IBM Mobile Systems

**ThinkPad 560Z (2640) Computer
Hardware Maintenance Manual**

August 1998

ThinkPad 560Z HMM

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 FRU Removal and Replacement procedures before replacing any FRUs.

Be extremely careful during write operations such 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 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 from a variety of reasons 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. If this is suspected, 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.

Screw Tightening Information

Loose screws can cause a reliability problem. The IBM
ThinkPad computer addresses this problem with
nylon-coated screws. 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
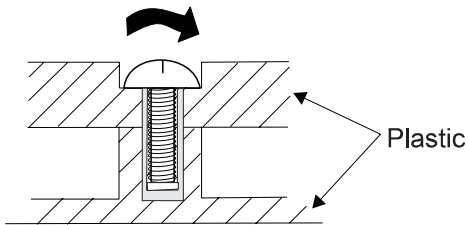
Plastic

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

180 degrees more

Logic Card

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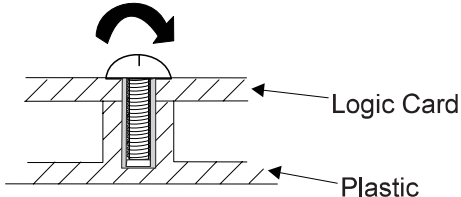
Torque driver
If you have a torque driver, refer to the "Torque"
instruction with each step.

How to Use Error Messages: Use the error
codes displayed on the screen to diagnose failures. If
more than one error code is displayed, begin the diagnosis
with the first error code. Whatever caused the first error
code can result in false error codes being displayed. If no
error code is displayed, see if the error symptom is listed
in the "Symptom-to-FRU Index" on page 21.

Port Replicator Problems: If you suspect a
problem with the port replicator, see "Port Replicator
Checkout" on page 13.

How to Diagnose Multiple FRUs: When the
adapter or the device has more than one FRU, the error
code could be caused by any of them. Before replacing
multiple FRUs, try removing or exchanging each FRU, one
by one in the designated sequence, to see if the symptoms
change.

What to Do First: The service personnel must fill in the following information in the parts exchange form or parts return form that is attached to the returned FRU:

___ 1. Name and phone number of service personnel
___ 2. Date of service
___ 3. Date that the machine failed
___ 4. Date of purchase
___ 5. Failure symptoms, error codes appearing on the display, and beep symptoms
___ 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 may indicate that the system was subjected to stress beyond normal use:

The following is not covered under the warranty:

LCD panel cracked by applying excessive for or by 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 improperly inserting a PC Card or installing an incompatible card
Damage caused by foreign material in the FDD
Diskette drive damage caused by pressing the diskette drive cover or inserting diskettes with multiple labels
Damaged or bent diskette eject button
CD-ROM drive damage caused by shock from excessive force, or by being dropped
Fuses blown by attaching 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.
> HDD 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.

How to Disable the Power-On Password:

When Only the Power-on Password is Set.

1. Power off the computer.
2. Turn the computer upside down.
3. Loosen the DIMM socket lid screw 1 , and remove the DIMM socket lid 2 .
4. Short the power-on password jumper pads (R522) 3 .
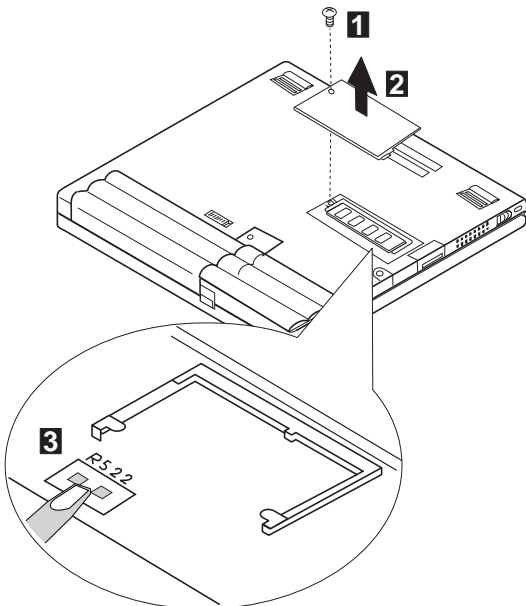
5. Power on the computer and wait until the POST ends. The password is cleared.
6. Reinstall the DIMM socket lid, and turn the computer right side up.
7. Verify that the password prompt does not appear.
8. To reactivate the password, set the password again.

When Both Power-on Password and Supervisor Password are Set
  1. Power off the computer.
  2. Press and hold **F1**; then power on the computer. After a few seconds, the password prompt appears.
  3. Enter your **supervisor password**. The Easy-setup Main Menu appears.
  4. Select **Password** and then **Power on**. A rectangular box appears.
  5. Enter your **supervisor password** and press the **Space bar** once.
  6. Press **Enter** twice.
  7. Select **Exit**.
  8. Select **Restart** on the Easy-Setup Main Menu and wait until the POST ends.
  9. Reinstall the DIMM socket lid, and turn the computer right side up.

  Verify that the password prompt does not appear.

To reactivate the password, set the password again.

Power Shutdown Switch: The Power Shutdown switch resets the system regardless of the microcode status and forces a power off. Use this push button to power off when power is not completely off or when the microcode is in a hung state.

Product Overview

The following table is an overview of the system features of the IBM ThinkPad 560 series:

Feature	Description
Processor	**560X** Intel Pentium MMX 200 MHz, L2 cache Intel Pentium MMX 233 MHz, L2 cache **560Z** Intel Pentium II 233 MHz, L2 cache Intel Pentium II 300 MHz, L2 cache
Bus Architecture	PCI Bus
Memory (Standard)	**560X** 32MB (on the system board) **560Z** 32MB (on the system board) 64MB (on the system board)
Memory (Option)	Maximum of 96MB for 560X. Maximum of 96MB for 560Z when the base memory is 32MB. Maximum of 128MB for 560Z when the base memory is 64MB.
CMOS RAM	**560X/560Z** 242 bytes
VGA Video	**560X** 12.1-inch, 256K colors 800×600 pixel DSTN color LCD 12.1-inch, 256K colors, 800×600 pixel TFT color LCD **560Z** 12.1-inch, 16M colors, 800×600 pixel TFT color LCD
Diskette Drive (External)	1.44MB (2-mode), 3.5-inch 1.44MB (3-mode), 3.5-inch, for Japan
Hard Disk Drive	**560X** 2.1GB, 2.5-inch, IDE interface 4.0GB, 2.5-inch, IDE interface **560Z** 4.0GB, 2.5-inch, IDE interface 6.4GB, 2.5-inch, IDE interface

Feature	Description
I/O Port	Serial Parallel USB External monitor Headphone Microphone Port replicator
Audio	16-bit audio Internal speaker Internal microphone Mechanical volume (560X) Software volume (560Z)
Infrared Transfer	**560X/560Z** IrDA 1.1
PCMCIA	One Type-III or two Type-I / Type-II **560X/560Z** CardBus support
AC Adapter	56 Watt type

Checkout Guide

Use the following procedure as a guide for computer problems.

Note: The diagnostic tests are intended to test only IBM products. Non-IBM products, prototype cards, or modified options can give false errors and invalid system responses.

