Contents

About this manual

1

This manual contains service and reference information for Lenovo 3000K computers listed on the cover. It is intended only for trained servicers who are familiar with Lenovo computer products.

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

This manual includes a complete FRU part number listing for each machine type and model listed on the cover. If you have internet access, FRU part numbers are also available at: http:/www.lenovo.com/support

Important Safety Information

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

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

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

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

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

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

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。

Using eSupport

For Key Commodities (Examples - hard disk drive, system board, microprocessor, LCD, and memory)
- eSupport can be used to view the list of key commodities built in a particular machine serial.
- eSupport can be accessed at the following Web site: http://www.lenovo.com/support
- To view the key commodities:
  1. Click **Parts information**.
  2. Under Parts information, click **Parts lookup**.
  3. Under Parts lookup, type the model type and serial number; then click **Continue**.
     The key commodities are returned in the eSupport record under Parts shipped with your system.

For the remaining FRUs (the complete list of FRUs at the MT Model level)
- eSupport can be used to view the complete list of FRUs for a machine type and model.
- To view the complete list of FRUs for a machine type:
  1. Point your browser to http://www.lenovo.com/support.
  2. Type the machine type (Example: 8129) in the Use Quick Path field; then click Go.
  3. Under Browse by product, click Continue.
  4. Under Important information, click Parts information.
  5. In the Refine results field, select Service parts; then click the entry for your machine type.
     The list of service parts by description, with applicable machine type model and FRU part number is displayed.

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 after June 2006. Products on the market before June 2006 are not required to have RoHS compliant parts.

So, 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.

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. 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 Lenovo 3000K parts have unique FRU part numbers. Before or after June, 2006, failed RoHS compliant parts must always be replaced using RoHS compliant FRUs, so only the FRUs identified as compliant in the system HMM or direct substitutions for those FRUs can be used.

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

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

Related Web URLs are:
*   Lenovo information for Suppliers website:
    http://www-03.ibm.com/procurement/proweb.nsf/
    ContentDocsByTitle/United+States~Information+for+suppliers
*   RoHS Directive:
    http://europa.eu.int/eur-lex/pri/en/oj/dat/2003/l_037/
    l_03720030213en00190023.pdf
*   California Senate Bills 20, 50:
    http://www.ciwmb.ca.gov/HHW/Events/AnnualConf/2004/
    presentation/MPaparian.pdf

Safety information

2

This chapter contains the safety information that you need to be familiar with before servicing a computer.

General safety

Follow these rules to ensure general safety:
- Observe good housekeeping in the area of the machines during and after maintenance.
- When lifting any heavy object:
  1. Ensure you can stand safely without slipping.
  2. Distribute the weight of the object equally between your feet.
  3. Use a slow lifting force. Never move suddenly or twist when you attempt to lift.
  4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back. *Do not attempt to lift any objects that weigh more than 16 kg (35 lb) or objects that you think are too heavy for you.*
- Do not perform any action that causes hazards to the customer, or that makes the equipment unsafe.
- Before you start the machine, ensure that other service representatives and the customer's personnel are not in a hazardous position.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the machine.
- Keep your tool case away from walk areas so that other people will not trip over it.
- Do not wear loose clothing that can be trapped in the moving parts of a machine. Ensure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.
- Insert the ends of your necktie or scarf inside clothing or fasten it with a nonconductive clip, approximately 8 centimeters (3 inches) from the end.
- Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.
  Remember: Metal objects are good electrical conductors.

- Wear safety glasses when you are: hammering, drilling soldering, cutting wire, attaching springs, using solvents, or working in any other conditions that might be hazardous to your eyes.
- After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective.
- Reinstall all covers correctly before returning the machine to the customer.

Electrical safety

CAUTION:
Electrical current from power, telephone, and communication cables can be hazardous. To avoid personal injury or equipment damage, disconnect the attached power cords, telecommunication systems, networks, and modems before you open the server/workstation covers, unless instructed otherwise in the installation and configuration procedures.

Observe the following rules when working on electrical equipment.

Important: Use only approved tools and test equipment. Some hand tools have handles covered with a soft material that does not insulate you when working with live electrical currents.

Many customers have, near their equipment, rubber floor mats that contain small conductive fibers to decrease electrostatic discharges. Do not use this type of mat to protect yourself from electrical shock.

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Disconnect all power before:
  – Performing a mechanical inspection
  – Working near power supplies
  – Removing or installing main units
- Before you start to work on the machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine and to lock the wall box in the off position.

6

- If you need to work on a machine that has exposed electrical circuits, observe the following precautions:
  - Ensure that another person, familiar with the power-off controls, is near you.
    Remember: Another person must be there to switch off the power, if necessary.
  - Use only one hand when working with powered-on electrical equipment; keep the other hand in your pocket or behind your back.
    Remember: There must be a complete circuit to cause electrical shock. By observing the above rule, you may prevent a current from passing through your body.
  - When using testers, set the controls correctly and use the approved probe leads and accessories for that tester.
  - Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames.
    Observe the special safety precautions when you work with very high voltages; these instructions are in the safety sections of maintenance information. Use extreme care when measuring high voltages.
- Regularly inspect and maintain your electrical hand tools for safe operational condition.
- Do not use worn or broken tools and testers.
- *Never assume* that power has been disconnected from a circuit. First, check that it has been powered-off.
- Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, nongrounded power extension cables, power surges, and missing safety grounds.
- Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and machine damage.
- Do not service the following parts with the power on when they are removed from their normal operating places in a machine:
  - Power supply units
  - Pumps
  - Blowers and fans
  - Motor generators
  and similar units. (This practice ensures correct grounding of the units.)
- If an electrical accident occurs:
  - Use caution; do not become a victim yourself.
  - Switch off power.
  - Send another person to get medical aid.

Safety inspection guide

The intent of this inspection guide is to assist you in identifying potentially unsafe conditions on these products. Each machine, as it was designed and built, had required safety items installed to protect users and service personnel from injury. This guide addresses only those items. However, good judgment should be used to identify potential safety hazards due to attachment of features or options not covered by this inspection guide.

If any unsafe conditions are present, you must determine how serious the apparent hazard could be and whether you can continue without first correcting the problem.

Consider these conditions and the safety hazards 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 bulging capacitor
• Mechanical hazards, such as loose or missing hardware

The guide consists of a series of steps presented in a checklist. Begin the checks with the power off, and the power cord disconnected.

Checklist:
1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Power-off the computer. Disconnect the power cord.
3. Check the power cord for:
   a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and frame ground.
   b. The power cord should be the appropriate type as specified in the parts listings.
   c. Insulation must not be frayed or worn.
4. Remove the cover.
5. Check for any obvious alterations. Use good judgment as to the safety of any alterations.
6. Check inside the unit for any obvious unsafe conditions, such as metal filings, contamination, water or other liquids, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Handling electrostatic discharge-sensitive devices

Any computer part containing transistors or integrated circuits (ICs) should be considered sensitive to electrostatic discharge (ESD). ESD damage can occur when there is a difference in charge between objects. Protect against ESD damage by equalizing the charge so that the machine, the part, the work mat, and the person handling the part are all at the same charge.

Notes:
1. Use product-specific ESD procedures when they exceed the requirements noted here.
2. Make sure that the ESD protective devices you use have been certified (ISO 9000) as fully effective.

When handling ESD-sensitive parts:
*   Keep the parts in protective packages until they are inserted into the product.
*   Avoid contact with other people.
*   Wear a grounded wrist strap against your skin to eliminate static on your body.
*   Prevent the part from touching your clothing. Most clothing is insulative and retains a charge even when you are wearing a wrist strap.
*   Use the black side of a grounded work mat to provide a static-free work surface. The mat is especially useful when handling ESD-sensitive devices.
*   Select a grounding system, such as those listed below, to provide protection that meets the specific service requirement.

    Note: The use of a grounding system is desirable but not required to protect against ESD damage.
    –   Attach the ESD ground clip to any frame ground, ground braid, or green-wire ground.
    –   Use an ESD common ground or reference point when working on a double-insulated or battery-operated system. You can use coax or connector-outside shells on these systems.
    –   Use the round ground-prong of the ac plug on ac-operated computers.

Grounding requirements

Electrical grounding of the computer is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.

Safety notices

The caution and danger safety notices in this section are provided in the following languages:
- English
- German

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

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

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

CAUTION:

When replacing the lithium battery, use only Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

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

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

CAUTION:

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

DANGER:

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following:
Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

≥18 kg(37 lbs)   ≥32 kg(70.5 lbs)   ≥55 kg(121.2 lbs)

CAUTION:
Use safe practices when lifting.

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.
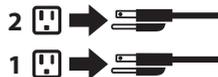
CAUTION:
Do not place any object weighing more than 82 kg (180 lbs.) on top of rack-mounted devices.

VORSICHT
An Netz-, Telefon- und Datenleitungen können gefährliche Spannungen anliegen.

Aus Sicherheitsgründen:

- **Bei Gewitter an diesem Gerät keine Kabel anschließen oder lösen. Ferner keine Installations-, Wartungs- oder Rekonfigurationsarbeiten durchführen.**
- **Gerät nur an eine Schutzkontaktsteckdose mit ordnungsgemäß geerdetem Schutzkontakt anschließen.**
- **Alle angeschlossenen Geräte ebenfalls an Schutzkontaktsteckdosen mit ordnungsgemäß geerdetem Schutzkontakt anschließen.**
- **Die Signalkabel nach Möglichkeit einhändig anschließen oder lösen, um einen Stromschlag durch Berühren von Oberflächen mit unterschiedlichem elektrischem Potenzial zu vermeiden.**
- **Geräte niemals einschalten, wenn Hinweise auf Feuer, Wasser oder Gebäudeschäden vorliegen.**
- **Die Verbindung zu den angeschlossenen Netzkabeln, Telekommunikationssystemen, Netzwerken und Modems ist vor dem Öffnen des Gehäuses zu unterbrechen, sofern in den Installations- und Konfigurationsprozeduren keine anders lautenden Anweisungen enthalten sind.**
- **Zum Installieren, Transportieren und Öffnen der Abdeckungen des Computers oder der angeschlossenen Einheiten die Kabel gemäß der folgenden Tabelle anschließen und abziehen.**

Zum Anschließen der Kabel gehen Sie wie folgt vor	Zum Abziehen der Kabel gehen Sie wie folgt vor
1. Schalten Sie alle Einheiten AUS.	1. Schalten Sie alle Einheiten AUS.
2. Schließen Sie erst alle Kabel an die Einheiten an.	2. Ziehen Sie zuerst alle Netzkabel aus den Netzsteckdosen.
3. Schließen Sie die Signalkabel an die Buchsen an.	3. Ziehen Sie die Signalkabel aus den Buchsen.
4. Schließen Sie die Netzkabel an die Steckdose an.	4. Ziehen Sie alle Kabel von den Einheiten ab.
5. Schalten Sie die Einheit EIN.	

CAUTION:
Eine verbrauchte Lithiumbatterie nur durch eine Batterie mit der Teilenummer 33F8354 oder eine gleichwertige, vom Hersteller empfohlene Batterie ersetzen. Enthält das System ein Modul mit einer Lithiumbatterie, dieses nur durch ein Modul desselben Typs und von demselben Hersteller ersetzen. Die Batterie enthält Lithium und kann bei unsachgemäßer Verwendung, Handhabung oder Entsorgung explodieren.

Die Batterie nicht:
- **mit Wasser in Berührung bringen.**
- **über 100 C erhitzen.**
- **reparieren oder zerlegen.**

Die örtlichen Bestimmungen für die Entsorgung von Sondermüll beachten.

ACHTUNG:
Bei der Installation von Lasergeräten (wie CD-ROM-Laufwerken, DVD-aufwerken, Einheiten mit Lichtwellenleitertechnik oder Sendern) Folgendes beachten:
- **Die Abdeckungen nicht entfernen. Durch Entfernen der Abdeckungen des Lasergeräts können gefährliche Laserstrahlungen freigesetzt werden. Das Gerät enthält keine zu wartenden Teile.**
- **Werden Steuerelemente, Einstellungen oder Durchführungen von Prozeduren anders als hier angegeben verwendet, kann gefährliche Laserstrahlung auftreten.**

VORSICHT
Einige Lasergeräte enthalten eine Laserdiode der Klasse 3A oder 3B. Beachten Sie Folgendes: Laserstrahlung bei geöffneter Verkleidung. Nicht in den Strahl blicken. Keine Lupen oder Spiegel verwenden. Strahlungsbereich meiden.


≥18 kg   ≥32 kg   ≥55 kg

ACHTUNG:
Arbeitsschutzrichtlinien beim Anheben der Maschine beachten.

ACHTUNG:

Mit dem Netzschalter an der Einheit und am Netzteil wird die Stromversorgung für die Einheit nicht unterbrochen. Die Einheit kann auch mit mehreren Netzkabeln ausgestattet sein. Um die Stromversorgung für die Einheit vollständig zu unterbrechen, müssen alle zum Gerät führenden Netzkabel vom Netz getrennt werden.
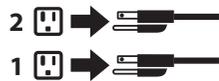
ACHTUNG:

Legen Sie auf in einem Rack montierten Einheiten keine über 82 kg schweren Gegenstände ab.

General information

3

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

Specifications

This section lists the physical specifications for your computer.

Type Lenovo 3000K

This section lists the physical specifications.

Dimensions
Width: 180 mm
Height: 388 mm
Length: 436.5 mm

Environment
Air temperature:
Operating: 10° to 35°C
Transit: -40° to 55°C
Humidity:
Operating: 35% to 80%
Transit: 20% to 93% (40°C)
Altitude: 86KPa to 106KPa

Electrical input
Input voltage: 220V±22V
Input frequency: 50Hz ±1Hz

General Checkout

4

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.

Notes

- The default is for this computer to boot up in quiet mode (no beep, no memory count and checkpoint code display) when no errors are detected by POST.
- To enable beep, memory count, and checkpoint code display when a successful POST occurs, do the following:
  1. Start the Setup Utility program. See "Starting the Setup Utility program" .
  2. Select **Start Options**.
  3. Set **Power-On Self-Test** to **Enhanced**.
- Before replacing any FRUs, 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. For more information on how to determine and obtain the latest level BIOS, see "BIOS levels" .

Use the following procedure to help determine the cause of the problem:
1. Power-off the computer 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.

19

5. Power-on the computer.
   - 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.

   If you do receive the correct response, proceed to step 7.
6. Look at the following conditions and follow the instructions:
   - If you hear beep codes during POST, go to "Beep symptoms".
   - If the computer displays a POST error, go to "POST error codes".
   - If the computer hangs and no error is displayed, continue at step 7.
7. If 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 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

Note: 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 configuration options set in the system
  7. Have the same setup for the operation system control files

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

Using the Setup Utility 5

The Setup Utility program is stored in the electrically erasable programmable read-only memory (EEPROM) of your computer. The Setup Utility program is used to view and change the configuration settings of your computer, regardless of which operating system you are using. However, the operating-system settings might override any similar settings in the Setup Utility program.

Starting the Setup Utility program

To start the Setup Utility program, do the following:
1. If your computer is already on when you start this procedure, shut down the operating system and turn off the computer.
2. Press and hold the F1 key then turn on the computer. When you hear multiple beeps, release the F1 key.
   Notes:
   a. If you are using a USB keyboard and the Setup Utility program does not display using this method, repeatedly press and release the F1 key rather than leaving it pressed when turning on the computer.
   b. If a user password or an administrator password has been set, the Setup Utility program menu is not displayed until you type your password. See "Using passwords" for more information.

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

Viewing and changing settings

The Setup Utility program menu lists items that identify system configuration topics.

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

23

bottom of each screen.

Using passwords

You can use passwords to provide security for your computer and data. There are two kinds of passwords: a user password and an administrator password. You do not have to set a password of either type to use your computer. However, if you decide to set either one, read the following sections.

User Password

The user password feature deters unauthorized persons from gaining access to your computer.

Setting, changing, and deleting a user password

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

Note: A password can be any combination of up to eight characters (A- Z, a-z, and 0-9).
1. Start the Setup Utility program (see "Starting the Setup Utility program".
2. From the Setup Utility program menu, select **Set User Password** and press Enter.
3. The password dialog box will be displayed. Type the new password, and press Enter.
4. When prompted to confirm the password, type the password again. If you type the password in correctly, the password will be installed.

