

IBM Mobile Systems

ThinkPad Computer
Hardware Maintenance Manual

January 2000

This manual supports:

ThinkPad 570 (MT 2643/2644)

ThinkPad 570E (MT 2643/2644)

Note

Before using this information and the product it supports, be sure to read the general information under "Notices" on page 91.

First Edition (January 2000)

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Read this first

General descriptions

This chapter includes descriptions for any ThinkPad model that has the PC-Doctor DOS diagnostics program. Some descriptions might not apply to your particular computer.

Read this first

Before you go to the checkout guide, be sure to read this section.

Important notes

- **Only certified trained personnel should service the computer.**
- **Read the entire FRU removal and replacement page before replacing any FRU.**
- **Use new nylon-coated screws when you replace FRUs.**
- **Be extremely careful during such write operations as copying, saving, or formatting.** Drives in the computer that you are servicing might have been rearranged, or the drive startup sequence might have been altered. If you select an incorrect drive, data or programs might be overwritten.
- **Replace FRUs only for the correct model.** When you replace a FRU, make sure the model of the machine and the FRU part number are correct by referring to the FRU parts list.
- **A FRU should not be replaced because of a single, unreproducible failure.** Single failures can occur for a variety of reasons that have nothing to do with a hardware defect, such as cosmic radiation, electrostatic discharge, or software errors. Consider replacing a FRU only when a problem recurs. If you suspected that a FRU is defective, clear the error log and run the test again. Do not replace any FRUs if log errors do not reappear.
- **Be careful not to replace a nondefective FRU.**

What to do first: When you do return a FRU, you must include the following information in the parts exchange form or parts return form that you attach to it:

- ___ 1. Name and phone number of servicer
- ___ 2. Date of service
- ___ 3. Date on which the machine failed
- ___ 4. Date of purchase
- ___ 5. Failure symptoms, error codes appearing on the display, and beep symptoms

Read this first

- ___ 6. Procedure index and page number in which the failing FRU was detected
- ___ 7. Failing FRU name and part number
- ___ 8. Machine type, model number, and serial number
- ___ 9. Customer's name and address

Before checking problems with the computer, determine whether the damage is covered under the warranty by referring to the following:

Note for warranty: During the warranty period, the customer may be responsible for repair costs if the computer damage was caused by misuse, accident, modification, unsuitable physical or operating environment, or improper maintenance by the customer. The following list provides some common items that are not covered under warranty and some symptoms that might indicate that the system was subjected to stress beyond normal use.

The following is not covered under warranty:

- LCD panel cracked from the application of excessive force or from being dropped.
- Scratched (cosmetic) parts.
- Cracked or broken plastic parts, broken latches, broken pins, or broken connectors caused by excessive force.
- Damage caused by liquid spilled into the system.
- Damage caused by the improper insertion of a PC Card or the installation of an incompatible card.
- Damage caused by foreign material in the diskette drive.
- Diskette drive damage caused by pressure on the diskette drive cover or by the insertion of a diskette with multiple labels.
- Damaged or bent diskette eject button.
- Fuses blown by attachment of a nonsupported device.
- Forgotten computer password (making the computer unusable).

The following symptoms might indicate damage caused by nonwarranted activities:

- Missing parts might be a symptom of unauthorized service or modification.
- Hard disk drive spindles can become noisy from being subjected to excessive force or from being dropped.
- I9990303 errors can be caused by exposure to strong magnetic fields.

Related service information

This section provides information about the following:

- “Reset switch”
- “Service Web site”
- “Passwords”
- Power management features

Reset switch

The Reset switch resets the system (regardless of the microcode status) and forces the power off. Use this pushbutton to power off when power is not completely off or the microcode is in a hung state. For its location, see “Front view” on page 75.

Service Web site

When the latest maintenance diskette and the system program service diskette are available, a notice will be posted on <http://pccbbs.raleigh.ibm.com/>

Passwords

As many as three passwords may be needed for any ThinkPad computers: the power-on password (POP), the hard disk password (HDP), and the supervisor password (PAP).

When the power-on password (POP), the hard disk password (HDP), or the supervisor password (PAP) is used, the following situations may occur:

- **If the PAP is used**, the HDP is enabled automatically, but no HDP prompt appears. The HDP is set the same as the PAP.
- **If the POP is the same as the HDP**, the POP prompt appears, but the HDP prompt does not appear.
- **If the POP is not the same as the HDP**, both prompts appear.

If a ThinkPad computer has an extra bay, it can support more than two HDPs. Then the following situations may occur:

- If the **POP** is the same as one of the **HDPs** (HDP-1 or HDP-2), a POP prompt appears. The passwords are different.
- If the **POP** is not the same as either of the **HDPs** (HDP-1 or HDP-2), both prompts appear.
- If the **PAP** is used, the **HDP-1** or the **HDP-2** is automatically enabled, but the HDP prompt does not appear. The HDP-1 or the HDP-2 are then set to the same password as the PAP.

Related service information

Supervisor and hard disk passwords: The supervisor password (PAP) and the hard disk password (HDP) are security features that are used to protect the system and the hard disk data from unauthorized access. No overriding capability is provided. If only a hard disk password is set, you must get the password from its owner in order to run diagnostic tests and perform service. If both the supervisor password and the hard disk password are set, you can enter Easy-Setup by pressing the **Enter** key or by entering the power-on password at the supervisor password prompt. In this case, the **Password**, **Start up**, **Network**, and **Initialize** or **Asset ID** (for some models) icons cannot be selected.

Note: The supervisor password and the hard disk password cannot be replaced if they are forgotten. If the customer forgets the supervisor password, the system board must be replaced. If the customer forgets the hard disk password, the hard disk drive must be replaced.

How to remove the power-on passwords:

If only the power-on password is set, do the following to remove it:

1. Turn off the computer.
2. Remove the DIMM cover from the bottom of the computer.
3. Short-circuit the two password pads or put the jumper on the pins.

For the location of the password pads or the jumper, see "Password pads" on page 78.

4. Turn on the computer and wait until the POST ends. After the POST ends, the password prompt does not appear. The power-on password has been removed.
5. Reinstall the DIMM cover.

If both the power-on password and the supervisor password are set, do the following to remove them:

1. Power on the computer by pressing and holding **F1**.
2. Enter the supervisor password. The Easy-Setup menu appears.
3. Click the **Password** icon.
4. Click the **Power on** icon.
5. Enter the supervisor password, and press the **Space bar**.
6. Press **Enter** twice.
7. Click **Exit**; then click **Restart**.
The power-on password has been removed.

Related service information

Power management features

To reduce power consumption, the computer has three power management modes: standby, suspend, and hibernation.

Standby mode: In standby mode, the following occurs:

- The LCD backlight turns off.
- The hard disk drive motor stops.
- The speaker is muted.

Note: Standby mode in Windows 98 is called *suspend mode* in Windows 95.

To enter standby mode, press **Fn + F3**. To end standby mode and resume normal operation, press any key.

Suspend mode: When the computer enters suspend mode, the following events occur in addition to what occurs in standby mode:

- The LCD is powered off.
- The hard disk drive is powered off.
- The CPU stops.

Suspend mode in Windows 95 is called *standby mode* in Windows 98.

You can cause the computer to enter suspend mode by doing any of the following:

- Press **Fn + F4**.
- Close the LCD cover. (To prevent the computer from entering suspend mode when the LCD is closed, click **Will not suspend even if LCD is closed** in the Power Management Properties window. Then only the LCD turns off.)
- Select the **Suspend** button in the Fuel Gauge program.

In certain circumstances, the computer goes into suspend mode automatically:

- If a "suspend time" has been set on the timer, and the user does not do any operation with the keyboard, the TrackPoint, the hard disk, the parallel connector, or the diskette drive within the time set.
- If the ac adapter is plugged in.
- If the battery indicator blinks orange, indicating that the battery power is low. (Alternatively, if **Hibernate when battery becomes low** has been selected in the "Power Management Properties" window, the computer goes into hibernation mode.)

Note: Even if you don't set the low-battery alarm, the charge indicator lets you know that the battery is low, and then the ThinkPad automatically enters the power-saving mode. This default low-battery

Related service information

behavior is independent of the operating system: so if you have set the low-battery alarm, the computer may not do what you specified. It chooses either your setting or the default setting, whichever is appropriate.

Any one of the following events causes the computer to resume operation from suspend mode:

- The **Fn** key is pressed.
- The LCD cover is opened.
- The ring indicator (RI) is signaled by a serial device or a PC Card device.
- The power switch is turned on.
- The resume timer is set. In Windows 98, the **Scheduled Tasks** setting has priority over the **Resume on timer** selection in the "Power Management Properties" window.

Note: The computer does not accept any input immediately after it enters suspend mode. Therefore, wait a few seconds before taking any action to reenter operation mode.

Hibernation mode

Note for Windows NT

A Windows NT user cannot create a hibernation file in a Windows NT system that uses the NTFS format system, the Windows NT default format. If you want to use hibernation mode, you should reinstall Windows NT with a FAT format system.

In hibernation mode, the following occurs:

- The system status, RAM, VRAM, and setup data are stored on the hard disk.
- The system is powered off.

Notes:

1. In the ThinkPad Configuration program, the computer can be set to **suspend/hibernate while docked**.
2. The computer cannot enter hibernation mode when it is powered with ac power and a communication PC Card is used.

Any one of the following events causes the computer to enter hibernation mode:

- The **Fn + F12** keys are pressed.
- The **Hibernation** button is selected in the Fuel-Gauge program.
- The power switch is turned off and the mode is set to **Power switch mode [Hibernation]**.

Related service information

- The timer conditions are satisfied in suspend mode (for operating systems other than Windows 98).
- A critically low battery condition occurs and the mode is set to **Hibernate when battery becomes low**.

When the power is turned on, the computer leaves hibernation mode and resumes operation. The hibernation file in the boot record on the hard disk drive is read, and system status is restored from the hard disk drive.

Checkout guide

Use the following procedures as a guide in identifying and correcting problems with the ThinkPad computer.

Note: The diagnostic tests are intended to test only IBM products. The use of non-IBM products, prototype cards, or modified options can lead to false indications of errors and invalid system responses.

1. Identify the failing symptoms in as much detail as possible.
2. Verify the symptoms. Try to re-create the failure by running the diagnostic test or by repeating the operation.

Testing the computer

The ThinkPad computer has a test program called PC-Doctor DOS (hereafter called *PC-Doctor*). You can detect errors by running the diagnostics test included in PC-Doctor. This section is an overview of the procedure. For details that depend on model-unique functions, refer to "Product overview" on page 17.

For some possible configurations of the computer, PC-Doctor might not run correctly. To avoid this problem, you need to initialize the computer setup by Easy-Setup before you run PC-Doctor. In the Easy-Setup screen, click **Config** and **Initialize**.

Note: When you initialize the computer configuration, some devices are disabled, such as the serial port. If you test one of these devices, you need to enable it by using PS2.EXE.

To run the test, do as follows:

Note: In the following procedure, you can select an item not only with the arrow keys, but also with the TrackPoint. Instead of pressing **Enter**, click the left button.

1. Insert the PC-Doctor disk into the diskette drive; then power on the computer.

If the computer cannot be powered on, go to "Power system checkout" on page 10, and check the power sources.

If an error code appears, go to "Symptom-to-FRU index" on page 24.

In the first screen, select the model and press **Enter**. Follow the instructions on the screen.

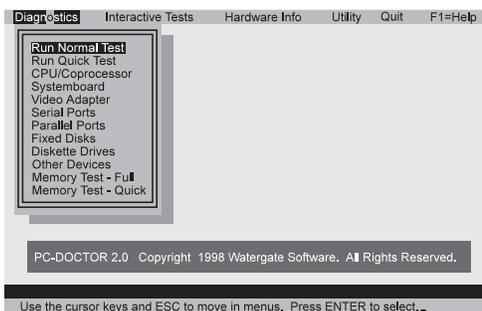
2. The PC-Doctor main panel appears.
3. Select **Diagnostics** with the arrow keys, and press **Enter**.

A pull-down menu appears. (Its exact form depends on the model.)

Checkout guide

The options on the test menu are as follows:

Diagnosics	Interactive Tests
<ul style="list-style-type: none">• Run Normal Test• Run Quick Test• CPU/Coprocessor• Systemboard• Video Adapter• Serial Ports• Fixed Disks• Diskette Drives• Other Devices• Memory Test – Full• Memory Test – Quick	<ul style="list-style-type: none">• Keyboard• Video• Internal Speaker• Mouse• Joystick• Diskette• System Load• CD-ROM/DVD• Stereo Speaker
Notes: <ul style="list-style-type: none">• In the Keyboard test in Interactive Tests, the Fn key is scanned only once. Each key should be held down for at least 2 seconds; otherwise, it cannot be sensed.• Sound Card is not recognized in the Hardware Info.	



4. Run the applicable function test.
5. Follow the instructions on the screen. If there is a problem, PC-Doctor shows some messages.
6. To exit the test, select **Quit — Exit Diag**.
To cancel the test, press **Esc**.

Detecting system information with PC-Doctor

PC-Doctor can detect the following system information:

Hardware Info:

- System Configuration
- Memory Contents
- Physical Disk Driver
- Logical Disk Driver
- VGA Information

Checkout guide

- IDE Drive Info
- PCI Information
- PNPISA Info
- SMBIOS Info
- FRU Info

Utility:

- Run External Tests
- Surface Scan Hard Disk
- Benchmark System
- DOS Shell
- Tech Support Form
- Battery Rundown
- View Test Log
- Print Log
- Save Log
- Full Erase Hard Drive
- Quick Erase Hard Drive

Power system checkout

To verify the symptom of a problem, do the following:

1. Power off the computer.
2. Remove the battery pack.
3. Connect the ac adapter.
4. Check that power is supplied when you power on the computer.
5. Power off the computer.
6. Disconnect the ac adapter and install the charged battery pack.
7. Check that power is supplied by the battery pack when you power on the computer.

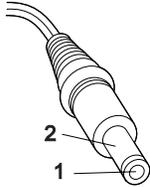
If you suspect a power problem, see the appropriate one of the following power supply checkouts:

- “Checking the ac adapter”
- “Checking operational charging” on page 11
- “Checking the battery pack” on page 11
- “Checking the backup battery” on page 12

Checking the ac adapter: You are here because the computer fails only when the ac adapter is used:

- If the power problem occurs only when the port replicator is used, replace the port replicator.
 - If the power-on indicator does not turn on, check the power cord of the ac adapter for correct continuity and installation.
 - If the computer does not charge during operation, go to “Checking operational charging” on page 11.
1. Unplug the ac adapter cable from the computer and measure the output voltage at the plug of the ac adapter cable. See the following figure:

Checkout guide



(16 - 10 V)

Pin	Voltage (V dc)
1	+15.5 to +17.0
2	Ground

If the voltage is not correct, replace the ac adapter.