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

   Note: To run the diagnostics, refer to "Running the Diagnostics" on page 33.

3. Use the following table with the verified symptom to determine which page to go to. Search the symptoms column, and find the description that best matches your symptom; then go to the page shown in the "Go To" column.

Symptoms (Verified)	Go To
Power failure (The power indicator does not go on or stay on).	"Power Systems Checkout" on page 14.
POST does not complete. No beep or error codes are indicated.	"Symptom-to-FRU Index" on page 21, and then use the **No Beep Symptoms** table.
POST beeps, but no error codes are displayed.	"Symptom-to-FRU Index" on page 21, and then use the **Beep Symptoms** table.
POST detected an error and displayed numeric error codes.	"Symptom-to-FRU Index" on page 21, and then use the **Numeric Error Codes** table.
The diagnostic test detected an error and displayed a FRU code.	"Running the Diagnostics" on page 33.
The configuration is not the same as the installed devices.	"Checking the Installed Devices List" on page 35.
Other symptoms (such as LCD display problems).	"Symptom-to-FRU Index" on page 21, and then use the **Other Symptoms** table.

Symptoms (Verified)	Go To
Symptoms cannot be re-created (Intermittent problems).	Use the customer-reported symptoms and go to "Symptom-to-FRU Index" on page 21.

Diskette Drive Checkout

Do the following to isolate the problem to a controller, drive, or diskette. A blank, write-enabled, formatted 2HD diskette is required.

FDD-1 represents an external diskette drive attached through the external diskette drive connector. *FDD-2* represents the external diskette drive attached to the port replicator.

Attention: Make sure that the diskette does not have more than one label attached to it. Multiple labels can cause damage to the drive or cause the drive to fail.

Do the following to select the test device:
See "Running the Diagnostics" on page 33 for details.

1. Go to the advanced diagnostic mode by pressing **Ctrl**+**A** from the Easy-Setup test menu.
2. Click on **Exit** twice.
3. Click on **FDD-1** or **FDD-2** to start the test.
4. Insert the blank diskette when instructed and follow the instructions on the screen.
5. If the controller test detects an error, FRU code 10 appears. Replace the system board.
6. If the controller test runs without errors, the drive read/write tests start automatically. If a drive test detects an error, FRU code 50 for FDD-1 or 51 for FDD-2 appears. If the diskette itself is known to be good, replace the drive.
7. If the FDD-2 test detects an error, move the drive to the computer's diskette drive connector directly, if possible, and test it again as FDD-1.

   If no errors occur in the FDD-1 position, the drive is not defective. Go to "Port Replicator Checkout" on page 13 to isolate the port replicator problem.

Keyboard or Auxiliary Input Device Checkout

If the internal keyboard does not work or an unexpected character appears, make sure that the flexible keyboard cable is firmly connected to the system board. If it is firmly connected, then run the Keyboard Test. If an external keyboard is connected, remove it before running the

Keyboard Test for the internal keyboard. See "Running the Diagnostics" on page 33 for details.

Note: When the **Fn** key is pressed, a black square briefly appears.

If the Keyboard Test detects a keyboard problem, do the following one at a time to correct the problem. Do not replace a nondefective FRU:

    Replace the flexible keyboard cable.
    Replace the keyboard.
    Replace the system board.

The following auxiliary input devices are supported for this computer:

    Numeric keypad
    Mouse (PS/2 compatible)
    External keyboard (with keyboard/mouse cable)

If any of these devices do not work, reseat the cable connector and repeat the failing operation.

If the problem does not recur, the problem may have been in the connector. Recheck the connector.

If the problem is not corrected, replace the device and then the system board.

Memory Checkout

EDO DIMM cards are available for increasing the memory capacity.

DIMM	Displayed Value (32MB Base)	Displayed Value (64MB Base)
No DIMM card installed	32192 KB	64960 KB
8 MB (not supported by 560Z)	40384 KB	73152 KB
16 MB	48576 KB	81344 KB
32 MB	64960 KB	97728 KB
64 MB	97728 KB	130496 KB

Memory errors might stop system operations, show error messages on the screen, or hang the system.

Use the following procedure to isolate memory problems.

Note: Make sure that the DIMM card is fully installed into the connector. A loose connection can cause an error.

See "Running the Diagnostics" on page 33 for details.

 1. Power off the computer and remove the DIMM card from its slot (if installed).

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2. Press and hold the **F1** key; then power on the computer. Hold the **F1** key down until the Easy-Setup menu appears.
3. Select **Test** and press **Enter**.
4. Select **Memory** and press **Enter** to run the memory test on base memory. If an error appears, replace the system board.
5. Power off the computer and reinstall the DIMM card; then power on the computer. Verify the memory size; then test the memory. If an error appears, replace the DIMM card.

If memory problems occur, use the loop option to repeat the test. If the test detects an error, an error log will be printed on the printer connected to the parallel port. See "Displaying the Error Log" on page 34 for more information.

Flash Memory Update: System setup programs and diagnostic tests are stored in the flash memory. The flash memory update is required for the following conditions:

     New versions of system programs
     New features or options

To update the flash memory, do the following:

1. Get the appropriate diskette containing the update.
2. Insert the **System Program Service Diskette** into drive A and power on the computer.
3. Select **Update system programs** from the menu.

Fan Checkout

To check the fan, do the following:

1. Start Easy-Setup.
2. Click on **Test**. The fan will start so you can check the air turbulance at the fan louver.
3. Press **Ctrl + A** to enter the advanced diagnostic mode. The ThinkPad FRU Connections window appears. If the fan connector is not connected, the **Fan not connected** message appears.
4. Click on **Exit**. The keyboard layout appears on the screen.
5. Click on **Exit** again.
6. Click on **System Board** then press **Enter** to run the test.
   Follow the description in the window. If the test detects a fan problem, replace it.

Port Replicator Checkout

Use the following procedure to isolate a port replicator problem. The port replicator attaches to the system expansion connector at the bottom of the computer.

1. Power off the computer.

2. Remove the failing devices from the port replicator.
3. Unplug the AC adapter from the port replicator, if attached.
4. Remove the port replicator from the computer.
5. Reconnect the failing device directly to the computer. (If another device is already connected to the computer, remove it first.)
6. Go to the "Running the Diagnostics" on page 33 and run the diagnostics.
7. If the advanced diagnostic device test did not find an error, suspect a problem with the port replicator of the system expansion bus.
8. Power off the computer and reconnect the port replicator.
9. Power on the computer and run the following advanced diagnostic tests:

    Serial port test with the wrap plug (P/N 72X8546) installed on the port replicator

    Universal serial bus test with the test cable (P/N 05K2580) [see "Universal Serial Bus (USB) Test" on page 34]

    Parallel port test with the wrap plug (P/N 72X8546) installed on the port replicator

    PC Card (PCMCIA) test with the PC test card (P/N 35G4703) installed

    FDD-2 device test on the failing device with a scratch diskette
10. If diagnostic errors appear, replace the port replicator or the diskette drive. If the problem remains after the replacement, replace the system board.
11. If power problem appears only when the port replicator is used, replace the port replicator.

