

lenovo

ThinkServer
Hardware Maintenance Manual



ThinkThink**ThinkServer**Think

ThinkServer TS200v Types 0981, 0992, 1008, and 1010



ThinkServer Hardware Maintenance Manual

ThinkServer TS200v Types 0981, 0992, 1008, and 1010

Before using this information and the product it supports, be sure to read and understand the *Safety Information* book and Appendix A “Notices” on page 87.

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Contents

Chapter 1. About this manual 1

Important Safety Information	1
Safety statements	2
Important information about replacing RoHS compliant FRUs	5

Chapter 2. General information. 7

Features and specifications.	7
Software	9
EasyStartup	9
EasyManage.	9

Chapter 3. General Checkout. 11

Problem determination tips.	11
-------------------------------------	----

Chapter 4. Diagnostics 13

PC-Doctor for DOS	13
Creating a diagnostic disc	13
Running the diagnostic program from a diagnostic disc.	13
Navigating through the diagnostics programs	13
Running tests	14
Viewing the test log	15
Troubleshooting tables	15
Hard disk drive boot error	15
Power Supply Problems	16
Beep symptoms	16
POST error codes.	17
EasyStartup problems	18
Miscellaneous error messages	19
Undetermined problems	21

Chapter 5. Locating Server Controls and connectors 23

Front view	23
Rear view.	23
System-board internal connectors	25
Internal components	26

Chapter 6. Replacing FRUs. 27

Guidelines for trained service technicians	27
Inspecting for unsafe conditions	27
Guidelines for servicing electrical equipment	28
Handling static-sensitive devices	28
Server components.	29
Replacing FRUs	30
Removing the server cover	30

Removing and reinstalling the front bezel	31
Installing or replacing a PCI card.	32
Replacing the battery	35
Installing or replacing a memory module.	36
Installing or replacing the optical drive	38
Replacing the secondary hard disk drive.	40
Replacing the power supply assembly	43
Replacing the heat sink and fan assembly	44
Replacing the microprocessor.	45
Replacing the system board	47
Replacing the primary hard disk drive	50
Replacing the front fan assembly	53
Replacing the rear fan assembly	55
Completing the parts replacement	57
Updating the server configuration	58

Chapter 7. Parts Listing, TS200v Machine Types 0981, 0992, 1008, and 1010 59

Machine Type 0981	59
Machine Type 0992	64
Machine Type 1008	68
Machine Type 1010	72

Chapter 8. Configuring the server . . . 77

Using the Setup Utility program	77
Starting the Setup Utility program	77
Viewing and changing settings	77
Using passwords	78
Enabling or disabling a device.	79
Selecting a startup device	79
Advanced settings	80
Exiting from the Setup Utility program	80
Configuring RAID.	80
RAID Level	80
Configuring the system UEFI to enable SATA RAID functionality.	81
Creating RAID volumes	81
Deleting RAID volumes	81
Updating system programs.	82
Using system programs	82
Updating (flashing) the UEFI from a disc	82
Updating (flashing) the UEFI from your operating system	83
Recovering from a POST/UEFI update failure	83
Using the ThinkServer EasyStartup program	84

Installing ThinkServer EasyManage Agent	85	Federal Communications Commission (FCC) and telephone company requirements	90
Appendix A. Notices	87	Canadian Department of Communications certification label	91
Export classification notice	88	Power cord notice	91
Television output notice	88	Polyvinyl Chloride (PVC) cable and cord notice	93
European conformance CE mark	88	Turkish statement of compliance	93
Trademarks	88	Waste electrical and electronic equipment (WEEE) notices.	93
Electronic emissions notices	88	European Union (EU) WEEE statement	94
Federal Communications Commission Declaration of Conformity	88	Japanese recycling statement.	94
Industry Canada Class B emission compliance statement.	89	Collecting and recycling a disused Lenovo computer or monitor	94
European Union EMC Directive conformance statement	89	Disposing of Lenovo computer components	94
EU-EMC Directive (2004/108/EC) EN 55022 class B Statement of Compliance	89	Disposing of disused lithium batteries from Lenovo computers	94
Japanese VCCI Class B statement	90	Index.	97
Japanese compliance for products less than or equal to 20 A per phase	90		

Chapter 1. About this manual

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

Replaceable components are of three types:

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

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

Before servicing a Lenovo product, be sure to read the Safety Information. See “Important Safety Information” on page 1.

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.

Veillez 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。

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

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

Safety statements

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

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

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

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

Statement 1



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

To avoid a shock hazard:

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

To Connect:

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

To Disconnect:

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

Statement 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.



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

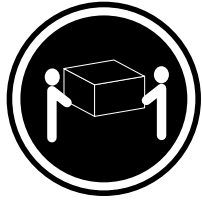
Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.



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

Statement 4

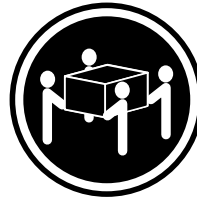




≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



≥ 55 kg (121.2 lb)

CAUTION:

Use safe practices when lifting.

Statement 5



CAUTION:

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



Statement 8



CAUTION:

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



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

Statement 26



CAUTION:

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



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

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

Important information about replacing RoHS compliant FRUs

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

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

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

RoHS compliant ThinkServer TS200v parts have unique FRU part numbers. Before or after June 2006, failed RoHS compliant parts must always be replaced using RoHS compliant FRUs, so only the FRUs identified as compliant in the system hardware maintenance manual or direct substitutions for those FRUs can be used.

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

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

Chapter 2. General information

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

Features and 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

<p>MicroprocessorYour server comes with one of the following microprocessors (internal cache size varies by model type):</p> <ul style="list-style-type: none"> • Intel® Celeron® microprocessor • Intel Core™ i3 microprocessor • Intel Core i5 microprocessor • Intel Pentium® microprocessor • Use the Setup Utility program to determine the type and speed of the microprocessor. • For a list of supported microprocessors, see http://www.lenovo.com/thinkserver and click the Options tab. <p>Memory</p> <ul style="list-style-type: none"> • Supports up to four DDR3 ECC UDIMMs (double data rate 3 error correction code unbuffered dual inline memory modules) <p>Internal drives</p> <ul style="list-style-type: none"> • Serial Advanced Technology Attachment (SATA) hard disk drive • SATA optical drive <p>Video subsystem</p> <ul style="list-style-type: none"> • Integrated graphics for a Video Graphics Array (VGA) connector and a DisplayPort connector <p>Connectivity</p> <ul style="list-style-type: none"> • 10/100/1000 Mbps integrated Ethernet controller <p>Power supply</p> <ul style="list-style-type: none"> • 280-watt auto-sensing power supply 	<p>Expansion</p> <ul style="list-style-type: none"> • Two hard disk drive bays (one standard and one optional) • Two optical drive bays • Two PCI card slots • One PCI Express x1 card slot • One PCI Express x16 card slot <p>System management features</p> <ul style="list-style-type: none"> • Ability to store power-on self-test (POST) hardware test results • Automatic power-on startup • Intel Active Management Technology (AMT) • Intel Hyper-Threading technology (some models) • Intel Rapid Storage Technology (RST) • Preboot Execution Environment (PXE) • System Management (SM) UEFI and SM software • Wake on LAN • Wake on Ring (in the Setup Utility program, this feature is called Serial Port Ring Detect for an external modem) <p>Input/Output (I/O) features</p> <ul style="list-style-type: none"> • Eight Universal Serial Bus (USB) connectors (two on the front panel and six on the rear panel) • One 9-pin serial port • One Ethernet connector • One DisplayPort connector • One VGA monitor connector • Three audio connectors on the rear panel (audio line-in connector, audio line-out connector, and microphone connector) 	<p>Security features</p> <ul style="list-style-type: none"> • Computrace • Enabling or disabling a device • Enabling or disabling USB connectors individually • Hard disk drive password • Power-On Password (POP) and Administrator Password for UEFI access • Startup sequence control • Startup without keyboard or mouse • Support for an integrated cable lock (Kensington lock) • Support for a padlock • Trusted Platform Module (TPM) <p>Preinstalled operating systemSome models are preinstalled with one of the following operating systems:</p> <ul style="list-style-type: none"> • Microsoft® Windows Server® 2008 R2 Foundation • Microsoft Windows Server 2008 R2 Standard • Windows® Small Business Server 2008 Standard (Service Pack 2) <p>Operating system(s), supported</p> <ul style="list-style-type: none"> • Microsoft Windows Server 2008 R2 Enterprise
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Table 1. Features and specifications (continued)

<p>Dimensions</p> <p>Width: 174.8 mm (6.88 inches) Height: 377.3 mm (14.85 inches) Depth: 406.7 mm (16.01 inches)</p> <p>Weight</p> <p>Maximum configuration: 11.2 kg (24.7 lbs)</p> <p>Environment</p> <p>Air temperature:</p> <p>Operating: 10° to 35°C (50° to 95°F) Non-operating: -40° to 60°C (-40° to 140°F) (with package) Non-operating: -10° to 60°C (14° to 140°F) (without package)</p>	<ul style="list-style-type: none"> • Humidity: <ul style="list-style-type: none"> Operating: 8% to 80% (non-condensing) Non-operating: 8% to 80% (non-condensing) • Altitude: <ul style="list-style-type: none"> Operating: 0 to 10 000 ft (0 to 3 048 m) Non-operating: 0 to 35 000 ft (0 to 10 668 m) 	<p>Electrical input</p> <p>Input voltage low range:</p> <p>Minimum: 100 V ac Maximum: 127 V ac</p> <p>Input frequency range: 50 to 60 Hz</p> <p>Voltage-selection switch setting: 115 V ac</p> <p>Input voltage high range:</p> <p>Minimum: 200 V ac Maximum: 240 V ac</p> <p>Input frequency range: 50 to 60 Hz</p> <p>Voltage-selection switch setting: 230 V ac</p>
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Software

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

EasyStartup

The ThinkServer EasyStartup program simplifies the process of installing supported Microsoft Windows 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 program” on page 84.

EasyManage

The ThinkServer EasyManage Agent enables other clients on the network to be managed by the centralized console. The ThinkServer EasyManage Agent is supported on 32-bit and 64-bit Windows, Red Hat, and SUSE operating systems.

Chapter 3. General Checkout

Attention

The drives in the servers you are servicing might have been rearranged or the drive startup sequence might have been changed. Be extremely careful during write operations such as copying, saving, or formatting. Data or programs can be overwritten if you select an incorrect drive.

General error messages appear if a problem or conflict is found by an application program, the operating system, or both. For an explanation of these messages, refer to the information supplied with that software package.

Before replacing a FRU, ensure that the latest level of BIOS is installed on the system. A down-level BIOS might cause false errors and unnecessary replacement of the system board.

Use the following procedure to help determine the cause of a problem:

1. Turn off the server and all external devices.
2. Check all cables and power cords.
3. Set all display controls to the middle position.
4. Power-on all external devices.
5. Turn on the server.
 - Look for displayed error codes
 - Listen for beep codes
 - Look for readable instructions or a main menu on the display.If you *did not* receive the correct response, proceed to step 6 on page 11.
If you *do* receive the correct response, proceed to step 7 on page 11.
6. Look at the following conditions and follow the instructions:
 - If you hear beep codes during POST, go to “Beep symptoms” on page 16.
 - If the server displays a POST error, go to “POST error codes” on page 17.
 - If the server hangs and no error is displayed, continue at step 7 on page 11.
7. Run the Diagnostic programs. See Chapter 4 “Diagnostics” on page 13.
 - If you receive an error, replace the part that the diagnostic program calls out.
 - If the test stops and you cannot continue, replace the last device tested.

Problem determination tips

Due to the variety of hardware and software combinations that can be encountered, use the following information to assist you in problem determination. If possible, have this information available when requesting assistance from Service Support and Engineering functions.

- Machine type and model
- Processor or hard disk drive upgrades
- Failure symptom
 - Do diagnostics indicate a failure?
 - What, when, where, single, or multiple systems?
 - Is the failure repeatable?
 - Has this configuration ever worked?

- If it has been working, what changes were made prior to it failing?
- Is this the original reported failure?
- Diagnostics version
 - Type and version level
- Hardware configuration
 - Print (print screen) configuration currently in use
 - BIOS level
- Operating system software
 - Type and version level

Notes: To eliminate confusion, identical systems are considered identical only if they:

1. Are the exact machine type and models
2. Have the same BIOS level
3. Have the same adapters/attachments in the same locations
4. Have the same address jumpers/terminators/cabling
5. Have the same software versions and levels
6. Have the same diagnostic diskettes (version)
7. Have the same configuration options set in the system
8. Have the same setup for operating-system-controlled files

Comparing the configuration and software set-up between “working and non-working” systems will often lead to problem resolution.

Chapter 4. Diagnostics

Diagnostic programs are used to test hardware components of your server. Diagnostic programs are also used to report operating-system-controlled settings that interfere with the correct operation of your server.

Notes:

1. You can download the PC-Doctor for DOS diagnostic program from <http://www.lenovo.com/support>. See “PC-Doctor for DOS” on page 13 for detailed information.
2. If you are unable to isolate and repair the problem yourself after running the diagnostic programs, save and print the log files created by the diagnostic programs. You will need the log files when you speak to a Lenovo technical support representative.

PC-Doctor for DOS

You can download the latest version of the PC-Doctor for DOS diagnostic program from <http://www.lenovo.com/support>. The PC-Doctor for DOS diagnostic program runs independently of the Windows operating system. You can run the PC-Doctor for DOS diagnostic program from a diagnostic disc that you created.

Creating a diagnostic disc

This section provides instructions on how to create a diagnostic disc.

To create a diagnostic disc, do the following:

1. Download a self-starting bootable CD/DVD image (known as an ISO image) of the diagnostic program from:<http://www.lenovo.com/support>
2. Use any CD/DVD burning software to create a diagnostic disc with the ISO image.

Running the diagnostic program from a diagnostic disc

This section provides instructions on how to run the diagnostic program from a diagnostic disc that you created.

To run the diagnostic program from a diagnostic disc that you created, do the following:

1. Make sure the optical drive you want to use is set as the first boot device in the startup device sequence. See “Viewing or changing the startup device sequence” on page 79.
2. Make sure the server is turned on and then insert the disc into the optical drive. The diagnostic program opens.

Note: You can insert the disc into the optical drive when you are setting the startup device sequence. However, if you insert the disc into the optical drive when you have already entered the operating system, you need to restart the server to access the diagnostic program.

3. Follow the instructions on the screen to select the diagnostic test you want to run.

Note: For additional help, press the F1 key.

4. Remove the diagnostic disc from the optical drive when you complete the diagnostic process.

Navigating through the diagnostics programs

Use the cursor movement keys to navigate within the menus.

- The Enter key is used to select a menu item.
- The Esc key is used to back up to the previous menu.
- For online help, select F1.

Running tests

There are four ways to run the diagnostic tests.

- Using the cursor movement keys, highlight **Run Normal Test** or **Run Quick Test** from the Diagnostics menu and then press Enter. This automatically runs a pre-defined group of tests from each test category. **Run Normal Test** runs a more extensive set of tests than **Run Quick Test** does and takes longer to complete.
- Press F5 to automatically run all selected tests in all categories.
- From within a test category, press Ctrl+Enter to automatically run only the selected tests in that category.
- Using the cursor movement keys, highlight a single test within a test category, and then press Enter. This runs only that test.

Press Esc at any time to stop the testing process.

Test results (N/A, PASSED, FAILED, ABORTED) are displayed in the field beside the test description and in the test log. See “Viewing the test log” on page 15.

To select one or more tests, do the following:

1. Open the corresponding test category.
2. Using the cursor movement keys, highlight the desired test.
3. Press the space bar. A selected test is marked by >>. Pressing the space bar again de-selects a test and removes the >>.
4. Repeat steps 2 and 3 above to select all desired tests.

Test results

Diagnostics test results produce the following error code format:

Function Code	Failure Type	DeviceID	Date	ChkDigits	Text
---------------	--------------	----------	------	-----------	------

- **Function Code:** Represents the feature or function within the server.
- **Failure Type:** Represents the type of error encountered.
- **DeviceID:** Contains the component's unit-ID that corresponds to a fixed disk drive, removable media drive, serial or parallel port, processor, specific RIMM, or a device on the PCI bus.
- **Date:** Contains the date when the diagnostic test was run. The date is retrieved from CMOS and displayed using the YYYYMMDD format.
- **ChkDigits:** Contains a 2-digit check-digit value to ensure the following:
 - Diagnostics were run on the specified date.
 - Diagnostics were run on the specified server.
 - The diagnostic error code is recorded correctly.
- **Text:** Description of the error.

Note: See Chapter 4 “Diagnostics” on page 13 for error code listings.

Quick and Full erase - hard disk drive

The diagnostics program offers two hard disk drive formatting utilities:

- Quick Erase Hard Drive
- Full Erase Hard Drive

Quick Erase Hard Drive provides a DOS utility that performs the following:

- Destroys the Master Boot Record (MBR) on the hard disk drive.
- Destroys all copies of the FAT Table on all partitions (both the master and backup).
- Destroys the partition table.
- Provides messages that warn the user that this is a non-recoverable process.

Full Erase Hard Drive provides a DOS utility that performs the following:

- Performs all the steps in Quick Erase.
- Provides a DOS utility that writes random data to all sectors of the hard disk drive.
- Provides an estimate of time to completion along with a visual representation of completion status.
- Provides messages that warn the user about a non-recoverable process.

Important: Make sure that all data is backed up before using the Quick or Full Erase functions.

To select the Quick Erase Hard Drive or Full Erase Hard Drive utility, do the following:

1. Select the UTILITY option on the toolbar and press **Enter**.
2. Select either the **QUICK ERASE** or **FULL ERASE HARD DISK** option and follow the instructions on the screen.

Viewing the test log

Errors reported by the diagnostic test will be displayed by the program as a failed test.

To view details of a failure or to view a list of test results, use the following procedure from any test category screen:

1. Press F3 to activate the log file.
2. Press F3 again to save the file to diskette or press F2 to print the file.

Troubleshooting tables

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

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

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

Hard disk drive boot error

A hard disk drive boot error can have the following causes.

Error	FRU/Action
The start-up drive is not in the boot sequence in configuration.	Check the configuration and ensure the start-up drive is in the boot sequence.
No operating system installed on the boot drive.	Install an operating system on the boot drive.
The boot sector on the start-up drive is corrupted.	The drive must be formatted. Do the following: <ol style="list-style-type: none"> 1. Attempt to back up the data on the failing hard disk drive. 2. Using the operating system programs, format the hard disk drive.
The drive is defective.	Replace the hard disk drive.

Power Supply Problems

If you suspect a power problem, use the following procedures.

Check/Verify	FRU/Action
Check the following for proper installation. <ul style="list-style-type: none"> • Power cord • On/Off switch connector • On/Off switch power supply connector • System board power supply connectors • Microprocessor(s) connection 	Reseat connectors
Check the power cord for continuity.	Power cord
Check the power-on switch for continuity.	Power-on switch

Beep symptoms

Beep symptoms are tones or a series of tones separated by pauses (intervals without sound) during POST.

The following tables describes beep symptoms.

Beep Symptom	FRU/Action
2 short beeps CMOS setting error	Perform the following actions in order. <ol style="list-style-type: none"> 1. Start the Setup Utility program and press F10 to Save and exit. See Chapter 8 “Configuring the server” on page 77. 2. Start the Setup Utility program and press F7 to load defaults and then press F10 to Save and exit. 3. Perform a Boot block recovery. See “Recovering from a POST/UEFI update failure” on page 83.
1 long and 2 short beeps Monitor or video adapter card error	Perform the following actions in order. <ol style="list-style-type: none"> 1. Make sure the monitor is properly connected to the computer. 2. Replace the video adapter card (if present). 3. Replace the system board.

Beep Symptom	FRU/Action
1 long and 3 short beeps Keyboard error	Perform the following actions in order. <ol style="list-style-type: none"> 1. Make sure the keyboard is properly connected to the keyboard connector. 2. Replace the keyboard. 3. Replace the system board.
1 long and 9 short beeps BIOS ROM error	Perform the following actions in order. <ol style="list-style-type: none"> 1. Start the Setup Utility program and press F7 to load defaults and then press F10 to Save and exit. See Chapter 8 “Configuring the server” on page 77. 2. Perform a Boot block recovery. See “Recovering from a POST/UEFI update failure” on page 83. 3. Replace the system board.
Continuous long beeps DRAM memory error	Perform the following actions in order. <ol style="list-style-type: none"> 1. Make sure the memory module(s) are properly seated in the connector(s). 2. Replace the memory module(s). 3. Replace the system board.

POST error codes

Each time you power-on the system, it performs a series of tests that check the operation of the system and some options. This series of tests is called the *Power-On Self-Test*, or *POST*. POST does the following operations.

- Checks some basic system-board operations
- Checks the memory operation
- Starts the video operation
- Verifies that the boot drive is working

If the POST detects a problem, an error message appears on the screen. A single problem can cause several error messages to appear. When you correct the cause of the first error message, the other error messages probably will not appear on the screen the next time you turn on the system.

POST Error Message	Description/Action
CMOS battery failed	The CMOS battery is no longer functional. Replace the battery.
CMOS checksum error - defaults loaded	Checksum of CMOS is incorrect. The computer loads the default configuration settings. This error might indicate that CMOS has become corrupt due to a weak CMOS battery.
CPU at nnnn	nnnn is the running speed of the microprocessor.
Press Esc to skip memory test	Pressing Esc skips the full memory test

POST Error Message	Description/Action
HARD DISK INSTALL FAILURE	<p>Cannot find or initialize the hard disk drive controller or the drive.</p> <p>Make sure the hard disk drive is correctly installed.</p> <p>If no hard disk drives are installed, make sure the hard disk drive selection in Setup is set to NONE.</p>
Keyboard error or no keyboard present	<p>Cannot initialize the keyboard.</p> <p>Make sure the keyboard is properly connected to the computer and that no keys are held pressed during POST.</p> <p>To purposely configure the computer without a keyboard, set the error halt condition in Setup to HALT ON ALL, BUT KEYBOARD. The BIOS then ignores the missing keyboard during POST.</p>
Memory Test:	This message displays during a full memory test, counting down the memory areas being tested.
Memory test fail	If POST detects an error during memory testing, additional information appears. This information gives specifics about the type and location of the memory error.
Press TAB to show POST screen	Pressing the TAB key permits the user to toggle between the default POST display screen and a custom POST display screen.
Error: Non-System disk or disk error Replace and press any key when ready	<p>The BIOS was unable to find a suitable boot device.</p> <p>Make sure the boot drive is properly connected to the computer.</p> <p>Make sure you have bootable media.</p>

EasyStartup problems

The following table describes the EasyStartup problems and suggested actions to correct detected problems.