To delete a previously set user password, do the following:

Note: When prompted for a password, you can type either your user or administrator password.
1. From the Setup Utility program menu, select **Set User Password** and press Enter. A message will display that indicates the password has been disabled.
2. Press any key to continue.

Administrator Password

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

After you set an Administrator Password, a password prompt is displayed

each time you try to access the Setup Utility program. If you type the wrong password, you will see an error message. If you type the wrong password three times, you must turn the computer off and start again.

If both the user and administrator passwords are set, you can type either password. However, to change any configuration settings, you must use your administrator password.

Setting, changing, and deleting an administrator password

To set, change, or delete an administrator password, do the following:

Note: A password can be any combination of up to eight characters (A- Z, a-z, and 0-9).
1. Start the Setup Utility program (see "Starting the Setup Utility program".
2. From the Setup Utility program menu, select **Set Administrator Password** and press Enter.
3. The password dialog box will be displayed. Type the new password, and press Enter.
4. When prompted to confirm the password, type the password again. If you type the password correctly, the password will be installed.

To delete a previously set administrator password, do the following:

Note: When prompted for a password, you must type your administrator password.
1. From the Setup Utility program menu, select **Set Administrator Password** and press Enter. A message will display that indicates the password has been disabled.
2. Press any key to continue.

Selecting a startup device

If your computer does not start up (boot) from a device such as the CD-ROM, diskette, or hard disk as expected, use one of the following procedures to select a startup device.

Selecting a temporary startup device

Use this procedure to startup from any boot device.

Note: Not all CDs, hard disks, and diskettes are startable (bootable).
1. Turn off your computer.
2. Press and hold the F12 key then turn on the computer. When the

25

Startup Device Menu (Boot Menu) appears, release the F12 key.

Note: If you are using a USB keyboard and the Startup Device Menu does not display using this method, repeatedly press and release the F12 key rather than leaving it pressed when turning on the computer.

3. Select the desired startup device from the Startup Device Menu and press Enter to begin.

Note: Selecting a startup device from the Startup Device (Boot) menu does not permanently change the startup sequence.

Changing the startup device sequence

To view or change the primary or automatic power-on startup sequence, do the following:
1. Start the Setup Utility program (see "Starting the Setup Utility program".
2. Select **Advanced BIOS features**.
3. Select the sequence of devices for the First Boot Device, the Second Boot Device, and the Third Boot Device.
4. Press Esc to return to the Setup Utility program menu.
5. Select **Save & Exit Setup**.

If you have changed these settings and want to return to the default settings, press (N) when the Save and Exit dialog box is displayed.

Exiting from the Setup Utility program

When you finish viewing or changing settings, press Esc to return to the Setup Utility program menu (you might have to press Esc several times). If you want to save the new settings, select **Save & Exit Setup** before you exit. Otherwise, your changes will not be saved.

Symptom-to-FRU Index 6

The Symptom-to-FRU index lists error symptoms and possible causes. The most likely cause is listed first. Always begin with Chapter 4, "General Checkout,". This index can also be used to help you decide which FRUs to have available when servicing a computer. If you are unable to correct the problem using this index, go to "Undetermined problems".

Notes

- If you have both an error message and an incorrect audio response, diagnose the error message first.
- If you cannot run the diagnostic tests or you get a diagnostic error code when running a test, but did receive a POST error message, diagnose the POST error message first.
- If you did not receive any error message, look for a description of your error symptoms in the first part of this index.

Hard disk drive boot error

A hard disk drive boot error (error codes 1962 and I999030X) 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: 1. Attempt to back-up the data on the failing hard disk drive. 2. Using the operating systems programs, format the hard disk drive.
The drive is defective.	Replace the hard disk drive.

27

Power Supply Problems

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

Check/Verify	FRU/Action
Check the following for proper installation. • 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

Diagnostic error codes

Refer to the following diagnostic error codes when using the diagnostic tests. See "Running diagnostics tests" for the specific type for information about the Diagnostic programs.

In the following index, X can represent any number.

Diagnostic Error Code	FRU/Action
000-000-XXX BIOS Test Passed	**No action**
000-002-XXX BIOS Timeout	**1. Flash the system. See "Flash update procedures"** 2. System board
000-024-XXX BIOS Addressing test failure	**1. Flash the system. See "Flash update procedures"** 2. System board
000-025-XXX BIOS Checksum Value error	**1. Flash the system. See "Flash update procedures"** 2. System board
000-026-XXX FLASH data error	**1. Flash the system. See "Flash update procedures"** 2. System board
000-027-XXX BIOS Configuration/Setup error	**1. Run Setup** 2. Flash the system. See "Flash update procedures" 3. System board

Diagnostic Error Code	FRU/Action
000-034-XXX BIOS Buffer Allocation failure	**1. Reboot the system** 2. Flash the system. See "Flash update procedures" 3. Run memory test 4. System board
000-035-XXX BIOS Reset Condition detected	**1. Flash the system. See "Flash update procedures"** 2. System board
000-036-XXX BIOS Register error	1. Flash the system. See **"Flash update procedures"** 2. System board
000-038-XXX BIOS Extension failure	**1. Flash the system. See "Flash update procedures"** 2. Adapter card 3. System board
000-039-XXX BIOS DMI data error	**1. Flash the system. See "Flash update procedures"** 2. System board
000-195-XXX BIOS Test aborted by user	**Information only** Re-start the test, if necessary
000-196-XXX BIOS test halt, error threshold exceeded	**1. Press F3 to review the log file** 2. Re-start the test to reset the log file
000-197-XXX BIOS test warning	**1. Make sure the component that is called out is connected and/or enabled. See "Using the Setup Utility,"** 2. Re-run test 3. Replace the component that is called out in warning statement 4. Replace the component under test
000-198-XXX BIOS test aborted	**1. Make sure the component that is called out is connected and/or enabled. See "Using the Setup Utility,"** 2. Flash the system and retest. See "Flash update procedures" 3. Go to "Undetermined problems"
000-199-XXX BIOS test failed, cause unknown	1. Go to "Undetermined problems" 2. Flash the system and re-test 3. Replace component under function test

Diagnostic Error Code	FRU/Action
000-250-XXX BIOS APM failure	**1. Flash the system. See "Flash update procedures"** 2. System board
000-270-XXX BIOS ACPI failure	**1. Flash the system. See "Flash update procedures"** 2. System board
001-000-XXX System Test Passed	**No action**
001-00X-XXX System Error	**System board**
001-01X-XXX System Error	**System board**
001-024-XXX System Addressing test failure	**System board**
001-025-XXX System Checksum Value error	**1. Flash the system. See "Flash update procedures"** 2. System board
001-026-XXX System FLASH data error	**1. Flash the system. See "Flash update procedures"** 2. System board
001-027-XXX System Configuration/Setup error	**1. Run Setup** 2. Flash the system. See "Flash update procedures" 3. System board
001-032-XXX System Device Controller failure	**System board**
001-034-XXX System Device Buffer Allocation failure	**1. Reboot the system** 2. Flash the system. See "Flash update procedures" 3. Run memory test 4. System board
001-035-XXX System Device Reset condition detected	**System board**
001-036-XXX System Register error	**System board**
001-038-XXX System Extension failure	**1. Adapter card** 2. System board
001-039-XXX System DMI data structure error	**1. Flash the system. See "Flash update procedures"** 2. System board
001-040-XXX System IRQ failure	**1. Power-off/on system and re-test** 2. System board

Diagnostic Error Code	FRU/Action
001-041-XXX System DMA failure	**1. Power-off/on system and re-test** 2. System board
001-195-XXX System Test aborted by user	**Information only** Re-start the test, if necessary
001-196-XXX System test halt, error threshold exceeded	**1. Press F3 to review the log file** 2. Re-start the test to reset the log file
001-197-XXX System test warning	**1. Make sure the component that is called out is connected and/or enabled. See "Using the Setup Utility,"** 2. Re-run test 3. Replace the component that is called out in warning statement 4. Replace the component under test
001-198-XXX System test aborted	**1. If a component is called out, make sure it is connected and/or enabled. See "Using the Setup Utility,"** 2. Flash the system and retest. See "Flash update procedures" 3. Go to "Undetermined problems"
001-199-XXX System test failed, cause unknown	1. Go to "Undetermined problems" 2. Flash the system and re-test 3. Replace component under function test
001-250-XXX System ECC error	**System board**
001-254-XXX **001-255-XXX** **001-256-XXX** **001-257-XXX** System DMA error	**System board**
001-260-XXX **001-264-XXX** System IRQ error	**System board**
001-268-XXX System IRQ1 failure	**1. Device on IRQ1** 2. System board
001-269-XXX System IRQ2 failure	**1. Device on IRQ2** 2. System board
001-270-XXX System IRQ3 failure	**1. Device on IRQ3** 2. System board

Diagnostic Error Code	FRU/Action
001-271-XXX System IRQ4 failure	**1. Device on IRQ4** 2. System board
001-272-XXX System IRQ5 failure	**1. Device on IRQ5** 2. System board
001-273-XXX System IRQ6 (diskette drive) failure	**1. Diskette Cable** 2. Diskette drive 3. System board
001-274-XXX System IRQ7 failure	**1. Device on IRQ7** 2. System board
001-275-XXX System IRQ8 failure	**1. Device on IRQ8** 2. System board
001-276-XXX System IRQ9 failure	**1. Device on IRQ9** 2. System board
001-277-XXX System IRQ10 failure	**1. Device on IRQ10** 2. System board
001-278-XXX System IRQ11 failure	**1. Device on IRQ11** 2. System board
001-279-XXX System IRQ12 failure	**1. Device on IRQ12** 2. System board
001-280-XXX System IRQ13 failure	**1. Device on IRQ13** 2. System board
001-281-XXX System IRQ14 (hard disk drive) failure	**1. Hard disk drive cable** 2. Hard disk drive 3. System board
001-282-XXX System IRQ15 failure	**1. Device on IRQ15** 2. System board
001-286-XXX **001-287-XXX** **001-288-XXX** System Timer failure	**System board**
001-292-XXX System CMOS RAM error	**1. Run Setup and re-test** 2. System board
001-293-XXX System CMOS Battery	**1. CMOS Battery** 2. System board
001-298-XXX System RTC date/time update failure	**1. Flash the system. See "Flash update procedures"** 2. System board
001-299-XXX System RTC periodic interrupt failure	**System board**
001-300-XXX System RTC Alarm failure	**System board**

Diagnostic Error Code	FRU/Action
001-301-XXX System RTC Century byte error	**1. Flash the system. See "Flash update procedures"** 2. System board
005-000-XXX Video Test Passed	**No action**
005-00X-XXX Video error	**1. Video card, if installed** 2. System board
005-010-XXX **005-011-XXX** **005-012-XXX** **005-013-XXX** Video Signal failure	**1. Video card, if installed** 2. System board
005-016-XXX Video Simple Pattern test failure	**1. Video Ram** 2. Video card, if installed 3. System board
005-024-XXX Video Addressing test failure	**1. Video card, if installed** 2. System board
005-025-XXX Video Checksum Value error	**1. Video card, if installed** 2. System board
005-027-XXX Video Configuration/Setup error	**1. Run Setup** 2. Video drivers update 3. Video card, if installed 4. System board
005-031-XXX Video Device Cable failure	**1. Video cable** 2. Monitor 3. Video card, if installed 4. System board
005-032-XXX Video Device Controller failure	**1. Video card, if installed** 2. System board
005-036-XXX Video Register error	**1. Video card, if installed** 2. System board
005-038-XXX System BIOS extension failure	**1. Video card, if installed** 2. System board
005-040-XXX Video IRQ failure	**1. Video card, if installed** 2. System board
005-195-XXX Video Test aborted by user	**Information only** Re-start the test, if necessary
005-196-XXX Video test halt, error threshold exceeded	**1. Press F3 to review the log file** 2. Re-start the test to reset the log file

Diagnostic Error Code	FRU/Action
005-197-XXX Video test warning	**1. Make sure the component that is called out is connected and/or enabled. See "Using the Setup Utility,"** 2. Re-run test 3. Replace the component called out in warning statement 4. Replace the component under test
005-198-XXX Video test aborted	**1. If a component is called out, make sure it is connected and/or enabled. See "Using the Setup Utility,"** 2. Flash the system and re-test. See "Flash update procedures" 3. Go to "Undetermined problems"
005-199-XXX Video test failed, cause unknown	1. Go to "Undetermined problems" 2. Flash the system and re-test. See "Flash update procedures" 3. Replace component under function test
005-2XX-XXX **005-3XX-XXX** Video subsystem error	**1. Video card, if installed** 2. System board
006-000-XXX Diskette interface Test Passed	**No action**
006-0XX-XXX Diskette interface error	**1. Diskette drive Cable** 2. Diskette drive 3. System board
006-195-XXX Diskette interface Test aborted by user	**Information only** Re-start the test, if necessary
006-196-XXX Diskette interface test halt, error threshold exceeded	**1. Press F3 to review the log file** 2. Re-start the test to reset the log file
006-197-XXX Diskette interface test warning	**1. If a component is called out, make sure it is connected and/or enabled** 2. Re-run test 3. Replace the component that is called out in warning statement 4. Replace the component under test

Diagnostic Error Code	FRU/Action
006-198-XXX Diskette interface test aborted	**1. If a component is called out, make sure it is connected and/or enabled** 2. Flash the system and re-test. See "Flash update procedures" 3. Go to "Undetermined problems"
006-199-XXX Diskette interface test failed, cause unknown	1. Go to "Undetermined problems" 2. Flash the system and re-test 3. Replace component under function test
006-25X-XXX Diskette interface Error	**1. Diskette drive cable** 2. Diskette drive 3. System board
011-000-XXX Serial port Interface Test Passed	**No action**
011-001-XXX Serial port Presence	**1. Remove external serial device, if present** 2. Run setup, enable port 3. System board
011-002-XXX **011-003-XXX** Serial port Timeout/Parity error	**System board**
011-013-XXX **011-014-XXX** Serial port Control Signal/Loopback test failure	**System board**
011-015-XXX Serial port External Loopback failure	**1. Wrap plug** 2. System board
011-027-XXX Serial port Configuration/Setup error	**1. Run Setup, enable port** 2. Flash the system. See "Flash update procedures" 3. System board
011-03X-XXX **011-04X-XXX** Serial port failure	**System board**
011-195-XXX Serial port Test aborted by user	**Information only** Re-start the test, if necessary
011-196-XXX Serial port test halt, error threshold exceeded	**1. Press F3 to review the log file** 2. Re-start the test to reset the log file

35

Diagnostic Error Code	FRU/Action
011-197-XXX Serial port test warning	1. **Make sure the component that is called out is connected and/or enabled. See "Using the Setup Utility,"** 2. Re-run test 3. Replace the component that is called out in warning statement 4. Replace the component under test
011-198-XXX Serial port test aborted	1. **If a component is called out, make sure it is connected and/or enabled. See "Using the Setup Utility,"** 2. Flash the system and re-test. See "Flash update procedures" 3. Go to "Undetermined problems"
011-199-XXX Serial port test failed, cause unknown	1. Go to "Undetermined problems" 2. Flash the system and re-test. See "Flash update procedures" 3. Replace component under function test
011-2XX-XXX Serial port signal failure	1. **External serial device** 2. System board
014-000-XXX Parallel port Interface Test Passed	**No action**
014-001-XXX Parallel port Presence	1. **Remove external parallel device, if present** 2. Run setup, enable port 3. System board
014-002-XXX **014-003-XXX** Parallel port Timeout/Parity error	**System board**
014-013-XXX **014-014-XXX** Parallel port Control Signal/ Loopback test failure	**System board**
014-015-XXX Parallel port External Loopback failure	1. **Wrap plug** 2. System board
014-027-XXX Parallel port Configuration/Setup error	1. **Run Setup, enable port** 2. Flash the system. See "Flash update procedures" 3. System board