If the voltage is acceptable, do the following:

- Replace the system board.
- If the problem persists, go to “Product overview” on page 17.

Note: Noise from the ac adapter does not always indicate a defect.

Checking operational charging: To check operational charging, use a discharged battery pack or a battery pack that has less than 50% of the total power remaining when installed in the computer.

Perform operational charging. If the battery status indicator or icon does not turn on, remove the battery pack and let it return to room temperature. Reinstall the battery pack. If the charge indicator or icon still does not turn on, replace the battery pack.

If the charge indicator still does not turn on, replace the system board. Then reinstall the battery pack. If the reinstalled battery pack is not charged, go to the next section.

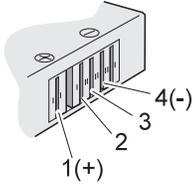
Checking the battery pack: Battery charging does not start until the Fuel Gauge shows that less than 95% of the total power remains; under this condition the battery pack can charge to 100% of its capacity. This protects the battery pack from being overcharged or from having a shortened life.

Note: The battery pack might not be able to charge when it is hot. In that case, remove it from the computer and leave it at room temperature for a while. After it cools down, reinstall and recharge it.

To check the battery pack, do the following:

1. Power off the computer.
2. Remove the battery pack and measure the voltage between battery terminals 1 (+) and 4 (-). See the following figure:

Checkout guide



Terminal	Voltage (V dc)
1	+ 0 to + 12.6
4	Ground (-)

- If the voltage is less than +11.0 V dc, the battery pack has been discharged. Recharge the battery pack.

Note: In this case, the battery pack is over-discharged. It takes at least 3 hours to recharge the battery pack even if the indicator does not turn on.

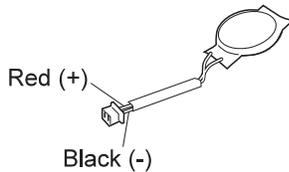
If the voltage is still less than +11.0 V dc after recharging, replace the battery.

- If the voltage is more than +11.0 V dc, measure the resistance between battery terminals 3 and 4. The resistance must be 4 to 30 K ohm.

If the resistance is not correct, replace the battery pack. If the resistance is correct, replace the system board.

Checking the backup battery: Do the following:

- Power off the computer, and unplug the ac adapter from it.
- Turn the computer upside down.
- Remove the backup battery (see "Checking the battery pack" on page 11).
- Measure the voltage of the backup battery. See the following figure.



Wire	Voltage (V dc)
Red	+2.5 to +3.2
Black	Ground

- If the voltage is correct, replace the system board.
- If the voltage is not correct, replace the backup battery.

Checkout guide

- If the backup battery discharges quickly after replacement, replace the system board.

Checkout guide

ThinkPad 570 and 570E

This chapter includes the descriptions for the ThinkPad 570 series computer.

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Product overview

This section describes the following product-unique information:

- “Specifications”
- “Status indicators” on page 19
- “Structure” on page 20
- “Fn key combinations” on page 23

Specifications

The following table lists the specifications of the ThinkPad 570 series:

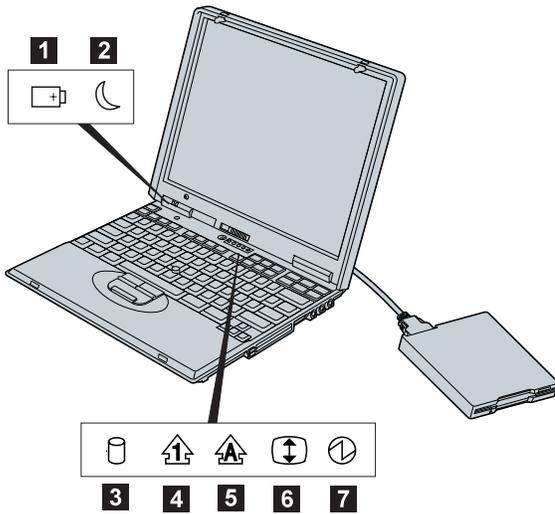
Feature	Description
Processor	<p>570</p> <ul style="list-style-type: none"> • Mobile Pentium® II 300 MHz, L2 256-KB cache • Intel® Mobile Pentium II 333 MHz, L2 256-KB cache • Intel Mobile Pentium II 366 MHz, L2 256-KB cache • Intel Celeron® processor 366 MHz, L2 256-KB cache (Japan and Korea only) • Intel Celeron® processor 400 MHz, L2 256-KB cache (Japan and Korea only) <p>570E</p> <ul style="list-style-type: none"> • Mobile Pentium III 450 MHz, L2 256-KB cache • Mobile Pentium III 500 MHz, L2 256-KB cache
Bus architecture	<ul style="list-style-type: none"> • PCI Bus
Memory (standard)	<ul style="list-style-type: none"> • 64 MB (on the system board)
Memory (option)	<p>570</p> <ul style="list-style-type: none"> • 32 MB, 64 MB, or 128 MB DIMM card (maximum of 192 MB) <p>570E</p> <ul style="list-style-type: none"> • 32 MB, 64 MB, 128 MB, or 256 MB DIMM card (maximum of 320 MB)
CMOS RAM	114 bytes +4 Kbytes

Product overview

Feature	Description
Video	<p>570</p> <ul style="list-style-type: none"> • 12.1-inch, 16M colors SVGA (800×600 resolution) TFT color LCD • 13.3-inch, 16M colors, XGA (1024×768 resolution) TFT color LCD <p>570E</p> <ul style="list-style-type: none"> • 13.3-inch, 16M colors, XGA (1024×768 resolution) TFT color LCD
Diskette drive (external)	1.44 MB (3-mode), 3.5-inch
Hard disk drive	<p>570</p> <ul style="list-style-type: none"> • 4.0 GB, 2.5-inch, IDE interface • 6.4 GB, 2.5-inch, IDE interface • 10 GB, 2.5-inch, IDE interface <p>570E</p> <ul style="list-style-type: none"> • 6.0 GB, 2.5-inch, IDE interface • 12.0 GB, 2.5-inch, IDE interface
I/O port	<ul style="list-style-type: none"> • External monitor • Line-in • Headphone • Microphone • Mouse • Parallel • Expansion connector • Serial • USB • RJ11
Internal modem	<ul style="list-style-type: none"> • 56.6 Kbps
Audio	<ul style="list-style-type: none"> • Internal microphone • Software control volume
Infrared transfer	IrDA 1.1
PC Card	One Type-III or two Type-II
Ac adapter	56-watt type
UrtraBase (Option)	<ul style="list-style-type: none"> • CD-ROM/DVD drive <ul style="list-style-type: none"> – 24 x CD-ROM drive – 2 x DVD drive (570 only) – 6 x DVD drive (570E only) • Audio <ul style="list-style-type: none"> – Internal monaural speaker

Status indicators

The system status indicators show the current computer status in different colors (green or orange):



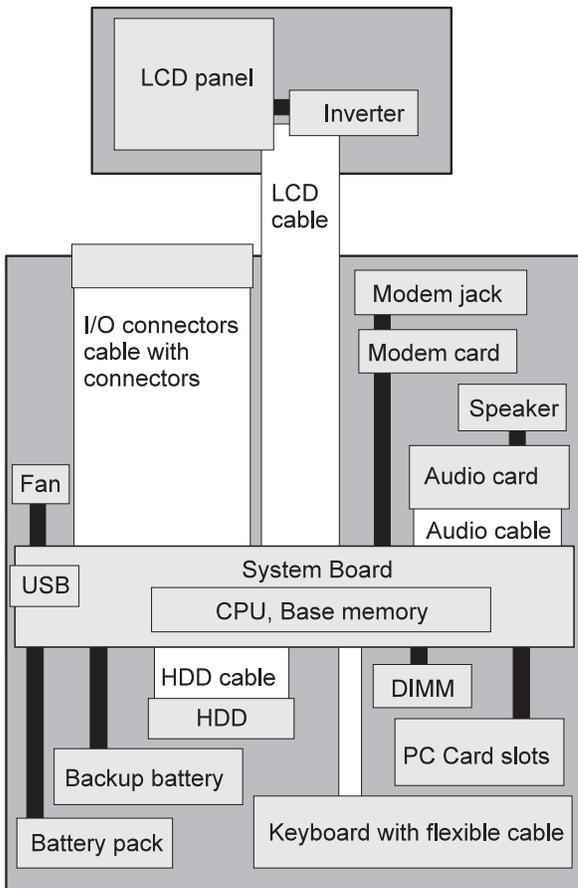
Symbol	Color	Meaning
1 Battery	Green	The battery is fully charged.
	Orange	The battery is charging.
	Blinking orange	The battery needs charging.
2 Suspend Mode	Green	Suspend mode
	Blinking green	Entering suspend mode
3 Hard Disk In Use	Orange	Data is read from or written to the hard disk drive.
4 Numeric Lock	Green	The numeric keypad on the keyboard is enabled.
5 Caps Lock	Green	Caps Lock mode is enabled.
6 Scroll Lock	Green	Arrow keys can be used as screen-scroll function keys.
7 Power On	Green	Power on

Product overview

Structure

The following illustration shows the overall organization of the FRUs.

- Flexible cable
- Connection



Product overview

The following table shows the test for each FRU.

FRU	Applicable test
System board	<ol style="list-style-type: none"> 1. Diagnostics --> CPU/Coprocessor 2. Diagnostics --> Systemboard
Power	Diagnostics --> Battery
LCD unit	<ol style="list-style-type: none"> 1. Diagnostics --> Video Adapter 2. Interactive Tests --> Video
Modem	<ol style="list-style-type: none"> 1. Make sure the modem sets up correctly. 2. Replacing the modem jack and modem card one at a time, run the modem test in Other Devices (Diagnostics)
Audio	<ol style="list-style-type: none"> 1. Interactive Tests --> Monaural Speaker 2. Diagnostics --> Systemboard
Speaker	<ul style="list-style-type: none"> • System beeper: <ul style="list-style-type: none"> – Interactive Tests --> Internal Speaker • Speaker of the UltraBase: <ul style="list-style-type: none"> – Interactive Tests --> Monaural Speaker
PC Card slots	Diagnostic --> Systemboard
Keyboard	<ol style="list-style-type: none"> 1. Diagnostics --> Keyboard 2. Interactive Test --> Keyboard
TrackPoint or pointing device	<p>If the TrackPoint does not work, check the configuration in the ThinkPad Configuration program. If the TrackPoint is disabled, select Enable to enable it.</p> <p>After you use the TrackPoint, the pointer drifts on the screen for a short time. This drift can occur when a slight, steady pressure is applied to the TrackPoint pointer. This symptom is not a hardware problem. No service action necessary if the pointer stops after a short time.</p> <p>If this does not correct the TrackPoint problem, continue with the following.</p> <ul style="list-style-type: none"> • Interactive Tests --> Mouse
Hard disk drive	Diagnostics --> Fixed Disks

Product overview

FRU	Applicable test
Diskette drive	<ol style="list-style-type: none">1. Diagnostics --> Diskette Drive2. Interactive Tests --> Diskette
CD-ROM or DVD drive (in the UltraBase)	Interactive Tests --> CD-ROM/DVD
Joystick	Interactive Tests --> Joystick
Memory	<ol style="list-style-type: none">1. If a DIMM is installed, remove it and run Memory Test - Quick (Diagnostics).2. If the problem does not recur, replace the DIMM and run the test again.3. If the test does not detect the error, run Memory Test - Full (Diagnostics).
Fan	<ol style="list-style-type: none">1. Turn on the computer and check the air turbulence at the louver near the power switch.2. Run the fan test in Other Devices (Diagnostics)

Fn key combinations

The following table shows the function of each combination of **Fn** with a function key.

The **Fn** key works independently from the operating system. The operating system obtains the status through the system management interface to control the system.

Key combination	Description
Fn + F1	Reserved.
Fn + F2	Turn the Fuel Gauge display on or off.
Fn + F3	Turn standby mode on.
Fn + F4	Turn suspend mode on.
Fn + F5	Reserved.
Fn + F6	Reserved.
Fn + F7	Switch between the LCD and an external monitor.
Fn + F8	Turn screen expansion on or off. (There is no symbol on the key.)
Fn + F9	Reserved.
Fn + F10	Reserved.
Fn + F11	Switch the power management mode: High performance, automatic, or customized. Note: In Windows 98, only the CPU speed is changed.
Fn + F12	Turn hibernation mode on.
Fn + Pg Up	Increase the volume, or unmute.
Fn + Pg Dn	Decrease the volume, or unmute.
Fn + Backspace	Mute. Note: To turn on the sound, press Fn + PgUp or Fn + PgDn .

Symptom-to-FRU index

The symptom-to-FRU index lists symptoms and errors and their possible causes. The most likely cause is listed first, in boldface type.

Note: Do the FRU replacement or other actions in the sequence shown in the “FRU/Action in Sequence” column. If a FRU replacement does not solve the problem, put the original part back in the computer. Do not replace a nondefective FRU.

This index can also help you determine, during regular servicing, what FRUs are likely to need to be replaced next.

A numeric error is displayed for each error detected in POST or system operation. In the displays, **n** can be any number.

If no numeric code is presented, check the narrative description of symptoms. If the symptom is not described there, go to “Intermittent problems” on page 28.

Note: For IBM devices not supported by diagnostic codes in the ThinkPad notebook computers, see the manual for that device.

Numeric error codes

Symptom or error	FRU or action, in sequence
0200 Fixed disk failure	<ol style="list-style-type: none">1. Reseat the hard disk drive.2. Load Setup Defaults in IBM BIOS Setup Utility.3. Hard disk drive.4. System board.
0210, 0211 Stuck key Keyboard error	<ol style="list-style-type: none">1. Run the keyboard test in the interactive tests and auxiliary input device.
0212 Keyboard controller failure	<ol style="list-style-type: none">1. Run the keyboard test in the interactive tests and auxiliary input device.
0213 Keyboard is locked	<ol style="list-style-type: none">1. Unlock external keyboard.
0220 Monitor type does not match CMOS	<ol style="list-style-type: none">1. Load Setup Defaults in IBM BIOS Setup Utility.
0230 Shadow RAM failure at offset nnnn	<ol style="list-style-type: none">1. System board.