Table 2. ThinkServer EasyStartup DVD

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is resolved. • See the Chapter 7 “Parts Listing, TS200v Machine Types 0981, 0992, 1008, and 1010” on page 59 to determine which components are customer replaceable units (CRUs) and which components are field replaceable units (FRUs). 	
Symptom	Action
The <i>ThinkServer EasyStartup</i> DVD will not start.	<ul style="list-style-type: none"> • Make sure the server supports the EasyStartup program and has a startable (bootable) DVD drive. • If the startup (boot) sequence settings have been changed, make sure the DVD drive is first in the startup sequence. • If more than one DVD drive is installed, make sure that only one DVD drive is set as the primary drive. Start the EasyStartup DVD from the primary DVD drive.
The operating-system installation program continuously loops.	Make more space available on the hard disk drive.

Table 2. ThinkServer EasyStartup DVD (continued)

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is resolved. • See the Chapter 7 “Parts Listing, TS200v Machine Types 0981, 0992, 1008, and 1010” on page 59 to determine which components are customer replaceable units (CRUs) and which components are field replaceable units (FRUs). 	
Symptom	Action
The EasyStartup program will not start the operating-system medium.	Make sure that the operating-system medium is supported by the EasyStartup program. See the <i>EasyStartup User Guide</i> for a list of supported operating-system versions. The <i>EasyStartup User Guide</i> and compatibility notes are available through the EasyStartup program.

Miscellaneous error messages

Message/Symptom	FRU/Action
Changing display colors	Display/Monitor
Computer will <i>not</i> power-off. See “Hard disk drive boot error” on page 16.	<ol style="list-style-type: none"> 1. Power Switch 2. System Board 3. Riser card, if installed.
Computer will <i>not</i> RPL from server	<ol style="list-style-type: none"> 1. Ensure that network is in startup sequence as first device or first device after diskette. 2. Ensure that network adapter is enabled for RPL. 3. Network adapter (Advise network administrator of new MAC address)
Computer will <i>not</i> perform a Wake On LAN® (if applicable)	<ol style="list-style-type: none"> 1. Check power supply and signal cable connections to network adapter. 2. Ensure that the operating system settings are set to enable Wake on LAN. 3. Ensure Wake On LAN feature is enabled in Setup/Configuration (see “Starting the Setup Utility program” on page 77) 4. Ensure network administrator is using correct MAC address. 5. Ensure no interrupt or I/O address conflicts. 6. Network adapter (advise network administrator of new MAC address)
Dead computer. See “Hard disk drive boot error” on page 16.	<ol style="list-style-type: none"> 1. Power Supply 2. System Board
Diskette drive in-use light remains on or does not light when drive is active.	<ol style="list-style-type: none"> 1. Diskette Drive 2. System Board 3. Diskette Drive Cable
Blank screen except for flashing cursor.	<ol style="list-style-type: none"> 1. System Board 2. Primary Hard Disk Drive 3. Hard Disk Drive Cable
Incorrect memory size during POST	<ol style="list-style-type: none"> 1. Run the Memory tests. 2. Memory Module 3. System Board

Message/Symptom	FRU/Action
"Insert a Diskette" icon appears with a known-good diagnostics diskette in the first 3.5-inch diskette drive.	<ol style="list-style-type: none"> 1. System Board 2. Diskette Drive Cable 3. Network Adapter
Intensity or color varies from left to right of characters and color bars	<ol style="list-style-type: none"> 1. Display 2. Video adapter (if present) 3. System Board
No power or fan not running	<ol style="list-style-type: none"> 1. See "Hard disk drive boot error" on page 16.
Non-system disk or disk error-type message with a known-good diagnostic diskette.	<ol style="list-style-type: none"> 1. Diskette Drive 2. System Board 3. Diskette Drive Cable
Other display symptoms not listed above (including blank or illegible display)	<ol style="list-style-type: none"> 1. Display 2. System Board
Power-on indicator or hard disk drive in-use light not on, but computer works correctly	<ol style="list-style-type: none"> 1. Power switch/LED assembly 2. System Board
Printer problems	<ol style="list-style-type: none"> 1. Printer 2. System Board
Program loads from the hard disk with a known-good diagnostics diskette in the first 3.5-inch diskette drive	<ol style="list-style-type: none"> 1. Run the Setup Utility program and check Startup sequence. 2. Diskette Drive 3. Diskette Drive Cable 4. System Board 5. Power Supply
RPL computer cannot access programs from its own hard disk.	<ol style="list-style-type: none"> 1. If network administrator is using LCCM Hybrid RPL, check startup sequence: <ol style="list-style-type: none"> a. First device - network b. Second device - hard disk 2. Hard disk drive
RPL computer does not RPL from server	<ol style="list-style-type: none"> 1. Check startup sequence. 2. Check the network adapter LED status.
Serial or parallel port device failure (system board port)	<ol style="list-style-type: none"> 1. External Device Self-Test OK? 2. External Device 3. Cable 4. System Board
Serial or parallel port device failure (adapter port)	<ol style="list-style-type: none"> 1. External Device Self-Test OK? 2. External Device 3. Cable 4. Alternate Adapter 5. System Board
Some or all keys on the keyboard do not work	<ol style="list-style-type: none"> 1. Keyboard 2. Keyboard Cable 3. System Board

Undetermined problems

This section provides instructions on how to find out the failing devices or adapters.

1. Turn off the server.
2. Remove or disconnect the following components (if installed) one at a time.
 - a. External devices (modem, printer, or mouse)
 - b. Any adapters
 - c. Memory modules
 - d. Extended video memory
 - e. External Cache
 - f. External Cache RAM
 - g. Hard disk drive
 - h. Diskette drive
3. Turn on the server to re-test the system.
4. Repeat steps 1 through 3 until you find the failing device or adapter.

If all devices and adapters have been removed, and the problem continues, replace the system board.

Chapter 5. 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

Front control and connector locations shows the locations of the controls and connectors on the front of your server.

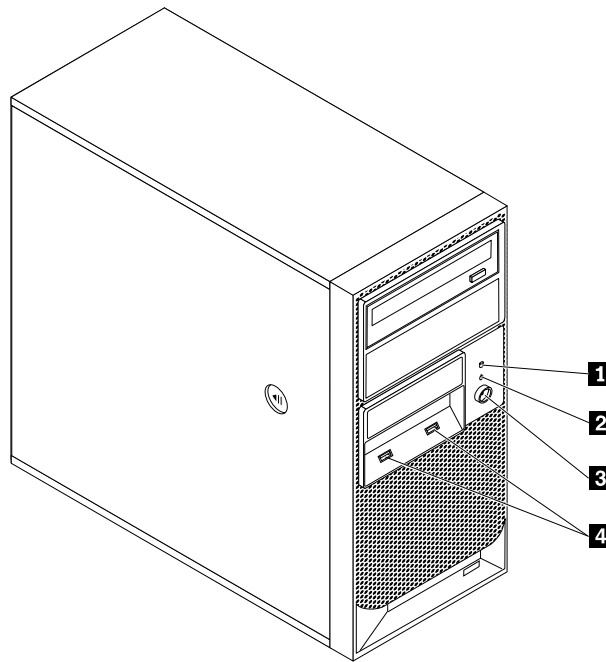


Figure 1. Front control and connector locations

- | | |
|---------------------------------------|-----------------------------|
| 1 Hard disk drive activity LED | 3 Power switch |
| 2 Power-on LED | 4 USB connectors (2) |

Rear view

Rear connector locations shows the locations of the connectors on the rear of your server. Some connectors on the rear of your server are color-coded to help you determine where to connect the cables in your server.

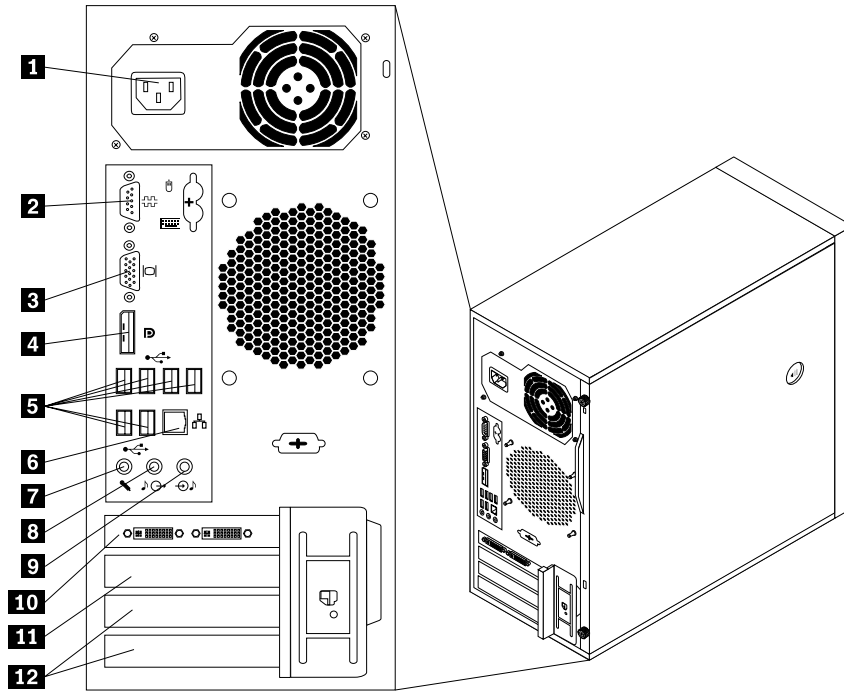


Figure 2. Rear connector locations

- | | |
|--------------------------------|-------------------------------------|
| 1 Power cord connector | 7 Microphone connector |
| 2 Serial port | 8 Audio line-out connector |
| 3 VGA monitor connector | 9 Audio line-in connector |
| 4 DisplayPort connector | 10 PCI Express x16 card slot |
| 5 USB connectors (6) | 11 PCI Express x1 card slot |
| 6 Ethernet connector | 12 PCI card slots (2) |

Connector	Description
Audio line-in connector	Used to receive audio signals from an external audio device, such as a stereo system. When you attach an external audio device, a cable connects the audio line-out connector of the device to the audio line-in connector of the server.
Audio line-out connector	Used to send audio signals from the server to external devices, such as powered stereo speakers (speakers with built-in amplifiers), headphones, multimedia keyboards, or the audio line-in connector on a stereo system or other external recording device.
DisplayPort connector	Used to attach a high-performance monitor, a direct-drive monitor, or other devices that use a DisplayPort connector.
Ethernet connector	Used to attach an Ethernet cable for a local area network (LAN). Note: To operate the server within FCC Class B limits, use a Category 5 Ethernet cable.
Microphone connector	Used to attach a microphone to your server when you want to record sound or if you use speech-recognition software.
Serial port	Used to attach an external modem, a serial printer, or other devices that use a 9-pin serial port.

Connector	Description
USB connector	Used to attach a device that requires a USB connector, such as a USB keyboard, a USB mouse, a USB scanner, or a USB printer. If you have more than eight USB devices, you can purchase a USB hub, which you can use to connect additional USB devices.
VGA monitor connector	Used to attach a VGA monitor or other devices that use a VGA monitor connector.

System-board internal connectors

Figure 3 “System board connector locations” on page 25 shows the locations of the parts and connectors on the system board.

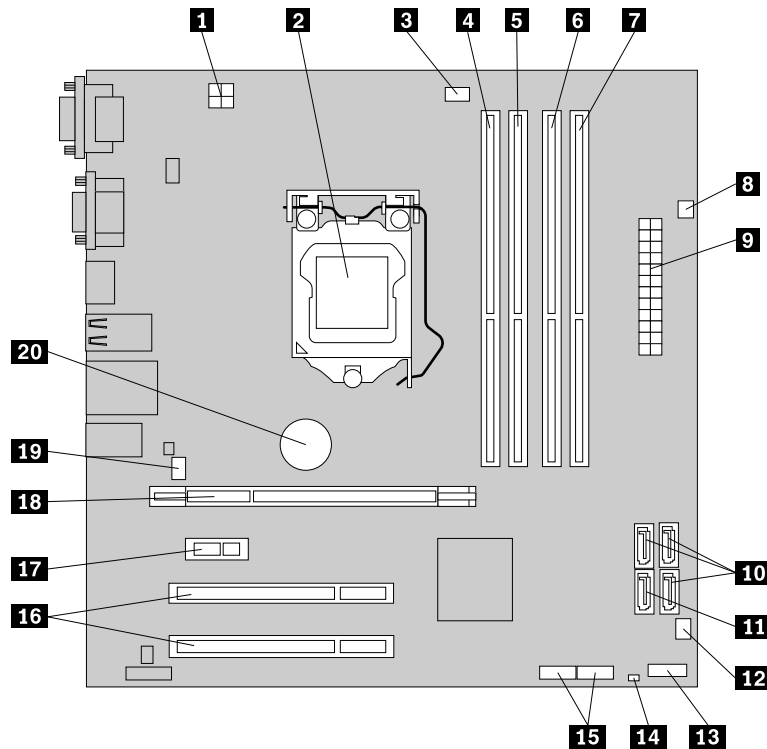


Figure 3. System board connector locations

- | | |
|---------------------------------------|---|
| 1 4-pin power connector | 11 eSATA connector |
| 2 Microprocessor | 12 Power fan connector |
| 3 Microprocessor fan connector | 13 Front panel connector |
| 4 DIMM 2 | 14 Clear CMOS (Complementary Metal Oxide Semiconductor) /Recovery jumper |
| 5 DIMM 1 | 15 Front USB connectors (2) |
| 6 DIMM 4 | 16 PCI card slots (2) |
| 7 DIMM 3 | 17 PCI Express x1 card slot |
| 8 Thermal sensor connector | 18 PCI Express x16 card slot |
| 9 24-pin power connector | 19 System fan connector |
| 10 SATA connectors (3) | 20 Battery |

Internal components

Figure 4 “Component locations” on page 26 shows the locations of the various components in your server. To remove the server cover and access to the inside of the server, see “Removing the server cover” on page 30.

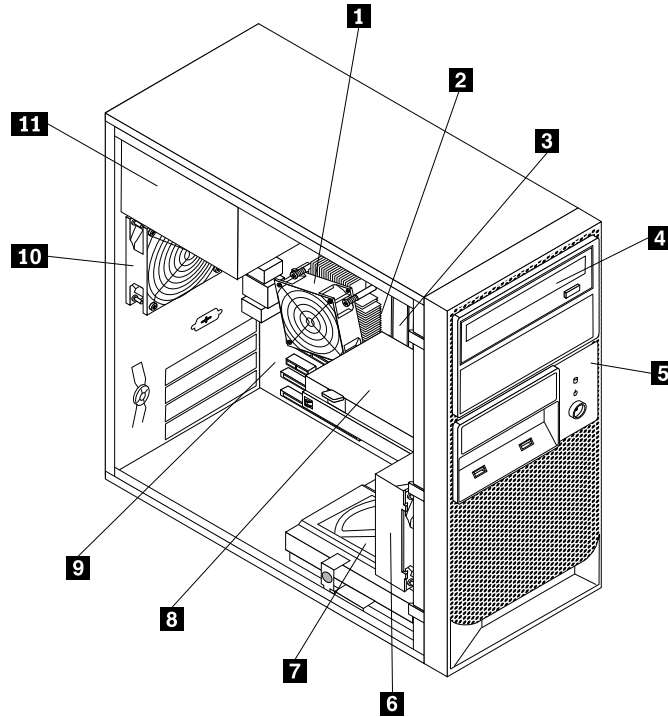


Figure 4. Component locations

- | | | | |
|----------|--------------------|-----------|--|
| 1 | Heat sink | 7 | Secondary hard disk drive (installed in some models) |
| 2 | Microprocessor | 8 | Primary hard disk drive |
| 3 | Memory modules | 9 | System board |
| 4 | Optical drive | 10 | Rear fan assembly |
| 5 | Front bezel | 11 | Power supply |
| 6 | Front fan assembly | | |

Chapter 6. Replacing FRUs

Important: Before you replacing FRUs, 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 4 “Diagnostics” on page 13 for diagnostic information.

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

Attention

Do not open your server or attempt any repair before reading and understanding the Chapter 1 “About this manual” on page 1 and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to: <http://www.lenovo.com/support>

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.

Handling static-sensitive devices

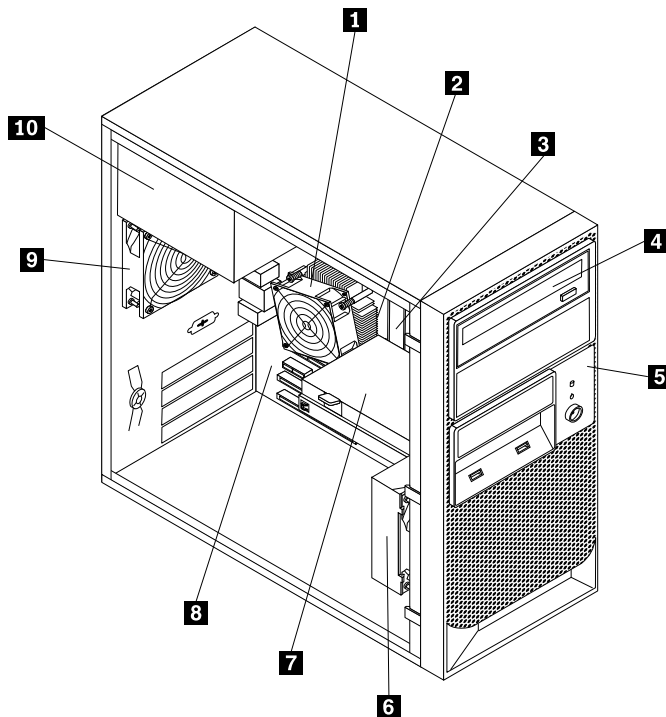
Attention: Static electricity can damage the server and other electronic devices. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them.

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

- Limit your movement. Movement can cause static electricity to build up around you.
- The use of a grounding system is recommended. For example, wear an electrostatic-discharge wrist strap, if one is available. Always use an electrostatic-discharge wrist strap or other grounding system when working inside the server with the power on.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an unpainted metal part on the outside of the server for at least 2 seconds. This drains static electricity from the package and from your body.
- Remove the device from its package and install it directly into the server without setting down the device. If it is necessary to set down the device, put it back into its static-protective package. Do not place the device on the server cover or on a metal surface.
- Take additional care when handling devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Server components

The following illustration shows the major components in the server.



- | | | | |
|----------|----------------|-----------|--------------------|
| 1 | Heat sink | 6 | Front fan assembly |
| 2 | Microprocessor | 7 | Hard disk drive |
| 3 | Memory modules | 8 | System board |
| 4 | Optical drive | 9 | Rear fan assembly |
| 5 | Front bezel | 10 | Power supply |

Replacing FRUs

This section provides instructions on how to install or replace hardware for your server. You can expand the capabilities of your server and maintain your server by installing or replacing hardware.

Attention

Do not open your server or attempt any repair before reading and understanding the Chapter 1 “About this manual” on page 1 and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to:<http://www.lenovo.com/support>

Notes:

1. Use only server parts provided by Lenovo.
2. When installing or replacing a FRU, use the appropriate instructions in this section along with the instructions that come with the FRU.

Removing the server cover

Attention

Do not open your server or attempt any repair before reading and understanding the Chapter 1 “About this manual” on page 1 and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to:<http://www.lenovo.com/support>

This section provides instructions on how to remove the server cover.

CAUTION:



Turn off the server and wait three to five minutes to let the server cool before removing the server cover.

To remove the server cover, do the following:

1. Remove any media from the drives and turn off all attached devices and the server.
2. Disconnect all power cords from electrical outlets.
3. Disconnect the power cords, Input/Output (I/O) cables, and any other cables that are connected to the server. See “Front view” on page 23 and “Rear view” on page 23.
4. Remove any locking device that secures the server cover, such as a padlock or an integrated cable lock.
5. Remove any thumbscrews that secure the server cover.
6. Press the cover-release button on the side of the server and slide the cover to the rear of the server to remove the cover.

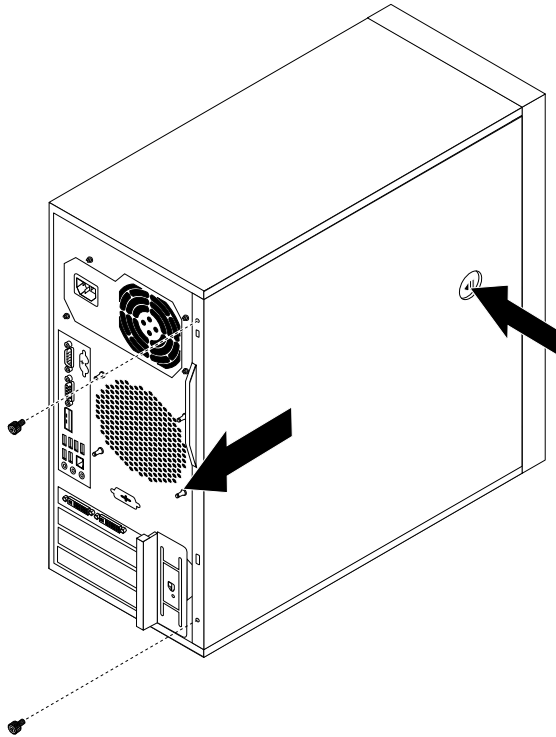


Figure 5. Removing the server cover

Removing and reinstalling the front bezel

Attention

Do not open your server or attempt any repair before reading and understanding the Chapter 1 “About this manual” on page 1 and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to: <http://www.lenovo.com/support>

This section provides instructions on how to remove and reinstall the front bezel.

To remove and reinstall the front bezel, do the following:

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 30.
3. Remove the front bezel by releasing the three plastic tabs on the left side and pivoting the front bezel outward.

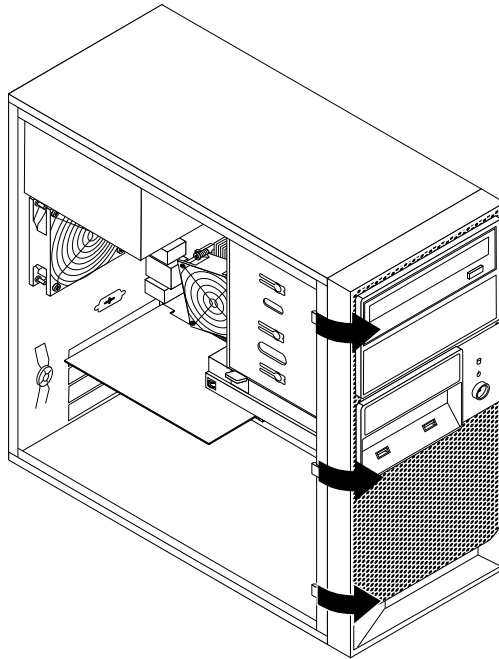


Figure 6. Removing the front bezel

4. To reinstall the front bezel, align the three plastic tabs on the right side of the front bezel with the corresponding holes in the chassis, then pivot the front bezel inward until it snaps into position on the left side.
5. Go to “Completing the parts replacement” on page 57.