Diagnostic Error Code	FRU/Action
014-03X-XXX **014-04X-XXX** Parallel port failure	**System board**
014-195-XXX Parallel port Test aborted by user	**Information only** Re-start the test, if necessary
014-196-XXX Parallel port test halt, error threshold exceeded	**1. Press F3 to review the log file** 2. Re-start the test to reset the log file
014-197-XXX Parallel port test warning	**1. Make sure the component that is called out is connected and/or enabled. See "Using the Setup Utility,"** 2. Re-run test 3. Replace the component that is called out in warning statement 4. Replace the component under test
014-198-XXX Parallel port test aborted	**1. If a component is called out, make sure it is connected and/or enabled** 2. Flash the system and re-test. See "Flash update procedures" 3. Go to "Undetermined problems"
014-199-XXX Parallel port test failed, cause unknown	1. Go to "Undetermined problems" 2. Flash the system and re-test. See "Flash update procedures" 3. Replace component under function test
014-2XX-XXX **014-3XX-XXX** Parallel port failure	**1. External parallel device** 2. System board
015-000-XXX USB port Interface Test Passed	**No action**
015-001-XXX USB port Presence	**1. Remove USB device(s) and re-test** 2. System board
015-002-XXX USB port Timeout	**1. Remove USB device(s) and re-test** 2. System board
015-015-XXX USB port External Loopback failure	**1. Remove USB device(s) and re-test** 2. System board

Diagnostic Error Code	FRU/Action
015-027-XXX USB port Configuration/Setup error	1. **Flash the system. See** **"Flash update procedures"** 2. System board
015-032-XXX USB port Device Controller failure	**System board**
015-034-XXX USB port buffer allocation failure	1. **Reboot the system** 2. Flash the system and re-test. See "Flash update procedures" 3. Run memory test 4. System board
015-035-XXX USB port Reset condition detected	1. **Remove USB device(s) and re-test** 2. System board
015-036-XXX USB port Register error	**System board**
015-040-XXX USB port IRQ failure	1. **Run setup and check for conflicts** 2. Flash the system. See "Flash update procedures" 3. System board
015-195-XXX USB port Test aborted by user	**Information only** Re-start the test, if necessary
015-196-XXX USB port test halt, error threshold exceeded	1. **Press F3 to review the log file** 2. Re-start the test to reset the log file
015-197-XXX USB port test warning	1. **Make sure the component that is called out is connected and/or enabled. See** **"Using the Setup Utility,"** 2. Re-run test 3. Replace the component that is called out in warning statement 4. Replace the component under test
015-198-XXX USB port test aborted	1. **If a component is called out, make sure it is connected and/or enabled. See** **"Using the Setup Utility,"** 2. Flash the system and re-test. See "Flash update procedures" 3. Go to "Undetermined problems"

Diagnostic Error Code	FRU/Action
015-199-XXX USB port test failed, cause unknown	1. Go to "Undetermined problems" 2. Flash the system and re-test. See "Flash update procedures" 3. Replace component under function test
018-000-XXX PCI Card Test Passed	**No action**
018-0XX-XXX PCI Card Failure	**1. Riser card, if installed** 2. System board
018-195-XXX PCI Card Test aborted by user	**1. PCI card** **2. Information only** Re-start the test, if necessary
018-196-XXX PCI Card test halt, error threshold exceeded	**1. Press F3 to review the log file** 2. Re-start the test to reset the log file
018-197-XXX PCI Card test warning	**1. Make sure the component that is called out is connected and/or enabled. See "Using the Setup Utility,"** 2. Re-run test 3. Replace the component that is called out in warning statement 4. Replace the component under test
018-198-XXX PCI Card test aborted	**1. If a component is called out, make sure it is connected and/or enabled. See "Using the Setup Utility,"** 2. Flash the system and re-test. See "Flash update procedures" 3. Go to "Undetermined problems"
018-199-XXX PCI Card test failed, cause unknown	1. Go to "Undetermined problems" 2. Flash the system and re-test. See "Flash update procedures" 3. Replace component under function test
018-250-XXX PCI Card Services error	**1. PCI card** 2. Riser card, if installed 3. System board
020-000-XXX PCI Interface Test Passed	**No action**

Diagnostic Error Code	FRU/Action
020-0XX-XXX PCI Interface error	**1. PCI card** 2. Riser card, if installed 3. System board
020-195-XXX PCI Test aborted by user	**Information only** Re-start the test, if necessary
020-196-XXX PCI test halt, error threshold exceeded	**1. Press F3 to review the log file** 2. Re-start the test to reset the log file
020-197-XXX PCI test warning	**1. Make sure the component that is called out is connected and/or enabled. See "Using the Setup Utility,"** 2. Re-run test 3. Replace the component that is called out in warning statement 4. Replace the component under test
020-198-XXX PCI test aborted	**1. If a component is called out, make sure it is connected and/or enabled. See "Using the Setup Utility,"** 2. Flash the system and re-test. See "Flash update procedures" 3. Go to "Undetermined problems"
020-199-XXX PCI test failed, cause unknown	1. Go to "Undetermined problems" 2. Flash the system and re-test. See "Flash update procedures" 3. Replace component under function test
020-262-XXX PCI system error	**1. PCI card** 2. Riser card, if installed 3. System board
025-000-XXX IDE interface Test Passed	**No action**
025-00X-XXX **025-01X-XXX** IDE interface failure	**1. IDE signal cable** 2. Check power supply voltages 3. Reseat IDE signal cable 4. IDE device 5. System board

40

Diagnostic Error Code	FRU/Action
025-027-XXX IDE interface Configuration/Setup error	**1. IDE signal cable** 2. Flash the system. See "Flash update procedures" 3. Reseat IDE signal cable 4. IDE device 5. System board
025-02X-XXX **025-03X-XXX** **025-04X-XXX** IDE Interface failure	**1. IDE signal cable** 2. Check power supply 3. Reseat IDE signal cable 4. IDE device 5. System board
025-195-XXX IDE interface Test aborted by user	**Information only** Re-start the test, if necessary
025-196-XXX IDE interface test halt, error threshold exceeded	**1. Press F3 to review the log file** 2. Re-start the test to reset the log file
025-197-XXX IDE interface test warning	**1. Make sure the component that is called out is connected and/or enabled. See "Using the Setup Utility,"** 2. Re-run test 3. Replace the component that is called out in warning statement 4. Replace the component under test
025-198-XXX IDE interface test aborted	**1. If a component is called out, make sure it is connected and/or enabled. See "Using the Setup Utility,"** 2. Flash the system and re-test. See "Flash update procedures" 3. Go to "Undetermined problems"
025-199-XXX IDE interface test failed, cause unknown	1. Go to "Undetermined problems" 2. Flash the system and re-test. See "Flash update procedures" 3. Replace component under function test
030-000-XXX SCSI interface Test Passed	**No action**

Diagnostic Error Code	FRU/Action
030-00X-XXX **030-01X-XXX** SCSI interface failure	**1. SCSI signal cable** 2. Check power supply 3. SCSI device 4. SCSI adapter card, if installed 5. System board
030-027-XXX SCSI interface Configuration/Setup error	1. SCSI signal cable 2. Flash the system. See "Flash update procedures" 3. SCSI device 4. SCSI adapter card, if installed 5. System board
030-03X-XXX **030-04X-XXX** SCSI interface error	**1. SCSI signal cable** 2. Check power supply 3. SCSI device 4. SCSI adapter card, if installed 5. System board
030-195-XXX SCSI interface Test aborted by user	**Information only** Re-start the test, if necessary
030-196-XXX SCSI interface test halt, error threshold exceeded	**1. Press F3 to review the log file** 2. Re-start the test to reset the log file
030-197-XXX SCSI interface test warning	**1. Make sure the component that is called out is connected and/or enabled. See "Using the Setup Utility,"** 2. Re-run test 3. Replace the component that is called out in warning statement 4. Replace the component under test
030-198-XXX SCSI interface test aborted	**1. If a component is called out, make sure it is connected and/or enabled. See "Using the Setup Utility,"** 2. Flash the system and re-test. See "Flash update procedures" 3. Go to "Undetermined problems"
030-199-XXX SCSI interface test failed, cause unknown	1. Go to "Undetermined problems" 2. Flash the system and re-test. See "Flash update procedures" 3. Replace component under function test

Diagnostic Error Code	FRU/Action
035-000-XXX RAID interface Test Passed	**No action**
035-0XX-XXX RAID interface Failure	**1. RAID signal cable** 2. RAID device 3. RAID adapter card, if installed 4. System board
035-195-XXX RAID interface Test aborted by user	**Information only** Re-start the test, if necessary
035-196-XXX RAID interface test halt, error threshold exceeded	**1. Press F3 to review the log file** 2. Re-start the test to reset the log file
035-197-XXX RAID interface test warning	**1. Make sure the component that is called out is connected and/or enabled. See "Using the Setup Utility,"** 2. Re-run test 3. Replace the component that is called out in warning statement 4. Replace the component under test
035-198-XXX RAID interface test aborted	**1. If a component is called out, make sure it is connected and/or enabled. See "Using the Setup Utility,"** 2. Flash the system and re-test. See "Flash update procedures" 3. Go to "Undetermined problems"
035-199-XXX RAID interface test failed, cause unknown	1. See "Undetermined problems" 2. Flash the system and re-test. See "Flash update procedures" 3. Replace component under function test
071-000-XXX Audio port Interface Test Passed	**No action**
071-00X-XXX **071-01X-XXX** **071-02X-XXX** Audio port error	**1. Run Setup** 2. Flash the system. See "Flash update procedures" 3. System board
071-03X-XXX Audio port failure	**1. Speakers** 2. Microphone 3. Audio card, if installed 4. System board

Diagnostic Error Code	FRU/Action
071-04X-XXX Audio port failure	**1. Run Setup** 2. Audio card, if installed 3. System board
071-195-XXX Audio port Test aborted by user	**Information only** Re-start the test, if necessary
071-196-XXX Audio port test halt, error threshold exceeded	**1. Press F3 to review the log file** 2. Re-start the test to reset the log file
071-197-XXX Audio port test warning	**1. Make sure the component that is called out is connected and/or enabled. See "Using the Setup Utility,"** 2. Re-run test 3. Replace the component that is called out in warning statement 4. Replace the component under test
071-198-XXX Audio port test aborted	**1. If a component is called out, make sure it is connected and/or enabled. See "Using the Setup Utility,"** 2. Flash the system and re-test. See "Flash update procedures" 3. Go to "Undetermined problems"
071-199-XXX Audio port test failed, cause unknown	1. See "Undetermined problems" 2. Flash the system and re-test. See "Flash update procedures" 3. Replace component under function test
071-25X-XXX Audio port failure	**1. Speakers** 2. Audio card, if installed 3. System board
080-000-XXX Game Port interface Test Passed	**No action**
080-XXX-XXX Game Port interface Error	**1. Remove the game port device and re-test the system**
080-195-XXX Game Port interface Test aborted by user	**Information only** Re-start the test, if necessary
080-196-XXX Game Port interface test halt, error threshold exceeded	**1. Press F3 to review the log file** 2. Re-start the test to reset the log file

Diagnostic Error Code	FRU/Action
080-197-XXX Game Port interface test warning	**1. Make sure the component that is called out is connected and/or enabled. See"Using the Setup Utility,"** 2. Re-run test 3. Replace the component that is called out in warning statement 4. Replace the component under test
080-198-XXX Game Port interface test aborted	**1. If a component is called out, make sure it is connected and/or enabled. See "Using the Setup Utility,"** 2. Flash the system and re-test. See "Flash update procedures" 3. Go to "Undetermined problems"
080-199-XXX Game Port interface test failed, cause unknown	1. See "Undetermined problems" 2. Flash the system and re-test. See "Flash update procedures" 3. Replace component under function test
086-000-XXX Mouse Port interface Test Passed	**No action**
086-001-XXX Mouse Port interface Presence	**1. Mouse** 2. System board
086-032-XXX Mouse Port interface Device controller failure	**1. Mouse** 2. System board
086-035-XXX Mouse Port interface Reset	**1. Mouse** 2. System board
086-040-XXX Mouse Port interface IRQ failure	**1. Run Setup** 2. Mouse 3. System board
086-195-XXX Mouse Port interface Test aborted by user	**Information only** Re-start the test, if necessary
086-196-XXX Mouse Port interface test halt, error threshold exceeded	**1. Press F3 to review the log file** 2. Re-start the test to reset the log file

Diagnostic Error Code	FRU/Action
086-197-XXX Mouse Port interface test warning	**1. Make sure the component that is called out is connected and/or enabled. See "Using the Setup Utility,"** 2. Re-run test 3. Replace the component that is called out in warning statement 4. Replace the component under test
086-198-XXX Mouse Port interface test aborted	**1. If a component is called out, make sure it is connected and/or enabled. See "Using the Setup Utility,"** 2. Flash the system and re-test. See "Flash update procedures" 3. Go to "Undetermined problems"
086-199-XXX Mouse Port interface test failed, cause unknown	1. See "Undetermined problems" 2. Flash the system and re-test. See "Flash update procedures" 3. Replace component under function test
089-000-XXX Microprocessor Test Passed	**No action**
089-XXX-XXX Microprocessor failure	**1. Microprocessor(s)** 2. System board
089-195-XXX Microprocessor Test aborted by user	**Information only** Re-start the test, if necessary
089-196-XXX Microprocessor test halt, error threshold exceeded	**1. Press F3 to review the log file** 2. Re-start the test to reset the log file
089-197-XXX Microprocessor test warning	**1. Make sure the component that is called out is connected and/or enabled. See "Using the Setup Utility,"** 2. Re-run test 3. Replace the component that is called out in warning statement 4. Replace the component under test
089-198-XXX Microprocessor test aborted	**1. Flash the system. See "Flash update procedures"** 2. Go to "Undetermined problems"

46

Diagnostic Error Code	FRU/Action
089-199-XXX Microprocessor test failed, cause unknown	1. See "Undetermined problems" 2. Flash the system and re-test. See "Flash update procedures" 3. Replace component under function test
170-000-XXX Voltage Sensor(s) Test Passed	**No action**
170-0XX-XXX Voltage Sensor(s) failure	**1. Flash system** 2. System board
170-195-XXX Voltage Sensor(s) Test aborted by user	**Information only** Re-start the test, if necessary
170-196-XXX Voltage Sensor(s) test halt, error threshold exceeded	**1. Press F3 to review the log file** 2. Re-start the test to reset the log file
170-197-XXX Voltage Sensor(s) test warning	**1. Make sure the component that is called out is connected and/or enabled. See "Using the Setup Utility,"** 2. Re-run test 3. Replace the component that is called out in warning statement 4. Replace the component under test
170-198-XXX Voltage Sensor(s) test aborted	**1. If a component is called out, make sure it is connected and/or enabled. See "Using the Setup Utility,"** 2. Flash the system and re-test. See "Flash update procedures" 3. Go to "Undetermined problems"
170-199-XXX Voltage Sensor(s) test failed, cause unknown	**1. See "Undetermined problems"** 2. Flash the system and re-test. See "Flash update procedures" 3. Replace component under function test
170-250-XXX **170-251-XXX** Voltage Sensor(s) Voltage limit error	**1. Power supply** 2. System board
170-254-XXX Voltage Sensor(s) Voltage Regulator Module error	**1. Voltage Regulator Module (VRM)** 2. Microprocessor 3. System board

Diagnostic Error Code	FRU/Action
175-000-XXX Thermal Sensor(s) Test Passed	**No action**
175-0XX-XXX Thermal Sensor(s) failure	**1. Flash system** 2. System board
175-195-XXX Thermal Sensor(s) Test aborted by user	**Information only** Re-start the test, if necessary
175-196-XXX Thermal Sensor(s) test halt, error threshold exceeded	**1. Press F3 to review the log file** 2. Re-start the test to reset the log file
175-197-XXX Thermal Sensor(s) test warning	**1. Make sure the component that is called out is connected and/or enabled. See "Using the Setup Utility,"** 2. Re-run test 3. Replace the component that is called out in warning statement 4. Replace the component under test
175-198-XXX Thermal Sensor(s) test aborted	**1. If a component is called out, make sure it is connected and/or enabled** 2. Flash the system and re-test. See "Flash update procedures" 3. Go to "Undetermined problems"
175-199-XXX Thermal Sensor(s) test failed, cause unknown	1. See "Undetermined problems" 2. Flash the system and re-test. See "Flash update procedures" 3. Replace component under function test
175-250-XXX **175-251-XXX** Thermal Sensor(s) limit error	**1. Check fans** 2. Check Power supply voltages 3. Microprocessor 4. System board
185-000-XXX Asset Security Test Passed	**No action**
185-XXX-XXX Asset Security failure	**1. Flash system** 2. System board
185-278-XXX Asset Security Chassis Intrusion	**1. Assure Asset Security Enabled** 2. C2 Cover Switch 3. System board
201-000-XXX System Memory Test Passed	**No action**