Symptom-to-FRU index

Symptom or error	FRU or action, in sequence
0231 System RAM failure at offset nnnn	<ol style="list-style-type: none"> 1. DIMM. 2. System board.
0250 System battery is dead—replace and run setup	<ol style="list-style-type: none"> 1. Replace the backup battery and run IBM BIOS Setup Utility to reset the time and date.
0251 System CMOS checksum bad—Default configuration used	<ol style="list-style-type: none"> 1. Replace the backup battery. and run IBM BIOS Setup Utility to reset the time and date.
0260 System timer error	<ol style="list-style-type: none"> 1. Replace the backup battery. and run IBM BIOS Setup Utility to reset the time and date. 2. System board.
0270 Real time clock error	<ol style="list-style-type: none"> 1. Replace the backup battery and run IBM BIOS Setup Utility to reset the time and date. 2. System board.
0280 Boot incomplete error—Default configuration used	<ol style="list-style-type: none"> 1. Load Setup Defaults in IBM BIOS Setup Utility. 2. DIMM. 3. System board.
0281 Memory size recognized by POST is different from that recognized by CMOS	<ol style="list-style-type: none"> 1. Load Setup Defaults in IBM BIOS Setup Utility. 2. DIMM. 3. System board.
02B0 Diskette drive error	<ol style="list-style-type: none"> 1. Check that the drive is defined with the proper diskette type in IBM BIOS Setup Utility. 2. Run the diskette diagnostics test.
02D0 System cache error—Cache is disabled	<ol style="list-style-type: none"> 1. System board.
02F0 CPU ID	<ol style="list-style-type: none"> 1. System board.
02F5 DIMM test failure	<ol style="list-style-type: none"> 1. DIMM. 2. System board.
02F6 Software NMI failure	<ol style="list-style-type: none"> 1. DIMM. 2. System board.
02F7 Fail—safe timer NMI failure	<ol style="list-style-type: none"> 1. DIMM. 2. System board.

Error messages

Symptom or error	FRU or action, in sequence
Device address conflict	<ol style="list-style-type: none">1. Load Setup Defaults in IBM BIOS Setup Utility.2. Backup battery.3. System board.
Allocation error for: device	<ol style="list-style-type: none">1. Load Setup Defaults in IBM BIOS Setup Utility.2. Backup battery.3. System board.
Failing bits: nnnn	<ol style="list-style-type: none">1. DIMM.2. System board.
Invalid system configuration data	<ol style="list-style-type: none">1. DIMM.2. System board.
I/O Device IRQ conflict	<ol style="list-style-type: none">1. Load Setup Defaults in IBM BIOS Setup Utility.2. Backup battery.3. System board.
Operating system not found	<ol style="list-style-type: none">1. Enter IBM BIOS Setup Utility and see whether the hard disk drive and diskette drive are properly identified.2. Diskette drive.3. Hard disk drive.4. System board.

Beep symptoms

Symptom or error	FRU or action, in sequence
One beep and a blank, unreadable, or flashing LCD	<ol style="list-style-type: none"> 1. Reseat the LCD connector 2. LCD assembly 3. System board
One long and two short beeps, and a blank or unreadable LCD	<ol style="list-style-type: none"> 1. System board. 2. LCD assembly.
Two short beeps with error codes	POST error. See "Numeric error codes" on page 24.
Two short beeps with blank screen	<ol style="list-style-type: none"> 1. System board.

No beep symptoms

Symptom or error	FRU or action, in sequence
No beep, power-on indicator on, LCD blank, and no POST	<ol style="list-style-type: none"> 1. Ensure that every connector is connected tightly and correctly. 2. DIMM. 3. System board.
No beep, power-on indicator on, and LCD blank during POST	<ol style="list-style-type: none"> 1. Reseat DIMM. 2. System board.
No beep, during POST but system runs correctly	<ol style="list-style-type: none"> 1. Speaker.

LCD-related symptoms

Important

The TFT LCD for the notebook computer contains many thin-film transistors (TFTs). A small number of dots that are missing, discolored, or always lighted is characteristic of TFT LCD technology, but excessive pixel problems can cause viewing concerns. The LCD should be replaced if the number of missing, discolored, or lighted dots in any background is:

- **SVGA (12.1 in.):** 5 or more bright dots, 5 or more dark dots or a total of 9 or more bright and dark dots.
- **XGA (13.3 in.):** 8 or more bright dots, 8 or more dark dots or a total of 9 or more bright and dark dots.

Symptom-to-FRU index

Symptom or error	FRU or action, in sequence
No beep, power-on indicator on, and a blank LCD during POST	1. System board.
<ul style="list-style-type: none">• LCD backlight not working• LCD too dark• LCD brightness cannot be adjusted• LCD contrast cannot be adjusted	1. Reseat the LCD connectors.. 2. LCD assembly. 3. System board.
<ul style="list-style-type: none">• LCD screen unreadable• Characters missing pixels• Screen abnormal• Wrong color displayed	1. See important note for "LCD-related symptoms." 2. Reseat all LCD connectors. 3. LCD assembly. 4. System board.
LCD has extra horizontal or vertical lines displayed	1. LCD assembly.

Intermittent problems

Intermittent system hang problems can be due to a variety of causes that have nothing to do with a hardware defect, such as: cosmic radiation, electrostatic discharge, or software errors. FRU replacement should be considered only when a recurring problem exists.

When analyzing an intermittent problem, do the following:

1. Run the diagnostic test for the system board in loop mode **at least 10 times**.
2. If no error is detected, do **not** replace any FRUs.
3. If any error is detected, replace the FRU shown by the FRU code. Rerun the test to verify that no more errors exist.

Undetermined problems

You are here because the diagnostic tests did not identify which adapter or device failed, installed devices are incorrect, a short circuit is suspected, or the system is inoperative. Follow these procedures to isolate the failing FRU (do not isolate nondefective FRUs).

Verify that all attached devices are supported by the computer.

Verify that the power supply being used at the time of the failure is operating correctly. (See "Power system checkout" on page 10.)

1. Power off the computer.
2. Visually check each FRU for damage. Replace any damaged FRU.
3. Remove or disconnect all of the following devices:

Symptom-to-FRU index

- a. Non-IBM devices
 - b. Devices attached to the port replicator
 - c. Printer, mouse, and other external devices
 - d. Battery pack
 - e. Hard disk drive
 - f. External diskette drive
 - g. DIMM
 - h. CD-ROM and diskette drive in the UltralimBay
 - i. PC Cards
4. Power on the computer.
 5. Determine whether the problem has changed.
 6. If the problem does not recur, reconnect the removed devices one at a time until you find the failing FRU.
 7. If the problem remains, replace the following FRUs one at a time (do not replace a nondefective FRU):
 - a. System board
 - b. LCD assembly

FRU replacement notices

This section contains notices for removal and replacement. Read this section carefully before replacing any FRU.

Screw notices

Loose screws can cause a reliability problem. The an IBM ThinkPad computer address this problem with special nylon-coated screws that have the following characteristics:

- They maintain tight connections.
- They do not easily come loose, even with shock or vibration.
- They need additional force to tighten.
- They should be used only once.

Do the following when you service this machine:

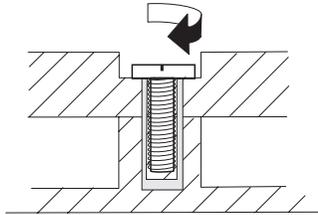
- Keep the screw kit (P/N 05K4841) in your tool bag.
- Always use new screws.
- Use a torque screwdriver if you have one.

Tighten screws as follows:

- **Plastic to plastic**

Turn an additional **90 degrees** after the screw head touches the surface of the plastic part:

90 degrees more

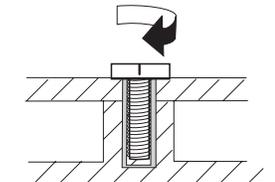


(Cross section)

- **Logic card to plastic**

Turn an additional **180 degrees** after the screw head touches the surface of the logic card:

180 degrees more



(Cross section)

- **Torque driver**

If you have a torque driver, refer to the "Torque" column with each step.

- Make sure you use the correct screw. If you have a torque screwdriver, tighten all screws firmly to the torque shown in the table. **Never use a screw that**

FRU replacement notices

you removed. Use a new one. Make sure the screws are tightened firmly

Retaining serial numbers

This section includes the following descriptions:

- “Restoring the serial number of the system unit”
- “Retaining the UUID”

Restoring the serial number of the system

unit: When the computer was manufactured, the EEPROM on the system board was loaded with the serial numbers of the system and all major components. The numbers need to remain the same throughout the life of the computer.

When you replace the system board, you must restore the system unit serial number to its original value.

Before replacing the system board, save the original serial number by doing the following:

1. Install the ThinkPad Hardware Maintenance Diskette Version 1.60 and restart the computer.
2. From the main menu, select **1. Set System Identification**.
3. Select **2. Read S/N data from EEPROM**.

The serial number for each device is displayed. Write down the serial number of the system unit, designated as follows:

20: System unit serial number

After you have replaced the system board, restore the serial number by doing the following:

1. Install the ThinkPad Hardware Maintenance Diskette Version 1.60 and restart the computer.
2. From the main menu, select **1. Set System Identification**.
3. Select **1. Add S/N data from EEPROM**.

Follow the instructions on the screen.

Note: The serial number of the system unit is written on the label attached on the bottom of the computer.

Retaining the UUID: The Universally Unique Identifier (UUID) is a 128-bit number uniquely assigned to your computer at production and stored in the EEPROM of your system board. The algorithm that generates the unique number is designed to provide unique IDs until the year A.D. 3400. No two computers in the world have the same number.

When you replace the system board, you must set the UUID on the new system board as follows:

FRU replacement notices

1. Install the ThinkPad Hardware Maintenance Diskette Version 1.60, and restart the computer.
2. Select **4. Assign UUID** from the main menu.
A new UUID is created and written. If a valid UUID already exists, it is not overwritten.

Removing and replacing a FRU

This section presents information and drawings for use in removing and replacing a FRU. Be sure to observe the following general rules:

1. Do not try to service the computer unless you have been trained and certified. An untrained person runs the risk of damaging parts.
2. Before replacing any FRU, review "FRU replacement notices" on page 30.
3. Begin by removing any FRUs that have to be removed before the failing FRU. Any such FRUs are listed at the top of the page. Remove them in the orders in which they are listed.
4. Follow the correct sequence in the steps for removing the FRU, as indicated in the drawings by the numbers in square callouts.
5. When turning a screw to replace a FRU, turn it in the direction indicated by the arrow in the drawing.
6. When removing the FRU, move it in the direction indicated by the arrow in the drawing.
7. To put the new FRU in place, reverse the removal procedure and follow any notes that pertain to replacement. For information about connecting and arranging internal cables, see "Locations" on page 75.
8. When replacing a FRU, use the correct screw as shown in the procedures.

CAUTION:

Before removing any FRU, power off the computer, unplug all power cords from electrical outlets, remove the battery pack, and then disconnect any interconnecting cables.

CAUTION:

Do not disassemble it, throw it into fire or water, or short-circuit it. Dispose of the battery pack as required by local ordinances or regulations.

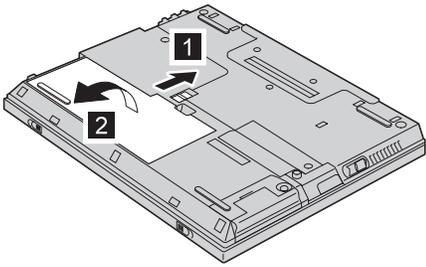
Attention: Before the computer is powered on after FRU replacement, make sure all screws, springs, and other small parts are in place and are not loose inside the computer. Verify this by shaking the computer gently and listening for rattling sounds. Metallic parts or metal flakes can cause electrical short circuits.

Attention: The system board is sensitive to, and can be damaged by, electrostatic discharge. Establish personal grounding by touching a ground point with one hand before touching these units.

You must use an electrostatic discharge (ESD) strap (P/N 6405959) must be used to establish personal grounding.

Removing and replacing a FRU

1010 Battery pack

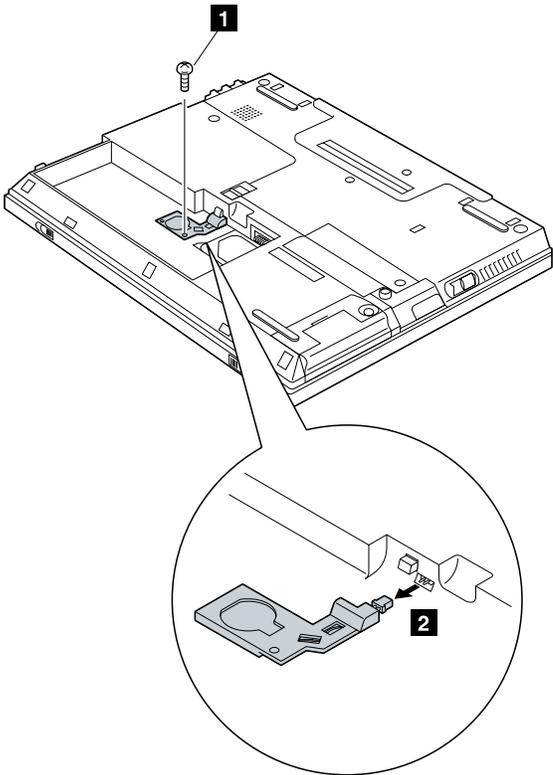


1020 Backup battery

CAUTION:

The backup battery is a lithium battery and can cause a fire, an explosion, or severe burns. Do not recharge it, remove its polarized connector, disassemble it, heat it above 100°C (212°F), incinerate it, or expose its cell contents to water. Dispose of the battery as required by local ordinances or regulations. The use of an incorrect battery can result in ignition or explosion of the battery.

