaces and settings
- Installed hardware
- EasyLED diagnostics status
- Service processor status and configuration
- Vital product data, firmware, and UEFI (formerly BIOS) configuration
- Hard disk drive health
- RAID controller configuration
- Event logs for service processors

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 information locally through a generated text report file. You can also copy the log to a removable media and view the log from a Web browser.

For additional information about preboot diagnostics, see "Running the diagnostic programs" on page 90.

- **EasyStartup DVD**

  The ThinkServer EasyStartup program guides you through the configuration of the hardware, the RAID controller, and the installation of the operating system and device drivers.

- **EasyManage DVD**

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

- **Integrated network support**

  The server comes with one integrated Broadcom 5709C series Gigabit Ethernet controller, which supports connection to a 10 Mbps, 100 Mbps, or 1000 Mbps network. For more information, see "Enabling the Broadcom Gigabit Ethernet Utility program" on page 266.

- **Intelligent Platform Management Interface (IPMI) 2.0**

  IPMI 2.0 support providing secure remote power-on/power-off and several standard alerts for components such as fans, voltage, and temperature.

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

  The server supports up to eight or 16 (depending on your model) 2.5-inch hot-swap hard disk drives in the hot-swap bays. With the hot-swap feature, you can add, remove, or replace hard disk drives without turning off the server.

- **Large system-memory capacity**

  The server supports up to 64 GB of system memory. The memory controller supports error correcting code (ECC) for up to 16 single-sided industry-standard third-generation double-data-rate 3 (DDR3) 800, 1066, and 1333, 240-pin, registered, synchronous dynamic random access memory (SDRAM) dual inline memory modules (DIMMs).

- **EasyLED diagnostics**

  EasyLED diagnostics provides LEDs to help you diagnose problems. For more information, see "EasyLED diagnostics panel" on page 129.

- **Memory mirroring**

  Memory mirroring improves the availability of memory by writing information to the main memory and redundant locations in a mirrored pair of DIMMs.

- **PCI-32 adapter capabilities**

The server has one slot for a PCI-32 adapter.

- **PCI Express x8 adapter capabilities**

  The server has five slots for PCI Express x8 adapters. Three of these slots accept x8 adapters, but the adapters will operate as x4 adapters.

- **PCI Express x16 adapter capabilities**

  The server has one slot for PCI Express x16 adapter, which will operate as an x8 adapter.

- **Redundant cooling and power capabilities**

  The server supports up to two 920-watt hot-swap power supplies. If the server came with only one power supply, you can install an additional power supply with three redundant hot-swap cooling fans to add redundant power and cooling capabilities. If the maximum load on the server is less than 920 watts and a problem occurs with one of the power supplies, the other power supply can meet the power requirements. The redundant cooling of the fans enables continued operation if one of the fans fails.

- **RAID support**

  The server supports an internal RAID SAS Controller, which is required for you to use the hot-swap hard disk drives and to create redundant array of independent disks (RAID) configurations.

- **Symmetric multiprocessing (SMP)**

  The server supports up to two Intel® Xeon® quad-core microprocessors. If the server comes with only one microprocessor, you can install an additional microprocessor to enhance performance and provide SMP capability.

- **Systems-management capabilities**

  The server contains an Integrated Management Module (IMM) which enables you to manage the functions of the server locally and remotely and provides remote presence and blue-screen capture capability. The IMM also provides system monitoring and event recording.

- **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 microprocessors 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: As of the date of this document, the Linux® operating system does not support TOE.

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:
- Intel Xeon dual-core or quad-core with integrated memory controller and Quick Path Interconnect (QPI) architecture
- Designed for LGA 1366 socket
- Scalable up to four cores
- 32 KB instruction cache, 32 KB data cache, and 8 MB cache that is shared among the cores
- Support for up to two microprocessors, second microprocessor with pluggable VRM
- Support for Intel Extended Memory 64 Technology (EM64T)

Note: Use the Setup Utility to determine the type and speed of the microprocessors. For a list of supported microprocessors, see http://www.lenovo.com/thinkserver and click **Options**.

Memory:
- 16 DIMM connectors (eight per microprocessor)
- Minimum: 2 GB DIMM per microprocessor
- Maximum: 64 GB
- Type: Registered ECC DDR3 800, 1066, and 1333 MHz DIMMs only
- Sizes: 1 GB single-rank, 2 GB single-rank or dual-rank, 4 GB dual-rank (PC3-10600R-999)

Drives:
- SATA:
  - DVD (standard)
  - DVD/CD-RW (optional)
  - Maximum of two devices can be installed
- Diskette (optional): External USB 1.44 MB
- Supported hard disk drives:
  - Serial Attached SCSI (SAS)

Expansion bays:
- 16 hot-swap SAS 2.5-inch bays
- Three half-high 5.25-inch bays (one DVD drive installed)
  Note: Full-high devices such as an optional tape drive will occupy two half-high 5.25-inch bays.

PCI and PCI-X expansion slots:
- Six PCI expansion slots on system board
  - Two PCI Express x8 (x4 link)
  - Two PCI Express x8 (x8 link)
  - One PCI Express x16 (x8 link)
  - One PCI 32-bit
- One PCI Express x8 (x4 link) on the extender card

Power supply:
Note: To upgrade to two 920-watt hot-swap power supplies, install the redundant power and cooling option kit. Kit includes one hot-swap 920-watt power-supply and three hot-swap fans.
- Standard: One 920-watt 110 V or 240 V ac input dual-rated power supply
- Upgradeable to two 920-watt hot-swap power supplies

Hot-swap fans:
- Three (standard)
- Upgradeable to six fans (for redundant cooling)

Note: To upgrade to redundant cooling, install the redundant power and cooling option kit. Kit includes one 920-watt hot-swap power-supply and three hot-swap fans.

Size:
- Tower
  - Height: 440 mm (17.3 inches)
  - Depth: 767 mm (30.2 inches)
  - Width: 218 mm (8.6 inches)
  - Weight: approximately 38 kg (84 lb.) when fully configured or 20 kg (42 lb.) minimum

Integrated functions:
- Integrated management module (IMM), which provides service processor control and monitoring functions, video controller, remote keyboard, video, mouse, and remote hard disk drive capabilities
- Dedicated or shared management network connections
- Six-port Serial ATA (SATA) controller
- Serial over LAN (SOL) and serial redirection over Telnet or Secure Shell (SSH)
- Support for remote management presence
- One systems-management RJ-45 for connection to a dedicated systems-management network
- EasyLED diagnostics
- Six Universal Serial Bus (USB) ports standard (v2.0 supporting v1.1)
  - Four on rear of server
  - Two on front of server
- One internal USB tape connector
- One Broadcom dual-port 10/100/1000 Ethernet controller with Wake on LAN support and TCP/IP Offload Engine (TOE) support
- One serial connector, shared with the IMM

Note: In messages and documentation, the term *service processor* refers to the integrated management module (IMM).

Video controller:
- Matrox G200 video on system board
- Compatible with SVGA and VGA
- 8 MB DDR2 SDRAM video memory
  Note: Maximum video resolution 1600 x 1200 at 85 MHz

RAID controllers:
- ServeRAID-BR10i SAS/SATA Controller that supports RAID levels 0, 1, 1E (standard)
- Upgradeable to ServeRAID-MR10i SAS/SATA Controller, which supports RAID levels 0, 1, 5, 6, 10
- Upgradeable to ServeRAID-MR10is SAS/SATA Controller, which supports RAID levels 0, 1, 5, 6, 10

Acoustical noise emissions:
- Sound power, idle: 5.5 bel declared
- Sound power, operating: 6.0 bel declared

Environment:
- Air temperature:
  - Server on: 10° to 35° C (50.0° to 95.0° F); altitude: 0 to 914.4 m (3000 ft.)
  - Server off: -40° to 60° C (-40.0° to 140.4° F); maximum altitude: 2133.6 m (7000 ft.)
- Humidity:
  - Server on: 8% to 80%
  - Server off: 8% to 80%

Heat output:

Approximate heat output in British thermal units (Btu) per hour:
- Minimum configuration: 2013 Btu per hour (590 watts)
- Maximum configuration: 3610 Btu per hour (1058 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
- Approximate input kilovolt-amperes (kVA):
  - Minimum: 0.60 kVA
  - Maximum: 1.10 kVA

Notes:

1. Power consumption and heat output vary depending on the number and type of optional features that are installed and the power-management optional features that are in use.

2. These levels were measured in controlled acoustical environments according to the procedures that are 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 stated values because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate.

Software

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

EasyStartup

The ThinkServer EasyStartup program simplifies the process of your RAID controller 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 *ThinkServer EasyStartup* DVD" on page 263.

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 Microsoft Windows Server 2003 and Microsoft Windows Server 2008 (32-bit) products. The ThinkServer EasyManage Agent is supported on 32-bit and 64-bit Windows, Red Hat, and SUSE operating systems.

Chapter 4. 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 vii.
- 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 EasyLED diagnostics LEDs indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See "Microprocessor problems" on page 69 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 "POST error codes" on page 30. If the server is halted and no error message is displayed, see "Troubleshooting tables" on page 64 and "Solving undetermined problems" on page 124.
- For information about power-supply problems, see "Solving power problems" on page 123 and "Power-supply LEDs" on page 88.
- For intermittent problems, check the system-event log; see "Event logs" on page 27, "System-event log" on page 38, and "Diagnostic programs, messages, and error codes" on page 90.

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. Turn off the server and all external devices.
   b. Check all cables and power cords.
   c. Check all internal and external devices for compatibility at http://www.lenovo.com/thinkserver and then click **Options**. Open the Server Options Guide.pdf.
   d. Set all display controls to the middle positions.
   e. Turn on all external devices.
   f. Turn on the server. If the server does not start, see "Troubleshooting tables" on page 64.
   g. Check the system-error LED on the operator information panel (see Chapter 6, "Locating Server Controls and connectors," on page 127). If it is flashing, check the EasyLED diagnostics LEDs (see "EasyLED diagnostics" on page 76).
   h. Check for the following results:
      - Successful completion of POST
      - Successful completion of startup, indicated by a readable display of the operating-system desktop
3. Are there readable instructions on the main menu?
   - **No:** Find the failure symptom in "Troubleshooting tables" on page 64; if necessary, see "Solving undetermined problems" on page 124.
   - **Yes:** Run the diagnostic programs (see "Running the diagnostic programs" on page 90).
      – If you receive an error, see "Diagnostic messages" on page 91.
      – If the diagnostic programs were completed successfully and you still suspect a problem, see "Solving undetermined problems" on page 124.

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:

- Lenovo ThinkServer Server Firmware (server firmware)
- Device drivers
- 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 "Viewing the test log" on page 91 for information about error codes.
- **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.
- **EasyLED diagnostics LEDs:** See "EasyLED diagnostics" on page 76 for information about EasyLED diagnostics LEDs that are lit.
- **System-board LEDs:** See "System-board LEDs" on page 135 for information about system-board LEDs that are lit.

"EasyLED diagnostics" on page 76

b. **Collect system data.**

Run Dynamic System Analysis (DSA) 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. For instructions for running the DSA program, see "Running the diagnostic programs" on page 90.

If you have to download the latest version of DSA , 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) Select **Servers and Storage** from the **Brand** list.
4) From **Family** list, select **ThinkServer TD200x**, and click **Continue**.
5) Click **Downloads and drivers** and look at the list for the Preboot DSA CD image.

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 Lenovo ThinkServer Server Firmware (server firmware), system firmware, device firmware, or device drivers that are not at the latest levels.

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.

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.**

   To display a list of available updates 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.

   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) Select **Servers and Storage** from the **Brand** list.

   d) From **Family** list, select **ThinkServer TD200x**, and click **Continue**.

   e) Click **System TD200x** to display the list of downloadable files for the server.

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/thinkserver 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. For information about performing the checkout procedure, see "Checkout procedure" on page 21.

   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) Enter your product number (machine type and model number) or select **Servers and Storage** from the **Select your product** list.

   c) Select **Servers and Storage** from the **Brand** list.

   d) From **Family** list, select **ThinkServer TD200x**, and click **Continue**.

   e) Under **Support & downloads**, click **Documentation**, **Install**, and **Use** to search for related documentation.

c. **Check for troubleshooting procedures, and hints and tips.**

   Troubleshooting procedures, and hints and tips document known problems and suggested solutions. To search for troubleshooting procedures, and hints and tips, 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) Select **Servers and Storage** from the **Brand** list.

   4) From **Family** list, select **ThinkServer TD200x**, and click **Continue**.

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

   6) Select the troubleshooting procedure or hints and tips that applies to your problem:

   • Troubleshooting procedures are under **Diagnostic**.

   • Hints and tips are under **Troubleshoot**.

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. For more information, see "Troubleshooting tables" on page 64 and Chapter 7, "Installing optional devices and replacing customer replaceable units," on page 149. Hardware errors are also indicated by EasyLED diagnostics LEDs.

   A single problem might cause multiple symptoms. Follow the troubleshooting procedure for the most obvious symptom. If that procedure does not diagnose the problem, use the procedure for another symptom, if possible.

   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 EasyLED diagnostics 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 5. Diagnostics

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

If you cannot diagnose and correct a problem by using the information in this chapter, see Appendix A, "Getting help and technical assistance," on page 275 for more information.

Diagnostic tools

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

- **POST error messages**

  The power-on self-test (POST) generates messages to indicate successful test completion or the detection of a problem. See "POST error codes" on page 30 for more information.

- **Event logs**

  For information about the POST event log, the system-event log, the integrated management module (IMM) event log, and the DSA log, see "Event logs" and "System-event log" on page 38.

- **Troubleshooting tables**

  These tables list problem symptoms and actions to correct the problems. See "Troubleshooting tables" on page 64.

- **EasyLED diagnostics**

  Use the EasyLED diagnostics to diagnose system errors quickly. See "EasyLED diagnostics" on page 76 for more information.

- **Diagnostic programs, messages, and error codes**

  The diagnostic programs are the primary method of testing the major components of the server. See "Diagnostic programs, messages, and error codes" on page 90 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 all IMM, POST, and system management interrupt (SMI) events. You can view the system-event log through the Setup utility and through the Dynamic System Analysis (DSA) program (as the IPMI event log).

  The system-event log is limited in size. When it is full, new entries will not overwrite existing entries; therefore, you must periodically save and then clear the system-event log through the Setup utility when the IMM logs an event that indicates that the log is more than 75% full. When you are troubleshooting, you might have to save and then clear the system-event log to make the most recent events available for analysis.

  Messages are listed on the left side of the screen, and details about the selected message are displayed on the right side of the screen. To move from one entry to the next, use the Up Arrow (↑) and Down Arrow (↓) keys.

Some IMM sensors cause assertion events to be logged when their setpoints are reached. When a setpoint condition no longer exists, a corresponding deassertion event is logged. However, not all events are assertion-type events.

- **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 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 system-event log, select **System Event Log**.

Viewing event logs without restarting the server

If the server is not hung, 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. To install a DSA Preboot CD image, 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. Select **Servers and Storage** from the **Brand** list.
4. From **Family** list, select **ThinkServer TD200x**, and click **Continue**.
5. Click **Downloads and drivers** and look at the list for the Preboot DSA CD image.

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

The following table describes the methods that you can use to view the event logs, depending on the condition of the server. The first two conditions generally do not require that you restart the server.

Table 2. Methods for viewing event logs

Condition	Action
The server is not hung and is connected to a network.	Use any of the following methods: • Run Portable or Installable DSA to view the event logs or create an output file that you can send to Lenovo service and support. • Type the IP address of the IMM and go to the Event Log page. • 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.
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 through the Setup utility" on page 28.

POST error codes

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.

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 is completed without detecting any problems, the server startup is completed.

If POST detects a problem, an error message is sent to the POST event log.

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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Error code	Description	Action

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

0011000	Invalid microprocessor type	1. Update the firmware (see "Updating the firmware" on page 267). 2. (Trained service technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Error code	Description	Action
0011002	Microprocessor mismatch	1. Run the Setup utility and view the microprocessor information to compare the installed microprocessor specifications. 2. (Trained service technician only) Remove and replace one of the microprocessors so that they both match.

0011004	Microprocessor failed BIST	1. Update the firmware (see "Updating the firmware" on page 267).
		2. (Trained service technician only) Reseat microprocessor 2.
		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 update failed	1. Update the server firmware (see "Updating the firmware" on page 267). 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 210 and "Installing a memory module" on page 211). 3. Run the Setup utility to enable all the DIMMs. 4. Run the DSA memory test.
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 210 and "Installing a memory module" on page 211). 3. Run the Setup utility to enable all the DIMMs. 4. Run the DSA memory test.
0051006	DIMM mismatch detected	Make sure that the DIMMs match and are installed in the correct sequence (see "Installing a memory module" on page 211).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Error code	Description	Action
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 211).
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 211). 4. Clear CMOS memory to re-enable all the memory connectors.
0058001	PFA threshold exceeded	1. Update the firmware (see"Updating the firmware" on page 267). 2. Reseat the DIMMs and run the memory test. 3. Replace the failing DIMM, which is indicated by a lit LED on the system board.
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, replace it with an identical pair of known good DIMMs, and then restart the server. Repeat as necessary. If the failures continue, go to step 4. 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, restarting the server each time:
		  a. DIMMs
		  b. (Trained service technician only) System board

00580A1	Invalid DIMM population for mirroring mode	1. If a fault LED is lit, resolve the failure. 2. Install the DIMMs in the correct sequence (see "Installing a memory module" on page 211).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Error code	Description	Action
00580A4	Memory population changed	Information only. Memory has been added, moved, or changed.
00580A5	Mirror failover complete	Information only. Memory redundancy has been lost. Check the event log for uncorrected DIMM failure events.

0068002	CMOS battery cleared	1. Reseat the battery.
		2. Clear the CMOS memory (see "System-board switches and jumpers" on page 144).
		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

2011000	PCI-X PERR	1. Check the extender card LEDs.
		2. Reseat all affected adapters and extender cards.
		3. Update the PCI device firmware.
		4. Remove the adapters from the extender card.
		5. Replace the following components one at a time, in the order shown, restarting the server each time:
		  a. Extender card
		  b. (Trained service technician only) System board

2011001	PCI-X SERR	1. Check the extender-card LEDs.
		2. Reseat all affected adapters and extender cards.
		3. Update the PCI device firmware.
		4. Remove the adapters from the extender card.
		5. Replace the following components one at a time, in the order shown, restarting the server each time:
		  a. Extender 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Error code	Description	Action

2018001	PCI Express uncorrected or uncorrected error	1. Check the extender-card LEDs.
		2. Reseat all affected adapters and extender cards.
		3. Update the PCI device firmware.
		4. Remove both adapters from the extender card.
		5. Replace the following components one at a time, in the order shown, restarting the server each time:
		  a. Extender 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 **Start 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. 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. 3. Remove any recently installed hardware.
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) server firmware image	Information only. The backup switch was used to boot the secondary bank.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Error code	Description	Action
3048006	Booted secondary (backup) server firmware image because of ABR	1. Run the Setup utility, select **Load Default Settings**, and save the settings to recover the primary server firmware settings. 2. Turn off the server and remove it from the power source. 3. Reconnect the server to the power source, and 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. Reseat 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 reseated by a trained service technician only)
		4. 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Error code	Description	Action
3058004	Three boot failures	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. Remove all hardware that is not listed on the ThinkServer ready Web site. 4. Make sure that the operating system is not corrupted. 5. Run the Setup utility, save the configuration, and then restart the server.
3108007	System configuration restored to default settings	Information only. This is message is usually associated with the CMOS battery clear event.
3138002	Boot configuration error	1. Remove any recent configuration changes that you made in 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. 3. (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 firmware.
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.

3808004	IMM system event log full	• When 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 Logs**.
		  3. Select **Clear System Event Log**.
		  4. Restart the server.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Error code	Description	Action
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 firmware bank to the backup bank. 2. Run the Setup utility, select **Load Default Settings**, and save the settings. 3. Switch the bank back to the current 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.

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. For more information about IMM, see the *IMM User's Guide* on the Web.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 12V going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	Check the power-supply LED on the EasyLED panel (see "EasyLED diagnostics" on page 76).
Numeric sensor Planar 12V going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	Check the power-supply LED on the EasyLED panel (see "EasyLED diagnostics" on page 76).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

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 fan. 2. Replace the failing fan. (*n* = fan number)
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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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. Make sure that the installed microprocessors are compatible with each other (see "Installing a microprocessor and heat sink" on page 220 for information about microprocessor requirements).
3. (Trained service technician only) Reseat microprocessor *n*.
4. (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. Make sure that the installed microprocessors are compatible with each other (see "Installing a microprocessor and heat sink" on page 220 for information about microprocessor requirements).
2. (Trained service technician only) Replace the incompatible microprocessor. |

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

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. Make sure that the installed microprocessors are compatible with each other (see "Installing a microprocessor and heat sink" on page 220 for information about microprocessor requirements). 3. (Trained service technician only) Reseat microprocessor *n*. 4. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
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)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 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)
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)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 diagnostic interrupt has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	An operator information panel NMI/diagnostic interrupt has occurred.	If the NMI button on the system board has not been pressed, complete the following steps: 1. Make sure that the NMI button is not pressed. 2. Replace the operator information panel cable. 3. Replace the operator information panel.
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.
A software NMI has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A software NMI has occurred.	1. Check the device driver. 2. Reinstall the device driver.
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 from a Lenovo ThinkServer Server Firmware update failure" on page 122). 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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. Remove the failing microprocessor 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 two microprocessors are matching.
6. (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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.

The Power Supply (Power Supply: *n*) has Failed.
(*n* = power supply number)
	Error	Power supply *n* has failed.
		(*n* = power supply number)
			1. If the power-on LED is lit, complete the following steps:
			  a. Reduce the server to the minimum configuration.
			  b. Reinstall the components one at a time, restarting the server each time.
			  c. If the error recurs, replace the component that you just reinstalled.
			2. Reseat power supply *n*.
			3. Replace power supply *n*.
			(*n* = power supply number)

Sensor PS *n* Fan Fault has transitioned to critical from a less severe state. (*n* = power supply number)	Error	A sensor has changed to Critical state from a less severe state.	1. Make sure that there are no obstructions, such as bundled cables, to the airflow from the power-supply fan. 2. Replace power supply *n*. (*n* = power supply number)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 Pwr Rail A Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. (Trained service technician only) Remove the PCI adapter and microprocessor 1. Reinstall the microprocessor in socket 1 and restart the server. 3. Restart the server. 4. Reinstall each device, one at a time, starting the server each time to isolate the failing device. 5. Replace the failing device. 6. (Trained service technician only) Replace the system board.
Sensor Pwr Rail B Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. (Trained service technician only) Remove the PCI adapter and microprocessor 2. 3. Restart the server. 4. Reinstall each device, one at a time, starting the server each time to isolate the failing device. 5. Replace the failing device. 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 Pwr Rail C Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. Remove the hard disk drives, hard disk drive backplanes, and DIMMs in connectors 1 through 8. 3. Restart the server. 4. Reinstall each device, one at a time, starting the server each time to isolate the failing device. 5. Replace the failing device. 6. (Trained service technician only) Replace the system board.
Sensor Pwr Rail D Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. Remove the optical drive and the DIMMs in connectors 9 through 16. 3. Restart the server. 4. Reinstall the microprocessor in socket 1 and restart the server. 5. (Trained service technician only) Replace the failing microprocessor. 6. (Trained service technician only) Replace the system board.
Sensor Pwr Rail E Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. (Trained service technician only) Remove the optical drive and the PCI adapter. 3. Restart the server. 4. Reinstall each device, one at a time, starting the server each time to isolate the failing device. 5. Replace the failing device. 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 Pwr Rail F Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. Remove the hard disk drives and the hard disk drive backplanes. 3. Restart the server. 4. Reinstall each device, one at a time, starting the server each time to isolate the failing device. 5. Replace the failing device. 6. (Trained service technician only) Replace the system board.
Sensor PS *n* Therm Fault has transitioned to critical from a less severe state. (*n* = power supply number)	Error	A sensor has changed to Critical state from a less severe state.	1. Make sure that there are no obstructions, such as bundled cables, to the airflow from the power-supply fan. 2. Replace power supply *n*. (*n* = power supply number)
Sensor PS*n* 12V OV Fault has transitioned to non-recoverable. (*n* = power supply number)	Error	A sensor has changed to Nonrecoverable state.	1. Check the power-supply LED on the EasyLED panel (see "EasyLED diagnostics" on page 76). 2. Remove the power supplies. 3. Replace power supply *n*. 4. (Trained service technician only) Replace the system board. (*n* = power supply number)
Sensor PS*n* 12V UV Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Check the power-supply LED on the EasyLED panel (see "EasyLED diagnostics" on page 76). 2. Remove the power supplies. 3. Replace power supply *n*. 4. (Trained service technician only) Replace the system board. (*n* = power supply number)

Sensor PS*n* 12V OC Fault has transitioned to non-recoverable. (*n* = power supply number)	Error	A sensor has changed to Nonrecoverable state.	1. Check the power-supply LED on the EasyLED panel (see "EasyLED diagnostics" on page 76). 2. Remove the power supplies. 3. Replace power supply *n*. 4. (Trained service technician only) Replace the system board. (*n* = power supply number)
Sensor PS *n* VCO Fault has transitioned to non-recoverable. (*n* = power supply number)	Error	A sensor has changed to Nonrecoverable state.	1. Check the power-supply LED on the EasyLED panel (see "EasyLED diagnostics" on page 76). 2. Replace the failing power supply. (*n* = power supply number)
Redundancy Power Unit has been reduced.	Error	Redundancy has been lost and is insufficient to continue operation.	1. Check the LEDs for both power supplies. 2. Follow the actions in "Power-supply LEDs" on page 88.
Redundancy Cooling Zone 1 has been reduced.	Error	Redundancy has been lost and is insufficient to continue operation.	1. Make sure that the connector on fan 1 and fan 4 (if installed) is not damaged. 2. Make sure that the fan connectors on the system board are not damaged. 3. Make sure that the fan cage is correctly installed. 4. Reseat the fan. 5. Replace the fan.
Redundancy Cooling Zone 2 has been reduced.	Error	Redundancy has been lost and is insufficient to continue operation.	1. Make sure that the connector on fan 2 and fan 5 (if installed) is not damaged. 2. Make sure that the fan connectors on the system board are not damaged. 3. Make sure that the fan cage is correctly installed. 4. Reseat the fan. 5. Replace the fan.

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- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 Cooling Zone 3 has been reduced.	Error	Redundancy has been lost and is insufficient to continue operation.	1. Make sure that the connector on fan 3 and fan 6 (if installed) is not damaged. 2. Make sure that the fan connectors on the system board are not damaged. 3. Make sure that the fan cage is correctly installed. 4. Reseat the fan. 5. Replace the fan.
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)

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.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 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)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 = 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.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 = Lenovo_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.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

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_StaticIPAssignment SettingData.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_StaticIPAssignment SettingData.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_StaticIPAssignment SettingData. 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.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Attempting to %1 server %2 by user %3. (%1 = Power Up, Power Down, Power Cycle, or Reset; %2 = Lenovo_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.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 = Lenovo_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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 cannot find a problem in these tables, see "Running the diagnostic programs" on page 90 for information about testing the server.

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

1. Check the operator information panel and the EasyLED diagnostics LEDs (see "EasyLED diagnostics" on page 76).
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.

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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Symptom	Action

The DVD drive is not recognized.	1. Make sure that:
	   • The SATA channel to which the DVD drive is attached (primary or secondary) is enabled in the Setup utility.
	   • All cables and jumpers are installed correctly.
	   • The signal cable and connector are not damaged and the connector pins are not bent.
	   • 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 cables
	4. Replace the following components one at a time, in the order shown, restarting the server each time:
	   a. DVD drive
	   b. DVD drive and cables
	   c. (Trained service technician only) System board

A DVD is not working correctly.	1. Clean the DVD. 2. Run the DVD drive diagnostic programs. 3. Reseat the DVD drive. 4. Replace the DVD drive.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Symptom	Action
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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Symptom	Action
Not all drives are recognized by the hard disk drive diagnostic tests.	Remove the drive that is indicated by the diagnostic tests; then, run the hard disk drive diagnostic tests again. If the remaining drives are recognized, replace the drive that you removed with a new one.
The server stops responding during the hard disk drive diagnostic test.	Remove the hard disk drive that was being tested when the server stopped responding, and run the diagnostic test again. If the hard disk drive diagnostic test runs successfully, replace the drive that you removed with a new one.
A hard disk drive was not detected while the operating system was being started.	Reseat all hard disk drives and cables; then, run the hard disk drive diagnostic tests again.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Symptom	Action
A hard disk drive passes the diagnostic Fixed Disk Test, but the problem remains.	Run the diagnostic SCSI Fixed Disk Test (see "Running the diagnostic programs" on page 90). **Note:** This test is not available on servers that have RAID arrays or servers that have SATA hard disk drives.

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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

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-event log or IMM log (see "Event logs" on page 27). 3. See "Solving undetermined problems" on page 124.

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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Symptom	Action
All or some keys on the keyboard do not work.	1. Make sure that: • The keyboard cable is securely connected. • The server and the monitor are turned on. 2. See http://www.lenovo.com/thinkserver and then click **Options**. Open the Server Options Guide.pdf for keyboard compatibility. 3. If you are using a USB keyboard, run the Setup utility and enable keyboardless operation to prevent the 301 POST error message from being displayed during startup. 4. 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. 5. 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 is compatible with the server. See http://www.lenovo.com/thinkserver and then click **Options**. Open the Server Options Guide.pdf. • 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 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. 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

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 or on the DIMM. • Memory mirroring does not account for the discrepancy. • The memory modules are seated correctly. • You have installed the correct type of memory. • If you changed the memory, you updated the memory configuration in the Setup utility. • All banks of memory are enabled. The server might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled. 2. Check the POST event log for DIMM error messages: • If a DIMM was disabled by a system-management interrupt (SMI), replace the DIMM. • If a DIMM was disabled by the user or by POST, run the Setup utility and enable the DIMM. 3. Run memory diagnostics (see "Running the diagnostic programs" on page 90). 4. Make sure that there is no memory mismatch when the server is at the minimum memory configuration (two 512 MB DIMMs; see the information about the minimum required configuration on page "Solving undetermined problems" on page 124). 5. Add one pair of DIMMs at a time, making sure that the DIMMs in each pair are matching. 6. Reseat the DIMMs. 7. Replace the components in step 6, one at a time, in the order shown, restarting the server each time.
Multiple rows of DIMMs in a branch are identified as failing.	1. Reseat the DIMMs; then, restart the server. 2. Replace the lowest-numbered DIMMs with identical known good DIMMs; then, restart the server. Repeat as necessary. If the failures continue after all identified pairs are replaced, go to step4. 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 each DIMM in the failed pair with an identical known good DIMM, restarting the server after you reinstall each DIMM. Replace the failed DIMM. Repeat step 3 until you have tested all removed DIMMs. 4. (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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Symptom	Action

The server emits a continuous beep during POST, indicating that the startup (boot) microprocessor is not working correctly.	1. Correct any errors that are indicated by the EasyLED diagnostics LEDs (see "EasyLED diagnostics" on page 76).
	
	2. Make sure that the server supports all the microprocessors and that the microprocessors match in speed and cache size.
	
	3. (Trained service technician only) Reseat microprocessor 1
	
	4. (Trained service technician only) If there is no indication of which microprocessor has failed, isolate the error by testing with one microprocessor at a time.
	
	5. Replace the following components one at a time, in the order shown, restarting the server each time:
	   a. (Trained service technician only) Microprocessor 2
	   b. VRM 2
	   c. (Trained service technician only) System board
	
	6. (Trained service technician only) If multiple error codes or EasyLED diagnostics LEDs indicate a microprocessor error, reverse the locations of two microprocessors to determine whether the error is associated with a microprocessor or with a microprocessor socket.
	   • If the error is associated with a microprocessor, replace the microprocessor.
	   • If the error is associated with a VRM, replace the VRM.
	   • If the error is associated with a microprocessor socket, replace the system board.

Monitor problems

Some Lenovo 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.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

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 73.
	  • The monitor cables are connected correctly.
	  • The monitor is turned on and the brightness and contrast controls are adjusted correctly.
	  • No POST errors are generated when the server is turned on.
	3. Make sure that the correct server is controlling the monitor, if applicable.
	4. See "Solving undetermined problems" on page 124.

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 "Running the diagnostic programs" on page 90).
	  • If the server passes the video diagnostics, the video is good; see "Solving undetermined problems" on page 124.
	  • (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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

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, fluorescent lights, 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. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Monitor b. (Trained service technician only) System board
Wrong characters appear on the screen.	1. If the wrong language is displayed, update the server firmware with the correct language (see "Updating the firmware" on page 267). 2. Reseat the monitor 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Monitor b. (Trained service technician only) 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Symptom	Action
An optional device that was just installed does not work.	1. Make sure that: • The device is designed for the server (See http://www.lenovo.com/thinkserver and then click **Options**. Open the Server Options Guide.pdf). • 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 used to work does not work now.	1. Make sure that all of the hardware and cable connections for the device are secure. 2. If the device comes with test instructions, use those instructions to test the device. 3. If the failing device is a SCSI device, make sure that: • The cables for all external SCSI devices are connected correctly. • The last device in each SCSI chain, or the end of the SCSI cable, is terminated correctly. • Any external SCSI device is turned on. You must turn on an external SCSI device before you turn on the server. 4. Reseat the failing device. 5. 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Symptom	Action

The power-control button does not work (the server does not start).
Note: The power-control button will not function until 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. If the server starts, reseat the operator information panel. If the problem remains, replace the operator information panel.
	2. 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 DIMM is fully seated.
	  • The LEDs on the power supply do not indicate a problem.
	  • The microprocessors are installed in the correct sequence.
	3. Reseat the following components:
	  a. DIMMs
	  b. (Trained service technician only) Power switch connector
	  c. (Trained service technician only) Power backplane
	4. Replace the following components one at a time, in the order shown, restarting the server each time:
	  a. DIMMs
	  b. (Trained service technician only) Power switch connector
	  c. (Trained service technician only) Power backplane
	  d. (Trained service technician only) System board
	5. 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.
	6. See "Power-supply LEDs" on page 88.
	7. See "Solving undetermined problems" on page 124.

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 for 5 seconds.
	  c. Restart the server.
	  d. If the server fails POST and the power-control button does not work, disconnect the power cord for 20 seconds; then, reconnect the 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.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Symptom	Action
The server unexpectedly shuts down, and the LEDs on the operator information panel are not lit.	See "Solving undetermined problems" on page 124.

Serial 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

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 Setup utility and none of the serial ports is disabled.
	   • The serial port adapter (if one is present) is seated correctly.
	2. Reseat the serial port adapter.
	3. Replace the serial port adapter.

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.
	2. Reseat the following components:
	   a. Failing serial device
	   b. Serial cable
	3. Replace the following components one at a time, in the order shown, restarting the server each time:
	   a. Failing serial device
	   b. Serial cable
	   c. (Trained service technician only) 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.	

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 adapter 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 receive any error messages while you use 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.	

Symptom	Action
A USB device does not work.	1. Run USB diagnostics (see "Running the diagnostic programs" on page 90). 2. Make sure that: • The correct USB device driver is installed. • The operating system supports USB devices. • A standard PS/2 keyboard or mouse is not connected to the server. If it is, a USB keyboard or mouse will not work during POST. 3. Make sure that the USB configuration optional devices are set correctly in the Setup utility (see "Setup Utility menu choices" on page 252 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.

EasyLED diagnostics

EasyLED diagnostics is a system of LEDs on various external and internal components of the server. When an error occurs, LEDs are lit throughout the server. By viewing the LEDs in a particular order, you can often identify the source of the error.

When LEDs are lit to indicate an error, they remain lit when the server is turned off, provided that the server is still connected to power and the power supply is operating correctly.

Before you work inside the server to view the EasyLED diagnostics LEDs, read the safety information that begins on page 5.

If an error occurs, view the EasyLED diagnostics LEDs in the following order:

1. Look at the operator information panel LEDs on the front of the server.
   - If an operator information panel LED is lit, it indicates that information about a suboptimal condition in the server is available in the system-event log.
   - If the system-error LED is lit, it indicates that an error has occurred; go to step 2 on page 77.

   The following illustration shows the operator information panel LEDs that are visible through the bezel.
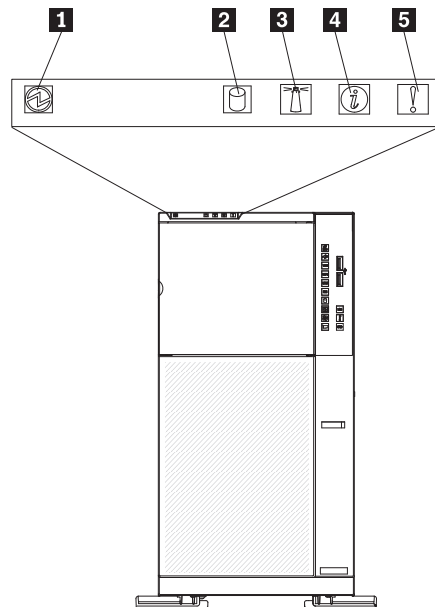
1	System power-on LED
2	Hard disk drive activity LED
3	System-locator LED
4	System-information LED
5	System-error LED

The following table lists the operator information panel LEDs, the problems that they indicate, and actions to solve the problems.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

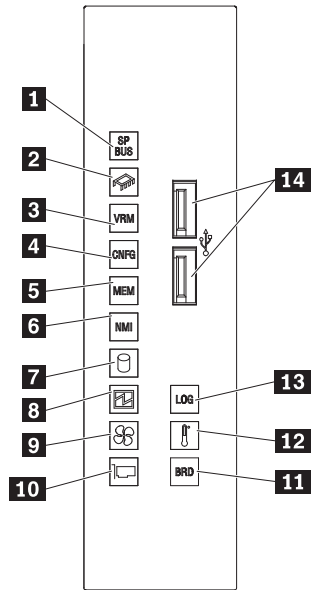| Lit EasyLED diagnostics LEDs with the system-error or information LED also lit	Description
System power (green)	**Off:** AC power is not present, or the power supply or the LED itself has failed. **Flashing rapidly (4 times per second):** The server is turned off and is not ready to be turned on. The power-control button is disabled. Approximately 3 minutes after the server is connected to ac power, the power-control button becomes active. **Flashing slowly (once per second):** The server is turned off and is ready to be turned on. You can press the power-control button to turn on the server. **Lit:** The server is turned on. **Fading on and off:** The server is in a reduced-power state. To wake the server, press the power-control button or use the IMM Web interface.
Hard disk drive activity (green)	When this LED is flashing rapidly, it indicates that there is activity on a hard disk drive.
System information (amber)	When this amber LED is lit, it indicates that information about a suboptimal condition in the server is available in the IMM event log or in the system-event log. Check the EasyLED panel for more information.
System error (amber)	When this LED is lit, it indicates that a system error has occurred. Use the EasyLED panel and the system service label to further isolate the error.

2. Look at the EasyLED panel on the front of the server. Lit LEDs on the EasyLED panel indicate the type of error that has occurred.

   The following illustration shows the EasyLED panel LEDs that are visible through the bezel.

1	Server processor bus	**8**	Power supply
2	Microprocessor	**9**	Fan
3	VRM	**10**	PCI bus
4	Microprocessor/memory configuration	**11**	System board
5	Memory	**12**	Temperature
6	NMI	**13**	System-event log
7	Hard disk drive/RAID	**14**	USB ports

The following table lists the EasyLED diagnostics LEDs, the problems that they indicate, and actions to solve the problems.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Lit EasyLED diagnostics LED with the system-error or information LED also lit	Description	Action
System-event log (LOG)	A system error occurred.	View the contents of the system-event log (see "Event logs" on page 27).
Temperature	The system temperature has exceeded a threshold level.	1. See the system-event log for the source of the fault (see "System-event log" on page 38). 2. Make sure that the airflow in the server is not blocked. 3. Make sure that the room temperature is neither too hot nor too cold (see "Environment" in "Specifications" on page 17).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Lit EasyLED diagnostics LED with the system-error or information LED also lit	Description	Action

System board (BRD)	An error occurred on the system board.	1. Check the LEDs on the system board to identify the component that is causing the error. The BRD LED can be lit for the following conditions:
		  • Failed or missing battery
		  • Failed voltage regulator
		2. Check the system-event log for information about the error.
		3. Replace any failed or missing replaceable components, such as the battery.
		4. (Trained service technician only) If a voltage regulator has failed, replace the system board.

PCI bus	A PCI adapter has failed.	1. See the system-event log (see "System-event log" on page 38).
		2. Check the LEDs on the PCI slots to identify the component that is causing the error, and reseat the failing adapter.
		3. Replace the following components one at a time, in the order shown, restarting the server each time:
		  a. Failing adapter
		  b. (Trained service technician only) System board

Fan	A fan has failed or is operating too slowly.	1. Reinstall the removed fan. 2. If an individual fan LED is lit, replace the fan. 3. (Trained service technician only) Replace the system board.