Installing or replacing a PCI card

Attention

Do not open your server or attempt any repair before reading and understanding the Chapter 1 “About this manual” on page 1 and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to: <http://www.lenovo.com/support>

This section provides instructions on how to install or replace a PCI card.

Your server has two standard PCI card slots, one PCI Express x1 card slot, and one PCI Express x16 card slot.

To install or replace a PCI card, do the following:

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 30.
3. At the rear of the server, press the release button **1** to open the PCI card latch **2**.

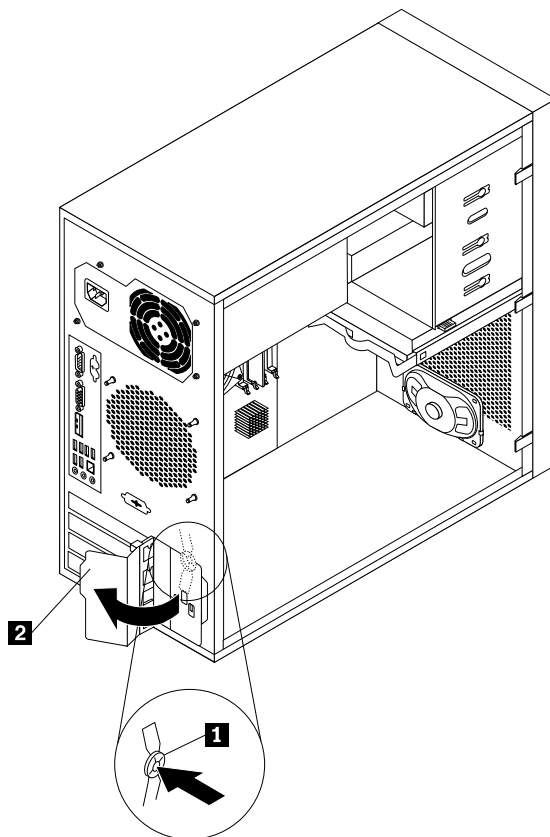


Figure 7. Opening the PCI card latch

4. If you are installing a PCI card, remove the appropriate metal slot cover. If you are replacing an old PCI card, grasp the old card that is currently installed and gently pull it out of the slot.

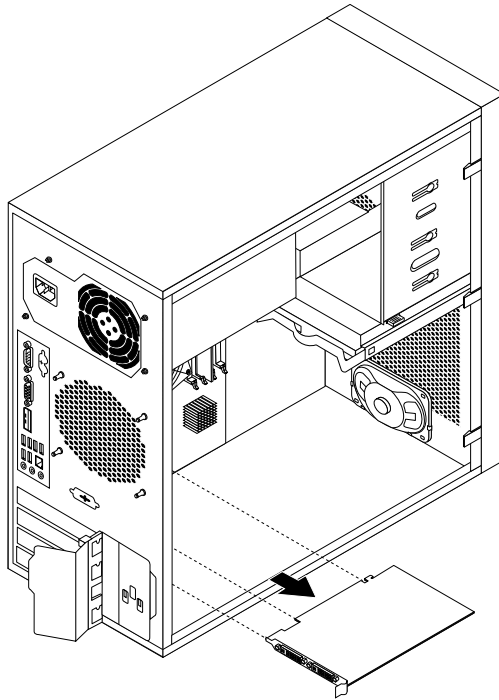


Figure 8. Removing a PCI card

Note: The PCI card fits tightly into the card slot. If necessary, alternate moving each side of the PCI card a small amount until it is removed from the card slot.

5. Remove the new PCI card from its static-protective package.
6. Install the new PCI card into the appropriate slot on the system board. See “System-board internal connectors” on page 25.

Note: If you are installing a PCI Express x16 card, make sure the memory slot retaining clips are closed before you install the PCI Express x16 card.

7. Pivot the PCI card latch to the closed position to secure the PCI card.

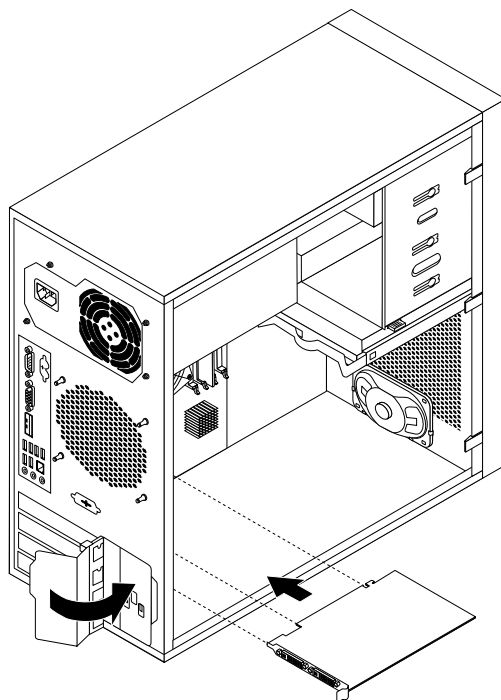


Figure 9. Installing a PCI card

8. To complete the installation or replacement, go to “Completing the parts replacement” on page 57.

Replacing the battery

Attention

Do not open your server or attempt any repair before reading and understanding the Chapter 1 “About this manual” on page 1 and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to: <http://www.lenovo.com/support>

This section provides instructions on how to replace the battery.

Your server has a special type of memory that maintains the date, time, and settings for built-in features, such as parallel-port assignments (configuration). A battery keeps this information active when you turn off the server.

The battery normally requires no charging or maintenance throughout its life; however, no battery lasts forever. If the battery fails, the date, time, and configuration information (including passwords) are lost. An error message is displayed when you turn on the server.

To replace the battery, do the following:

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 30.
3. Locate the battery. See “System-board internal connectors” on page 25.
4. Remove any parts that may prevent your access to the battery.
5. Remove the old battery.

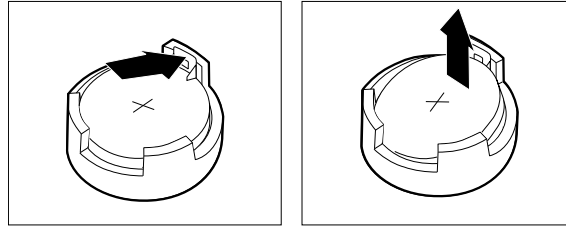


Figure 10. Removing the old battery

6. Install a new battery.

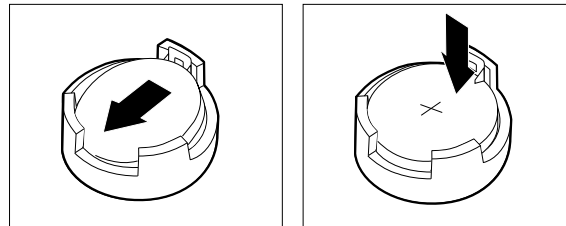


Figure 11. Installing a new battery

7. Reinstall any internal parts that have been removed.
8. Reinstall the server cover and reconnect the cables. See “Completing the parts replacement” on page 57.
9. Turn on the server and all attached devices.

Note: When the server is turned on for the first time after replacing the battery, an error message might be displayed. This is normal after replacing the battery.

10. Use the Setup Utility program to set the date, time, and any passwords. See Chapter 8 “Configuring the server” on page 77.

Installing or replacing a memory module

Attention

Do not open your server or attempt any repair before reading and understanding the Chapter 1 “About this manual” on page 1 and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to: <http://www.lenovo.com/support>

This section provides instructions on how to install or replace a memory module.

Your server has four slots for installing or replacing memory modules. When installing or replacing a memory module, use the following guidelines:

- Use DDR3 ECC UDIMMs for your server.
- Use 1 GB, 2 GB, or 4 GB memory modules in any combination up to a maximum of 16 GB system memory.
- Install memory modules in the sequence of DIMM 1, DIMM 2, DIMM 3, and DIMM 4. See “System-board internal connectors” on page 25.

To install or replace a memory module, do the following:

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 30.
3. Lay the server on its side for easier access to the system board.
4. Locate the memory slots. See “System-board internal connectors” on page 25.
5. Remove any parts that might prevent your access to the memory slots.

Note: Depending on your server model, you might need to remove the PCI Express x16 card for easier access to the memory slots. See “Installing or replacing a PCI card” on page 32.

6. If you are installing a new memory module, open the retaining clips of the memory slot into which you want to install the new memory module.

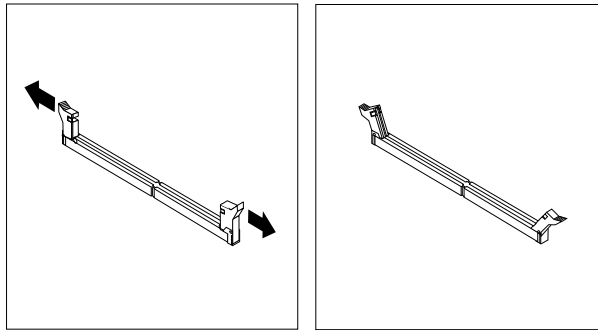


Figure 12. Opening the retaining clips

If you are replacing an old memory module, open the retaining clips and gently pull the memory module out of the memory slot.

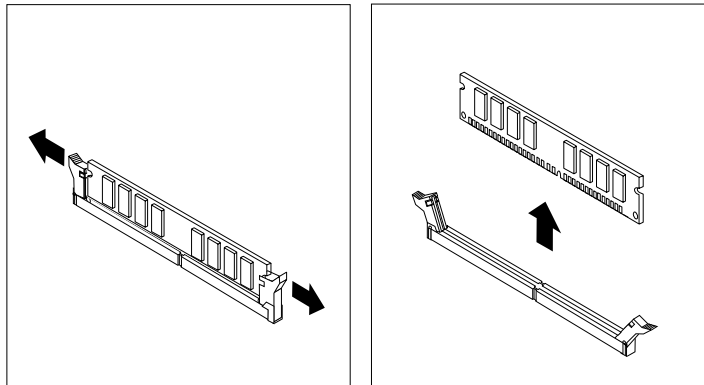


Figure 13. Removing a memory module

7. Position the new memory module over the memory slot. Make sure that the notch **1** on the memory module aligns correctly with the key **2** in the memory slot. Press the memory module straight down into the memory slot until the retaining clips close.

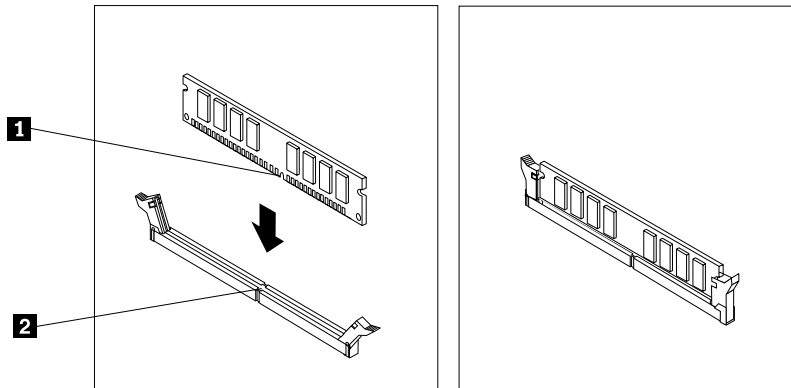


Figure 14. Installing a memory module

8. Reinstall all parts that have been removed.
9. Go to “Completing the parts replacement” on page 57.

Installing or replacing the optical drive

Attention

Do not open your server or attempt any repair before reading and understanding the Chapter 1 “About this manual” on page 1 and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to: <http://www.lenovo.com/support>

This section provides instructions on how to install or replace the optical drive.

To install or replace an optical drive, do the following:

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 30.
3. Remove the front bezel. See “Removing and reinstalling the front bezel” on page 31.
4. Depending on whether you are installing or replacing an optical drive, do one of the following:
 - If you are installing a secondary optical drive, remove the plastic panel in the front bezel for the drive bay you want to use. If there is a metal static shield installed in the drive bay, remove the metal static shield.
 - If you are replacing an optical drive, disconnect the signal cable and the power cable from the rear of the optical drive, press the blue release button **1**, and then slide the optical drive out of the optical drive bay.

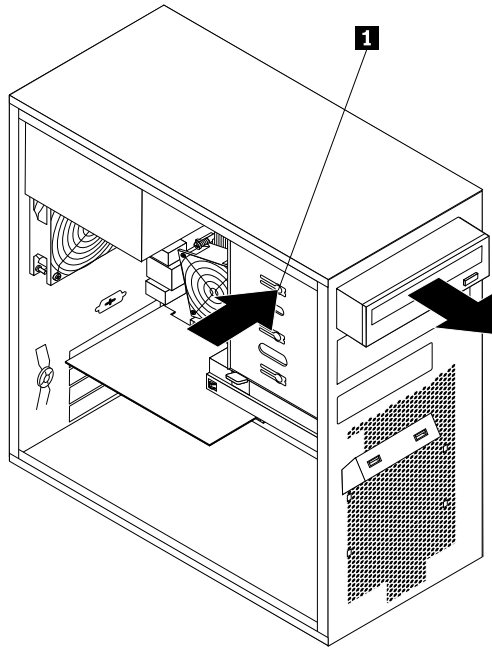


Figure 15. Removing the optical drive

5. Install the optical drive retainer on the side of the new optical drive.

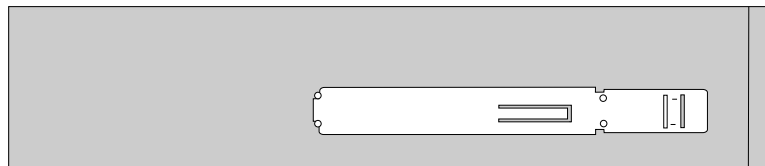


Figure 16. Installing the optical drive retainer

6. Slide the new optical drive into the optical drive bay from the front of the server until the optical drive snaps into position.

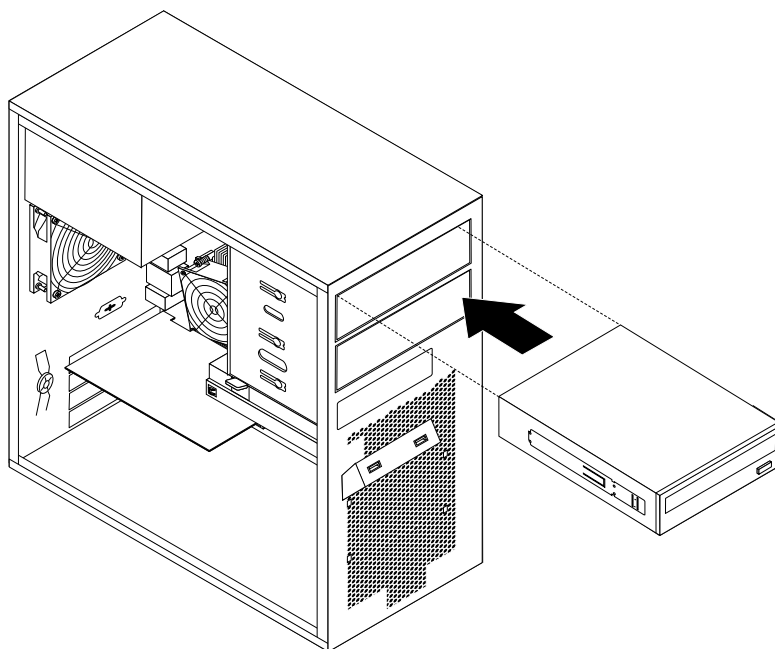


Figure 17. Installing the optical drive

7. Reinstall the front bezel. See “Removing and reinstalling the front bezel” on page 31.
8. Reconnect the signal cable and the power cable of the optical drive.
9. Go to “Completing the parts replacement” on page 57.

Replacing the secondary hard disk drive

Attention

Do not open your server or attempt any repair before reading and understanding the Chapter 1 “About this manual” on page 1 and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to: <http://www.lenovo.com/support>

This section provides instructions on how to replace the secondary hard disk drive.

Installing a secondary hard disk drive

To install a secondary hard disk drive, do the following:

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 30.
3. Locate the secondary hard disk drive bay.
4. Press the release button **1** to release the secondary hard disk drive cage and then lift the cage out of the chassis.

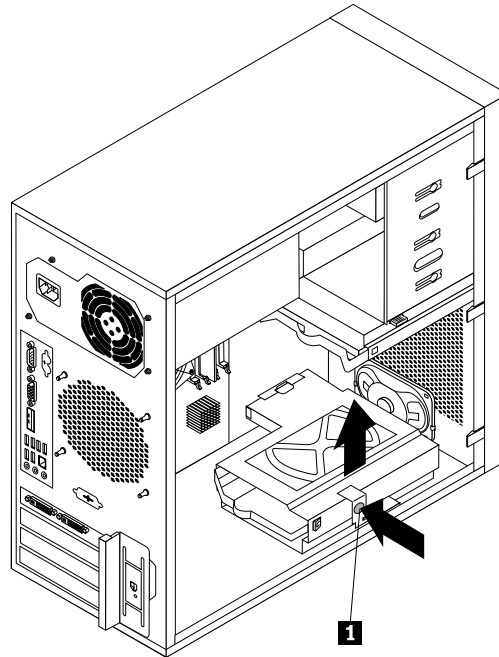


Figure 18. Removing the secondary hard disk drive cage

5. Pull on the handle to release and remove the blue hard disk drive bracket from the hard disk drive cage.
6. Flex the sides of the blue bracket to remove the hard disk drive from the bracket.
7. To install the new hard disk drive into the blue bracket, flex the sides of the bracket properly and align pin **1**, pin **2**, pin **3**, and pin **4** on the bracket with the corresponding holes in the hard disk drive. Do not touch the circuit board **5** on the bottom of the hard disk drive.

Note: If you are installing a 2.5-inch hard disk drive, install the hard disk drive into a 2.5-inch to 3.5-inch hard disk drive tray first and then install the tray into the blue bracket.

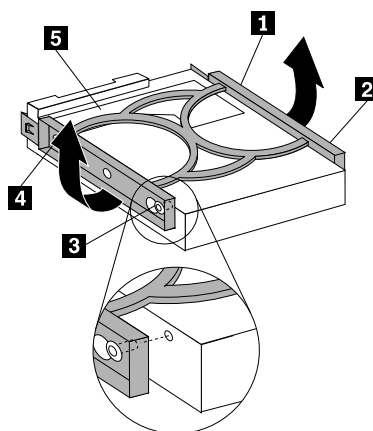


Figure 19. Installing the hard disk drive into the bracket

8. Slide the new hard disk drive with the blue bracket into the secondary hard disk drive cage until it snaps into position.

- Slide the hard disk drive cage with the new hard disk drive into the chassis until it is directly underneath the metal tab **1**.

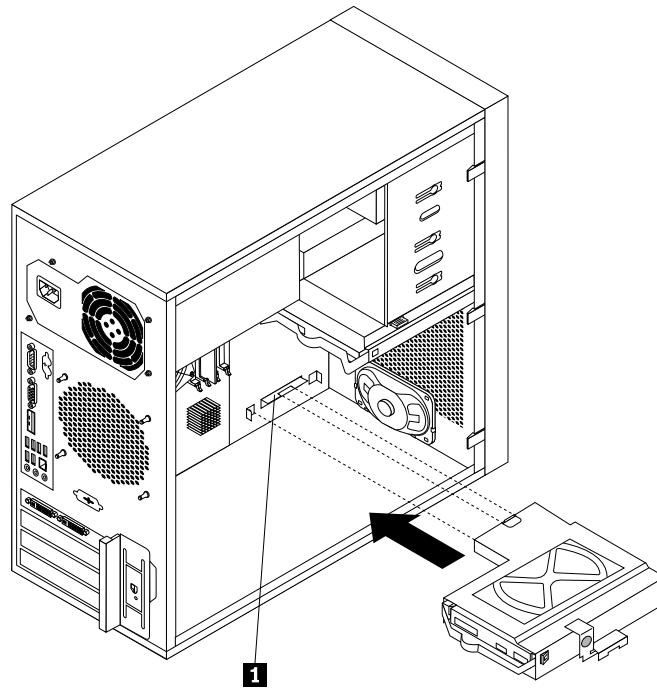


Figure 20. Installing the secondary hard disk drive

- Press the hard disk drive cage downward until it snaps into position. Make sure that the hard disk drive cage is secured in the chassis.

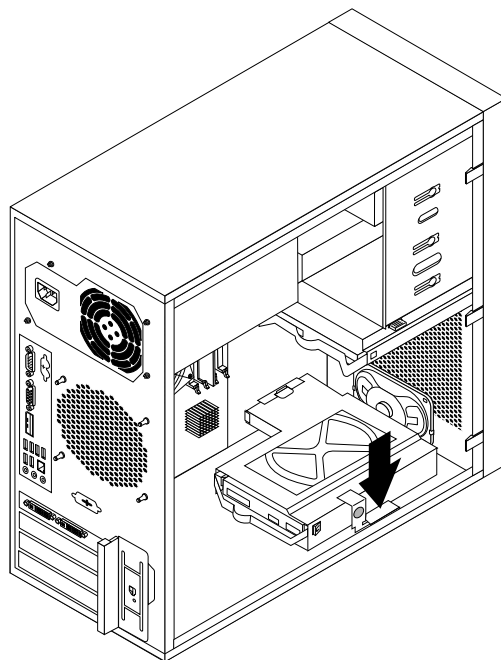


Figure 21. Installing the secondary hard disk drive

11. Reconnect the signal cable and power cable of the secondary hard disk drive.
12. Go to “Completing the parts replacement” on page 57.

Replacing the power supply assembly

Attention

Do not open your server or attempt any repair before reading and understanding the Chapter 1 “About this manual” on page 1 and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to: <http://www.lenovo.com/support>

This section provides instructions on how to replace the power supply assembly.

To replace the power supply assembly, do the following:

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 30.
3. Disconnect the power supply assembly cables from the system board and all drives. See “System-board internal connectors” on page 25.
4. Lay the server on its side and remove the four screws at the rear of the chassis that secure the power supply assembly.