- Battery pack (1010)

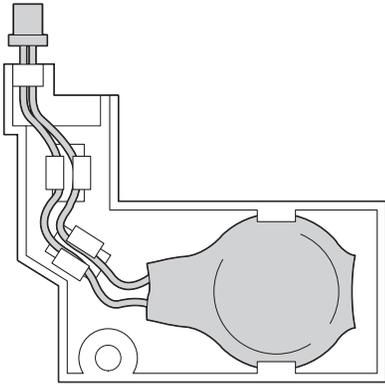


Step	Screw (quantity)	Torque
1	M2.5 x 3 mm (1)	4 kgcm

(continued)

Removing and replacing a FRU

Cable route:

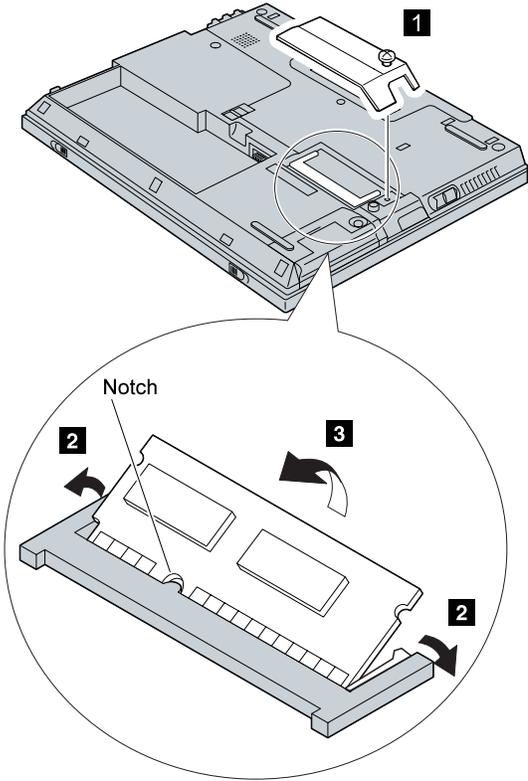


Removing and replacing a FRU

1030 DIMM

- Battery pack (1010)

Note: The ThinkPad 570E computer's DIMM slot faces in the direction opposite that shown here. However, the procedure for removing DIMM is the same.



Step	Screw (quantity)	Torque
1	Not removable	4 kgcm

1040 Hard disk drive

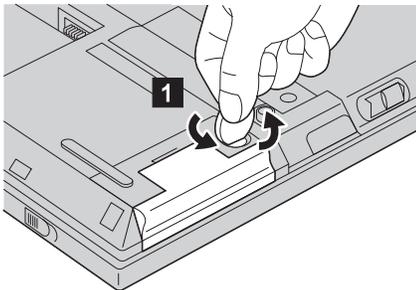
Attention

Do not drop or apply any shock to the hard disk drive. The hard disk drive is sensitive to physical shock. Incorrect handling can cause damage and permanent loss of data.

Before removing the drive, have the user make a backup copy of all the information on the drive if possible.

Never remove the drive while the system is operating or in suspend mode.

- Battery pack (1010)

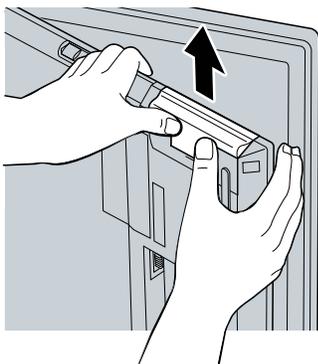


- 1** Coin screw or security screw

Note: Use a 2.5-mm allen wrench to remove the security screw. (continued)

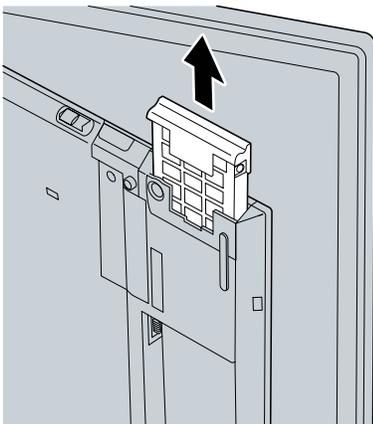
Removing and replacing a FRU

When removing the hard disk drive, open the LCD a little as shown in the figure.



Attention

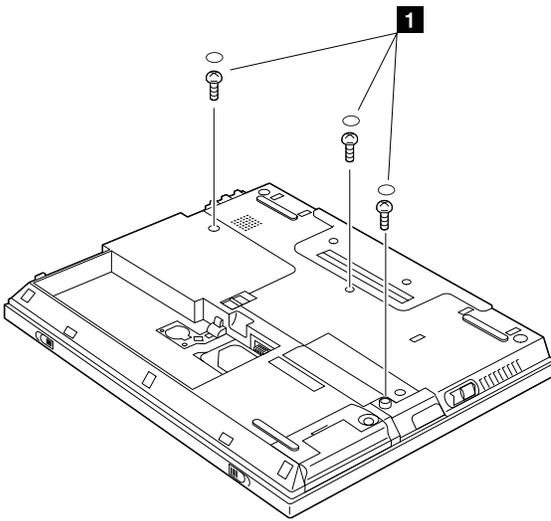
Be careful not to drop the hard disk drive. It is still attached to the cover when you push it up.



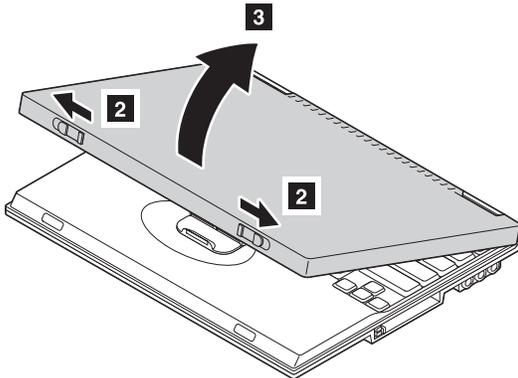
Removing and replacing a FRU

1050 Keyboard

- Battery pack (1010)
- Hard disk drive (1040)



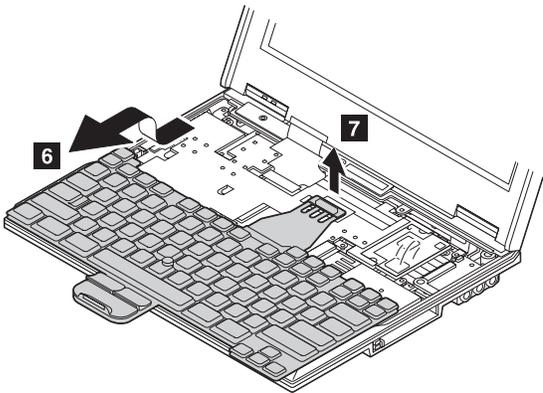
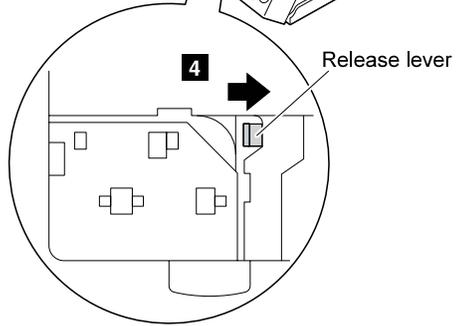
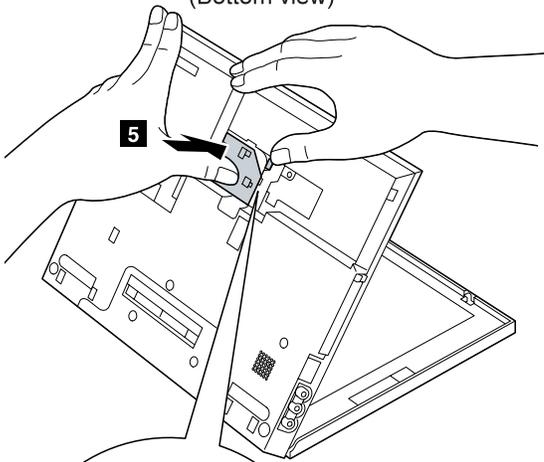
Step	Screw (quantity)	Torque
1	M2.5 x 9 mm (3)	4 kgcm



(continued)

Removing and replacing a FRU

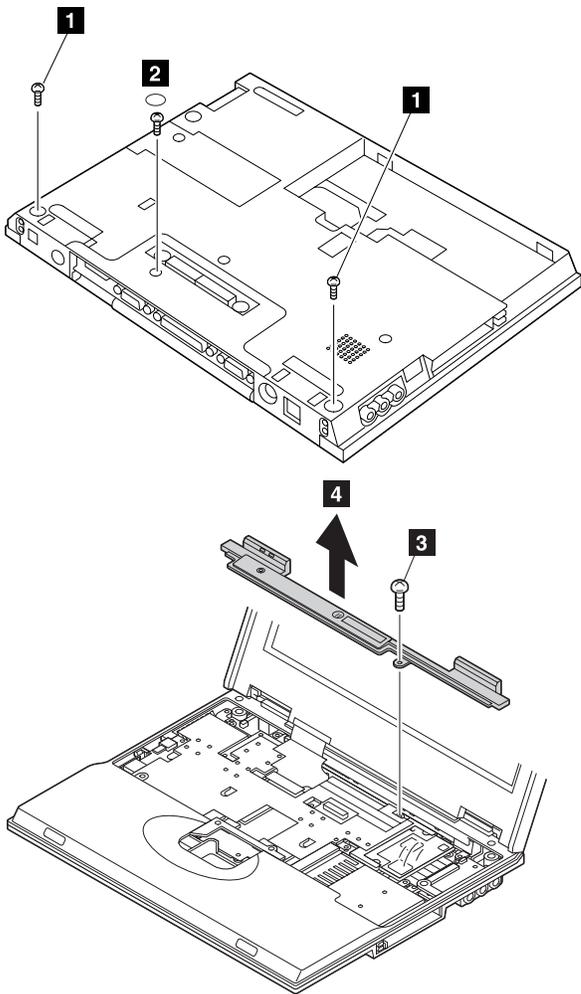
(Bottom view)



Removing and replacing a FRU

1060 Center cover

- Battery pack (1010)
- Hard disk drive (1040)
- Keyboard (1050)

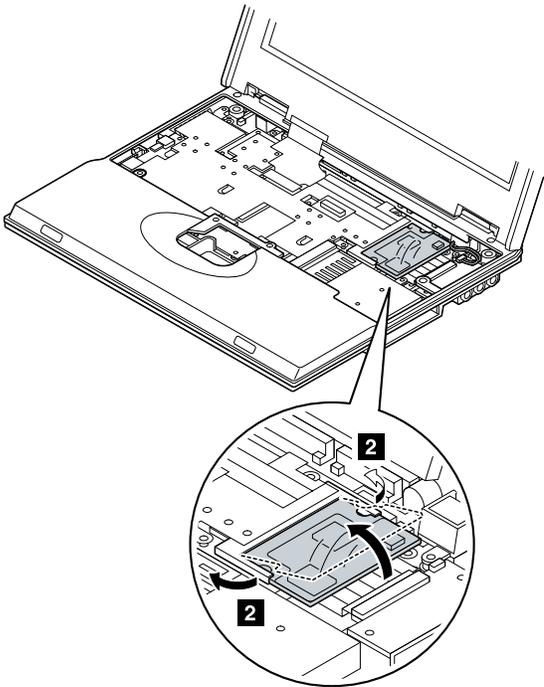
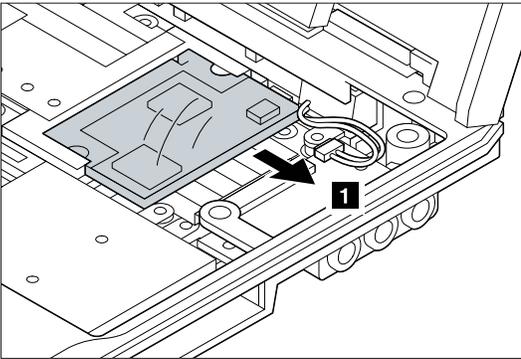


Step	Screw (quantity)	Torque
1	M2.5 x 3 mm (2)	4 kgcm
2	M2.5 x 9 mm (1)	4 kgcm
3	M2.5 x 9 mm (1)	4 kgcm

Removing and replacing a FRU

1070 Modem card

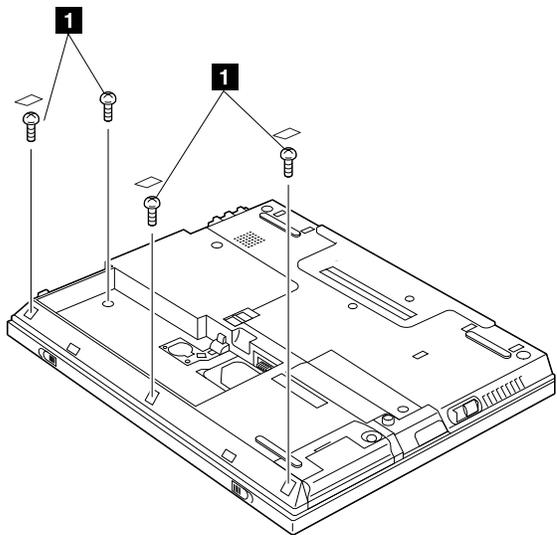
- Battery pack (1010)
- Hard disk drive (1040)
- Keyboard (1050)
- Center cover (1060)



Removing and replacing a FRU

1080 Frame and power switch

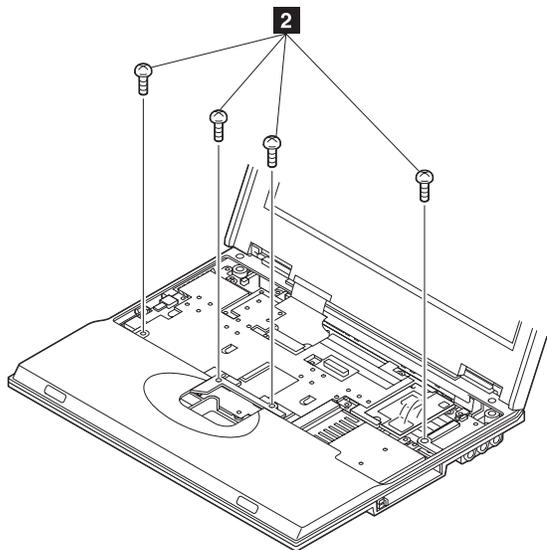
- Battery pack (1010)
- Hard disk drive (1040)
- Keyboard (1050)
- Center cover (1060)



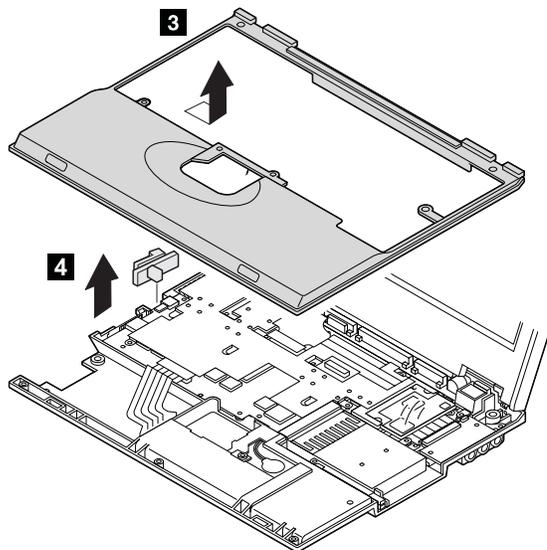
Step	Screw (quantity)	Torque
1	M2.5 x 3 mm (4)	4 kgcm