If power shutdown occurs intermittently when using PC Card devices via a port replicator, suspect an over-current problem. Some PC Card devices use more power; if the maximum usage of each devices occurs simultaneously, the total current will exceed the limit, thereby causing a power shutdown. Isolate this problem by removing one of the devices, and use the computer under the same condition, and see whether a power shutdown occurs. Do this procedure for all devices to determine the cause.

Power Systems Checkout

To verify the symptom of the problem, power on the computer using each of the following power sources.

1. Remove the battery pack and the diskette drive.
2. Connect the AC Adapter and check that power is supplied.
3. Disconnect the AC Adapter and install the charged battery pack; then check that power is supplied by the battery pack.

If you suspect a power problem, see the appropriate power supply checkout in the following list:

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 operational charge does not work, go to "Checking Operational Charging."

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:
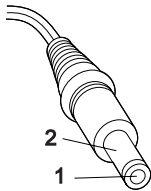
Pin	Voltage (V dc)
1	+14.5 to +17.0
2	Ground

If the voltage is not good, replace the AC Adapter.

If the voltage is within the range, do the following:
Replace the system board.
If the problem is not corrected, go to "Undetermined Problems" on page 31.

Note: An audible 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 does not turn on, remove the battery pack and let it return to room temperature. Reinstall the battery pack. If the charge indicator 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 will not start until the Fuel-Gauge shows that less than 95% of the total power remains; with this condition the battery pack will charge to 100% of its capacity. This protects the battery pack from being overcharged or having a shortened life.

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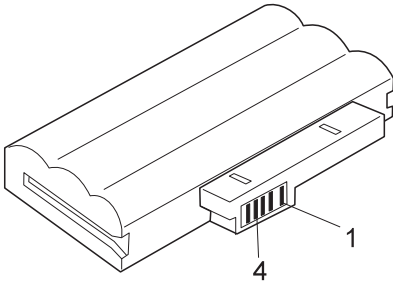
3. If the voltage is less than +11.0 V dc, the battery pack has been discharged. Recharge the battery pack.

    Note: In this case, the battery pack is over-discharged. It takes the at least 2 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 pack.
4. If the voltage is more than +11.0 V dc, measure the resistance between battery pack 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

1. Power off the computer and unplug the AC Adapter from the computer.
2. Turn the computer upside down.
3. Remove the backup battery (see "1010 Backup Battery" on page 45).
4. Measure the voltage of the backup battery. See the following figure.

    Note: Be careful not to measure the wrong side of the backup battery.

Black(-)　　Red(+)
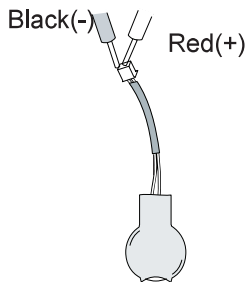
Wire	Voltage (V dc)
Red	+2.5 to +3.7
Black	Ground

If the voltage is correct, replace the system board.
If the voltage is not correct, replace the backup battery.
If the backup battery discharges quickly after replacement, replace the system board.

Status Indicator Checkout

If an LED problem occurs, do the following:

1. Power off the computer.
2. Power on the computer.
3. All the LEDs in the indicator panel, except the Hard Disk In Use LED, should turn on for a moment soon after the computer is powered on. Make sure they turn on.

   If the problems persists, replace the system board.

System Board and CPU Mini-Cartridge Checkout

The system board and the CPU mini-cartridge FRUs perform the operation on the computer. Processor problems can be caused by either FRU. Generally, the CPU mini-cartridge has a lower failure rate. If a numeric code indicates the system board or the CPU mini-cartridge as failing, do the following procedure to isolate the problem:

1. Run the system board test to verify the symptom. This test verifies both the system board and the CPU mini-cartrige. If no error is detected, return to "Undetermined Problems" on page 31.

   Note: Do not touch the keyboard and the pointing device when the system board is being tested. This might cause unexpected errors.

2. If FRU code 10 appears, replace the system board, but do not replace the CPU mini-cartrige. Transfer

the CPU mini-cartrige from the old system board to
the new system board.
3. If FRU code 11 appears, reseat the CPU
   mini-cartridge.
4. Rerun the test to verify the fix.
5. If FRU code 11 remains, replace the CPU
   mini-cartridge.

If this procedure does not correct the problem, go to
"Undetermined Problems" on page 31.

TrackPoint Checkout

If the TrackPoint does not work, do the following:

1. Run the ThinkPad Configurations program and check
   if the TrackPoint is enabled.
2. If it is not, select **Enable** and enable it.
3. If you still have a problem, continue to the next step.

   Drifting Pointer

   There may be cases when the pointer drifts for a
   short while on the screen, this is not a hardware
   problem. This movement can occur when a
   slight, steady pressure is applied to the
   TrackPoint. No service action needs to be taken.
   ---

4. Go to the Easy-Setup menu.
5. Move to an item with the TrackPoint.
6. Press either the left or the right click button.
7. Verify that both buttons work correctly.
8. Move to another item with the TrackPoint.
9. Press the TrackPoint. (Press-to-Select).
10. Verify that the item is selected.
11. If the problem still persists, do the following one at a
    time:
    Warning: Do not replace a nondefective FRU.
        Reseat the TrackPoint cable.
        Replace the keyboard.
        Replace the system board.

Power Management Features

Three power management modes are provided by the computer to reduce power consumption and prolong battery power.

Standby Mode

In standby mode, the following occurs:

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

The computer enters standby mode when the **Fn** + **F3** keys are pressed.

The computer exits standby and resumes normal operation when any key is pressed.

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

Suspend Mode

The following events occur in addition to what occurs in standby mode when the computer enters suspend mode:

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

Note: Suspend mode in Windows 95 is called standby mode in Windows 98.

The following events cause the computer to enter suspend mode:

The **Fn** + **F4** keys are pressed.
The LCD cover is closed.
If you add a check mark to the **Will not suspend even if LCD is closed** box in the "Power Management Properties" window, the computer will not enter suspend mode even if the LCD is closed. The LCD only turns off.
The **Suspend** button is selected in the Fuel-Gauge program.
The specified time has elapsed from the last operation with the keyboard, the TrackPoint, the hard disk drive, the parallel connector, or the diskette drive; or the AC Adapter is plugged in.
In Windows 95, the timer is set by the **Suspend Timer** in the "Power Properties" window.
In Windows 98, the timer is set by the **System standby timer** in the "Power Management Properties" window.
The battery indicator blinks orange indicating that the battery power is low.
If you add a check mark to the **Hibernate when battery becomes low** box in the "Power

Management Properties" window, the computer enters hibernation mode under this condition.

Note: In Windows 98, the **Alarms** setting in the "Power Management Properties" window may not be synchronous with the actual low battery condition which shows a blinking then a steady orange and may cause the alarm to sound prematurely.

Note: The computer cannot enter suspend mode when it is attached to a docking station.

The following events cause the computer to resume operation from suspend mode:

The **Fn** key is pressed.
The LCD cover is opened.
The power switch is turned on.
The resume timer is set.
In Windows 95, you can set the time in the **resume on timer** in the "Power Management Properties" window.
In Windows 98, the **Scheduled Tasks** setting has priority over the **resume on timer** in the "Power Management Properties" window.