Power supply	A power supply has failed or has been removed.
	Note: In a redundant power configuration, the dc power LED on one power supply might be off.
		1. Check the individual power-supply LEDs.
		2. Reseat the following components:
		  a. Power supply
		  b. (Trained service technician only) Power-supply cage cables
		3. Replace the following components one at a time, in the order shown, restarting the server each time:
		  a. Power supply
		  b. (Trained service technician only) Power-supply cage

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Lit EasyLED diagnostics LED with the system-error or information LED also lit	Description	Action

DASD/RAID	A hard disk drive, SAS controller, or RAID adapter error has occurred.
	Notes:
	1. This LED is also lit when a hard disk drive is removed from the server.
	2. The error LED on the failing hard disk drive is also lit.
	3. Check the system-event log for a RAID error.
		1. Reinstall the removed drive.
		2. Reseat the following components:
		  a. Failing hard disk drive
		  b. SAS hard disk drive backplane
		  c. SAS signal and power cables
		  d. System board
		  e. ServeRAID adapter
		3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time.

NMI	A hardware error has been reported to the operating system.	1. See the system-event log (see "System-event log" on page 38). 2. If the PCI LED is lit, follow the instructions for that LED. 3. If the MEM LED is lit, follow the instructions for that LED. 4. Restart the server.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Lit EasyLED diagnostics LED with the system-error or information LED also lit	Description	Action

Memory (MEM)	A memory error has occurred. **Note:** The error LED on the DIMM is also lit.	1. Determine whether the CNFG LED is also lit, which indicates that the memory configuration is invalid. Reinstall the DIMMs in a supported configuration.
		2. If the CNFG LED is not lit, one of the following conditions might be present:
		• The server did not start and a failing DIMM LED is lit:
		  a. Check for a PFA log event in the system-event log.
		  b. Reseat the DIMM.
		  c. Move the DIMM to a different slot or replace the DIMM.
		  d. (Trained service technician only) Replace the system board.
		• The server started, the failing DIMM is disabled, and the LED is lit:
		  a. If the LEDs are lit by two DIMMs, check the system-event log for a PFA event on one of the DIMMs, and then replace that DIMM. Otherwise, replace both DIMMs.
		  b. If the LED is lit by only one DIMM, replace that DIMM.
		  c. Re-enable the DIMM, using the Setup utility.

Microprocessor/ Memory Configuration (CNFG)	A hardware configuration error has occurred. (This LED is used with the MEM, VRM, and CPU LEDs.)	1. (The system error LED, CPU LED, and this LED are lit when POST detects a microprocessor mismatch.) Remove and install two microprocessors of the same cache size, type, and clock speed. 2. (The system error LED, MEM LED, and this LED are lit when POST detects an invalid memory configuration.) Remove and install supported DIMMs (see "Installing a memory module" on page 211). 3. (The system error LED, VRM LED, and this LED are lit when POST detects a missing VRM.) Install a VRM for microprocessor 2 (see "Installing a voltage regulator module" on page 180). 4. Check the system error log for information indicating incompatible components.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**
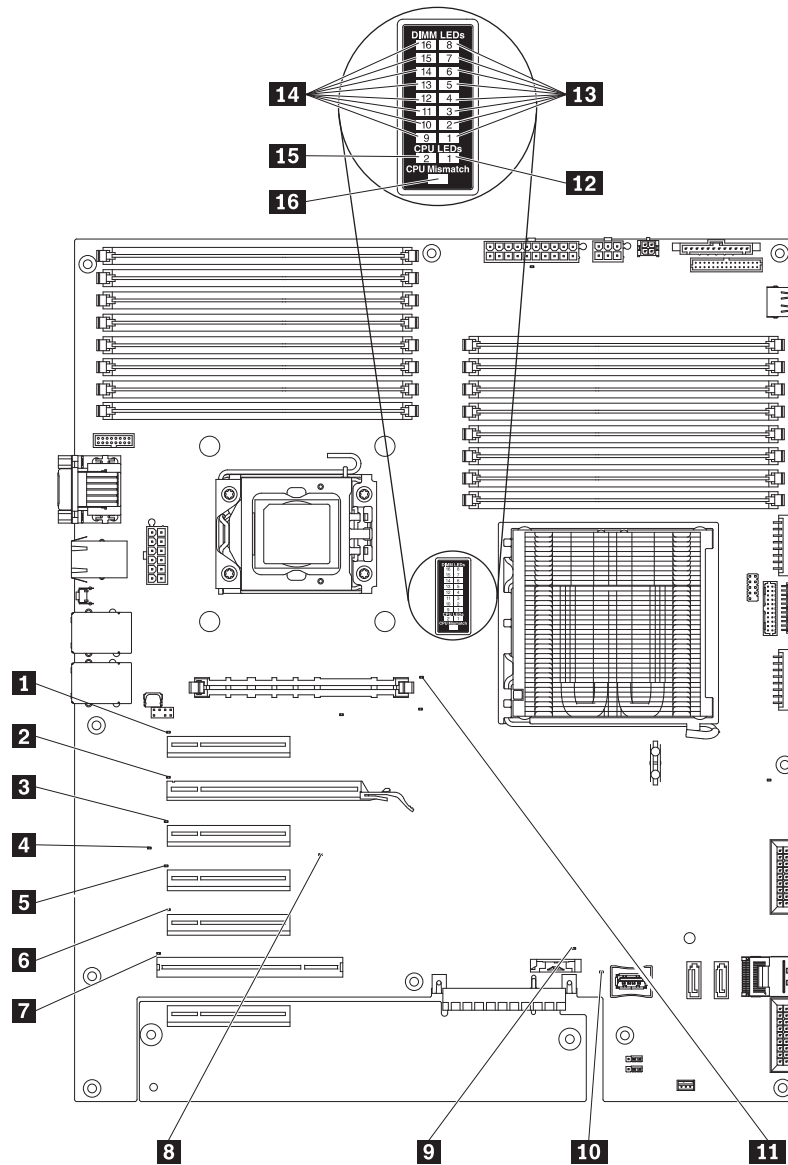
Lit EasyLED diagnostics LED with the system-error or information LED also lit	Description	Action

VRM	A VRM has failed.	1. Check the system-event log to determine the reason for the lit LED (for a VRM).
		 2. Determine whether the CNFG LED is also lit. If the CNFG LED is lit, the memory configuration is invalid. Reseat the VRM.
		 3. If the CNFG LED is not lit, reseat the following components:
		   a. Failing VRM
		   b. (Trained service technician only) Microprocessor associated with the VRM
		 4. Replace the following components one at a time, in the order shown, restarting the server each time:
		   a. Failing VRM
		   b. (Trained service technician only) Microprocessor associated with the VRM
		   c. (Trained service technician only) System board

Microprocessor (CPU)	A microprocessor has failed, or an invalid microprocessor configuration is installed.
	 Note: (Trained service technician only) Make sure that the microprocessors are installed in the correct sequence.
		1. Check the system-event log to determine the reason for the lit LED.
		 2. Determine whether the CNFG LED is also lit. If the CNFG LED is not lit, a microprocessor has failed.
		   a. Make sure that the failing microprocessor, which is indicated by the CPU1 or CPU2 error LED on the system board, is installed correctly.
		   b. Replace the following components one at a time, in the order shown, restarting the server each time:
		     1) (Trained service technician only) Failing microprocessor
		     2) (Trained service technician only) System board
		   c. If the CNFG LED is lit and the CPU mismatch LED on the system board is also lit, an invalid microprocessor configuration is installed:
		     1) Make sure that the microprocessors are compatible with each other. They must match in speed and cache size. Use the Setup utility to compare the microprocessor information.
		     2) (Trained service technician only) Replace the incompatible microprocessor.

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.		
• See the Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.		
Lit EasyLED diagnostics LED with the system-error or information LED also lit	**Description**	**Action**
Service processor bus (SP BUS)	The IMM detects an internal error.	1. Disconnect the server from ac power; then, reconnect the server to power and restart the server. 2. Update the IMM firmware.

Look at the system service label on the top of the server, which gives an overview of internal components that correspond to the LEDs on the EasyLED panel. This information can often provide enough information to diagnose the error.

3. Remove the server cover and look inside the server for lit LEDs. Certain components inside the server have LEDs that are lit to indicate the location of a problem.

The following illustration shows the LEDs on the system board.

1	PCI slot 1 error LED	9	Battery error LED
2	PCI slot 2 error LED	10	System-board error LED
3	PCI slot 3 error LED	11	VRM fail LED
4	HS heartbeat LED	12	CPU 1 error LED
5	PCI slot 4 error LED	13	DIMMs 1 - 8 error LEDs (starting from the bottom)
6	PCI slot 5 error LED	14	DIMMs 9 - 16 error LEDs (starting from the bottom)
7	PCI slot 6 error LED	15	CPU 2 error LED
8	IMM heartbeat LED	16	CPU mismatch LED

The system board is equipped with a PCI extender card that provides either one or two additional expansion slots. The following illustration shows the LEDs on the PCI Express extender card, if one is installed.

The following illustration shows the LEDs on the PCI-X extender card, if one is installed.

The following table describes the LEDs on the system board and extender card 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Lit EasyLED diagnostics LED with the system-error or information LED also lit	Description	Action

DIMM 1 to DIMM 16 error LEDs	A DIMM has failed or is incorrectly installed.	1. Remove the DIMM that is indicated by a 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 1 error LED	Microprocessor 1 has failed, is missing, or has been incorrectly installed.
	Note: (Trained service technician only) Make sure that the microprocessors are installed in the correct sequence; see "Installing a microprocessor and heat sink" on page 220.
		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

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Lit EasyLED diagnostics LED with the system-error or information LED also lit	Description	Action

CPU 2 error LED	Microprocessor 2 has failed, is missing, or has been incorrectly installed.
	Note: (Trained service technician only) Make sure that the microprocessors are installed in the correct sequence; see "Installing a microprocessor and heat sink" on page 220.
		1. Check the system-event log to determine the reason for the lit LED.
		2. Find the failing, missing, or mismatched microprocessor by checking the LEDs on the system board.
		3. (Trained service technician) Reseat the failing microprocessor.
		4. 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

CPU mismatch LED	A mismatched microprocessor has been installed. **Note:** All microprocessors must have the same speed and cache size.	1. Run the Setup utility and view the microprocessor information to compare the installed microprocessor specifications. 2. (Trained service technician only) Remove and replace one of the microprocessors so that they both match.

VRM failure LED	Microprocessor 2 VRM has failed or is incorrectly installed.	1. Reseat the VRM
		2. Replace the following components one at a time, in the order shown, restarting the server each time:
		  a. VRM
		  b. (Trained service technician only) System board
		3. Replace the VRM

System-board error LED	System-board CPU VRD, power voltage regulators, or both 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.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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.**

Lit EasyLED diagnostics LED with the system-error or information LED also lit	Description	Action
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) Use the IMM recovery switch to recover the firmware (see Table 10 on page 144). 2. (Trained service technician only) Replace the system board.
PCI slot 1 to PCI slot 8 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.
H8 heartbeat LED	Indicates the status of power-on and power-off sequencing.	1. If the H8 heartbeat LED is blinking at a 1 Hz rate, no action is necessary. 2. (Trained service technician only) If the H8 heartbeat LED is not blinking, replace the system board.

Remind button

You can use the remind button on the EasyLED panel to put the system-error LED on the operator information panel into Remind mode. When you press the remind button, you acknowledge the error but indicate that you will not take immediate action. The system-error LED flashes while it is in Remind mode and stays in Remind mode until one of the following conditions occurs:

- All known errors are corrected.
- The server is restarted.
- A new error occurs, causing the system-error LED to be lit again.

Power-supply LEDs

The following illustration shows the power-supply LEDs on the rear of the server.
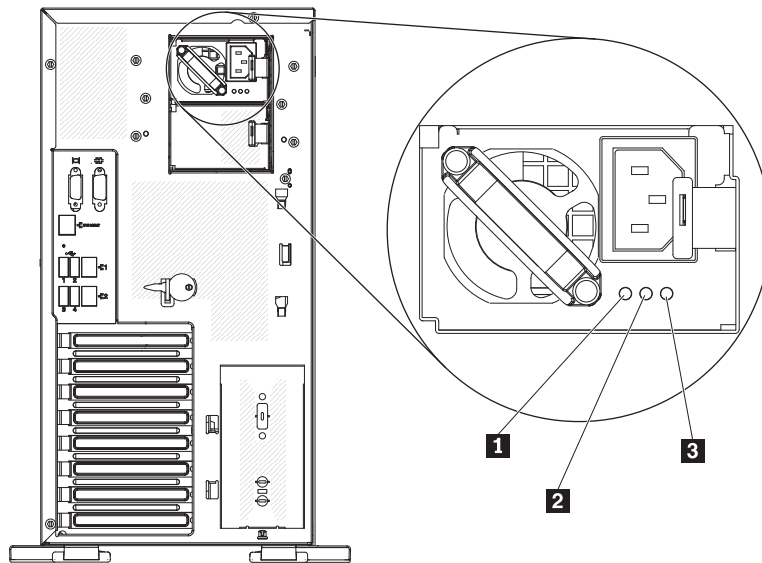
1	ac power LED
2	dc power LED
3	Power error LED

The following table describes the problems that are indicated by various combinations of the power-supply LEDs and the system power LED on the operator information panel and suggested actions to correct the detected problems.

Table 3. Power-supply LEDs

Power-supply LEDs			Description	Action	Notes
AC	DC	Error			
Off	Off	Off	No ac power to the server or a problem with the ac power source	1. Check the ac power to the server. 2. Make sure that the power cord is connected to a functioning power source. 3. Turn the server off and then turn the server back on. 4. If the problem remains, replace the power supply.	This is a normal condition when no ac power is present.
Off	Off	On	No ac power to the server or a problem with the ac power source and the power supply had detected an internal problem	1. Replace the power supply. 2. Make sure that the power cord is connected to a functioning power source.	This happens only when a second power supply is providing power to the server.
Off	On	Off	Faulty power supply	Replace the power supply.	
Off	On	On	Faulty power supply	Replace the power supply.	
On	Off	Off	Power supply not fully seated, faulty system board, or faulty power supply	1. Reseat the power supply. 2. If the system-board error LED is not lit, replace the power supply. 3. (Trained service technician only) If system-board error LED is lit, replace the system board.	Typically indicates that a power supply is not fully seated.
On	Off or Flashing	On	Faulty power supply	Replace the power supply.	
On	On	Off	Normal operation		
On	On	On	Power supply is faulty but still operational	Replace the power supply.	

Diagnostic programs, messages, and error codes

The diagnostic programs are the primary method of testing the major components of the server. As you run the diagnostic programs, text messages and error codes are displayed on the screen and are saved in the test log. A diagnostic text message or error code indicates that a problem has been detected; to determine what action you should take as a result of a message or error code, see the table in "Diagnostic messages" on page 91.

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 `Press F2 for Dynamic System Analysis (DSA)` 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 operations, 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 EasyLED diagnostics LEDs indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See "Microprocessor problems" on page 69 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.

User Aborted: You stopped the test before it was completed.

Not Applicable: You attempted to test a device that is not present in the server.

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

Warning: The test could not be run. There was no failure of the hardware that was being tested, but there might be a hardware failure elsewhere, or another problem prevented the test from running; for example, there might be a configuration problem, or the hardware might be missing or is not being recognized.

The result is followed by an error code or other additional information about the error.

Viewing the test log

To view the DSA log when the tests are completed, select **Utility** from the top of the screen and then select **View Test Log**. To view a detailed test log, press Tab while you view the DSA log. The DSA log data is maintained only while you are running the diagnostic programs. When you exit from the diagnostic programs, the DSA log is cleared.

To save the DSA log to a file on a diskette or to the hard disk, click **Save Log** on the diagnostic programs screen and specify a location and name for the saved log file.

Notes:

1. To create and use a diskette, you must add an optional external diskette drive to the server.
2. To save the test log to a diskette, you must use a diskette that you have formatted yourself; this function does not work with preformatted diskettes. If the diskette has sufficient space for the test log, the diskette can contain other data.

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 4. DSA messages

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
• See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 number	Component	Test	State	Description	Action
089-000-xxx	CPU	CPU Stress test	Pass	CPU passed stress test	No action required.

Table 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 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.
					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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267.
					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.

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.
					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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267.
					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.

Table 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 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.
					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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267.
					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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 number	Component	Test	State	Description	Action
166-808-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: reservation aborted 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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.

Table 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 number	Component	Test	State	Description	Action
166-902-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the I/O Expander (Bus 1).	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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 6. Run the test again. 7. Turn off the system and disconnect it from the power source. 8. Reseat the EasyLED panel. 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 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 number	Component	Test	State	Description	Action
166-903-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the host 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 number	Component	Test	State	Description	Action
166-905-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the SAS backplane and the Sensor 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 number	Component	Test	State	Description	Action
166-906-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the PCI 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. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 aborted: the server firmware 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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 aborted: 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 server firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 number	Component	Test	State	Description	Action
201-803-xxx	Memory	Memory Test	Aborted	Test aborted: 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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 aborted: 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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 aborted: 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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 aborted: 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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 number	Component	Test	State	Description	Action
201-807-xxx	Memory	Memory Test	Aborted	Test aborted: 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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 aborted: 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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 aborted 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. 4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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.
201-810-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. 4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 number	Component	Test	State	Description	Action
201-901-xxx	Memory	Memory Test	Failed	Test failure: single-bit error, failing bank x, failing memory card y, 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. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 252). 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.
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. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 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 log. If necessary, enable all memory in the Setup utility (see "Using the Setup Utility" on page 252). 2. Make sure that the DSA code is at the latest level. 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. 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.
215-801-xxx	Optical 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. 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 system firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 6. Run the test again. 7. Replace the CD/DVD drive. 8. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support.

Table 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 number	Component	Test	State	Description	Action
215-802-xxx	Optical 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. 8. Run the test again. 9. Replace the CD/DVD drive. 10. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support.
215-803-xxx	Optical 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 CD/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	Optical 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. Replace the CD/DVD drive. 6. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support.

Table 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 number	Component	Test	State	Description	Action
215-902-xxx	Optical 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. Replace the CD/DVD drive. 6. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support.
215-903-xxx	Optical 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. 6. Run the test again. 7. Replace the CD/DVD drive. 8. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support.
215-904-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test Messages and actions apply to both 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. Replace the CD/DVD drive. 6. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support.
217–800–000	SAS/SATA Hard Drive	Disk Drive Test	Aborted	Test aborted.	Run the test again.

Table 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 number	Component	Test	State	Description	Action
217-900-xxx	SAS/SATA Hard Drive	Disk Drive Test	Failed		1. Reseat all hard disk drive backplane connections at both ends. 2. Reseat the 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.
264-901-000	Tape Drive	Tape Drive Test	Failed	An error was found in the tape alert log page.	1. Clean the tape drive using the appropriate cleaning media and install new media. 2. Run the test again. 3. Clear the error log. 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.
264-902-000	Tape Drive	Tape Drive Test	Failed	Media is not detected.	1. Clean the tape drive using the appropriate cleaning media and install new media. 2. Run the test again. 3. Clear the error log. 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.
264-903-000	Tape Drive	Tape Drive Test	Failed	Media error.	1. Clean the tape drive using the appropriate cleaning media and install new media. 2. Run the test again. 3. Clear the error log. 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.
264-904-000	Tape Drive	Tape Drive Test	Failed	Drive hardware error.	1. Check the tape drive cabling for loose or broken connections or damage to the cable. Replace the tape drive cable if damage is present. 2. Clean the tape drive using the appropriate cleaning media and install new media. 3. Run the test again. 4. Clear the error log. 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 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 number	Component	Test	State	Description	Action
264-905-000	Tape Drive	Tape Drive Test	Failed	Software error: invalid request.	1. If the system has stopped responding, turn off and restart the system and then run the test again. 2. Check system firmware level and upgrade if necessary. The installed firmware level can be found in the DSA Log within the Firmware/VPD section for this component. 3. Run the test again. 4. If the system has stopped responding, turn off and restart the system. 5. If the failure remains, go to the Lenovo Web site for more troubleshooting information at http://www.lenovo.com/support.
264-906-000	Tape Drive	Tape Drive Test	Failed	Unrecognized error.	1. Clean the tape drive using the appropriate cleaning media and install new media. 2. Run the test again. 3. Clear the error log. 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.
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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 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 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 number	Component	Test	State	Description	Action
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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 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.
405-903-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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 2. Run the test again. 3. Check the interrupt assignments in the PCI Hardware section of the DSA log. If the Ethernet device is sharing interrupts, if possible, use the Setup utility (see "Using the Setup Utility" on page 252) 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 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 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 number	Component	Test	State	Description	Action
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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 2. Run the test again. 3. Check the interrupt assignments in the PCI Hardware section of the DSA log. If the Ethernet device is sharing interrupts, if possible, use the Setup utility (see "Using the Setup Utility" on page 252) 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 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.
405-905-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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 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.
405-906-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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267. 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 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 4. DSA 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 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 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 number	Component	Test	State	Description	Action
405-907-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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 267.
					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 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 from a Lenovo ThinkServer Server Firmware update failure

If power to the server is interrupted while you are updating the Lenovo ThinkServer Server Firmware, the server might not restart correctly or might not display video. If this happens, complete the following steps to recover:

1. Read the safety information that begins on page 5.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see "Removing the left-side cover" on page 157).
4. Locate JP6 on the system board and remove any adapters that impede access to the jumpers.
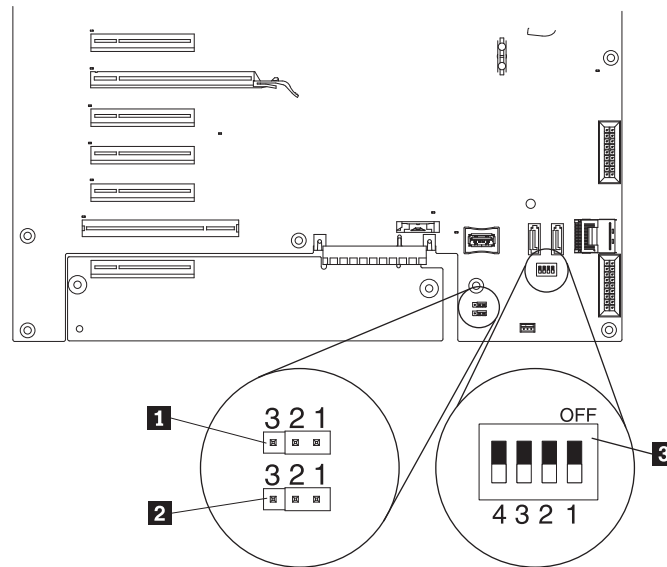
Table 5. System-board jumpers

	Jumper number	Jumper name	Jumper setting
1	JP6	UEFI boot recovery	• Pins 1 and 2: Normal operation (default). • Pins 2 and 3: Enable the UEFI recovery mode.
2	JP1	CMOS clear	• Pins 1 and 2: Normal operation (default). • Pins 2 and 3: Clears CMOS.
3	SW6	switch block	
	Note: If no jumper is present, the server responds as if the pins are set to 1 and 2.		

5. Move jumper JP6 to pins 2 and 3 to enable the UEFI recovery mode.
6. Replace any adapters that you removed; then, install the side cover (see "Installing the left-side cover" on page 158).
7. Reconnect all external cables and power cords.
8. Insert the update CD into the CD or DVD drive.
9. Turn on the server and the monitor.

   After the update session is completed, remove the CD from the drive and turn off the server.

10. Disconnect all power cords and external cables.

11. Remove the side cover (see "Removing the left-side cover" on page 157).

12. Remove any adapters that impede access to jumper JP6.

13. Move jumper JP6 to back to pins 1 and 2 for normal operation.

14. Replace any adapters that you removed; then, install the side cover (see "Installing the left-side cover" on page 158).

15. Lock the side cover if you unlocked it during removal.

16. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

The function of each switch and jumper on the system board is described in "System-board switches and jumpers" on page 144.

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 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.

3. 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 124 for the minimum configuration).

4. Reconnect all ac power cords and turn on the server. If the server starts successfully, replace the adapters and devices one at a time until the problem is isolated.

If the server does not start from the minimum configuration, 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 the Ethernet controller is set 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 light is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Check the LAN activity LEDs 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 75.

Damaged data in CMOS memory or damaged Lenovo ThinkServer Server Firmware can cause undetermined problems. To reset the CMOS data, use the password switch 2 (SW4) to override the power-on password and clear the CMOS memory; see "Internal LEDs, connectors, and jumpers" on page 140.

Check the LEDs on all the power supplies (see "Power-supply LEDs" on page 88). If the LEDs indicate that 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).
    - Modem, printer, mouse, and non-Lenovo devices.
    - Each adapter.
    - Hard disk drives.
    - Memory modules. The minimum configuration requirement is 1 GB DIMM per microprocessor (2 GB in a two-microprocessor configuration).

The following minimum configuration is required for the server to start:
- One microprocessor
- One 1 GB DIMM
- One power supply
- Power cord
- ServeRAID SAS adapter
- System board assembly

4. Turn on the server. If the problem remains, suspect the following components in the following order:
   a. Power supply
   b. Power-supply cage
   c. Memory
   d. Microprocessor
   e. 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 system board or extender 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.

Problem determination tips

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

- Machine type and model
- Microprocessor and hard disk drive upgrades
- Failure symptoms
  - 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)
- Lenovo ThinkServer Server Firmware level
- Operating-system type and version level

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
- Lenovo ThinkServer Server 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

See Appendix A, "Getting help and technical assistance," on page 275 for information about calling Lenovo for service.

Chapter 6. Locating Server Controls and connectors

This section describes the controls and light-emitting diodes (LEDs) and how to turn the server on and off.

Front view

The following illustration shows the controls and LEDs on the front of the server.

Note: The front bezel door is not shown so that the drive bays are visible.
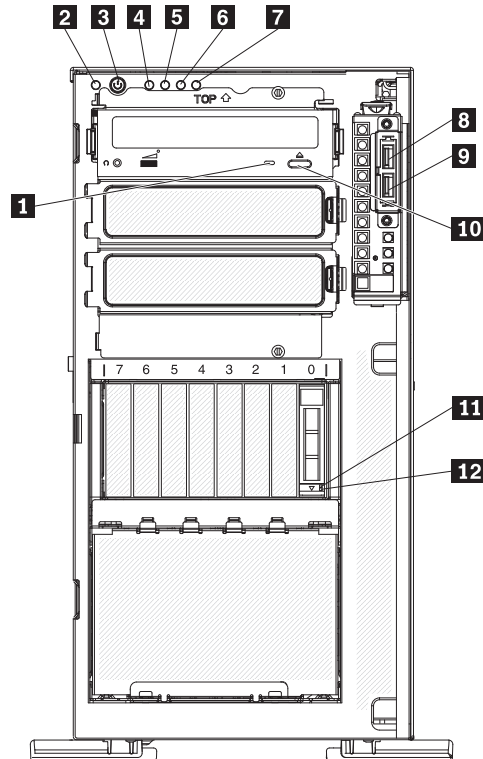
1	DVD drive activity LED (green)	7	System-error LED
2	System-power LED	8	USB 2
3	Power-control button	9	USB 1
4	Hard-disk drive activity LED	10	DVD drive eject button
5	System-locator LED	11	Hard disk drive status LED (amber)
6	System-information LED	12	Hard disk drive activity LED (green)

Operator information panel

The following illustration shows the LEDs on the operator information panel on the front of the server.
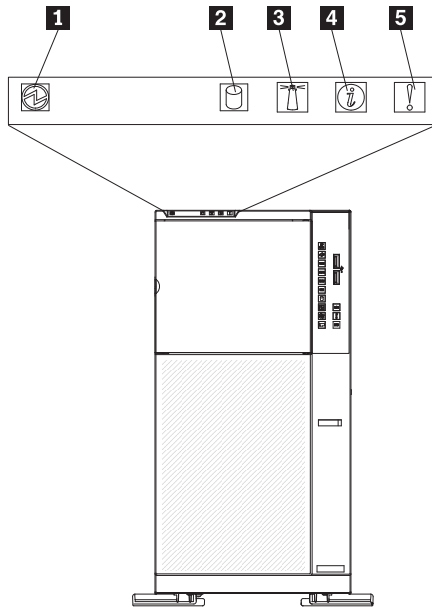
1	System power-on LED
2	Hard disk drive activity LED
3	System-locator LED
4	System-information LED
5	System-error LED

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 to determine which components are customer replaceable units (CRUs) and which components are field replaceable units (FRUs).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

| Lit EasyLED diagnostics LEDs with the system-error or information LED also lit	Description
System power-on (green)	The states of the power-on LED are as follows: • **Off:** ac power is not present, or the power supply or the LED itself has failed. • **Flashing rapidly (4 times per second):** The server is turned off and is not ready to be turned on. The power-control button is disabled. Approximately 3 minutes after the server is connected to ac power, the power-control button becomes active. • **Flashing slowly (once per second):** The server is turned off and is ready to be turned on. You can press the power-control button to turn on the server. • **Lit:** The server is turned on. • **Fading on and off:** The server is in a reduced-power state. To wake the server, press the power-control button or use the IMM Web interface.
Hard-disk drive activity (green)	When this LED is flashing rapidly, it indicates that there is activity on a hard disk drive.
System locator (blue)	Use this LED to visually locate the server among other servers.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 8, "Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823," on page 237 to determine which components are customer replaceable units (CRUs) and which components are field replaceable units (FRUs).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Lit EasyLED diagnostics LEDs with the system-error or information LED also lit	Description
System information (amber)	When this amber LED is on, it indicates that information about a suboptimal condition in the server is available in the IMM-event log or in the system-event log. Check the EasyLED diagnostics panel for more information.
System error (amber)	When this LED is lit, it indicates that a system error has occurred. Use the diagnostic LED panel and the system service label to further isolate the error.

EasyLED diagnostics panel

The following illustration shows the front LEDs on the EasyLED diagnostics panel. The EasyLED diagnostics panel is located inside the front bezel.

Note: The EasyLED diagnostics LEDs remain lit only while the server is connected to power.

1	Server processor bus	8	Power supply
2	Microprocessor	9	Fan
3	VRM	10	PCI bus
4	Microprocessor/memory configuration	11	System board
5	Memory	12	Temperature
6	NMI	13	System-event log
7	Hard disk drive/RAID	14	USB ports

For more information about the EasyLED diagnostics LEDs, see "EasyLED diagnostics" on page 76

Rear view

The following illustration shows the connectors and LEDs on the rear of the server.

1	USB 1	7	Power-error LED
2	USB 2	8	dc-power LED
3	USB 3	9	ac-power LED
4	USB 4	10	Video connector
5	Ethernet 10/100/1000	11	Serial 1 (COM 1)
6	Power-cord connector	12	Systems-management connector
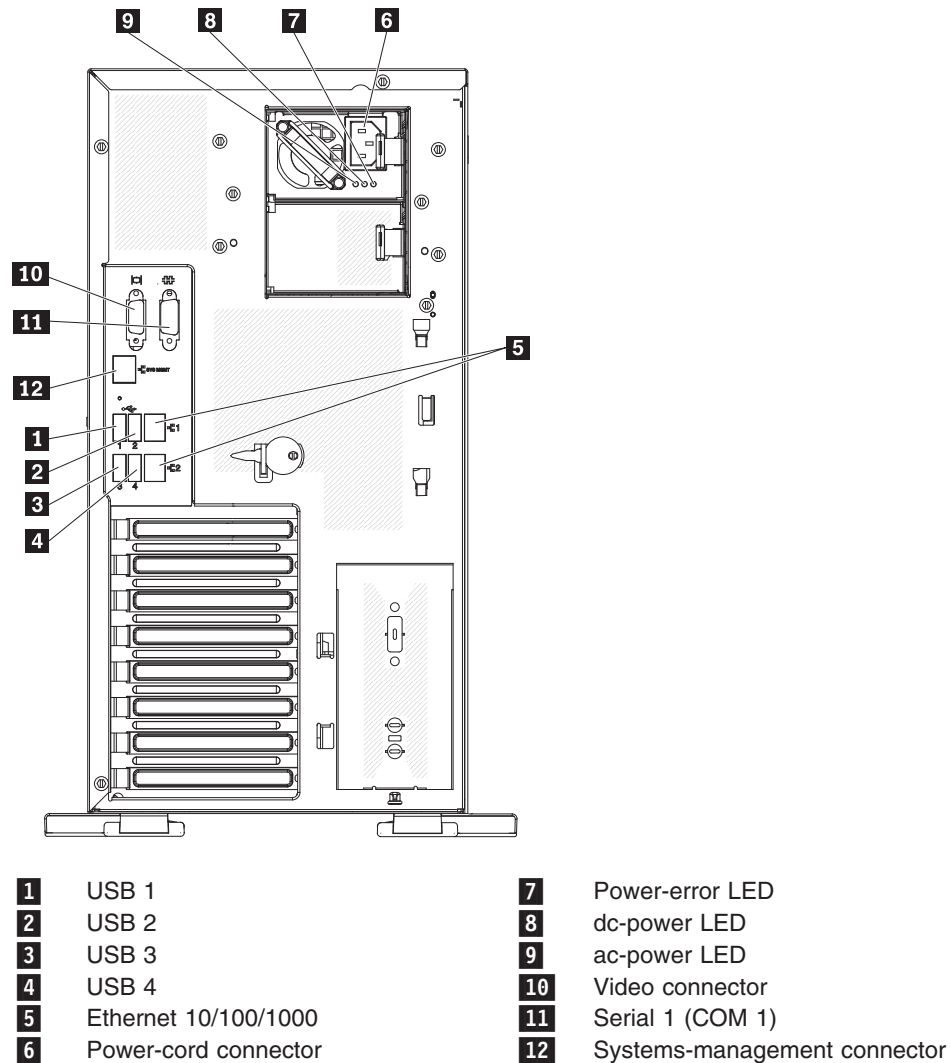
USB 1-4 connectors: Connect a USB device, such as USB mouse or keyboard, to any of these connectors.

Ethernet 10/100/1000 connector: Use these connectors to connect the server to a network.

Power-cord connector: Connect the power cord to this connector.

Power-error LED: When the power-error LED is lit, it indicates that the power supply has failed.

dc-power LED: Each hot-swap power supply has a dc-power LED and an ac-power LED. When the dc-power LED is lit, it indicates that the power supply is supplying adequate dc power to the system. During typical operation, both the ac and dc-power LEDs are lit. For any other combination of LEDs, see "Power-supply LEDs" on page 139.

ac-power LED: Each hot-swap power supply has an ac-power LED and a dc-power LED. When the ac-power LED is lit, it indicates that sufficient power is coming into the power supply through the power cord. During typical operation, both the ac and dc-power LEDs are lit. For any other combination of LEDs, see "Power-supply LEDs" on page 139.

Video connector: Connect a monitor to this connector.

Serial 1 connector (COMM 1): Connect a 9-pin serial device to this connector. The serial port is shared with the integrated management module (IMM). The IMM can take control of the shared serial port to perform text console redirection and to redirect serial traffic, using Serial over LAN (SOL).

Systems-management connector: Use this connector to connect the server to a network for systems-management information control. This connector is used only by the IMM.

System-board internal connectors

The following illustrations show the internal connectors and switches on the system board.

1	Microprocessor 2	**21**	Wake on LAN
2	System power	**22**	Battery
3	ADV power	**23**	PCI Express x8 slot 7
4	Optical power	**24**	PCI - 32 slot 6
5	Front panel	**25**	PCI Express x8 slot 5
6	EasyLED panel	**26**	PCI Express x8 slot 4
7	USB tape	**27**	PCI Express x8 slot 3
8	DIMM 8	**28**	PCI Express x8 slot 2
9	DIMM 1	**29**	PCI Express x8 slot 1
10	SATA backplane 2 power	**30**	Virtual media key connector
11	Front USB	**31**	VRM connector (Microprocessor 2)
12	SAS/SATA configuration backplane 1	**32**	USB
13	SAS/SATA configuration backplane 2	**33**	NMI button
14	SATA backplane 1 power	**34**	RJ45 (10/100)
15	Microprocessor 1	**35**	Microprocessor power
16	Fans 4, 5, and 6	**36**	Video
17	SATA 0	**37**	Serial
18	SATA 2 - 5	**38**	Power supply power
19	Fans 1, 2, and 3	**39**	DIMM 9
20	SATA 1	**40**	DIMM 16

The system board is equipped with a PCI extender card that provides one additional expansion slot. The following illustration shows the additional PCI Express expansion slot that is available on the PCI Express extender card.

Note: The PCI Express extender card comes standard in the TD200x server.
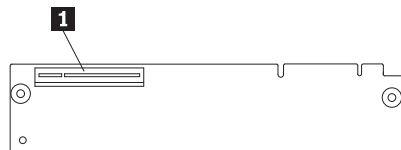
1   PCI Express x8 slot 7

The following illustration shows two additional PCI-X expansion slots that are available on the PCI-X extender card.
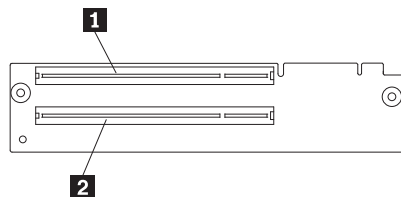
1   PCI-X 1 slot 7
2   PCI-X 2 slot 8

System-board external connectors

The following illustration shows the external input/output connectors and the NMI button on the system board.
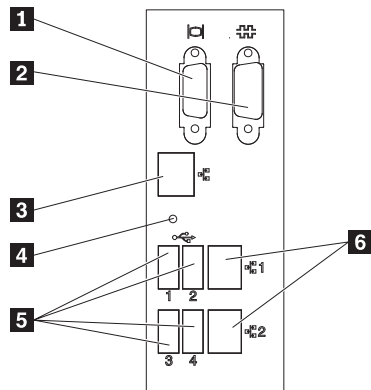
1	Video port
2	Serial port
3	10/100m RJ45 LAN connector
4	NMI button
5	USB ports
6	GbE RJ45 LAN connectors

System-board switches and jumpers

The following illustration shows the SW6 switch and the jumpers on the system board. See the tables below the illustration for information about the switch settings.
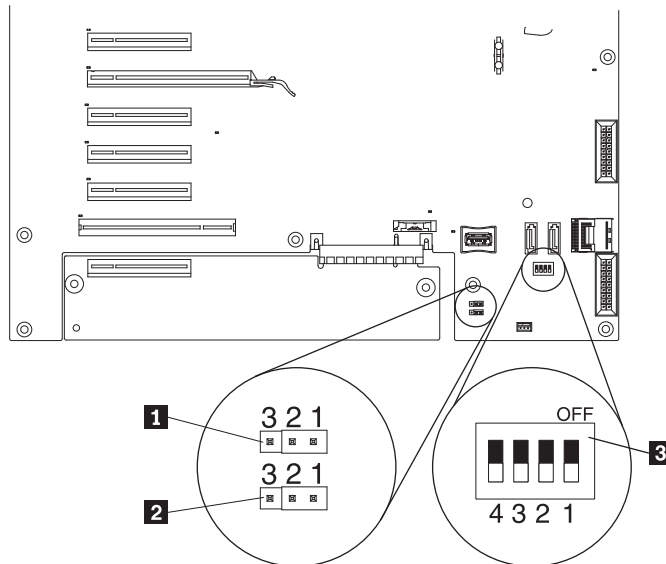
Table 6. System-board jumpers

	Jumper number	Jumper name	Jumper setting
1	JP6	UEFI boot recovery	• Pins 1 and 2: Normal operation (default). • Pins 2 and 3: Enable the UEFI recovery mode.
2	JP1	CMOS clear	• Pins 1 and 2: Normal operation (default). • Pins 2 and 3: Clears CMOS.
3	SW6	switch block	
	Note: If no jumper is present, the server responds as if the pins are set to 1 and 2.		

Table 7. System-board switch 6

SW 6 Switches	Switch description
1	Reserved (Default off)
2	Power-on password override when on. (Default off)
3	Reserved (Default off)
4	When off, this loads the primary IMM firmware ROM page. When on, this loads the secondary (backup) IMM firmware ROM page. (Default off)

Notes:

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 Chapter 2, "Safety information," on page 5).
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 LEDs on the system board.

1	PCI slot 1 error LED	**9**	Battery error LED
2	PCI slot 2 error LED	**10**	System-board error LED
3	PCI slot 3 error LED	**11**	VRM fail LED
4	HS heartbeat LED	**12**	CPU 1 error LED
5	PCI slot 4 error LED	**13**	DIMMs 1 - 8 error LEDs (starting from the bottom)
6	PCI slot 5 error LED	**14**	DIMMs 9 - 16 error LEDs (starting from the bottom)
7	PCI slot 6 error LED	**15**	CPU 2 error LED
8	IMM heartbeat LED	**16**	CPU mismatch LED

The system board is equipped with a PCI extender card that provides either one or two additional expansion slots. The following illustration shows the LEDs on the PCI

Express extender card **1** , if one is installed.