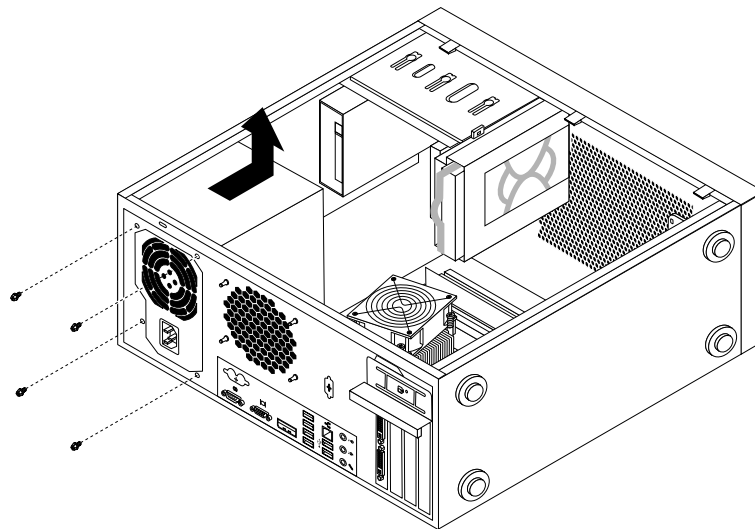


Figure 22. Removing the screws for the power supply assembly

5. Slide the power supply assembly to the front of the server and then lift it out of the chassis.
6. Ensure that the new power supply assembly is the correct replacement.
7. Install the new power supply assembly into the chassis so that the screw holes in the power supply assembly are aligned with the corresponding holes in the chassis.
8. Install and tighten the four screws to secure the new power supply assembly.

Note: Use only screws provided by Lenovo.

9. Connect the new power supply assembly cables to the system board and each of the drives. See “System-board internal connectors” on page 25.

10. Go to “Completing the parts replacement” on page 57.

Replacing the heat sink and fan assembly

Attention

Do not open your server or attempt any repair before reading and understanding the Chapter 1 “About this manual” on page 1 and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to: <http://www.lenovo.com/support>

This section provides instructions on how to replace the heat sink and fan assembly.

CAUTION:



The heat sink and fan assembly might be very hot. Turn off the server and wait three to five minutes to let the server cool before removing the server cover.

To replace the heat sink and fan assembly, do the following:

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 30.
3. Lay the server on its side for easier access to the system board.
4. Locate the heat sink and fan assembly. See “System-board internal connectors” on page 25.
5. Disconnect the heat sink and fan assembly cable from the microprocessor fan connector on the system board. See “System-board internal connectors” on page 25.
6. Follow this sequence to remove the four screws that secure the heat sink and fan assembly to the system board:
 - a. Partially remove screw **1**, then fully remove screw **2**, and then fully remove screw **1**.
 - b. Partially remove screw **3**, then fully remove screw **4**, and then fully remove screw **3**.

Note: Carefully remove the four screws from the system board to avoid any possible damage to the system board. The four screws cannot be removed from the heat sink and fan assembly.

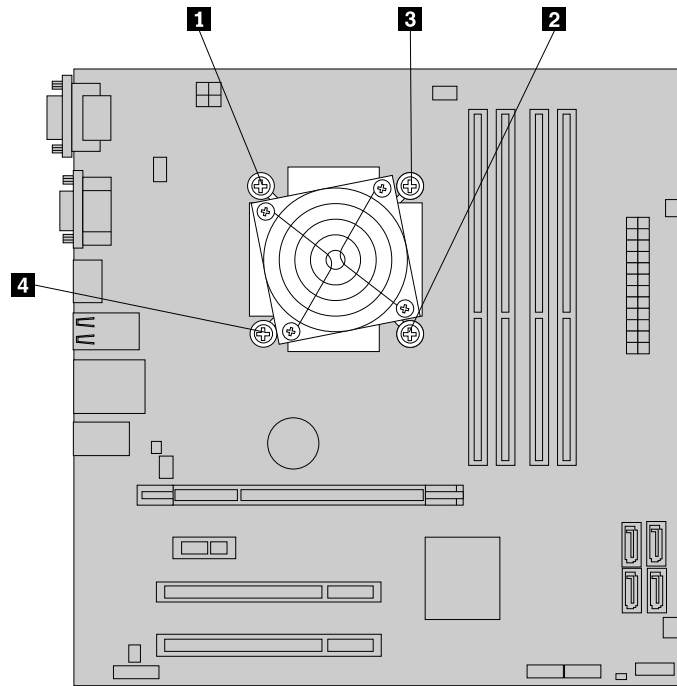


Figure 23. Removing the heat sink and fan assembly

7. Lift the failing heat sink and fan assembly off the system board.

Notes:

- a. You might have to gently twist the heat sink and fan assembly to free it from the microprocessor.
 - b. When handling the heat sink and fan assembly, do not touch the thermal grease on the bottom of the heat sink and fan assembly.
8. Position the new heat sink and fan assembly on the system board so that the four screws are aligned with the corresponding holes in the system board. Make sure that the heat sink and fan assembly cable can be easily connected to the microprocessor fan connector on the system board.
 9. Follow this sequence to install the four screws to secure the heat sink and fan assembly, as shown in Removing the heat sink and fan assemblyFigure 23 on page 45.
 - a. Partially tighten screw **1**, then fully tighten screw **2**, and then fully tighten screw **1**.
 - b. Partially tighten screw **3**, then fully tighten screw **4**, and then fully tighten screw **3**.
 10. Connect the heat sink and fan assembly cable to the microprocessor fan connector on the system board. See “System-board internal connectors” on page 25.
 11. Go to “Completing the parts replacement” on page 57.

Replacing the microprocessor

Attention

Do not open your server or attempt any repair before reading and understanding the Chapter 1 “About this manual” on page 1 and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to:<http://www.lenovo.com/support>

This section provides instructions on how to replace the microprocessor.

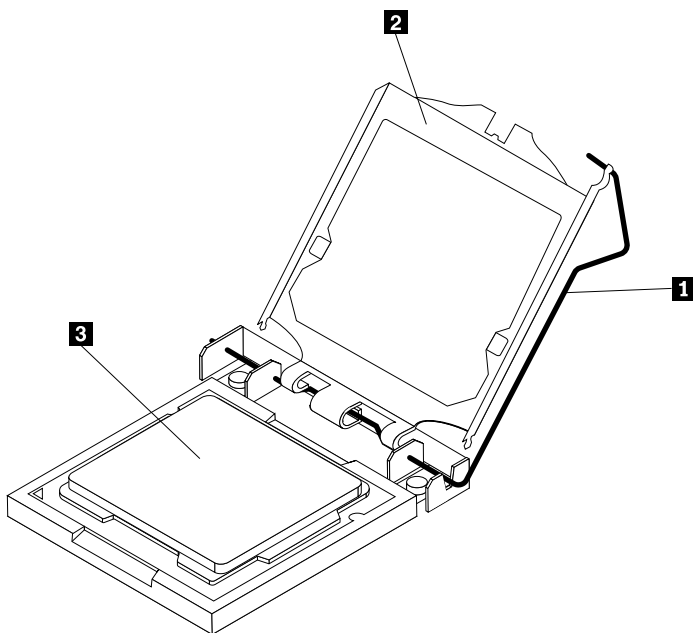
CAUTION:



The heat sink and microprocessor might be very hot. Turn off the server and wait three to five minutes to let the server cool before removing the server cover.

To replace the microprocessor, do the following:

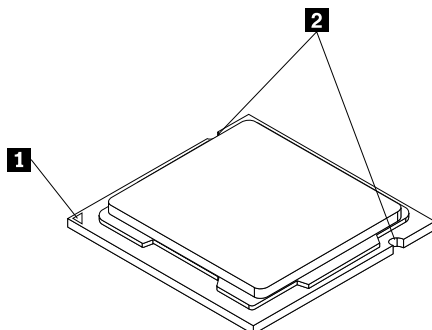
1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 30.
3. Lay the server on its side to get easier access to the system board.
4. Remove the heat sink and fan assembly from the system board. See “Replacing the heat sink and fan assembly” on page 44.
5. Lift the small handle **1** and open the retainer **2** to access the microprocessor **3**.



6. Lift the microprocessor straight up and out of the socket.

Notes:

- a. Your microprocessor and socket might look different from the one illustrated.
- b. Note the orientation of the microprocessor in the socket. You can either look for the small triangle **1** on one corner of the microprocessor or note the orientation of the notches **2** on the microprocessor. This is important when installing the new microprocessor on the system board.



- c. Touch only the sides of the microprocessor. Do not touch the gold contacts on the bottom.

- d. Do not drop anything onto the microprocessor socket while it is exposed. The socket pins must be kept as clean as possible.

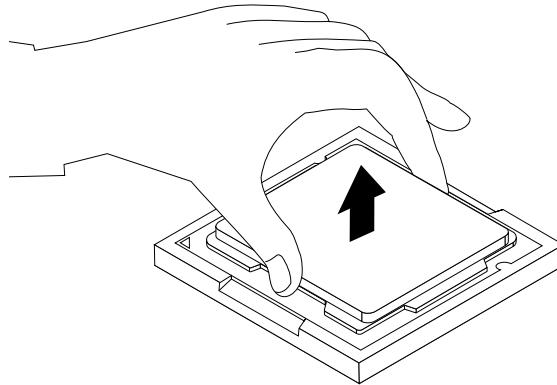


Figure 24. Removing the microprocessor

7. Make sure that the small handle is in the raised position and the microprocessor retainer is fully open.
8. Hold the new microprocessor and align the notches on it with the alignment keys in the microprocessor socket, or align the small triangle on one corner of the new microprocessor with the corresponding beveled corner of the microprocessor socket.
9. Lower the new microprocessor straight down into the microprocessor socket on the system board.
10. Close the microprocessor retainer and lock it into position with the small handle to secure the new microprocessor in the socket.
11. Reinstall the heat sink and fan assembly. See “Replacing the heat sink and fan assembly” on page 44.
12. Reinstall any other parts or reconnect any other cables you removed.
13. Go to “Completing the parts replacement” on page 57.

Replacing the system board

Attention

Do not open your server or attempt any repair before reading and understanding the Chapter 1 “About this manual” on page 1 and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to: <http://www.lenovo.com/support>

This section provides instructions on how to replace the system board.

CAUTION:



The heat sink and microprocessor might be very hot. Turn off the server and wait three to five minutes to let the server cool before removing the server cover.

Note: When replacing the system board, you must order a new retention module for the new system board. Make sure you have a retention module for the new system board before continuing this procedure.

To replace the system board, do the following:

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 30.
3. Lay the server on its side for easier access to the system board.

4. Remove all memory modules and PCI cards that are currently installed. See “Installing or replacing a memory module” on page 36 and “Installing or replacing a PCI card” on page 32.
5. Remove the secondary hard disk drive. See “Replacing the secondary hard disk drive” on page 40.
6. Remove the heat sink and fan assembly from the failing system board. See “Replacing the heat sink and fan assembly” on page 44.
7. Remove the microprocessor from the failing system board. See “Replacing the microprocessor” on page 45.
8. Remove the battery from the failing system board. See “Replacing the battery” on page 35.
9. Note the location of all cable connections on the system board and disconnect all cables. See “System-board internal connectors” on page 25.
10. Remove the eight screws that secure the system board to the chassis, following the sequence shown in the illustration:

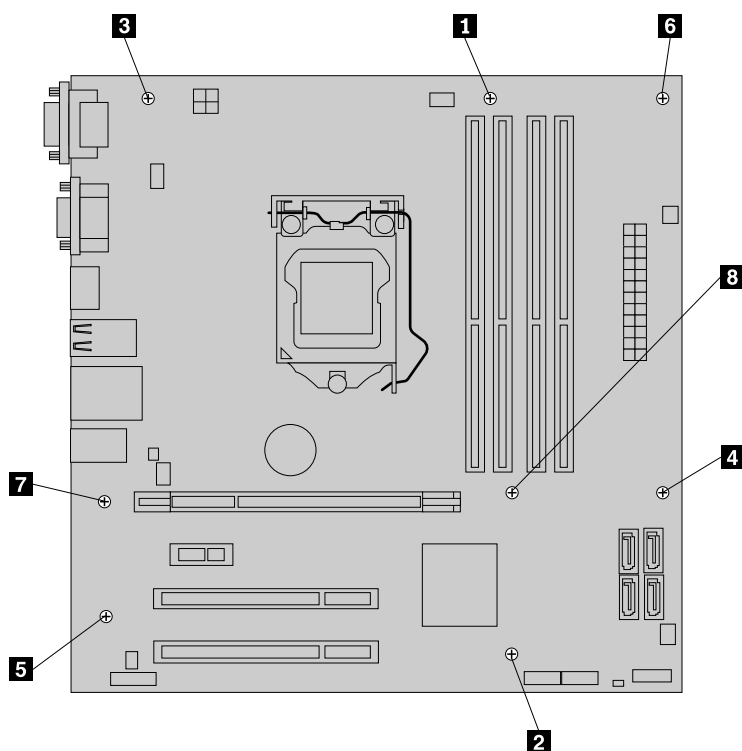


Figure 25. Removing the system board

11. Carefully lift the failing system board out of the chassis.
12. Position the new system board into the chassis so that the screw holes in the new system board are aligned with those in the chassis. Install the screws that secure the system board following the sequence shown in Removing the system board Figure 25 on page 48.
13. Remove the microprocessor socket cover from the new system board.
14. Install the memory modules, PCI cards, battery, microprocessor, and heat sink and fan assembly that you removed from the failing system board to the new system board.
15. Reinstall the secondary hard disk drive. See “Replacing the secondary hard disk drive” on page 40.
16. Connect all cables to the system board. See “System-board internal connectors” on page 25.
17. Go to “Completing the parts replacement” on page 57.

The failing system board must be returned with a microprocessor socket cover to protect the pins during shipping and handling.

To install the microprocessor socket cover:

1. Remove the microprocessor from the microprocessor socket. See “Replacing the microprocessor” on page 45.
2. Align the notches **1** on the microprocessor socket cover with the alignment keys **2** in the microprocessor socket.
3. Install one side of the socket cover into the microprocessor socket as shown.

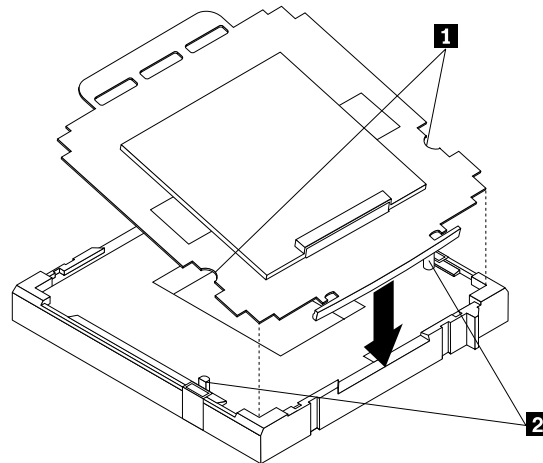


Figure 26. Installing the socket cover

Note: Your microprocessor socket and socket cover might look slightly different from the illustration.

4. Carefully press the other side of the socket cover downward until the socket cover snaps into place.

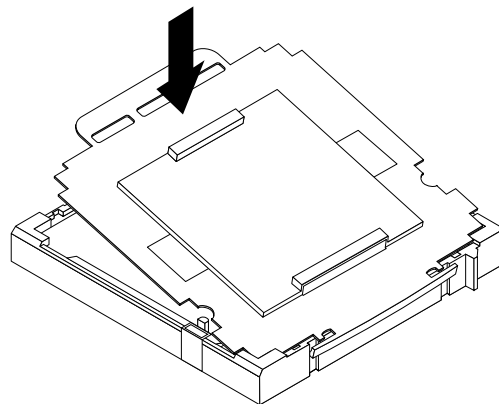


Figure 27. Securing the socket cover

5. Carefully check the corners of the socket cover to make sure that the cover is secured in the microprocessor socket.
6. Lower the microprocessor retainer and then lower the lever to secure the retainer. Make sure the lever is locked into position.

Replacing the primary hard disk drive

Attention

Do not open your server or attempt any repair before reading and understanding the Chapter 1 “About this manual” on page 1 and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to: <http://www.lenovo.com/support>

This section provides instructions on how to replace the primary hard disk drive.

To replace the primary hard disk drive, do the following:

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 30.
3. Locate the primary hard disk drive.
4. Disconnect the signal cable and the power cable from the rear of the hard disk drive.
5. Press the blue release tab **1** downward, slide the hard disk drive cage **2** to the rear of the server, and then pivot it outward to completely remove the drive cage from the chassis. Then, pull on the blue handle **3** to release and remove the hard disk drive from the drive cage.

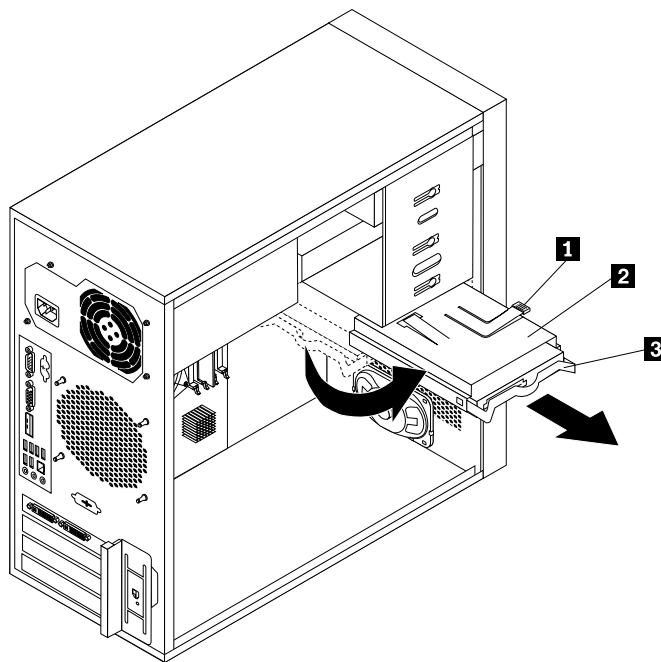


Figure 28. Removing the primary hard disk drive

6. Flex the sides of the blue bracket to remove the hard disk drive from the bracket.
7. To install a new hard disk drive into the blue bracket, flex the sides of the bracket and align pin **1**, pin **2**, pin **3**, and pin **4** on the bracket with the corresponding holes in the hard disk drive. Do not touch the circuit board **5** on the bottom of the hard disk drive.

Note: If you are installing a 2.5-inch hard disk drive, install the hard disk drive into a 2.5-inch to 3.5-inch hard disk drive tray first and then install the tray into the blue bracket.

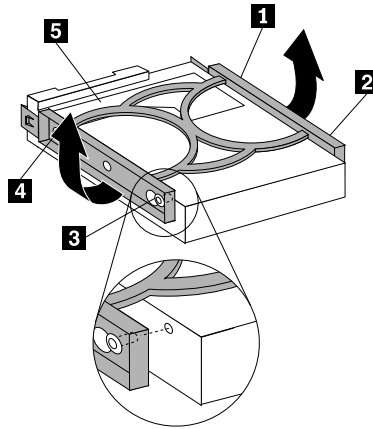


Figure 29. Installing the hard disk drive into the bracket

8. Slide the new hard disk drive with the blue bracket into the drive cage until it snaps into position.
9. Align the hard disk drive cage pivot pin with the slot **1** in the upper drive cage, as shown in Installing the primary hard disk drive Figure 30 on page 52. Then, slide the hard disk drive cage into the chassis.
10. Press down on the metal latch **2** and pivot the hard disk drive cage into place. Then, slide the drive cage to the front of the server until it snaps into position.

Note: There are two arrows, one on the upper drive cage and one on the hard disk drive cage. The arrows are aligned when the hard disk drive is in the proper position.

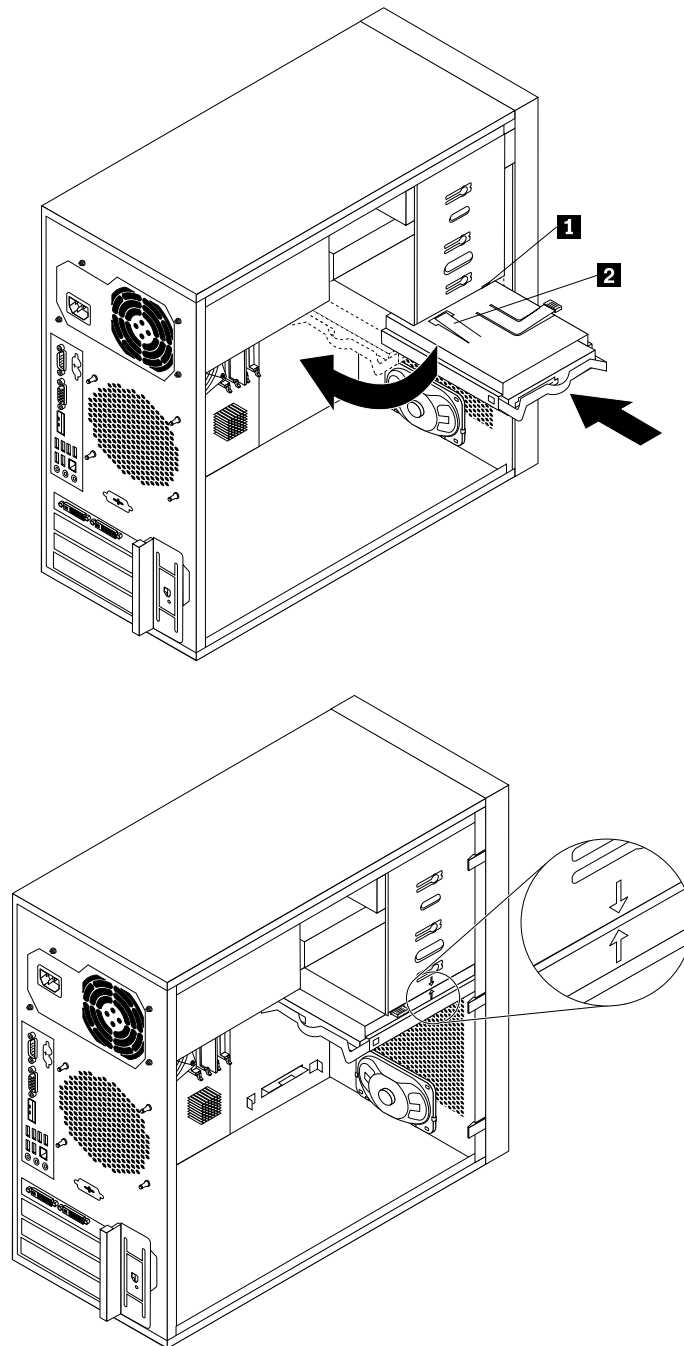


Figure 30. Installing the primary hard disk drive

11. Connect the signal cable and the power cable to the new hard disk drive.
12. Go to “Completing the parts replacement” on page 57.

Replacing the front fan assembly

Attention


Do not open your server or attempt any repair before reading and understanding the Chapter 1 “About this manual” on page 1 and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to: <http://www.lenovo.com/support>

Depending on the model type, your server might have a front fan assembly installed. This section provides instructions on how to replace the front fan assembly.