48

Diagnostic Error Code	FRU/Action
201-XXX-XXX System Memory error	**1. Replace the memory module called out by the test** 2. System board
202-000-XXX System Cache Test Passed	**No action**
202-XXX-XXX System Cache error	**1. Cache, if removable** 2. System board 3. Microprocessor
206-000-XXX Diskette Drive Test Passed	**No action**
206-XXX-XXX Diskette Drive error	**1. Diskette Drive Cable** 2. Check power supply voltages 3. Diskette drive 4. System board
215-000-XXX CD-ROM Drive Test Passed	**No action**
215-XXX-XXX CD-ROM Drive error	**1. CD-ROM Drive Cable** 2. Check power supply voltages 3. CD-ROM drive 4. System board
217-000-XXX Hard Disk Drive Test Passed	**No action**
217-25X-XXX **217-26X-XXX** Hard Disk Drive (IDE) error	**1. Hard Disk Drive Cable** 2. Check power supply voltages 3. Reseat the hard disk drive cable 4. Hard Disk drive (IDE) 5. System board
217-28X-XXX **217-29X-XXX** Hard Disk Drive (SCSI) error	**1. Hard Disk Drive Cable** 2. Check power supply voltages 3. Reseat the hard disk drive cable 4. Hard Disk drive (SCSI) 5. SCSI adapter card 6. System board
220-000-XXX Hi-Capacity Cartridge Drive Test Passed	**No action**
220-XXX-XXX Hi-Capacity Cartridge Drive error	**1. Remove the Hi-Capacity Cartridge Drive and re-test the system**
301-XXX-XXX Keyboard error	**1. Keyboard** 2. Check and test mouse 3. System board

Diagnostic Error Code	FRU/Action
301-000-XXX Keyboard Test Passed	**No action**
302-000-XXX Mouse Test Passed	**No action**
302-XXX-XXX Mouse error	**1. Mouse** 2. Check and test Keyboard 3. System board
303-000-XXX Joystick Test Passed	**No action**
303-XXX-XXX Joystick error	**Remove the Joystick and re-test the system**
305-000-XXX Monitor DDC Test Passed	**No action**
305-250-XXX Monitor DDC self test failure	**1. Run Setup to enable DDC** 2. Cable 3. Monitor 4. Video card 5. System board
415-000-XXX Modem Test Passed	**No action**
415-XXX-XXX Modem error	**Remove the Modem and re-test the system**

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. 1. Start the Setup Utility program and press F10 to Save and exit. See "Using the Setup Utility," 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/BIOS update failure".

Beep Symptom	FRU/Action
1 long and 2 short beeps Monitor or video adapter card error	Perform the following actions in order. 1. Make sure the monitor is properly connected to the computer. 2. Replace the video adapter card (if present). 3. Replace the system board.
1 long and 3 short beeps Keyboard error	Perform the following actions in order. 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. 1. Start the Setup Utility program and press F7 to load defaults and then press F10 to Save and exit. See "Using the Setup Utility," 2. Perform a Boot block recovery. See "Recovering from a POST/BIOS update failure" 3. Replace the system board.
Continuos long beeps DRAM memory error	Perform the following actions in order. 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
HARD DISK INSTALL FAILURE	Cannot find or initialize the hard disk drive controller or the drive. Make sure the hard disk drive is correctly installed. If no hard disk drives are installed, make sure the hard disk drive selection in Setup is set to NONE.
Keyboard error or no keyboard present	Cannot initialize the keyboard. Make sure the keyboard is properly connected to the computer and that no keys are held pressed during POST. 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.
Memory Test:	This message displays during a full memory test, counting down the memory areas being tested.

POST Error Message	Description/Action
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	The BIOS was unable to find a suitable boot device. Make sure the boot drive is properly connected to the computer. Make sure you have bootable media.

Miscellaneous error messages

Message/Symptom	FRU/Action
Changing display colors	**Display/Monitor**
Computer will *not* power-off. See "Power Supply Problems"	**1. Power Switch** 2. System Board 3. Riser card, if installed
Computer will *not* RPL from server	**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)

Message/Symptom	FRU/Action
Computer will not perform a Wake On LAN® (if applicable)	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") 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 "Power Supply Problems"	1. **Power Supply** 2. System Board
Diskette drive in-use light remains on or does not light when drive is active.	1. **Diskette Drive** 2. System Board 3. Diskette Drive Cable
Flashing cursor with an otherwise blank display.	1. **System Board** 2. Primary Hard Disk Drive 3. Hard Disk Drive Cable
Incorrect memory size during POST	1. **Run the Memory tests** 2. Memory Module 3. System Board
"Insert a Diskette" icon appears with a known-good diagnostics diskette in the first 3.5-inch diskette drive.	1. **System Board** 2. Diskette Drive Cable 3. Network Adapter
Intensity or color varies from left to right of characters and color bars	1. **Display** 2. Video adapter (if present) 3. System Board
No power or fan not running	1. **See "Power Supply Problems"**
Non-system disk or disk error-type message with a known-good diagnostic diskette.	1. **Diskette Drive** 2. System Board 3. Diskette Drive Cable
Other display symptoms not listed above (including blank or illegible display)	1. **Display** 2. System Board

Message/Symptom	FRU/Action
Power-on indicator or hard disk drive in-use light not on, but computer works correctly	1. Power switch/LED assembly 2. System Board
Printer problems	**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	1. **Run Setup** 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.	**1. If network administrator is using LCCM Hybrid RPL, check startup sequence:** **a. First device - network** **b. Second device - hard disk** 2. Hard disk drive
RPL computer does not RPL from server	**1. Check startup sequence** 2. Check the network adapter LED status
Serial or parallel port device failure (system board port)	**1. External Device Self-Test OK?** 2. External Device 3. Cable 4. System Board
Serial or parallel port device failure (adapter port)	**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	**1. Keyboard** 2. Keyboard Cable 3. System Board

Undetermined problems

If this computer has a parallel ATA hard disk drive, make sure that the hard disk drive is jumpered as a master and the optical drive is jumpered as a slave.

1. Power-off the computer.
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. Power-on the computer 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.

Replacing FRUs (tower computers)

7

This chapter is for tower computers of the following machine type: 3000K.

> **Important**
>
> Before you replace any FRU, read "Safety information".
> These precautions and guidelines will help you work safely.

FRU replacements are to be done by trained service technicians only.

This chapter does not contain a remove and replace procedure for all FRUs. Only the major FRUs are documented.

Rear connectors

The following illustration shows the locations of the connectors on the rear of the computer.
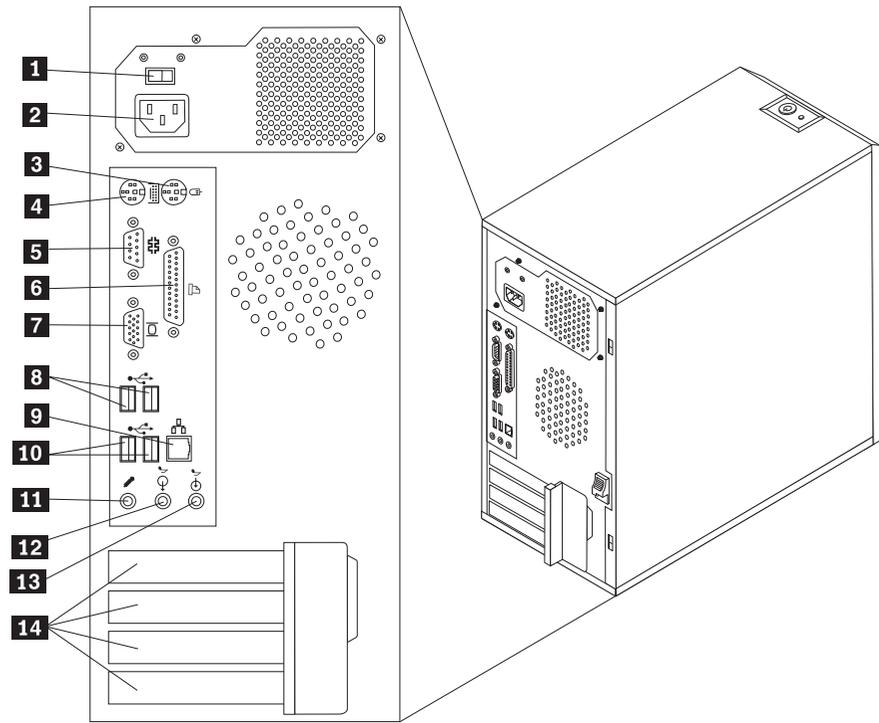
1 Voltage selection switch
2 Power connector
3 Mouse connector
4 Keyboard connector
5 Serial connector
6 Parallel connector
7 VGA monitor connector
8 USB connectors

9   Ethernet connector
10 USB connectors
11 Microphone connector
12 Audio line out connector
13 Audio line in connector
14 PCI and PCI Express adapter slots
    (type of adapter depends on system board)
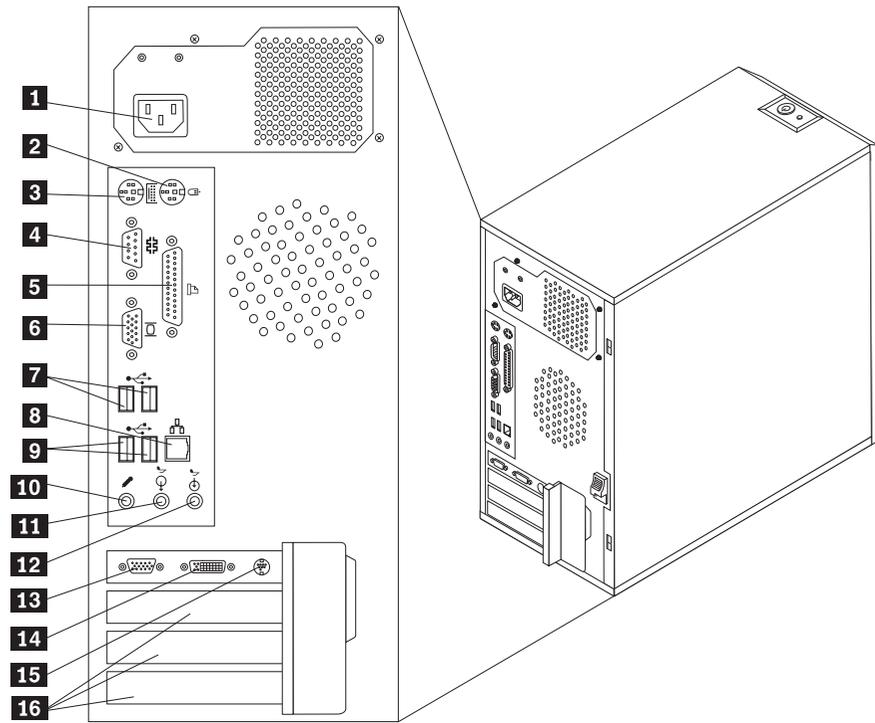
1	Power connector	**9**	USB connectors
2	Mouse connector	**10**	Microphone connector
3	Keyboard connector	**11**	Audio line out connector
4	Serial connector	**12**	Audio line in connector
5	Parallel connector	**13**	VGA monitor connector
6	VGA monitor connector	**14**	DVI connector
7	USB connectors	**15**	S-video connector
8	Ethernet connector	**16**	PCI and PCI Express adapter slots (type of adapter depends on system board)
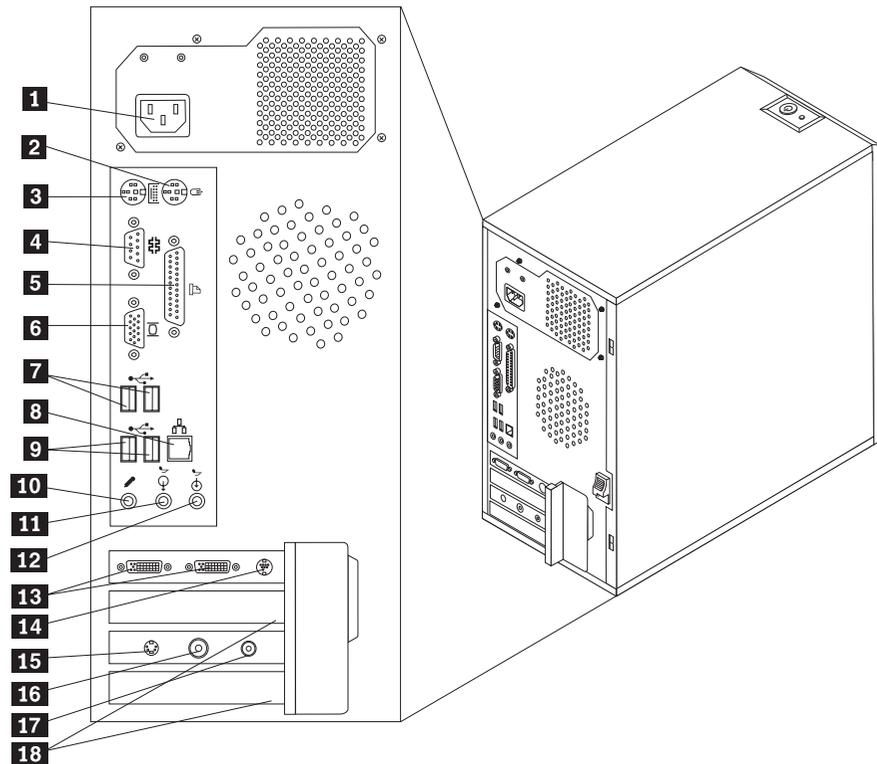
1   Power connector   10   Microphone connector
2   Mouse connector   11   Audio line out connector
3   Keyboard connector   12   Audio line in connector
4   Serial connector   13   DVI connector
5   Parallel connector   14   S-video connector
6   VGA monitor connector   15   S-video connector
7   USB connectors   16   TV card connector
8   Ethernet connector   17   FM connector
9   USB connectors   18   PCI and PCI Express adapter slots
                                                                 (type of adapter depends on system board)

Removing the cover

> **Important**
>
> Read "Safety information," and "Handling electrostatic discharge-sensitive devices" in the chapter of "safety information".