The following illustration shows the LEDs (**1** and **2**) on the PCI-X extender card, if one is installed.

The following table describes the LEDs on the system board and extender card 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.
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Lit EasyLED diagnostics LED with the system-error or information LED also lit	Description	Action

DIMM 1 to DIMM 16 error LEDs	A DIMM has failed or is incorrectly installed.	1. Remove the DIMM that is indicated by a 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 1 error LED	Microprocessor 1 has failed, is missing, or has been incorrectly installed.
	Note: (Trained service technician only) Make sure that the microprocessors are installed in the correct sequence; see "Removing a microprocessor and heat sink" on page 218
		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

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

Lit EasyLED diagnostics LED with the system-error or information LED also lit	Description	Action

CPU 2 error LED	Microprocessor 2 has failed, is missing, or has been incorrectly installed.
	Note: (Trained service technician only) Make sure that the microprocessors are installed in the correct sequence; see "Removing a microprocessor and heat sink" on page 218
		1. Check the system-event log to determine the reason for the lit LED.
		2. Find the failing, missing, or mismatched microprocessor by checking the LEDs on the system board.
		3. (Trained service technician) Reseat the failing microprocessor.
		4. 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

CPU mismatch LED	A mismatched microprocessor has been installed. **Note:** All microprocessors must have the same speed and cache size.	1. Run the Setup Utility and view the microprocessor information to compare the installed microprocessor specifications. 2. (Trained service technician only) Remove and replace one of the microprocessors so that they both match.

VRM failure LED	Microprocessor 2 VRM has failed or is incorrectly installed.	1. Reseat the VRM
		2. Replace the following components one at a time, in the order shown, restarting the server each time:
		   a. VRM
		   b. (Trained service technician only) System board
		3. Replace the VRM

System-board error LED	System-board CPU VRD, power voltage regulators, or both 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, do the following: 1. (Trained service technician only) Use the IMM recovery switch to recover the firmware (see "System-board switches and jumpers" on page 133). 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.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Lit EasyLED diagnostics LED with the system-error or information LED also lit	Description	Action
PCI slot 1 to PCI slot 8 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, call Lenovo Service and Support for additional troubleshooting information.
H8 heartbeat LED	Indicates the status of power-on and power-off sequencing.	1. If the H8 heartbeat LED is blinking at a 1 Hz rate, no action is necessary. 2. (Trained service technician only) If the H8 heartbeat LED is not blinking, replace the system board.

SAS backplane connectors

The following illustration shows the connectors on the SAS backplane.
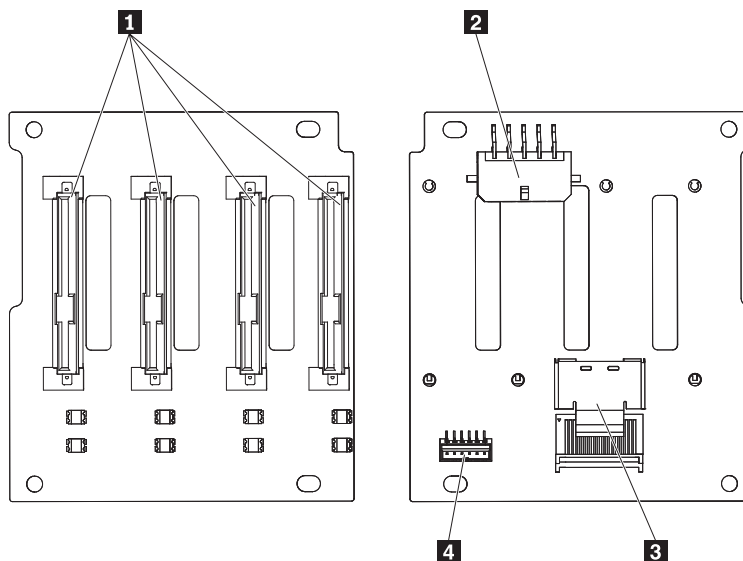
1	Hard disk drive connectors
2	Power connector
3	Signal connector
4	Configuration connector

Power-supply LEDs

The following illustration shows the power-supply LEDs on the rear of the server. For more information about solving power-supply problems, see "Solving power problems" on page 123.
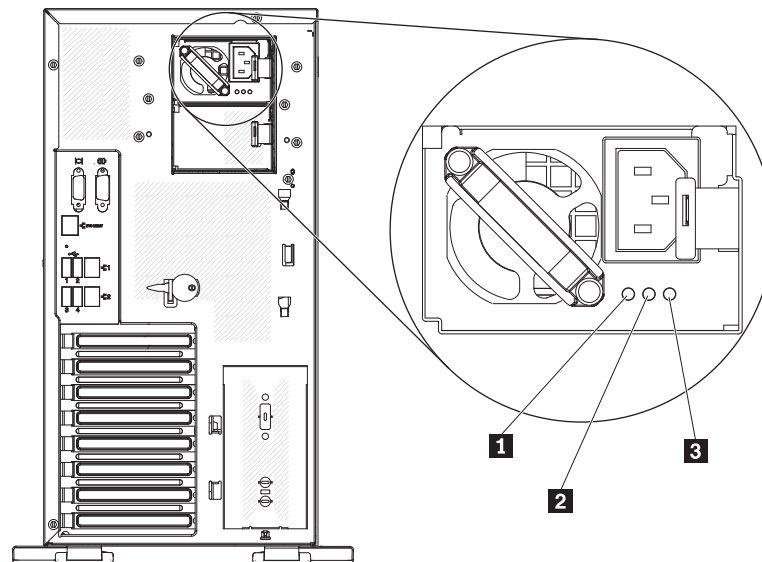
1	ac power LED
2	dc power LED
3	Power error LED

The following table describes the problems that are indicated by various combinations of the power-supply LEDs and the power-on LED on the operator information panel and suggested actions to correct the detected problems.

Table 8. Power-supply LEDs

| Power-supply LEDs | | | | | |
ac	dc	Error	Description	Action	Notes
Off	Off	Off	No ac power to the server or a problem with the ac power source	1. Check the ac power to the server. 2. Make sure that the power cord is connected to a functioning power source. 3. Turn the server off and then turn the server back on. 4. If the problem remains, replace the power supply.	This is a normal condition when no ac power is present.
Off	Off	On	No ac power to the server or a problem with the ac power source and the power supply had detected an internal problem	1. Replace the power supply. 2. Make sure that the power cord is connected to a functioning power source.	This happens only when a second power supply is providing power to the server.
Off	On	Off	Faulty power supply	Replace the power supply.	
Off	On	On	Faulty power supply	Replace the power supply.	
On	Off	Off	Power supply not fully seated, faulty system board, or faulty power supply	1. Reseat the power supply. 2. If the system board error LED is off, replace the power supply. 3. (Trained service technician only) If the system board error LED is on, replace the system board.	Typically indicates that a power supply is not fully seated.
On	Off or Flashing	On	Faulty power supply	Replace the power supply.	
On	On	Off	Normal operation		
On	On	On	Power supply is faulty but still operational	Replace the power supply.	

Internal LEDs, connectors, and jumpers

The illustrations in this section show the LEDs, connectors, and jumpers on the internal boards. The illustrations might differ slightly from your hardware.

System-board internal connectors

The following illustration shows the internal connectors on the system board.

1	Microprocessor 2	**21**	Wake on LAN
2	System power	**22**	Battery
3	ADV power	**23**	PCI Express x8 slot 7
4	Optical power	**24**	PCI - 32 slot 6
5	Front panel	**25**	PCI Express x8 slot 5
6	EasyLED panel	**26**	PCI Express x8 slot 4
7	USB tape	**27**	PCI Express x8 slot 3
8	DIMM 8	**28**	PCI Express x8 slot 2
9	DIMM 1	**29**	PCI Express x8 slot 1
10	SATA backplane 2 power	**30**	Virtual media key connector
11	Front USB	**31**	VRM connector (Microprocessor 2)
12	SAS/SATA configuration backplane 1	**32**	USB
13	SAS/SATA configuration backplane 2	**33**	NMI button
14	SATA backplane 1 power	**34**	RJ45 (10/100)
15	Microprocessor 1	**35**	Microprocessor power
16	Fans 4, 5, and 6	**36**	Video
17	SATA 0	**37**	Serial
18	SATA 2 - 5	**38**	Power supply power

19	Fans 1, 2, and 3	39	DIMM 9
20	SATA 1	40	DIMM 16

The system board is equipped with a PCI extender card that provides either one or two additional expansion slots. The following illustration shows one additional PCI Express expansion slot that is available on the PCI Express extender card, if equipped.
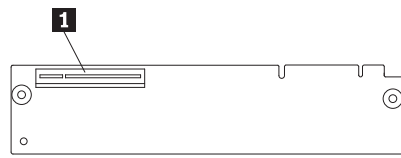
1   PCI Express x8 slot 7

The following illustration shows two additional PCI-X expansion slots that are available on the PCI-X extender card, if equipped.
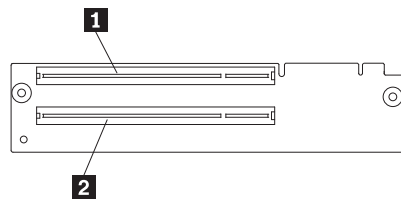
1   PCI-X 1 slot 7
2   PCI-X 2 slot 8

System-board switches and jumpers

The following illustration shows the switches and jumpers on the system board.
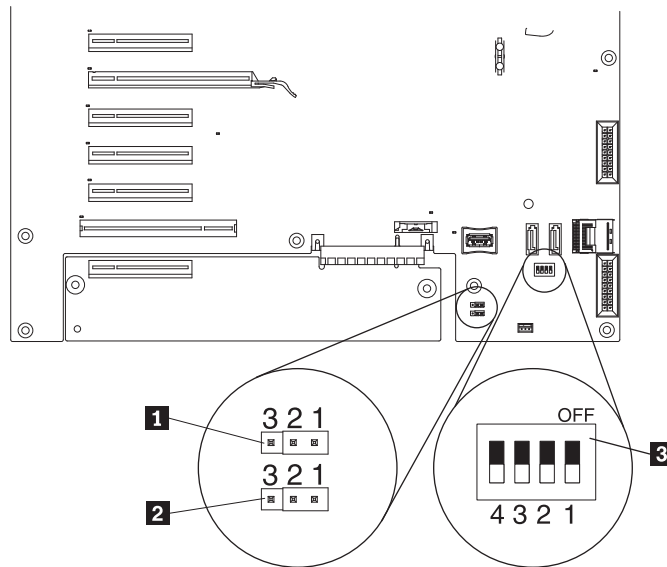
See Table 9 and Table 10 for information about the switch and jumper settings.

Table 9. System-board jumpers

Jumper number	Jumper name	Jumper setting
JP1	CMOS clear	• Pins 1 and 2: Normal operation (default). • Pins 2 and 3: Clears CMOS memory.
JP6	UEFI boot recovery	• Pins 1 and 2: Normal operation (default). • Pins 2 and 3: Enable the UEFI recovery mode.
Note: If no jumper is present, the server responds as if the jumper is on pins 1 and 2.		

Table 10. System-board switch 6

SW 6 Switches	Switch description
1	Reserved (default off)
2	Power-on password override when on. (default off)
3	Reserved (default off)
4	When this switch is off, the primary IMM firmware ROM page is loaded. When this switch is on, the secondary (backup) IMM firmware ROM page is loaded. (default off)

Notes:

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 Chapter 2, "Safety information," on page 5.)
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 LEDs on the system board.

1	PCI slot 1 error LED	9	Battery error LED
2	PCI slot 2 error LED	10	System-board error LED
3	PCI slot 3 error LED	11	VRM fail LED
4	HS heartbeat LED	12	CPU 1 error LED
5	PCI slot 4 error LED	13	DIMMs 1 - 8 error LEDs (starting from the bottom)
6	PCI slot 5 error LED	14	DIMMs 9 - 16 error LEDs (starting from the bottom)
7	PCI slot 6 error LED	15	CPU 2 error LED
8	IMM heartbeat LED	16	CPU mismatch LED

The system board is equipped with a PCI extender card that provides either one or two additional expansion slots. The following illustration shows the LEDs on the PCI Express extender card **1**, if one is installed.

The following illustration shows the LEDs (**1** and **2**) on the PCI-X extender card, if one is installed.

System-board external connectors

The following illustration shows the external input/output connectors on the system board.
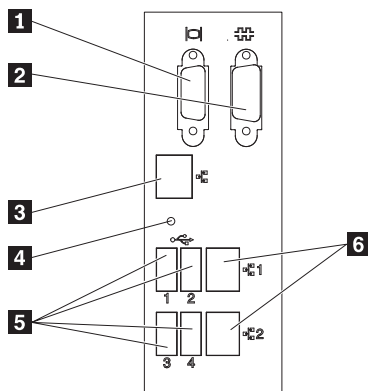
1	Video port
2	Serial port
3	10/100m RJ45 LAN connector
4	NMI button
5	USB ports
6	GbE RJ45 LAN connectors

2.5-inch hard disk drive backplane connectors

The following illustration shows the connectors on the 2.5-inch hard disk drive backplane.
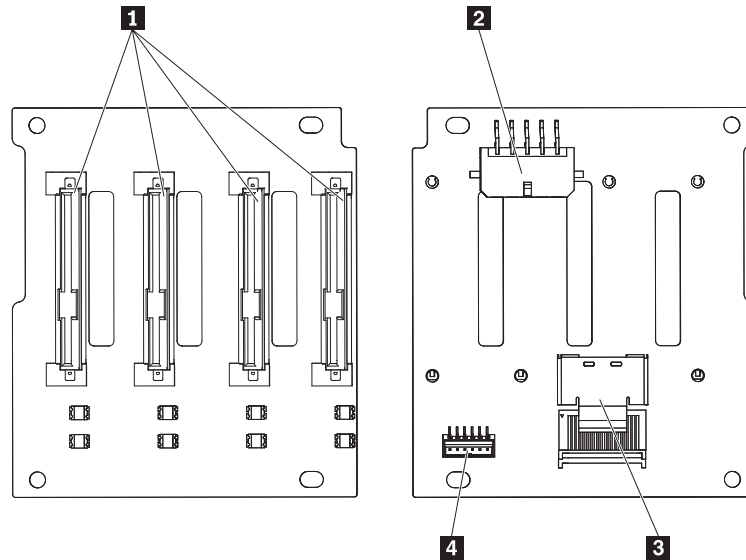
1	Hard disk drive connectors
2	Power connector
3	Signal connector
4	Configuration connector

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 integrated management module (IMM) is shut down; however, the server can respond to requests from the IMM, 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 not turned on.

Turning on the server

Approximately 3 minutes after the server is connected to ac power, the power-control button becomes active, and one or more fans might start running to provide cooling while the server is connected to power. You can turn on the server and start the operating system 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.

For 32-bit operating systems only: 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 options.

Turning off the server

When you turn off the server and leave it connected to ac power, the server can respond to requests from the IMM, 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.

Important: To view the error LEDs on the system board, leave the server connected to a 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.
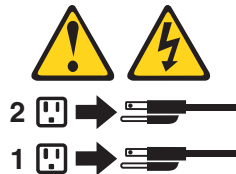
The server can be turned off in any of the following ways:

- 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 be turned 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 IMM can turn off the server as an automatic response to a critical system failure.
- You can turn off the server through a request from the IMM.

Chapter 7. Installing optional devices and replacing customer replaceable units

Important: Before you install optional hardware, make sure that the server is working correctly. Start the server, and make sure that the operating system starts, if an operating system is installed. If the server is not working correctly, see the Chapter 5, "Diagnostics," on page 27 for diagnostic information.

This chapter provides detailed instructions for installing optional hardware devices in the server.

Server components

The following illustration shows the major components in the server.

1	Cover	**14**	USB cable/EasyLED diagnostics assembly
2	Rear adapter retention bracket	**15**	DVD drive
3	Air baffle	**16**	Bezel
4	Heat sink	**17**	Optical drive bay EMC shield
5	Microprocessor	**18**	2.5-inch EMC shield
6	Heat sink retention bracket	**19**	2.5-inch hot-swap drive
7	DIMMs	**20**	2.5-inch drive cage assembly
8	System board	**21**	SAS/SATA 2.5-inch backplane
9	VRM	**22**	Fan assembly
10	Power-supply cage	**23**	Hot-swap fan
11	Power supply	**24**	ServeRAID MR10i
12	Power-supply filler	**25**	ServeRAID BR10i
13	Control panel assembly	**26**	ServeRAID MR10is

Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.

Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.

Opening the bezel

Important: Before you install optional hardware, make sure that the server is working correctly. If an operating system is installed, start the server, and make sure that the operating system starts. If no operating system is installed, start the server and make sure that a 19990305 error code is displayed, indicating that an operating system was not found but the server is otherwise working correctly. If the server is not working correctly, see the Chapter 5, "Diagnostics," on page 27 for diagnostic information.

The following illustration shows how to open the bezel.

Notes:
1. The left-side cover does not have to be removed to open the bezel.
2. The left-side cover lock must be unlocked to open or remove the bezel.
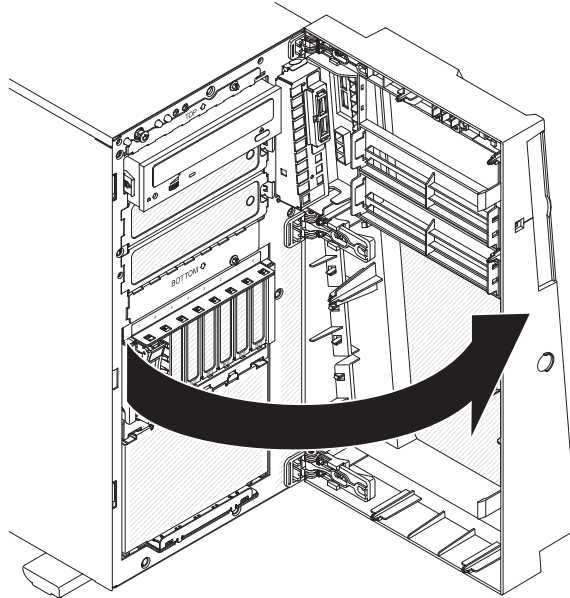
Complete the following steps to open the bezel:
1. Read the safety information that begins on page 5.
2. Using the supplied key, unlock the left-side cover and bezel.
3. Press on the left edge of the bezel, and rotate the left side of the bezel away from the server.

Closing the bezel
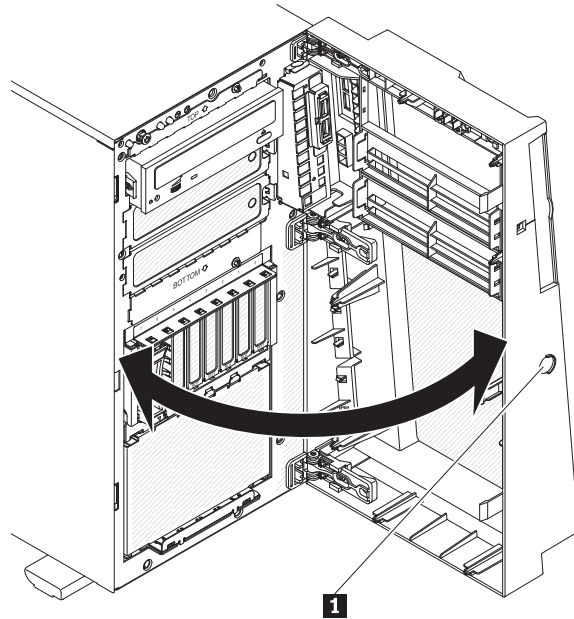
1　　Pull point

To close the bezel, do the following:
1. Rotate the left side of the bezel toward the server to the closed position.
2. Lock the left-side cover, using the key that comes with the server.

Removing the bezel
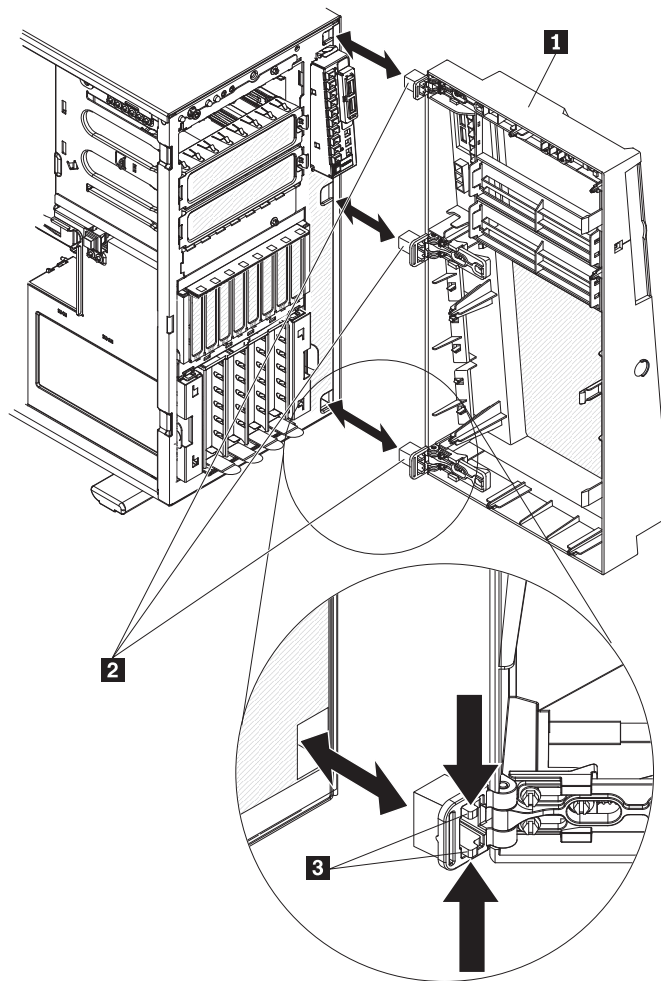
1   Bezel
2   Hinge assembly
3   Retention tabs

To remove the bezel, do the following:

1. Read the safety information that begins on page 5.
2. Unlock the left-side side cover.

   Note: You must unlock the side cover to remove the bezel.

3. Open the bezel (see "Opening the bezel" on page 150).

4. Press the retention tabs **1** on the hinge assembly toward each other and pull the hinge assembly out of the chassis.
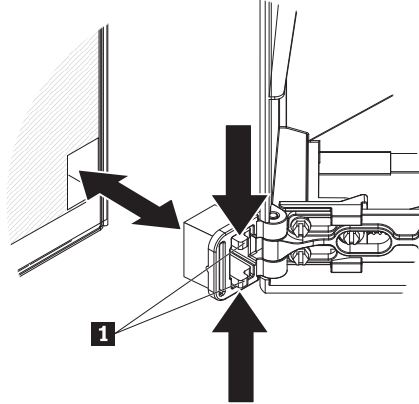
Note: The bezel will also disengage from the chassis hinges if you rotate the bezel beyond 180° or if excessive pressure is applied to the bezel. Do not be alarmed because this is how the bezel was designed. The bezel is designed with breakaway hinges so that you can easily reattach it to the chassis.

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

Installing the bezel
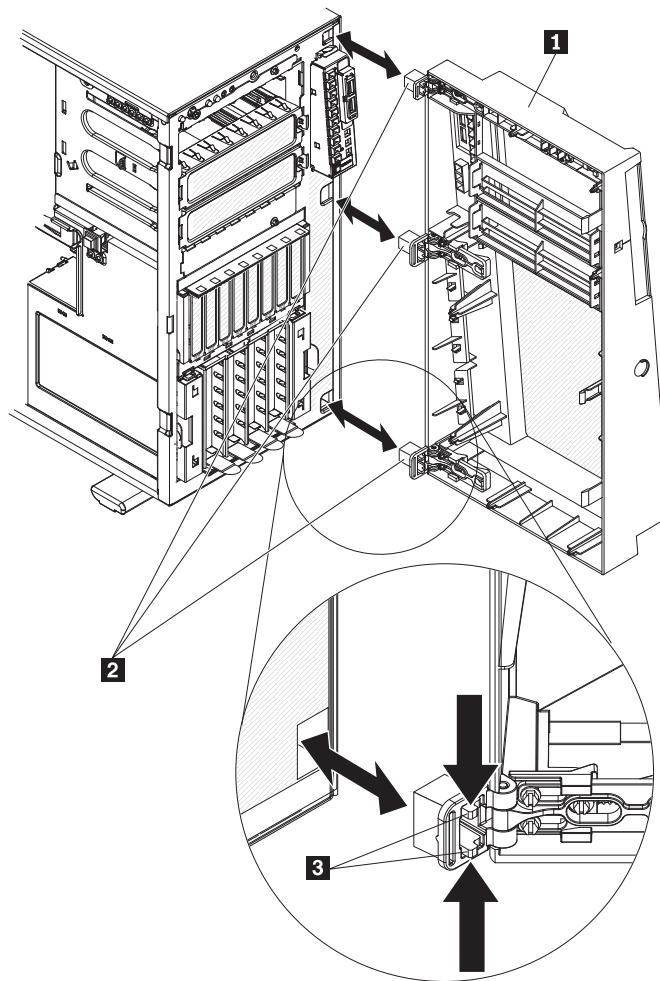
1   Bezel
2   Hinge assembly
3   Retention tabs

To install the bezel, do the following:

1. Align the hinge assemblies with the hinge holes on the chassis.
2. Push the hinges into the holes on the chassis until they snap into place.
3. If however, the bezel was removed by detaching the sliding hinge mount from the hinge assembly (using the breakaway method as the bezel was designed to do), complete the following steps to reattach the bezel:
   a. Press in on the rear of the sliding hinge mount until it extends beyond the edge of the bezel and hold it in place.
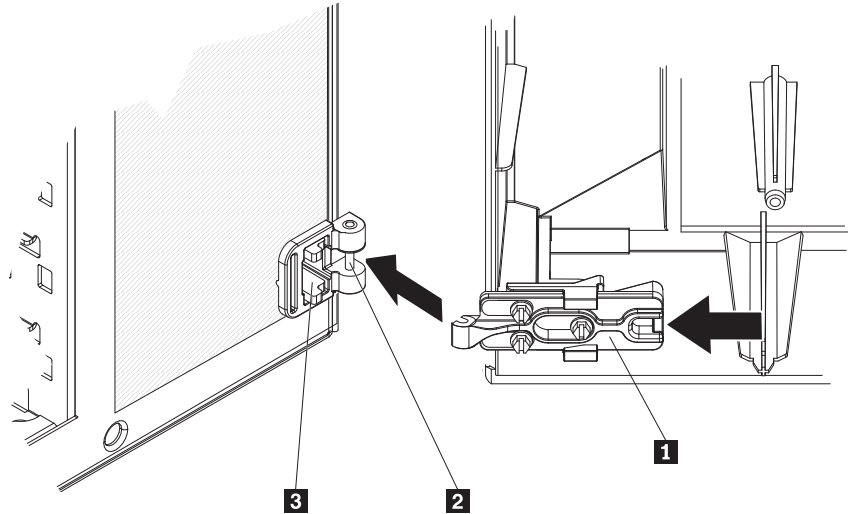
b. Align the sliding hinge mount **1** with the hinge pin **2** on the hinge assembly **3** on the chassis.

c. Press the sliding hinge mount against the hinge pin until the sliding hinge mount snaps onto the hinge pin.

4. Close the bezel (see "Closing the bezel" on page 151).

5. Lock the left-side cover.

Opening the bezel media door

To open or remove the media door, do the following:

1. Read the safety information that begins on page 5.

2. Unlock the side cover.

   Note: You must unlock the side cover to open or remove the bezel. When you lock the server side cover, it locks both the cover and the bezel.

3. Grasp the depressed area on the left side of the bezel door and rotate the bezel to the open position.

4. From inside of the top section of the bezel door, slide the blue tab up to unlock the bezel media door; then, grasp the depressed area on the left side of the media door and pull the door open.
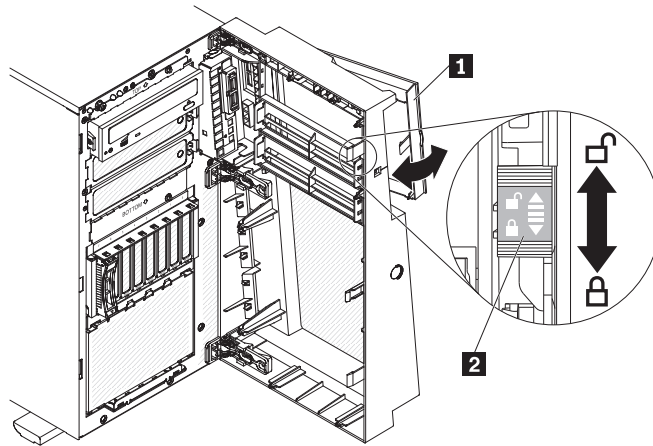
1	Bezel media door
2	Media door lock

> **Note:** To remove the media door from the bezel, push upward on the media door hinge to remove it from the bezel.

5. When the media door is unlocked, the icon on the side of the bezel **1** will be in the unlocked position.
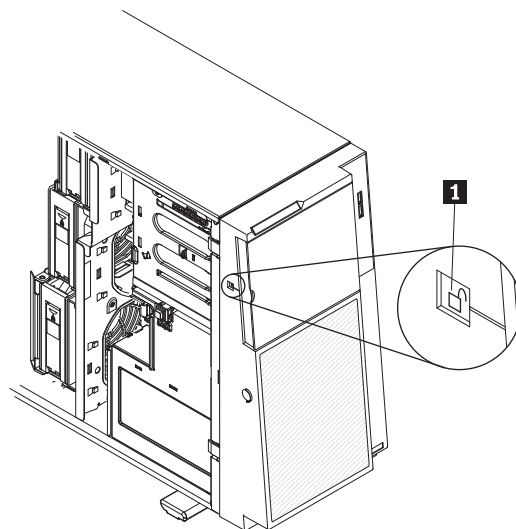
Closing the bezel media door

To close the media door, do the following:

1. Swing the bezel media door closed and push it into the bezel to close it.
2. From inside of the top section of the bezel door, slide the blue tab down to lock the bezel media door.
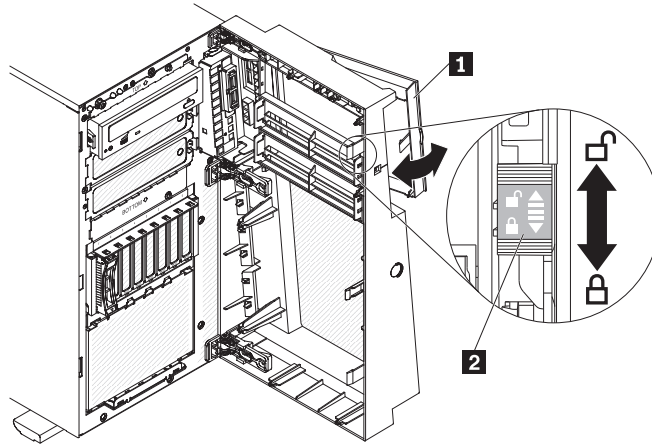
[1] Bezel media door
[2] Media door lock

3. Close the bezel (see "Closing the bezel" on page 151).

Removing the left-side cover

Important: Before you install optional hardware, make sure that the server is working correctly. If an operating system is installed, start the server, and make sure that the operating system starts. If no operating system is installed, start the server and make sure that a 19990305 error code is displayed, indicating that an operating system was not found but the server is otherwise working correctly. If the server is not working correctly, see the Chapter 5, "Diagnostics," on page 27 for diagnostic information.
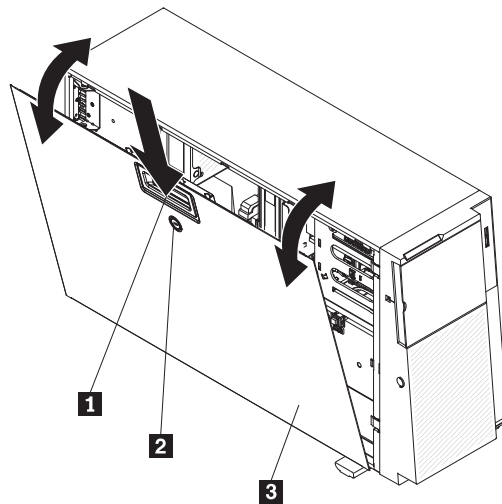
[1] Cover release latch
[2] Lock
[3] Left-side cover

To remove the cover, do the following:

1. Read the safety information that begins on page 5.

2. If you are planning to view the error LEDs that are on the system board and components, leave the server connected to power and go directly to step 5.

3. Turn off the server and all attached devices.

4. Disconnect all external cables and power cords.

5. Using the supplied key, unlock the left-side cover.

6. Pull the cover-release latch down and rotate the top edge of the cover away from the server.

   Attention: For proper cooling and airflow, replace the cover before you turn on the server. Operating the server for extended periods of time (more than 30 minutes) with the cover removed might damage server components.

7. Remove the left-side cover from the server.

Installing the left-side cover
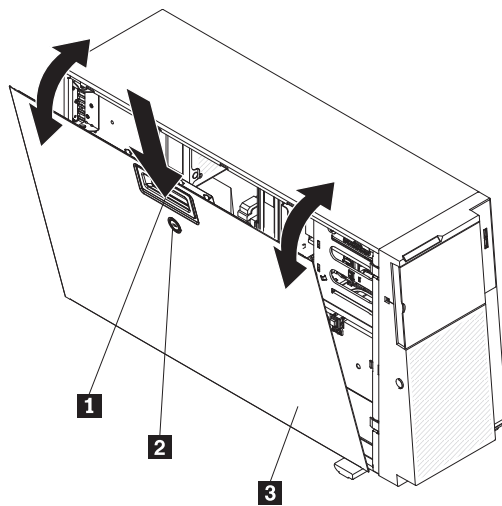
To install the left-side cover, complete the following steps:

1. Set the bottom edge of the left-side cover on the bottom ledge of the server.

2. Rotate the top edge of the cover toward the server and press inward on the cover until it clicks into place.

3. Lock the cover, using the key that comes with the server.

Opening the power-supply cage

Opening the power-supply cage allows access to the air baffle, microprocessors, and DIMMs. To open the power-supply cage, do the following:

1. Read the safety information that begins on page 5.

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

3. Press the release latch on the power supplies and filler panels and pull them out of the power-supply cage.
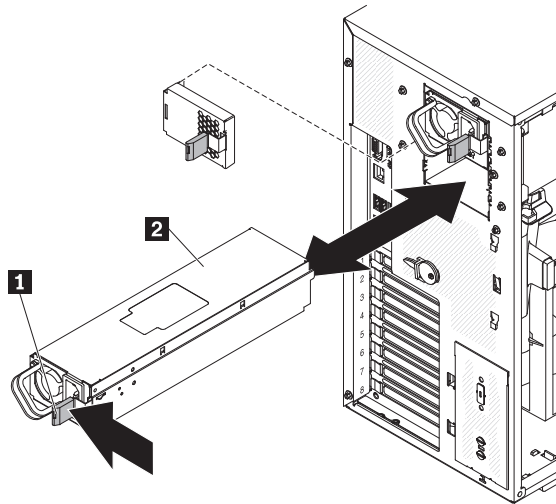
| 1 | Release latch |
| 2 | Hot-swap power supply |

4. Unlock and remove the left-side cover.
5. Pull up on the power-supply cage handle to unlock the cage; then, rotate the cage out until it stops. The tab on the rear power-supply latch bracket will click into place when the cage is completely out of the way.
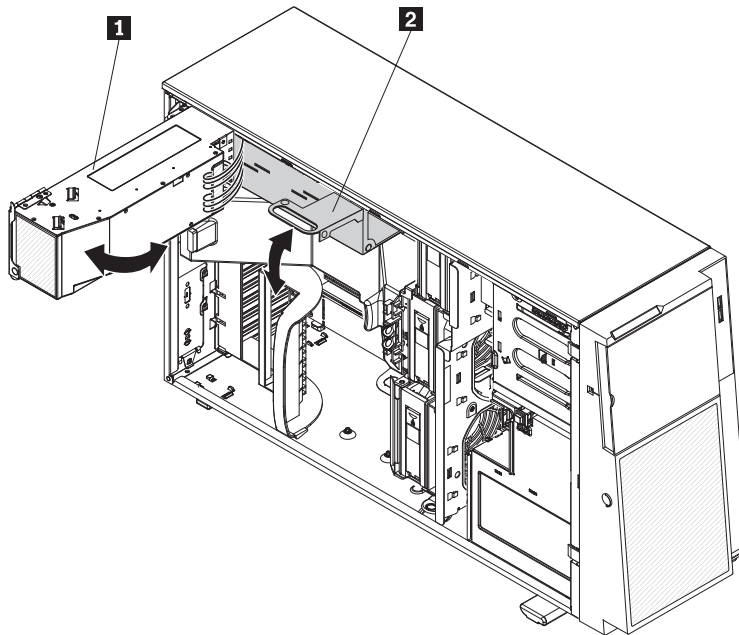
| 1 | Power-supply cage |
| 2 | Power-supply cage handle |

6. Let the power-supply cage rest on the rear power-supply latch bracket.

Closing the power-supply cage

To return the power-supply cage to its closed position, do the following:

1. Rotate the power-supply cage back slightly; then, push the release tab on the rear power-supply support bracket out of the way.
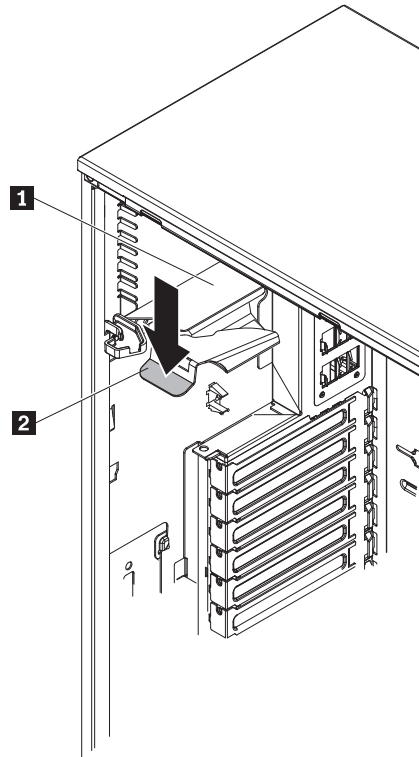
1	Power supply support bracket
2	Power supply release tab

Attention: Be sure to move the cables out of the way of the power supply cage before you start to move the cage back into the server.