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

Hibernation Mode

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.

The following events cause 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 hibernation mode is set to **Hibernate by Power Switch???**.
The timer conditions are satisfied in suspend mode (for operating systems other than Windows 98).
A critically low battery condition occurs and hibernation mode is set to **Hibernate when battery becomes low**.

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

Symptom-to-FRU Index

The Symptom-to-FRU Index is a list containing symptoms, errors, the possible causes. The most likely cause is listed first.

Note: Perform the FRU replacement or 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 the next possible FRUs to be replaced when servicing a computer.

Numeric error codes show the errors detected in POST or system operation. In the following error codes, **X** can be any number.

If no codes are available, use narrative symptoms.

If the symptom is not listed, go to "Undetermined Problems" on page 31.

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

Numeric Error Codes

Symptom / Error		FRU / Action in Sequence
10X		1. **System board**.
101	Interrupt failure.	
102	Timer failure.	
103	Timer interrupt failure.	
104	Protected mode failure.	
105	Last 8042 command not accepted.	
107	NMI test failure.	
108	Timer bus test failure.	
109	Low meg-chip select test.	
110 (Planar parity.)		1. **Go to "Memory Checkout" on page 12.** 2. DIMM card. 3. Detach the expansion unit if it is attached to the computer. 4. System board.

Symptom / Error	FRU / Action in Sequence
111 (I/O parity.)	1. **Go to "Memory Checkout" on page 12.** 2. Port replicator. 3. System board.
127 (Cache error)	1. **CPU mini-cartridge**. 2. System board.
158 (Hard disk password was not set even though the supervisor password is set.)	1. **Set the password for hard disk drive.**
159 (Hard disk password is not set the same as the supervisor password.)	1. **Set the correct password for hard disk drive.**
161 (Dead battery.)	1. **Go to "Checking the Backup Battery" on page 16.** 2. Backup battery. 3. System board.
163 (Time and date were not set.)	1. **Set time and date**. 2. System board.
173 (Configuration data was lost.)	1. **Select OK in the error screen; then set the time and date.** 2. Backup battery. 3. System board.
174 (Configuration error: Perform"Checking the Installed Devices List" on page 35 before changing any FRUs.)	1. **Check device configuration.** 2. Hard disk drive assembly. 3. System board.
175, 177, 178 **175** EEPROM CRC #1 error. **177** Supervisor password check sum error. **178** EEPROM is not functional.	1. **System board**.
183 (Incorrect password entered at the supervisor password prompt.)	1. **Have the user examine the password.**
184 (Power-on password check sum error.)	1. **Reset the power-on password in Easy-Setup.**

Symptom / Error	FRU / Action in Sequence
185 (The startup sequence is not valid. Suspect that power was off when the startup sequence was being updated.)	1. **Reset the startup sequence in Easy-Setup.**
186	1. **System Board**.
188 (EEPROM CRC #2 error.)	1. **System board**.
190 (A depleted battery pack was installed when the power was on.)	1. **Go to "Checking the Battery Pack" on page 16.**
191XX (PM initialization error.)	1. **System board**.
192 (A fan error.)	1. **Fan**. 2. System board.
195 (The configuration read from the hibernation area does not match the actual configuration.)	1. **Check if the configuration was changed.** For example, check if a DIMM card was added.
196 (A read error occurred in the hibernation area of the hard disk drive.)	1. **Run the hard disk drive test.** 2. Reseat the HDD flat cable. 3. Hard disk drive.
199XX (Resume error.)	1. **System board**.
1XX	1. **System board**.
225 (An unsupported memory module.)	1. **Check if a supported DIMM card is installed.** 2. **DIMM card.** 3. **System board.**
2XX **201** Memory data error. **202** Memory line error 00–15. **203** Memory line error 16–23. **205** Memory test failure on on-board memory. **221** ROM to RAM remap error.	1. **Go to "Memory Checkout" on page 12.** 2. DIMM card. 3. System board.

Symptom / Error	FRU / Action in Sequence
301, 303, 304, 305, 3XX **301** Keyboard error.	1. **Go to "Keyboard or Auxiliary Input Device Checkout" on page 11.** 2. Keyboard. 3. External numeric keypad. 4. External keyboard. 5. Keyboard/mouse cable. 6. System board.

601, 6XX
 	
601   Diskette drive
        or controller
        error.
	1. **Go to "Diskette Drive Checkout" on page 11.**
	2. Diskette drive assembly.
	3. Diskette.
	4. System board.

602 (Diskette read error.)	1. **Go to "Diskette Drive Checkout" on page 11.** 2. Diskette. 3. Diskette drive assembly.
604 (Unacceptable ID was read from the diskette drive.)	1. **Go to "Diskette Drive Checkout" on page 11.** 2. Diskette drive assembly. 3. System board.
11XX **1101** Serial_A test failure.	1. **Serial device**. 2. Communication cable. 3. System board.
12XX **1201** Serial_B test failure.	1. **System board (infrared)**.

17XX
 	
1701   Hard disk
         controller
         failure.
1780, 1790 Hard disk 0
         error.
1781, 1791 Hard disk 1
         error.
	1. **HDD flat cable**.
	2. Hard disk drive..
	3. System board.

1801 (An unsupported port replicator.)	1. **Make sure that the correct port replicator is connected.** See page 79.
24XX **2401** System board video error.	1. **System board**.

Symptom / Error	FRU / Action in Sequence
808X **8081** PCMCIA presence test failure. (PCMCIA revision number also checked.) **8082** PCMCIA register test failure.	1. **PC Card slot assembly**. 2. PCMCIA device. 3. System board.
860X (Pointing device error when TrackPoint is disabled.) **8601** System bus error–8042 mouse interface. **8602** External mouse error. **8603** System bus error or mouse error.	1. **External mouse**. 2. External keyboard. 3. System board.
861X (Pointing device error when TrackPoint is enabled.) **8611** System bus error–I/F between 8042 and IPDC. **8612** TrackPoint error. **8613** System board or TrackPoint error.	1. **Reseat the keyboard cable on the system board.** 2. Keyboard. 3. External mouse. 4. System board.
I9990301 **I9990302** **I9990305** **I9990301** Hard disk error. **I9990302** Invalid hard disk boot record. **I9990305** No bootable device.	1. **Check that the operating system is installed in the hard disk drive. If not, install the operating system.** 2. Reseat the boot device. 3. Reseat the HDD flat cable. 4. Check the startup sequence for the correct boot device. 5. Check that the operating system has no failure and is installed correctly.
I9990303 (Bank–2 flash ROM check sum error.)	1. **System board**.