To replace the front fan assembly, do the following:

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 30.
3. Remove the front bezel. See “Removing and reinstalling the front bezel” on page 31.
4. Disconnect the front fan assembly cable from the power fan connector on the system board. See “System-board internal connectors” on page 25.

Note: If your server has a secondary hard disk drive installed, remove the secondary hard disk drive to get easier access to the power fan connector on the system board. See “Replacing the secondary hard disk drive” on page 40.

5. Release the two tabs  that attach the front fan assembly to the chassis as shown and then completely remove the front fan assembly from the chassis.

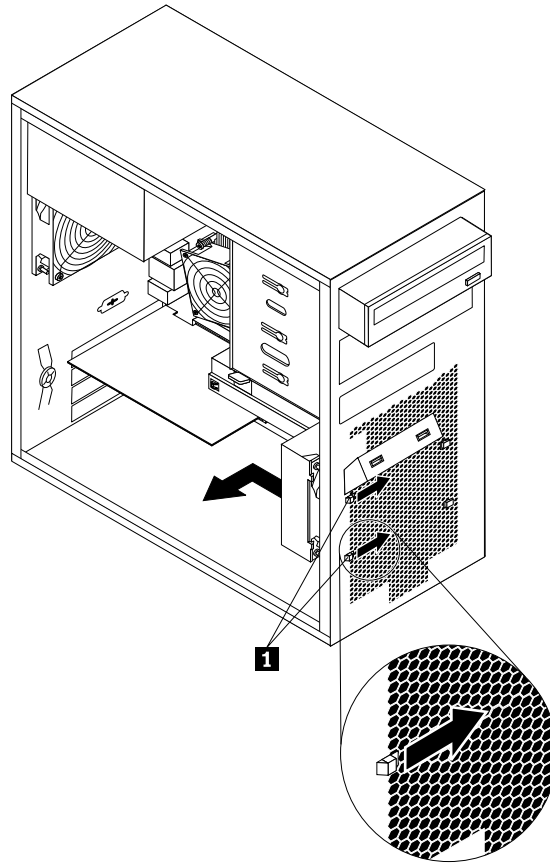


Figure 31. Removing the front fan assembly

6. Insert the two tabs **2** of the new front fan assembly into the corresponding holes in the chassis, and press the other two tabs **1** through the holes until the front fan assembly is secured in place.

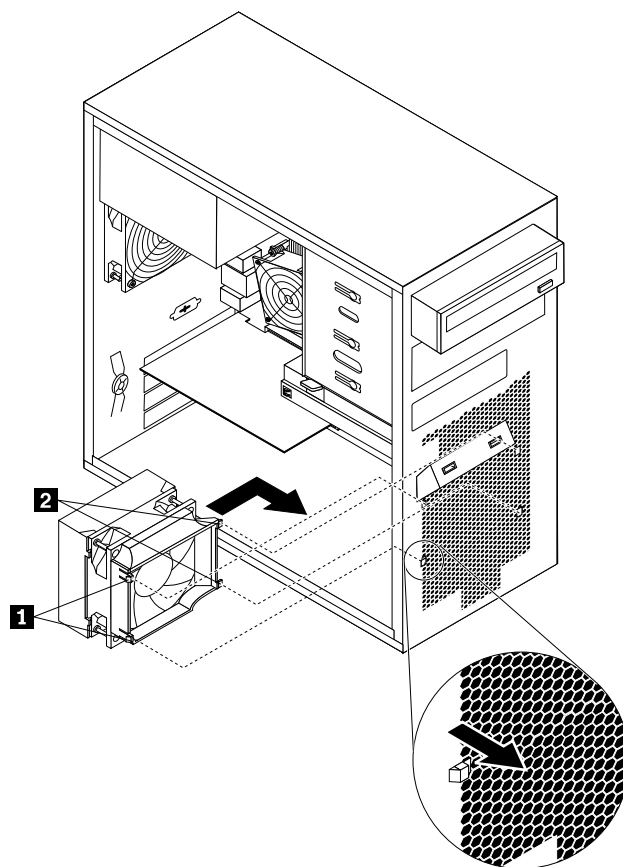


Figure 32. Installing the front fan assembly

7. Connect the new front fan assembly cable to the power fan connector on the system board. See “System-board internal connectors” on page 25.
8. Reinstall the secondary hard disk drive if removed. See “Replacing the secondary hard disk drive” on page 40.
9. Go to “Completing the parts replacement” on page 57.

Replacing the rear fan assembly

Attention

Do not open your server or attempt any repair before reading and understanding the Chapter 1 “About this manual” on page 1 and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to: <http://www.lenovo.com/support>

This section provides instructions on how to replace the rear fan assembly.

To replace the rear fan assembly, do the following:

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 30.
3. Locate the rear fan assembly. See “Internal components” on page 26.

4. Disconnect the rear fan assembly cable from the system fan connector on the system board. See “System-board internal connectors” on page 25.
5. The rear fan assembly is attached to the chassis by four rubber mounts. Remove the rear fan assembly by cutting the rubber mounts and gently pulling the rear fan assembly out of the chassis.

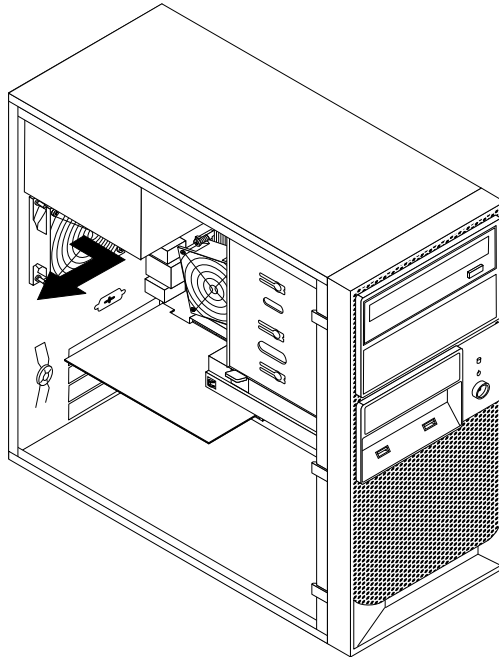


Figure 33. Removing the rear fan assembly

6. Install the new rear fan assembly by aligning the new rubber mounts with the corresponding holes in the chassis and push the rubber mounts through the holes.

Note: The new rear fan assembly will have four new rubber mounts attached.

7. Carefully pull on the tips of the rubber mounts until the new rear fan assembly is secured in place.

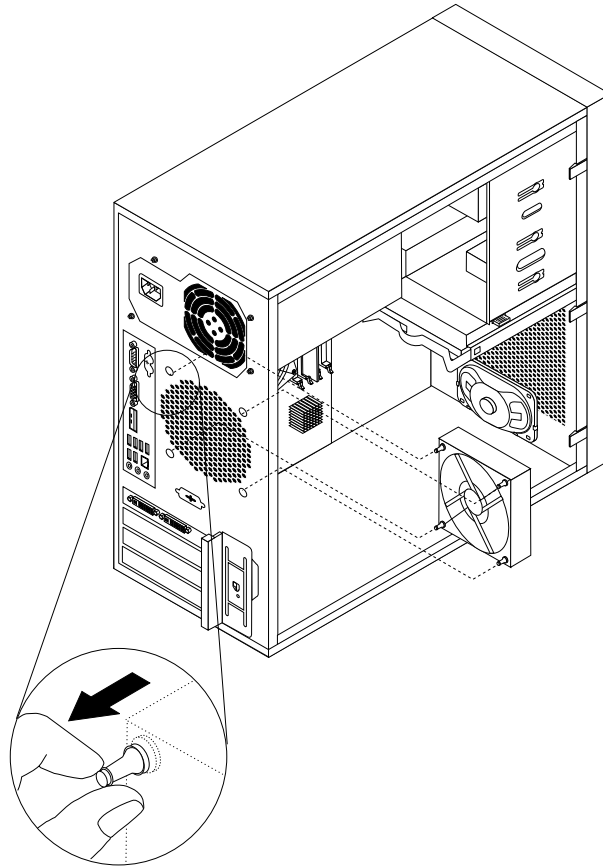


Figure 34. Installing the rear fan assembly

8. Connect the new rear fan assembly cable to the system fan connector on the system board. See “System-board internal connectors” on page 25.
9. Go to “Completing the parts replacement” on page 57.

Completing the parts replacement

After completing the installation or replacement for all parts, you need to reinstall the server cover and reconnect cables.

To reinstall the server cover and reconnect cables to your server, do the following:

1. Make sure that all components have been reassembled correctly and that no tools or loose screws are left inside your server. See “Internal components” on page 26 for the locations of various components in your server.
2. If you have removed the front bezel, reinstall it. See “Removing and reinstalling the front bezel” on page 31.
3. Make sure that the cables are routed correctly before reinstalling the server cover. Keep cables clear of the hinges and sides of the server chassis to avoid interference with reinstalling the server cover.
4. Position the server cover on the chassis so that the rail guides on the bottom of the server cover engage the rails on the chassis. Then, slide the cover to the front of the server until it snaps into position.

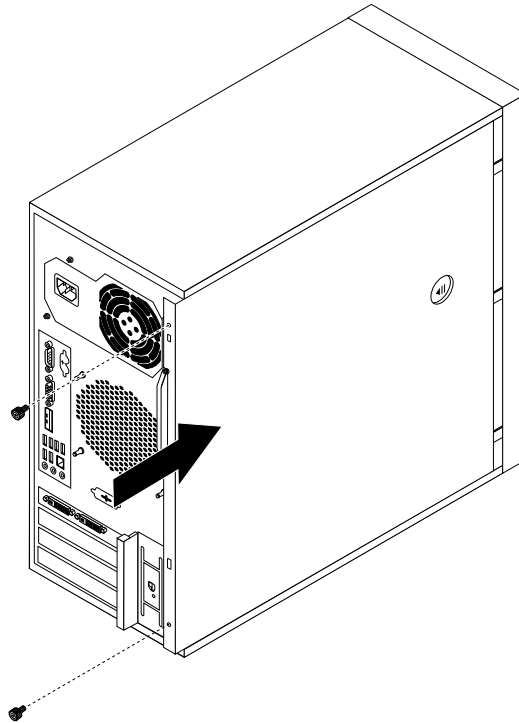


Figure 35. Reinstalling the server cover

5. Install the screws to secure the server cover.
6. Lock the server cover if you have a server cover lock.
7. Reconnect the external cables and power cords to the server. See “Front view” on page 23 and “Rear view” on page 23.
8. Depending on the parts you installed or replaced, you might need to confirm the updated information in the Setup Utility program. Refer to Chapter 8 “Configuring the server” on page 77.

Note: In most areas of the world, Lenovo requires the return of the defective FRU. Information about this will come with the FRU or will come a few days after the FRU arrives.

Updating the server configuration

When you start the server for the first time after you install or remove an internal option or external device, you might receive a message that the configuration has changed. The Setup Utility program starts automatically so that you can save the new configuration settings.

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

You can obtain device drivers for operating systems that are not preinstalled at <http://www.lenovo.com/support>. Installation instructions are provided in readme files with the device-driver files.

Chapter 7. Parts Listing, TS200v Machine Types 0981, 0992, 1008, and 1010

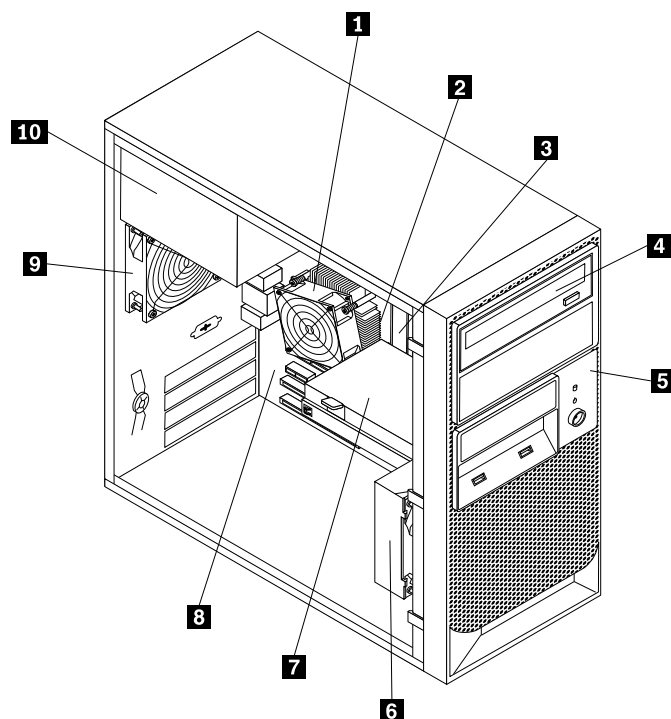
The following replaceable components are available for the ThinkServer TS200v Machine Types 0981, 0992, 1008, and 1010 servers.

Replaceable components are of three types:

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

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

Machine Type 0981



Item #	0981 FRUs	FRU#	CRU
1	Heat sink, 73/95 Watt (models CTO All Models)	43N9700	N
2	Microprocessor, Intel Celeron, 2.26G/2M-L2 (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11J 11G 11M)	46U3127	N

Item #	0981 FRUs	FRU#	CRU
2	Microprocessor, Pentium G6950 1066/2800MHz 3MB Cache 73W 2-Thread Dual Core (iGfx 533MHz) (models CTO 12U 12F 12S 12L 12D 12Y 12G 12M 12J 14M 14J 1AU 1AF 1AS)	71Y5303	N
2	Microprocessor, Core i3 530 1333/2930MHz 4MB Cache 73W 4-Thread Dual Core (iGfx Speed 733MHz) (models CTO)	71Y6960	N
2	Microprocessor, Core i3-540 / 2.93GHz (models CTO)	71Y5304	N
2	Microprocessor, Core i5-650 / 3.20GHz (models CTO 18U 18F 18S 18L 18D 18Y 18G 18M 18J 19U 19F 19S 19L 19D 19Y 19G 19M 19J 1BU 1BF)	71Y6961	N
2	Microprocessor, Core i5-660 / 3.33GHz (models CTO)	71Y6962	N
2	Microprocessor, Core i5-670 / 3.46GHz (models CTO)	71Y6963	N
2	Microprocessor, i5-680 (K0 stepping) (models CTO)	89Y9196	N
2	Microprocessor, i3-550(K0 stepping) (models CTO)	89Y9195	N
2	Microprocessor, B1 stepping (models CTO1CU 1CF 1CS 1CL 1CD 1CY 1CG 1CM 1CJ)	64Y8427	N
2	Microprocessor, B1 stepping (models CTO)	64Y8425	N
3	Memory modules, DDR3 ECC PC3-10600 1GB UDIMM (1333) (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11J 11G 11M)	46R6026	1
3	Memory modules, DDR3 ECC PC3-10600 2GB UDIMM (1333) (models CTO12U 12F 12S 12L 12D 12Y 12G 12M 12J 14M 14J 18U 18F 18S 18L 18D 18Y 18G 18M 18J 19U 19F 19S 19L 19D 19Y 19G 19M 19J 1AU 1AF 1AS 1BU 1BF 1CU 1CF 1CS 1CL 1CD 1CY 1CG 1CM 1CJ)	46R6027	1
3	Memory modules, DDR3 ECC PC3-10600 4GB UDIMM (1333) (models CTO)	64Y9570	1
4	Optical drive, DVD-ROM Drive, 16x/48x (SATA) (models CTO 111U 11F 11S 11L 11D 11Y 11G 11M 11J 12U 12F 12S 12L 12D 12Y 12G 12M 12J 14M 14J 18U 18F 18S 18L 18D 18Y 18G 18M 18J 1AS 1AU 1AF)	71Y5543	1
4	Optical drive, DVD Burner/CD, RW Rambo 8 (SATA) (models CTO 19U 19F 19S 19L 19D 19Y 19G 19M 19J 1BU 1BF 1CU 1CF 1CS 1CL 1CD 1CY 1CG 1CM 1CJ)	71Y5545	1
5	Front Bezel assembly (models CTO All Models)	90Y0051	2
6	Front system fan assembly including mount and baffle (models CTO All Models)	45K2306	N
7	Hard disk drive, 250GB SATA, Enterprise 7200 rpm, 3 Gb/s, 8MB cache, 3.5" (models CTO 111U 11F 11S 11L 11D 11Y 11G 11M 11J 12U 12F 12S 12L 12D 12Y 12G 12M 12J 14M 14J 18U 18F 18S 18L 18D 18Y 18G 18M 18J 1AU 1AF 1AS 1BU 1BF)	46U3100	1
7	Hard disk drive, 500GB SATA, Enterprise 7200 rpm, 3 Gb/s, 16MB cache, 3.5" (models CTO 19U 19F 19S 19L 19D 19Y 19G 19M 19J 1CU 1CF 1CS 1CL 1CD 1CY 1CG 1CM 1CJ)	46U3101	1
7	Hard disk drive, 1TB SATA, Enterprise 7200 rpm, 3 Gb/s, 32MB cache, 3.5" (models CTO)	46U3103	1
8	System board, Motherboard, TPM Enabled, not Russia (models CTO 11U 11F 11S 11L 11D 11Y 11G 11M 11J 12U 12F 12S 12L 12D 12Y 12G 12M 12J 14M 14J 18U 18F 18S 18L 18D 18Y 18G 18M 18J 19U 19F 19S 19L 19D 19Y 19G 19M 19J 1AU 1AF 1AS 1BU 1BF 1CU 1CF 1CS 1CL 1CD 1CY 1CG 1CM 1CJ)	64Y8423	N
8	System board, Motherboard, TPM Disabled, Russia Only (models Russia Only)	64Y8424	N
9	Rear Fan Assembly, with Fan Grill, 0 to 20%, 750 RPM (models CTO All Models)	45K2324	2
10	Power supply, 280 Watt Power Supply (85 plus) WW, Robust, JP (models CTO All Models)	45J9431	2

The FRUs listed in the following tables are not illustrated.

0981 FRUs	FRU#	CRU
Front and rear handle assembly, no handle cover (models CTO All Models)	45K2301	2
ODD/FDD cover, retainer and shield assembly (models CTO All Models)	45K2302	1
Side panel assembly (models CTO All Models)	45K2304	2
Miscellaneous kit (models CTO All Models)	45K2307	2
Speaker cable, 400mm (models CTO All Models)	43N9091	2
EMC Shield (models CTO All Models)	41N8080	2
Cable, SATA 457mm (RoHS) (models CTO All Models)	43N9013	2
FDD EMI shield (models CTO All Models)	41N8078	2
Optional HDD bracket assembly, without 4 pin cable (models CTO All Models)	41R6106	1
Temp sense cable (6pin 460 mm) kit w/ bracket (models CTO All Models)	45J9495	2
Intrusion switch assembly (models CTO All Models)	41R6116	2
Cable, SATA 250mm (RoHS) (models CTO All Models)	43N9012	2
HDD tray (models CTO All Models)	41R6291	1
Rear IO shield, ATX, with USB number (models CTO All Models)	43N9846	2
Cable, SATA 120mm RoHS used for 2nd HDD (models CTO All Models)	41R3328	2
Adapter bracket, 2.5 to 3.5 HDD (models CTO All Models)	41R5625	2
USB cable assembly, front panel (models CTO All Models)	90Y0075	2
Chassis assembly, mechanical kit (models CTO All Models)	90Y1296	2
Intel Pro/1000 PT dual port Ethernet card (models CTO 1AS 1AU 1AF 18U 18F 18S 18L 18D 18Y 18G 18M 19U 19F 19S 19L 19D 19Y 19G 19M 11U 11F 11S 11L 11D 11Y 11G 11M 12U 12F 12S 12L 12D 12Y 12G 12M)	67Y1430	1
Lenovo RDX drive bay (models CTO)	67Y1421	1
Lenovo RDX cables (models CTO)	67Y1422	1
Lenovo RDX 160GB cartridge (models CTO)	67Y1423	1
Lenovo RDX 320GB cartridge (models CTO)	67Y1424	1
Lenovo RDX 500GB cartridge (models CTO)	67Y1425	1
256MB NVIDIA FX380 (2xDVI) (models CTO 1CU 1CF 1CS 1CL 1CD 1CY 1CG 1CM 1CJ)	46R2784	1

0981 Line Cords	FRU#	CRU
Line Cord - US (models CTO 11U 12U 11F 12F 11S 12S 11L 12L 11D 12D 18U 18F 18S 18L 18D 19U 19F 19S 19L 19D 1AU 1AS 1AF)	41R3184	1
Line Cord - US (models CTO 11U 12U 11F 12F 11S 12S 11L 12L 11D 12D 18U 18F 18S 18L 18D 19U 19F 19S 19L 19D 1AU 1AS 1AF)	41R3185	1
Line Cord - China (models CTO)	41R3256	1
Line Cord - China (models CTO)	41R3257	1
Line Cord - Japan (models CTO)	41R3248	1
Line Cord - Japan (models CTO)	24R2633	1
Line Cord - Brazil (models CTO)	41R3271	1

0981 Line Cords	FRU#	CRU
Line Cord - Brazil (models CTO)	45J9595	1
Line Cord - LA High Volt (APU) (models CTO)	41R3176	1
Line Cord - LA High Volt (APU) (models CTO)	41R3177	1
Line Cord-Australia / New Zealand (models CTO 11M 12M 18M 19M)	41R3196	1
Line Cord-Australia / New Zealand (models CTO 11M 12M 18M 19M)	41R3197	1
Line Cord - Korea (models CTO)	41R3260	1
Line Cord - Korea (models CTO)	41R3261	1
Line Cord - Hong Kong, UK, Ireland, Singapore, Malaysia, Brunei, Hong Kong (models CTO 11G 12G 18G 19G)	41R3224	1
Line Cord - Hong Kong, UK, Ireland, Singapore, Malaysia, Brunei, Hong Kong (models CTO 11G 12G 18G 19G)	41R3225	1
Line Cord - Taiwan (models CTO)	41R3278	1
Line Cord - Taiwan (models CTO)	41R3279	1
Line Cord - Italy (models CTO 11S 12S 11L 12L 11Y 12Y 11G 12G 18S 18L 18Y 18G 19S 19L 19Y 19G 1AS)	41R3232	1
Line Cord - Italy (models CTO 11S 12S 11L 12L 11Y 12Y 11G 12G 18S 18L 18Y 18G 19S 19L 19Y 19G 1AS)	41R3233	1
Line Cord - A models (models CTO)	41R3208	1
Line Cord - A models (models CTO)	41R3209	1
Line Cord - Denmark (models CTO 11G 12G 18G 19G)	41R3212	1
Line Cord - Denmark (models CTO 11G 12G 18G 19G)	41R3213	1
Line Cord - Switzerland (models CTO 11G 12G 18G 19G)	41R3228	1
Line Cord - Switzerland (models CTO 11G 12G 18G 19G)	41R3229	1
Line Cord - Israel (models CTO 11G 12G 18G 19G)	41R3236	1
Line Cord - Israel (models CTO 11G 12G 18G 19G)	41R3237	1
Line Cord - South Africa (models CTO 11G 12G 11M 12M 18G 18M 19G 19M)	41R3220	1
Line Cord - South Africa (models CTO 11G 12G 11M 12M 18G 18M 19G 19M)	41R3221	1
Line Cord - India (models CTO)	41R3341	1
Line Cord - India (models CTO)	41R3175	1
Line Cord - Austria, Belgium, Croatia ,Czechoslovakia, Finland France Germany Hungary, Netherlands, Norway, Poland, Portugal Romania, Spain , Sweden (models CTO)	41R3209	1
Line Cord - Austria, Belgium, Croatia ,Czechoslovakia, Finland France Germany Hungary, Netherlands, Norway, Poland, Portugal Romania, Spain , Sweden (models CTO)	41R3208	1