2. Carefully rotate the power-supply cage into the server chassis. The locating tabs on the power-supply cage must fit over the corresponding tabs on the front latch bracket.
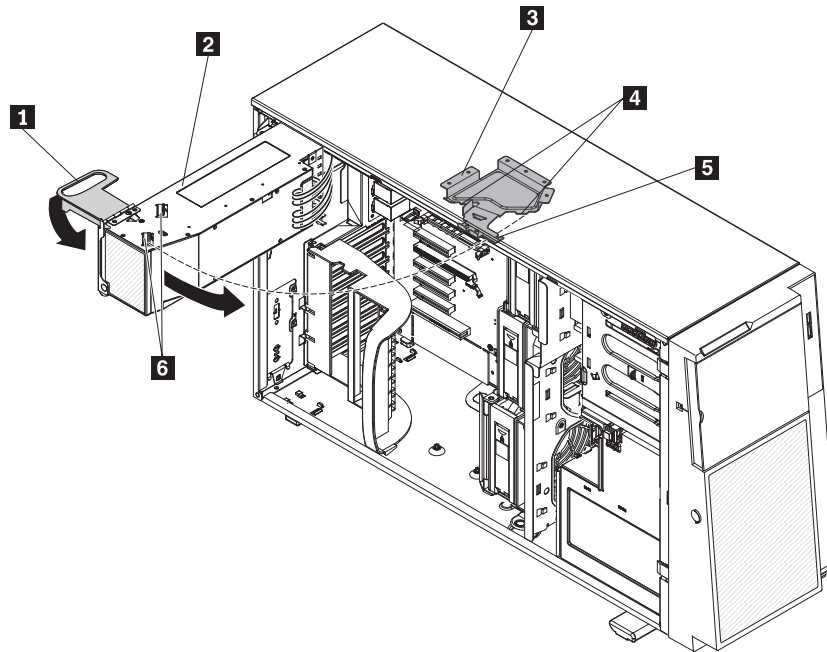
1	Power-supply cage handle
2	Power-supply cage
3	Power-supply cage front latch bracket
4	Locating tabs
5	Notch
6	Locating tabs

3. Rotate the power-supply cage handle down until the handle tip engages the notch in the front latch bracket; then, lower the handle until it locks in place (power supply cage closed **1**).
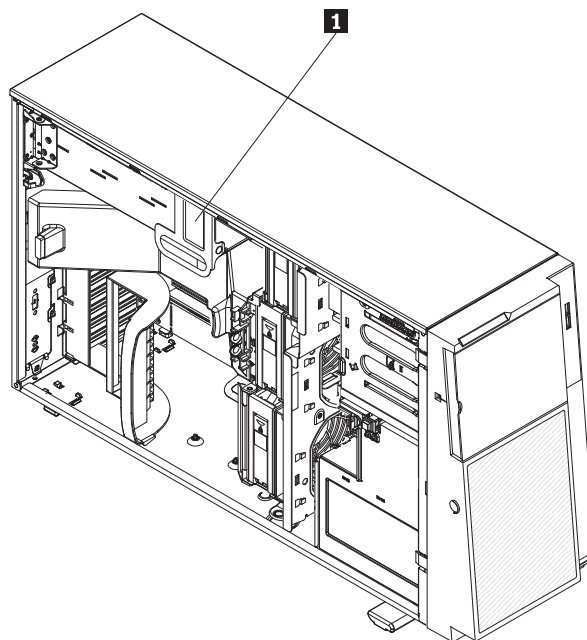
4. Install and lock the left-side cover (see "Installing the left-side cover" on page 158).
5. Install the hot-swap power supplies.
6. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Turning the stabilizing feet
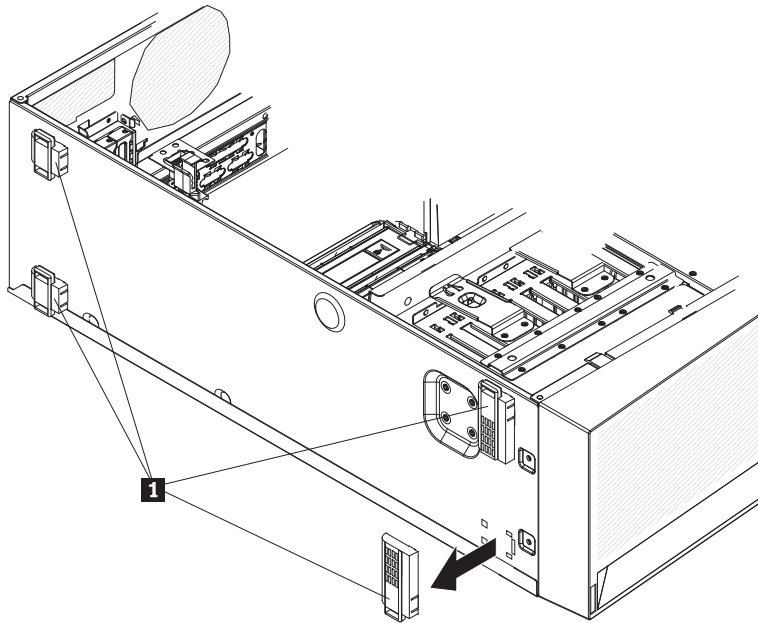
To rotate the front feet, do the following:

1. Carefully position the server on a flat surface. The feet (**1**) should hang over the edge of the flat surface to ease removal.
2. Press in on the clips to hold the feet in place; then, pry the feet away from the server. In some cases, you might need a screwdriver to pry the feet from the server.
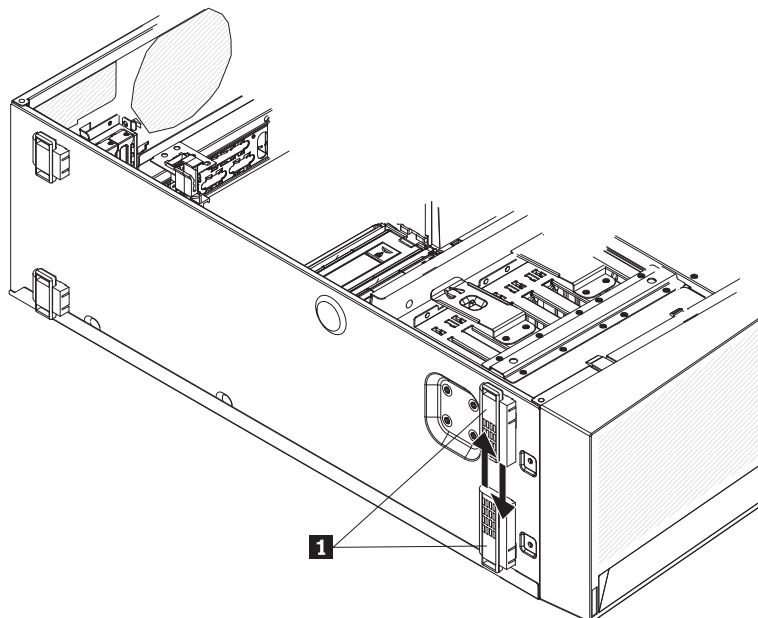
3. Reinstall the feet **1** in the opposite location. The tab on the feet should extend beyond the edge of the server.

Internal cable routing and connectors

You can install either an USB or a SATA tape drive in the server. The following illustration shows the internal cable routing and connectors for both the USB tape drive and the SATA tape drive. It also shows the internal power cable for the optical drives.
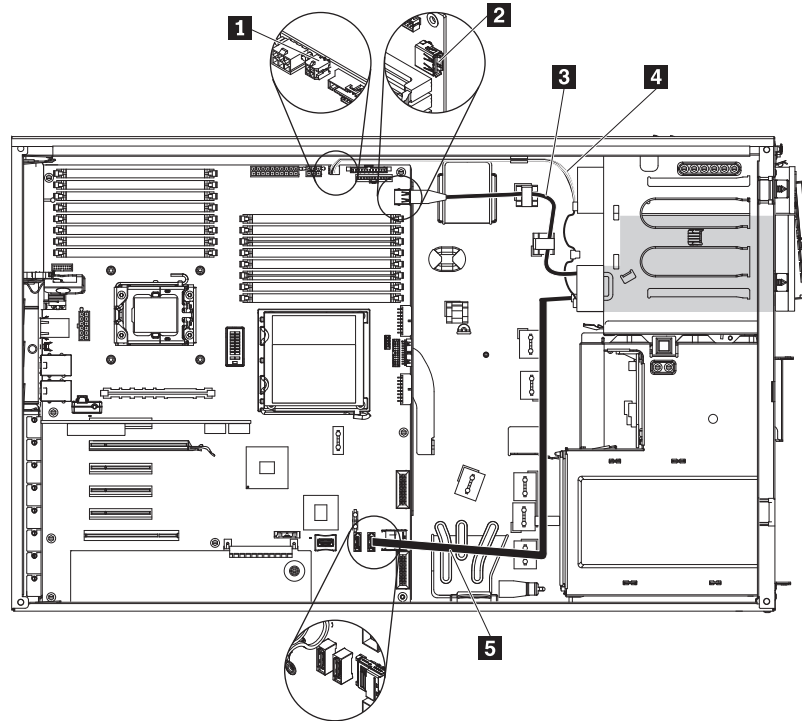
1	Optical drive power cable
2	USB signal cable connector
3	USB signal cable
4	Optical drive power cable
5	SATA optical drive signal cable

The following illustration shows the internal SAS/SATA cable routing and connectors from the ServeRAID BR10i controller to eight 2.5-inch hard disk drives. The left port on the ServeRAID BR10i controller is connected to the backplane for drives 4-7 and the right port on the adapter is connected to the backplane for drives 0-3.
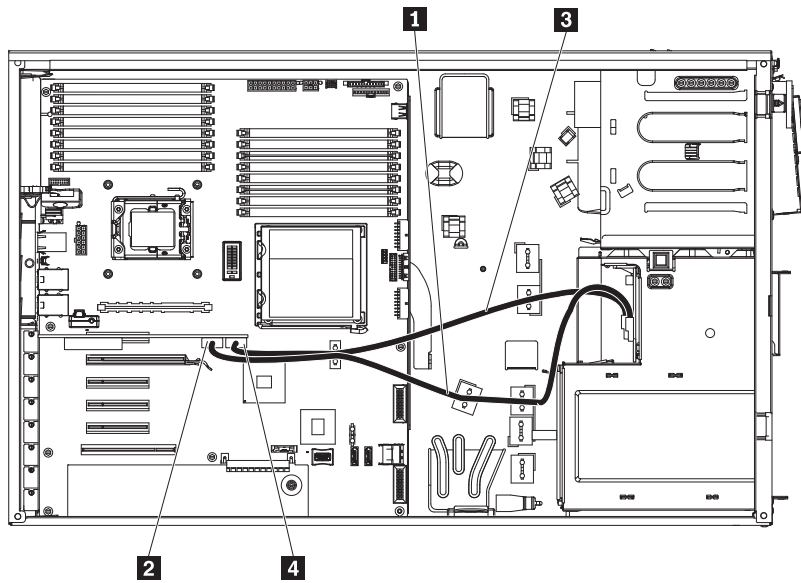
1	Cable for drives 4-7
2	Cable connector for drives 4-7
3	Cable for drives 0-3
4	Cable connector for drives 0-3

The following illustration shows the internal SAS/SATA cable routing and connectors from the ServeRAID BR10i controller to 16 2.5-inch hard disk drives.
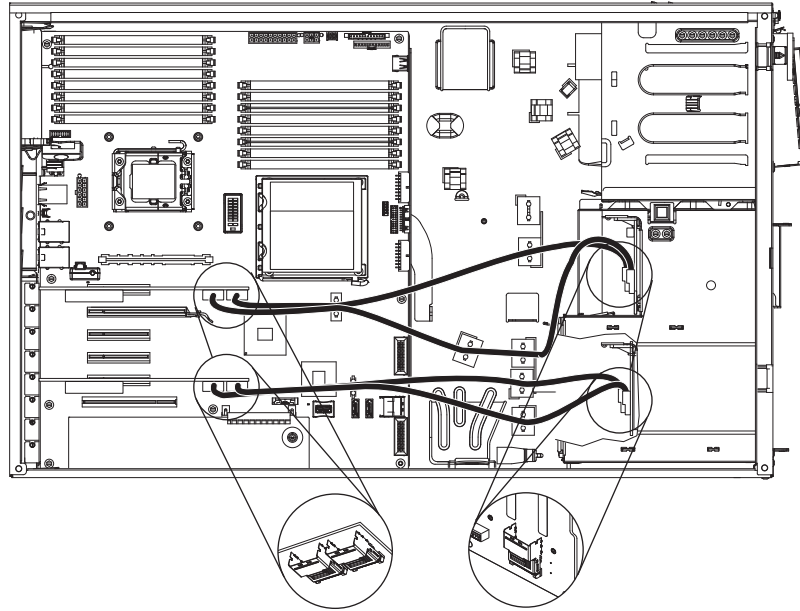
The following illustration shows the cable connectors on the ServeRAID-BR10i controller.
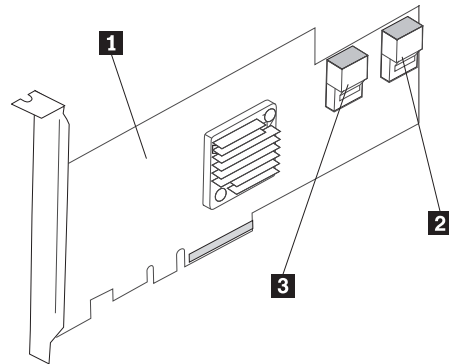
1   ServeRAID-BR10i controller
2   Cable connector for drives 0 - 3
3   Cable connector for drives 4 - 7

The following illustration shows the internal SAS/SATA cable routing and connectors from the ServeRAID MR10i or ServeRAID MR10is controllers to eight 2.5-inch hard disk drives. The right port on the ServeRAID MR10i or ServeRAID MR10is controller is connected to the backplane for drives 4-7 and the left port on the controller is connected to the backplane for drives 0-3.
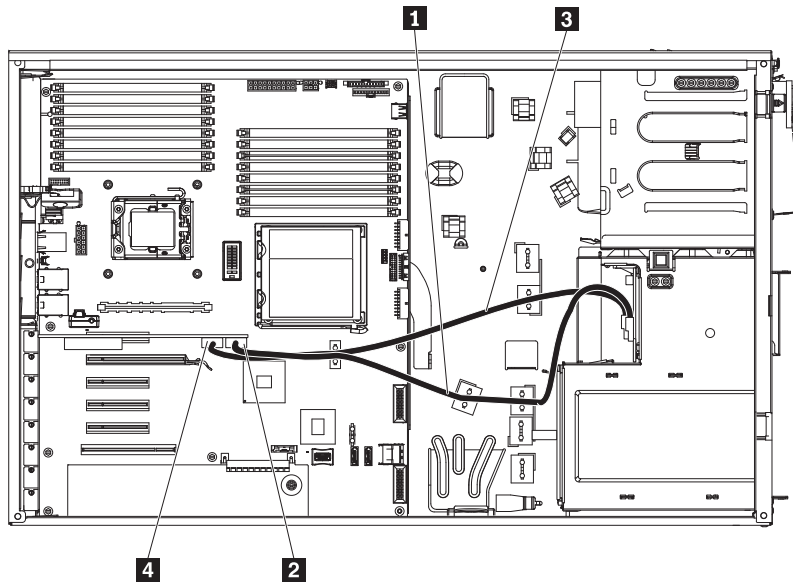
1	Cable for drives 4 - 7
2	Cable connector for drives 4 - 7
3	Cable for drives 0 - 3
4	Cable connector for drives 0 - 3

The following illustration shows the cable connectors on the ServeRAID-MR10i controller.
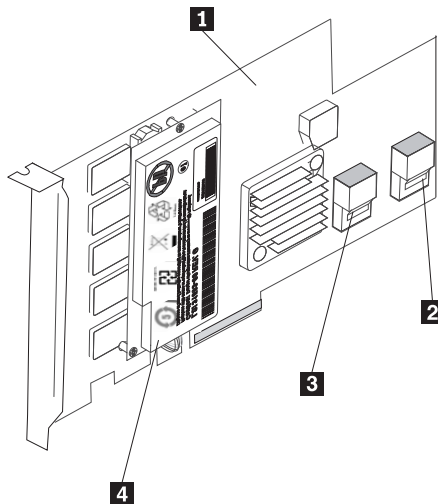
1	ServeRAID-MR10i controller
2	Cable connector for drives 4 - 7
3	Cable connector for drives 0 -3
4	Battery

The following illustration shows the internal SAS power and signal cable routing from the hard disk drives to the connectors on the system board.
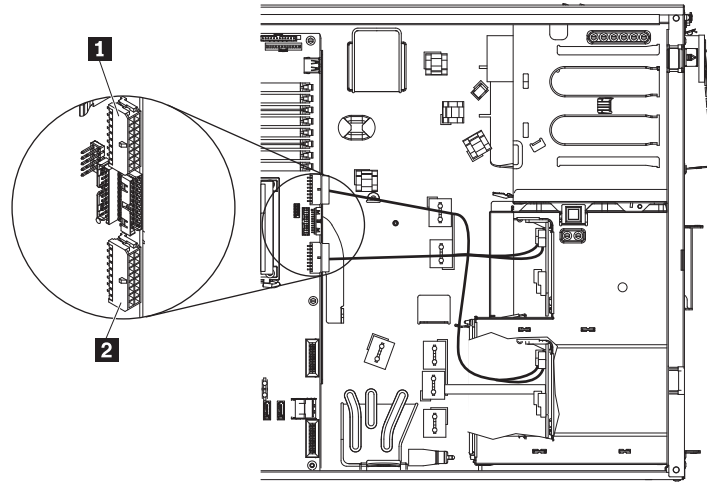
1	SAS power cable connector B
2	SAS power cable connector A

The following illustration shows the internal SATA and power cable routing and the connectors from the DVD drive to the system board.
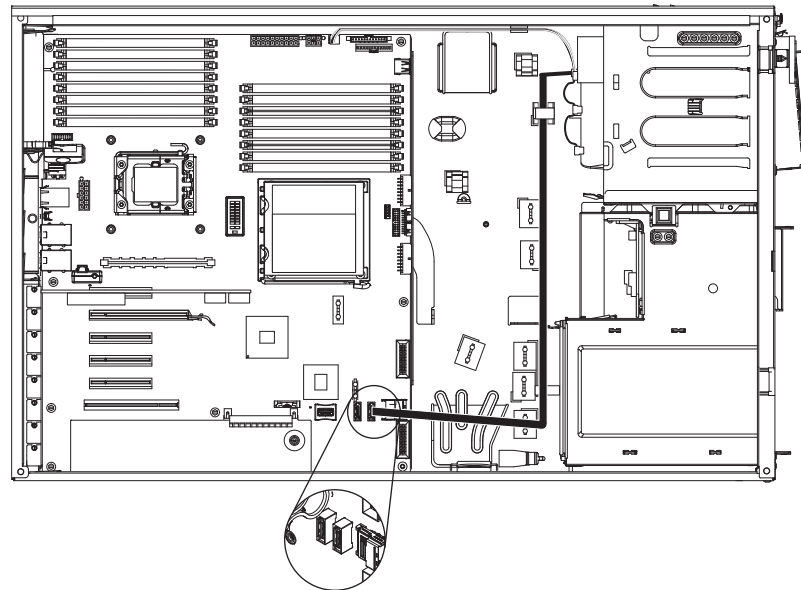
The following illustration shows the internal cable routing and connectors from the operator information panel to the system board.
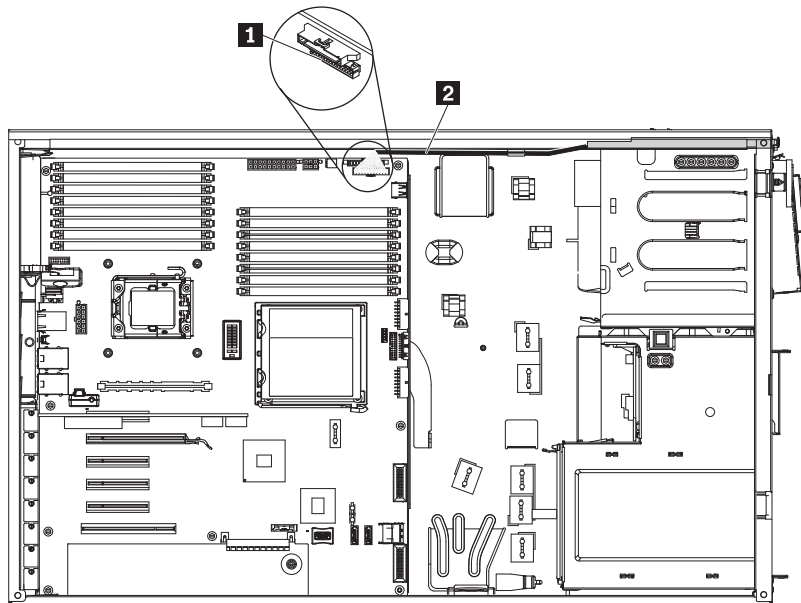
1	Operator information panel cable connector
2	Operator information panel cable

The following illustration shows the internal cable routing and connectors from the EasyLED diagnostics panel to the system board.
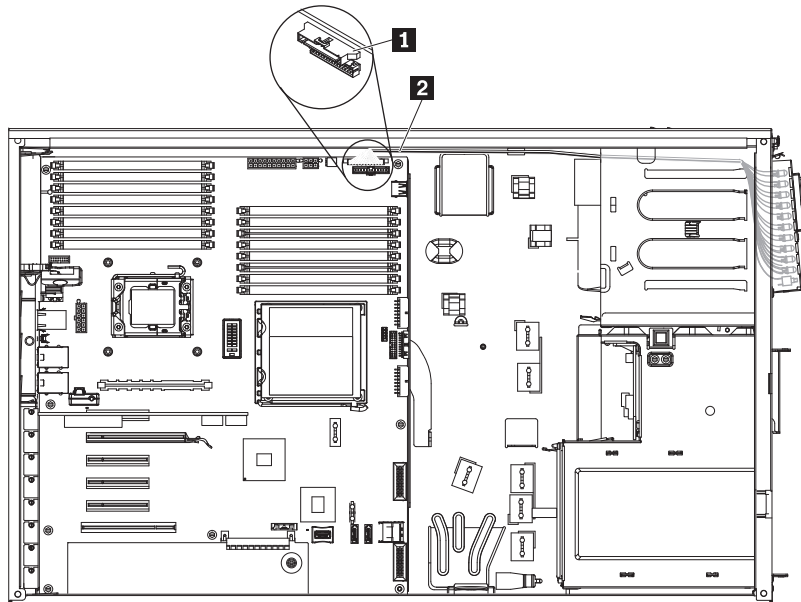
1	EasyLED cable connector
2	EasyLED cable

Removing the air baffle
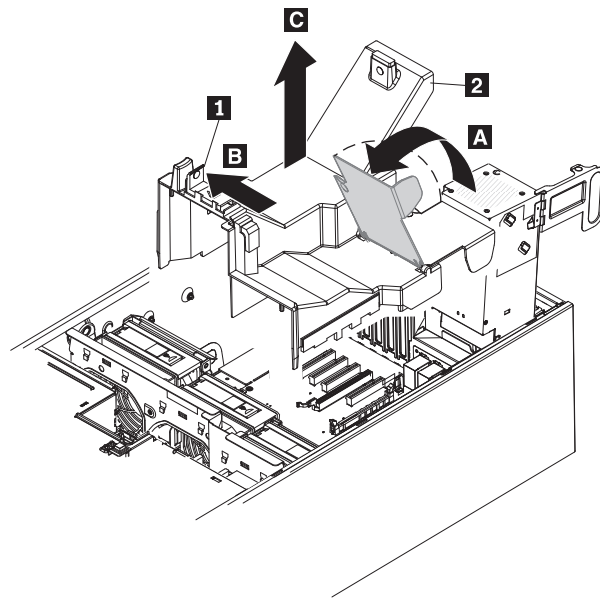
To remove the air baffle, do the following:

1. Read the safety information that begins on page 5.
2. Turn off the server and all attached devices.
3. Disconnect all external cables and power cords.
4. Remove the left-side cover.
5. Remove the power supplies from the power supply cage.
6. Unlatch the power supply cage and rotate it out of the server until it locks.
7. Rotate the rear of the air baffle up **A**, then find the pinch-tab **1** on the air baffle, pinch it together with your fingers **B**, and lift **C** the air baffle **2** out of the server.

Installing the air baffle
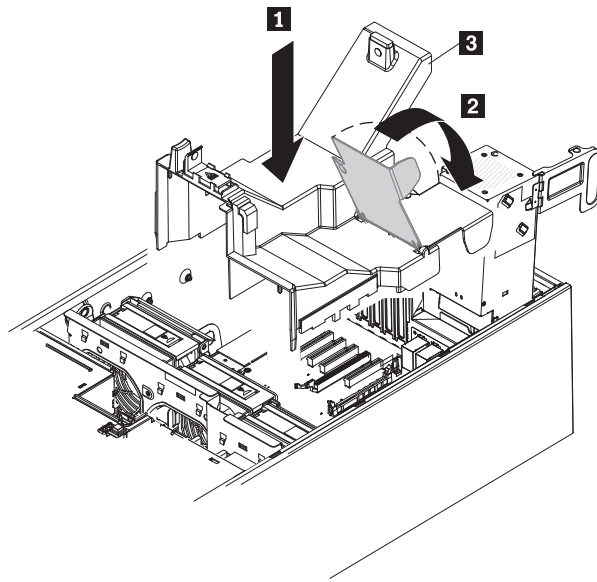
To install the air baffle, do the following:

1. With the rear (hinged) part of the air baffle **3** lifted up, align the positioning pins on the ends of the air baffle with the locating holes in the server chassis and fan-cage assembly.

2. Slide the air baffle down into the server **1** until the positioning pins fit into the locating holes; then, press down on the air baffle until the pinch tab clicks into place.

3. Rotate the rear (hinged) part of the air baffle **2** down to the system board.

   Note: Make sure that the power-supply cage cables are not caught under the air baffle.

4. Return the power-supply cage to its closed position (see "Closing the power-supply cage" on page 160).

5. Install the hot-swap power supply or power supplies (see "Installing a hot-swap power supply" on page 175).

6. Install and lock the left-side cover.

7. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the fan-cage assembly
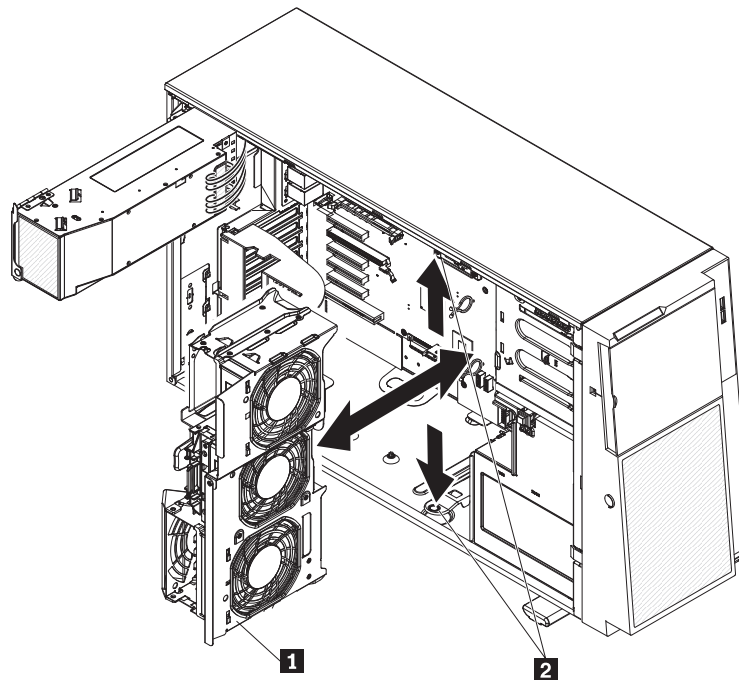
1   Fan cage assembly
2   Fan cage assembly release buttons

To remove the fan-cage assembly, do the following:

1. Read the safety information that begins on page 5.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Turn the server on its side so that it is lying flat, with the side cover facing up.
4. Unlock and remove the left-side cover (see "Removing the left-side cover" on page 157).
5. Remove the hot-swap power supply or power supplies from the power-supply cage (see "Removing a hot-swap power supply" on page 174).
6. Rotate the power-supply cage to its open position (see "Opening the power-supply cage" on page 158).
7. If any full-length PCI adapters are installed, remove them (see "Removing an adapter" on page 184).
8. Remove the air baffle (see "Removing the air baffle" on page 169).
9. Press the fan cage release latches on each side of the fan cage toward the sides of the server. The fan cage will lift up slightly when the release latches are fully open.
10. Grasp the fan-cage assembly and lift it out of the server.
11. If you are instructed to return the fan-cage assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the fan-cage assembly
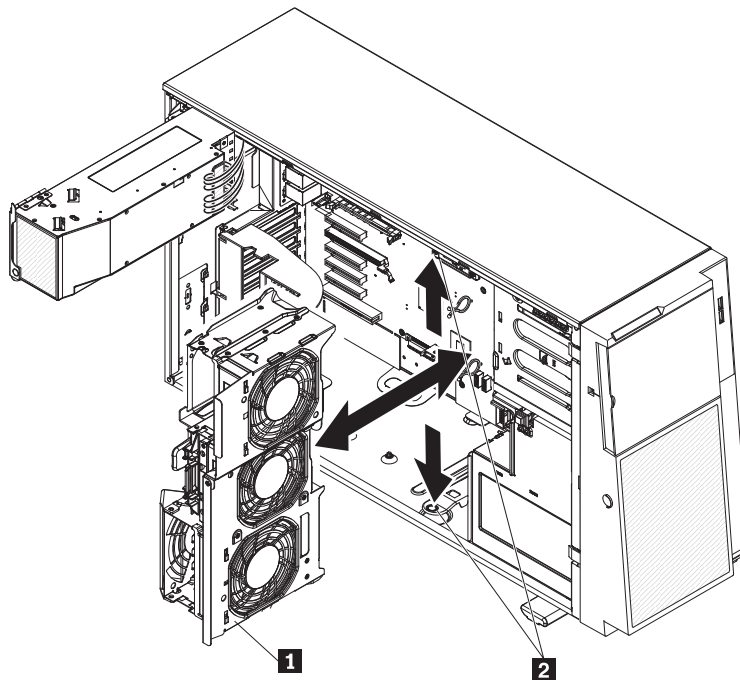
1	Fan cage assembly
2	Fan cage assembly release buttons

To install the fan-cage assembly, do the following:

1. Align the guides on the fan cage with release latches on each side.
2. Push the fan-cage assembly into the server until it clicks into place.
3. If you removed any full-length PCI adapters, install them (see "Installing an adapter" on page 184).
4. Install the air baffle (see "Installing the air baffle" on page 170).
5. Return the power-supply cage to its closed position (see "Closing the power-supply cage" on page 160).
6. Install the hot-swap power supply or power supplies (see "Installing a hot-swap power supply" on page 175).
7. Install and lock the left-side cover (see "Installing the left-side cover" on page 158).
8. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the battery

To remove the battery, do the following:

1. Read the safety information that begins on page 5.
2. Turn off the server and all attached devices.
3. Disconnect all external cables and power cords.
4. Turn the server on its side so that it is lying flat, with the side cover facing up.
5. Unlock and remove the left-side cover (see "Removing the left-side cover" on page 157).

6. Locate the battery on the system board (see "System-board internal connectors" on page 131).

7. Remove the battery:

    a. Use one finger to push the battery horizontally out of its socket, pushing it away from the socket.

    b. Lift and remove the battery from the socket.
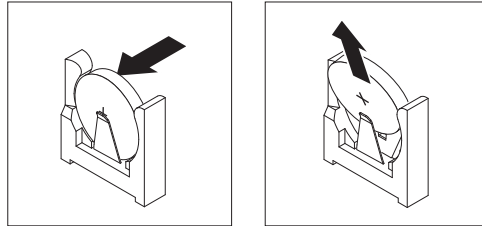
8. Dispose of the battery as required by local ordinances or regulations.

Installing the battery

The following notes describe information that you must consider when you replace the battery in the server:

- You must replace the battery with a lithium battery of the same type from the same manufacturer.
- After you replace the 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 the 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**
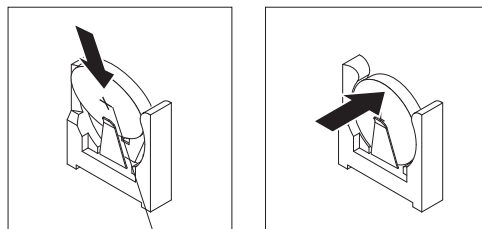
To install the replacement battery, do the following:

1. Follow any special handling and installation instructions that come with the replacement battery.
2. Insert the replacement battery **1** :
   a. Hold the battery in a vertical orientation so that the smaller side is facing the socket.
   b. Place the battery into its socket, and press the battery towards the socket until it clicks into place. Make sure that the battery clip holds the battery securely.
3. Install and lock the left-side cover (see "Installing the left-side cover" on page 158).
4. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

   Note: You must wait approximately 2 1/2 minutes after you connect the server power cord to an electrical outlet before the power-control button becomes active.

5. Start the Setup Utility and reset the configuration:
   • Set the system date and time.
   • Set the power-on password.
   • Reconfigure the server.

   See "Starting the Setup Utility" on page 252 for details.

Removing a hot-swap power supply

If you remove a hot-swap power supply, observe the following precautions.

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.

Note: If only one hot-swap power supply is installed in the server, you must turn off the server before removing the power supply.

To remove a hot-swap power supply, do the following:

1. Read the safety information Chapter 2, "Safety information," on page 5.

   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.

2. Disconnect the power cord from the connector on the back of the power supply that you are removing.
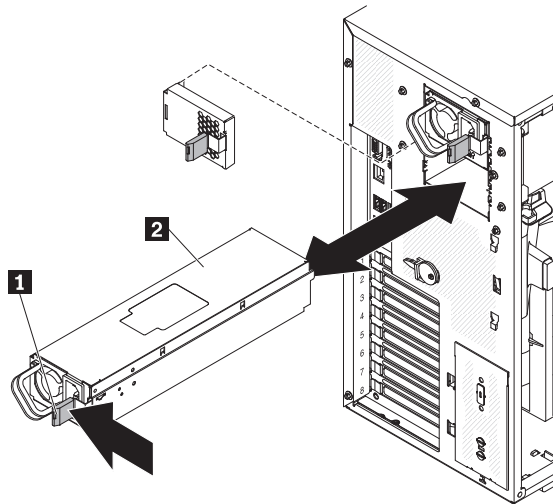
3. Press the release latch on the power supply **1** and pull the power supply **2** out of the power-supply cage.

4. If you are instructed to return the hot-swap power supply, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a hot-swap power supply

If you install or remove a hot-swap power supply, observe the following precautions.

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.
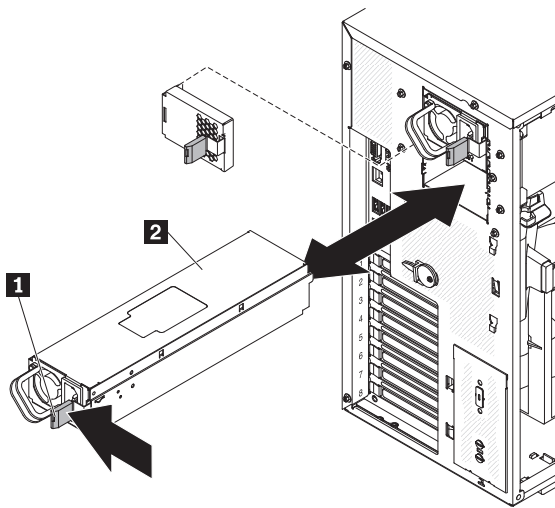
| 1 | Hot-swap power supply |
| 2 | Release latch |

To install a hot-swap power supply, do the following:

1. Read the safety information Chapter 2, "Safety information," on page 5.

   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.

2. Touch the static-protective package that contains the power supply to any unpainted metal surface on the server; then, remove the power supply from the package.

3. Remove the power-supply filler panel from the power bay, if one is installed.

4. Place the power supply into the power-supply cage and push it in until it locks into place.

   Note: If only one hot-swap power supply is installed in the server, a power-supply filler must be installed in the empty power bay.

5. Connect one end of the power cord for the new power supply into the connector on the back of the power supply; then, connect the other end of the power cord to a properly grounded electrical outlet.

   Note: If the server has been turned off, you must wait approximately 3 minutes after you connect the server power cord to an electrical outlet before the power-control button becomes active.
6. Make sure that the ac power LED on the top of the power supply is lit, indicating that the power supply is operating correctly. If the server is turned on, make sure that the dc power LED on the top of the power supply is lit also.

Installing redundant power supply and fans

You can install a second 920-watt hot-swap power-supply. This upgrade option includes a hot-swap power supply and three hot-swap fans. You must also purchase a second power cord to connect the power-supply to a power source.

To install the redundant power and cooling option, do the following:
1. Read the safety information that begins on page 5.
2. Remove the left-side cover (see "Removing the left-side cover" on page 157).
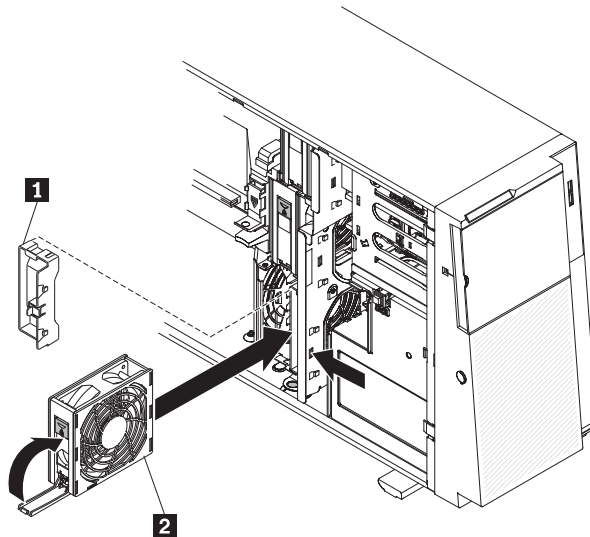
3. Remove the three fan air baffles **1** from the fan bays of the fan cage assembly.
4. Install the three hot-swap fans **2** in the empty bays of the fan cage assembly.
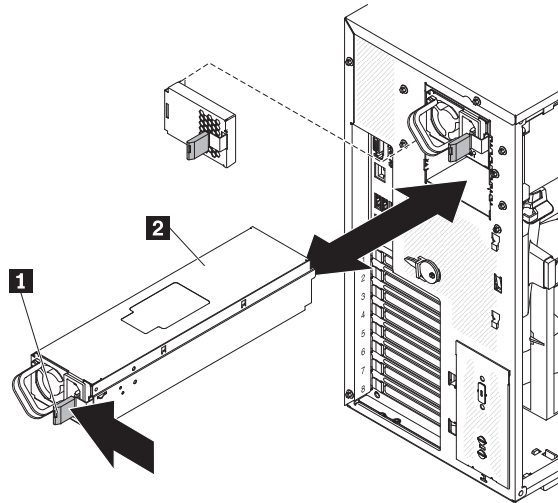
1   Release latch
2   Hot-swap power supply

5. Remove the power supply filler from the second power supply bay.
6. Slide the new power supply partially into the empty power supply bay. Pinch the orange release latch and push the power supply the rest of the way into the bay until it is seated.
7. Install the left-side cover.
8. Connect one end of the new power cord into the connector on the back of power supply, and connect the other end of the power cord to a properly grounded electrical outlet.
9. Make sure that the ac power LED on the top of each power supply is lit, indicating that the power supply is operating correctly. If the server is turned on, make sure that the dc power LED on the top of the power supply is lit also.

If you have other optional devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 233.

Removing a voltage regulator module
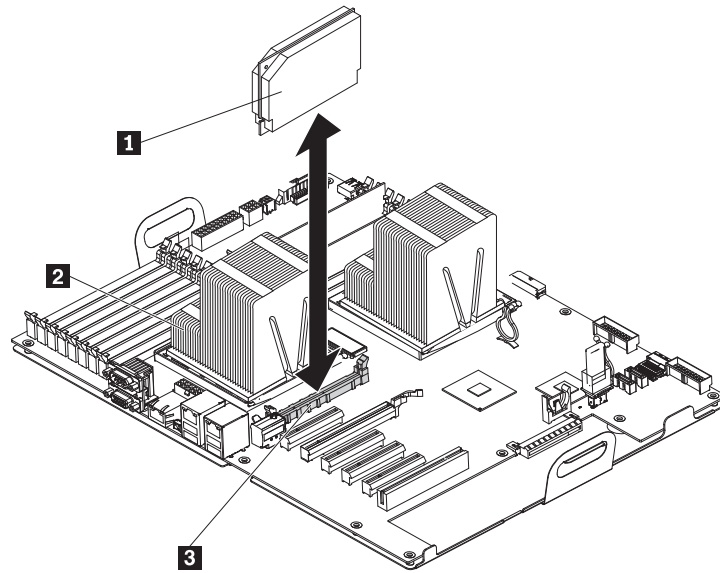
1	Microprocessor 2 VRM
2	Heat sink 2
3	VRM connector

To remove a voltage regulator module (VRM), do the following:

1. Read the safety information (see Chapter 2, "Safety information," on page 5).
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.
4. Unlock and remove the left-side cover (see "Removing the left-side cover" on page 157).
5. Remove the hot-swap power supply or power supplies from the power-supply cage (see "Removing a hot-swap power supply" on page 174).
6. Rotate the power-supply cage to its open position (see "Opening the power-supply cage" on page 158).
7. Remove the air baffle (see "Removing the air baffle" on page 169).
8. Locate the voltage regulator module next to microprocessor 2.
9. Open the retaining clips on each end of the VRM connector.
10. Pull the VRM out of the connector.
11. If you are instructed to return the VRM, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a voltage regulator module
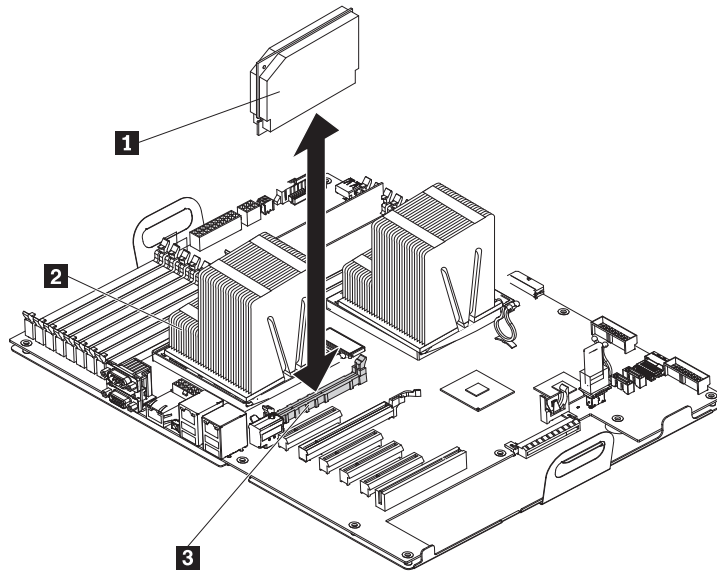
1	Microprocessor 2 VRM
2	Heat sink 2
3	VRM connector

To install a voltage regulator module, do the following:

1. Locate the VRM connector on the system board, next to the heat sink for microprocessor 2 (see "System-board internal connectors" on page 131).
2. Open the retaining clips on each end of the VRM connector.
3. Turn the VRM so that the keys align with the connector.
4. Insert the VRM into the connector by aligning the edges of the VRM with the slots at the end of the VRM connector. Firmly press the VRM straight down into the connector by applying pressure on both ends of the VRM simultaneously. The retaining clips snap into the locked position when the VRM is seated in the connector.
5. Install the air baffle (see "Installing the air baffle" on page 170).
6. Return the power-supply cage to its closed position (see "Closing the power-supply cage" on page 160).
7. Install the hot-swap power supply or power supplies (see "Installing redundant power supply and fans" on page 177).
8. Install and lock the left-side cover (see "Installing the left-side cover" on page 158).
9. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the front adapter-retention bracket

To remove the front adapter-retention bracket, complete the following steps:

1. Read the safety information that begins on page 5.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.

3. Unlock and remove the side cover (see "Removing the left-side cover" on page 157).

4. Open the front and rear adapter-retention brackets.

5. Remove all adapters and place the adapters on a static-protective surface (see "Removing an adapter" on page 184).

   Note: You might find it helpful to note where each adapter is installed before you remove the adapters.