Symptom / Error	FRU / Action in Sequence
Other codes not listed above.	1. **Go to "Undetermined Problems" on page 31.**

Beep Symptoms

Symptom / Error	FRU / Action in Sequence
Continuous beeps.	**System board**.
One beep and a blank, unreadable, or flashing LCD.	1. **Reseat the LCD connector**. 2. LCD assembly. 3. System board.
One beep, and the message "Unable to access boot source."	1. **Boot device**. 2. System board.
One long and two short beeps, and a blank or unreadable LCD.	1. **System board**. 2. LCD assembly.
One long beep followed by four short beeps each time the Power switch is operated. (System cannot power on due to low battery voltage.)	**Connect the AC Adapter or install a fully charged battery.**
One beep every second. (System is shutting down due to low battery voltage.)	**Connect the AC Adapter or install a fully charged battery. (Allow the system to completely shut down before changing the battery.)**
Two short beeps with error codes.	**POST error. See "Numeric Error Codes" on page 21.**
Two short beeps with blank screen.	**System board**.

No Beep Symptoms

Symptom / Error	FRU / Action in Sequence
No beep, power-on indicator not on, and a blank LCD during POST.	1. **Go to "Power Systems Checkout" on page 14.** 2. System board. 3. CPU Mini-Cartridge. 4. Check the power outlet.
No beep, power-on indicator on, and a blank LCD during POST.	1. **System board**. 2. CPU Mini-Cartridge.
No beep, power-on indicator on, and a blinking cursor only during POST.	1. **System board**. 2. CPU Mini-Cartridge.
No beep during POST but system runs correctly.	1. **Turn the volume up and check the speaker.** 2. Speaker. 3. System board.

Function-Related Symptoms

Symptom / Error	FRU / Action in Sequence
The system does not suspend or resume when the LCD is closed or opened.	1. **Go to "Suspend Mode" on page 19, and check that the computer can enter suspend mode.** 2. Boot an operating system and press **Fn**+**F4.** If the computer enters suspend mode, suspect that the application program is not working properly. 3. LCD assembly. 4. System board.
The battery Fuel-Gauge does not go higher than 90%.	**Go to "Checking the Battery Pack" on page 16 and see the note.**
The memory count (size) appears different from actual size.	**Go to "Memory Checkout" on page 12.**
The system configuration does not match the installed devices.	**Go to "Checking the Installed Devices List" on page 35.**
The system hangs intermittently.	**Go to "Intermittent Problems" on page 31.**

Indicator-Related Symptoms

Symptom / Error	FRU / Action in Sequence
The indicator incorrectly remains off or on, but system runs correctly.	**System board**.
The battery power status indicator blinks from green, yellow, to orange.	1. **Check that a correct battery is installed.** 2. Battery pack. 3. System board.
The battery indicator does not turn on when the battery is installed.	1. **Battery pack**. 2. System board.

Infrared-Related Symptoms

Symptom / Error	FRU / Action in Sequence
Unable to communicate using the Infrared (IR) Port.	1. **Make sure the setup for the IR is correct.** Use the ThinkPad Configurations utility. 2. Make sure there are no fluorescent lights near the computer. The computer may receive optical noise from the fluorescent light. 3. Run the advanced diagnostic test. If an error occurs and a FRU code is displayed, replace the parts shown by the FRU code.

Keyboard- or TrackPoint-Related Symptoms

Symptom / Error	FRU / Action in Sequence
The keyboard (one or more keys) does not work.	1. **Reseat the keyboard cable on the system board**. 2. Keyboard. 3. System board.
The TrackPoint does not work.	1. **Reseat the keyboard cable on the system board.** 2. Go to "TrackPoint Checkout" on page 18. 3. Keyboard. 4. System board.
The pointer moves automatically or does not work correctly.	**See "TrackPoint Checkout" on page 18.**

LCD-Related Symptoms

> **Important**
>
> The TFT LCD for the notebook computer contains
> over 2,359,296 thin-film transistors (TFTs). A small
> number of missing, discolored, or lighted dots (on all
> the time) 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 **21 or
> more**.

Symptom / Error	FRU / Action in Sequence
No beep, power-on indicator on, and a blank LCD during POST.	1. **Reseat the CPU mini-cartridge.** 2. System board.
LCD backlight not working. LCD too dark. LCD brightness cannot be adjusted. LCD contrast cannot be adjusted.	1. **Reseat the LCD connectors.** 2. LCD inverter card. 3. LCD assembly. 4. System board.
LCD screen unreadable. Characters missing pels. 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.	**LCD assembly**.

Peripheral-Device-Related Symptoms

Symptom / Error	FRU / Action in Sequence
The external monitor does not work correctly.	**Connect the external monitor to another PC. If the monitor works fine, replace the system board. If not, replace the external monitor**.
Printer problems.	1. **Run printer self-test**. 2. Parallel port wrap test. 3. System board. 4. Printer cable.
Serial or parallel port device problems.	1. **Run serial/parallel port wrap test**. 2. Device. 3. System board. 4. Device cable.

Power-Related Symptoms

Symptom / Error	FRU / Action in Sequence
Power shuts down during operation.	1. **Go to "Power Systems Checkout" on page 14.** 2. Battery pack. 3. Remove the battery pack and let it cool for 2 hours. 4. System board. 5. Check the power outlet.
The system does not power off. (See "Power Shutdown Switch" on page 7.)	1. **Press the Power Shutdown switch.** 2. System board.

Other Symptoms

Symptom / Error	FRU / Action in Sequence
Errors occur only when the port replicator is used.	**See "Port Replicator Checkout" on page 13.**
PC Card slot pin is damaged.	**PC Card slots assembly**.

Note: If you cannot find a symptom or an error in this list and the problem remains, see "Undetermined Problems."

Intermittent Problems

Intermittent system hang problems can be caused by a variety of reasons 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 the intermittent problem, do the following:

1. Run the advanced 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 Systems
Checkout" on page 14):

1. Power off the computer.
2. Visually check them for damage. If any problems are
   found, replace the FRU.
3. Remove or disconnect all of the following devices:
   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 card.
   h. PC cards.
4. Power on the computer.
5. Determine if 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.
   c. CPU mini-cartridge.

Running the Diagnostics

Use either the TrackPoint or the cursor move keys to interact with the tests.

The following table lists the special tools used for the diagnostics:

Tool Name	Part Number
PC Test Card	35G4703
Tri-Connector wrap plug	72X8546
USB parallel test cable	05K2580

Use either the TrackPoint or the cursor move keys to interact with the tests. The **Enter** key works the same as selecting the **OK** icon to reply OK.

1. Press and hold **F1**; then power on the computer. Hold **F1** down until the Easy-Setup menu appears.
2. Click on **Test**. The basic diagnostic menu appears.
3. Click on a device to run the test. The test progress screen appears; then **OK** appears under the tested device icon when the test ends without any errors.
4. Start the **Advanced Diagnostic test** by pressing **Ctrl**+**A** on the basic diagnostic menu. The ThinkPad FRU connections window appears.
5. Click on **Exit** or press the **Esc** key. The keyboard test window appears.
6. When you press a key, a mark appears or disappears on the corresponding key position on the screen. Repeat this step for any keys that need to be tested. You can run the keyboard test if you press **Ctrl**+**K** key at the advanced diagnostic menu.
7. To exit the keyboard test, click on **Exit** or press **Ctrl**+**Break**. The Advanced Diagnostics menu appears:
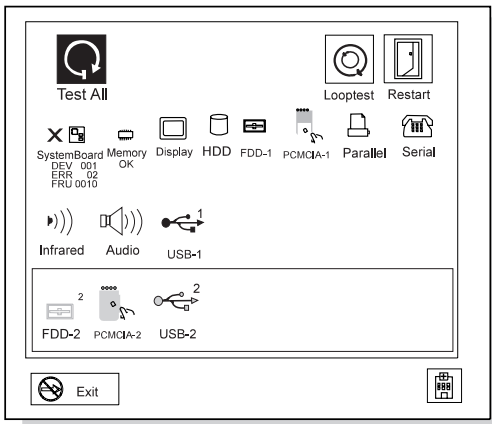
8. Click on a device to test it, or click on **Test All** to test all devices.