(continued)

Removing and replacing a FRU



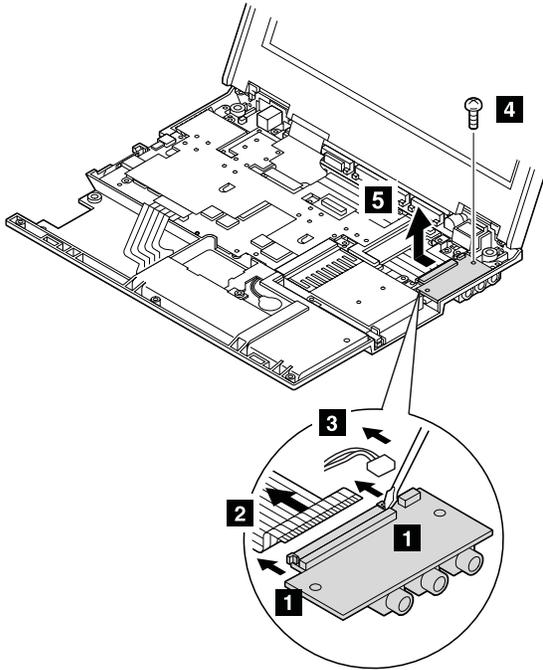
Step	Screw (quantity)	Torque
2	M2.5 x 4.8 mm (4)	4 kgcm



Removing and replacing a FRU

1090 Audio card

- Battery pack (1010)
- Hard disk drive (1040)
- Keyboard (1050)
- Center cover (1060)
- Modem card (1070)
- Frame and power switch (1080)

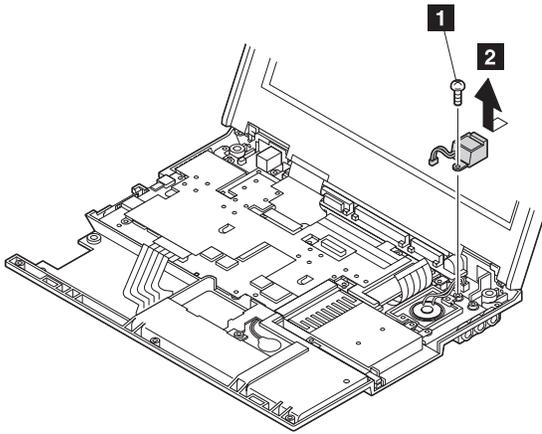


Step	Screw (quantity)	Torque
4	M2.5 x 4.8 mm (1)	4 kgcm

Removing and replacing a FRU

1100 Modem jack

- Battery pack (1010)
- Hard disk drive (1040)
- Keyboard (1050)
- Center cover (1060)
- Modem card (1070)
- Frame and power switch (1080)
- Audio card (1090)



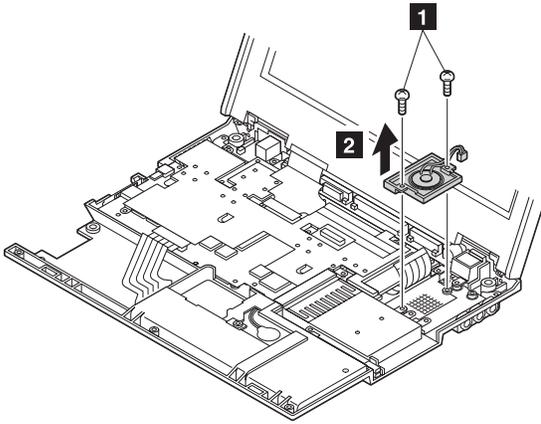
Step	Screw (quantity)	Torque
1	M2.5 x 4.8 mm (1)	4 kgcm

Removing and replacing a FRU

1110 Speaker

- Battery pack (1010)
- Hard disk drive (1040)
- Keyboard (1050)
- Center cover (1060)
- Modem card (1070)
- Frame and power switch (1080)
- Audio card (1090)

For the ThinkPad 570 computer

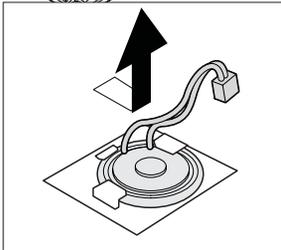
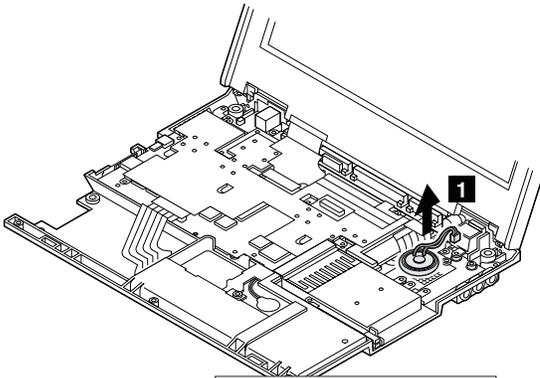


Step	Screw (quantity)	Torque
1	M2.5 x 4.8 mm (2)	4 kgcm

(continued)

Removing and replacing a FRU

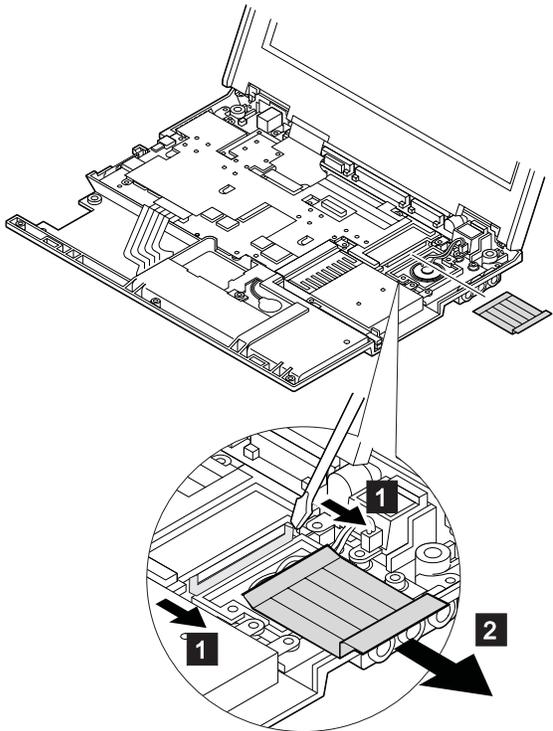
For the ThinkPad 570E computer



Removing and replacing a FRU

1120 Audio cable

- Battery pack (1010)
- Hard disk drive (1040)
- Keyboard (1050)
- Center cover (1060)
- Modem card (1070)
- Frame and power switch (1080)
- Audio card (1090)

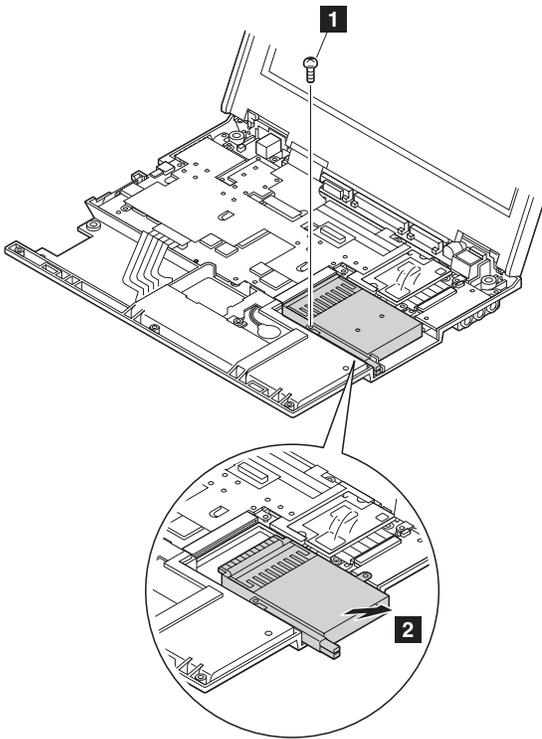


When replacing: Make sure you install the cable in the correct direction. Installing it the wrong direction will cause audio problems.

Removing and replacing a FRU

1130 PC Card slots

- Battery pack (1010)
- Hard disk drive (1040)
- Keyboard (1050)
- Center cover (1060)
- Frame and power switch (1080)



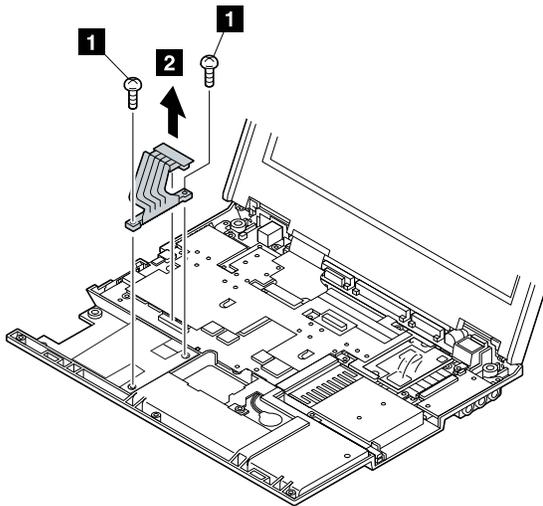
Step	Screw (quantity)	Torque
1	M2.5 x 4.8 mm (1)	4 kgcm

Removing and replacing a FRU

1140 Hard disk drive cable

- Battery pack (1010)
- Hard disk drive (1040)
- Keyboard (1050)
- Center cover (1060)
- Frame and power switch (1080)

For the ThinkPad 570 computer

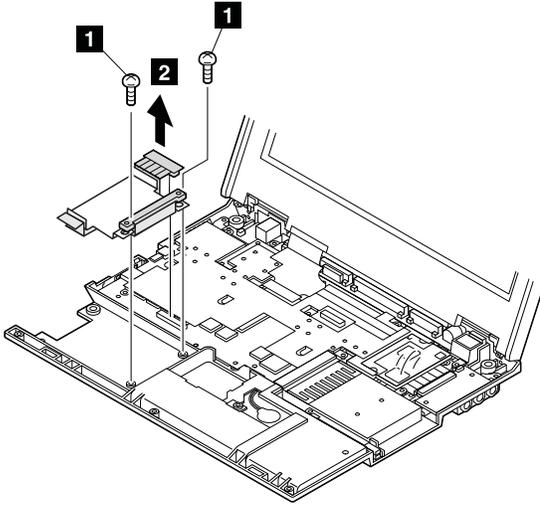


Step	Screw (quantity)	Torque
1	M2.5 x 4.8 mm (2)	4 kgcm

(continued)

Removing and replacing a FRU

For the ThinkPad 570E computer



Step	Screw (quantity)	Torque
1	M2.5 x 4.8 mm (2)	4 kgcm

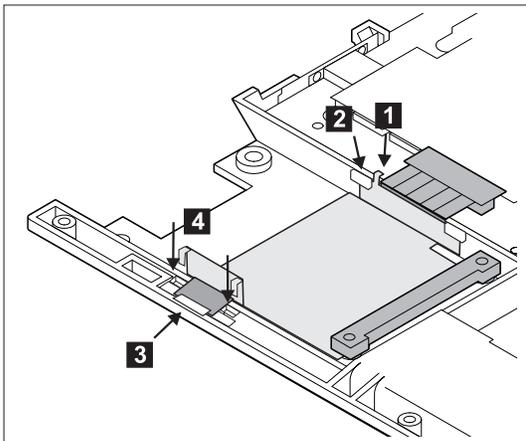
(continued)

Removing and replacing a FRU

When replacing: If the cable and cable shield are not installed correctly, they might be in the way when you install the hard disk drive.

To install them correctly, do as follows:

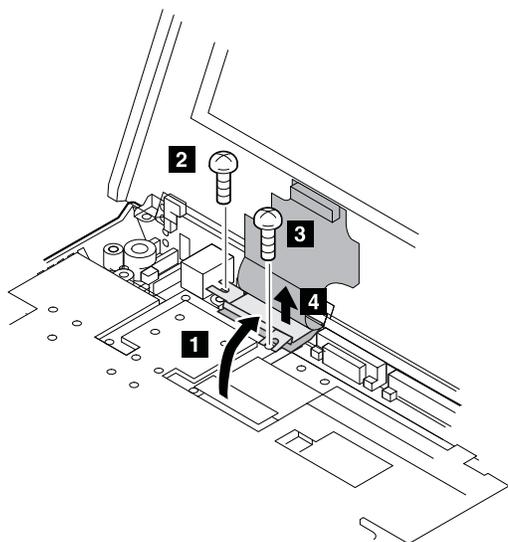
1. Insert the tab of the cable **1** and catch the cable shield by the base cover latches **2**.
2. Catch the cable by the base cover latch **3**.
3. Insert the tabs of the cable shield **4** into the holes of the base cover.