6. Lift the top of the front adapter-retainer bracket and release the hinge point; then, remove the bottom hinge point and remove the bracket from the chassis.

7. If you are instructed to return the front adapter-retention bracket, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the front adapter-retention bracket

To install the front adapter-retention bracket, complete the following steps:

1. Insert one hole on the front adapter-retention bracket into the hinge point.

2. Position the other hole and insert the adapter-retention bracket into the hinge point.

3. Install the adapters (see "Installing an adapter" on page 184).

4. Close the front and rear adapter-retention brackets.

5. Install and lock the side cover (see "Installing the left-side cover" on page 158).

6. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the rear adapter retention bracket
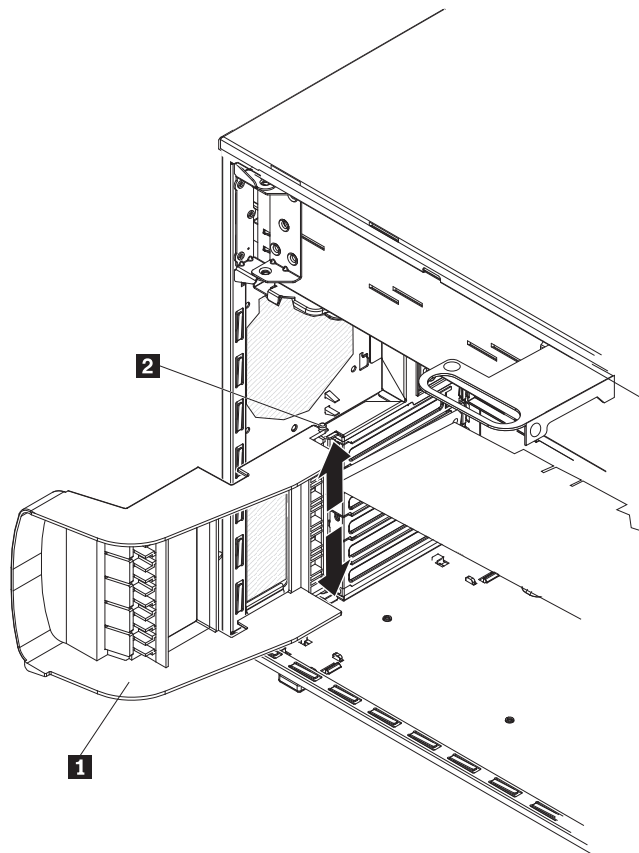
1   Rear adapter retention bracket
2   Hinge pin

To remove the rear adapter-retention bracket, do the following:

1. Read the safety information that begins on page 5.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see "Removing the left-side cover" on page 157).
4. Remove all adapters and place the adapters on a static-protective surface (see "Removing an adapter" on page 184).

   Note: You might find it helpful to note where each adapter is installed before removing the adapters.

5. Open the rear adapter retention bracket.
6. Press the rear adapter retention bracket and release the top hinge point; then, release the other hinge point and remove the bracket from the chassis.
7. If you are instructed to return the rear adapter-retention bracket, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the rear adapter retention bracket
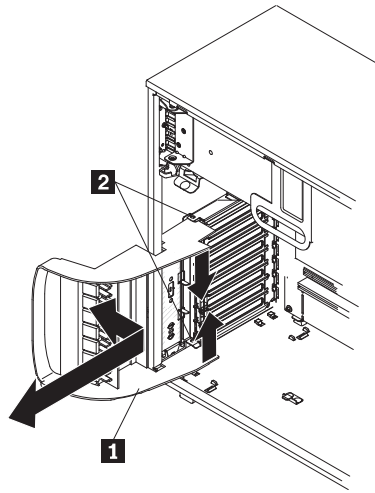
[1]   Rear adapter retention bracket
[2]   Hinge pins

To install the rear adapter retention bracket, do the following:

1. Insert the bottom hinge point on the rear adapter retention bracket into the matching hole in the chassis; then, insert the top hinge point into the matching hole.
2. Install the adapters (see "Installing an adapter" on page 184).
3. Close the rear adapter retention bracket.
4. Install and lock the side cover (see "Installing the left-side cover" on page 158).
5. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing an adapter
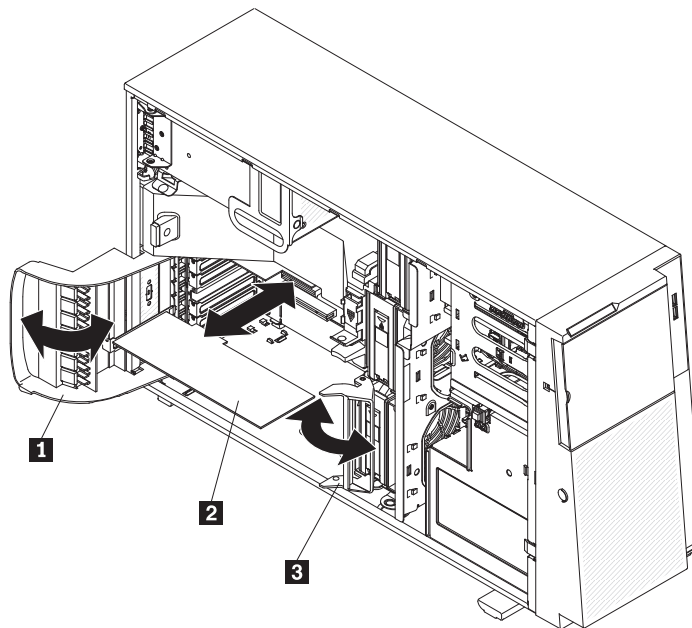
1	Rear adapter retention bracket
2	Adapter
3	Front adapter retention bracket

To remove an adapter, do the following:

1. Read the safety information that begins on page 5.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.
4. Unlock and remove the left-side cover (see "Removing the left-side cover" on page 157).
5. Rotate the adapter retention brackets to the open position.
6. Disconnect the cables from the adapter.
7. Remove the screw that secures the adapter to the server chassis.
8. Pull the adapter out of the adapter connector; then, lift the adapter out of the server.
9. If you are instructed to return the adapter, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing an adapter

The following notes describe the types of adapters that the server supports and other information that you must consider when you install an adapter:

- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this section. If you must change the switch or jumper settings on the adapter, follow the instructions that come with the adapter.

- Avoid touching the components and gold-edge connectors on the adapter.
- PCI slots 1 and 6 support half-length PCI adapters only.
- PCI slots 2, 3, 4, and 5 support full-length and half-length PCI adapters.
- The PCI Express extender card supports a full-length adapter.
- The PCI-X extender card supports two full-length adapters.
- PCI slots 1 and 5 support the RAID adapters.
- PCI slot 2 supports a VGA adapter.
- The PCI configuration:
  - Slot 1 is a PCI Express x8 slot with x8 links, PCI Express Base Specification Revision 2.0 compliant.
  - Slot 2 is a PCI Express x16 slot with x8 links, PCI Express Base Specification Revision 2.0 compliant.
  - Slots 3 and 4 are PCI Express x8 slots with x4 links, PCI Express Base Specification Revision 2.0 compliant.
  - Slot 5 is a PCI Express x8 slot with x8 links, PCI Express Base Specification Revision 2.0 compliant.
  - Slot 6 is a PCI 33/32 slot, PCI 2.2 compliant.
  - PCI Express extender card slot 7 is a PCI Express x8 slot with x4 links, PCI Express 1.0a compliant.

    Note: The PCI Express extender card comes standard on the ThinkServer TD200x server.
  - PCI-X extender card slots 7 and 8 are a PCI-X slots with 64/32 bits, 133/100/66 MHz from PXH.
- The system scans PCI slots 1 through 6 to assign system resources. The system then starts (boots) the system devices in the following order, if you have not changed the default boot precedence: integrated Ethernet controller, ServeRAID-BR10i SAS Controller, and then PCI, PCI-X, and PCI Express slots.

  Note: To change the boot precedence for PCI and PCI-X devices, start the Setup Utility and select **Start Options** from the main menu. See the "Starting the Setup Utility" on page 252 for details about using the Setup Utility.
- The server uses a rotational interrupt technique to configure PCI adapters so that you can install PCI adapters that do not support sharing of PCI interrupts.

Attention: Static electricity that is released to internal server components when the server is powered on might cause the server to stop, 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 working inside the server with the power on.

To install an adapter, do the following:

1. Read the safety information that begins on page 5.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables. Remove the left-side cover (see "Removing the left-side cover" on page 157 for more information).
3. See the documentation that comes with the adapter for any cabling instructions and information about jumper or switch settings. (It might be easier for you to route cables before you install the adapter.)
4. Open the rear adapter-retention bracket.
5. Remove the expansion-slot cover.
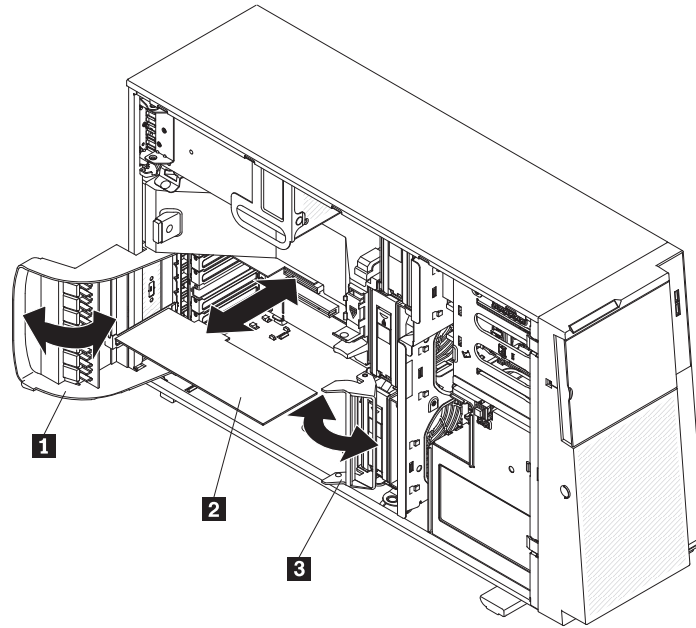
1	Rear adapter retention bracket
2	Adapter
3	Front adapter retention bracket

6. If you are installing a full-length adapter, remove the blue adapter guide **1** (if any) from the end of the adapter. Otherwise, continue with the next step.
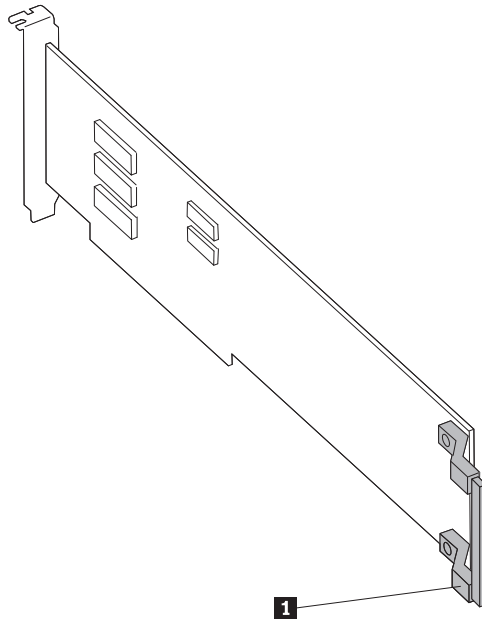
7. Press the adapter *firmly* into the expansion slot, lower the adapter-retention bracket, and make sure that the bracket is in the closed position.

   Attention: Incomplete insertion might cause damage to the system board or the adapter.

8. Connect any needed cables to the adapter.

If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 233.

Removing the DVD drive
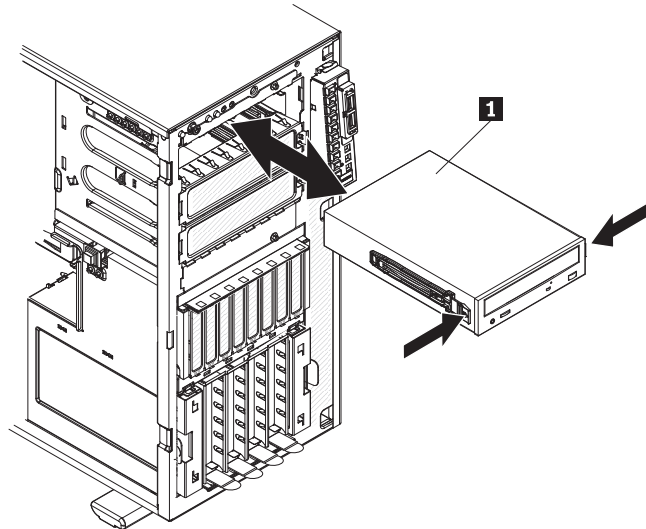
To remove the DVD drive **1**, do the following:
1. Read the safety information that begins on page 5.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Unlock and remove the left-side cover (see "Removing the left-side cover" on page 157).
4. Disconnect the DVD drive cables from the back of the DVD drive.
5. Open the bezel (see "Opening the bezel" on page 150).
6. Grasping the blue tabs on each side of the DVD drive, press them inward while you pull the drive out of the sever.
7. Remove the rails from the DVD drive and save them for future use.
8. 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 (optical) drive
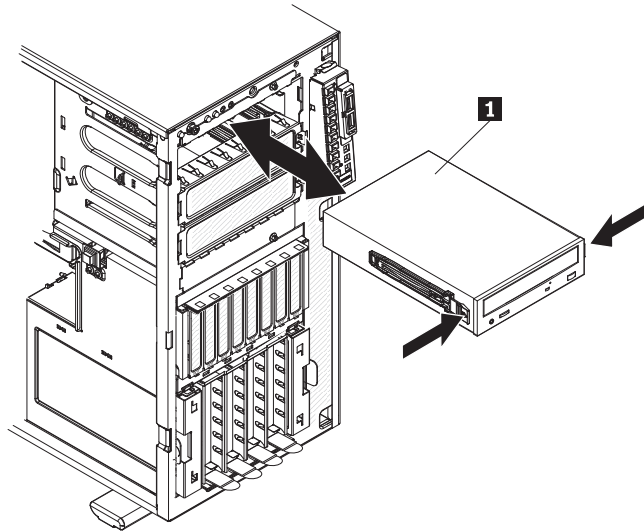
To install a DVD (optical) drive **1** , do the following:

1. Read the safety information that begins on page 5.
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables.
3. Unlock and remove the left-side cover (see "Removing the left-side cover" on page 157).
4. Install the rails on the sides of the DVD drive.
5. Connect one end of the DVD drive cables to the rear of the DVD drive.
6. Slide the drive into the server.
7. Connect the other end of the DVD drive cables to the optical power connector on the system board. (See "System-board internal connectors" on page 131 for cable connector locations and "Internal cable routing and connectors" on page 163 for cable routing information.)
8. Replace the left-side cover and bezel; then, lock the side cover and bezel.
9. Reconnect the external cables and power cords.

If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 233.

Removing an optional tape drive
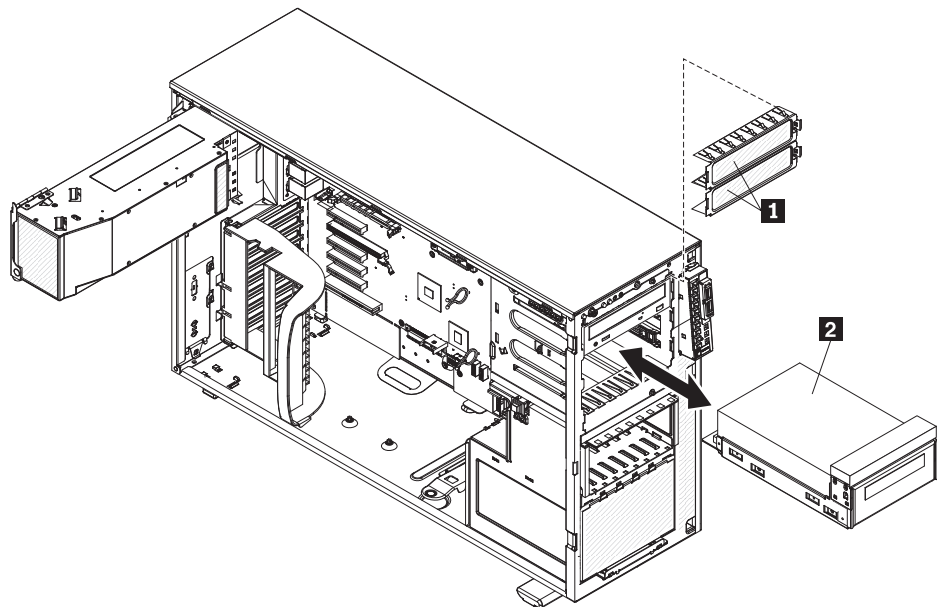
| **1** | EMC shield |
| **2** | Tape drive |

To remove an optional tape drive, do the following:

1. Read the safety information that begins on page 5.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Unlock and remove the left-side cover (see "Removing the left-side cover" on page 157).
4. Open the bezel (see "Opening the bezel" on page 150).
5. Remove the power supply or power supplies from the power-supply cage (see "Removing a hot-swap power supply" on page 174).
6. Rotate the power-supply cage to its open position (see "Opening the power-supply cage" on page 158).
7. Remove the air baffle (see "Removing the air baffle" on page 169).
8. Remove the fan-cage assembly (see "Removing the fan-cage assembly" on page 171).
9. Disconnect the drive signal cable from the system board.
10. Disconnect the power cable from the back of the tape drive.
11. If the tape drive is secured to the server with screws, remove them.
12. Gently pull the tape drive and signal cable out of the server.
13. If you are instructed to return the tape drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a USB or SATA tape drive

The server supports USB and SATA tape drives. When you install a tape drive, be sure to connect the internal tape cable to the correct connector on the system board.
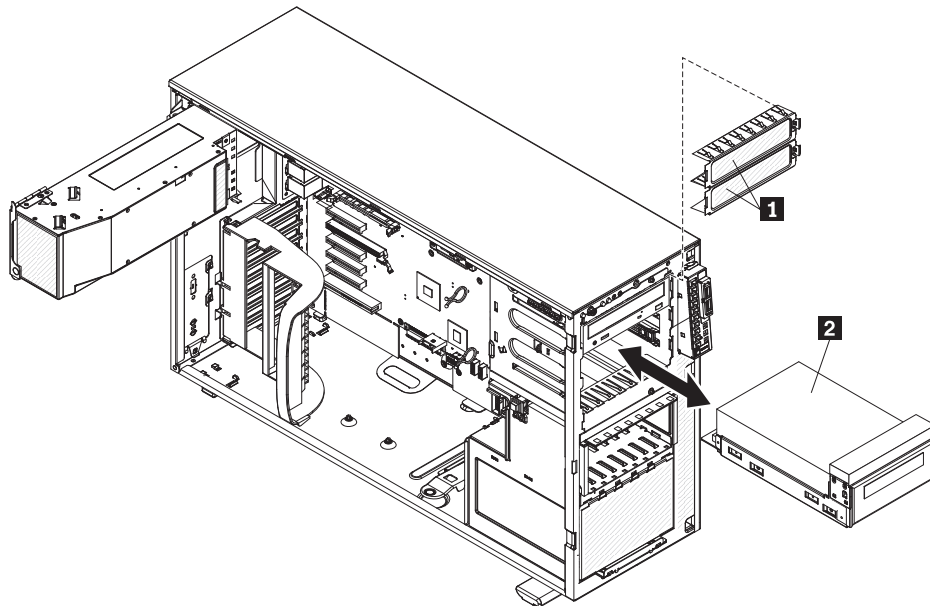
To install a tape drive, do the following:

1. Read the safety information that begins on page 5.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Unlock and remove the left-side cover (see "Removing the left-side cover" on page 157 for more information).
4. Open the bezel by pressing on the bezel retention tab at the center-left edge of the bezel and rotating the left side of the bezel away from the server (see "Removing the bezel" on page 152).
5. Remove the EMC shields **1** from the drive bays.
6. Find the blue drive rails in the server bay and install one on each side of the tape drive.
7. Slide the tape drive **2** into the server.
8. Close the bezel.
9. Remove the power supplies from the rear of the server.
10. Carefully lay the server down on its side.
11. Open the power-supply cage (see "Opening the power-supply cage" on page 158 for more information).
12. Remove the air baffle (see "Removing the air baffle" on page 169 for more information).
13. Remove the fan-cage assembly.
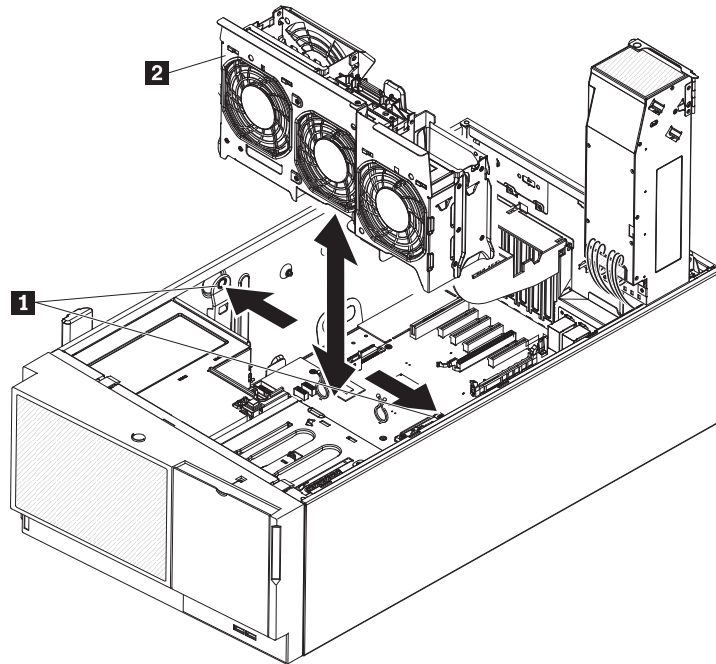
|1| Fan-cage assembly release buttons
|2| Fan-cage assembly

     a.   Press the fan-cage release latches on the top and bottom of the fan cage toward the sides of the server. The cage lifts slightly when the release latches are fully open.

     b.   Grasp the cage and lift it out of the server.

14. If the tape drive came with screws, secure the drive to the server chassis, using the supplied screws.
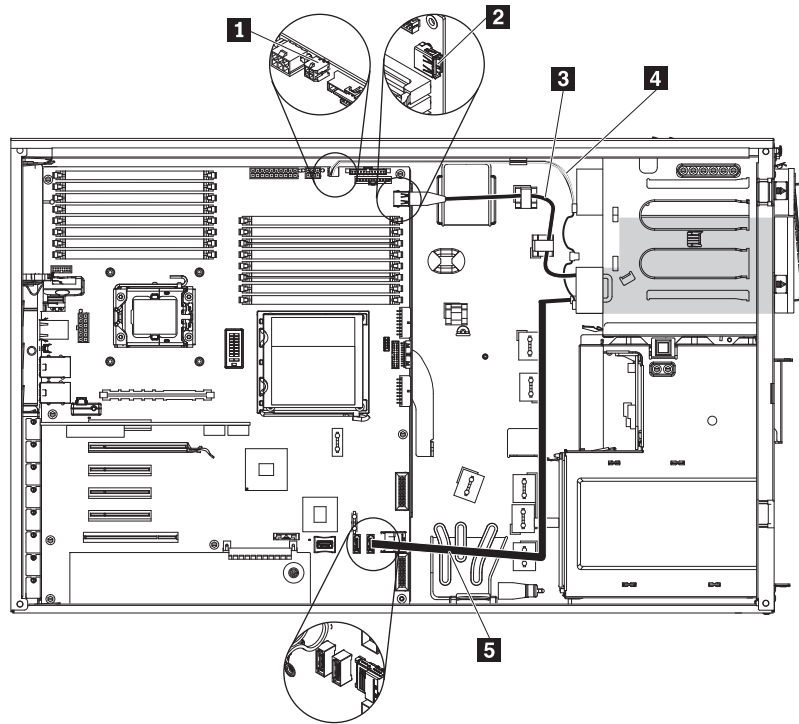
1	SATA optical drive power connector
2	USB signal cable connector
3	USB signal cable
4	SATA optical drive power cable (SATA-to-traditional power connector cable also included. Not pictured.)
5	SATA optical drive signal cable

15. Connect one end of the tape drive cable to the USB or SATA connector on the system board, depending upon the type of tape drive that you are installing; then, route the cable through the cable holders on the inside of the server and connect the opposite end of the cable to the back of the tape drive.

    Note: If you are installing an RDX internal USB tape drive, use the SATA-to-traditional power converter cable to serve as a bridge between the optical power cable and the power connector on the RDX tape drive.

16. Connect the power cable to the tape drive and to the connector on the system board (see "Internal cable routing and connectors" on page 163 for more information.)

17. Reinstall the fan-cage assembly.

18. Reinstall the air baffle ("Installing the air baffle" on page 170).

19. Reinstall or close the power-supply cage ("Closing the power-supply cage" on page 160).

20. Reinstall the power supplies ("Installing a hot-swap power supply" on page 175).

21. Replace the left-side cover; then, lock the side cover and bezel.

22. Reconnect the external cables and power cords.

If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 233.

Removing the USB cable and EasyLED panel
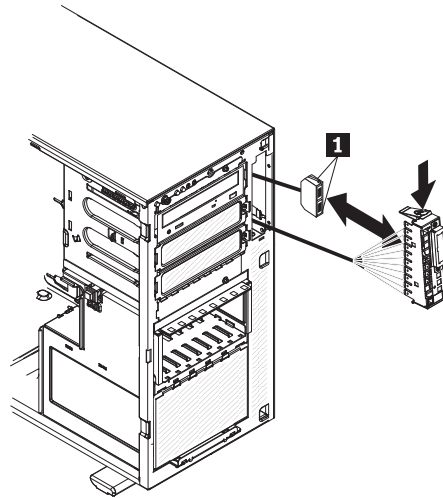
1   Spring clips

To remove the USB cable and EasyLED panel from the server, complete the following steps:

1. Read the safety information that begins on page 5.
2. Turn off the server and peripheral devices; then, disconnect the power cords and all external cables.
3. Remove the power supply or power supplies from the power-supply cage (see "Removing a hot-swap power supply" on page 174).
4. Unlock and remove the left-side cover (see "Removing the left-side cover" on page 157).
5. Carefully lay the server down on its side.
6. Remove the power supply or power supplies from the power-supply cage (see "Removing a hot-swap power supply" on page 174).
7. Rotate the power-supply cage to its open position (see "Opening the power-supply cage" on page 158).
8. Remove the air baffle (see "Removing the air baffle" on page 169).
9. Remove the fan-cage assembly (see "Removing the fan-cage assembly" on page 171).
10. Disconnect the EasyLED diagnostics cable from the system board (see "System-board internal connectors" on page 131 and "Internal cable routing and connectors" on page 163).
11. Stand the server back up in its vertical position.
12. Open the bezel (see "Opening the bezel" on page 150).
13. Press down on the release latch on the top of the USB cable and EasyLED panel mounting bracket; then, rotate the top of the mounting bracket away from the server.
14. Lift the USB cable and EasyLED panel mounting bracket out and away from the server while you pull the diagnostics cable through the hole.

15. Disconnect the USB cable from the USB cable and EasyLED panel:

    a. Rotate the USB cable and EasyLED panel mounting bracket so that you are looking at the rear of the bracket.

    b. Squeeze the retaining clips on each side of the USB cable connector and pull the USB cable away from the mounting bracket.

16. If you are instructed to return the USB cable and EasyLED panel, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the USB cable and EasyLED panel
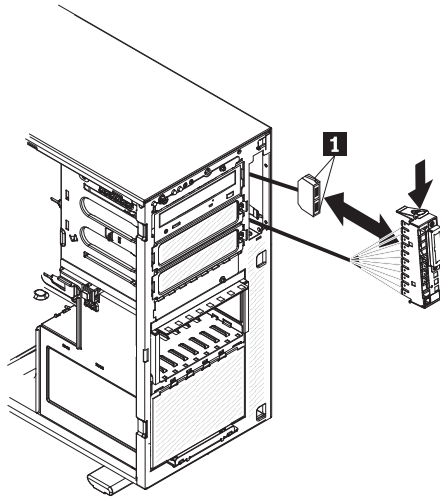
1 Spring clips

To install the USB cable and EasyLED panel, complete the following steps:

1. Touch the static-protective package that contains the USB cable and EasyLED panel to any unpainted metal surface on the server; then, remove the assembly from the package.

2. Connect the USB cable to the replacement USB cable and EasyLED panel:

    a. Rotate the USB cable and EasyLED panel mounting bracket so that you are looking at the rear of the bracket.

    b. Squeeze the retaining clips on each side of the USB cable connector and align the key on the cable connector with the notch on the mounting bracket.

    c. Insert the connector into the mounting bracket; then, release the retaining clips.

3. Feed the EasyLED diagnostics cable into the server through the opening in the front of the server.

4. Position the bottom of the USB cable and EasyLED panel mounting bracket into the opening and rotate the top of the bracket toward the server until it clicks into place.

5. Connect the EasyLED diagnostics cable to the system board. See "System-board internal connectors" on page 131 and "Internal cable routing and connectors" on page 163 to locate the USB and EasyLED diagnostics connectors on the system board.

6. Install the fan-cage assembly (see "Installing the fan-cage assembly" on page 172).

7. Install the air baffle (see "Installing the air baffle" on page 170).

8. Return the power-supply cage to its closed position (see "Closing the power-supply cage" on page 160).

9. Install the hot-swap power supply or power supplies (see "Installing a hot-swap power supply" on page 175).

10. Install the bezel (see "Installing the bezel" on page 154).

11. Install and lock the left-side cover (see "Installing the left-side cover" on page 158).

12. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing a 2.5-inch hot-swap hard disk drive
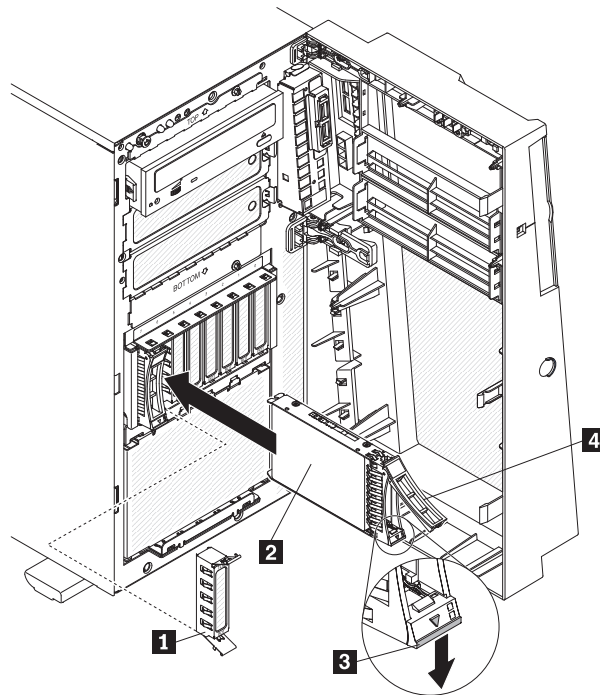
1	Filler panel
2	Hard disk drive assembly
3	Release latch
4	Drive handle

To remove a hot-swap hard disk drive, do the following:

1. Read the safety information that begins on page 5.

   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.

2. Open the bezel (see "Opening the bezel" on page 150).

3. Press down on the release latch to open the drive handle; then, pull the drive out of the drive bay.

4. If you are instructed to return the hot-swap hard disk drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a 2.5-inch hot-swap hard disk drive

The following notes describe the types of hard disk drives that the server supports and other information that you must consider when you install a hard disk drive:

- Depending on the model, the server supports up to eight or up to 16 2.5-inch SAS hot-swap hard disk drives in the hot-swap bays.

- The hot-swap bays are arranged horizontally in the top and bottom hard disk drive cages:
  - On models with eight hard disk drives, the top bays are numbered 0 through 7 (from right to left)
  - On models with 16 hard disk drives, the top bays are numbered 0 through 7 (from right to left) and the bottom bays are 8 through 15 (from right to left)
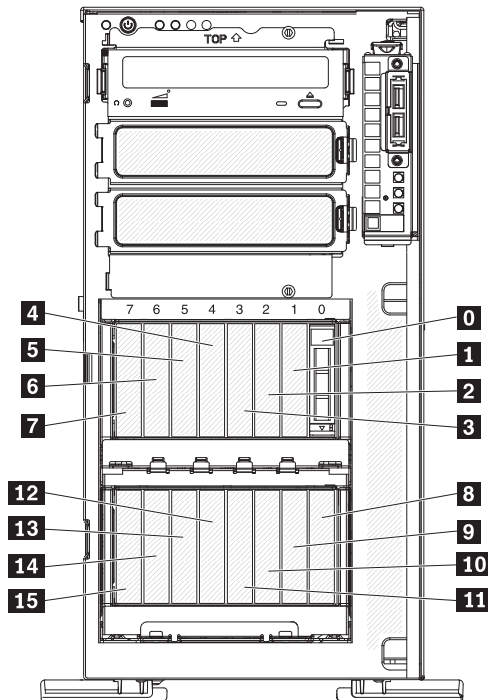
0	Bay 0	**8**	Bay 8
1	Bay 1	**9**	Bay 9
2	Bay 2	**10**	Bay 10
3	Bay 3	**11**	Bay 11
4	Bay 4	**12**	Bay 12
5	Bay 5	**13**	Bay 13
6	Bay 6	**14**	Bay 14
7	Bay 7	**15**	Bay 15

- For a list of supported optional devices for the server, see http://www.lenovo.com/thinkserver.
- Inspect the drive and drive bay for signs of damage.

- Make sure that the drive is correctly installed in the drive bay.
- See the documentation for the ServeRAID controller for instructions for installing a hard disk drive.
- All hot-swap drives in the server must have the same throughput speed rating; using drives with different speed ratings might cause all drives to operate at the throughput of the slowest drive.
- You do not have to turn off the server to install hot-swap drives in the hot-swap drive bays. However, you must turn off the server when you perform any steps that involve installing or removing cables.
- The drive ID for each hot-swap hard disk drive is printed above the drive bay.
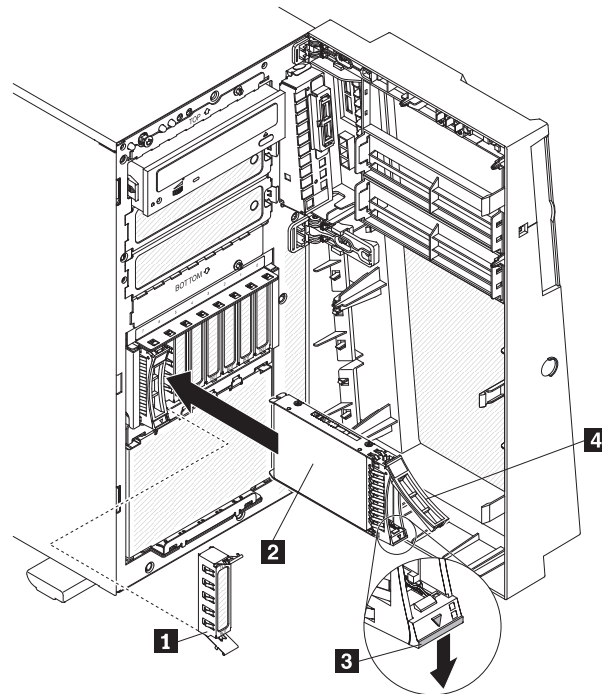
1	Filler panel
2	Hard disk drive assembly
3	Release latch
4	Drive handle

To install a hot-swap hard disk drive, do the following:

1. Read the safety information that begins on page 5.

   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.

2. Touch the static-protective package that contains the disk drive to any unpainted metal surface on the server; then, remove the disk drive from the package.

3. Remove the filler panel from the hot-swap drive bay, if one is installed.

4. Make sure that the tray handle is open; then, install the hard disk drive into the hot-swap bay.

5. Rotate the drive handle down until the drive is seated in the hot-swap bay and the release latch clicks into place.

Notes:

a. After installing the hard disk drive, check the disk drive status LEDs to verify that the hard disk drive is operating correctly.

   If the amber hard disk drive status LED 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.

b. If the server is configured for RAID operation using an optional ServeRAID adapter, you might have to reconfigure your disk arrays after you install hard disk drives. See the documentation that was included with the optional adapter for additional information about RAID operation.

6. Close the bezel (see "Closing the bezel" on page 151).

Removing a 2.5-inch disk drive backplane
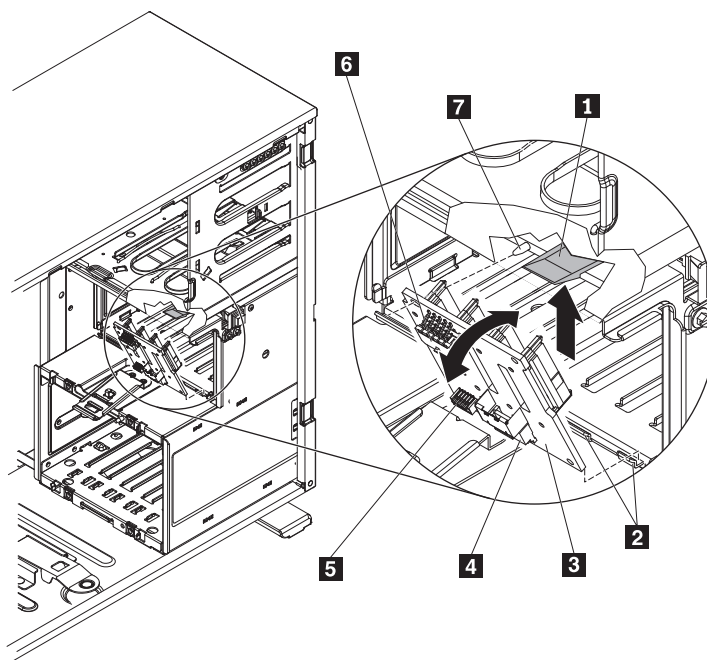
1	Latch
2	Tabs
3	Configuration cable connector
4	SAS signal cable connector
5	2.5-inch hot-swap backplane
6	Power cable connector
7	Locator pin

To remove a 2.5-inch hard disk drive backplane, complete the following steps.

1. Read the safety information that begins on page and Chapter 2, "Safety information," on page 5.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Unlock and remove the left-side cover (see "Removing the left-side cover" on page 157).
4. Open the bezel (see "Opening the bezel" on page 150).

5. Remove the hot-swap hard disk drives (see "Removing a 2.5-inch hot-swap hard disk drive" on page 195).

6. Remove the power supply or power supplies from the power-supply cage (see "Removing a hot-swap power supply" on page 174).

7. Rotate the power-supply cage to its open position (see "Opening the power-supply cage" on page 158).

8. Remove the air baffle (see "Removing the air baffle" on page 169).

9. Remove the fan-cage assembly (see "Removing the fan-cage assembly" on page 171).

10. Note where the power, signal, and configuration cables are connected to the 2.5-inch hard disk drive backplane; then, disconnect them (see "SAS backplane connectors" on page 138).

11. Lift the retention latch that holds the backplane in place; then, grasp the top edge of the backplane and rotate it toward the rear of the server. When the backplane is clear of the drive-cage retention tabs, remove it from the server.