   Click on **Looptest** to run the tests in a repeated loop. The loop option menu appears. Click on a device; the mark appears beside the selected device. Repeat this step to select multiple devices. Click on **OK** to start the diagnostic loop. If no device is selected, all devices tests are looped.

9. To exit the loop, keep pressing **Ctrl**+**Pause** until the test exits. A beep sounds to notify that the exit interrupt is sensed by the test program. Press **Esc** to exit from the loop test.

PC Card (PCMCIA) Slots Test

The green LED on the PC test card (P/N 35G4703) turns on when the PC Card (PCMCIA) slot test is running. If the LED does not turn on, check that the card is installed correctly by reseating it. If the LED still does not turn on after the card is reseated, try using another slot for the test. If the LED still does not turn on and the test fails, replace the FRU shown by the diagnostic error code.

Universal Serial Bus (USB) Test

At the advanced diagnostic test menu, connect the USB parallel test cable (P/N 05K2580) to the computer shown below:
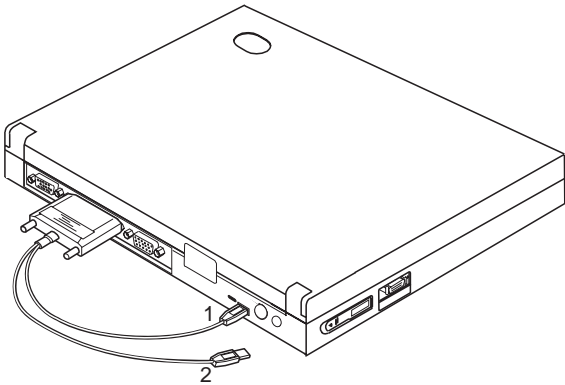
Click on ![USB-1] to run the test. Follow the instructions on the screen. **OK** appears if the test passed, but three lines of error codes appear if the test failed. The defective FRU must be the system board.

Use the cable number 2 for an external USB port, such as a port replicator.

Displaying the Error Log

Diagnostic errors are printed on a printer that is attached to the parallel port when the error is detected. The error is also logged in the system memory.

Use the following procedure to display the errors:

1. Enter the advanced diagnostic test.
2. Press **Ctrl**+**E**.
3. The error log appears.
4. To exit the screen, click on **Exit** or press **Esc** key.

The error log is not saved when system power is turned off.

Checking the Installed Devices List

If a device is installed but the icon appears in a gray shade rather than a dark shade on the basic diagnostics test menu, the device is defective. Reseat the device connectors. If the symptom remains, replace the device or the system board.

If a device that is not installed appears in a dark shade (for example, FDD-2 appears in a dark shade when *no* second FDD is installed), do the following:

1. Replace the **first** device in the configuration, such as an FDD-1.
2. If the problem persists, replace the system board.

The Parallel, and Serial icons are always displayed in a dark shade, because the icons represent subsystems of the system board and not the attachment of the devices.

The FDD-1 icon represents the **first** drive in the system configuration for each type of device. For Model 560Z, FDD-1 represents an external diskette drive attached through the external diskette drive connector. Similarly, the FDD-2 icon represents the **second** drive, usually attached through a port replicator.

Diagnostic Error Codes

If an error is detected, the following appears:

Large **X** on the left side of the device icon.
Device ID (three digits).
Error code (two digits).
FRU code (four digits).
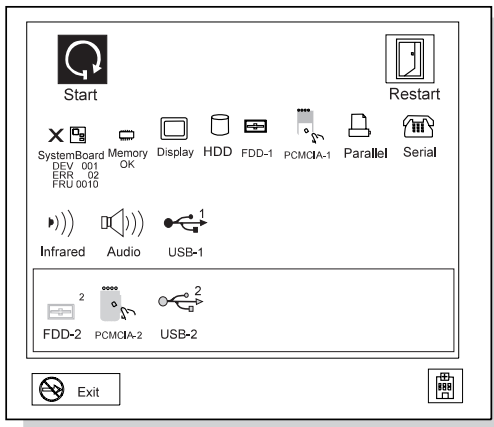
The device ID and error code indicate the detailed portion of the FRU that caused the error. If replacing a FRU does not correct the problem, see the device ID or error code from the previous failure. If they have changed, the cause might be that the new FRU is detective or that the FRU was incorrectly installed.

Device ID: If an error is detected by the diagnostic tests, a three-digit device ID is displayed, indicating the suspected device.

Icon	Device ID	Suspected Device
SystemBoard	001	System board CPU mini-cartridge
	003	Keyboard
	007	Math coprocessor
	086	Pointing device
Memory	002	Memory
Display	050	VGA display
	054	Neomagic display
HDD	017	Hard disk drive

Icon	Device ID	Suspected Device
FDD-1	006	External diskette drive or FDD connector of the computer
FDD-2	066	External diskette drive or FDD Connector of the port replicator
PCMCIA-1	080	PCMCIA
PCMCIA-2	088	External PC Card (PCMCIA)
Parallel	009	Parallel port
Serial	011	Serial port
USB-1	154	Universal serial bus (USB)
USB-2	155	External universal serial bus (USB)
Infrared	103	IR
Audio	153	Audio (Crystal)

FRU Codes: If an error is detected by the diagnostic tests, a four-digit FRU code is displayed. The FRU code indicates two suspected FRUs. Replace the FRU that is indicated by the **two leftmost digits** first; then replace the FRU that indicated by the **two rightmost digits.** No FRU is assigned to code 00. If only one FRU is suspected, the other FRU code is filled with zeros. See the reference page before replacing the FRU.

FRU Code	FRU
10	System board
11	CPU Mini Cartridge
20	Memory (See "Memory Checkout" on page 12.)
30	Reserved
32	External keyboard
33	External mouse
34	AC Adapter
35	Speaker
36	Battery pack
38	Fan
40	LCD assembly
45	External monitor
50	1. Reseat the diskette drive (FDD-1) 2. Diskette drive (FDD-1)
51	1. Reseat the diskette drive (FDD-2) 2. Diskette drive (FDD-2)
60	1. Reseat the hard disk drive 2. Hard disk drive
70	Port replicator (PC Card)
72	PC Card slot assembly
73	Port replicator (USB)

If the problem persists after replacement of the FRUs, go to "Undetermined Problems" on page 31.