Removing and replacing a FRU

1150 Upper shield

- Battery pack (1010)
- Hard disk drive (1040)
- Keyboard (1050)
- Center cover (1060)
- Frame and power switch (1080)

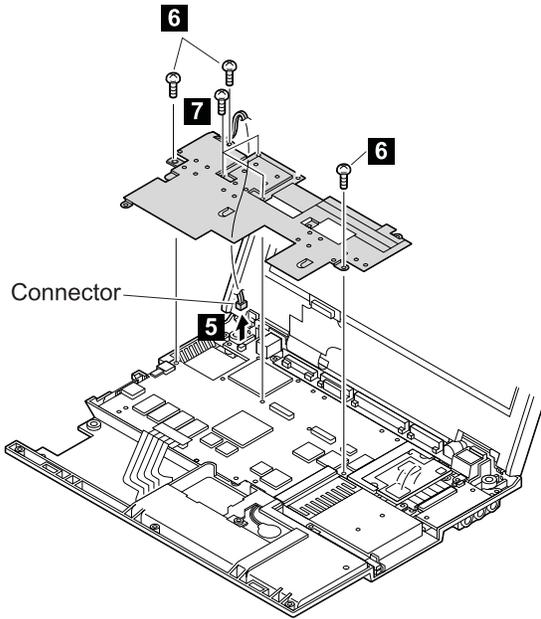


Step	Screw (quantity)	Torque
2	M2.5 x 4.8 mm (3)	4 kgcm
3	M2 x 9 mm (4)	2 kgcm

(continued)

Removing and replacing a FRU

For the ThinkPad 570 computer

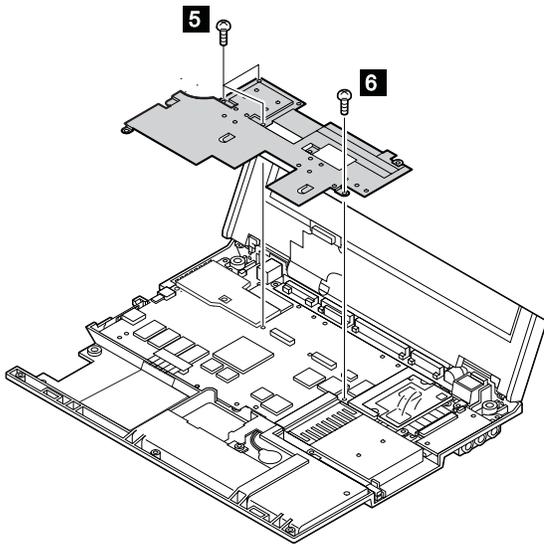


Step	Screw (quantity)	Torque
6	M2.5 x 4.8 mm (3)	4 kgcm
7	M2 x 9 mm (3)	Yellow
2 kgcm		

(continued)

Removing and replacing a FRU

For the ThinkPad 570E computer



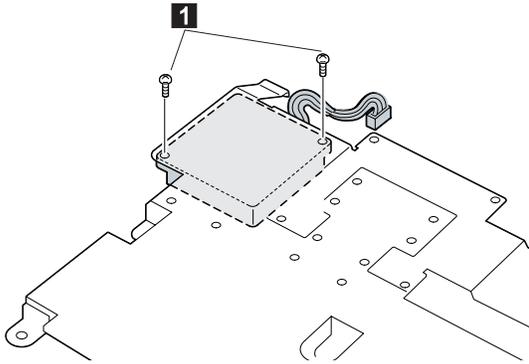
Step	Screw (quantity)	Torque
5	M2 x 9 mm (3)	4 kgcm
6	M2.5 x 4.8 mm (1)	4 kgcm

Removing and replacing a FRU

1160 Fan

- Battery pack (1010)
- Hard disk drive (1040)
- Keyboard (1050)
- Center cover (1060)
- Frame and power switch (1080)
- Upper shield (1150)

For the ThinkPad 570 computer

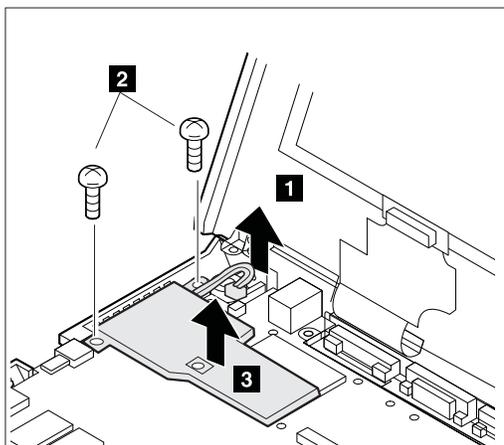


Note: Do not pinch the fan cable when re-installing the fan.

Step	Screw (quantity)	Torque
1	M2 x 9 mm (2)	2 kgcm

Removing and replacing a FRU

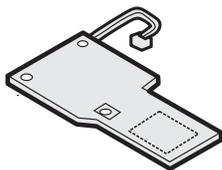
For the ThinkPad 570E computer



Step	Screw (quantity)	Torque
1	M2.5 x 4.8 mm (2)	2 kgcm

When replacing:

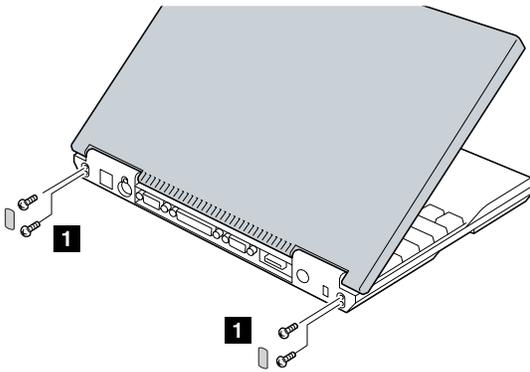
1. Make sure not to pinch the fan cable when re-installing the fan.
2. Apply grease to the underside of the surface shown in the dotted square in the following figure:



Removing and replacing a FRU

1170 LCD unit

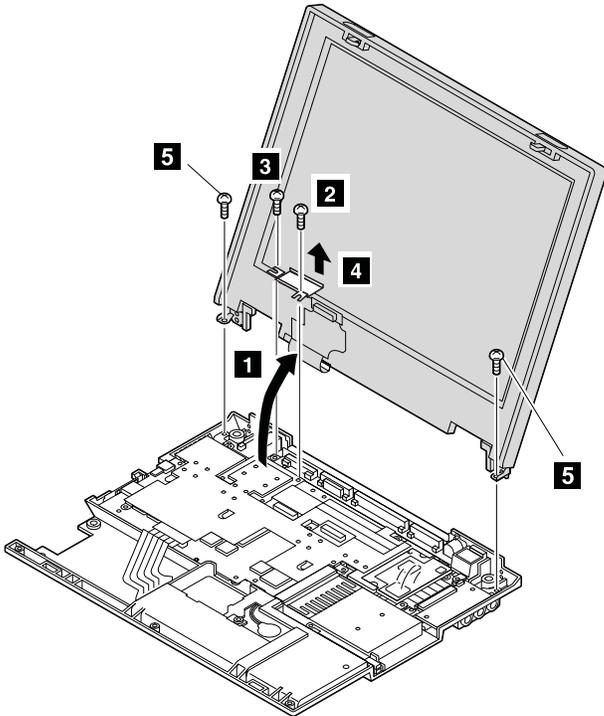
- Battery pack (1010)
- Hard disk drive (1040)
- Keyboard (1050)
- Center cover (1060)
- Frame and power switch (1080)



Step	Screw (quantity)	Torque
1	M2.5 x 4.8 mm (4)	4 kgcm

(continued)

Removing and replacing a FRU

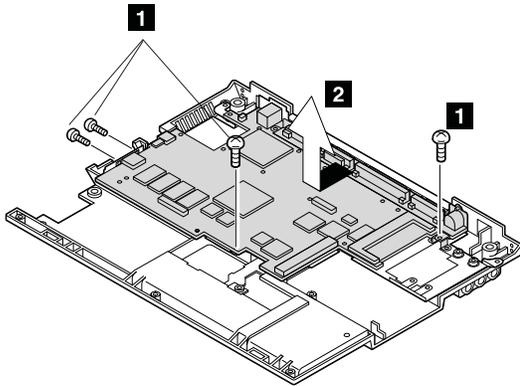


Step	Screw (quantity)	Torque
2	M2 x 9 mm (1)	4 kgcm
3	M2.5 x 4.8 mm (1)	4 kgcm
5	M2.5 x 4.8 mm (2)	4 kgcm

Removing and replacing a FRU

1180 System board assembly

- Battery pack (1010)
- Backup battery (1020)
- DIMM (1030)
- Hard disk drive (1040)
- Keyboard (1050)
- Center cover (1060)
- Modem card (1070)
- Frame and power switch (1080)
- Audio card (1090)
- Modem jack (1100)
- Speaker (1110)
- Audio cable (1120)
- PC Card slots (1130)
- Hard disk drive cable (1140)
- Upper shield (1150)
- LCD unit (1170)

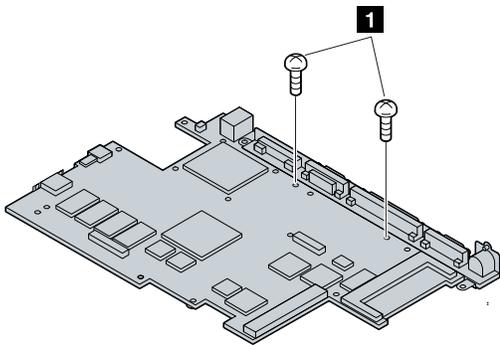


Step	Screw (quantity)	Torque
1	M2.5 x 4.8 mm (4)	4 kgcm

Removing and replacing a FRU

1190 I/O Connector cable or system board

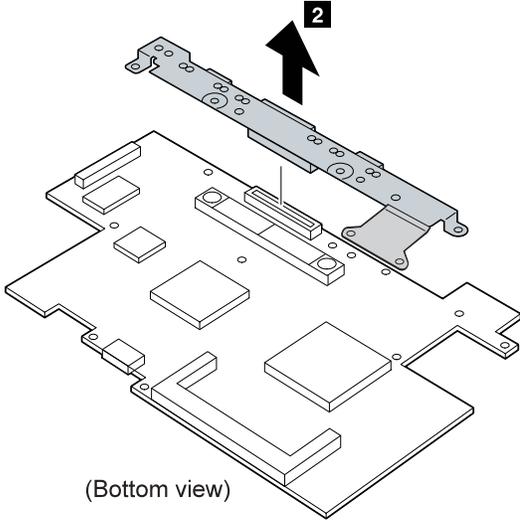
- Battery pack (1010)
- Backup battery (1020)
- DIMM (1030)
- Hard disk drive (1040)
- Keyboard (1050)
- Center cover (1060)
- Modem card (1070)
- Frame and power switch (1080)
- Audio card (1090)
- Modem jack (1100)
- Speaker (1110)
- Audio cable (1120)
- PC Card slots (1130)
- Hard disk drive cable (1140)
- Upper shield (1150)
- LCD unit (1170)



Step	Screw (quantity)	Torque
1	M2.5 x 4.8 mm (2)	4 kgcm

(continued)

Removing and replacing a FRU



Removing and replacing a FRU

2010 LCD front bezel

- Battery pack (1010)
- Hard disk drive (1040)
- Keyboard (1050)
- Center cover (1060)
- Frame and power switch (1080)
- LCD unit (1170)

CAUTION:

The inverter card has a high tension current. To avoid shock hazard, never power on the computer when the LCD cover is opened.

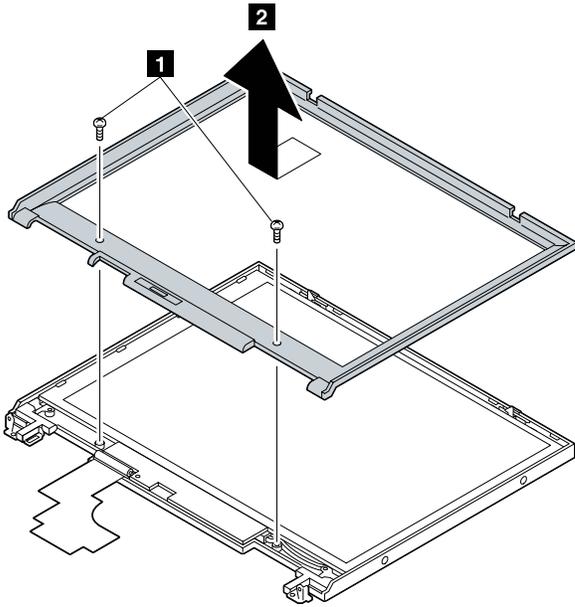
The TFT LCD for the notebook computer contains many thin-film transistors (TFTs). A small number of dots that are missing, discolored, or always lighted is characteristic of TFT LCD technology, but excessive pixel problems can cause viewing concerns. The LCD should be replaced if the number of missing, discolored, or lighted dots in any background is:

- **SVGA (12.1 in.):** 5 or more bright dots, 5 or more dark dots or a total of 9 or more bright and dark dots.
- **XGA (13.3 in.):** 8 or more bright dots, 8 or more dark dots or a total of 9 or more bright and dark dots.

(continued)

Removing and replacing a FRU

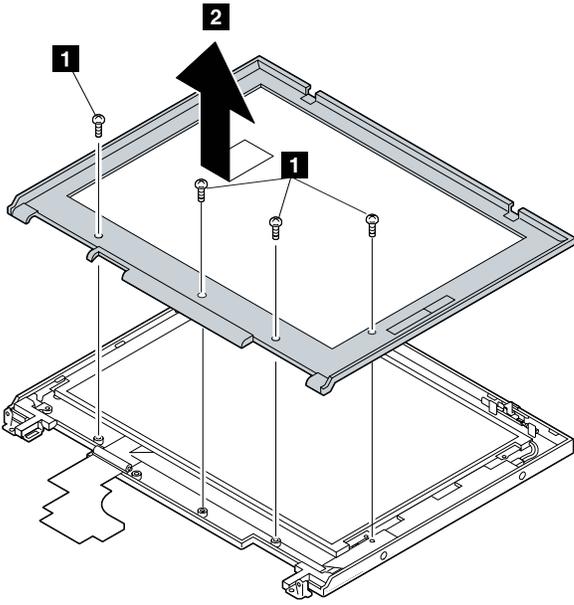
13.1-inch XGA TFT LCD



Step	Screw (quantity)	Torque
1	M2.5 x 3 mm (2)	4 kgcm

Removing and replacing a FRU

12.1-inch SVGA TFT LCD



Step	Screw (quantity)	Torque
1	M2.5 x 3 mm (4)	4 kgcm

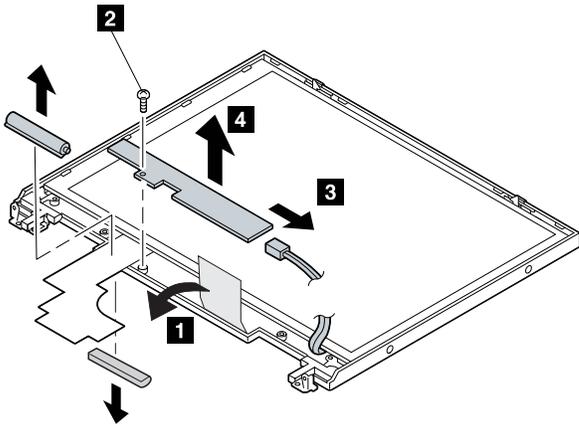
Removing and replacing a FRU

2020 Inverter card

- Battery pack (1010)
- Hard disk drive (1040)
- Keyboard (1050)
- Center cover (1060)
- Frame and power switch (1080)
- LCD unit (1170)
- LCD front bezel (2010)

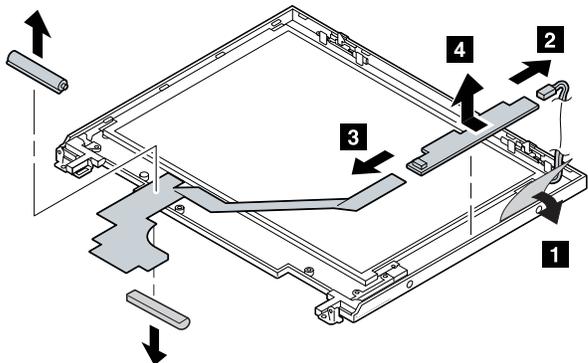
Note: Be careful of high voltage on the cable. Connect the LCD connector firmly to the inverter card by lifting it up straight.