12. If you are removing another SAS backplanes, repeat steps 10 and 11 to remove the remaining backplane.

13. If you are instructed to return the 2.5-inch hard disk drive backplane, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a 2.5-inch disk drive backplane
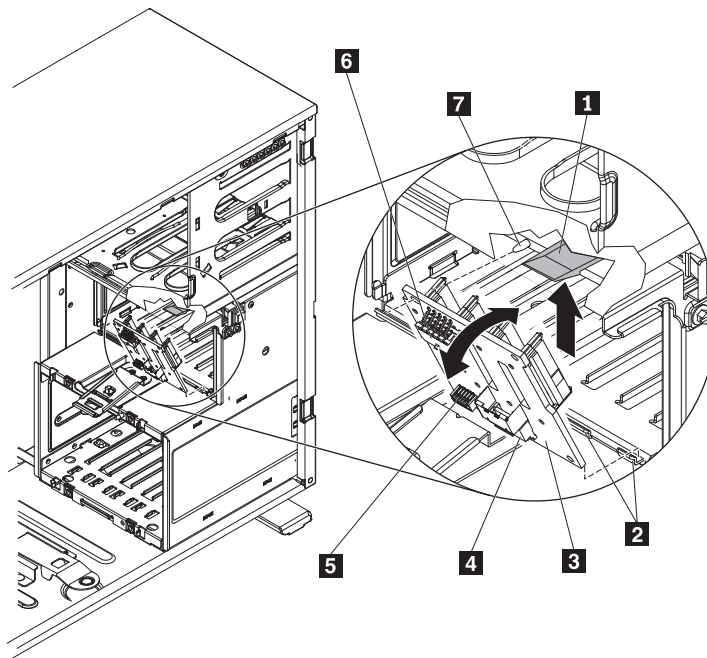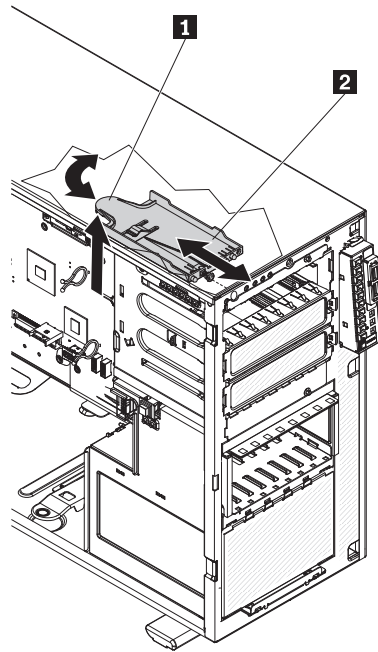

1	Latch
2	Tabs
3	Configuration cable connector
4	SAS signal cable connector
5	2.5-inch hot-swap backplane
6	Power cable connector
7	Locator pin

To install a 2.5-inch hard disk drive backplane, complete the following steps:

1. Touch the static-protective package that contains the hard disk drive backplane to any unpainted metal surface on the server; then, remove the backplane from the package.
2. Position the 2.5-inch hard disk drive backplane in the drive-cage retention tabs; then, rotate the top of the backplane toward the locator pins until the latch clicks into place
3. Connect the power, signal, and configuration cables to the 2.5-inch hard disk drive backplane (see "2.5-inch hard disk drive backplane connectors" on page 147 and "Internal cable routing and connectors" on page 163).
4. If you are replacing another 2.5-inch hard disk drive backplane, repeat steps 1 through 3 to install the additional backplane.
5. Install the hot-swap hard disk drives (see "Installing a 2.5-inch hot-swap hard disk drive" on page 196).
6. Close the bezel (see "Closing the bezel" on page 151).
7. Install the fan-cage assembly (see "Installing the fan-cage assembly" on page 172).
8. Install the air baffle (see "Installing the air baffle" on page 170).
9. Return the power-supply cage to its closed position (see "Closing the power-supply cage" on page 160).

10. Install the power supplies (see "Installing a hot-swap power supply" on page 175).
11. Install and lock the left-side cover (see "Installing the left-side cover" on page 158).
12. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the 2.5-inch disk drive cage
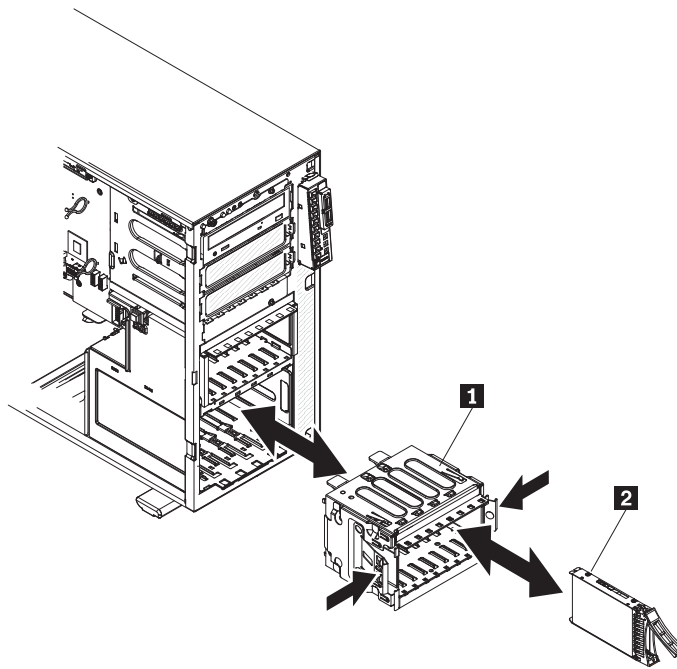
1	2.5-inch hard disk drive cage
2	2.5-inch hot-swap drive

To remove the 2.5-inch hard disk drive cage, complete the following steps.

1. Read the safety information that begins on page 5..
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.
4. Unlock and remove the left-side cover (see "Removing the left-side cover" on page 157).
5. Remove the power supply or power supplies from the power-supply cage (see "Removing a hot-swap power supply" on page 174).
6. Rotate the power-supply cage to its open position (see "Opening the power-supply cage" on page 158).
7. Remove the air baffle (see "Removing the air baffle" on page 169).
8. Remove the fan-cage assembly (see "Removing the fan-cage assembly" on page 171).
9. Turn the server upright and open the bezel (see "Opening the bezel" on page 150).
10. Remove all of the disk drives from the 2.5-inch disk drive cage (see "Removing a 2.5-inch hot-swap hard disk drive" on page 195).
11. Disconnect the cables from the 2.5-inch disk drive backplane.
12. Press both drive cage release latches inward; then, pull the drive cage out of the front of server.

13. Remove both of the backplanes from the 2.5-inch disk drive cage (see "Removing a 2.5-inch disk drive backplane" on page 198).

14. If you are instructed to return the 2.5-inch disk drive cage, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the 2.5-inch disk drive cage
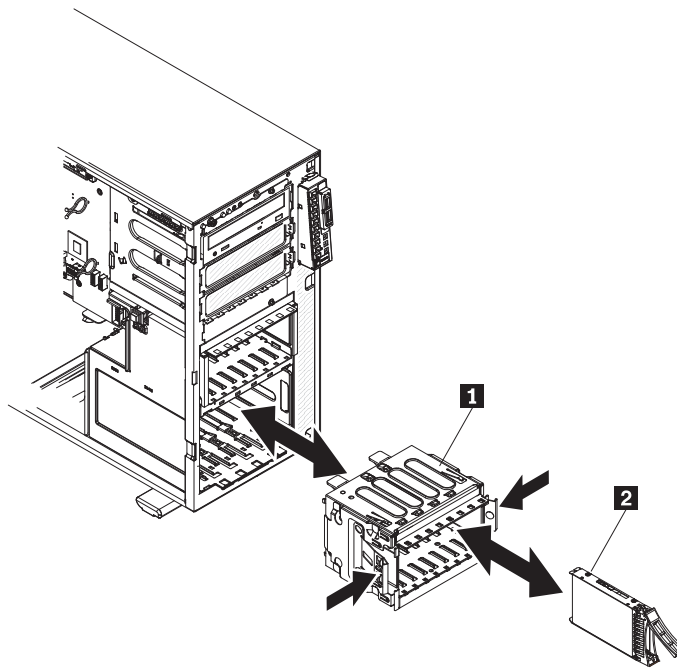
1	2.5-inch hard disk drive cage
2	2.5-inch hot-swap drive

To install a 2.5-inch hard disk drive cage, complete the following steps:

1. Touch the static-protective package that contains the 2.5-inch disk drive cage to any unpainted metal surface on the server; then, remove the drive cage from the package.

2. Install both 2.5-inch disk drive backplanes in the back of the drive cage (see "Installing a 2.5-inch disk drive backplane" on page 200).

3. Slide the 2.5-inch disk drive cage into the opening in the front of the server; then, press drive cage in until the release latches click into place.

4. Install any hot-swap hard disk drives that were removed from the drive cage (see "Installing a 2.5-inch hot-swap hard disk drive" on page 196).

5. Close the bezel (see "Closing the bezel" on page 151).

6. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.

7. Connect the cables to the 2.5-inch disk drive backplane (see "SAS backplane connectors" on page 138 and "Internal cable routing and connectors" on page 163).

8. Install the fan-cage assembly (see "Installing the fan-cage assembly" on page 172).

9. Install the air baffle (see "Installing the air baffle" on page 170).

10. Return the power-supply cage to its closed position (see "Closing the power-supply cage" on page 160).

11. Install the power supplies (see "Installing a hot-swap power supply" on page 175).

12. Install and lock the left-side cover (see "Installing the left-side cover" on page 158).
13. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the operator information panel assembly

1	Release latch
2	Control panel assembly

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

1. Read the safety information that begins on page 5.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Unlock and remove the left-side cover (see "Removing the left-side cover" on page 157).
4. Open the bezel (see "Opening the bezel" on page 150).
5. Remove the power supply or power supplies from the power-supply cage (see "Removing a hot-swap power supply" on page 174).
6. Rotate the power-supply cage to its open position (see "Opening the power-supply cage" on page 158).
7. Remove the air baffle (see "Removing the air baffle" on page 169).
8. Remove the fan-cage assembly (see "Removing the fan-cage assembly" on page 171).
9. Disconnect the operator information panel assembly cable from the system board (see "System-board internal connectors" on page 131).
10. Locate the operator information panel assembly release latch just above the DVD drive.

11. Push up on the release latch while you pull the operator information panel assembly toward the rear of the server; then, angle the back of the assembly toward the system board and remove the assembly from the server.

12. 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
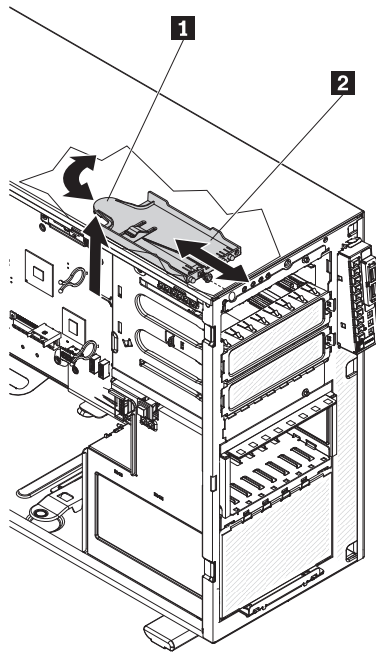
| **1** | Release latch |
| **2** | Control panel assembly |

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

1. Touch the static-protective package that contains the operator information panel assembly to any unpainted metal surface on the server; then, remove the assembly from the package.

2. Angle the operator information panel assembly so that the edge of the assembly is in the guide slot.

3. Slide the operator information panel assembly forward until the release latch clicks into place.

4. Connect the operator information panel assembly cable to the system board (see "System-board internal connectors" on page 131 and "Internal cable routing and connectors" on page 163).

5. Install the fan-cage assembly (see "Installing the fan-cage assembly" on page 172).

6. Install the air baffle (see "Installing the air baffle" on page 170).

7. Return the power-supply cage to its closed position (see "Opening the power-supply cage" on page 158).

8. Install the hot-swap power supply or power supplies (see "Installing a hot-swap power supply" on page 175).

9. Close the bezel (see "Closing the bezel" on page 151).
10. Install and lock the left-side cover (see "Installing the left-side cover" on page 158).
11. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing an extender card
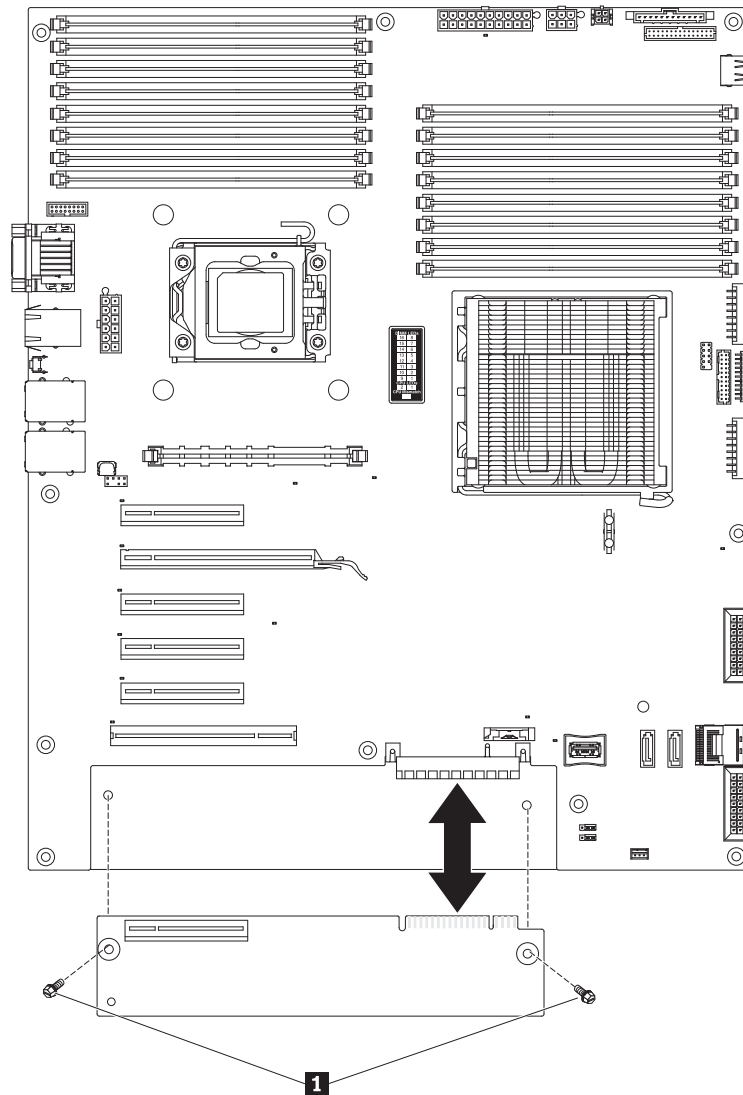

1 Extender card retaining screws

To remove an extender card, complete the following steps:
1. Read the safety information that begins on page 5.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.

4. Unlock and remove the side cover (see "Removing the left-side cover" on page 157).

5. Remove any adapters that are installed in the expansion slots (see "Removing an adapter" on page 184).

6. Remove the system board and place it on a static-protective surface (see "Removing the system board" on page 231).

   Note: Do not remove the DIMMs, heat sinks, microprocessors, VRM, or battery from the system board.

7. Remove the two screws that secure the extender card to the system-board tray.

8. Pull the extender card out of the system-board connector.

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

Installing an extender card
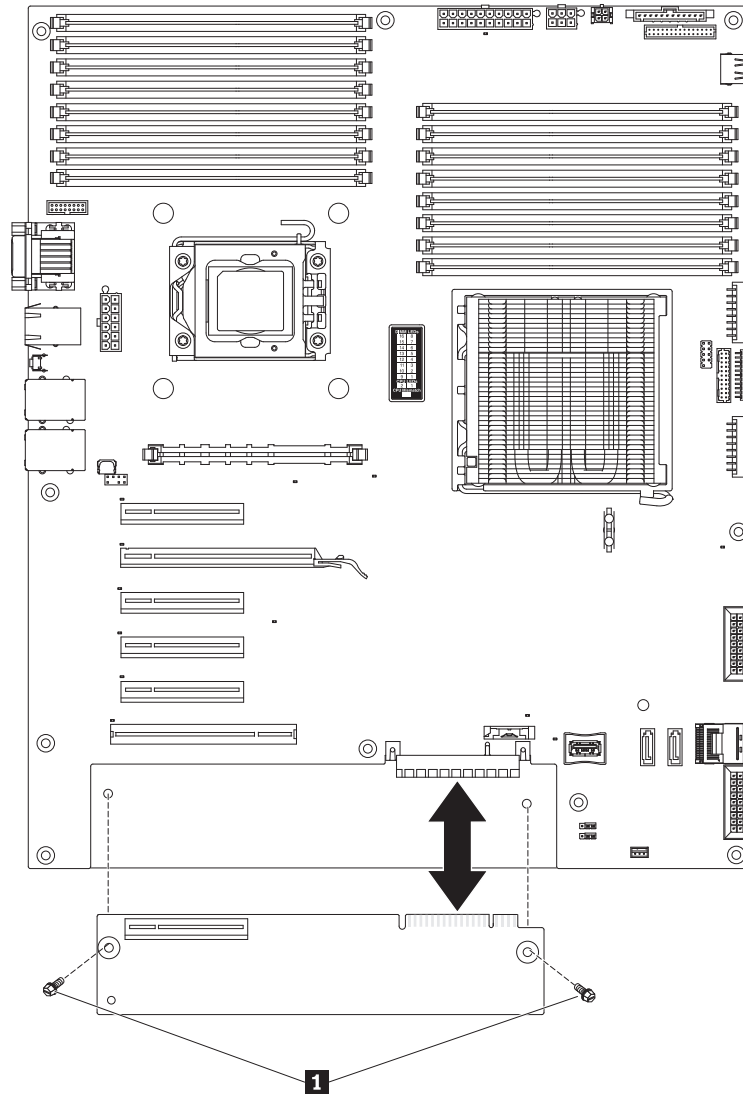
| **1** | Extender card retaining screws |

To install an extender card, complete the following steps:

1. Touch the static-protective package that contains the extender card to any unpainted metal surface on the server; then, remove the extender card from the package.

2. Align the extender card with its connector on the system board; then, slide the extender card into the connector.

3. Install the two screws that secure the extender card to the system-board tray.

4. Install the system board in the server (see "Installing the system board" on page 232).

5. Install any adapters that you removed from the expansion slots (see "Installing an adapter" on page 184).

6. Install and lock the left-side cover (see "Installing the left-side cover" on page 158).

7. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing a memory module

| 1 | DIMM |
| 2 | Retaining clip |
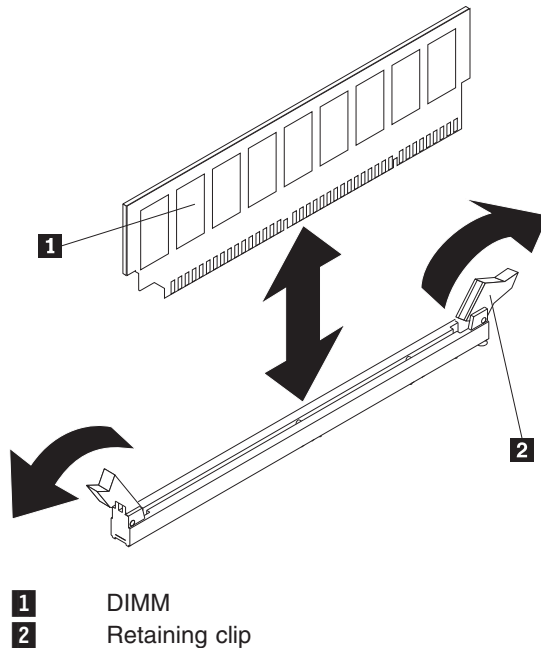
To remove a dual inline memory module (DIMM), do the following:
1. Read the safety information that begins on page 5.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Turn the server on its side so that it is lying flat, with the cover facing up.
4. Unlock and remove the left-side cover (see "Removing the left-side cover" on page 157).
5. Remove the hot-swap power supply or power supplies from the power-supply cage (see "Removing a hot-swap power supply" on page 174).
6. Rotate the power-supply cage to its open position (see "Opening the power-supply cage" on page 158).
7. Remove the air baffle (see "Removing the air baffle" on page 169).
8. Locate the DIMM connectors on the system board (see "System-board internal connectors" on page 131).

   Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, handle the clips gently.
9. Move the DIMM retaining clips on the side of the DIMM connector to the open position by pressing the retaining clips away from the center of the DIMM connector.
10. Using your fingers, lift the DIMM out of the DIMM connector.
11. 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 following notes describe the types of dual inline memory modules (DIMMs) that your server supports and other information that you must consider when you install DIMMs.
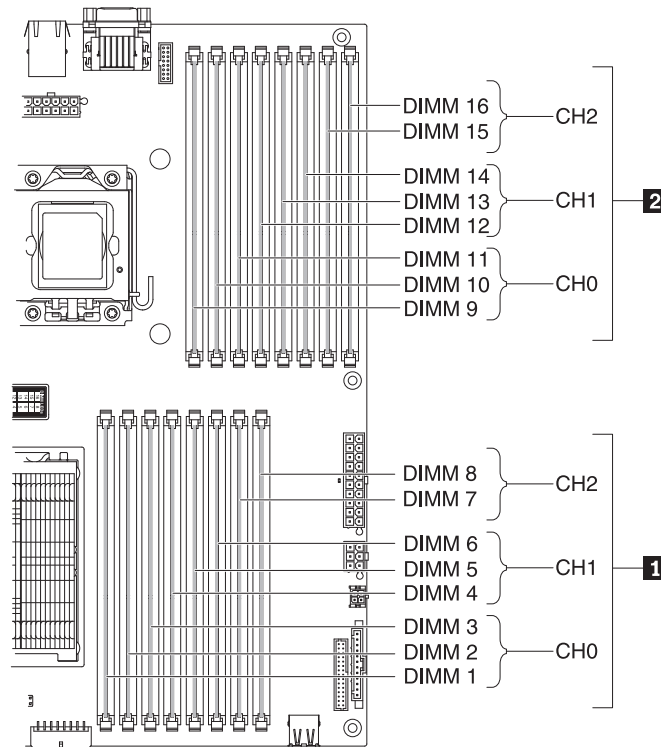
1	Microprocessor 1
2	Microprocessor 2

- The server supports industry-standard double-data-rate 3 (DDR3), 800, 1066, or 1333 MHz, PC3-10600R-999 (single-, dual-, or quad-rank), registered, synchronous dynamic random-access memory (SDRAM) dual inline memory modules (DIMMs) with error correcting code (ECC). See http://www.lenovo.com/thinkserver and click the **Options** tab for a list of supported memory modules for the server.
- At least one DIMM must be installed for each installed microprocessor for the server to operate, but three DIMMs per microprocessor improves server performance.
- When two microprocessors are installed in the server, distribute the DIMMs between the two microprocessors to improve server performance.
- The server supports a maximum of 16 single-, dual-, or quad-rank DIMMs.
- The memory controller has three registered DIMM channels per microprocessor (Channels 0, 1, and 2). Channels 0 and 1 support three DIMMs and Channel 2 supports two DIMMs.
- When installing DIMMs, install them starting with the connector farthest from the microprocessor within each channel.
- When installing a quad-ranked DIMM in a channel with single- or dual-ranked DIMMs, install the quad-ranked DIMM in the connector farthest from the microprocessor.

- The server supports 1 GB, 2 GB, and 4 GB DIMMs, with a minimum of 1 GB and a maximum of 64 GB of system memory.

  For 32-bit operating systems only: 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.
- The maximum operating speed of the server is determined by the slowest DIMM in the server.
- The server can operate in two major modes: mirroring and independent channel modes.

Independent channel mode

The server requires at least one installed DIMM per microprocessor. The server comes with a minimum of two 1 GB DIMMs, installed in connectors 3 and 6. Connector 3 (in channel 0) and connector 6 (in channel 1) are the farthest connectors from microprocessor 1 in those channels. When you install additional DIMMs, install them in the order shown in Table 11, to maintain server performance.

Note: If you have configured the server to use memory mirroring, do not use the order shown in this table; go to Table 13 on page 214 and use the installation order shown there.

Table 11. DIMM installation sequence for independent channel mode

Installed microprocessors	DIMM connector population sequence
Microprocessor 1	3, 6, 8, 2, 5, 7, 1, 4
Microprocessor 2	11, 14, 16, 10, 13, 15, 9, 12

Memory mirroring mode

Memory-mirroring mode replicates and stores data on two pairs of DIMMs within two channels simultaneously. If a failure occurs, the memory controller switches from the primary pair of memory DIMMs to the backup pair of DIMMs. You must enable memory mirroring through the Setup Utility. For details about enabling memory mirroring, see "Using the Setup Utility" on page 252. When you use the memory mirroring feature, consider the following information:

- When you use memory mirroring, you must install a pair of DIMMs at a time. One DIMM must be in channel 0, and the mirroring DIMM must be in the same connector in channel 1. The two DIMMs in each pair must be identical in size, type, rank (single, dual, or quad), and organization. They do not have to be identical in speed. The channels run at the speed of the slowest DIMM in any of the channels. See Table 13 on page 214 for the DIMM connectors that are in each pair.
- Channel 2, DIMM connectors 7, 8, 15, and 16 are not used in memory-mirroring mode.
- The maximum available memory is reduced to half of the installed memory when memory mirroring is enabled. For example, if you install 64 GB of memory, only 32 GB of addressable memory is available when you use memory mirroring.

The following illustration shows the memory channel interface layout with the DIMM installation sequence for mirroring mode. The numbers within the boxes indicate the DIMM population sequence in pairs within the channels, and the numbers next to the boxes indicate the DIMM connectors within the channels. For example, the

following illustration shows that the first pair of DIMMs (indicated by ones (1) inside the boxes) should be installed in DIMM connector 3 on channel 0 and DIMM connector 6 on channel 1. DIMM connectors 7, 8, 15, and 16 on channel 2 are not used in memory-mirroring mode.
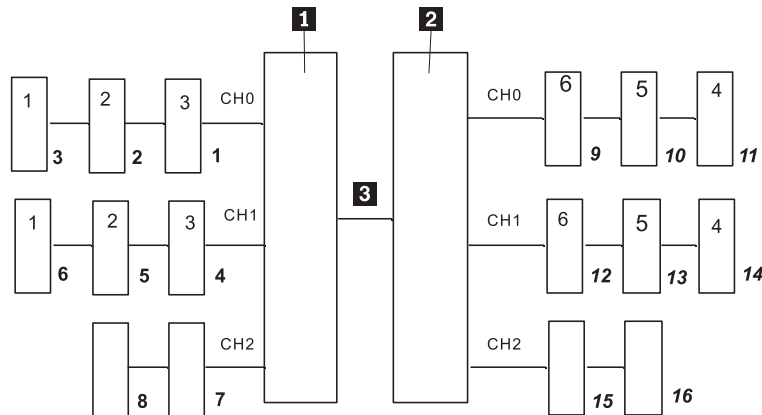
Figure 1. Memory channel interface layout

1 CPU 1
2 CPU 2
3 QPI

The following table lists the DIMM connectors on each memory channel.

Table 12. Connectors on each memory channel

Memory channel	DIMM connectors
Channel 0	1, 2, 3, 9, 10, 11
Channel 1	4, 5, 6, 12, 13, 14
Channel 2 (not used in memory mirroring)	7, 8, 15, 16

The following illustration shows the memory connector layout that is associated with each microprocessor. For example, DIMM connectors 9, 10, 11, 12, 13, 14, 15, and 16 (DIMM connectors are shown underneath the boxes) are associated with microprocessor 2 socket (CPU2) and DIMM connectors 1, 2, 3, 4, 5, 6, 7, and 8 are associated with microprocessor 1 socket (CPU1). The numbers within the boxes indicate the installation sequence of the DIMM pairs. For example, the first DIMM pair (indicated within the boxes by ones (1)) should be installed in DIMM connectors 3 and 6, which are associated with microprocessor 1 (CPU1).

Note: You can install DIMMs for microprocessor 2 as soon as you install microprocessor 2; you do not have to wait until all of the DIMM connectors for microprocessor 1 are filled.
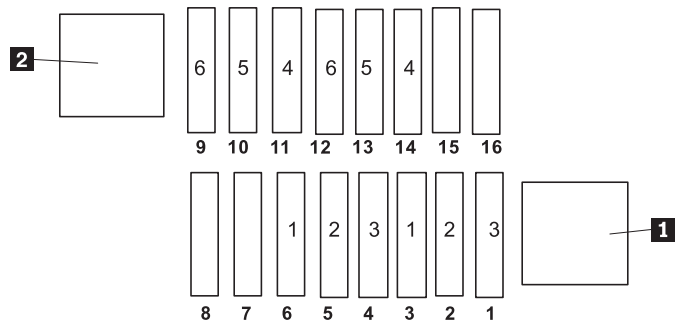
Figure 2. Memory connectors associated with each microprocessor

| **1** | CPU 1 |
| **2** | CPU 2 |

The following table lists the installation sequence for installing DIMMs in memory-mirroring mode.

Table 13. Memory-mirroring mode DIMM population sequence

DIMMs	Number of installed microprocessors	DIMM connector
First pair of DIMMs	1	3, 6
Second pair of DIMMs	1	2, 5
Third pair of DIMMs	1	1, 4
Fourth pair of DIMMs	2	14, 11
Fifth pair of DIMMs	2	13, 10
Sixth pair of DIMMs	2	12, 9
Note: DIMM connectors 7, 8, 15, and 16 are not used in memory-mirroring mode.		

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.

The following illustration shows how to install DIMMs on the system board.
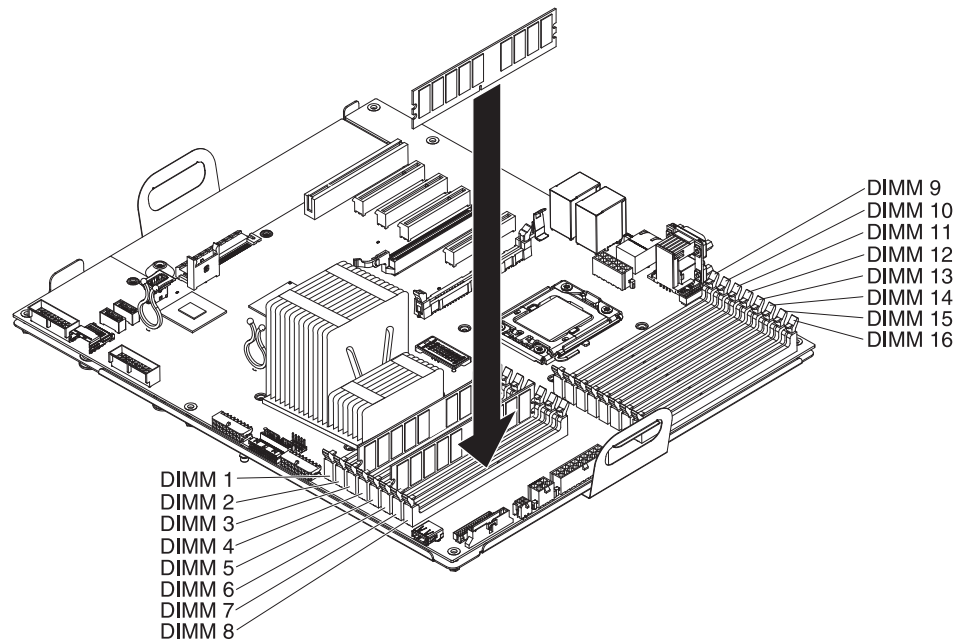
DIMM 9
DIMM 10
DIMM 11
DIMM 12
DIMM 13
DIMM 14
DIMM 15
DIMM 16

DIMM 1
DIMM 2
DIMM 3
DIMM 4
DIMM 5
DIMM 6
DIMM 7
DIMM 8

Attention: Static electricity that is released to internal server components when the server is powered on might cause the server to stop, 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.

To install a DIMM, do the following:

1. Read the safety information that begins on page 5.
2. Turn off the server and peripheral devices; then, disconnect the power cords and all external cables.
3. Remove the left-side cover (see "Removing the left-side cover" on page 157).
4. Remove the hot-swap power supply or power supplies from the server.
5. Pull up the power-supply cage handle, then swing the power-supply cage out of the server (see"Opening the power-supply cage" on page 158 for more information).
6. Remove the air baffle from the server (see "Removing the air baffle" on page 169 for more information).
7. Open the retaining clip on each end of the DIMM connector.

   Attention: To avoid breaking the DIMM retaining clips or damaging the DIMM connectors, open and close the clips gently.
8. Touch the static-protective package containing the DIMM to any unpainted metal surface on the outside of the server. Then, remove the DIMM from the package.
9. Turn the DIMM so that the DIMM keys align correctly with the connector.
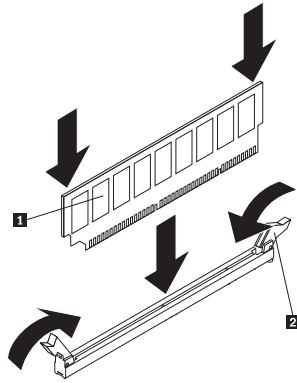
1	DIMM
2	Retaining clip

10. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector. 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.

11. Reinstall the air baffle ("Installing the air baffle" on page 170).

12. Reinstall the power-supply cage ("Installing a hot-swap power supply" on page 175).

13. Reinstall the left-side cover ("Installing the left-side cover" on page 158).

14. Reinstall the power supplies ("Installing a hot-swap power supply" on page 175).

15. Reconnect the power cords and external cables.

If you have other optional devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 233.

Removing a hot-swap fan

The server comes with three 120 mm x 38 mm hot-swap fans in the fan support bracket at the front of the server. The following instructions can be used to remove any hot-swap fan in the server.
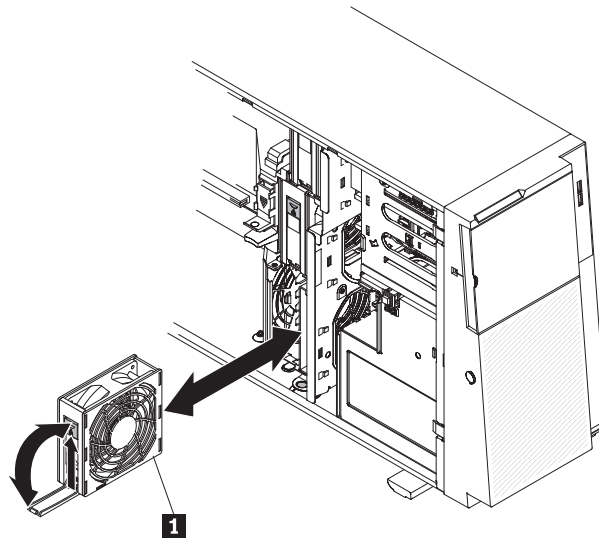
1   Hot-swap fan

To remove a hot-swap fan, do the following:

1. Read the safety information that begins on page 5.

   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.

2. Unlock and remove the left-side cover (see "Removing the left-side cover" on page 157).

   Attention: To ensure proper system cooling, do not leave the top cover off the server for more than 2 minutes.

3. Open the fan-locking handle by sliding the orange release latch in the direction of the arrow.

4. Pull outward on the free end of the handle to remove the fan from the server.

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

Installing a hot-swap fan

The server comes with three 120 mm x 38 mm hot-swap fans in the fan support bracket at the front of the server. The following instructions can be used to install any hot-swap fan in the server.
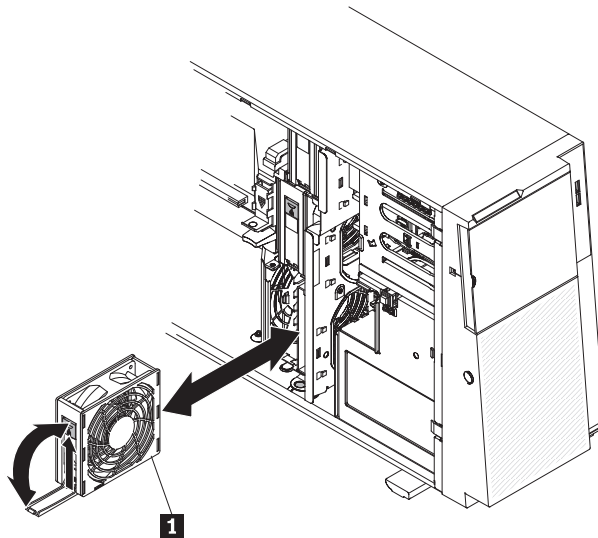
1   Hot-swap fan

To install a hot-swap fan, do the following:

1. Read the safety information that begins on page 5.

   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.

2. Touch the static-protective package that contains the hot-swap fan to any unpainted metal surface on the server; then, remove the fan from the package.

3. Open the fan-locking handle on the replacement fan.

4. Insert the fan into the socket and close the handle to the locked position.

5. Install and lock the left-side cover (see "Installing the left-side cover" on page 158).

Removing a microprocessor and heat sink

To remove a microprocessor, complete the following steps:

1. Read the safety information that begins on page 5.

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

3. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.

4. Unlock and remove the left-side cover (see "Removing the left-side cover" on page 157).

5. Remove the power supply or power supplies from the power-supply cage (see "Removing a hot-swap power supply" on page 174).

6. Rotate the power-supply cage to its open position (see "Opening the power-supply cage" on page 158).

7. Remove the air baffle (see "Removing the air baffle" on page 169).

8. Remove the microprocessor heat sink:

    a. Lift the heat-sink release lever to the fully open position.

    b. Rotate the back of the heat sink out of the retention bracket and remove the heat sink from the server.

       Attention: Do not touch the thermal grease on the bottom of the heat sink. Touching the thermal grease will contaminate it. If the thermal grease on the microprocessor or heat sink becomes contaminated, you must replace it. See "Thermal grease" on page 226 for more information.
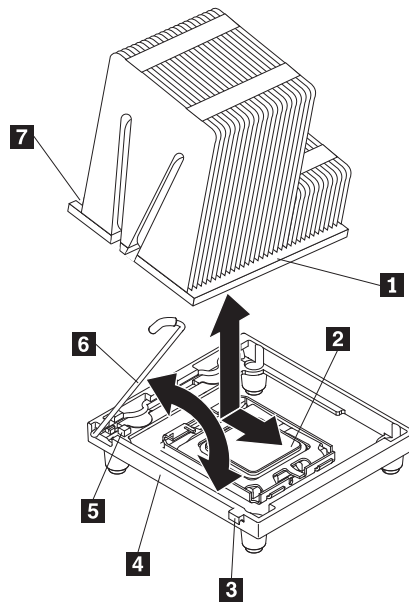
1	Heat sink flange
2	Microprocessor
3	Release level locking tab
4	Retainer bracket
5	Alignment tab
6	Heat sink release level
7	Notch

9. Lift the microprocessor-release latch to the fully open position (approximately 135° angle); then, lift the bracket frame and remove the microprocessor from the socket.
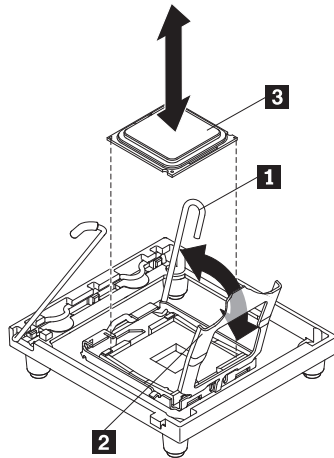
1	Microprocessor release latch
2	Microprocessor bracket frame
3	Microprocessor

10. If you are removing microprocessor 2, remove the voltage regulator module (VRM) from the connector next to microprocessor socket 2.

   a. Open the retaining clips on each end of the VRM connector.

   b. Pull the VRM out of the connector.

11. 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 a microprocessor and heat sink

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

- The server supports certain Intel® Xeon® scalable multi-core microprocessors, which are designed for the LGA 1366 socket. These microprocessors are 64-bit dual-core or quad-core microprocessors with an integrated memory controller, quick-path interconnect, and shared last cache. See http://www.lenovo.com/thinkserver for a list of supported microprocessors.

- The server supports up to two microprocessors. If the server comes with one microprocessor, you can install a second microprocessor.

- Both microprocessors must have the same QuickPath Interconnect (QPI) link speed, integrated memory controller frequency, core frequency, power segment, cache size, and type.

- Read the documentation that comes with the microprocessor to determine whether you must update the server firmware. To download the most current level of server firmware and many other code updates for your server, 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. Select **Servers and Storage** from the **Brand** list.