0981 Windows Server 2008 R2 Foundation 64-bit	FRU#	CRU
English (models CTO 13U 13F 13S 13L 13D 13Y 13G 13M)	90Y1166	1
French (models CTO 13F)	90Y1168	1
German (models CTO)	90Y1169	1
Japanese (models CTO)	90Y1171	1
Spanish (models CTO 13S 13D13Y)	90Y1172	1
Italian (models CTO 13S 13L13Y)	90Y1170	1

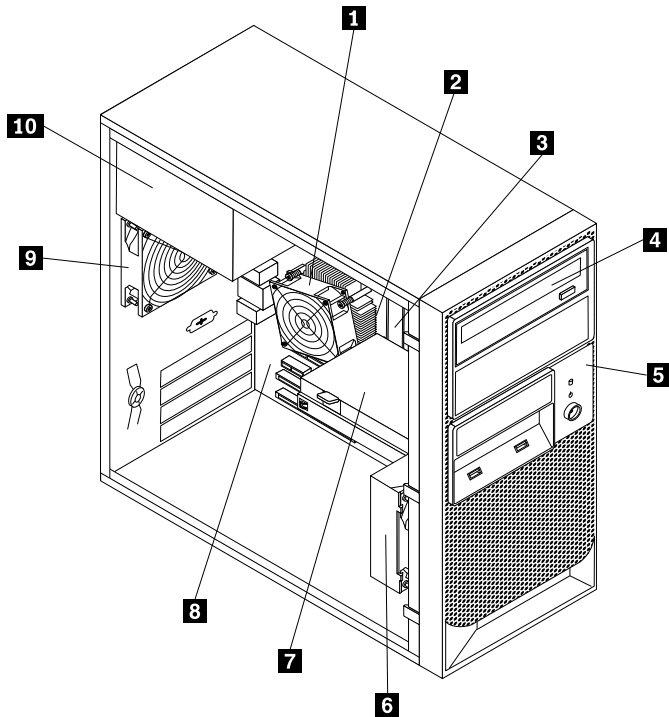
0981 Windows Server 2008 R2 Foundation 64-bit	FRU#	CRU
Turkish (models CTO)	90Y1173	1
Dutch (models CTO)	90Y1167	1

0981 Ship Groups	FRU#	CRU
Easy start up DVD (models CTO)	03X3607	1

0981 Windows Server 2008 R2 Standard 64-bit	FRU#	CRU
English (models CTO)	90Y1183	1
French (models CTO)	90Y1184	1
German (models CTO)	90Y1185	1
Japanese (models CTO)	90Y1186	1
Spanish (models CTO)	90Y1187	1
Italian (models CTO)	90Y1188	1
Turkish (models CTO)	90Y1189	1
Dutch (models CTO)	90Y1190	1

0981 Windows Small Business Server 2008 Standard w/ SP2	FRU#	CRU
English (models CTO)	90Y1174	1
French (models CTO)	90Y1176	1
German (models CTO)	90Y1177	1
Japanese (models CTO)	90Y1179	1
Spanish (models CTO)	90Y1180	1
Italian (models CTO)	90Y1178	1
Turkish (models CTO)	90Y1181	1
Dutch (models CTO)	90Y1175	1

Machine Type 0992



Item #	0992 FRUs	FRU#	CRU
1	Heat sink, 73/95 Watt (models CTO All Models)	43N9700	N
2	Microprocessor, Intel Celeron, 2.26G/2M-L2 (models CTO)	46U3127	N
2	Microprocessor, Pentium G6950 1066/2800MHz 3MB Cache 73W 2-Thread Dual Core (iGfx 533MHz) (models CTO)	71Y5303	N
2	Microprocessor, Core i3 530 1333/2930MHz 4MB Cache 73W 4-Thread Dual Core (iGfx Speed 733MHz) (models CTO)	71Y6960	N
2	Microprocessor, Core i3-540 / 2.93GHz (models CTO 18G)	71Y5304	N
2	Microprocessor, Core i5-650 / 3.20GHz (models CTO 17G 17J 17M)	71Y6961	N
2	Microprocessor, Core i5-660 / 3.33GHz (models CTO)	71Y6962	N
2	Microprocessor, Core i5-670 / 3.46GHz (models CTO)	71Y6963	N
2	Microprocessor, i5-680 (K0 Stepping) (models CTO)	89Y9196	N
2	Microprocessor, i3-550(K0 stepping) (models CTO)	89Y9195	N
2	Microprocessor, B1 Stepping (models CTO)	64Y8425	N
2	Microprocessor, B1 Stepping (models CTO 19U 19F 19S 19L 19D 19Y 19G 19M 19J)	64Y8427	N
3	Memory modules, DDR3 ECC PC3-10600 1GB UDIMM (1333) (models CTO)	46R6026	1
3	Memory modules, DDR3 ECC PC3-10600 2GB UDIMM (1333) (models CTO 17G 17J 17M 18G)	46R6027	1
3	Memory modules, DDR3 ECC PC3-10600 4GB UDIMM (1333) (models CTO 19U 19F 19S 19L 19D 19Y 19G 19M 19J)	64Y9570	1
4	Optical drive, DVD-ROM Drive, 16x/48x (SATA) (models CTO)	71Y5543	1

Item #	0992 FRUs	FRU#	CRU
4	Optical drive, DVD Burner/CD, RW Rambo 8 (SATA) (models CTO 17G 17J 17M 18G19U 19F 19S 19L 19D 19Y 19G 19M 19J)	71Y5545	1
5	Front Bezel assembly (models CTO All Models)	90Y0051	2
6	Front system fan assembly including mount and baffle (models CTO All Models)	45K2306	N
7	Hard disk drive, 250GB SATA, Enterprise 7200 rpm, 3 Gb/s, 8MB cache, 3.5" (models CTO)	46U3100	1
7	Hard disk drive, 500GB SATA, Enterprise 7200 rpm, 3 Gb/s, 16MB cache, 3.5" (models CTO 17G 17J 17M 18G19U 19F 19S 19L 19D 19Y 19G 19M 19J)	46U3101	1
7	Hard disk drive, 1TB SATA, Enterprise 7200 rpm, 3 Gb/s, 32MB cache, 3.5" (models CTO)	46U3103	1
8	System board, Motherboard, TPM Enabled, not Russia (models CTO 17G 17J 17M 18G19U 19F 19S 19L 19D 19Y 19G 19M 19J)	64Y8423	N
8	System board, Motherboard, TPM Disabled, Russia Only (models Russia Only)	64Y8424	N
9	Rear fan assembly, with Fan Grill, 0 to 20%, 750 RPM (models CTO All Models)	45K2324	2
10	Power supply, 280 Watt Power Supply (85 plus) WW, Robust, JP (models CTO)	45J9431	2

The FRUs listed in the following tables are not illustrated.

0992 FRUs	FRU#	CRU
Front and rear handle assembly, no handle cover (models CTO All Models)	45K2301	2
ODD/FDD cover, retainer and shield assembly (models CTO All Models)	45K2302	1
Side panel assembly (models CTO All Models)	45K2304	2
Miscellaneous kit (models CTO All Models)	45K2307	2
Speaker cable, 400mm (models CTO All Models)	43N9091	2
EMC Shield (models CTO All Models)	41N8080	2
Cable, SATA 457mm (RoHS) (models CTO All Models)	43N9013	2
FDD EMI shield (models CTO All Models)	41N8078	2
Optional HDD bracket assembly, without 4 pin cable (models CTO All Models)	41R6106	1
Temp sense cable (6pin 460 mm) kit w/ bracket (models CTO All Models)	45J9495	2
Intrusion switch assembly (models CTO All Models)	41R6116	2
Cable, SATA 250mm (RoHS) (models CTO All Models)	43N9012	2
HDD tray (models CTO All Models)	41R6291	1
Rear IO shield, ATX, with USB number (models CTO All Models)	43N9846	2
Cable, SATA 120mm RoHS used for 2nd HDD (models CTO All Models)	41R3328	2
Adapter bracket, 2.5 to 3.5 HDD (models CTO All Models)	41R5625	2
USB cable assembly, front panel (models CTO All Models)	90Y0075	2
Chassis assembly, mechanical kit (models CTO All Models)	90Y1296	2
Intel Pro/1000 PT dual port Ethernet card (models CTO 17G 17J 17M)	67Y1430	1
Lenovo RDX drive bay (models CTO All Models)	67Y1421	1
Lenovo RDX cables (models CTO All Models)	67Y1422	1
Lenovo RDX 160GB cartridge (models CTO All Models)	67Y1423	1

0992 FRUs	FRU#	CRU
Lenovo RDX 320GB cartridge (models CTO All Models)	67Y1424	1
Lenovo RDX 500GB cartridge (models CTO All Models)	67Y1425	1
Easy startup DVD (models CTO All Models)	03X3607	1
256MB NVIDIA FX380 (2xDVI) (models CTO 19U 19F 19S 19L 19D 19Y 19G 19M 19J)	46R2784	1

0992 Line Cords	FRU#	CRU
Line Cord - US (models CTO)	41R3184	1
Line Cord - US (models CTO)	41R3185	1
Line Cord - China (models CTO)	41R3256	1
Line Cord - China (models CTO)	41R3257	1
Line Cord - Japan (models CTO 15J)	41R3248	1
Line Cord - Japan (models CTO 15J)	24R2633	1
Line Cord - Brazil (models CTO)	45J9595	1
Line Cord - Brazil (models CTO)	41R3271	1
Line Cord - LA High Volt (APU) (models CTO)	41R3176	1
Line Cord - LA High Volt (APU) (models CTO)	41R3177	1
Line Cord-Australia / New Zealand (models CTO 15M)	41R3196	1
Line Cord-Australia / New Zealand (models CTO 15M)	41R3197	1
Line Cord - Korea (models CTO)	41R3260	1
Line Cord - Korea (models CTO)	41R3261	1
Line Cord - Hong Kong, UK, Ireland, Singapore, Malaysia, Brunei, Hong Kong (models CTO 15G)	41R3224	1
Line Cord - Hong Kong, UK, Ireland, Singapore, Malaysia, Brunei, Hong Kong (models CTO 15G)	41R3225	1
Line Cord - Taiwan (models CTO)	41R3278	1
Line Cord - Taiwan (models CTO)	41R3279	1
Line Cord - Italy (models CTO)	41R3232	1
Line Cord - Italy (models CTO)	41R3233	1
Line Cord - A models (models CTO)	41R3208	1
Line Cord - A models (models CTO)	41R3209	1
Line Cord - Denmark (models CTO 15G)	41R3212	1
Line Cord - Denmark (models CTO 15G)	41R3213	1
Line Cord - Switzerland (models CTO 15G)	41R3228	1
Line Cord - Switzerland (models CTO 15G)	41R3229	1
Line Cord - Israel (models CTO 15G)	41R3236	1
Line Cord - Israel (models CTO 15G)	41R3237	1
Line Cord - South Africa (models CTO 15M)	41R3220	1
Line Cord - South Africa (models CTO 15M)	41R3221	1

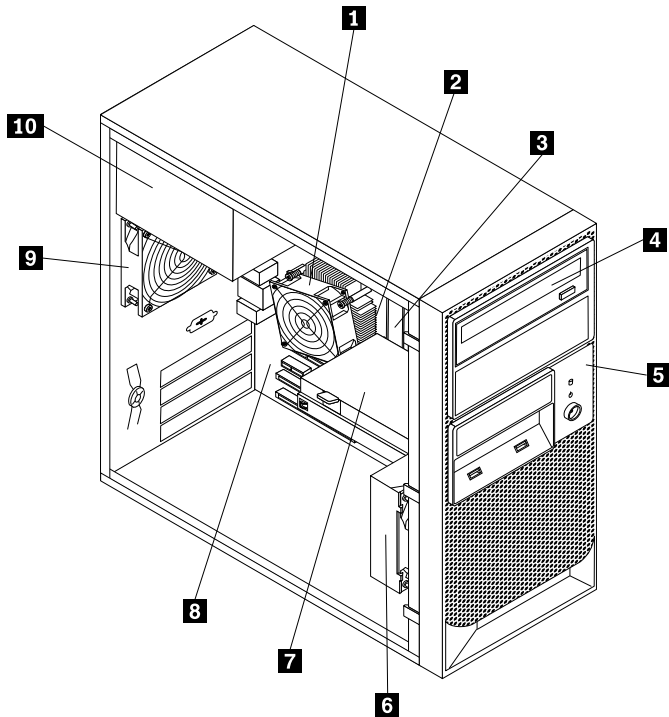
0992 Line Cords	FRU#	CRU
Line Cord - India (models CTO)	41R3341	1
Line Cord - India (models CTO)	41R3175	1
Line Cord - Line Cord - Austria, Belgium, Croatia, Czechoslovakia, Finland France Germany Hungary, Netherlands, Norway, Poland, Portugal Romania, Spain, Sweden (models CTO)	41R3208	1
Line Cord - Line Cord - Austria, Belgium, Croatia, Czechoslovakia, Finland France Germany Hungary, Netherlands, Norway, Poland, Portugal Romania, Spain, Sweden (models CTO)	41R3209	1

0992 Windows Server 2008 R2 Foundation 64-bit	FRU#	CRU
English (models CTO)	90Y1166	1
French (models CTO)	90Y1168	1
German (models CTO)	90Y1169	1
Japanese (models CTO)	90Y1171	1
Spanish (models CTO)	90Y1172	1
Italian (models CTO)	90Y1170	1
Turkish (models CTO)	90Y1173	1
Dutch (models CTO)	90Y1167	1

0992 Windows Server 2008 R2 Standard 64-bit	FRU#	CRU
English (models CTO)	90Y1183	1
French (models CTO)	90Y1184	1
German (models CTO)	90Y1185	1
Japanese (models CTO)	90Y1186	1
Spanish (models CTO)	90Y1187	1
Italian (models CTO)	90Y1188	1
Turkish (models CTO)	90Y1189	1
Dutch (models CTO)	90Y1190	1

0992 Windows Small Business Server 2008 Standard w/ SP2	FRU#	CRU
English (models CTO)	90Y1174	1
French (models CTO)	90Y1176	1
German (models CTO)	90Y1177	1
Japanese (models CTO)	90Y1179	1
Spanish (models CTO)	90Y1180	1
Italian (models CTO)	90Y1178	1
Turkish (models CTO)	90Y1181	1
Dutch (models CTO)	90Y1175	1

Machine Type 1008



Item #	1008 FRUs	FRU#	CRU
1	Heat sink, 73/95 Watt (models CTO All Models)	43N9700	N
2	Microprocessor, Intel Celeron, 2.26G/2M-L2 (models CTO 15D 15F 15G 15J 15L 15M 15S 15U 15Y)	46U3127	N
2	Microprocessor, Pentium G6950 1066/2800MHz 3MB Cache 73W 2-Thread Dual Core (iGfx 533MHz) (models CTO)	71Y5303	N
2	Microprocessor, Core i3 530 1333/2930MHz 4MB Cache 73W 4-Thread Dual Core (iGfx Speed 733MHz) (models CTO)	71Y6960	N
2	Microprocessor, Core i3-540 / 2.93GHz (models CTO)	71Y5304	N
2	Microprocessor, Core i5-650 / 3.20GHz (models CTO)	71Y6961	N
2	Microprocessor, i5-660 (models CTO)	71Y6962	N
2	Microprocessor, i5-670 (models CTO)	71Y6963	N
2	Microprocessor, i5-680 (K0 stepping) (models CTO)	89Y9196	N
2	Microprocessor, i3-550(K0 stepping) (models CTO)	89Y9195	N
3	Microprocessor, B1 stepping (models CTO)	64Y8427	N
3	Microprocessor, B1 stepping (models CTO)	64Y8425	N
3	Memory modules, DDR3 ECC PC3-10600 4GB UDIMM (1333) (models CTO)	64Y9570	1
3	Memory modules, 128Mx72 = 128Mx8 (1Gbit) x9 (1R) (models CTO 15D 15F 15G 15J 15L 15M 15S 15U 15Y)	46R6026	1
3	Memory modules, 256Mx72 = 128Mx8 (1Gbit) x18 (2R) (models CTO)	46R6027	1

Item #	1008 FRUs	FRU#	CRU
4	Optical drive, DVD-ROM Drive, 16x/48x (SATA) (models CTO 15D 15F 15G 15J 15L 15M 15S 15U 15Y)	71Y5543	1
4	Optical drive, DVD Burner/CD, RW Rambo 8 (SATA) (models CTO)	71Y5545	1
5	Front Bezel assembly (models CTO All Models)	90Y0051	2
6	Front system fan assembly including mount and baffle (models CTO All Models)	45K2306	N
7	Hard disk drive, 250GB SATA, Enterprise 7200 rpm, 3 Gb/s, 8MB cache, 3.5" (models CTO)	46U3100	1
7	Hard disk drive, 500GB SATA, Enterprise 7200 rpm, 3 Gb/s, 16MB cache, 3.5" (models CTO)	46U3101	1
7	Hard disk drive, 1TB SATA, Enterprise 7200 rpm, 3 Gb/s, 32MB cache, 3.5" (models CTO)	46U3103	1
8	System board, Motherboard, TPM Enabled, not Russia (models CTO 15D 15F 15G 15J 15L 15M 15S 15U 15Y)	64Y8423	N
8	System board, Motherboard, TPM Disabled, Russia Only (models CTO)	64Y8424	N
9	Rear fan assembly, with Fan Grill, 0 to 20%, 750 RPM (models CTO All Models)	45K2324	2
10	Power supply, 280 Watt Power Supply (85 plus) WW, Robust, JP (models CTO)	45J9431	2

The FRUs listed in the following tables are not illustrated.

1008 FRUs	FRU#	CRU
Front and rear handle assembly, no handle cover (models CTO All Models)	45K2301	2
ODD/FDD cover, retainer and shield assembly (models CTO All Models)	45K2302	1
Side panel assembly (models CTO All Models)	45K2304	2
Miscellaneous kit (models CTO All Models)	45K2307	2
Speaker cable, 400mm (models CTO All Models)	43N9091	2
EMC Shield (models CTO All Models)	41N8080	2
Cable, SATA 457mm (RoHS) (models CTO All Models)	43N9013	2
FDD EMI shield (models CTO All Models)	41N8078	2
Optional HDD bracket assembly, without 4 pin cable (models CTO All Models)	41R6106	1
Temp sense cable (6pin 460 mm) kit w/ bracket (models CTO All Models)	45J9495	2
Intrusion switch assembly (models CTO All Models)	41R6116	2
Cable, SATA 250mm (RoHS) (models CTO All Models)	43N9012	2
HDD tray (models CTO All Models)	41R6291	1
Rear IO shield, ATX, with USB number (models CTO All Models)	43N9846	2
Cable, SATA 120mm RoHS used for 2nd HDD (models CTO All Models)	41R3328	2
Adapter bracket, 2.5 to 3.5 HDD (models CTO All Models)	41R5625	2
USB cable assembly, front panel (models CTO All Models)	90Y0075	2
Chassis assembly, mechanical kit (models CTO All Models)	90Y1296	2
Intel Pro/1000 PT dual port Ethernet card (models CTO 15D 15F 15G 15J 15L 15M 15S 15U 15Y)	67Y1430	1
Lenovo RDX drive bay (models CTO All Models)	67Y1421	1

1008 FRUs	FRU#	CRU
Lenovo RDX cables (models CTO All Models)	67Y1422	1
Lenovo RDX 160GB cartridge (models CTO All Models)	67Y1423	1
Lenovo RDX 320GB cartridge (models CTO All Models)	67Y1424	1
256MB NVIDIA FX380 (2xDVI) (models CTO All models)	46R2784	1
Easy start up DVD (models CTO)	03X3607	1
Lenovo RDX 500GB cartridge (models CTO All Models)	67Y1425	1
Intel Pro/1000 PT dual port Ethernet card (models CTO 15D 15F 15G 15J 15L 15M 15S 15U 15Y)	67Y1430	1
256MB NVIDIA FX380 (2xDVI) (models CTO)	46R2784	N
Easy startup DVD (models CTO)	03X3607	1

1008 Line Cords	FRU#	CRU
Line Cord - US (models CTO 15U 15F 15S 15L 15D)	41R3184	1
Line Cord - US (models CTO 15U 15F 15S 15L 15D)	41R3185	1
Line Cord - China (models CTO)	41R3256	1
Line Cord - China (models CTO)	41R3257	1
Line Cord - Japan (models CTO 15J)	41R3248	1
Line Cord - Japan (models CTO 15J)	24R2633	1
Line Cord - Brazil (models CTO)	45J9595	1
Line Cord - Brazil (models CTO)	41R3271	1
Line Cord - LA High Volt (APU) (models CTO)	41R3176	1
Line Cord - LA High Volt (APU) (models CTO)	41R3177	1
Line Cord-Australia / New Zealand (models CTO 15M)	41R3196	1
Line Cord-Australia / New Zealand (models CTO 15M)	41R3197	1
Line Cord - Korea (models CTO)	41R3260	1
Line Cord - Korea (models CTO)	41R3261	1
Line Cord - Hong Kong, UK, Ireland, Singapore, Malaysia, Brunei, Hong Kong (models CTO 15G)	41R3224	1
Line Cord - Hong Kong, UK, Ireland, Singapore, Malaysia, Brunei, Hong Kong (models CTO 15G)	41R3225	1
Line Cord - Taiwan (models CTO)	41R3278	1
Line Cord - Taiwan (models CTO)	41R3279	1
Line Cord - Italy (models CTO 15S 15L 15Y 15G)	41R3232	1
Line Cord - Italy (models CTO 15S 15L 15Y 15G)	41R3233	1
Line Cord - A models (models CTO)	41R3208	1
Line Cord - A models (models CTO)	41R3209	1
Line Cord - Denmark (models CTO 15G)	41R3212	1
Line Cord - Denmark (models CTO 15G)	41R3213	1