1. Shut down the operating system, remove any media (DVDs, CDs, or tapes) from the drives, and turn off all attached devices.
2. Unplug all power cords from electrical outlets.
3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are
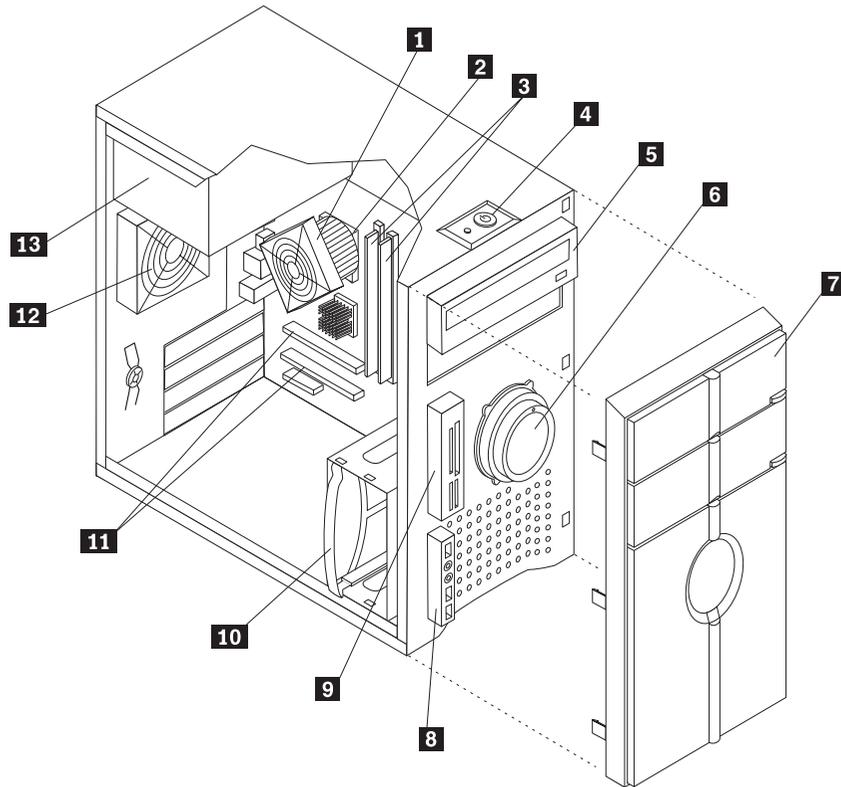
connected to the computer.
4. If there are thumb screws securing the cover, remove them.
5. Pull down the switch on the rear of the PC and slide the cover to the rear to remove.
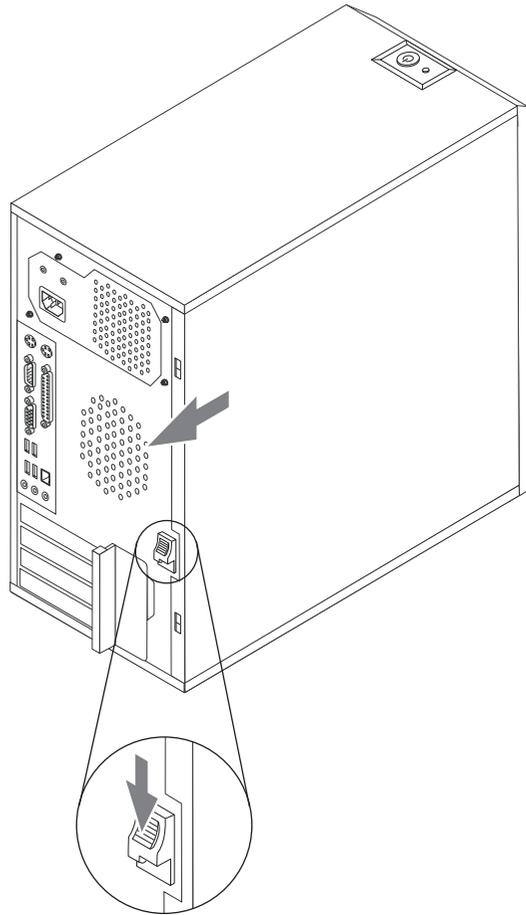
Locations

The following illustration will help you locate the major FRUs in the computer.

|			
1	Heat sink and fan assembly	**8**	Front audio/USB assembly
2	Microprocessor	**9**	Card reader assembly
3	Memory modules	**10**	Hard disk drive
4	Powerswitch/LED assembly	**11**	System board
5	Optical drive	**12**	System fan
6	Mode switch button	**13**	Power supply
7	Bezel		

Identifying parts on the system board

Machine type 3000K
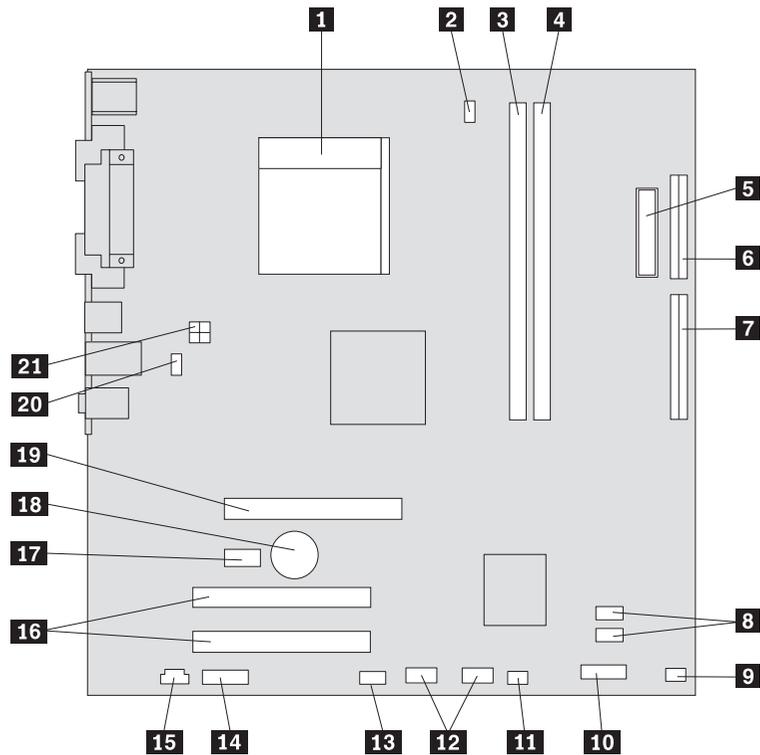
1	Microprocessor and heat sink	12	Front USB connectors(2)
2	Microprocessor fan connector	13	Serial (COM2) connector
3	Memory connector 1	14	Front audio connector
4	Memory connector 2	15	CD-IN connector
5	Power connector	16	PCI adapter connectors(2)
6	Diskette drive connector	17	PCI Express x1 adapter connector
7	IDE connector	18	Battery
8	SATA IDE connectors(2)	19	PCI Express x16 graphics adapter connector
9	Power fan connector	20	System fan connector
10	Front panel connector	21	12v power connector
11	Clear CMOS/Recovery jumper		

Removing and replacing the front bezel

To remove and replace the front bezel:
1. Remove the computer cover. See "Removing the cover".
2. Remove the front bezel by releasing the three plastic tabs inside the chassis and pivoting the bezel outward.
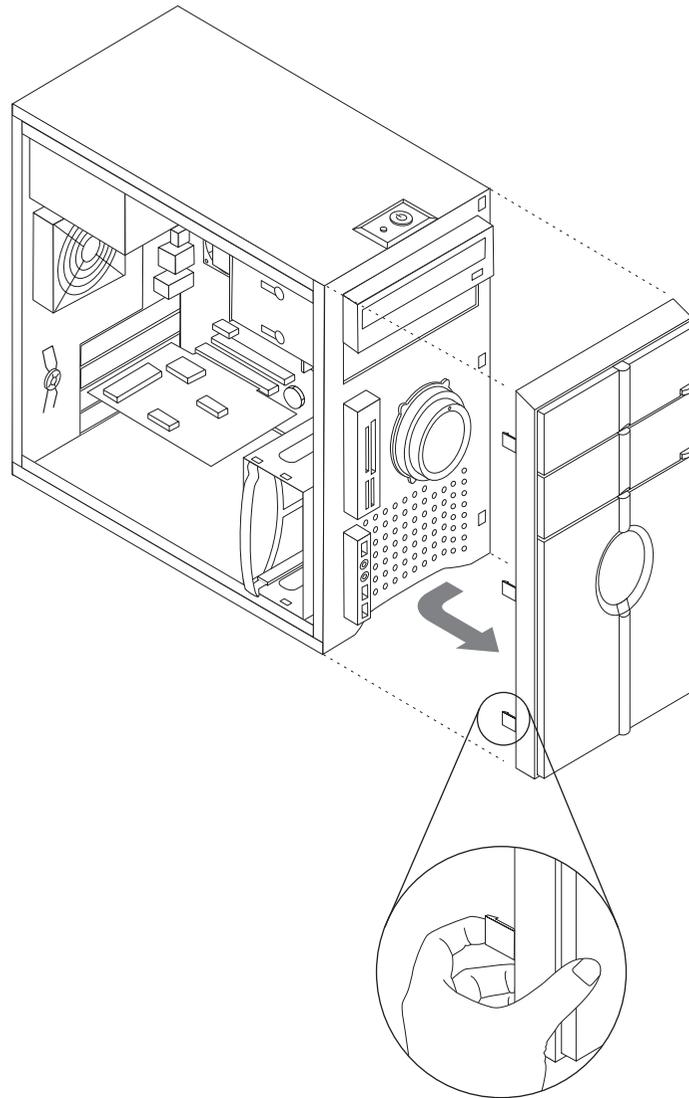
3. To reinstall the bezel, align the plastic tabs on the right side of the bezel with the corresponding holes in the chassis, then pivot it inward until it snaps into position on the left side.
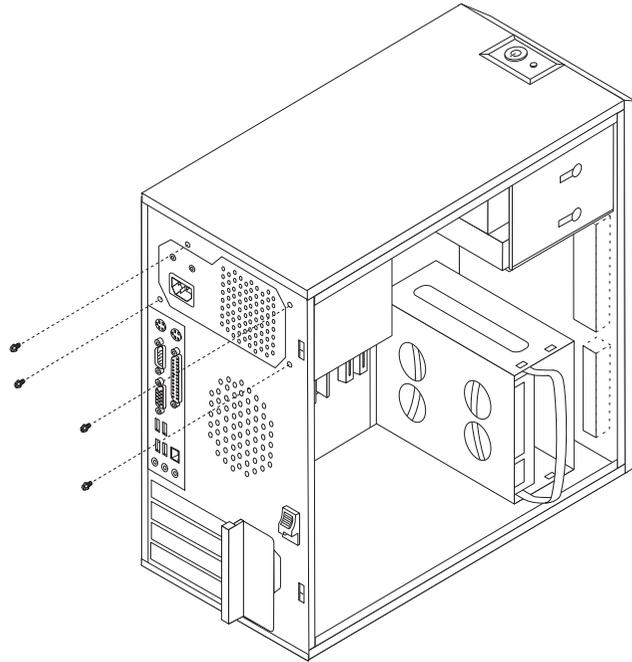
Replacing the power supply

1. Remove the computer cover. See "Removing the cover".

Note: For this procedure, it helps to lay the computer on its side.

2. Disconnect the power supply cables from the system board and from all drives.
3. Remove the four screws that secure the power supply at the rear of the chassis.

64

4. Lift the power supply out of the chassis.
5. Install the new power supply into the chassis so that the screw holes in the power supply align with those in the chassis.
6. Install the four screws to secure the power supply.

Note: Use only the screws provided by Lenovo.

7. Reconnect the power supply connectors to the system board. See "Identifying parts on the system board".
8. Reconnect a power supply connector to each of the drives.
9. See the "Completing the FRU replacement".

Replacing the system board

> **Important**
>
> The heat sink and microprocessor might be very hot. Make sure these components are cool enough to safely handle before continuing this procedure.

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

1. Remove the cover. See "Removing the cover".

2. Place the computer on its right side to help make the system board more accessible.
3. Remove any adapter cards installed in the PCI connectors.
4. Carefully take note of the location of all cable connections on the system board and disconnect all cables. See the system board illustration for your machine type at "Identifying parts on the system board".
5. Remove the screws that secure the system board to the chassis.
6. Lift the system board out of the chassis.
7. Remove the memory modules from the failing system board and install them in the same location on the new system board.
8. Disconnect the heat sink and fan assembly cable from the system board. See the system board illustration for your machine type at "Identifying parts on the system board".
9. Remove the four screws **1** securing the heat sink and fan assembly to the system board.
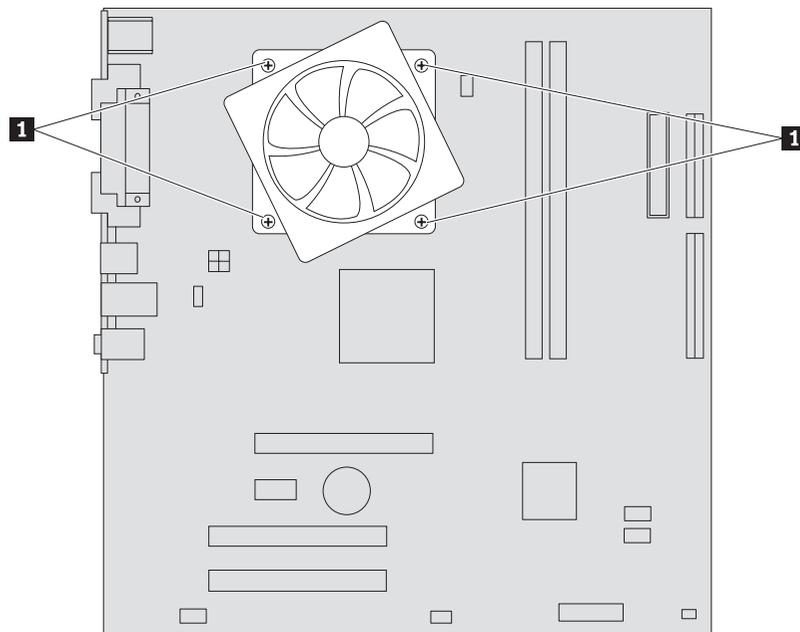
10. Lift the heat sink and fan assembly off the failing system board. Place the heat sink on its side so that the thermal grease does not come in contact with anything.
11. To remove the microprocessor **2** from the system board, lift the small handle **3** and open the retainer **1** .

66
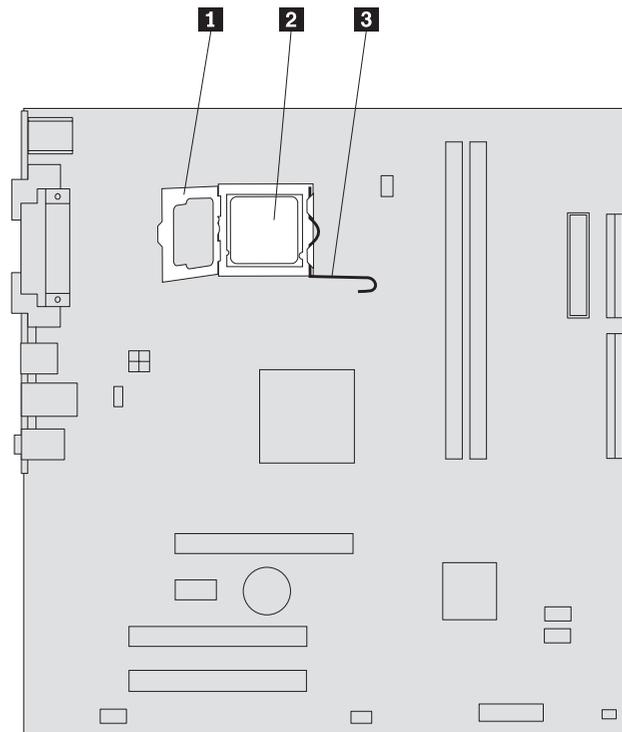
Important

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

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12. Lift the microprocessor straight up and out of the socket.
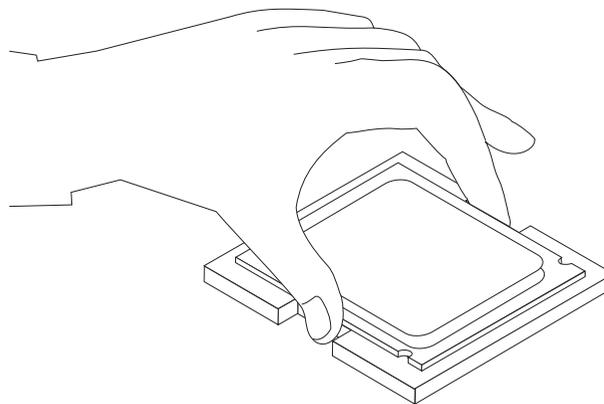
Notes:
a. Note the orientation of the notches **1** on the microprocessor. This is important when reinstalling the microprocessor on the new system board.

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

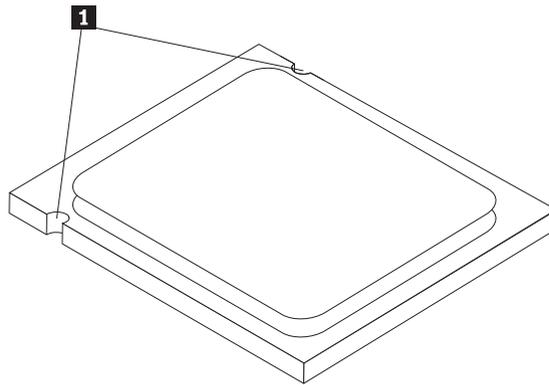13. On the new system board, release the lever securing the microprocessor retainer and then pivot the retainer until it is fully open.

> **Note:** There will be a black plastic cover on the microprocessor retainer to protect the socket on the new system board. Remove the black plastic cover and place it on the microprocessor socket of the failing system board.

14. Holding the microprocessor with your fingers, position the microprocessor so that the notches on the microprocessor are aligned with the tabs in the microprocessor socket.

Important

To avoid damaging the microprocessor contacts, do not tilt the microprocessor when installing it into the socket.