   4. From **Family** list, select **ThinkServer TD200x**, and click **Continue**.

   5. Click **System TD200x** to display the matrix of downloadable files for the server.

- (Optional) Obtain an SMP-capable operating system. For a list of supported operating systems and optional devices, see http://www.lenovo.com/thinkserver.
- To order additional microprocessor optional devices, contact your Lenovo marketing representative or authorized reseller.
- The microprocessor speeds are automatically set for this server; therefore, you do not have to set any microprocessor frequency-selection jumpers or switches.
- If you have to replace a microprocessor, call for service.
- The heat-sink FRU is packaged with the thermal grease applied to the underside:
  - 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.
  - You must replace the thermal grease if it becomes contaminated or has come in contact with another object other than its paired microprocessor.
  - The thermal grease is available as a separate FRU.
- Do not remove the first microprocessor from the system board to install the second microprocessor.
- Some models support dual-core processors and quad-core processors. Do not use dual-core processors and quad-core processors in the same server. Install all dual-core or all quad-core processors in the server.
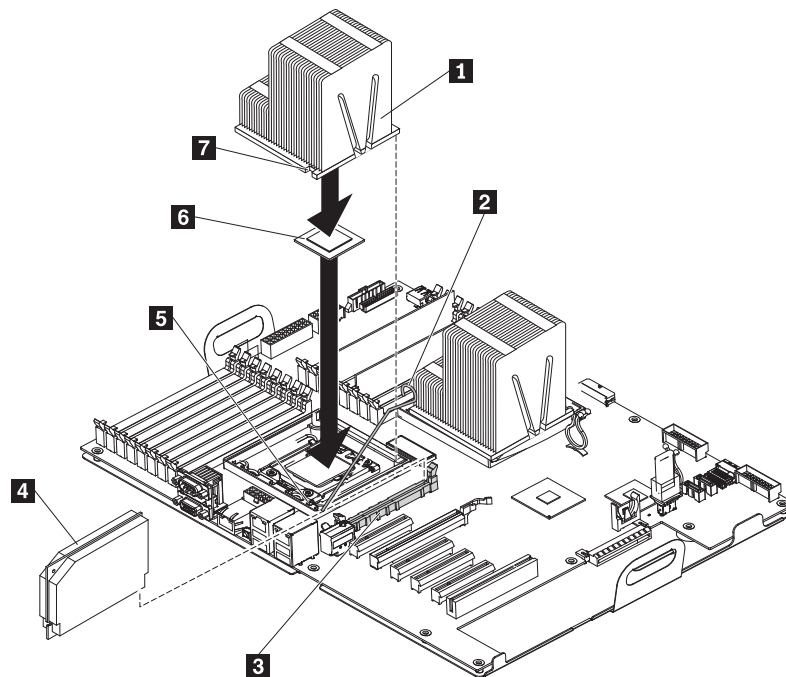
1	Heat sink 2	5	Alignment key tab
2	Microprocessor release lever	6	Microprocessor 2
3	VRM connector	7	Alignment key
4	Microprocessor 2 VRM		

To install a microprocessor, complete the following steps:

1. Touch the static-protective package that contains the microprocessor to any unpainted metal surface on the server; then, remove the microprocessor from the package.

2. Open the microprocessor socket by pressing down on the end of the release lever, moving it to the side, and slowly releasing it to the open (up) position.
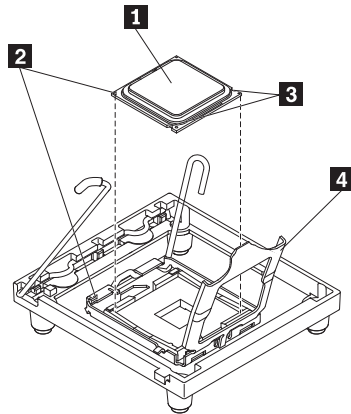
1	Microprocessor
2	Alignment triangles
3	Notches
4	Microprocessor bracket frame

3. Open the microprocessor bracket frame and remove the microprocessor filler, if one is installed.

   Attention:

   a. Do not touch the microprocessor contacts; handle the microprocessor by the edges only. Contaminants on the microprocessor contacts, such as oil from your skin, can cause connection failures between the contacts and the socket.

   b. Handle the microprocessor carefully. Dropping the microprocessor during installation or removal can damage the contacts.

   c. Do not use excessive force when you press the microprocessor into the socket.

   d. Make sure that the microprocessor is oriented, aligned, and positioned in the socket before you try to close the lever.

4. Install the microprocessor:

   a. Touch the static-protective package that contains the microprocessor to any unpainted metal surface on the server. Then, remove the microprocessor from the package.

   b. Remove the protective cover, tape, or label from the surface of the microprocessor socket, if any is present.

   c. Align the microprocessor with the socket. The microprocessor has two notches that are keyed to two tabs on the sides of the socket. A triangle-shaped indicator on one corner of the microprocessor points to a 45-degree angle on one corner of the socket.

   d. Carefully place the microprocessor into the socket. Do not use excessive force when you press the microprocessor into the socket.

      Note: The microprocessor fits only one way on the socket.

5. Close the microprocessor bracket frame and hold it down; then, close the microprocessor retention latch and lock it securely in place.
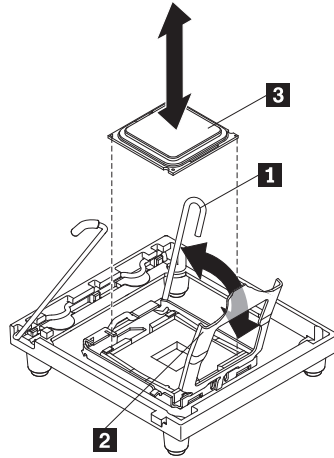
1	Microprocessor release latch
2	Microprocessor bracket frame
3	Microprocessor

6. Install a heat sink on the microprocessor.

   Attention: Do not touch the thermal grease on the bottom of the heat sink or set down the heat sink after you remove the plastic cover. Touching the thermal grease will contaminate it. If the thermal grease is contaminated, call Lenovo service to request a replacement thermal grease kit. For information about installing the replacement thermal grease, see "Thermal grease" on page 226.
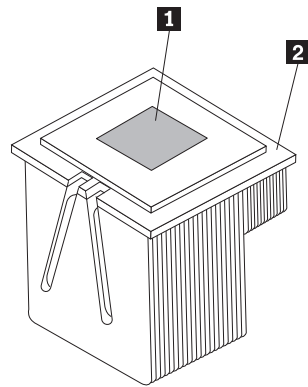
1	Thermal grease
2	Heat sink

   a. Make sure that the heat-sink release lever is in the fully open position.

   b. Remove the plastic protective cover from the bottom of the heat sink, if one is installed.

   c. Position the heat sink above the microprocessor with the thermal-grease side down.
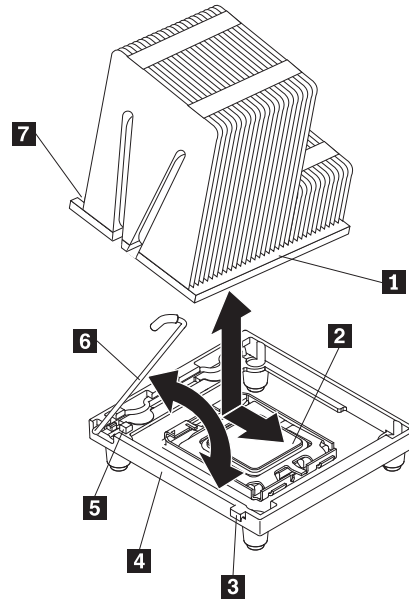
1	Heat sink flange
2	Microprocessor
3	Release level locking tab
4	Retainer bracket
5	Alignment tab
6	Heat sink release level
7	Notch

> **Attention:** The heat sink is keyed to the retention module. Make sure that the notch on the heat sink fits over the alignment tab on the retention module.

   d. Align the notch on the heat sink with the alignment tab on the retainer module.

   e. Slide the rear flange of the heat sink into the opening in the retainer bracket.

   f. Press down firmly on the front of the heat sink until it is seated securely.

   g. Rotate the heat-sink release lever to the closed position and hook it underneath the locking tab.

7. If you are installing microprocessor 2, install a VRM in the connector next to microprocessor socket 2 (see "System-board internal connectors" on page 131 for the VRM connector location).

> **Note:** A VRM must be installed for microprocessor 2. The server will not start if microprocessor 2 is installed without a VRM.

   a. Open the retaining clips on each end of the VRM connector.

   b. Turn the VRM so that the keys align with the connector.

   c. Insert the VRM into the connector by aligning the edges of the VRM with the slots at the end of the VRM connector. Firmly press the VRM straight down into the connector by applying pressure on both ends of the VRM simultaneously. The retaining clips snap into the locked position when the VRM is seated in the connector.

8. Install the air baffle (see "Installing the air baffle" on page 170).

9. Return the power-supply cage to its closed position (see "Closing the power-supply cage" on page 160).

10. Install the power supplies (see "Installing a hot-swap power supply" on page 175).

11. Install and lock the left-side cover (see "Installing the left-side cover" on page 158).

12. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

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.

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.
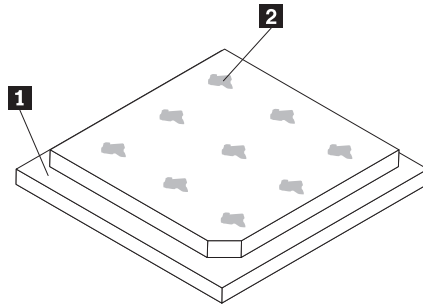
1	Microprocessor
2	0.02 mL of thermal grease

5. Use the thermal-grease syringe to place 9 uniformly spaced dots of 0.02 mL each on the top of the microprocessor. The outermost dots must be within approximately 5 mm of the edge. This is to ensure uniform distribution.
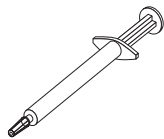
   Note: 0.01 mL is one tick mark on the syringe. If the grease is properly applied, approximately half (0.22 mL) of the grease will remain in the syringe.
6. Install the heat sink onto the microprocessor as described in "Installing a microprocessor and heat sink" on page 220.

Removing a heat-sink retention module
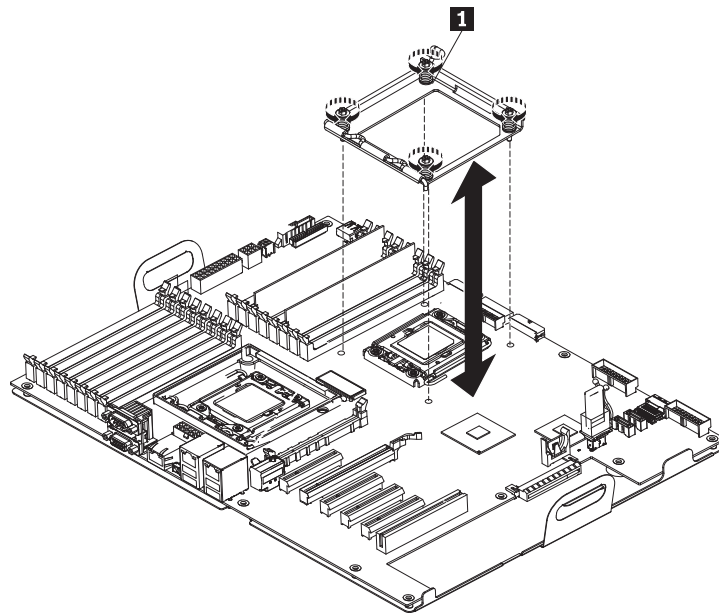
1   Alignment triangle

To remove a heat-sink retention module, complete the following steps:

1. Read the safety information that begins on page 5.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.
4. Unlock and remove the side cover (see "Removing the left-side cover" on page 157).
5. Remove the power supply or power supplies from the power-supply cage (see "Removing a hot-swap power supply" on page 174).
6. Rotate the power-supply cage to its open position (see "Opening the power-supply cage" on page 158).
7. Remove the air baffle (see "Removing the air baffle" on page 169).
8. Remove the heat sink (see "Removing a microprocessor and heat sink" on page 218).
9. Using a Phillips screwdriver, remove the four screws that secure the heat-sink retention module to the system board; then, lift the heat-sink retention module from the system board.
10. If you are instructed to return the heat-sink retention module, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a heat-sink retention module
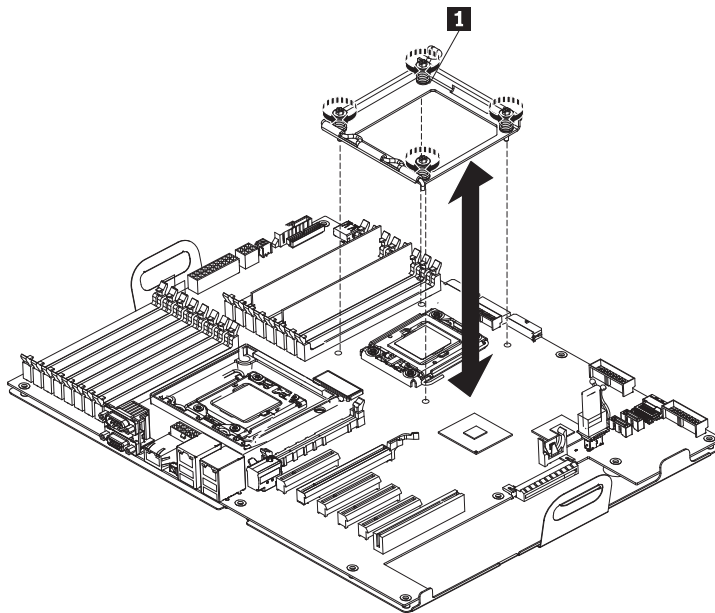
1   Alignment triangle

To install a heat-sink retention module, complete the following steps:

1. Place the heat-sink retention module in the microprocessor location on the system board.
2. Using a Phillips screwdriver, install the four screws that secure the module to the system board.
3. Install the heat sink (see "Installing a microprocessor and heat sink" on page 220).

   Attention: Make sure that you install each heat sink with its paired microprocessor.
4. Install the air baffle (see "Installing the air baffle" on page 170).
5. Return the power-supply cage to its closed position (see "Closing the power-supply cage" on page 160).
6. Install the power supplies (see "Installing a hot-swap power supply" on page 175).
7. Install and lock the left-side cover (see "Installing the left-side cover" on page 158).
8. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing a microprocessor retention module

To remove a microprocessor retention module, complete the following steps:

1. Read the safety information that begins on page 5.

2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.

3. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.

4. Unlock and remove the side cover (see "Removing the left-side cover" on page 157).

5. Remove the power supply or power supplies from the power-supply cage (see "Removing a hot-swap power supply" on page 174).

6. Rotate the power-supply cage to its open position (see "Opening the power-supply cage" on page 158).

7. Remove the air baffle (see "Removing the air baffle" on page 169).

8. Remove the heat sink and the microprocessor (see "Removing a microprocessor and heat sink" on page 218).

9. Using a T8 Torx screwdriver, remove the four screws that secure the microprocessor retention module to the system board; then, lift the microprocessor retention module from the system board.

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

Installing a microprocessor retention module
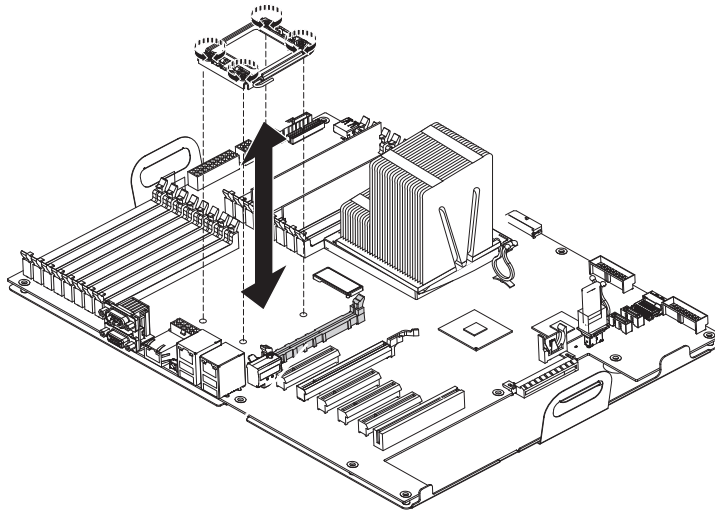
To install a microprocessor retention module, complete the following steps:

1. Orient the triangle-shaped indicator on one corner of the microprocessor retention module to the corresponding alignment triangle on the system board; then, place the retention module on the system board.

2. Using a T8 Torx screwdriver, install the four screws that secure the module to the system board.

3. Install the microprocessor and heat sink (see "Installing a microprocessor and heat sink" on page 220).

   Attention: Make sure that you install each heat sink with its paired microprocessor.

4. Install the air baffle (see "Installing the air baffle" on page 170).

5. Return the power-supply cage to its closed position (see "Closing the power-supply cage" on page 160).

6. Install the power supplies (see "Installing a hot-swap power supply" on page 175).

7. Install and lock the left-side cover (see "Installing the left-side cover" on page 158).

8. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the system board
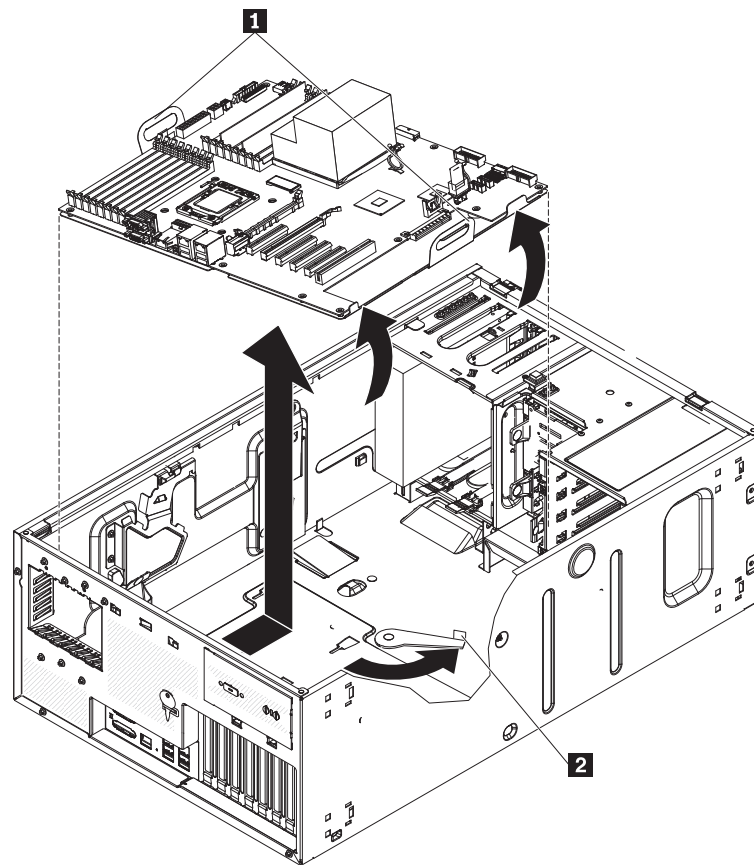
1	Handle
2	Release lever

To remove the system board, complete the following steps:

1. Read the safety information that begins on page 5.

2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.

3. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.

4. Unlock and remove the side cover (see "Removing the left-side cover" on page 157).

5. Remove the power supply or power supplies from the power-supply cage (see "Removing a hot-swap power supply" on page 174).

6. Rotate the power-supply cage to its open position (see "Opening the power-supply cage" on page 158).

7. Remove the air baffle (see "Removing the air baffle" on page 169).

8. Remove the fan-cage assembly (see "Removing the fan-cage assembly" on page 171).

9. Note where the cables are connected to the system board; then, disconnect them.

10. Remove any of the following components that are installed on the system board and put them in a safe, static-protective place:
    - Adapters (see "Removing an adapter" on page 184).
    - Extender card (see "Removing an extender card" on page 207).
    - DIMMs (see "Removing a memory module" on page 210).
    - Microprocessors and heat sinks (see "Removing a microprocessor and heat sink" on page 218).
    - Battery (see "Removing the battery" on page 172).
11. Rotate the release lever toward the front of the chassis.
12. Slide the system board toward the front of the server to disengage the tabs from the chassis; then, grasp the handles and carefully lift the system board out of the server.
13. 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
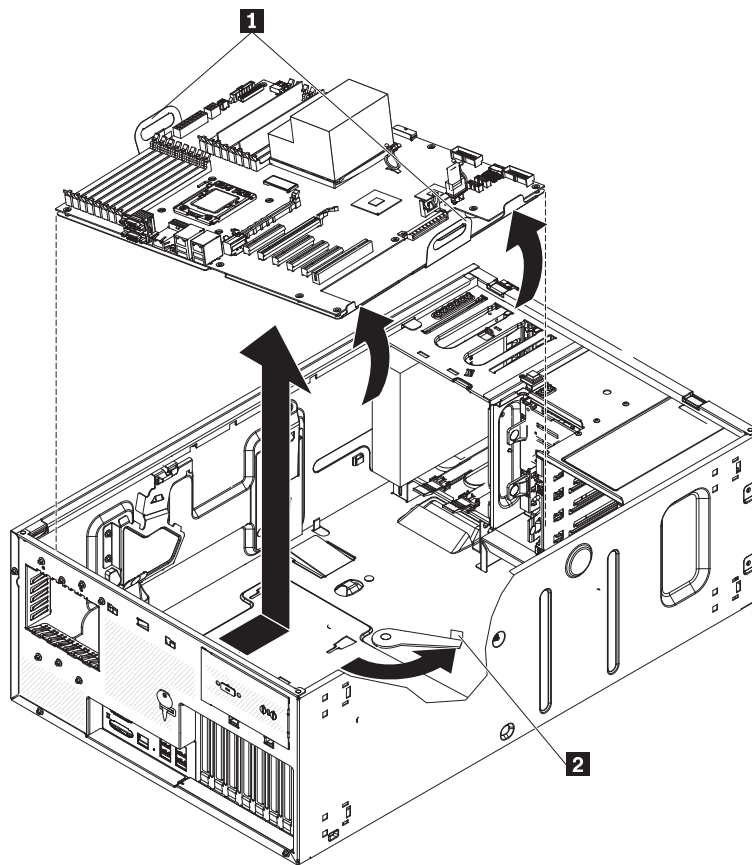
| **1** | Handle |
| **2** | Release lever |

To install the system board, complete the following steps:

1. Touch the static-protective package that contains the system board to any unpainted metal surface on the server; then, remove the system board from the package.
2. Hold the system board by the handles and insert the system board into the chassis at an angle; then, slide it toward the rear of the server.

   Note: Make sure that none of the server cables are caught under the system board.
3. Press down on the retention modules; then, rotate the release lever toward the rear of the chassis to secure the system board.
4. Install any of the following components that you removed from the system board:
   - Microprocessors and heat sinks (see "Installing a microprocessor and heat sink" on page 220).
   - DIMMs (see "Installing a memory module" on page 211).
   - Extender card (see "Installing an extender card" on page 209).
   - Adapters (see "Installing an adapter" on page 184)
   - Battery (see "Installing the battery" on page 173).
5. Reconnect any cables to the system board that you disconnected during removal (see "System-board internal connectors" on page 131 and "Internal cable routing and connectors" on page 163).
6. Install the fan-cage assembly (see "Installing the fan-cage assembly" on page 172).
7. Install the air baffle (see "Installing the air baffle" on page 170).
8. Return the power-supply cage to its closed position (see "Closing the power-supply cage" on page 160).
9. Install the power supplies (see "Installing a hot-swap power supply" on page 175).
10. Install and lock the left-side cover (see "Installing the left-side cover" on page 158).
11. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Completing the installation

To complete the installation, do the following:
1. Insert the bezel hinges into the slots on the server chassis and close the bezel ("Closing the bezel media door" on page 156 and "Closing the bezel" on page 151).
2. Position the left-side cover over the server.
3. Place the bottom edge of the cover onto the bottom edge of the server.
4. Rotate the top edge of left-side cover toward the server; then, press down on the cover handle until it clicks into place ("Installing the left-side cover" on page 158).
5. Rotate the bezel to its fully closed position.
6. Using the supplied key, lock the left-side cover and bezel.
7. Connect the cables and power cords. For more information, see "Connecting the cables" on page 234.

Connecting the cables

Notes:

1. Be sure to turn off the server before you connect any cables to or disconnect any cables from the server or hot-plug adapter.

2. For additional cabling instructions, see the documentation that comes with the optional devices. It might be easier for you to route any cables before you install certain optional devices.

3. 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. For example, the hard disk drive cables are labeled "HDD option."

The following illustration shows the locations of the input and output connectors on the rear of the server.
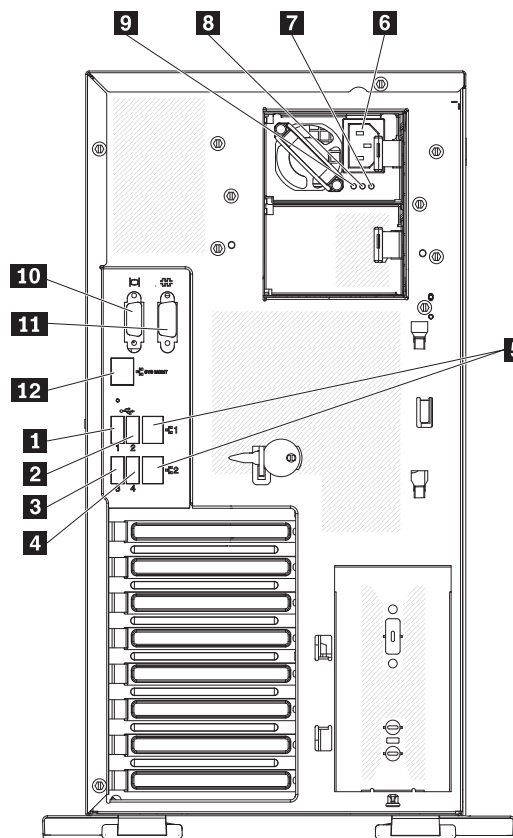
1	USB 1	**7**	Power-error LED
2	USB 2	**8**	dc-power LED
3	USB 3	**9**	ac-power LED
4	USB 4	**10**	Video
5	Ethernet 10/100/1000	**11**	Serial 1 (COM 1)
6	Power cord connector	**12**	Systems management

Updating the server configuration

When you start the server for the first time after you add or remove a device, you might receive a message that the configuration has changed. The Setup Utility starts automatically so that you can save the new configuration settings. For more information, see Chapter 9, "Configuring the server," on page 251.

Some optional devices have device drivers that you must install. For information about installing device drivers, see the documentation that comes with each device.

The server comes with at least one microprocessor. If more than one microprocessor is installed, the server can operate as a symmetric multiprocessing (SMP) server. You might have to upgrade the operating system to support SMP. For more information, see "Typical operating system installation" on page 265 and the operating-system documentation.

If the server has an optional RAID adapter and you have installed or removed a hard disk drive, see the documentation that comes with the RAID adapter for information about reconfiguring the disk arrays.

For information about configuring the integrated Gigabit Ethernet controller, see "Configuring the Gigabit Ethernet controller" on page 266.

Chapter 8. Parts Listing, TD200x Machine Types 3719, 3821, 3822, and 3823

The following replaceable components are available for the ThinkServer TD200x Types 3719, 3821, 3822, and 3823 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 TD200x**, and click **Continue**.

№	Part	№	Part
1	Cover	14	USB cable/EasyLED diagnostics assembly
2	Rear adapter retention bracket	15	DVD drive
3	Air baffle	16	Bezel
4	Heat sink	17	Optical drive bay EMC shield
5	Microprocessor	18	2.5-inch EMC shield
6	Heat sink retention bracket	19	2.5-inch hot-swap drive
7	DIMMs	20	2.5-inch drive cage assembly
8	System board	21	SAS/SATA 2.5-inch backplane
9	VRM	22	Fan assembly
10	Power-supply cage	23	Hot-swap fan
11	Power supply	24	ServeRAID MR10i
12	Power-supply filler	25	ServeRAID BR10i
13	Control panel assembly	26	ServeRAID MR10is

Table 14. Parts listing, Type 3719

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Side Cover (models CTO All Models)	46D1389		
2	Retention Module (models CTO All Models)	46D1397		
3	Air Duct (models CTO All Models)	46D1409		
4	CPU Heat sink (models CTO All Models)	46D1407		
5	Microprocessor, Xeon 2.66GHz/6.4GTS-8MB QC 95w (models CTO)			46D1264
5	Microprocessor, Xeon 2.4GHz/5.86GTS-8MB QC 80w (models CTO)			46D1266
5	Microprocessor, Xeon 2.26GHz/5.86GTS-8MB QC 80w (models CTO)			46D1267
5	Microprocessor, Xeon 2.0GHz/4.8GTS-4MB QC 80w (models CTO)			46D1271
5	Microprocessor, Xeon 1.86GHz/4.8GTS-4MB DC 80w (models CTO)			46D1272
7	Memory module, 1GB DDR3-1333 1Rx8 LP RDIMM (models CTO)	46U1991		
7	Memory module, 2GB DDR3-1333 2Rx8 LP RDIMM (models CTO)	46U1992		
7	Memory module, 2GB DDR3-1333 1Rx4 LP RDIMM (models CTO 45U 45S 45Y 45G 45M 45A 45Q 45T 45H 45R 45E)	46U1993		
7	Memory module, 4GB DDR3-1333 2Rx4 LP RDIMM (models CTO)	46U1994		
8	System board, TD200x Planar (models CTO 45U 45S 45Y 45G 45M 45A 45Q 45T 45H 45R 45E)			46D1406
9	VRM (models CTO All Models)	39Y7395		
10	Power Supply Cage (models CTO All Models)	39Y7389		
11	Power supply, 920W Power Supply (models CTO All Models)	39Y7387		
12	Power Supply Filler (models CTO All Models)	39Y7391		
14	USB/Lightpath bracket (models CTO All Models)	46D1385		
15	Half-High SATA DVD-ROM (models CTO)		43W8466	
15	Half-High SATA Multi-Burner (models CTO 45U 45S 45Y 45G 45M 45A 45Q 45T 45H 45R 45E)		43W8467	
16	TD200x Bezel FRU (models CTO All Models)	46U2424		
17	EMC Shield 4 x 3.5″ (models CTO All Models)	46D1402		
18	EMC Shield Kit (models CTO All Models)	46C6706		
19	Hard disk drive, 146GB 15K SFF 6Gbps HS HDD (models CTO All Models)	46U2117		
19	Hard disk drive, 146GB 10K SFF 6Gbps HS HDD (models CTO All Models)	46U2120		
19	Hard disk drive, 300GB 10K SFF 6Gbps HS HDD (models CTO All Models)	46U2124		

Table 14. Parts listing, Type 3719 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
19	Hard disk drive, 73GB 15K SFF 6Gbps HS HDD (models CTO All Models)	46U2128		
20	2.5″ HDD CAGE (models CTO All Models)	46D1405		
21	Backplane (models CTO All Models)	49Y4462		
22	Fan, 120mm (models CTO All Models)	44E4563		
23	HS 120x38 Fan harness (models CTO All Models)	46D1394		
24	LSI MR-10i SAS/SATA Controller (models CTO)	43W4297		
25	LSI BR-10i SAS/SATA Controller (models CTO 45U 45S 45Y 45G 45M 45A 45Q 45T 45H 45R 45E)	44E8690		
26	LSI -MR10is VAULT SAS/SATA Controller (models CTO)	44E8696		
	FOOT STATIONARY GBM (models CTO)	13N2985		
	Cable, 24 SATA Cable (models CTO All Models)	25R5635		
	Cable, USB Cable (models CTO All Models)	39Y9790		
	Cable, Easy LED Cable (models CTO All Models)	46D1395		
	Cable, Pure Power Cable (models CTO All Models)	46D1400		
	Cable, Backplane Configuration Cable (models CTO All Models)	46D1401		
	Cable, SAS 710mm Cable (models CTO All Models)	46M6498		
	Cable, Simple Swap SATA Signal/Power Cable (models CTO All Models)	49Y4514		
	Cable, CONTROL PANEL PWR/5 LED Cable (models CTO All Models)	41Y9080		
	SYSTEM FEET GBM (models CTO All Models)	26K7345		
	KEYLOCK, ALIKE (models CTO All Models)	26K7363		
	KEYLOCK, RANDOM (models CTO All Models)	26K7364		
	PWR/5 LED (models CTO All Models)	46C6707		
	Thermal Grease (models CTO All Models)	41Y9292		
	SAS Backplate (models CTO All Models)	43V7070		
	Fan Cage/Card (models CTO All Models)	46D1384		
	PLANAR TRAY (models CTO All Models)	46D1390		
	SATA Opt Power (models CTO All Models)	46D1393		
	Chassis (models CTO All Models)	46D1408		
	Hot Swap Fan Cage (models CTO All Models)	46D1410		
	Top/Side cover (models CTO All Models)	46D1411		
	ALCOHOL WIPE (models CTO All Models)	59P4739		
	Bottom Cover - TD200(x) Rack (models CTO All Models)	46C6704		
	Keyboard,. USEng103P (models CTO)	41A5100		
	Mouse, Opt.Wheel USB (models CTO)	41U3013		
	LSI MR10M SAS/SATA Controller (models CTO)	43W4341		
	3Gb SAS HBA Controller v2 (models CTO)	44E8701		

Table 14. Parts listing, Type 3719 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
	NetXtreme II 1000 Express G Ethernet Adapter- PCIe (models CTO)	39Y6070		
	NetXtreme II 1000 Express Dual Port Ethernet Adapter (models CTO)	42C7182		
	QLogic 10Gb CNA (models CTO)	42C1802		
	Hot Swap Fan Cage (models CTO All Models)	46D1410		
	Qlogic 10Gb SFP+ SR Optical Transce (models CTO)	42C1816		
	Service Label (models CTO All Models)	46U2443		
	LSI Raid battery (models CTO)		43W4301	

Table 15. Parts listing, Type 3821

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Side Cover (models CTO All Models)	46D1389		
2	Retention Module (models CTO All Models)	46D1397		
3	Air Duct (models CTO All Models)	46D1409		
4	CPU Heat sink (models CTO All Models)	46D1407		
5	Microprocessor, Xeon 2.66GHz/6.4GTS-8MB QC 95w (models CTO)			46D1264
5	Microprocessor, Xeon 2.4GHz/5.86GTS-8MB QC 80w (models CTO)			46D1266
5	Microprocessor, Xeon 2.26GHz/5.86GTS-8MB QC 80w (models CTO)			46D1267
5	Microprocessor, Xeon 2.0GHz/4.8GTS-4MB QC 80w (models CTO)			46D1271
5	Microprocessor, Xeon 1.86GHz/4.8GTS-4MB DC 80w (models CTO)			46D1272
7	Memory module, 1GB DDR3-1333 1Rx8 LP RDIMM (models CTO)	46U1991		
7	Memory module, 2GB DDR3-1333 2Rx8 LP RDIMM (models CTO)	46U1992		
7	Memory module, 2GB DDR3-1333 1Rx4 LP RDIMM (models CTO)	46U1993		
7	Memory module, 4GB DDR3-1333 2Rx4 LP RDIMM (models CTO)	46U1994		
8	System board, TD200x Planar (models CTO)			46D1406
9	VRM (models CTO All Models)	39Y7395		
10	Power Supply Cage (models CTO All Models)	39Y7389		
11	Power supply, 920W Power Supply (models CTO All Models)	39Y7387		
12	Power Supply Filler (models CTO All Models)	39Y7391		
14	USB/Lightpath bracket (models CTO All Models)	46D1385		

Table 15. Parts listing, Type 3821 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
15	Half-High SATA DVD-ROM (models CTO)		43W8466	
15	Half-High SATA Multi-Burner (models CTO)		43W8467	
16	TD200x Bezel FRU (models CTO All Models)	46U2424		
17	EMC Shield 4 x 3.5″ (models CTO All Models)	46D1402		
18	EMC Shield Kit (models CTO All Models)	46C6706		
19	Hard disk drive, 146GB 15K SFF 6Gbps HS HDD (models CTO All Models)	46U2117		
19	Hard disk drive, 146GB 10K SFF 6Gbps HS HDD (models CTO All Models)	46U2120		
19	Hard disk drive, 300GB 10K SFF 6Gbps HS HDD (models CTO All Models)	46U2124		
19	Hard disk drive, 73GB 15K SFF 6Gbps HS HDD (models CTO All Models)	46U2128		
20	2.5″ HDD CAGE (models CTO All Models)	46D1405		
21	Backplane (models CTO All Models)	49Y4462		
22	Fan, 120mm (models CTO All Models)	44E4563		
23	HS 120x38 Fan harness (models CTO All Models)	46D1394		
24	LSI MR-10i SAS/SATA Controller (models CTO)	43W4297		
25	LSI BR-10i SAS/SATA Controller (models CTO)	44E8690		
26	LSI -MR10is VAULT SAS/SATA Controller (models CTO)	44E8696		
	FOOT STATIONARY GBM (models CTO All Models)	13N2985		
	Cable, 24 SATA Cable (models CTO All Models)	25R5635		
	Cable, USB Cable (models CTO All Models)	39Y9790		
	Cable, Easy LED Cable (models CTO All Models)	46D1395		
	Cable, Pure Power Cable (models CTO All Models)	46D1400		
	Cable, Backplane Configuration Cable (models CTO All Models)	46D1401		
	Cable, SAS 710mm Cable (models CTO All Models)	46M6498		
	Cable, Simple Swap SATA Signal/Power Cable (models CTO All Models)	49Y4514		
	Cable, CONTROL PANEL PWR/5 LED Cable (models CTO All Models)	41Y9080		
	SYSTEM FEET GBM (models CTO All Models)	26K7345		
	KEYLOCK, ALIKE (models CTO All Models)	26K7363		
	KEYLOCK, RANDOM (models CTO All Models)	26K7364		
	PWR/5 LED (models CTO All Models)	46C6707		
	Thermal Grease (models CTO All Models)	41Y9292		
	SAS Backplate (models CTO All Models)	43V7070		
	Fan Cage/Card (models CTO All Models)	46D1384		
	PLANAR TRAY (models CTO All Models)	46D1390		
	SATA Opt Power (models CTO All Models)	46D1393		

Table 15. Parts listing, Type 3821 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
	Chassis (models CTO All Models)	46D1408		
	Hot Swap Fan Cage (models CTO All Models)	46D1410		
	Top/Side cover (models CTO All Models)	46D1411		
	ALCOHOL WIPE (models CTO All Models)	59P4739		
	Bottom Cover - TD200(x) Rack (models CTO All Models)	46C6704		
	Keyboard,. USEng103P (models CTO)	41A5100		
	Mouse, Opt.Wheel USB (models CTO)	41U3013		
	LSI MR10M SAS/SATA Controller (models CTO)	43W4341		
	3Gb SAS HBA Controller v2 (models CTO)	44E8701		
	NetXtreme II 1000 Express G Ethernet Adapter- PCIe (models CTO)	39Y6070		
	NetXtreme II 1000 Express Dual Port Ethernet Adapter (models CTO)	42C7182		
	QLogic 10Gb CNA (models CTO)	42C1802		
	Hot Swap Fan Cage (models CTO All Models)	46D1410		
	Qlogic 10Gb SFP+ SR Optical Transce (models CTO)	42C1816		
	Service Label (models CTO All Models)	46U2443		
	LSI Raid battery (models CTO)		43W4301	

Table 16. Parts listing, Type 3822

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Side Cover (models CTO All Models)	46D1389		
2	Retention Module (models CTO All Models)	46D1397		
3	Air Duct (models CTO All Models)	46D1409		
4	CPU Heat sink (models CTO All Models)	46D1407		
5	Microprocessor, Xeon 2.66GHz/6.4GTS-8MB QC 95w (models CTO)			46D1264
5	Microprocessor, Xeon 2.4GHz/5.86GTS-8MB QC 80w (models CTO)			46D1266
5	Microprocessor, Xeon 2.26GHz/5.86GTS-8MB QC 80w (models CTO)			46D1267
5	Microprocessor, Xeon 2.0GHz/4.8GTS-4MB QC 80w (models CTO)			46D1271
5	Microprocessor, Xeon 1.86GHz/4.8GTS-4MB DC 80w (models CTO)			46D1272
7	Memory module, 1GB DDR3-1333 1Rx8 LP RDIMM (models CTO)	46U1991		
7	Memory module, 2GB DDR3-1333 2Rx8 LP RDIMM (models CTO)	46U1992		