13.3-Inch XGA TFT LCD



Step	Screw (quantity)	Torque
1	M2.5 x 3 mm (1)	4 kgcm

12.1-inch SVGA TFT LCD

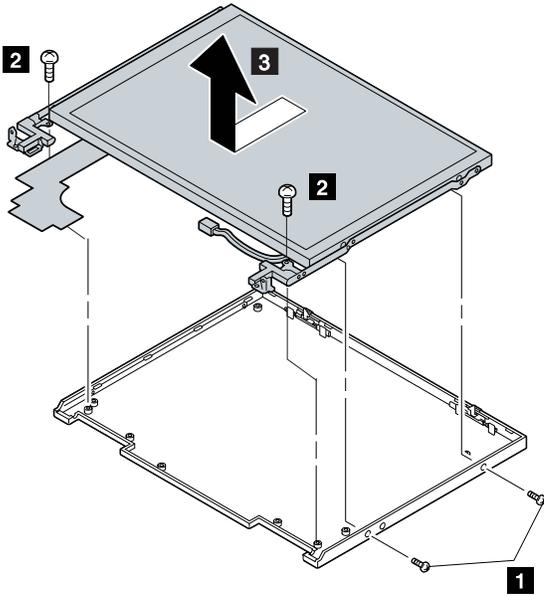


Removing and replacing a FRU

2030 LCD panel

- Battery pack (1010)
- Hard disk drive (1040)
- Center cover (1060)
- LCD unit (1170)
- LCD front bezel (2010)
- Inverter card (2020)

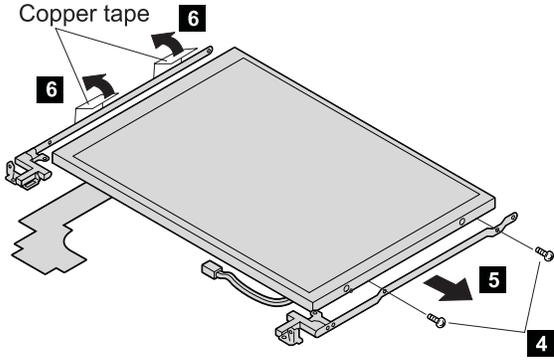
13.3-inch XGA TFT LCD



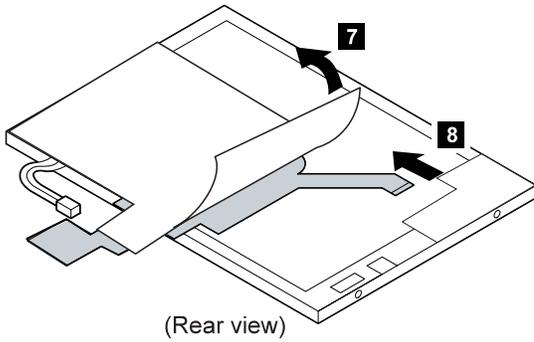
Step	Screw (quantity)	Torque
1	M2.5 x 3 mm (2)	4 kgcm
2	M2.5 x 3 mm (2)	4 kgcm

(continued)

Removing and replacing a FRU

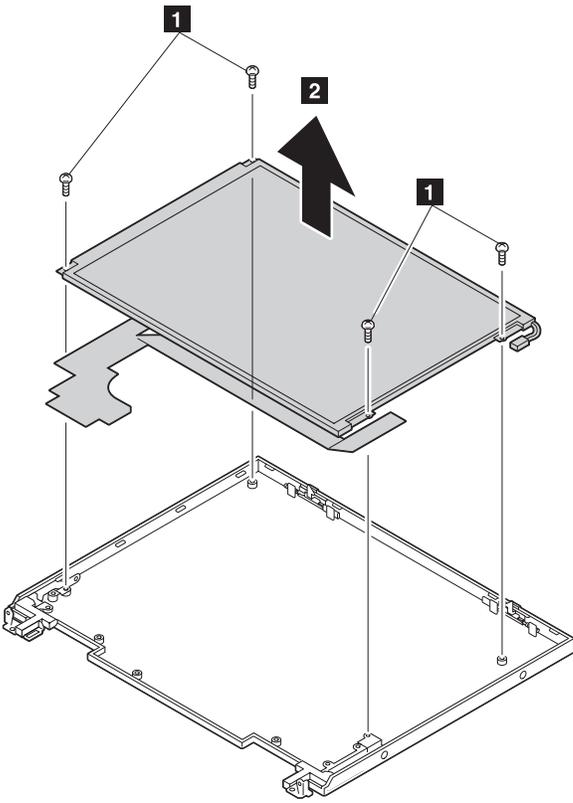


Step	Screw (quantity)	Torque	Note
4	M2.5 x 3 mm (2)	4 kgcm	Blue, Small head

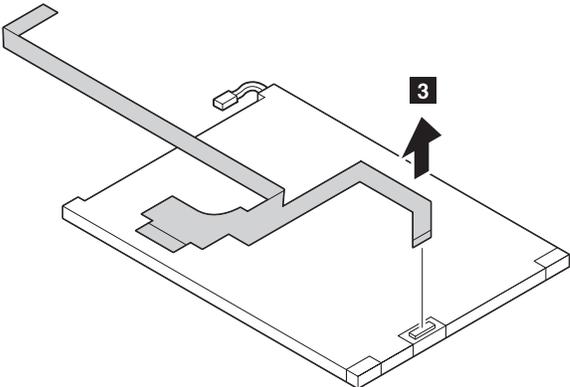


Removing and replacing a FRU

12.1-inch SVGA TFT LCD



Step	Screw (quantity)	Torque
1	M2.5 x 3 mm (4)	4 kgcm



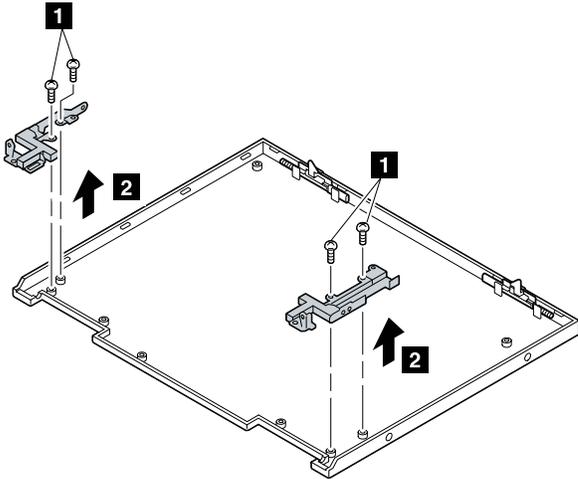
Removing and replacing a FRU

2040 Hinges

- Battery pack (1010)
- Hard disk drive (1040)
- Keyboard (1050)
- Center cover (1060)
- Frame and power switch (1080)
- LCD unit (1170)
- LCD front bezel (2010)
- Inverter card (2020)
- LCD panel (2030)

13.3-inch XGA TFT LCD: See “2030 LCD panel” on page 69.

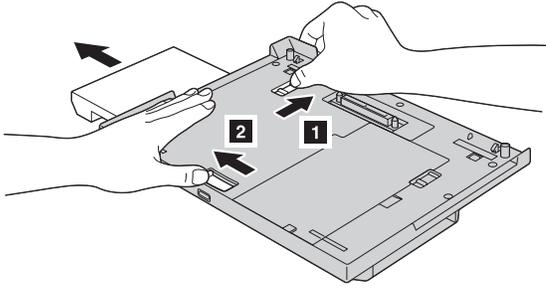
12.1-inch SVGA TFT LCD



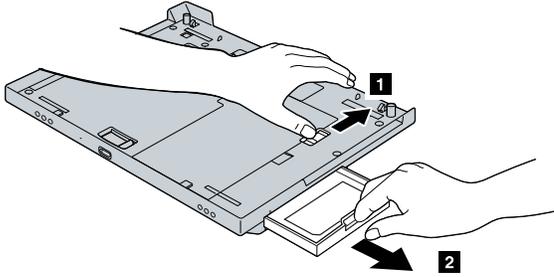
Step	Screw (quantity)	Torque
1	M2.5 x 3 mm (4)	4 kgcm

Removing and replacing a FRU

**3010 Blank bezel in the UltraBase
In the UltraslimBay**

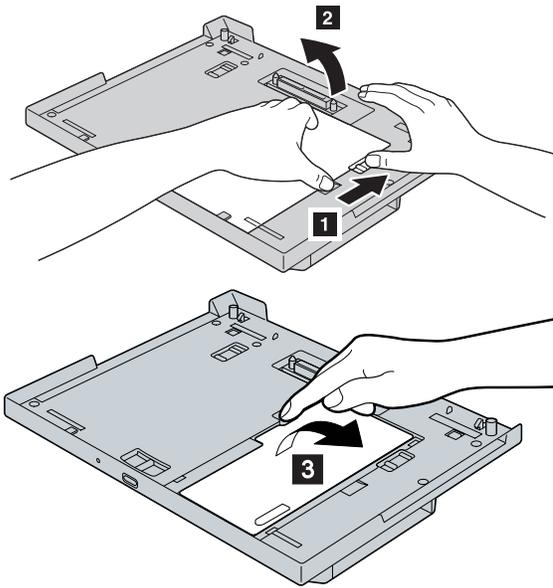


In the diskette-drive/battery bay



Removing and replacing a FRU

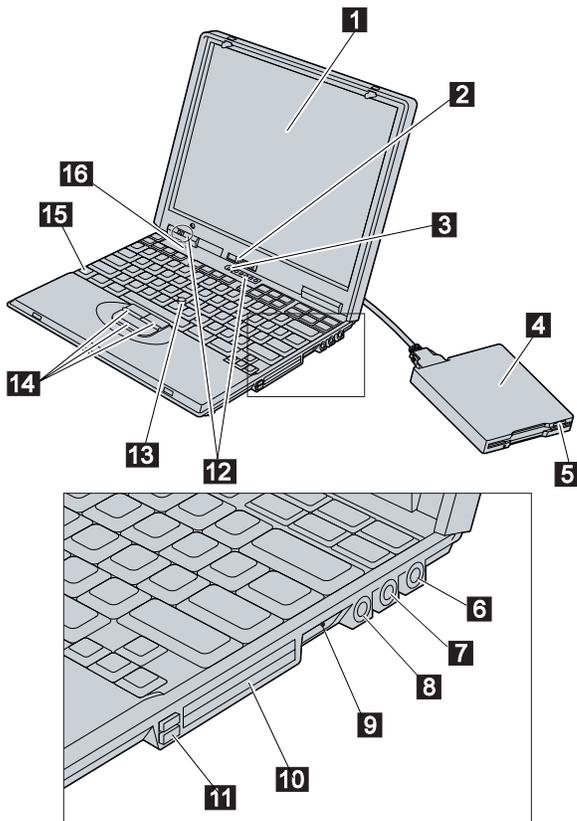
Battery pack in the UltraBase



Locations

Front view

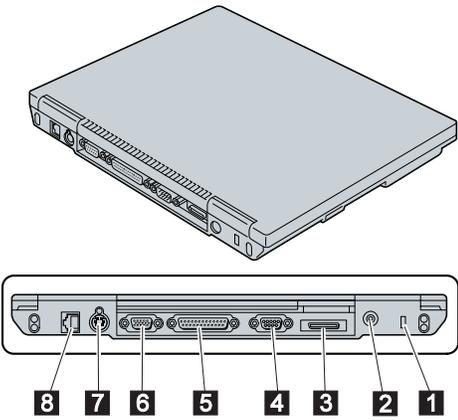
- 1** LCD panel
- 2** Brightness control
- 3** Built-in microphone
- 4** External diskette drive
- 5** Diskette eject button
- 6** Headphone jack
- 7** Line-In jack
- 8** Microphone jack
- 9** Reset switch
- 10** PC Card slots
- 11** PC Card eject button
- 12** Status indicator
- 13** TrackPoint
- 14** Click buttons
- 15** Fn Key
- 16** Suspend switch



Locations

Rear view

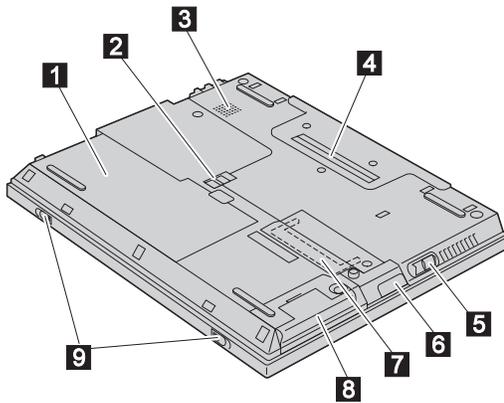
- 1** Security keyhole
- 2** AC Adapter jack
- 3** External-diskette-drive connector
- 4** Serial connector
- 5** Parallel connector
- 6** External-monitor connector
- 7** External-input-device connector
- 8** Modem connector



Locations

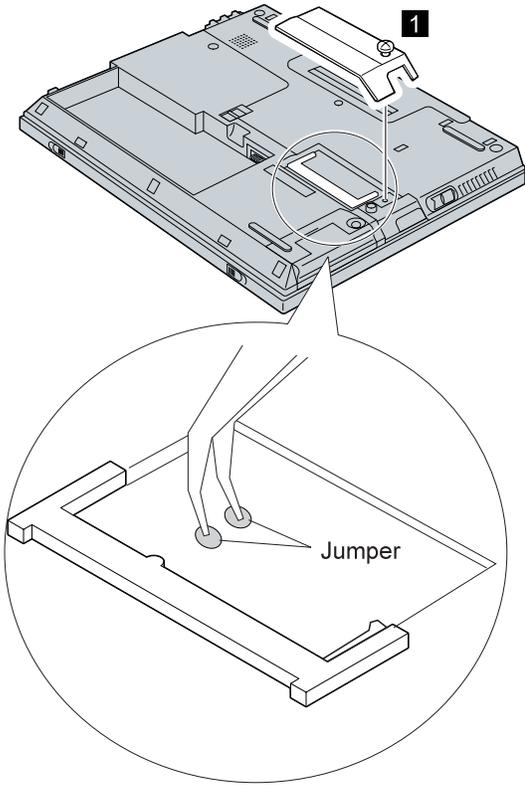
Bottom view

- 1** Battery pack
- 2** Battery release switch
- 3** Built-in speaker
- 4** Expansion connector
- 5** Power switch
- 6** USB port
- 7** Memory slot
- 8** Hard disk drive
- 9** LCD latches