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15. Lower the microprocessor straight down into the system board socket of the new system board.
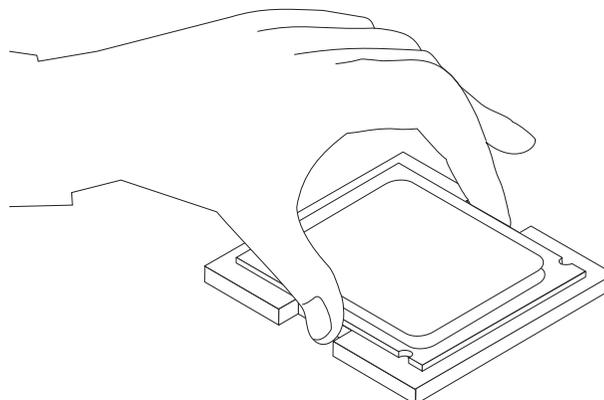
16. To secure the microprocessor in the socket, close the microprocessor retainer and lock it into position with the small handle.
17. Install the retention module for the heat sink and fan assembly on the system board.
18. Install the heat sink and fan assembly on the system board.
19. Connect the heat sink and fan assembly cable to the new system board. See the system board illustration for your machine type at "Identifying parts on the system board".
20. Install the new system board into the chassis and align the screw holes with those in the chassis. Insert and tighten the screws that secure the system board.
21. Connect all cables to the system board. See the system board illustration for your machine type at "Identifying parts on the system board".
22. See the "Completing the FRU replacement".

Replacing the microprocessor

> **Important**
>
> The heat sink and microprocessor might be very hot. Make sure these components are cool enough to safely handle before continuing this procedure.

1. Remove the side cover. See "Removing the cover".
2. Place the computer on its right side to help make the microprocessor more accessible.
3. Disconnect the heat sink and fan assembly cable from the system board. See the system board illustration for your machine type at "Identifying parts on the system board".
4. Remove the four screws securing the heat sink and fan assembly to the system board.
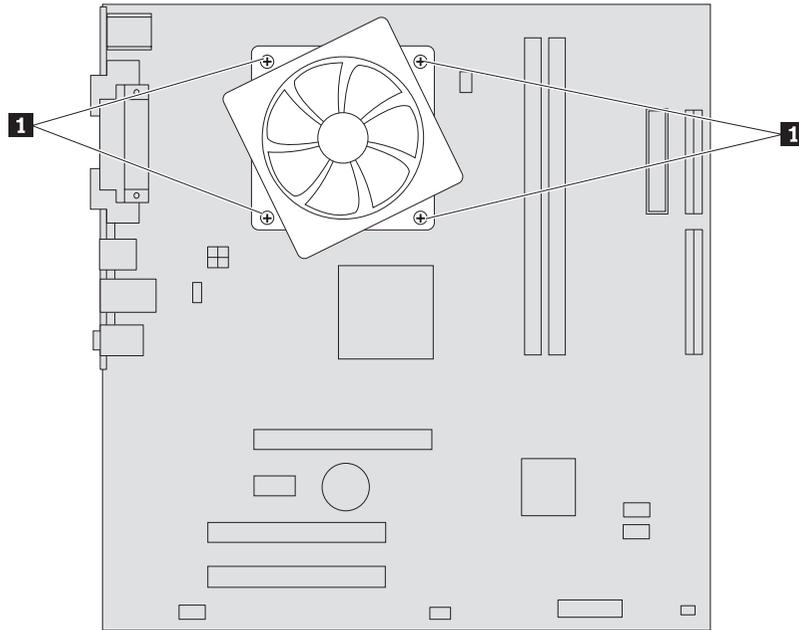
5. Lift the heat sink and fan assembly off the failing system board. Place the heat sink on its side so that the thermal grease does not come in contact with anything.
6. To remove the microprocessor **2** from the system board, lift the small handle **3** and open the retainer **1** .
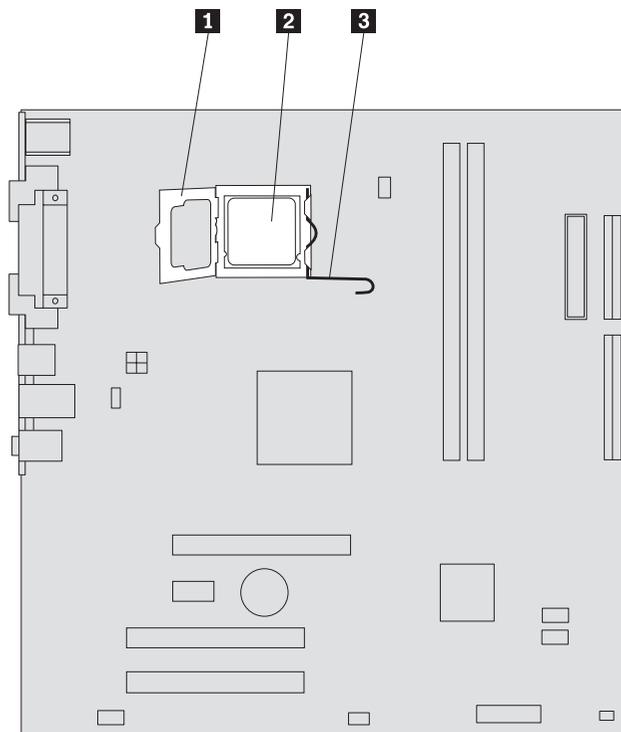
> **Important**
>
> Touch only the sides of the microprocessor. Do not touch the gold contacts on the bottom.

7. Lift the microprocessor straight up and out of the socket.
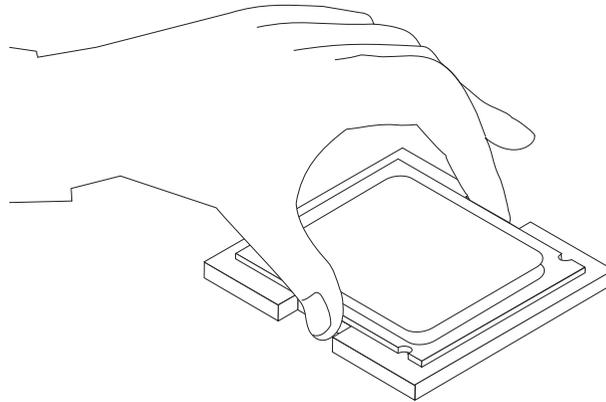
Notes:
a. Note the orientation of the notches **1** on the microprocessor. This is important when reinstalling the microprocessor on the new system board.
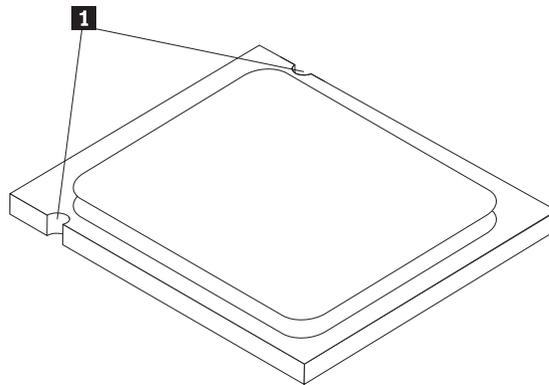
b. Do not drop anything onto the microprocessor socket while it is exposed. The socket pins must be kept as clean as possible.
8. Make sure that the microprocessor retainer is fully open.
9. Holding the microprocessor with your fingers, remove the protective cover **2** that protects the gold contacts on the new microprocessor **1** .
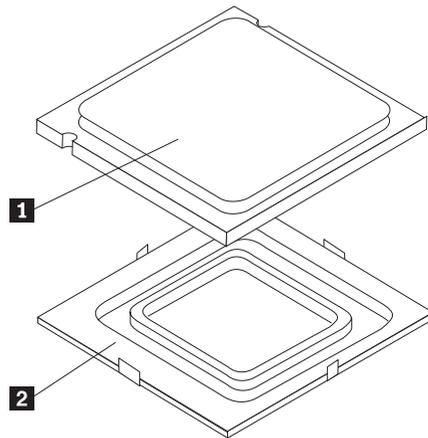
10. Holding the microprocessor with your fingers, position the microprocessor so that the notches on the microprocessor are aligned with the tabs in the microprocessor socket.

> **Important**
>
> To avoid damaging the microprocessor contacts, do not tilt the microprocessor when installing it into the socket.

11. Lower the microprocessor straight down into the system board socket of the system board.
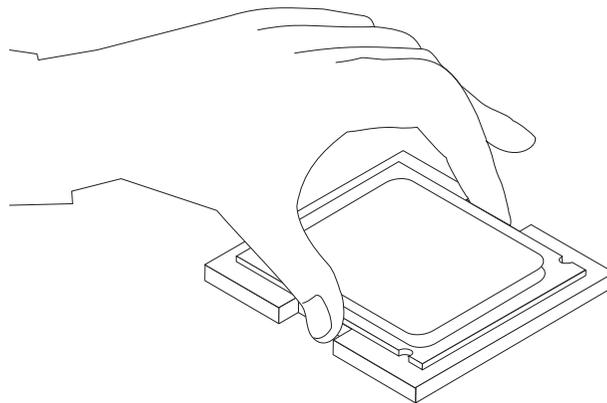
12. To secure the microprocessor in the socket, close the microprocessor retainer and lock it into position with the small handle.
13. Use the thermal grease syringe to place five drops of grease on the top of the microprocessor. Each drop of grease should be 0.03ml (3 tick marks on the grease syringe).
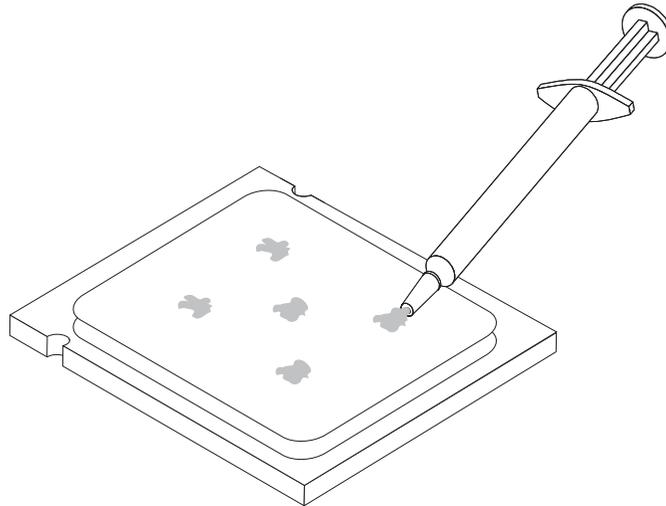
14. Install the heat sink and fan assembly on the system board.
15. Connect the heat sink and fan assembly cable to the system board. See the system board illustration for your machine type at "Identifying parts on the system board".
16. See the "Completing the FRU replacement".

Replacing a memory module

To replace a memory module:
1. Remove the computer cover. See "Removing the cover".

Note: For this procedure, it helps to lay the computer on its side.

2. Locate the memory module connectors. See "Identifying parts on the system board".
3. Remove the memory module being replaced by opening the retaining clips as shown.
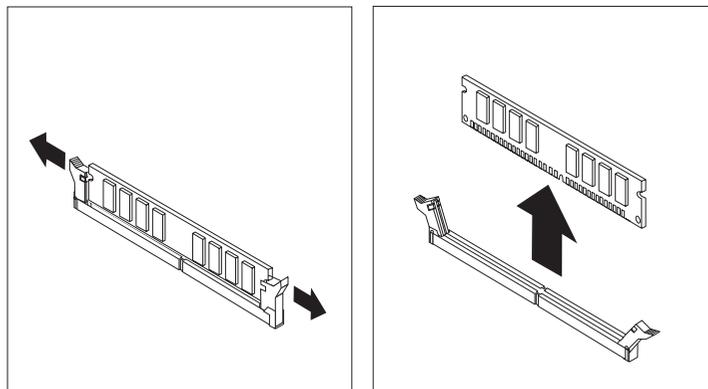
4. Position the new memory module over the memory connector. Make

73

sure the notch **1** on the memory aligns correctly with the connector key **2** on the system board. Push the memory module straight down into the connector until the retaining clips close.
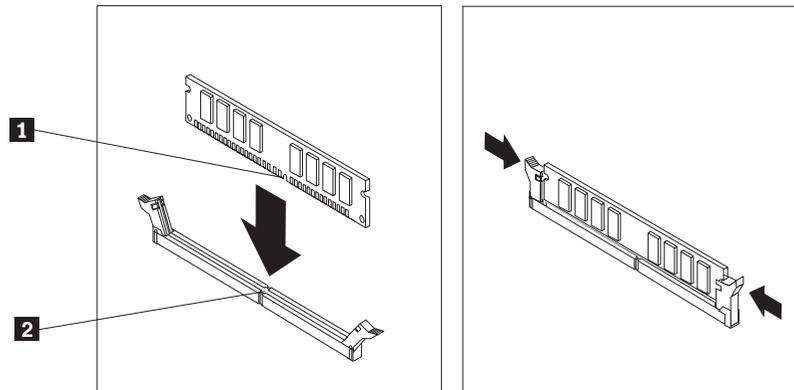
5. See the "Completing the FRU replacement".

Replacing a PCI adapter

To replace an adapter:

1. Remove the computer cover. See "Removing the cover".
2. At the rear of the computer, press the release button **1** to open the adapter latch **2** and remove the adapter by pulling it straight out of the adapter connector.
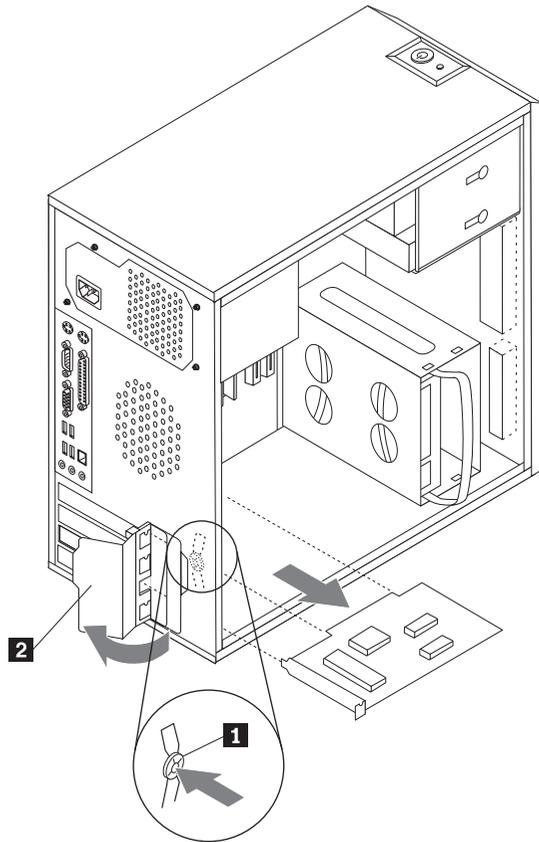
3. Install the new adapter into the same adapter connector.
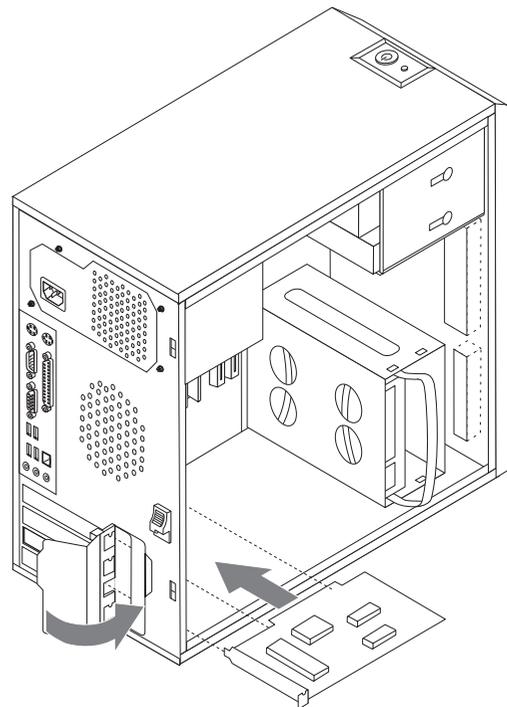
4. Ensure the adapter is fully seated into the adapter connector.
5. At the rear of the computer, pivot the adapter latch to the closed position to secure the adapter.
6. See the "Completing the FRU replacement".