Table 16. Parts listing, Type 3822 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
7	Memory module, 2GB DDR3-1333 1Rx4 LP RDIMM (models CTO 41U 41S 41Y 41G 41M 41A 41Q 41T 41H 41R 41E 42U 42S 42Y 42G 42M 42A 42Q 42T 42H 42R 42E 43G 43M 43A 43Q 43T 43H 43R 43E)	46U1993		
7	Memory module, 4GB DDR3-1333 2Rx4 LP RDIMM (models CTO)	46U1994		
8	System board, TD200x Planar (models CTO 41U 41S 41Y 41G 41M 41A 41Q 41T 41H 41R 41E 42U 42S 42Y 42G 42M 42A 42Q 42T 42H 42R 42E 43U 43S 43Y 43G 43M 43A 43Q 43T 43H 43R 43E)			46D1406
9	VRM (models CTO All Models)	39Y7395		
10	Power Supply Cage (models CTO All Models)	39Y7389		
11	Power supply, 920W Power Supply (models CTO All Models)	39Y7387		
12	Power Supply Filler (models CTO All Models)	39Y7391		
14	USB/Lightpath bracket (models CTO All Models)	46D1385		
15	Half-High SATA DVD-ROM (models CTO)		43W8466	
15	Half-High SATA Multi-Burner (models CTO 41U 41S 41Y 41G 41M 41A 41Q 41T 41H 41R 41E 42U 42S 42Y 42G 42M 42A 42Q 42T 42H 42R 42E 43G 43M 43A 43Q 43T 43H 43R 43E)		43W8467	
16	TD200x Bezel FRU (models CTO All Models)	46U2424		
17	EMC Shield 4 x 3.5″ (models CTO All Models)	46D1402		
18	EMC Shield Kit (models CTO All Models)	46C6706		
19	Hard disk drive, 146GB 15K SFF 6Gbps HS HDD (models CTO All Models)	46U2117		
19	Hard disk drive, 146GB 10K SFF 6Gbps HS HDD (models CTO All Models)	46U2120		
19	Hard disk drive, 300GB 10K SFF 6Gbps HS HDD (models CTO All Models)	46U2124		
19	Hard disk drive, 73GB 15K SFF 6Gbps HS HDD (models CTO All Models)	46U2128		
20	2.5″ HDD CAGE (models CTO All Models)	46D1405		
21	Backplane (models CTO All Models)	49Y4462		
22	Fan, 120mm (models CTO All Models)	44E4563		
23	HS 120x38 Fan harness (models CTO All Models)	46D1394		
24	LSI MR-10i SAS/SATA Controller (models CTO 41U 41S 41Y 41G 41M 41A 41Q 41T 41H 41R 41E 42U 42S 42Y 42G 42M 42A 42Q 42T 42H 42R 42E 43G 43M 43A 43Q 43T 43H 43R 43E)	43W4297		
25	LSI BR-10i SAS/SATA Controller (models CTO 45U 45S 45Y 45G 45M 45A 45Q 45T 45H 45R 45E)	44E8690		
26	LSI -MR10is VAULT SAS/SATA Controller (models CTO)	44E8696		
	FOOT STATIONARY GBM (models CTO All Models)	13N2985		

Table 16. Parts listing, Type 3822 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
	Cable, 24 SATA Cable (models CTO All Models)	25R5635		
	Cable, USB Cable (models CTO All Models)	39Y9790		
	Cable, Easy LED Cable (models CTO All Models)	46D1395		
	Cable, Pure Power Cable (models CTO All Models)	46D1400		
	Cable, Backplane Configuration Cable (models CTO All Models)	46D1401		
	Cable, SAS 710mm Cable (models CTO All Models)	46M6498		
	Cable, Simple Swap SATA Signal/Power Cable (models CTO All Models)	49Y4514		
	Cable, CONTROL PANEL PWR/5 LED Cable (models CTO All Models)	41Y9080		
	SYSTEM FEET GBM (models CTO All Models)	26K7345		
	KEYLOCK, ALIKE (models CTO All Models)	26K7363		
	KEYLOCK, RANDOM (models CTO All Models)	26K7364		
	PWR/5 LED (models CTO All Models)	46C6707		
	Thermal Grease (models CTO All Models)	41Y9292		
	SAS Backplate (models CTO All Models)	43V7070		
	Fan Cage/Card (models CTO All Models)	46D1384		
	PLANAR TRAY (models CTO All Models)	46D1390		
	SATA Opt Power (models CTO All Models)	46D1393		
	Chassis (models CTO All Models)	46D1408		
	Hot Swap Fan Cage (models CTO All Models)	46D1410		
	Top/Side cover (models CTO All Models)	46D1411		
	ALCOHOL WIPE (models CTO All Models)	59P4739		
	Bottom Cover - TD200(x) Rack (models CTO All Models)	46C6704		
	Keyboard,. USEng103P (models CTO)	41A5100		
	Mouse, Opt.Wheel USB (models CTO)	41U3013		
	LSI MR10M SAS/SATA Controller (models CTO)	43W4341		
	3Gb SAS HBA Controller v2 (models CTO)	44E8701		
	NetXtreme II 1000 Express G Ethernet Adapter- PCIe (models CTO)	39Y6070		
	NetXtreme II 1000 Express Dual Port Ethernet Adapter (models CTO)	42C7182		
	QLogic 10Gb CNA (models CTO)	42C1802		
	Hot Swap Fan Cage (models CTO All Models)	46D1410		
	Qlogic 10Gb SFP+ SR Optical Transce (models CTO)	42C1816		
	Service Label (models CTO All Models)	46U2443		
	LSI Raid battery (models CTO)		43W4301	

Table 17. Parts listing, Type 3823

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Side Cover (models CTO All Models)	46D1389		
2	Retention Module (models CTO All Models)	46D1397		
3	Air Duct (models CTO All Models)	46D1409		
4	CPU Heat sink (models CTO All Models)	46D1407		
5	Microprocessor, Xeon 2.66GHz/6.4GTS-8MB QC 95w (models CTO)			46D1264
5	Microprocessor, Xeon 2.4GHz/5.86GTS-8MB QC 80w (models CTO)			46D1266
5	Microprocessor, Xeon 2.26GHz/5.86GTS-8MB QC 80w (models CTO)			46D1267
5	Microprocessor, Xeon 2.0GHz/4.8GTS-4MB QC 80w (models CTO)			46D1271
5	Microprocessor, Xeon 1.86GHz/4.8GTS-4MB DC 80w (models CTO)			46D1272
7	Memory module, 1GB DDR3-1333 1Rx8 LP RDIMM (models CTO)	46U1991		
7	Memory module, 2GB DDR3-1333 2Rx8 LP RDIMM (models CTO)	46U1992		
7	Memory module, 2GB DDR3-1333 1Rx4 LP RDIMM (models CTO 46U 46S 46Y 46G 46M 46A 46Q 46T 46H 46R 46E)	46U1993		
7	Memory module, 4GB DDR3-1333 2Rx4 LP RDIMM (models CTO)	46U1994		
8	System board, TD200x Planar (models CTO 46U 46S 46Y 46G 46M 46A 46Q 46T 46H 46R 46E)			46D1406
9	VRM (models CTO All Models)	39Y7395		
10	Power Supply Cage (models CTO All Models)	39Y7389		
11	Power supply, 920W Power Supply (models CTO All Models)	39Y7387		
12	Power Supply Filler (models CTO All Models)	39Y7391		
14	USB/Lightpath bracket (models CTO All Models)	46D1385		
15	Half-High SATA DVD-ROM (models CTO)		43W8466	
15	Half-High SATA Multi-Burner (models CTO 46U 46S 46Y 46G 46M 46A 46Q 46T 46H 46R 46E)		43W8467	
16	TD200x Bezel FRU (models CTO All Models)	46U2424		
17	EMC Shield 4 x 3.5″ (models CTO All Models)	46D1402		
18	EMC Shield Kit (models CTO All Models)	46C6706		
19	Hard disk drive, 146GB 15K SFF 6Gbps HS HDD (models CTO All Models)	46U2117		
19	Hard disk drive, 146GB 10K SFF 6Gbps HS HDD (models CTO All Models)	46U2120		
19	Hard disk drive, 300GB 10K SFF 6Gbps HS HDD (models CTO All Models)	46U2124		

Table 17. Parts listing, Type 3823 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
19	Hard disk drive, 73GB 15K SFF 6Gbps HS HDD (models CTO All Models)	46U2128		
20	2.5″ HDD CAGE (models CTO All Models)	46D1405		
21	Backplane (models CTO All Models)	49Y4462		
22	Fan, 120mm (models CTO All Models)	44E4563		
23	HS 120x38 Fan harness (models CTO All Models)	46D1394		
24	LSI MR-10i SAS/SATA Controller (models CTO 41U 41S 41Y 41G 41M 41A 41Q 41T 41H 41R 41E 42U 42S 42Y 42G 42M 42A 42Q 42T 42H 42R 42E 43G 43M 43A 43Q 43T 43H 43R 43E)	43W4297		
25	LSI BR-10i SAS/SATA Controller (models CTO 46U 46S 46Y 46G 46M 46A 46Q 46T 46H 46R 46E)	44E8690		
26	LSI -MR10is VAULT SAS/SATA Controller (models CTO)	44E8696		
	FOOT STATIONARY GBM (models CTO All Models)	13N2985		
	Cable, 24 SATA Cable (models CTO All Models)	25R5635		
	Cable, USB Cable (models CTO All Models)	39Y9790		
	Cable, Easy LED Cable (models CTO All Models)	46D1395		
	Cable, Pure Power Cable (models CTO All Models)	46D1400		
	Cable, Backplane Configuration Cable (models CTO All Models)	46D1401		
	Cable, SAS 710mm Cable (models CTO All Models)	46M6498		
	Cable, Simple Swap SATA Signal/Power Cable (models CTO All Models)	49Y4514		
	Cable, CONTROL PANEL PWR/5 LED Cable (models CTO All Models)	41Y9080		
	SYSTEM FEET GBM (models CTO All Models)	26K7345		
	KEYLOCK, ALIKE (models CTO All Models)	26K7363		
	KEYLOCK, RANDOM (models CTO All Models)	26K7364		
	PWR/5 LED (models CTO All Models)	46C6707		
	Thermal Grease (models CTO All Models)	41Y9292		
	SAS Backplate (models CTO All Models)	43V7070		
	Fan Cage/Card (models CTO All Models)	46D1384		
	PLANAR TRAY (models CTO All Models)	46D1390		
	SATA Opt Power (models CTO All Models)	46D1393		
	Chassis (models CTO All Models)	46D1408		
	Hot Swap Fan Cage (models CTO All Models)	46D1410		
	Top/Side cover (models CTO All Models)	46D1411		
	ALCOHOL WIPE (models CTO All Models)	59P4739		
	Bottom Cover - TD200(x) Rack (models CTO All Models)	46C6704		
	Keyboard,. USEng103P (models CTO)	41A5100		
	Mouse, Opt.Wheel USB (models CTO)	41U3013		

Table 17. Parts listing, Type 3823 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
	LSI MR10M SAS/SATA Controller (models CTO)	43W4341		
	3Gb SAS HBA Controller v2 (models CTO)	44E8701		
	NetXtreme II 1000 Express G Ethernet Adapter- PCIe (models CTO)	39Y6070		
	NetXtreme II 1000 Express Dual Port Ethernet Adapter (models CTO)	42C7182		
	QLogic 10Gb CNA (models CTO)	42C1802		
	Hot Swap Fan Cage (models CTO All Models)	46D1410		
	Qlogic 10Gb SFP+ SR Optical Transce (models CTO)	42C1816		
	Service Label (models CTO All Models)	46U2443		
	LSI Raid battery (models CTO)		43W4301	

Power cords

For your safety, IBM® 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 18. Power cords, Type 3719

Lenovo Power cord part number	Used in these countries and regions
39M5247	Taiwan 2.8M (models CTO)
39M5102	ANZ 2.8M (models CTO 45M)
39M5123	Europe 2.8M (models CTO)
39M5130	Denmark 2.8M (models CTO 45G)

Table 18. Power cords, Type 3719 (continued)

Lenovo Power cord part number	Used in these countries and regions
39M5144	South Africa 2.8M (models CTO 45G 45M 45A)
39M5151	UK 2.8M (models CTO)
39M5158	Switzerland 2.8M (models CTO 45S 45G)
39M5165	Italy 2.8M (models CTO 45Y 45G)
39M5172	Israel 2.8M (models CTO 45G)
39M5081	US/Canada 2.8M (models CTO 45U 45S 45A 45T 45H 45V)
39M5219	Korea 2.8M (models CTO 45R)
39M5199	Japan 2.8M (models CTO 45E)
39M5068	Argentina 2.8M (models CTO 45Y)
39M5226	India 2.8M (models CTO 45Q)
39M5179	Europe 2.8M (models CTO)
39M5233	Brazil 2.8M (models CTO)

Table 19. Power cords, Type 3821

Lenovo Power cord part number	Used in these countries and regions
39M5247	Taiwan 2.8M (models CTO)
39M5102	ANZ 2.8M (models CTO)
39M5123	Europe 2.8M (models CTO)
39M5130	Denmark 2.8M (models CTO)
39M5144	S. Africa 2.8M (models CTO)
39M5151	UK 2.8M (models CTO)
39M5158	Switzerland 2.8M (models CTO)
39M5165	Italy 2.8M (models CTO)
39M5172	Israel 2.8M (models CTO)
39M5081	US/Canada 2.8M (models CTO)
39M5219	Korea 2.8M (models CTO)
39M5199	Japan 2.8M (models CTO)
39M5068	Argentina 2.8M (models CTO)
39M5226	India 2.8M (models CTO)
39M5179	Europe 2.8M (models CTO)
39M5233	Brazil 2.8M (models CTO)

Table 20. Power cords, Type 3822

Lenovo Power cord part number	Used in these countries and regions
39M5247	Taiwan 2.8M (models CTO)
39M5102	ANZ 2.8M (models CTO 41M 42M 43M)
39M5123	Europe 2.8M (models CTO 41A 42A 43A)
39M5130	Denmark 2.8M (models CTO 41G 42G 43G)

Table 20. Power cords, Type 3822 (continued)

Lenovo Power cord part number	Used in these countries and regions
39M5144	S. Africa 2.8M (models CTO 41G 41M 41A 42G 42M 42A 43G 43M 43A 44G)
39M5151	UK 2.8M (models CTO 41G 41A 42G 42A 43G 43A)
39M5158	Switzerland 2.8M (models CTO 41Y 41G 42Y 42G 43Y 43G)
39M5165	Italy 2.8M (models CTO 41S 41G 42S 42G 43S 43G)
39M5172	Israel 2.8M (models CTO 41G 42G 43G)
39M5081	US/Canada 2.8M (models CTO 41U 41A 41T 42U 42A 42T 43U 43A 43T)
39M5219	Korea 2.8M (models CTO)
39M5199	Japan 2.8M (models CTO)
39M5068	Argentina 2.8M (models CTO 41Y 42Y 43Y)
39M5226	India 2.8M (models CTO 41Q 42Q 43Q)
39M5179	Europe 2.8M (models CTO)
39M5233	Brazil 2.8M (models CTO)

Table 21. Power cords, Type 3823

Lenovo Power cord part number	Used in these countries and regions
39M5247	Taiwan 2.8M (models CTO)
39M5102	ANZ 2.8M (models CTO 46M)
39M5123	Europe 2.8M (models CTO)
39M5130	Denmark 2.8M (models CTO 46G)
39M5144	S. Africa 2.8M (models CTO 46G 46M 46A)
39M5151	UK 2.8M (models CTO)
39M5158	Switzerland 2.8M (models CTO 46S 46G)
39M5165	Italy 2.8M (models CTO 46Y 46G)
39M5172	Israel 2.8M (models CTO 46G)
39M5081	US/Canada 2.8M (models CTO 46U 46S 46A 46T 46H 46V)
39M5219	Korea 2.8M (models CTO 46R)
39M5199	Japan 2.8M (models CTO 46E)
39M5068	Argentina 2.8M (models CTO 46Y)
39M5226	India 2.8M (models CTO 46Q)
39M5179	Europe 2.8M (models CTO)
39M5233	Brazil 2.8M (models CTO)

Chapter 9. Configuring the server

The following configuration programs come with the server:

- **Setup Utility**

  The Setup Utility (formerly called the Configuration/Setup Utility program) is part of the server firmware. Use it to change the startup-device sequence, set the date and time, and set passwords. For information about using this program, see "Using the Setup Utility" on page 252.

- **Boot Menu program**

  The Boot Menu 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.

- **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. For information about using the IMM, see "Using the Integrated Management Module" on page 268.

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

  The remote presence and blue-screen capture feature are integrated into the integrated management module (IMM). These features allow you to access the network remotely and to mount or unmount drives or images on the client system. For more information about how to enable the remote presence function, see "Using the remote presence capability and blue-screen capture" on page 269.

- **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 "Advanced Settings Utility program" on page 270.

- **Ethernet controller configuration**

  For information about configuring the Ethernet controller, see "Configuring the Gigabit Ethernet controller" on page 266.

- **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 the LSI Configuration Utility program" on page 259.

  The following table lists the different server configurations and the applications that are available for configuring and managing RAID arrays.

Table 22. Server configurations and applications for configuring and managing RAID arrays

Server configuration	RAID array configuration (before operating system is installed)	RAID array management (after operating system is installed)
ServeRAID-BR10i SAS/SATA Controller (LSI 1068) installed	LSI Utility (invoked from the Setup Utility)	

Table 22. Server configurations and applications for configuring and managing RAID arrays (continued)

Server configuration	RAID array configuration (before operating system is installed)	RAID array management (after operating system is installed)
ServeRAID-MR10i SAS/SATA Controller (LSI 1078) installed	MegaRAID BIOS Configuration Utility (press C to start)	

Using the Setup Utility

Use the Setup Utility, formerly called the Configuration/Setup Utility program, to perform the following tasks:

- View configuration information
- View and change assignments for devices and I/O ports
- Set the date and time
- Set the startup characteristics of the server and the order of startup devices
- Set and change settings for advanced hardware features
- View, set, and change settings for power-management features
- View and clear error logs
- Resolve configuration conflicts

Starting the Setup Utility

To start the Setup Utility, do the following:

1. Turn on the server.

   Note: Approximately 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 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 the settings to view or change.

Setup Utility menu choices

The following choices are on the Setup Utility main menu. 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 choices 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.

- **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. To configure memory mirroring, select **System Settings → Memory**, and then select **Memory Channel Mode → Mirroring**.

– **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 optical drive channels, and PCI slots. 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 19h**

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 the UEFI to interact with PCI mass storage devices that are not 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. **Enabled** 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 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.

- **Reset IMM to Defaults**

  Select this choice to view or reset IMM to the default settings.

– **Adapters and UEFI Drivers**

  Select this choice to view information about the adapters and drivers in the server that are compliant with UEFI 1.10 and UEFI 2.0.

- **Network**

  Select this choice to view or configure the network options, such as the iSCSI, PXE, and network devices. There might be additional configuration choices for optional network devices that are compliant with UEFI 2.1 and later.

- **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 boot to devices, including the startup sequence.

  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 media in a CD-RW/DVD drive, then checks the hard disk drive, and then the 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. See"Running the diagnostic programs" on page 90 for instructions for running the diagnostic programs.

  Important: If the system-error LED on the front of the server is lit but there are no other error indications, clear the system-event log. Also, after you complete a repair or correct an error, clear the 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 error messages in the POST event log.

  – **System Event Log**

    Select this choice to view the error messages in the system-event log.

  – **Clear System Event Log**

    Select this choice to clear the system-event log.

- **User Security**

  Select this choice to set, change, or clear passwords. See "Passwords" for more information.

  This choice is on the full and limited Setup Utility menu.

  – **Set Power-on Password**

    Select this choice to set or change a power-on password. For more information, see "Power-on password" on page 256.

  – **Clear Power-on Password**

    Select this choice to clear a power-on password. For more information, see "Power-on password" on page 256.

  – **Set 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 257.

  – **Clear Administrator Password**

    Select this choice to clear an administrator password. For more information, see "Administrator password" on page 257.

- **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 **User Security** menu choice, you can set, change, and delete a power-on password and an administrator password. The **User Security** choice is on the full Setup Utility menu only.

If you set only a power-on password, you must type the power-on password to complete the system startup and to have access to the full Setup Utility menu.

An administrator password is intended to be used by a system administrator; it limits access to the full 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 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 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 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.

When 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. Start the Setup Utility and reset the power-on password.
- Remove the battery from the server and then reinstall it. See "Removing the battery" on page 172 for instructions for removing the battery.

- Change the position of the power-on password switch (enable switch 2 of the system board switch block (SW6)) to bypass the power-on password check (see the following illustration).
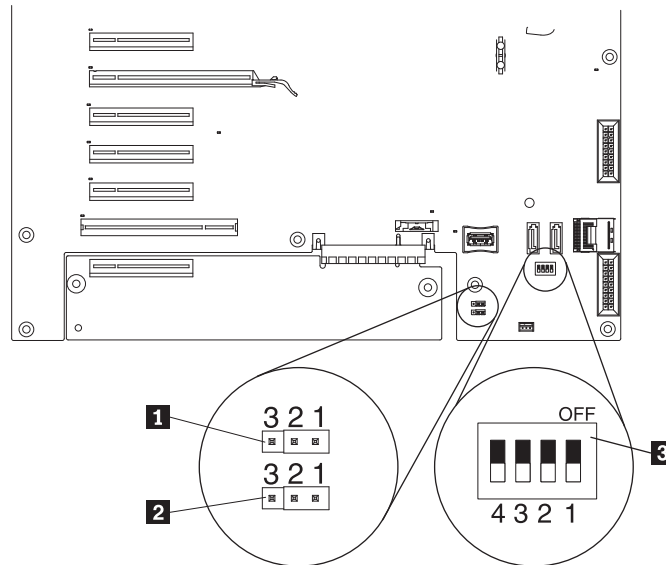
1	UEFI boot recovery jumper (JP6)
2	Clear CMOS jumper (JP1)
3	SW6 switch block

Attention: Before you change any switch settings or moving any jumpers, turn off the server; then, disconnect all power cords and external cables. See the safety information that begins on page 5. Do not change settings or move jumpers on any system-board switch or jumper blocks that are not shown in this document.

While the server is turned off, move switch 2 of the switch block (SW6) to the On position to enable the power-on password override. You can then start the Setup Utility and reset the power-on password. You do not have to return the switch to the previous position.

The power-on password override jumper does not affect the administrator password.

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, 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.

Attention: If you set an administrator password and then forget it, there is no way to change, override, or remove it. You must replace the system board.

Using the Boot Selection Menu program

The Boot Selection Menu is used to temporarily redefine the first startup device without changing boot options or settings in the Setup Utility.

To use the Boot Selection Menu program, do the following:

1. Turn off the server.
2. Restart the server.
3. Press F12 (**Select Boot Device**). 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 next time the server starts, it returns to the startup sequence that is set in the Setup Utility.

RAID controllers

The following table lists the various utilities available to configure RAID controllers before an operating system is installed.

Table 23. RAID utilities

RAID configuration utility	Description	Location	Where to find more information
EasyStartup RAID configuration utility	• For use with all factory-supported RAID controllers • Automatically detects hardware and lists all supported RAID configurations • Configures one disk array per controller using all drives currently attached to the controller • Created a RAID response file that can be used to configure RAID controllers on similarly configured Lenovo servers.	EasyStartup DVD	"Using the *ThinkServer EasyStartup* DVD" on page 263
MegaRAID BIOS Configuration Utility (WebBIOS)	For: • ServeRAID-MR10i controller • ServeRAID-MR10is controller • ServeRAID-MR10m 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 261

Table 23. RAID utilities (continued)

RAID configuration utility	Description	Location	Where to find more information
LSI Logic MPT Setup Utility	For: • ServeRAID-BR10i controller • ServeRAID-BR10ie controller	In system firmware. To access: • Use UEFI Setup Utility. • Press Ctrl + C at the LSI prompt during startup.	"Using the LSI Configuration Utility program"

Using the 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 adapter, follow the instructions in the documentation that comes with the adapter to view or change settings for attached devices.

In addition, you can download an LSI command-line configuration program from http://www.lenovo.com/support.

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. 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. 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, do the following:

1. Turn on the server.

   Note: Approximately 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 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 **System Settings → Adapters and UEFI drivers**.

4. Select **Please refresh this page first** and press Enter.

5. Select the device driver that is applicable for the SAS controller in the server. For example, **LSI Logic Fusion MPT SAS Driver**.

6. To perform storage-management tasks, see the SAS controller documentation.

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, do the following:

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, do the following:

1. From the list of adapters, select the controller (channel) for which you want to create an array.

2. Select **RAID Properties**.

3. Select the type of array that you want to create.

4. In the RAID Disk column, use the Spacebar or Minus (-) key to select **[Yes]** (select) or **[No]** (deselect) to select or deselect a drive from a RAID disk.

5. Continue to select drives, using the Spacebar or Minus (-) key, until you have selected all the drives for your array.

6. Press C to create the disk array.

7. Select **Save changes then exit this menu** to create the array.

8. Exit the Setup Utility.

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 an adapter 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 adapter 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 created a non-redundant RAID 0 configuration.

5. Click **Next** to continue.

Viewing and changing adapter properties

You can view information for one LSI SAS adapter 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 *ThinkServer EasyStartup* DVD

The *ThinkServer EasyStartup* DVD simplifies the process of configuring your RAID controller 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 a *ThinkServer 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 reuseable response file that can be used with similarly configured Lenovo servers to make future installations even faster.

Before you use the *ThinkServer 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 *ThinkServer EasyStartup* DVD and restart the server.
2. Advance to the Home screen.
3. Click **Compatability notes**. The compatability notes provide detailed information about the 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.

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 select one RAID level for each installed controller, and the program automatically will use the discs currently attached to the controller to support that RAID level.

If you have a need to assign a primary and secondary RAID on the same controller and assign some of your discs to the primary RAID and some to the secondary RAID, you can use either of the following methods:

- **Manually remove the drives that you do not want included in your array before you configure your RAID controller through the EasyStartup program.**

  This method enables you to use the EasyStartup program to configure your RAID controller and install the operating system. After the operating system is installed, reinstall the drives and use the RAID configuration utility provided in the firmware to configure the secondary RAID.

- **Configure the controller using the RAID configuration utility provided in the firmware before you use the EasyStartup program.**

  For details, see "Starting the LSI Configuration Utility program" on page 260. After your RAID controller is configured, start the EasyStartup program and install your operating system.

EasyStartup overview

The EasyStartup program requires a supported Lenovo server with an enabled, startable (bootable) DVD drive. In addition to the *ThinkServer 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 one or more RAID controllers and optionally saves the settings in a RAID response file
- 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 installations 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 *ThinkServer 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, French, German, Spanish, Japanese, Korean, Turkish, Italian, and Dutch.

You will then see one or more reminders about 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 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 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.

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 Server operating system installation. Each task must be completed 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 install 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, complete the following steps 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 TD200x**, 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.

Enabling the Broadcom Gigabit Ethernet Utility program

The Broadcom 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 Broadcom Gigabit Ethernet Utility program from the Setup Utility.

To enable the Broadcom Gigabit Ethernet Utility program, do the following:

1. From the Setup Utility main menu, select **Devices and I/O Ports** and press Enter.
2. Select **Enable/Disable onboard devices** and press Enter.
3. Select **Ethernet** and press Enter.
4. Select **Enable** and press Enter.
5. Exit to the main menu and select **Save Settings**.

Configuring the Gigabit Ethernet controller

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 *Broadcom NetXtreme II Gigabit Ethernet Software* CD that comes with the server.

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 ROM 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 SAS controller.
- SAS firmware is stored in ROM on the integrated RAID controller on the system board.
- Major components contain vital product data (VPD) code. You can select to update the VPD code during the UEFI code update procedure.

The following items are downloadable at http://www.lenovo.com/support:

- Diagnostic 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 and adapter firmware and updating hard disk drive (HDD) firmware.

To update your system, first go 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 TD200x**, 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 to CD or DVD.
7. Insert the media in the server CD/DVD drive, and boot the server to that drive.
8. After DOS starts, the master application starts automatically. Hardware detection runs, and a list of applicable firmware updates is displayed.
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 server firmware that you update only during the process of updating 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 UEFI boot recovery J29 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 UEFI boot recovery J29 jumper back to the primary position (pins 1 and 2).

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 IMM Premium is installed) remote presence function in a single chip.

The IMM supports the following basic system management features:

- Environmental monitor with fan speed control for temperature, voltages, fan failure, power supply failure, and power backplane failure.
- LED indicators to report errors that occur with fans, power supplies, microprocessor, hard disk drives, and system errors (EasyLED Diagnostics LEDs)
- DIMM error assistance. The Unified Extensible Firmware Interface (UEFI) will disable a failing DIMM that is detected during POST IMM will light the associated system-error LED and the failing DIMM error LED.
- System-event log (SEL)
- ROM-based IMM firmware flash (IMM firmware updates)
- Auto Boot Failure Recovery (ABR)
- A virtual media key which enables full system management support (remote video, remote keyboard/mouse, and remote storage)
- Automatic microprocessor disable on failure restart in a two-microprocessor configuration when one microprocessor signals an internal error
- NMI detection and reporting
- SMI handling
- Automatic Server Restart (ASR) when (1) POST is not complete or (2) the OS hangs and the OS Watchdog Timer times-out. The IMM might be configured to watch for OS Watchdog Timer and reboot the system after timeout, if the ASR feature is enabled. Otherwise, IMM allows the administrator to generate an NMI by pressing an NMI button on the system board for OS memory dump. ASR is supported by IPMI.
- Intelligent Platform Management Interface (IPMI) Specification V 2.0 and Intelligent Platform Management Bus (IPMB) support
- Invalid system configuration (CNFG) LED support
- Serial redirect
- Serial Over LAN (SOL)
- Query power supply input power
- PECI 2 support

- Power/Reset control (power-on, hard and soft shut down, 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:

- **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.

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). These integrated functions allow you to remotely mount or unmount drives or images on the client system as well as accessing the Web interface.

The remote presence feature provides the following functions:

- Remotely viewing video with graphics resolutions up to 1600 x 1200 at 85 Hz, regardless of the system state
- Remotely accessing the server, using the keyboard and mouse from a remote client
- Mapping the CD or 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.

Obtaining the IP address for the Web interface access

To access the Web interface and use the remote presence feature, you need the IP address for the IMM. You can obtain the IMM IP address through the Setup Utility. To locate the IP address, do the following:

1. Turn on the server.

Note: Approximately 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 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, do the following:

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.

    Notes:

    a. If you are logging in to the IMM for the first time after installation, the IMM defaults to DHCP. If a DHCP host is not available, the IMM uses the default static IP address 192.168.70.125.

    b. You can obtain the DHCP-assigned IP address or the static IP address from the server UEFI or from your network administrator.

    The Login page is displayed.

2. 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. A welcome page opens in the browser.

    Note: The IMM is set initially with a user name of USERID and password of PASSW0RD (passw0rd with a zero, not the letter O). You have read/write access. For enhanced security, change this default password during the initial configuration.

3. On the Welcome page, type a timeout value (in minutes) in the field that is provided. The IMM will log you off 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 browser opens the System Status page, which displays the server status and the server health summary.

Advanced Settings Utility program

The Advanced Settings Utility (ASU) program is an alternative to the Setup Utility 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 server to access the Setup Utility.

You can also 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 2003 or 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 2003 or Microsoft Windows Server 2008 32-bit with the latest Service Pack.
2. Install the following Windows Components: See "Installing Windows 2003 components on the Core Server" on page 272 or "Installing Windows 2008 32-bit components" on page 272.
3. Use Windows Update to install all available critical updates.
4. (For Windows Server 2003 only) Download Microsoft .NET Framework 2.0 Service Pack 1 or newer from the following Web site: http://www.microsoft.com/downloads/details.aspx?FamilyID=0856eacb-4362-4b0d-8edd-aab15c5e04f5&DisplayLang=en. Install the software using the default settings.

5. (For both Windows Server 2003 and 2008) 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.

6. Use Windows Update to install all available critical updates.

7. Launch the EasyManage installation.

8. 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.

9. 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 2003 components on the Core Server

To install IIS, ASP.Net, and SNMP on the Core Server, do the following procedure:

1. In the Windows Control Panel, double-click **Add or Remove Programs**.

2. In the toolbar on the left, click **Add/Remove Windows Components** to launch the Windows Components Wizard.

3. Select from the Components list:
   - When installing IIS and ASP.NET, click **Application Server**; then, click **Details**.
   - When installing SNMP, click **Management and Monitoring Tools**; then, click **Details**.

4. Select the component that you want to install:
   - When installing IIS, select **Internet Information Services (IIS)**; then, click **OK**.
   - When installing ASP.NET, select **ASP.NET**; then, click **OK**.
   - When installing SNMP, select **Simple Network Management Protocol**; then, click **OK**.

5. Click **Next** to continue the wizard.

6. If prompted, insert the original Windows operating system CD. If the autorun launches when you insert the CD, close it. The Windows Components Wizard will automatically detect and install the necessary files.

7. Click **Finish**.

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 follow are checked:
   - 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 from the \Program Files\LANDesk\ManagementSuite folder.

Appendix A. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about Lenovo products, you will find a wide variety of sources available from Lenovo to assist you. This section contains information about where to go for additional information about Lenovo and Lenovo products, what to do if you experience a problem with your system, and whom to call for service, if it is necessary.

Before you call

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

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in Chapter 5, "Diagnostics," on page 27.
- Go to the at http://www.lenovo.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

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

Getting help and information from the World Wide Web

On the World Wide Web, the Lenovo Web site has up-to-date information about Lenovo systems, optional devices, services, and support. For general information about Lenovo products or to purchase Lenovo products, go to http://www.lenovo.com. For support on Lenovo products, go to http://www.lenovo.com/support.

Calling for service

During the warranty period, you can get help and information by telephone through the Customer Support Center.

These services are available during the warranty period:

- **Problem determination -** Trained personnel are available to assist you with determining a hardware problem and deciding what action is necessary to fix the problem.
- **Hardware repair -** If the problem is caused by hardware under warranty, trained service personnel are available to provide the applicable level of service.
- **Engineering Change management -** There might be changes that are required after a product has been sold. Lenovo or your reseller will make selected Engineering Changes (ECs) available that apply to your hardware.

These items are not covered by the warranty:

- Replacement or use of parts not manufactured for or by Lenovo or non-warranted Lenovo parts
- Identification of software problem sources
- Configuration of BIOS as part of an installation or upgrade
- Changes, modifications, or upgrades to device drivers
- Installation and maintenance of network operating systems (NOS)
- Installation and maintenance of application programs

Refer to the safety and warranty information that is provided with your computer for a complete explanation of warranty terms. You must retain your proof of purchase to obtain warranty service.

For a list of service and support phone numbers for your country or region, go to http://www.lenovo.com/support and click **Support phone list** or refer to the safety and warranty information provided with your computer.

Note: Phone numbers are subject to change without notice. If the number for your country or region is not provided, contact your Lenovo reseller or Lenovo marketing representative.

If possible, be at your computer when you call. Have the following information available:

- Machine type and model
- Serial numbers of our hardware products
- Description of the problem
- Exact working of any error messages
- Hardware and software configuration information

Using other services

If you travel with a Lenovo notebook computer or relocate your computer to a country where your desktop, notebook, or server machine type is sold, your computer might be eligible for International Warranty Service, which automatically entitles you to obtain warranty service throughout the warranty period. Service will be performed by service providers authorized to perform warranty service.

Service methods and procedures vary by country, and some services might not be available in all countries. International Warranty Service is delivered through the method of service (such as depot, carry-in, or on-site service) that is provided in the servicing country. Service centers in certain countries might not be able to service all models of a particular machine type. In some countries, fees and restrictions might apply at the time of service.

To determine whether your computer is eligible for International Warranty Service and to view a list of the countries where service is available, go to http://www.lenovo.com/support, click **Warranty**, and follow the instructions on the screen.

For technical assistance with the installation of, or questions related to, Service Packs for your preinstalled Microsoft® Windows product, refer to the Microsoft Product Support Services Web site at http://www.support.microsoft.com/directory/, or you can contact the Customer Support Center. Some fees might apply.

Purchasing additional services

During and after the warranty period, you can purchase additional services, such as support for hardware, operating systems, and application programs; network setup and configuration; upgraded or extended hardware repair services; and custom installations. Service availability and service name might vary by country or region. For more information about these services, go to the Lenovo Web site at http://www.lenovo.com/.

Lenovo product service

台灣 Lenovo 產品服務資訊如下：

荷蘭商聯想股份有限公司台灣分公司

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服務電話：0800-000-700

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Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been

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Important notes

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

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

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 bytes.

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

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

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

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

Product recycling and disposal

This unit must be recycled or discarded according to applicable local and national regulations. Lenovo encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. Lenovo offers a variety of programs and services to assist equipment owners in recycling their IT products. Information on Lenovo product recycling offerings can be found on Lenovo's Internet site at http://www.lenovo.com/lenovo/environment/recycling.

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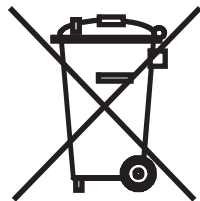
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This appliance is labeled in accordance with European Directive 2002/96/EC concerning waste electrical and electronic equipment (WEEE). The Directive determines the framework for the return and recycling of used appliances as applicable throughout the European Union. This label is applied to various products to indicate that the product is not to be thrown away, but rather reclaimed upon end of life per this Directive.

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。

Remarque : Cette marque s'applique uniquement aux pays de l'Union Européenne et à la Norvège.

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.

In accordance with the European WEEE Directive, electrical and electronic equipment (EEE) is to be collected separately and to be reused, recycled, or recovered at end of life. Users of EEE with the WEEE marking per Annex IV of the WEEE Directive, as shown above, must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and recovery of WEEE. Customer participation is important to minimize any potential effects of EEE on the environment and human health due to the potential presence of hazardous substances in EEE. For proper collection and treatment, contact your local Lenovo representative.

Compliance with Republic of Turkey Directive on the Restriction of Hazardous Substances

Meets 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.

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

企業のお客様が、本機が使用済みとなり廃棄される場合は、廃棄物処理法の規定により、産業廃棄物として、地域を管轄する県知事あるいは、政令市長の許可を持った産業廃棄物処理業者に適正処理を委託する必要があります。また、弊社では資源有効利用促進法に基づき使用済みパソコンの回収および再利用・再資源化を行う「PC 回収リサイクル・サービス」を提供しています。詳細については、以下のURL にアクセスしてください。
http://www.ibm.com/jp/pc/service/recycle/pcrecycle

また、同法により、家庭で使用済みとなったパソコンのメーカー等による回収再資源化が2003 年10 月1 日よりスタートしました。詳細については、以下のURL にアクセスしてください。
http://www.ibm.com/jp/pc/service/recycle/personal

重金属を含む内部部品の廃棄処理について

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。

リチウム電池交換後の廃棄処理について

本機器には、ボタン型のリチウム電池がシステム・ボード上に取り付けられてい
ます。この電池を交換する場合には、お買い上げいただいた販売店にお問い合わ
せいただくか、弊社の修理サービスをご利用ください。万一お客様が交換された
場合の古い電池を廃棄する際は、ビニール・テープなどで絶縁処理をして、お買
い上げいただいた販売店にお問い合わせいただくか、もしくは産業廃棄物処理業
者に処理をご依頼ください。また一般家庭などから、一般廃棄物として自治体に
廃棄を依頼するときは、地方自治体の条例・規則に従って廃棄してください。

Battery return program

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:

Notice: This mark applies only to countries within the European Union (EU).

Batteries or packaging for batteries are labeled in accordance with European
Directive 2006/66/EC concerning batteries and accumulators and waste batteries
and accumulators. The Directive determines the framework for the return and
recycling of used batteries and accumulators as applicable throughout the European
Union. This label is applied to various batteries to indicate that the battery is not to
be thrown away, but rather reclaimed upon end of life per this Directive.

Les batteries ou emballages pour batteries sont étiquetés conformément aux
directives européennes 2006/66/EC, norme relative aux batteries et accumulateurs
en usage et aux batteries et accumulateurs usés. Les directives déterminent la
marche à suivre en vigueue dans l'Union Européenne pour le retour et le recyclage
des batteries et accumulateurs usés. Cette étiquette est appliquée sur diverses

batteries pour indiquer que la batterie ne doit pas être mise au rebut mais plutôt récupérée en fin de cycle de vie selon cette norme.

In accordance with the European Directive 2006/66/EC, batteries and accumulators are labeled to indicate that they are to be collected separately and recycled at end of life. The label on the battery may also include a chemical symbol for the metal concerned in the battery (Pb for lead, Hg for mercury, and Cd for cadmium). Users of batteries and accumulators must not dispose of batteries and accumulators as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and treatment of batteries and accumulators. Customer participation is important to minimize any potential effects of batteries and accumulators on the environment and human health due to the potential presence of hazardous substances. For proper collection and treatment, go to http://www.lenovo.com/lenovo/environment.

For California:

Perchlorate material - special handling may apply. See http://www.dtsc.ca.gov/ hazardouswaste/perchlorate/.

The foregoing notice is provided in accordance with California Code of Regulations Title 22, Division 4.5 Chapter 33. Best Management Practices for Perchlorate Materials. This product/part may include a lithium manganese dioxide battery which contains a perchlorate substance.

German Ordinance for Work gloss statement

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.

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

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

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.

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.

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

Deutschland:

Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Betriebsmittein

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

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln, EMVG vom 20. Juli 2007 (früher Gesetz über die elektromagnetische Verträglichkeit von Geräten), bzw. der EMV EG Richtlinie 2004/108/EC (früher 89/336/EWG), für Geräte der Klasse A.

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

Informationen in Hinsicht EMVG Paragraf 4 Abs. (1) 4:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

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

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

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

Japan Voluntary Control Council for Interference (VCCI) statement

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Taiwan Class A warning statement

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

People's Republic of China Class A warning statement

声　　明

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

Korea Class A warning statement

이 기기는 업무용으로 전자파적합등록을 한 기기이오니 판매자
또는 사용자는 이점을 주의하시기 바라며, 만약 잘못 판매 또는
구입하였을 때에는 가정용으로 교환하시기 바랍니다.

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