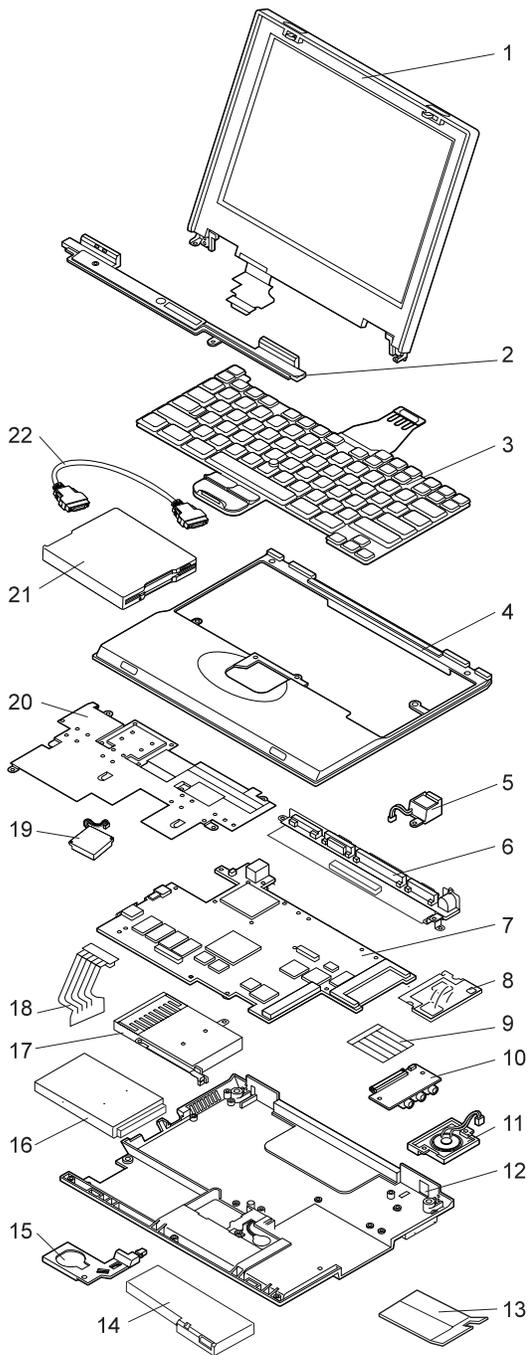


Locations

Password pads



Parts List



Parts list

The parts marked with asterisk are CRU (customer replacement unit).

No.	FRU	P/N
1	LCD unit (see "LCD FRU" on page 83.)	
2	Center cover, for 12.1-inch	05K6081
	Center cover (570), for 13.3-inch	05K6082
	Center cover (570E), for 13.3-inch	05K6096
3	Keyboard (see "Keyboard" on page 86)	
4	Keyboard bezel (570)	08K5981
	Keyboard bezel (570E)	05K4759
5	Modem jack (RJ11)	05K2834
	Holder, modem jack	05K6063
6	I/O connector cable (570)	27L0529
	I/O connector cable (570E)	05K4877
7	System board, Pentium II 300 MHz	10L1243
	System board, Pentium II 333 MHz	10L1299
	System board, Pentium II 366 MHz	10L1244
	System board, Celeron 366 MHz	10L1379
	System board, Celeron 400 MHz	08K3420
	System board, 450 MHz (570E)	10L1429
	System board, 500 MHz (570E)	10L1376
8	Modem card	08K3412
9	Cable, audio card	05K2833
10	Audio card	10L1245
11	Speaker (570)	02K4870
	Speaker (570E)	02K4937
12	For 570, MT 2643	
	Base cover	08K5687
	Base cover, for Korea	08K5688
	Base cover, for China	08K5689
	Base cover, for Taiwan	08K5690
	For 570, MT 2644	
	Base cover	05K6061
	Base cover, for Korea	10L1906
	Base cover, for China	10L1907
	Base cover, for Taiwan	10L1908

(continued)

Parts list

No.	FRU	P/N
	For 570E, MT 2643	
	Base cover	08K5683
	Base cover, for Korea	08K5684
	Base cover, for China	08K5685
	Base cover, for Taiwan	08K5686
	For 570E, MT 2644	
	Base cover	05K6286
	Base cover, for Korea	05K6287
	Base cover, for China	05K6288
	Base cover, for Taiwan	05K6289
13	DIMM cover*	05K6071
14	Battery pack*, Panasonic	02K6638
	Battery pack*, SANYO	02K6639
15	Backup battery*	02K6572
	Holder, backup battery (see system misc. parts)	
16	Hard disk drive* (4.0 GB)	22L0018
	Hard disk drive* (6.0 GB)	22L0055
	Hard disk drive* (6.4 GB)	22L0019
	Hard disk drive* (10.0 GB)	22L0016
	Hard disk drive* (12.0 GB)	22L0053
17	PC Card slots (570)	05K6068
	PC Card slots (570E)	05K6291
18	Hard disk drive cable (570)	05K2837
	Hard disk drive cable (570E)	27L0476
	Holder, hard disk drive cable	08K6379
	Holder, hard disk drive (570E)	05K6294
	Cover*, hard disk drive	05K6072
	Bracket, hard disk drive	05K4752
19	Fan (570)	05K6065
	Fan (570E)	05K6293
20	Upper shield (570)	05K6064
	Upper shield (570E)	05K6290
21	Diskette drive* (TEAC)	05K8989
21	Diskette drive* (SONY)	05K8990
22	Cable*, diskette drive	05K2844

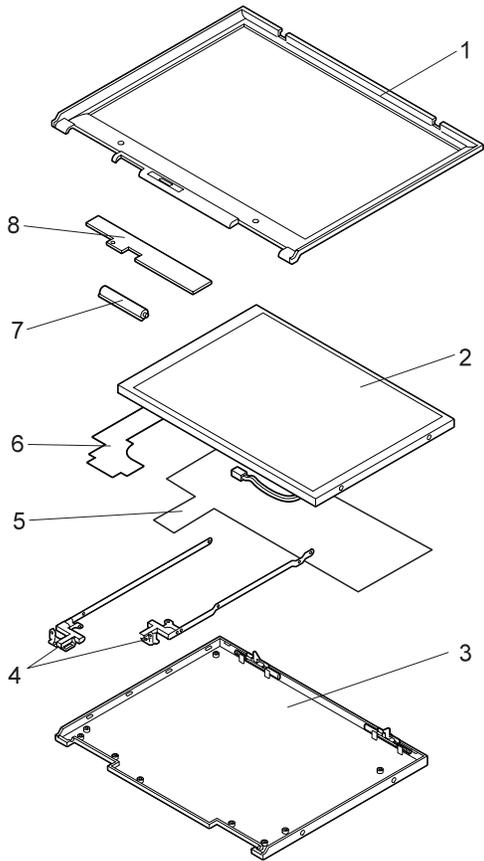
(continued)

Parts list

No.	FRU	P/N
	Screw kit (including nylon-coated screws): <ul style="list-style-type: none"> • M2 x 4 mm, pan head (5) • M2 x 9 mm, flat head (10) • M2.5 x 3 mm, flat head (20) • M2.5 x 4.8 mm, flat head (30) • M2.5 x 9 mm, flat head (10) • M2.5 x 3 mm, flat head small (5) • M3 x 3 mm, flat head (5) • Hex stud D-sub (10) • Screw caps (10) • Screw caps, front (5) • Screw caps, side (5) • Screw caps, rear (5) 	08K5892
	System miscellaneous parts* (including nylon-coated screws): <ul style="list-style-type: none"> • Power switch knob • Holder, backup battery • Cover, microphone • Cover, I/O connector • LID modem blank • GND spring, LCD I/F 	05K6066 08K6444
	Hard disk drive screw kit*	05K6073

Parts list

LCD FRU
13.3-inch XGA TFT



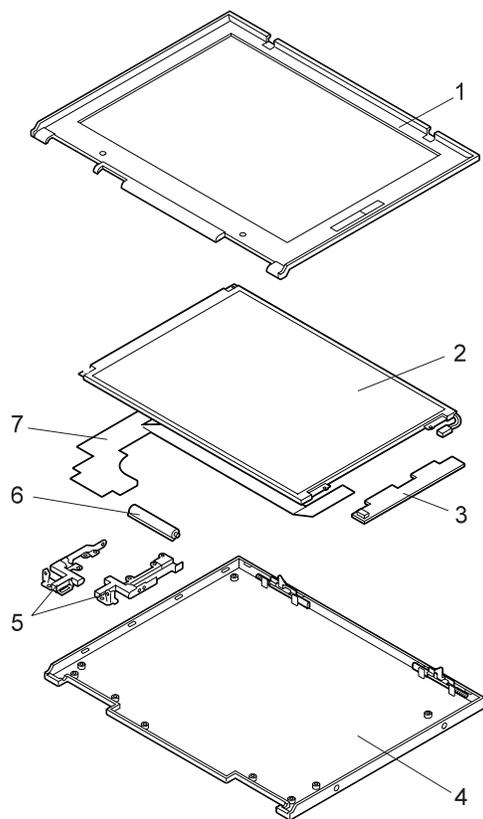
(continued)

Parts list

No.	FRU	P/N
	LCD unit (DBU)	05K9506
	LCD unit (HITACHI)	05K9492
	LCD rear cover kit for Korea (570)	05K6456
	LCD rear cover kit for Korea (570E)	05K6455
1	LCD front bezel	05K6077
2	LCD panel (see LCD Unit)	
3	LCD rear cover	08K6454
4	Hinges	08K5290
5	Shield	08K6384
6	LCD cables	05K2836
7	LCD miscellaneous parts kit	05K6080
8	Inverter card	10L1249
	Rear shield	08K6384
	Copper tape	27L6460

Parts list

12.1-inch SVGA TFT



No.	FRU	P/N
	LCD unit	05K9505
	LCD rear cover kit for Korea	10L1909
1	LCD front bezel	05K6076
2	LCD panel (see LCD unit)	
3	Inverter card	10L1248
4	LCD rear cover	05K6074
5	Hinges	05K6078
6	LCD miscellaneous parts kit	05K6080
7	LCD cables	27L0507

Parts list

Keyboard

No.	FRU	P/N
	Arabic	10L2208
	Belgian	10L2190
	Canadian French	10L2168
	Chinese, Simplified	02K4875
	Chinese, Traditional	10L2176
	Czech	10L2210
	Danish	10L2200
	Dutch	10L2188
	French	10L2182
	German	10L2180
	Hungary	10L2212
	Hebrew	10L2206
	Italian	10L2184
	Japanese	10L2172
	Korean	10L2174
	Latin American Spanish	10L2170
	Norwegian	10L2198
	Portuguese	10L2194
	Russian	10L2202
	Spanish	10L2192
	Swedish or Finnish	10L2196
	Swiss	10L2186
	Turkish	10L2204
	U.K. English	10L2178
	U.S. English	10L2166

Option list

AC adapter* (56W, Sanken)	02K6555
AC adapter*, for Japan	02K6554
AC adapter* (56W, Astec)	02K6557
AC adapter* (56W, Astec), for Japan	02K6556
TrackPoint III cap*	84G6536
Telephone cable	05K2707
UltraBase	10L2149
UltraBase blank bezel	05K6211
UltraBase miscellaneous kit	08K6585
Quick charger	11J9003
Attachment, quick charger	05K5666

Parts list

Modem kit	
for Australia	22L1939
for Austria	22L1863
for Belgium	22L1929
for Denmark	22L1919
for France	22L1909
for Germany	22L1911
for Israel	22L1935
for Italy	22L1915
for Malaysia	27L0425
for Netherlands	22L1917
for New Zealand	22L1937
for Norway or Finland	22L1921
for Portugal	22L1931
for Singapore	22L1941
for Spain	22L1913
for Sweden	22L1923
for Switzerland	22L1925
for Turkey	22L1933
for U.K.	22L1907
UltraslimBay HDD adapter	05K5336
SuperDisk UltraslimBay drive	20L1929
24X-10X IDE CD-ROM drive	12J2471
20X-8X CD-ROM drive	1969010
20X-8X stereo CD-ROM drive	1969011
6.4-GB hard disk drive	02K0518
DVD 6X (RPC II) UltraslimBay drive	05K9169
DVD UltraslimBay drive	
for North America (Region 1)	05K8890
for Japan and EMEA (Region 2)	05K8891
for AP North and AP South (Region 3)	05K8832
for LA and AP South (Region 4)	05K8893
for Russia (Region 5)	05K8959
for China (Region 6)	05K8960
32-MB SDRAM SO DIMM*	76H0294
64-MB SDRAM SO DIMM*	20L0241
128-MB SDRAM SO DIMM*	01K1150
Miniature mouse (black)	07G0033

Parts list

Common Parts List

Tools

Triconnector wrap plug	72X8546
PC test card	35G4703
Audio wrap cable	66G5180
USB parallel test cable	05K2580
Screwdriver kit	95F3598
Torque screwdriver	05K4695
5mm socket wrench	05K4694
Screwdriver	27L8126
ThinkPad hardware maintenance diskette version 1.60 Note: Download the file from the Web site.	–

Parts list

Power cords: IBM power cords for a specific country are usually available only in that country:

For 2-pin power cords:

Used in these countries	P/N
Japan	13H5273
Argentina	36L8870

For 3-pin power cords:

Used in these countries	P/N
Argentina	36L8867
People's Republic of China (other than Hong Kong)	76H3514
Argentina, Australia, New Zealand, Papua New Guinea, Paraguay, Uruguay	76H3516
Aruba, Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Curaçao, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Korea (South), Liberia, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Thailand, Trinidad (West Indies), United States of America, Venezuela	02K0539
Austria, Belgium, Bosnia-Herzegovina, Bulgaria, Croatia, Czech Republic, Egypt, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Macao, Macedonia, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Turkey, Yugoslavia	76H3518
Denmark	76H3520
Bangladesh, Myanmar, Pakistan, South Africa, Sri Lanka	76H3522
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