Related Service Procedures

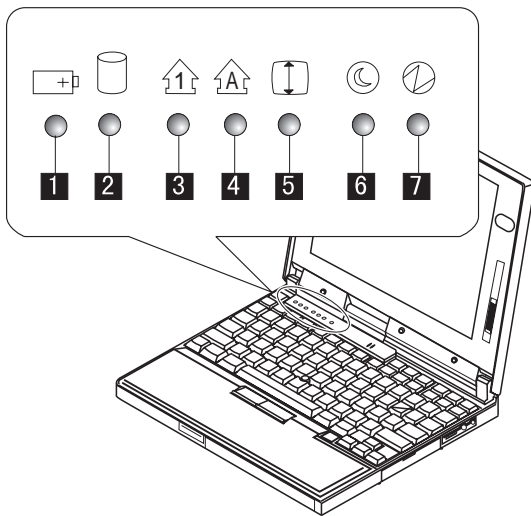This section provides information about the following:

"Status Indicators"

Status Indicators

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

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

Password Combinations

The Model 560Z supports the following passwords:

Power-on password (POP)
Hard disk password (HDP)
Supervisor password (PAP)

The password combinations are:

When the **POP** is the same as the **HDP**, a POP prompt appears, but the HDP prompt does not appear.

When the **POP** is not the same as the **HDP**, all of the prompts appear.

When the **PAP** is used, the **HDP** is automatically enabled but the HDP prompt does not appear. The HDP is then set to the same password as the PAP.

Running a Low-Level Format

Do the following to format the hard disk.

Attention: Make sure the drive address to be formatted is correct. This procedure erases all information on the disk.

1. Power off the computer.
2. Press and hold **F1**; then power on the computer.

3. Hold **F1** until the Easy-Setup menu appears.
4. Click on the **Test** icon. The basic diagnostic menu appears.
5. Press **Ctrl + A** to enter Advanced Diagnostics mode. The ThinkPad FRU Connections menu appears.
6. Click on **Exit**. The Keyboard Test menu appears.
7. Click on **Exit** again.
8. Press **Ctrl + L**. The Low Level Format menu appears.
9. Follow the instructions on the menu.

Fn Key Combinations

The following table shows the **Fn** key and function key combinations and their corresponding functions.

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

Fn +	Description
F1	Reserved
F2	Fuel-Gauge display on or off
F3	Invokes standby mode
F4	Invokes suspend mode
F5	Reserved
F6	Reserved
F7	Switches between the LCD and an external monitor
F8	Switches between screen expansion on and off (no symbol on the key)
F9	Reserved
F10	Reserved
F11	In Window 98, you can change only the CPU speed. For other operating systems, this key switches the power management mode between; High Performance, Automatic, and Customized.
F12	Invokes hibernation mode

FRU Removals and Replacements

This section contains information about removals and replacements.

   Do not damage any part. Only certified and trained personnel should service the computer.

   The arrows in the "Removals and Replacements" section show the direction of movement to remove a FRU, or to turn a screw to release the FRU. The arrows are marked in numeric order, in square callouts, to show the correct sequence of removal.

   When other FRUs must be removed before the failing FRU is removed, they are listed at the top of the page.

   To replace a FRU, reverse the removal procedure and follow any notes that pertain to replacement. See "Locations" for internal cable connections and arrangement information.

   When replacing a FRU, use the correct screw size 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:
The battery pack contains small amounts of nickel. 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, or other small parts are in place and are not left loose inside the computer. Verify this by shaking the computer 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.
An electrostatic discharge (ESD) strap (P/N 6405959) must be used to establish personal grounding.

Important Notice

This computer uses special nylon-coated screws with the following characteristics:

   They maintain tight connections.
   They do not easily come loose, even with shock or vibration.

But:
   They need additional force to tighten.

42

They should be used only once.

Do the following when you service this machine:

Keep the screw kit (P/N 12J0808) in your tool bag.
Always use new screws.
Use a torque screwdriver if you have one.

FRU Service Procedures

Review the following procedures before replacing any
FRUs.

Replacing the System Board

Restoring the System Unit Serial Number

The system unit serial number is written on the label
attached to the bottom cover of the computer and is also
stored as vital product data (VPD) in the EEPROM on the
system board.

When you replace the system board, you must set the
system unit serial number on the new system board to its
original number as follows:

1. Press and hold **F1** and power on the computer.
2. Hold down **F1** until the Easy-Setup menu appears.
3. Click on Config.
4. Press **Ctrl + N**. The System Unit Serial Number
   menu appears.
5. Follow the instructions on the menu.

Notes:

1. Do not power-off the computer during the restoring
   process.

Updating the Universally Unique IDentifier (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 3400 A.D. Consequently,
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:

1. Press and hold **F1** and power on the computer.
2. Hold down **F1** until the Easy-Setup menu appears.
3. Click on Config.
4. Press **Ctrl + G**. The UUID menu appears.
5. Press **F5** to generate a new UUID and press **Enter** to
   overwrite it to the EEPROM.

Removal Reference

Refer to the following chart for going to the removal procedure:

Ref. No.	FRU	Page No.
1010	Backup Battery	45
1020	DIMM Card	46
1030	Battery Pack	47
1040	Hard Disk Driver	48
1050	Keyboard Bezel	49
1060	Keyboard Unit	52
1070	LCD Assembly	53
1080	Speaker	55
1081	HDD Flat Cable	56
1090	PC Card Slot Assembly	57
1100	Heat Sink	58
1110	CPU Mini Cartridge	59
1120	Fan	61
1130	System Board	62
2010	LCD Front Cover	64
2020	LCD Panel	66
2030	LCD Inverter Card	67
2040	LCD Cable and Hinges	68
3010	ThinkPad Port Replicator with Advanced EtherJet Feature	70

1010 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. Use of an incorrect battery can result in ignition or explosion of the battery. Replacement batteries can be ordered from IBM or IBM Authorized Dealers.

Turn the computer upside down.
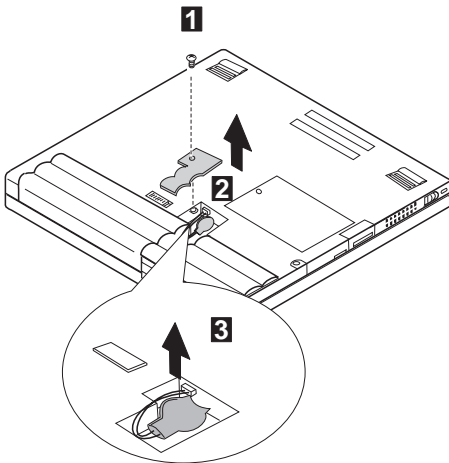
Note: When putting back the battery, connect the battery connector using a small screwdriver and place the battery in a slanted position.

Step	Size (Quantity)	Torque
1	M2.5 x 7 mm, black bind (1)	4 kgcm
When re-installing: Make sure you use the correct screw, and tighten it firmly to the torque shown in the table if you have a torque screwdriver. **Never use a screw that you removed. Use a new one. Make sure the screw is tightened firmly** (see "Screw Tightening Information" on page 4 if you do not have a torque screwdriver).		