Replacing the hard disk drive

> **Important**
>
> When you receive a new hard disk drive, you will also receive a set of *Product Recovery* discs. The set of *Product Recover* discs enable you to restore the contents of the hard disk to the same state as when your computer was originally shipped from the factory. For more information on recovering factory-installed software, refer to "OneKey Recovery" in the *User guide*.

1. Remove the computer cover. See "Removing the cover" .

Note: For this procedure, it helps to lay the computer on its side.

2. Disconnect the signal and power cables from the hard disk drive.
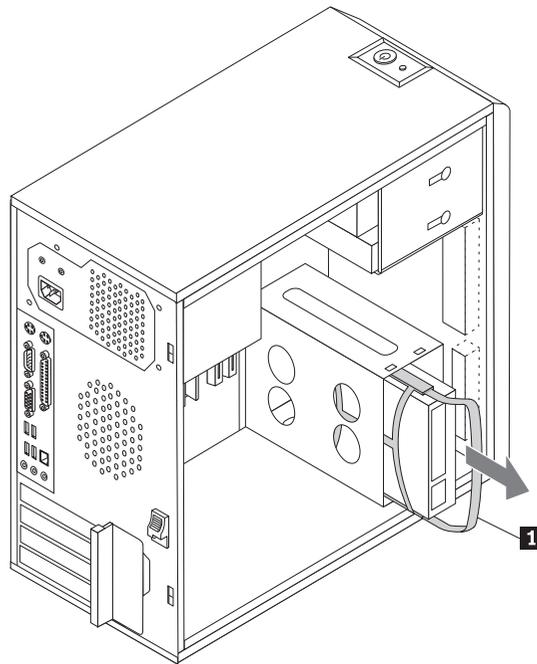
3. Pull on the blue handle **1** to remove hard disk drive from the drive cage.
4. Remove the failing hard disk drive from the blue plastic bracket from by flexing the sides of the bracket enough to free it from the hard disk

76

drive.

5. To install the new drive into the blue bracket, flex the bracket, and align the pins **2** through **5** on the bracket with the holes in the hard disk drive. Do not touch the circuit board **6** on the bottom of the hard disk drive.
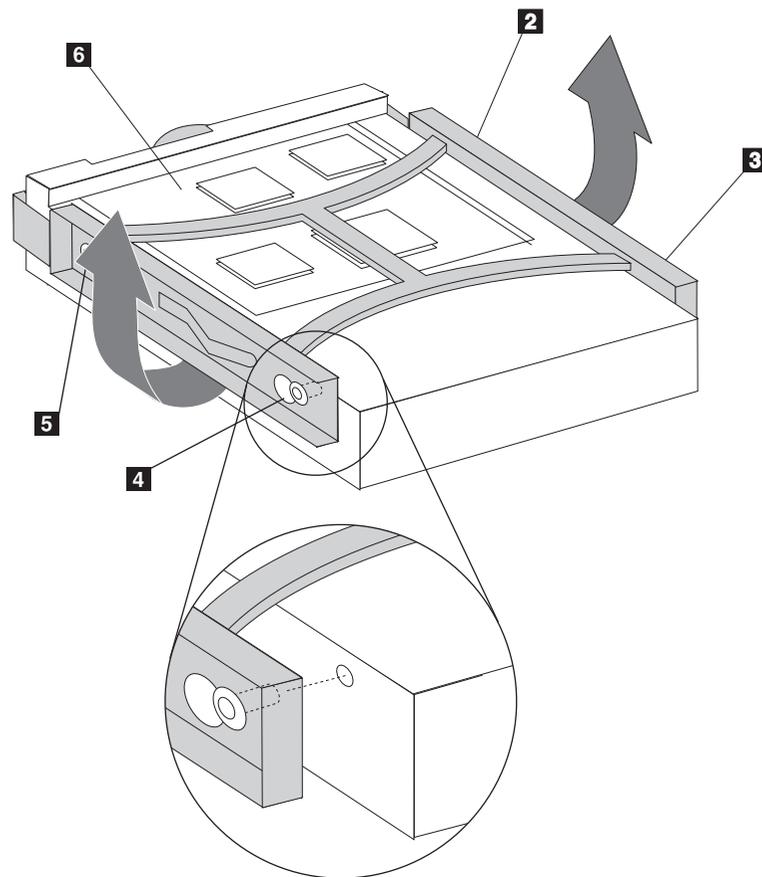
6. Slide the new hard disk drive into the drive cage until it snaps into position.
7. Connect the power and signal cables to the hard disk drive.
8. See the "Completing the FRU replacement".

Replacing an optical drive

To replace an optical drive
1. Remove the computer cover. See "Removing the cover".
2. Disconnect the signal and power cables from the rear of the optical drive.
3. Press the release button and remove the optical drive out the front of the computer.

77
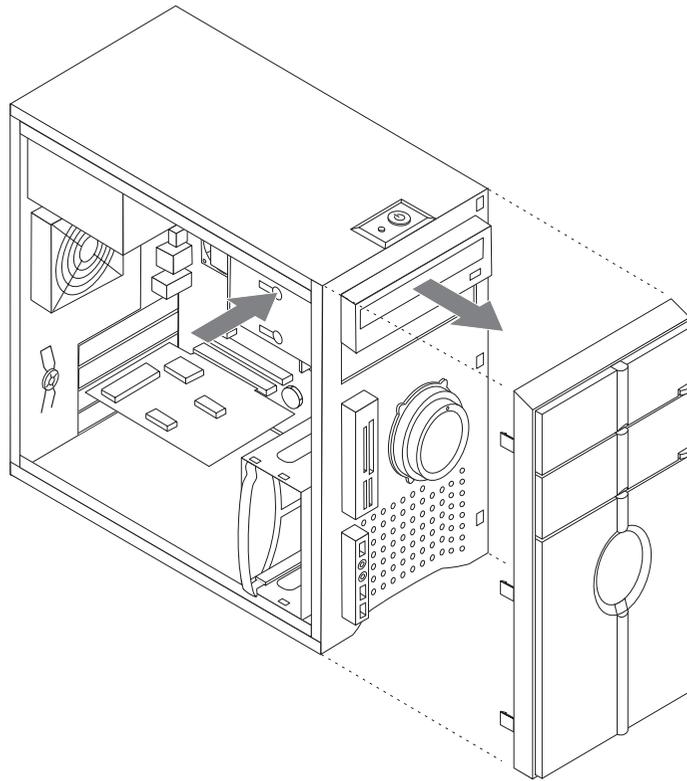
4. Slide the new optical drive into the bay from the front until it snaps into position.
5. Connect the signal and power cables to the drive.
6. See the "Completing the FRU replacement".

Replacing the card reader assembly

To replace the diskette drive:
1. Remove the computer cover. See "Removing the cover" .
2. Remove the front bezel. See "Removing and replacing the front bezel" .
3. Disconnect the assembly cables from the rear of the card reader assembly.
4. Remove the screws securing the card reader assembly on the chassis and slide the card reader assembly out the front of the computer.
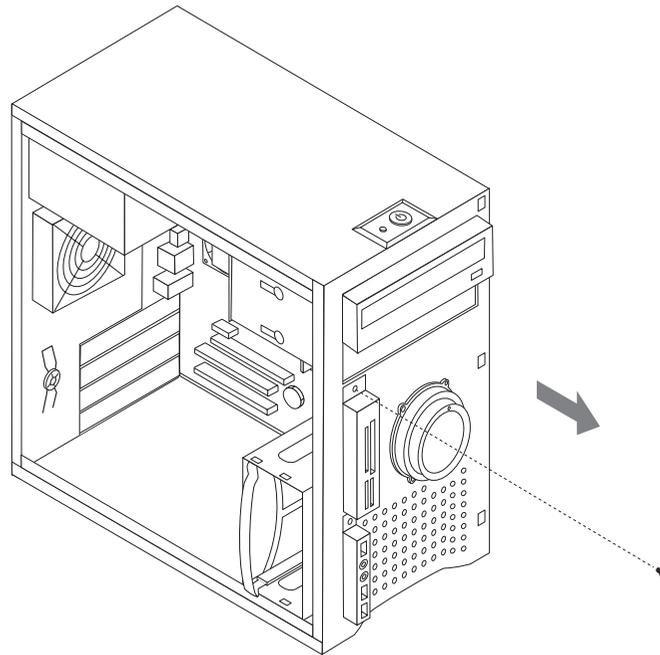
5. Install the new card reader assembly on the chassis so that the screw holes in the card reader assembly align with those in the chassis.
6. Install the screw to secure the card reader assembly.
7. Connect the assembly cables to the card reader.
8. See the "Completing the FRU replacement" .

Replacing the system fan assembly

To replace the system fan assembly:
1. Remove the computer cover. See "Removing the cover" .
2. Disconnect the system fan power cable from the system board. See "Identifying parts on the system board" .
3. Pull the system fan assembly out of chassis.
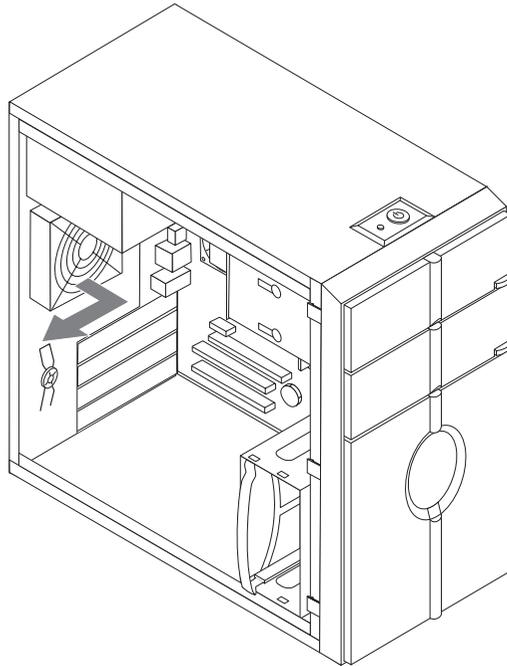
4. Install the new system fan assembly by aligning the rubber mounts of the system fan assembly with the holes on the chassis and push the rubber mounts through the holes.
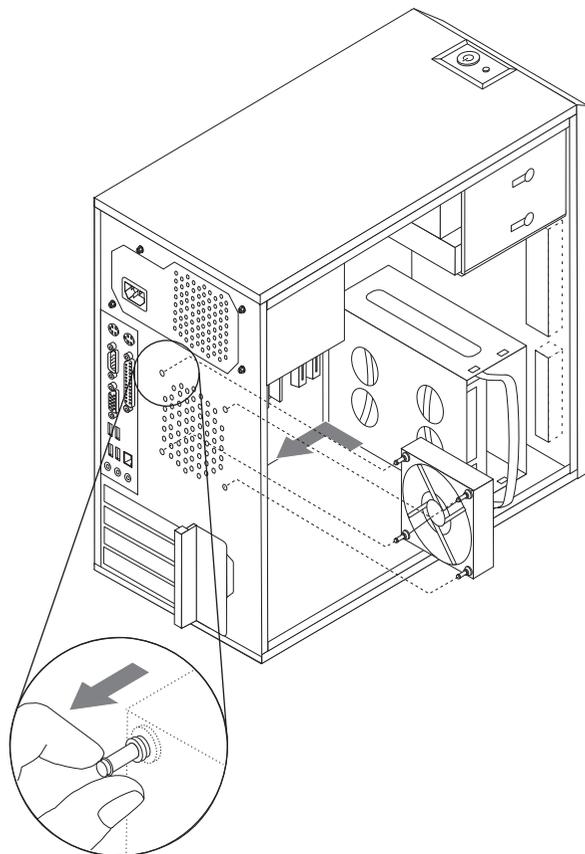
5. Pull on the tips of the rubber mounts until the fan assembly is in place.
6. Connect the system fan assembly cable to the system fan connector on the system board.
7. See the "Completing the FRU replacement".

Replacing the front audio/USB assembly

1. Remove the computer cover. See "Removing the cover".
2. Remove the front bezel. See "Removing and replacing the front bezel".
3. Disconnect the front audio/USB assembly cable from the system board. See the system board illustration for your machine type at "Identifying parts on the system board".
4. Note the front audio/USB assembly cable routing and remove the screw that secures the assembly to the chassis.
5. Remove the front audio/USB assembly.
6. Route the cable for the new front audio/USB assembly through the hole in the chassis and to the system board.
7. Install the front audio/USB assembly into the chassis and secure it with the screw.
8. Connect the front audio/USB assembly cable to the system board.
9. Reinstall the front bezel.
10. See the "Completing the FRU replacement".

Replacing the Mode switch Button

1. Remove the computer cover. See "Removing the cover".
2. Remove the front bezel. See "Removing and replacing the front bezel".
3. Disconnect the Mode switch button cable from the system board. See the system board illustration for your machine type at "Identifying parts on the system board".
4. Note the Mode switch button cable routing and remove the screw that secures the assembly to the chassis.
5. Remove the Mode switch button.
6. Route the cable for the new Mode switch button through the hole in the chassis and to the system board.
7. Install the Mode switch button into the chassis and secure it with the screw.
8. Connect the Mode switch button cable to the system board.
9. Reinstall the front bezel.
10. See the "Completing the FRU replacement".

81

Replacing the power switch/LED assembly

1. Remove the computer cover. See "Removing the cover" .
2. Remove the front bezel. See "Removing and replacing the front bezel" .
3. Disconnect the power switch/LED assembly cable from the system board. See the system board illustration for your machine type at "Identifying parts on the system board" .
4. Note the power switch/LED assembly cable routing and the position of the two LEDs.
5. Remove the switch and the LEDs from the top of the chassis.

6. Route the cable for the new power switch/LED assembly to the system board.
7. Install the new power switch/LED assembly to the top of the chassis. Make sure that the LEDs are in the correct position.
8. Connect the power switch/LED cable to the system board.
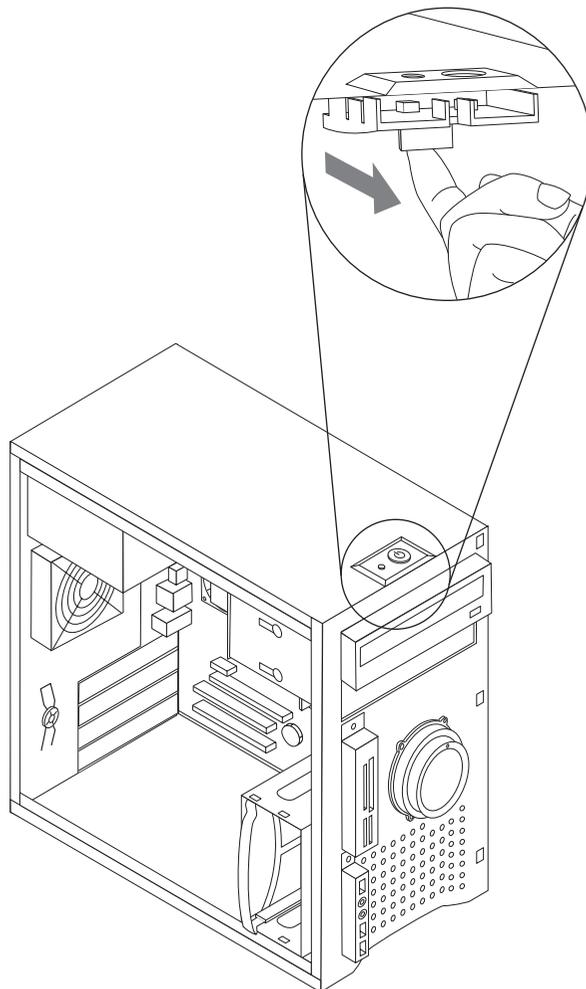9. Reinstall the front bezel.
10. See the "Completing the FRU replacement" .

Replacing the CMOS battery

If the CMOS battery fails, the date, time, and configuration information (including passwords) are lost. An error message is displayed when you turn on the computer.

> **Important**
>
> Refer to "Safety notices (multi-lingual translations)" for information about replacing and disposing of the battery.