1008 Line Cords	FRU#	CRU
Line Cord - Switzerland (models CTO 15G)	41R3228	1
Line Cord - Switzerland (models CTO 15G)	41R3229	1
Line Cord - Israel (models CTO 15G)	41R3236	1
Line Cord - Israel (models CTO 15G)	41R3237	1
Line Cord - South Africa (models CTO 15M)	41R3220	1
Line Cord - South Africa (models CTO 15M)	41R3221	1
Line Cord - India (models CTO)	41R3341	1
Line Cord - India (models CTO)	41R3175	1
Line Cord - Austria, Belgium, Croatia, Czechoslovakia, Finland France Germany Hungary, Netherlands, Norway, Poland, Portugal Romania, Spain, Sweden (models CTO)	41R3208	1
Line Cord - Austria, Belgium, Croatia, Czechoslovakia, Finland France Germany Hungary, Netherlands, Norway, Poland, Portugal Romania, Spain, Sweden (models CTO)	41R3209	1

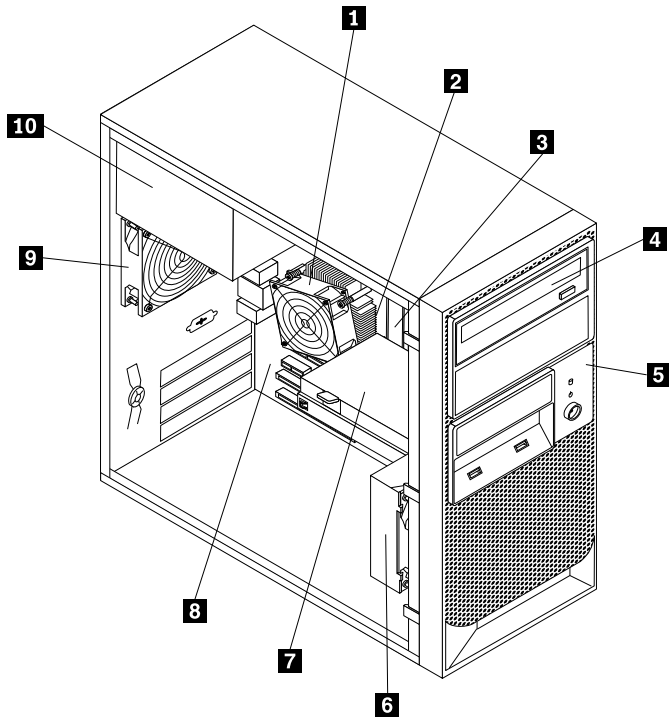
1008 Windows Server 2008 R2 Foundation 64-bit	FRU#	CRU
English (models CTO)	90Y1166	1
French (models CTO)	90Y1168	1
German (models CTO)	90Y1169	1
Japanese (models CTO)	90Y1171	1
Spanish (models CTO)	90Y1172	1
Italian (models CTO)	90Y1170	1
Turkish (models CTO)	90Y1173	1
Dutch (models CTO)	90Y1167	1

1008 Windows Server 2008 R2 Standard 64-bit	FRU#	CRU
English (models CTO)	90Y1183	1
French (models CTO)	90Y1184	1
German (models CTO)	90Y1185	1
Japanese (models CTO)	90Y1186	1
Spanish (models CTO)	90Y1187	1
Italian (models CTO)	90Y1188	1
Turkish (models CTO)	90Y1189	1
Dutch (models CTO)	90Y1190	1

1008 Windows Small Business Server 2008 Standard w/ SP2	FRU#	CRU
English (models CTO)	90Y1174	1
French (models CTO)	90Y1176	1
German (models CTO)	90Y1177	1
Japanese (models CTO)	90Y1179	1
Spanish (models CTO)	90Y1180	1
Italian (models CTO)	90Y1178	1

1008 Windows Small Business Server 2008 Standard w/ SP2	FRU#	CRU
Turkish (models CTO)	90Y1181	1
Dutch (models CTO)	90Y1175	1

Machine Type 1010



Item #	1010 FRUs	FRU#	CRU
1	Heat sink, 73/95 Watt (models CTO All Models)	43N9700	N
2	Microprocessor, Intel Celeron, 2.26G/2M-L2 (models 16D 16F 16G 16J 16L 16M 16S 16U 16Y)	46U3127	N
2	Microprocessor, Pentium G6950 1066/2800MHz 3MB Cache 73W 2-Thread Dual Core (iGfx 533MHz) (models CTO)	71Y5303	N
2	Microprocessor, Core i3 530 1333/2930MHz 4MB Cache 73W 4-Thread Dual Core (iGfx Speed 733MHz) (models CTO)	71Y6960	N
2	Microprocessor, Core i3-540 / 2.93GHz (models CTO)	71Y5304	N
2	Microprocessor, Core i5-650 / 3.20GHz (models CTO)	71Y6961	N
2	Microprocessor, Core i5-660 / 3.33GHz (models CTO)	71Y6962	N
2	Microprocessor, i5-680 (K0 Stepping) (models CTO)	89Y9196	N
2	Microprocessor, i3-550(K0 stepping) (models CTO)	89Y9195	N
2	Microprocessor, B1 Stepping (models CTO)	64Y8425	N
2	Microprocessor, B1 Stepping (models CTO)	64Y8427	N
2	Microprocessor, Core i5-670 / 3.46GHz (models CTO)	71Y6963	N
3	Memory modules, DDR3 ECC PC3-10600 1GB UDIMM (1333) (models CTO 16D 16F 16G 16J 16L 16M 16S 16U 16Y)	46R6026	1

Item #	1010 FRUs	FRU#	CRU
3	Memory modules, DDR3 ECC PC3-10600 2GB UDIMM (1333) (models CTO)	46R6027	1
3	Memory modules, DDR3 ECC PC3-10600 4GB UDIMM (1333) (models CTO 16D 16F 16G 16J 16L 16M 16S 16U 16Y)	64Y9570	1
4	Optical drive, DVD-ROM Drive, 16x/48x (SATA) (models CTO 16D 16F 16G 16J 16L 16M 16S 16U 16Y)	71Y5543	1
4	Optical drive, DVD Burner/CD, RW Rambo 8 (SATA) (models CTO)	71Y5545	1
5	Front Bezel assembly (models CTO All Models)	90Y0051	2
6	Front system fan assembly including mount and baffle (models CTO All Models)	45K2306	N
7	Hard disk drive, 250GB SATA, Enterprise 7200 rpm, 3 Gb/s, 8MB cache, 3.5" (models CTO)	46U3100	1
7	Hard disk drive, 500GB SATA, Enterprise 7200 rpm, 3 Gb/s, 16MB cache, 3.5" (models CTO)	46U3101	1
7	Hard disk drive, 1TB SATA, Enterprise 7200 rpm, 3 Gb/s, 32MB cache, 3.5" (models CTO)	46U3103	1
8	System board, Motherboard, TPM Enabled, not Russia (models CTO 16D 16F 16G 16J 16L 16M 16S 16U 16Y)	64Y8423	N
8	System board, Motherboard, TPM Disabled, Russia Only (models CTO)	64Y8424	N
9	Rear fan assembly, with Fan Grill, 0 to 20%, 750 RPM (models CTO All Models)	45K2324	2
10	Power supply, 280 Watt Power Supply (85 plus) WW, Robust, JP (models CTO)	45J9431	2

The FRUs listed in the following tables are not illustrated.

1010 FRUs	FRU#	CRU
Front and rear handle assembly, no handle cover (models CTO All Models)	45K2301	2
ODD/FDD cover, retainer and shield assembly (models CTO All Models)	45K2302	1
Side panel assembly (models CTO All Models)	45K2304	2
Miscellaneous kit (models CTO All Models)	45K2307	2
Speaker cable, 400mm (models CTO All Models)	43N9091	2
EMC Shield (models CTO All Models)	41N8080	2
Cable, SATA 457mm (RoHS) (models CTO All Models)	43N9013	2
FDD EMI shield (models CTO All Models)	41N8078	2
Optional HDD bracket assembly, without 4 pin cable (models CTO All Models)	41R6106	1
Temp sense cable (6pin 460 mm) kit w/ bracket (models CTO All Models)	45J9495	2
Intrusion switch assembly (models CTO All Models)	41R6116	2
Cable, SATA 250mm (RoHS) (models CTO All Models)	43N9012	2
HDD tray (models CTO All Models)	41R6291	1
Rear IO shield, ATX, with USB number (models CTO All Models)	43N9846	2
Cable, SATA 120mm RoHS used for 2nd HDD (models CTO All Models)	41R3328	2
Adapter bracket, 2.5 to 3.5 HDD (models CTO All Models)	41R5625	2
USB cable assembly, front panel (models CTO All Models)	90Y0075	2

1010 FRUs	FRU#	CRU
Chassis assembly, mechanical kit (models CTO All Models)	90Y1296	2
Lenovo RDX drive bay (models CTO All Models)	67Y1421	1
Lenovo RDX cables (models CTO All Models)	67Y1422	1
Lenovo RDX 160GB cartridge (models CTO All Models)	67Y1423	1
Lenovo RDX 320GB cartridge (models CTO All Models)	67Y1424	1
Easy startup DVD (models CTO All Models)	03X3607	1
256MB NVIDIA FX380 (2xDVI) (models CTO)	46R2784	1
Intel Pro/1000 PT Dual Port Ethernet Card (models CTO 16D 16F 16G 16J 16L 16M 16S 16U 16Y)	67Y1430	1

1010 Line Cords	FRU#	CRU
Line Cord - US (models CTO 16U 16F 16S 16L 16D)	41R3184	1
Line Cord - US (models CTO 16U 16F 16S 16L 16D)	41R3185	1
Line Cord - China (models CTO)	41R3256	1
Line Cord - China (models CTO)	41R3257	1
Line Cord - Japan (models CTO 16J)	41R3248	1
Line Cord - Japan (models CTO 16J)	24R2633	1
Line Cord - Brazil (models CTO)	45J9595	1
Line Cord - Brazil (models CTO)	41R3271	1
Line Cord - LA High Volt (APU) (models CTO)	41R3176	1
Line Cord - LA High Volt (APU) (models CTO)	41R3177	1
Line Cord-Australia / New Zealand (models CTO 16M)	41R3196	1
Line Cord-Australia / New Zealand (models CTO 16M)	41R3197	1
Line Cord - Korea (models CTO)	41R3260	1
Line Cord - Korea (models CTO)	41R3261	1
Line Cord - Hong Kong, UK, Ireland, Singapore, Malaysia, Brunei, Hong Kong (models CTO 16G)	41R3224	1
Line Cord - Hong Kong, UK, Ireland, Singapore, Malaysia, Brunei, Hong Kong (models CTO 16G)	41R3225	1
Line Cord - Taiwan (models CTO)	41R3278	1
Line Cord - Taiwan (models CTO)	41R3279	1
Line Cord - Italy (models CTO 16S 16L 16Y 16G)	41R3232	1
Line Cord - Italy (models CTO 16S 16L 16Y 16G)	41R3233	1
Line Cord - A models (models CTO)	41R3208	1
Line Cord - A models (models CTO)	41R3209	1
Line Cord - Denmark (models CTO 16G)	41R3212	1
Line Cord - Denmark (models CTO 16G)	41R3213	1
Line Cord - Switzerland (models CTO 16G)	41R3228	1
Line Cord - Switzerland (models CTO 16G)	41R3229	1

1010 Line Cords	FRU#	CRU
Line Cord - Israel (models CTO 16G)	41R3236	1
Line Cord - Israel (models CTO 16G)	41R3237	1
Line Cord - South Africa (models CTO 16M)	41R3220	1
Line Cord - South Africa (models CTO 16M)	41R3221	1
Line Cord - India (models CTO)	41R3341	1
Line Cord - India (models CTO)	41R3175	1
Line Cord - Austria, Belgium, Croatia, Czechoslovakia, Finland, France, Germany, Hungary, Netherlands, Norway, Poland, Portugal Romania, Spain, Sweden (models CTO)	41R3208	1
Line Cord - Austria, Belgium, Croatia, Czechoslovakia, Finland, France, Germany, Hungary, Netherlands, Norway, Poland, Portugal Romania, Spain, Sweden (models CTO)	41R3209	1

1010 Windows Server 2008 R2 Foundation 64-bit	FRU#	CRU
English (models CTO)	90Y1166	1
French (models CTO)	90Y1168	1
German (models CTO)	90Y1169	1
Japanese (models CTO)	90Y1171	1
Spanish (models CTO)	90Y1172	1
Italian (models CTO)	90Y1170	1
Turkish (models CTO)	90Y1173	1
Dutch (models CTO)	90Y1167	1

1010 Windows Server 2008 R2 Standard 64-bit	FRU#	CRU
English (models CTO)	90Y1183	1
French (models CTO)	90Y1184	1
German (models CTO)	90Y1185	1
Japanese (models CTO)	90Y1186	1
Spanish (models CTO)	90Y1187	1
Italian (models CTO)	90Y1188	1
Turkish (models CTO)	90Y1189	1
Dutch (models CTO)	90Y1190	1

1010 Windows Small Business Server 2008 Standard w/ SP2	FRU#	CRU
English (models CTO)	90Y1174	1
French (models CTO)	90Y1176	1
German (models CTO)	90Y1177	1
Japanese (models CTO)	90Y1179	1
Spanish (models CTO)	90Y1180	1
Italian (models CTO)	90Y1178	1
Turkish (models CTO)	90Y1181	1
Dutch (models CTO)	90Y1175	1

Chapter 8. Configuring the server

This chapter provides instructions on how to configure your server.

This chapter provides information on the following topics:

- “Using the Setup Utility program” on page 77
- “Configuring RAID” on page 80
- “Updating system programs” on page 82
- “Using the ThinkServer EasyStartup program” on page 84
- “Installing ThinkServer EasyManage Agent” on page 85

Using the Setup Utility program

The Setup Utility program is used to view and change the configuration settings of your server, regardless of which operating system you are using. However, the operating system settings might override any similar settings in the Setup Utility program.

This section provides information on the following topics to help you use the Setup Utility program:

- “Starting the Setup Utility program” on page 77
- “Viewing and changing settings” on page 77
- “Using passwords” on page 78
- “Enabling or disabling a device” on page 79
- “Selecting a startup device” on page 79
- “Advanced settings” on page 80
- “Exiting from the Setup Utility program ” on page 80

Starting the Setup Utility program

To start the Setup Utility program, do the following:

1. Make sure your server is turned off.
2. Repeatedly press and release the F1 key when turning on the server. When you hear multiple beeps or see a logo screen, release the F1 key.

Note: If a Power-On Password or an Administrator Password has been set, the Setup Utility program menu will not be displayed until you type the correct password. For more information, see “Using passwords” on page 78.

The Setup Utility program might start automatically when POST detects that hardware has been removed or new hardware has been installed in your server.

Viewing and changing settings

The Setup Utility program menu lists various items about the system configuration. To view or change settings, start the Setup Utility program. See “Starting the Setup Utility program” on page 77. Then, follow the instructions on the screen.

When working with the Setup Utility program menu, you must use the keyboard. The keys used to perform various tasks are displayed at the bottom of each screen.

Using passwords

By using the Setup Utility program, you can set passwords to prevent unauthorized access to your server and data. The following types of passwords are available:

- Power-On Password
- Administrator Password
- Hard Disk Password

You do not have to set a password to use your server. However, using passwords improves computing security. If you decide to set a password, read the following sections.

Password considerations

A password can be any combination of up to 64 alphabetic and numeric characters. For security reasons, it is recommended to use a strong password that cannot be easily compromised. To set a strong password, use the following guidelines:

- Have at least eight characters in length
- Contain at least one alphabetic character and one numeric character
- Setup Utility program and hard disk drive passwords are not case sensitive
- Not be your name or your user name
- Not be a common word or a common name
- Be significantly different from your previous passwords

Power-On Password

When a Power-On Password is set, you are prompted to type a valid password each time the server is turned on. The server cannot be used until the valid password is typed in.

Administrator Password

Setting an Administrator Password deters unauthorized users from changing configuration settings. If you are responsible for maintaining the configuration settings of several servers, you might want to set an Administrator Password.

When an Administrator Password is set, you are prompted to type a valid password each time you try to access the Setup Utility program. The Setup Utility program cannot be accessed until a valid password is typed in.

If both the Power-On Password and Administrator Password are set, you can type either password. However, you must use your Administrator Password to change any configuration settings.

Hard Disk Password

Setting a Hard Disk Password prevents unauthorized access to the data on the hard disk drive. When a Hard Disk Password is set, you are prompted to type a valid password each time you try to access the hard disk drive.

Setting, changing, and deleting a password

To set, change, or delete a password, do the following:

1. Start the Setup Utility program. See “Starting the Setup Utility program” on page 77.

2. From the Setup Utility program main menu, select **Security**.
3. Depending on the password type, select **Set Power-On Password**, **Set Administrator Password**, or **Hard Disk Security** → **Hard Disk Password**.
4. Follow the instructions on the right side of the screen to set, change, or delete a password.

Note: A password can be any combination of up to 64 alphabetic and numeric characters. For more information, see “Password considerations” on page 78.

Enabling or disabling a device

This section provides information on how to enable or disable user access to the following devices:

USB Setup	Use this option to enable or disable a USB connector. When a USB connector is disabled, the device connected to the USB connector cannot be used.
SATA Controller	When this option is set to Disable , all devices connected to the SATA connectors (such as hard disk drives or the optical drive) are disabled and cannot be accessed.
External SATA Port	When this option is set to Disable , the device connected to the External SATA connector cannot be accessed.

To enable or disable a device, do the following:

1. Start the Setup Utility program. See “Starting the Setup Utility program” on page 77.
2. From the Setup Utility program main menu, select **Devices**.
3. Depending on the device you want to enable or disable, do one of the following:
 - Select **USB Setup** to enable or disable a USB device.
 - Select **ATA Drives Setup** to enable or disable an internal or external SATA device.
4. Select the desired settings and press Enter.
5. Press F10 to save and exit the Setup Utility program. See “Exiting from the Setup Utility program ” on page 80.

Selecting a startup device

If your server does not start up from a device such as the disc or hard disk drive as expected, do one of the following to select the startup device of your choice.

Selecting a temporary startup device

This section provides instructions on how to select a temporary startup device.

Note: Not all discs and hard disk drives are bootable.

To select a temporary startup device, do the following:

1. Turn off your server.
2. Repeatedly press and release the F12 key when turning on the server. When the Please select boot device window displays, release the F12 key.
3. Select the desired startup device and press Enter. The server will start up from the device you selected.

Note: Selecting a startup device from the Please select boot device window does not permanently change the startup sequence.

Viewing or changing the startup device sequence

This section provides instructions on how to view or permanently change the configured startup device sequence.

To view or permanently change the configured startup device sequence, do the following:

1. Start the Setup Utility program. See “Starting the Setup Utility program” on page 77.
2. From the Setup Utility program main menu, select **Startup** → **Primary Boot Sequence**. Read the information displayed on the right side of the screen.
3. Select the first boot device, second boot device, and so on.
4. Press Esc to return to the **Startup** menu. Then, select the devices for the **Automatic Boot Sequence** and **Error Boot Sequence**.
5. Press F10 to save and exit the Setup Utility program. See “Exiting from the Setup Utility program ” on page 80.

Advanced settings

On some server models, the **Advanced** menu includes a setting to enable or disable HyperThreading. This feature works only with HyperThreading-aware operating systems. The default setting for HyperThreading is enabled. However, if you are not using a HyperThreading-aware operating system and the setting for HyperThreading is **Enabled**, your server performance might be degraded. Therefore, you should always set HyperThreading to **Disabled** unless you are sure your operating system supports HyperThreading.

Exiting from the Setup Utility program

After you finish viewing or changing settings, press Esc to return to the Setup Utility program main menu. You might have to press Esc several times. Then, do one of the following:

- If you want to save the new settings, press F10 to save and exit the Setup Utility program.
- If you do not want to save the settings, select **Exit** → **Discard Changes and Exit**.
- If you want to return to the default settings, press F9 or select **Exit** → **Load Optimal Defaults**.

Configuring RAID

This section provides information about how to configure Redundant Array of Independent Disks (RAID) for your server.

This section provides information on the following topics:

- “RAID Level” on page 80
- “Configuring the system UEFI to enable SATA RAID functionality” on page 81
- “Creating RAID volumes” on page 81
- “Deleting RAID volumes” on page 81

Note: The information about configuring RAID in this section is applicable only for a Windows environment. For information about configuring RAID in a Linux environment, contact your Linux software provider.

RAID Level

Your server must have the minimum number of SATA hard disk drives installed for the supported level of RAID below:

- RAID Level 0 – Striped disk array
 - Two hard disk drives minimum
 - Better performance without fault tolerance
- RAID Level 1 – Mirrored disk array
 - Two hard disk drives minimum

- Improved read performance and 100% redundancy

To install a secondary hard disk drive, refer to “Installing a secondary hard disk drive” on page 40.

Configuring the system UEFI to enable SATA RAID functionality

This section describes how to configure the system UEFI to enable SATA RAID functionality.

Note: Use the arrow keys on the keyboard to make selections.

To enable SATA RAID functionality, do the following:

1. Start the Setup Utility program. See “Starting the Setup Utility program” on page 77.
2. Select **Devices** → **ATA Drives Setup**.
3. Select **Configure SATA as** and press Enter.
4. Select **RAID** and press Enter.
5. Press F10 to save the new settings and exit the Setup Utility program. See “Exiting from the Setup Utility program ” on page 80.

Creating RAID volumes

This section describes how to use the Intel Matrix Storage Manager option ROM configuration utility to create RAID volumes.

To create RAID volumes, do the following:

1. Press Ctrl+I when prompted to enter the Intel Matrix Storage Manager option ROM configuration utility during the server startup.
2. Use the up and down arrow keys to select **Create RAID Volume** and press Enter.
3. Type a proper RAID Volume name in the **Name** field and press Tab.
4. Use the arrow keys to select a RAID level in the **RAID Level** field and press Tab.
5. If appropriate, use the arrow keys to select a Stripe Size in the **Stripe Size** field and press Tab.
6. Type a volume size in the **Capacity** field and press Tab.
7. Press Enter to initiate volume creation.
8. When prompted, press Y to accept the warning message and create the volume.
9. Return to step 2 to create additional RAID volumes, or select **Exit** and press Enter.
10. Press Y when prompted to confirm the exit.

Deleting RAID volumes

This section describes how to use the Intel Matrix Storage Manager option ROM configuration utility to delete RAID volumes.