1. Remove the computer cover. See "Removing the cover".
2. Locate the battery. See the system board illustration for your machine type at "Identifying parts on the system board".
3. You might have to remove any PCI adapters that impede access to the battery.
4. Remove the old battery.
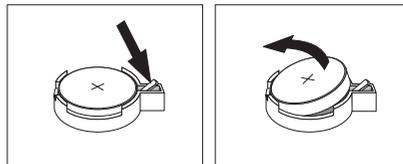
5. Install the new battery.
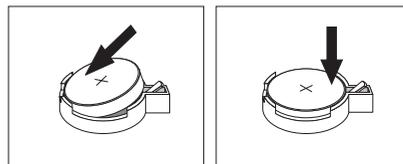
6. Replace any PCI adapters that were removed.

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

7. See the "Completing the FRU replacement."

Completing the FRU replacement

After replacing FRUs, you need to install any removed parts, replace the cover, and reconnect any cables, including telephone lines and power cords. Also, depending on the FRU that is replaced, you might need to

confirm the updated information in the Setup Utility program.

Note: When the power cord is first plugged in, the computer might appear to turn on for a few seconds and then turn off. This is a normal sequence to enable the computer to initialize.

1. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside your computer.
2. Replace the cover.
3. Reconnect the external cables and power cords to the computer. See "Rear connectors" .
4. If you have replaced the system board, you must update (flash) the BIOS. See "Flash update procedures" .
5. Some FRU replacements require the configuration to be updated. See "Using the Setup Utility," .

FRU lists

Machine Type 5301
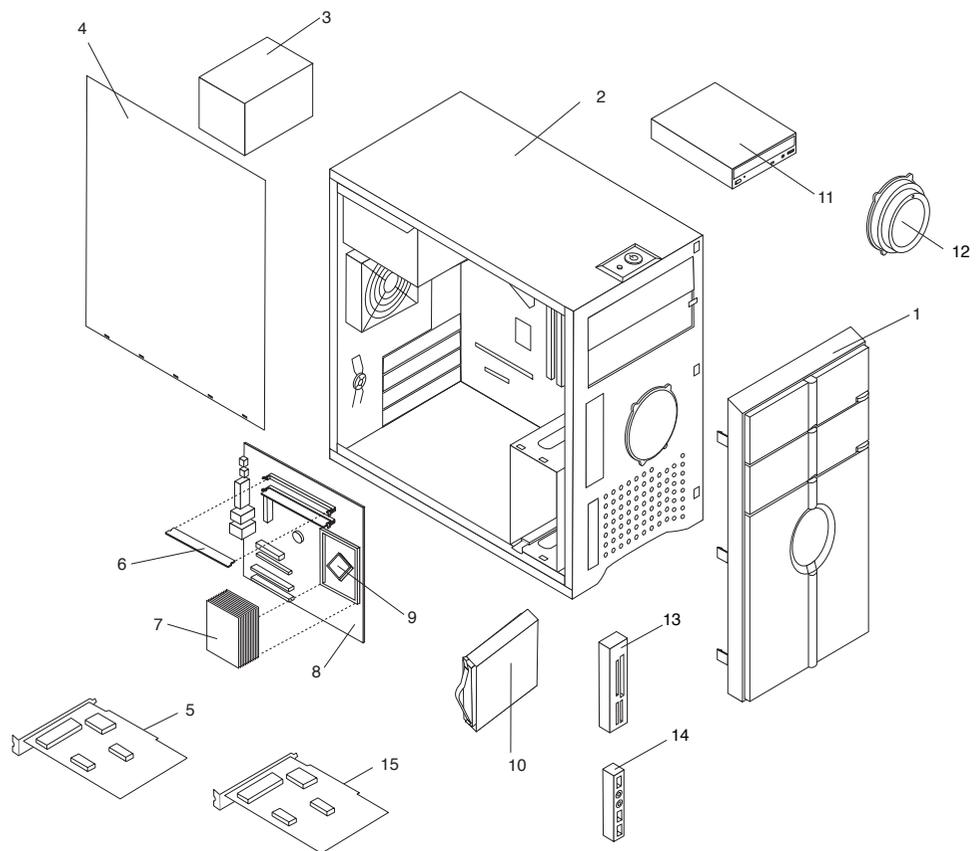
Item	Description	Models	FRU p/n	CRU
1	Front Bezel ASSEMBLY	All models	41R5995	1
2	Chassis Asm	All models	41R5999	N
	Power Supply			
3	PS-5281-7VR-ROHS/Switch/ATX/280W	6AG 6BG	41A9651	2
3	400W ATX Power Supply, Robust, for discovery , DPS-400-TBA, Delta	2AG 2BG 4AG 4BG 5AG 5BG	41A9662	2

Item	Description	Models	FRU p/n	CRU
	Mechanical			
4	Fru-Access Cover (Painting)	All models	41R6000	1
	HDDs			
5	250 GB 7200rpm SATA	4AG 4BG 5AG 5BG 6AG 6BG	42Y9696	1
5	500GB 7200rpm SATA	2AG 2BG	42Y9697	1
	Memory -- 4200 DDR2			
6	1 GB PC2-4200 (533MHz) DDR2 SDRAM	**2AG 2BG 4AG 4BG 5AG 5BG 6AG 6BG**	41X4252	1
	Mechanical			
7	Heatsink for Tamdhu II Intel 95W CPUs	All models	41N8261	2
	Planars			
8	F 946GZ mATX B MB@946GZ_1986_B5786(R)	2AG 2BG 4AG 4BG 5AG 5BG 6AG 6BG	87H4655	N
8	F 946GZ mATX B1 MB@946GZ_1986_B5786(R)--matrix from 87H4655	2AG 2BG 4AG 4BG 5AG 5BG 6AG 6BG	43C3504	N
	CPUs			
9	Pentium D 915 Processor 2.8 GHz 800 FSB 2MBx2 L2 C1-Value (95W)	6AG 6BG	41X7775	N
9	Pentium D 925 Processor 3.0 GHz 800 FSB 2MBx2 L2 C1-Value	5AG 5BG	41X2413	N
9	E6300 B2 CONROE 1066/1860MHZ-2M, LGA, EM64T	2AG 2BG	41X2495	N
9	E4300 L2 stepping	4AG 4BG	42Y8009	N
	Opticals			
10	DVD-ROM 16x – 48x	2AG 2BG	41X3545	2
10	DVD-ROM 16x – 48x	2AG 2BG	41X3546	2
10	DVD Recorder-RAMBO 8 (12XDVD-RAM)	2AG 2BG 4AG 4BG 5AG 5BG 6AG 6BG	43C0144	2
	Mechanicals			
11	Bitland BA7632 Mode Switch board	All models	41R6065	N
12	K2 8 in 1 Card reader	All models	41R5997	2
13	CABLE, LUXSHARE, HAD & USB & 1394 FRONT I_O CABLE ASSEMBLY	All models	41R5996	2
14	CABLE, LUXSHARE, 317CT LED & SWITCH CABLE ASSEMBLY	All models	41R5998	2
	System Fan for Tamdhu II	All models	41R2519	2
	Fru-EMC, Shield kit (For ODD)	All models	41R6151	2
	Foxconn LX 4PIN CABLE-SATA, 2H 100mm LATCH(RoHs)	All models	41R3300	2

Item	Description	Models	FRU p/n	CRU
	Luxshare SATA cable, 300mm, 1 latching & right angle, RoHS.	All models	41R3298	2
	ODD CABLE, 3H457mm(356+101), ATA100.	All models	39M0516	2
	CABLE, LUXSHARE, 317CT (WITH FUSE)	All models	41R6150	2
	Plannar Rear IO Shield with Stiffener-946MTX	All models	41N5347	N
	Fru-Retainer clip kit	All models	41R6063	2
	Fru-Hdd Bracket, Plastic;	All models	41R6064	1
	Fru-Front IO Ass'y, USB 2.0, Audio;	All models	41R6062	2
Keyboard - PS2 Preferred Pro				
	Chicony LXH-CH0623(US) PS/2 Keyboard	2AG 2BG 4AG 4BG 5AG 5BG 6AG 6BG	41R0094	1
Mice				
	(Primax) three button usb wired optical wheel mouse	4AG 4BG 5AG 5BG 6AG 6BG	41R0150	1
	Four button usb-ps2 wired optical wheel mouse (G1)	2AG 2BG	41R0152	1
Adapters & Misc				
	Bitland BA7446 1394_V1.5(VIA)(R)	2AG 2BG 4AG 4BG 5AG 5BG 6AG 6BG	42Y9702	1
	Bitland TV-Tuner card, & cable LR323 DVB-T & Analog Hybrid , PCI, Low Profile, RoHS	2AG 2BG	42Y9700	1
	LXH-J2010 Speaker (VDE CE SW).... Dingol 2.0 speaker	All models	41R0091	1
	Remote-control Receiver, RoHS; IR protocol, RC6; Interface, USB1.1; Driver, Vista inbox driver; USB cable and IrDA cable include	2AG 2BG	42Y9701	1
	ATI X1650PRO 256MB 128bit Video Card	4AG 4BG 5AG 5BG	42Y9698	1
	Nvidia 7950GT 512MB 256bit Video Card	2AG 2BG	42Y9699	1
	Foxconn DVI(F)-VGA(M) cord, Luxshare, 130mm,	2AG 2BG	41R3342	1
Power Cords				
	VL BLK1.8m VDE Power Cord(R)	All models	39M5122	1
Recovery CDs				
	Windows Vista Home Premium (German)	2AG 2BG 4BG 5BG	87H4154	1

Item	Description	Models	FRU p/n	CRU
	Windows Vista Home Basic (German)	4AG 5AG 6AG 6BG	87H4155	1

MT	Model	Model List Geography		
	2AG	EMEA		
	2BG	EMEA		
	4AG	EMEA		
	4BG	EMEA		
	5AG	EMEA		
	5BG	EMEA		
	6AG	EMEA		
	6BG	EMEA		

Additional Service Information

This chapter provides additional information that the service representative might find helpful.

Security features

Hardware controlled Passwords

Hardware controlled passwords are set using the Setup Utility program. For more information about passwords, see "Using passwords".

Operating system password

An operating system password is very similar to a power-on password and denies access to the computer by an unauthorized user when the password is activated. The computer is unusable until the password is entered and recognized by the computer.

Vital product data

Each computer has a unique Vital Product Data (VPD) code stored in the nonvolatile memory on the system board. After you replace the system board, the VPD must be updated. To update the VPD, see "Flash update procedures".

Management Information Format (MIF)

Management Information Format (MIF) is a file used to maintain a list of the system unit serial number along with all serialized components (for example, system board, riser card, memory, and processor).

At the time of computer manufacture, the EPROM is loaded with the serial numbers of the system and all major components.

A company called Retain-a-Group is a central data warehouse offering serial number data management. Retain-a-Group acts as a focal point

to law enforcement. The customer has the option to purchase serial number information and services from Retain-a-Group. It is the customer's responsibility to maintain the MIF file and to inform Retain-a-Group of any changes to the file.

Some customers might request that their servicers assist them in maintaining the MIF file when serialized components are replaced during hardware service. This assistance is between the customer and the servicer. The servicer can use the DMI MIF Browser to update the MIF information in the EPROM. It is anticipated that some servicers might charge for this service.

To update the EPROM using the DMI MIF Browser, use the following procedure.

1. Click **Start** from the desktop, then **Programs**.
2. Select **SystemView Agent**
3. Select the **Serial Number Information** icon
4. Click the plus sign to expand.
5. Select the component you want to view or edit.
6. Double click on the component you want to change.
7. Enter new data in the Value field, then click **Apply**.

BIOS levels

An incorrect level of BIOS can cause false errors and unnecessary FRU replacement. Use the following information to determine the current level of BIOS installed in the computer, the latest BIOS available for the computer, and where to obtain the latest level of BIOS.
* Current Level BIOS information
    – Run the Setup Utility to determine the level of BIOS installed.
* Sources for obtaining the latest level BIOS available
    1. Lenovo support web site: http://www.lenovo.com/support/
    2. Lenovo Customer Support Center
    3. Levels 1 and 2 Support
To update (flash) the BIOS, see "Flash update procedures."

Flash update procedures

This section details how to flash (update) the BIOS.

Updating (flashing) BIOS from a diskette or CD-ROM

1. Shut down the operating system and turn off the computer.
2. Insert the flash update diskette or CD-ROM.
3. Turn on the computer. The update begins.
4. When you are prompted to select a language, press the number on your keyboard that corresponds to the language; then press Enter.
5. When prompted to change the serial number, press Y, type the seven character serial number of your computer, and then press Enter.
6. When prompted to change the machine type/model, press Y, type the seven character machine type/model of your computer, and then press Enter.
7. Follow the instructions on the screen to complete the update.

Updating (flashing) BIOS from your operating system

Note: Due to constant improvements being made to the Lenovo Web site, Web page content (including the links referenced in the following procedure) is subject to change.

1. From your browser, type http://www.lenovo.com/support.
2. In the Use Quick path field, type your 4-digit machine type and click **Go**.
3. Under Browse by product, click **Downloads and drivers**.
4. Scroll down to the BIOS catagory and click on the **Flash Bios Update**.
5. On the Flash BIOS Update page, scroll down to locate the .txt file for the flash from the operating system version. Click the .txt file.
6. Print these instructions. This is very important because these instructions are not on the screen after the download begins.
7. From the browser, click **Back** to return to the list of files. Carefully follow the printed instructions to download, extract, and install the update.

Recovering from a POST/BIOS update failure

Attention: If an interruption occurs during a POST/BIOS update (flash update), the computer might not restart correctly. If this occurs, perform the following procedure (also known as a Boot-block recovery).

Note: If your computer has no internal diskette drive, an optional USB diskette drive must be connected to use the BIOS flash diskette.

1. Open the cover.
2. Remove any parts necessary to gain access to the Clear CMOS/Recovery jumper.
3. Move the Clear CMOS/Recovery jumper from the standard position (pins 1 and 2) to pins 2 and 3.

4. Insert the BIOS flash diskette in the diskette drive.
5. Close the cover and reconnect the computer power cord to the computer and to an electrical outlet. Turn on the computer.
6. The recovery session takes two to three minutes. During this time you will hear a series of beeps. After the update session completes, the series of beeps ends and the computer automatically turns off. There is no video during the recovery session.
7. When the computer turns off, open the cover.
8. Move the Clear CMOS/Recovery jumper back to the original position (pins 1 and 2).
9. Remove the BIOS flash diskette from the diskette drive.
10. Close or install the cover and reconnect all external cables.

Power management

Power management reduces the power consumption of certain components of the computer such as the system power supply, processor, hard disk drives, and some monitors.

Automatic configuration and power interface (ACPI) BIOS

Being an ACPI BIOS system, the operating system is allowed to control the power management features of the computer and the setting for Advanced Power Management (APM) BIOS mode is ignored. Not all operating systems support ACPI BIOS mode.

Automatic Power-On features

The Automatic Power-On features within the Power Management menu allow you to enable and disable features that turn on the computer automatically.

- **Serial Port A Ring Detect:** With this feature set to **Enabled** and an external modem connected to serial port (COM1), the computer will turn on automatically when a ring is detected on the modem.
- **PCI Modem Ring Detect:** With this feature set to **Enabled**, the computer will turn on automatically when a ring is detected on the internal modem.
- **PCI Wake Up:** This feature allows PCI cards that support this capability to wake the system.
- **Wake Up on Alarm:** You can specify a date and time at which the computer will be turned on automatically. This can be either a single event or a daily event.

- **Wake on LAN:** If the computer has a properly configured token-ring or Ethernet LAN adapter card that is Wake on LAN-enabled and there is remote network management software, you can use the Wake on LAN feature. When you set Wake on LAN to **Enabled**, the computer will turn on when it receives a specific signal from another computer on the local area network (LAN).

Statement A

Thanks for using Lenovo products.

Carefully read all documents shipped with your computer before you install and use the product for the first time for better use of it. If you fail to operate the product according to instructions and requirements in all the manuals included with your computer, or operate the product inappropriately for reasons such as misunderstanding, Lenovo (Beijing) Co., Ltd. will not be responsible for any loss caused except those arising from the installation and operations carried out by Lenovo professional service staff.

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The software interface and hardware configuration involved in all the manuals included with your computer depends on the actual configuration of the computer you purchase.

Welcome to contact us for any inconsistency between the product and all the manuals included with your computer. For the latest information or any questions or comments, contact or visit Lenovo website:

Service website: http://www.lenovo.com

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