To delete RAID volumes, do the following:

1. Press Ctrl+I when prompted to enter the Intel Matrix Storage Manager option ROM configuration utility during the server startup.
2. Use the up and down arrow keys to select **Delete RAID Volume** and press Enter.
3. Use the arrow keys to select the RAID volume to be deleted and press Delete.
4. When prompted, press Y to confirm the deletion of the selected RAID volume. Deleting a RAID volume will reset the hard disk drives to non-RAID.
5. After deleting a RAID volume, you can:
 - Return to step 2 to delete additional RAID volumes.

- See “Creating RAID volumes” on page 81 for RAID volume creation.
- Use the up and down arrow keys to select **Exit** and press Enter.
- Use the up and down arrow keys to select **Reset Disks to Non-RAID** and press Enter.
 - a. Use the arrow keys and the space key to mark the hard disk drives to be reset, and then press Enter to complete the selection.
 - b. When prompted, press Y to confirm the reset action.
 - c. After completing the Reset Disks to Non-RAID function, you can:
 - Return to step 2 to delete additional RAID volumes.
 - See “Creating RAID volumes” on page 81 for RAID volume creation.
 - Use the up and down arrow keys to select **Exit** and press Enter.

Updating system programs

This section contains information about updating the POST/UEFI and recovering from a POST/UEFI update failure.

This section provides information about the following topics:

- “Using system programs” on page 82
- “Updating (flashing) the UEFI from a disc” on page 82
- “Updating (flashing) the UEFI from your operating system” on page 83
- “Recovering from a POST/UEFI update failure” on page 83

Using system programs

System programs are the basic layer of software built into your server. System programs include the POST, the UEFI code, and the Setup Utility program. The POST is a set of tests and procedures that are performed each time you turn on your server. The UEFI is a layer of software that translates instructions from other layers of software into electrical signals that the server hardware can execute. You can use the Setup Utility program to view and change the configuration and setup of your server.

Your server system board has a module called electrically erasable programmable read-only memory (EEPROM, also referred to as flash memory). You can easily update the POST, the UEFI, and the Setup Utility program by starting your server with a flash update disc or running a special update program from your operating system.

Lenovo might make changes and enhancements to the POST and UEFI. When updates are released, they are available as downloadable files on the Lenovo Web site at <http://www.lenovo.com>. Instructions for using the POST/UEFI updates are available in a TXT file that is included with the update files. For most models, you can download either an update program to create a system-program-update (flash) disc or an update program that can be run from the operating system.

Note: You can download a self-starting bootable CD/DVD image (known as an ISO image) of the diagnostics program to support servers without a diskette drive. Go to:<http://www.lenovo.com>

Updating (flashing) the UEFI from a disc

This section provides instructions on how to update (flash) the UEFI from a disc. The System UEFI program updates are available at: <http://www.lenovo.com/support>

To update (flash) the UEFI from a disc, do the following:

1. Turn off your server.
2. Repeatedly press and release the F12 key when turning on the server. When the Please select boot device window displays, release the F12 key.
3. Select the optical drive of your choice as the first boot device.
4. Insert the disc into the optical drive and press Enter. The update begins.
5. When prompted to change the serial number, press N.

Note: If you want to change the serial number, press Y when prompted. Type in the serial number and then press Enter.

6. When prompted to change the machine type/model, press N.

Note: If you want to change the machine type/model, press Y when prompted. Type in the machine type/model and then press Enter.

7. Follow the instructions on the screen to complete the update. After the update is completed, remove the disc from the optical drive.

Updating (flashing) the UEFI from your operating system

Note: Because Lenovo makes constant improvements to the Web site, the Web page contents are subject to change without notice, including the contents referenced in the following procedure.

To update (flash) the UEFI from your operating system, do the following:

1. Go to <http://www.lenovo.com/support>.
2. Do the following to locate the downloadable files for your machine type:
 - a. In the **Enter a product number** field, type your machine type and click **Go**.
 - b. Click **Downloads and drivers**.
 - c. Select the appropriate UEFI file for your server.
 - d. Click the TXT file that contains the instructions for updating (flashing) the UEFI from your operating system.
3. Print these instructions. This is very important because they are not on the screen after the download begins.
4. Follow the printed instructions to download, extract, and install the update.

Recovering from a POST/UEFI update failure

If power to your server is interrupted while the POST/UEFI is being updated (flash update), your server might not restart correctly. If this happens, perform the following procedure, which is commonly called Boot-block Recovery.

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 30.
3. Locate the Clear CMOS /Recovery jumper on the system board. Refer to “System-board internal connectors” on page 25.
4. Remove all parts and disconnect all cables that might prevent your access to the Clear CMOS /Recovery jumper.

Note: You might need to remove the secondary hard disk drive to access the Clear CMOS /Recovery jumper. See “Installing a secondary hard disk drive” on page 40.

5. Move the jumper from the standard position (pin 1 and pin 2) to the maintenance position (pin 2 and pin 3).
6. Reinstall all parts and reconnect all cables that have been removed.

7. Reinstall the server cover and reconnect the power cords for the server and monitor to electrical outlets. See “Completing the parts replacement” on page 57.
8. Repeatedly press and release the F12 key when turning on the server. When the Please select boot device window displays, release the F12 key.
9. Select the optical drive of your choice as the first boot device.
10. Insert the POST/UEFI update (flash) disc into the optical drive and press Enter. The recovery begins. The recovery session will take two to three minutes. During this time, you will hear a series of beeps.
11. After the recovery session is completed, the series of beeps will end, and the system will automatically turn off.
12. Repeat step 1 through step 4.
13. Move the Clear CMOS /Recovery jumper back to the standard position (pin 1 and pin 2).
14. Reinstall all parts and reconnect all cables that have been removed.
15. Reinstall the server cover and reconnect all the power cords and other cables. See “Completing the parts replacement” on page 57.
16. Turn on the server and remove the disc from the optical drive.

Using the ThinkServer EasyStartup program

The ThinkServer EasyStartup program simplifies the process of installing the operating system and device drivers by performing the following tasks:

- Detects installed hardware devices
- Guides you through the process of creating a response file
- Prepares the hard disk drive for installation
- Prompts you to insert the operating-system installation disc
- Initiates an unattended installation of the operating system and device drivers for most adapters and devices

The program is contained on the *ThinkServer EasyStartup* DVD provided with your server. If you did not receive the DVD with your server, you can download an ISO image of the DVD from <http://www.lenovo.com/support>. The program has a built-in help system and User Guide to answer questions you might have. The program also provides compatibility notes to help you determine what server configurations and operating systems are supported by that specific version of the program.

The ThinkServer EasyStartup program also enables you to save the response file on a USB device for reuse, and an option that enables you to install an operating system using the saved response file. This option is useful if you intend to install the same operating system on similarly configured ThinkServer servers.

Notes:

1. If you intend to implement a RAID, make sure your storage controller or RAID adapter is configured correctly before you use the ThinkServer EasyStartup program to install the operating system.
2. If you are using any external storage devices or fiber channels, use the utilities provided with the device. You also will have to provide the device drivers for these devices and install them after the EasyStartup program finishes installing the operating system.
3. The *ThinkServer EasyStartup* DVD requires that you have a DVD drive that is configured as your first device in the startup sequence. Use the Setup Utility program to view or change your startup sequence. See “Viewing or changing the startup device sequence” on page 79.
4. To install an operating system, you need the operating system installation disc (CD or DVD) and the associated product key, if one was provided.

To start the *ThinkServer EasyStartup* DVD, do the following:

1. Insert the *ThinkServer EasyStartup* DVD and restart the server. If the EasyStartup program does not start, see “EasyStartup problems” on page 18.
2. Follow the instructions on the screen and continue to the main interface.
3. When you arrive at the Home screen, do any of the following:
 - Click **Compatibility notes** to view detailed information about the operating systems and server configurations supported by that version of the EasyStartup program.
 - Click **User Guide** to view an overview of the various functions provided by that version of the EasyStartup program.
 - Click **Hardware list** to view a list of hardware detected by the ThinkServer EasyStartup program.
 - Click **Install operating system** to begin the process of creating a response file and installing the operating system. As part of this procedure you will be given the opportunity to include the ThinkServer EasyManage Agent as part of the installation process. You also can provide one or more command-line based instructions to run at the end of the operating system installation process.
 - Click **About** to view version information and legal notices.

To use the *ThinkServer EasyStartup* DVD to install an operation system using a preexisting response file, do the following:

1. Insert the *ThinkServer EasyStartup* DVD and restart the server. If the EasyStartup program does not start, see “EasyStartup problems” on page 18.
2. Follow the instructions on the screen until you get to the Start option screen.
3. When the Start option screen is displayed, do the following:
 - a. Insert the USB device that contains the response file.
 - b. Select **Install the operating system using a preexisting response file**.
 - c. Click **OK**.
4. Follow the remaining instructions on the screen to complete the procedure.

Installing ThinkServer EasyManage Agent

To install the ThinkServer EasyManage Agent, you must already have a core server running the ThinkServer EasyManage Core Server program. The ThinkServer EasyManage Agent must be installed from that core server. Refer to the ThinkServer EasyManage Core Server documentation about Agent deployment for instructions on the various ways to deploy the ThinkServer EasyManage Agent to your new server.

Also, the ThinkServer EasyStartup program provides an option to install the ThinkServer EasyManage Agent as part of the operating system installation process.

Appendix A. Notices

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Any references in this publication to non-Lenovo Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this Lenovo product, and use of those Web sites is at your own risk.

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

Export classification notice

This product is subject to the United States Export Administration Regulations (EAR) and has an Export Classification Control Number (ECCN) of 4A994.b. It can be re-exported except to any of the embargoed countries in the EAR E1 country list.

Television output notice

The following notice applies to models that have the factory-installed television-output feature.

This product incorporates copyright protection technology that is protected by method claims of certain U.S. patents and other intellectual property rights owned by Macrovision Corporation and other rights owners. Use of this copyright protection technology must be authorized by Macrovision Corporation, and is intended for home and other limited viewing uses only unless otherwise authorized by Macrovision Corporation. Reverse engineering or disassembly is prohibited.

European conformance CE mark



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ThinkServer

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Electronic emissions notices

The following information applies to Lenovo server machine types 0981, 0992, 1008, and 1010.

Federal Communications Commission Declaration of Conformity

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an authorized dealer or service representative for help.

Lenovo is not responsible for any radio or television interference caused by using other than specified or recommended cables or 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.

Responsible party:

Lenovo (United States) Incorporated
 1009 Think Place - Building One
 Morrisville, NC 27560
 U.S.A.
 Telephone: (919) 294-5900



Industry Canada Class B emission compliance statement

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

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

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 nonrecommended modification of the product, including the installation of option cards from other manufacturers.

This product has been tested and found to comply with the limits for Class B Information Technology Equipment according to CISPR 22/European Standard EN 55022. The limits for Class B equipment were derived for typical residential environments to provide reasonable protection against interference with licensed communication devices.

EU-EMC Directive (2004/108/EC) EN 55022 class B Statement of Compliance



Deutschsprachiger EU Hinweis:

Hinweis für Geräte der Klasse B 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 B ein.

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Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Betriebsmitteln

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

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln, EMVG vom 20. Juli 2007 (früher "Gesetz über die elektromagnetische Verträglichkeit von Geräten"), bzw. der EMV EG Richtlinie 2004/108/EC (früher 89/336/EWG), für Geräte der Klasse B.

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 B.

Japanese VCCI Class B statement

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取扱説明書に従って正しい取り扱いをして下さい。

VCCI-B

Japanese compliance for products less than or equal to 20 A per phase

日本の定格電流が 20A/相 以下の機器に対する高調波電流規制
高調波電流規格 JIS C 61000-3-2 適合品

Federal Communications Commission (FCC) and telephone company requirements

1. This device complies with Part 68 of the FCC rules. A label is affixed to the device that contains, among other things, the FCC registration number, USOC, and Ringer Equivalency Number (REN) for this equipment. If these numbers are requested, provide this information to your telephone company.

Note: If the device is an internal modem, a second FCC registration label is also provided. You may attach the label to the exterior of the computer in which you install the Lenovo modem, or you may attach the label to the external DAA, if you have one. Place the label in a location that is easily accessible, should you need to provide the label information to the telephone company.

2. The REN is useful to determine the quantity of devices you may connect to your telephone line and still have those devices ring when your number is called. In most, but not all areas, the sum of the RENs of all devices should not exceed five (5). To be certain of the number of devices you may connect to

your line, as determined by the REN, you should call your local telephone company to determine the maximum REN for your calling area.

3. If the device causes harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance; if advance notice is not practical, you will be notified as soon as possible. You will be advised of your right to file a complaint with the FCC.
4. Your telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the proper operation of your equipment. If they do, you will be given advance notice to give you an opportunity to maintain uninterrupted service.
5. If you experience trouble with this product, contact your authorized reseller or call the Customer Support Center. In the United States, call **1-800-426-7378**. In Canada, call **1-800-565-3344**. You may be required to present proof of purchase. The telephone company may ask you to disconnect the device from the network until the problem has been corrected, or until you are sure the device is not malfunctioning.
6. No customer repairs are possible to the device. If you experience trouble with the device, contact your Authorized Reseller or see the Diagnostics section of this manual for information.
7. This device may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs. Contact your state public utility commission or corporation commission for information.
8. When ordering network interface (NI) service from the local Exchange Carrier, specify service arrangement USOC RJ11C.

Canadian Department of Communications certification label

NOTICE: The Industry Canada label identifies certified equipment. This certification means that the equipment meets telecommunications network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements documents. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations. Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

CAUTION:

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

NOTICE: The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed 5.

Power cord notice

For your safety, Lenovo provides a power cord with a grounded attachment plug to use with this product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.

Power cords provided by Lenovo in the United States and Canada are listed by Underwriters 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, 127 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.

Power cords provided by Lenovo for a specific country or region are usually available only in that country or region.

For units intended to be operated in Germany: The power cords shall be safety approved. For Germany, it shall be H05VV-F, 3G, 0.75 mm², or better. For other countries, the suitable types shall be used accordingly.

Power cord part number	Used in these countries and regions
41R3175 or 41R3341	India
41R3176 or 41R3177	Argentina, Paraguay, Uruguay
41R3184 or 41R3185	Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Canada, Cayman Islands, Costa Rica, Columbia, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Mexico, Micronesia (Federal States of), Montserrat, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Thailand, Turks and Caicos Islands, United States, Venezuela, Virgin Islands
41R3196 or 41R3197	Australia, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea
41R3208 or 41R3209	Afghanistan, Albania, Algeria, Andorra, Angola, Armenia, Austria, Azerbaijan, Belarus, Belgium, Benin, Bosnia and Herzegovina, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Democratic Republic of), Congo (Republic of), Côte d'Ivoire (Ivory Coast), Croatia (Republic of), Czech Republic, Djibouti, Egypt, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Finland, France, French Guyana, French Polynesia, Gabon, Georgia, Germany, Greece, Guadeloupe, Guinea, Guinea Bissau, Hungary, Iceland, Indonesia, Iran, Kazakhstan, Kyrgyzstan, Laos (People's Democratic Republic of), Latvia, Lebanon, Lithuania, Luxembourg, Macedonia (former Yugoslav Republic of), Madagascar, Mali, Martinique, Mauritania, Mauritius, Mayotte, Moldova (Republic of), Monaco, Mongolia, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Reunion, Romania, Russian Federation, Rwanda, Sao Tome and Principe, Senegal, Serbia, Slovakia, Slovenia (Republic of), Somalia, Spain, Suriname, Sweden, Syrian Arab Republic, Tajikistan, Tahiti, Togo, Tunisia, Turkey, Turkmenistan, Ukraine, Upper Volta, Uzbekistan, Vanuatu, Vietnam, Wallis and Futuna, Yugoslavia (Federal Republic of), Zaire
41R3212 or 41R3213	Denmark
41R3220 or 41R3221	Bangladesh, Lesotho, Macao S.A.R. of China, Maldives, Namibia, Nepal, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda

Power cord part number	Used in these countries and regions
41R3224 or 41R3225	Abu Dhabi, Bahrain, Botswana, Brunei Darussalam, Channel Islands, Cyprus, Dominica, Gambia, Ghana, Grenada, Guyana, Hong Kong S.A.R. of China, Iraq, Ireland, Jordan, Kenya, Kuwait, Liberia, Malawi, Malaysia, Malta, Myanmar (Burma), Nigeria, Oman, Qatar, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Seychelles, Sierra Leone, Singapore, Sudan, Tanzania (United Republic of), Trinidad and Tobago, United Arab Emirates (Dubai), United Kingdom, Yemen, Zambia, Zimbabwe
41R3228 or 41R3229	Liechtenstein, Switzerland
41R3232 or 41R3233	Chile, Italy, Libya Arab Jamahiriya
41R3236 or 41R3237	Israel
43N9057 or 43N9058	Japan
41R3256 or 41R3257	China
41R3260 or 41R3261	Korea (Democratic People's Republic of), Korea (Republic of)
41R3271 or 45J9595	Brazil
41R3278 or 41R3279	Taiwan
43N9029 or 43N9030	Thailand
41R3175 or 41R3341	India

Polyvinyl Chloride (PVC) cable and cord notice

WARNING: Handling the cord on this product or cords associated with accessories sold with this product will expose you to lead, a chemical known to the State of California to cause cancer, and birth defects or other reproductive harm. ***Wash hands after handling.***

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

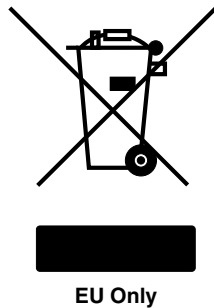
Bu Lenovo ürünü, T.C. Çevre ve Orman Bakanlığı'nın "Elektrik ve Elektronik Eşyalarda Bazı Zararlı Maddelerin Kullanımının Sınırlanmasına Dair Yönetmelik (EEE)" direktiflerine uygundur.

EEE Yönetmeliğine Uygundur.

Waste electrical and electronic equipment (WEEE) notices

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

European Union (EU) WEEE statement



The WEEE mark applies only to countries within the European Union (EU) and Norway. Appliances are 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.

Users of electrical and electronic equipment (EEE) with the WEEE marking per Annex IV of the WEEE Directive must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to them for the return, recycle, recovery of WEEE and minimize any potential effects of EEE on the environment and human health due to the presence of hazardous substances. For additional WEEE information, go to: <http://www.lenovo.com/lenovo/environment>

Japanese recycling statement

Collecting and recycling a disused Lenovo computer or monitor

If you are a company employee and need to dispose of a Lenovo computer or monitor that is the property of the company, you must do so in accordance with the Law for Promotion of Effective Utilization of Resources. Computers and monitors are categorized as industrial waste and should be properly disposed of by an industrial waste disposal contractor certified by a local government. In accordance with the Law for Promotion of Effective Utilization of Resources, Lenovo Japan provides, through its PC Collecting and Recycling Services, for the collecting, reuse, and recycling of disused computers and monitors. For details, go to <http://www.ibm.com/jp/pc/service/recycle/pcrecycle>.

Pursuant to the Law for Promotion of Effective Utilization of Resources, the collecting and recycling of home-used computers and monitors by the manufacturer was begun on October 1, 2003. This service is provided free of charge for home-used computers sold after October 1, 2003. For details, go to: <http://www.ibm.com/jp/pc/service/recycle/personal>

Disposing of Lenovo computer components

Some Lenovo computer products sold in Japan may have components that contain heavy metals or other environmental sensitive substances. To properly dispose of disused components, such as a printed circuit board or drive, use the methods described above for collecting and recycling a disused computer or monitor.

Disposing of disused lithium batteries from Lenovo computers

A button-shaped lithium battery is installed on the system board of your Lenovo computer to provide power to the computer clock while the computer is off or disconnected from the main power source. If you want to replace it with a new one, contact your place of purchase or ask for a repair service provided by Lenovo. If you have replaced it by yourself and want to dispose of the disused lithium battery, insulate it with vinyl tape,

contact your place of purchase, and follow their instructions. If you use a Lenovo computer at home and need to dispose of a lithium battery, you must comply with local ordinances and regulations.

Index

A

Administrator, password 78
advanced settings 80
audio line-in connector 24
audio line-out connector 24

B

battery, replacing 35
boot-block recovery 83

C

changing
 password 78
 startup device sequence 79
components, internal 26
connector 24
connectors
 front 23
 rear 23
considerations, passwords 78
CRU
 completing the installation 57

D

deleting a password 78
Description 24
device drivers
 installing 58
DisplayPort connector 24

E

environment, operating 9
Ethernet connector 24
exiting, Setup Utility 80

F

failure, recovering from POST/UEFI 83
features 7
flashing UEFI 82
front bezel
 front bezel, removing 31
 front bezel, reinstalling 31
 front connectors 23
 front fan assembly, replacing 53

H

hard disk drive, replacing 50
heat sink and fan assembly, replacing 44

I

Input/Output (I/O) features 8
installing
 device drivers 58
installing options
 memory module 36
 PCI card 32

L

locating components 26

M

memory module
 installing, replacing 36
 system board 36
Microphone connector 24

N

notice, television output 88
notices 87

O

optical drive, replacing 38

P

parts replacement, completing 57
password
 Administrator 78
 considerations 78
 Power-On Password 78
 setting, changing, deleting 78
passwords, using 78
PCI card 32
 installing, replacing 32
 slots 32
power supply assembly, replacing 43
power-on self-test (POST) 82
Power-On, Password 78
problem isolation tables 15
programs, updating system 82

R

rear connectors 23
rear fan assembly, replacing 55
recovering
 from a POST/UEFI update failure 83
recovery
 boot-block 83

- removing server cover 30
- replacing
 - battery 35
 - hard disk drive 50
 - heat sink and fan assembly 44

S

- security
 - enabling or disabling 79
- selecting
 - startup device 79
 - temporary startup device 79
- serial port 24
- server components 29
- server cover
 - removing 30
- server cover, reinstalling 57
- setting
 - password 78
- settings
 - advanced 80
 - changing 77
 - viewing 77
- Setup Utility 77
- Setup Utility program, starting 77
- Setup Utility, exiting 80
- specifications 7
- starting the Setup Utility program 77
- startup device 79
 - sequence, changing 79
 - temporary, selecting 79
- static-sensitive devices, handling 29
- system
 - programs 82
- system board
 - connectors 25
 - locating parts 25
 - locations 25
 - memory module 36

T

- television output notice 88
- temporary startup device 79
- trademarks 88

U

- UEFI, updating (flashing) 82–83
- updating
 - (flashing) UEFI 82
 - system programs 82
- updating (flashing) the UEFI 83
- USB connector 25
- using
 - passwords 78
 - Setup Utility 77

V

- VGA monitor connector 25
- video subsystem 8
- viewing and changing settings 77

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