1020 DIMM Card (If Installed)

Turn the computer upside down.
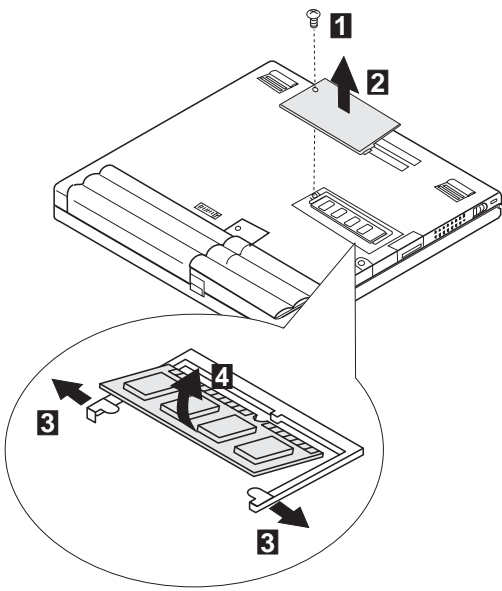
Step	Size (Quantity)	Torque
1	M2.5 x 7 mm, black pan-head (1)	4 kgcm
When re-installing: Make sure you use the correct screw, and tighten it firmly to the torque shown in the table if you have a torque screwdriver. **Never use a screw that you removed. Use a new one. Make sure the screw is tightened firmly** (see "Screw Tightening Information" on page 4 if you do not have a torque screwdriver).		

1030 Battery Pack
Turn the computer upside down.
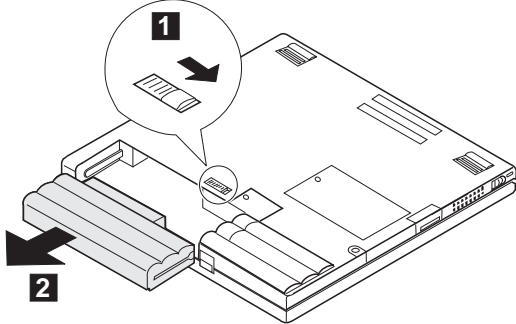
# 1040 Hard Disk Drive

> **Warning**
>
> **Do not drop or apply any shock.**
> **Do not apply pressure to the cover.**
> **Do not touch the connector.**
>
> The hard disk drive is sensitive. Incorrect handling
> can cause damage and permanent loss of data on the
> hard disk. Before removing the hard disk drive, make
> a backup copy of all the data on the hard disk. Never
> remove the drive while the system is operating, in
> suspend mode, or in hibernation mode.

Note:

> **For 560X**, if you are replacing a 4GB hard disk
> drive, reuse the shield and the tape (P/N 05K4690).

Battery Pack **(1030)**
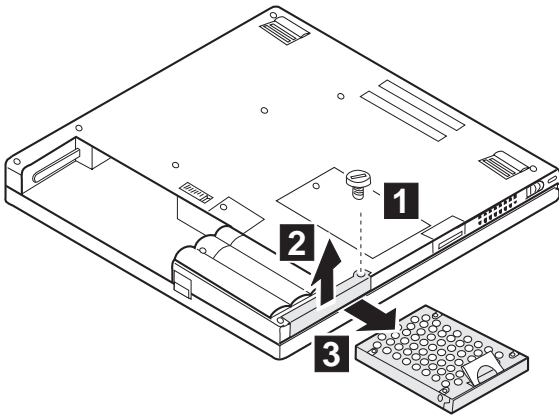
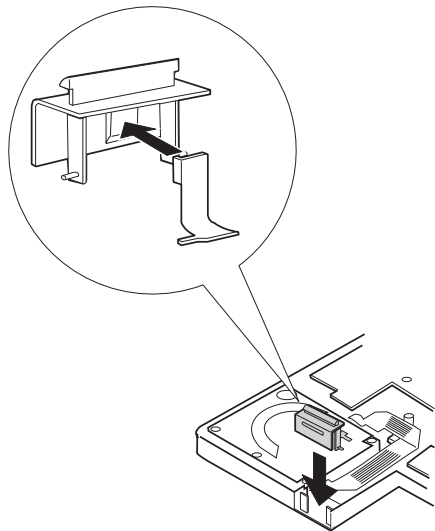| Step	Size (Quantity)	Torque
1	M3 x 4 mm, coin screw (1)	4 kgcm
When re-installing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. **Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly** (see "Screw Tightening Information" on page 4 if you do not have a torque screwdriver).		

1050 Keyboard Bezel
Battery Pack **(1030)**
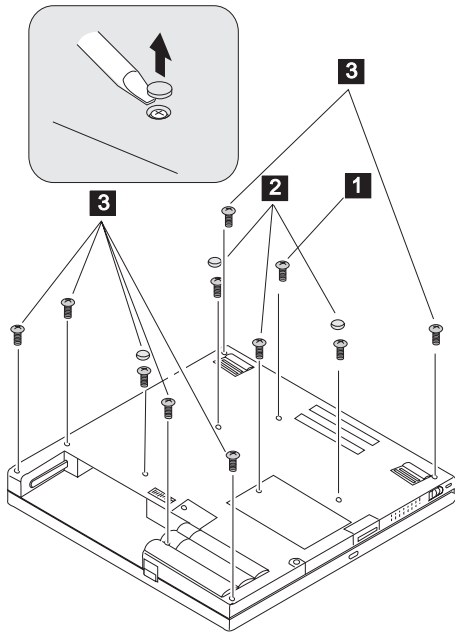
Step	Size (Quantity)	Torque
1	M2.5 x 14 mm, black bind (1)	3 kgcm
2	M2.5 x 10 mm, black bind (3)	4 kgcm
3	M2.5 x 7 mm, black bind (7)	4 kgcm

When re-installing: Make sure you use the correct screw,
and tighten all screws firmly to the torque shown in the table if
you have a torque screwdriver. **Never use a screw that you
removed. Use a new one. Make sure the screws are
tightened firmly** (see "Screw Tightening Information" on
page 4 if you do not have a torque screwdriver).
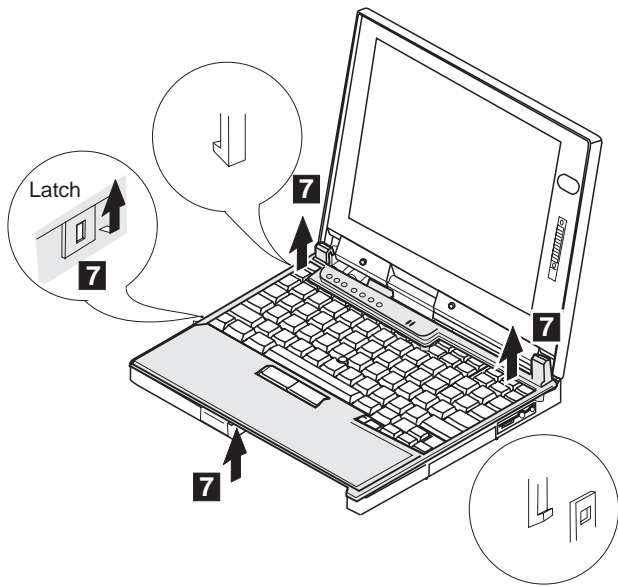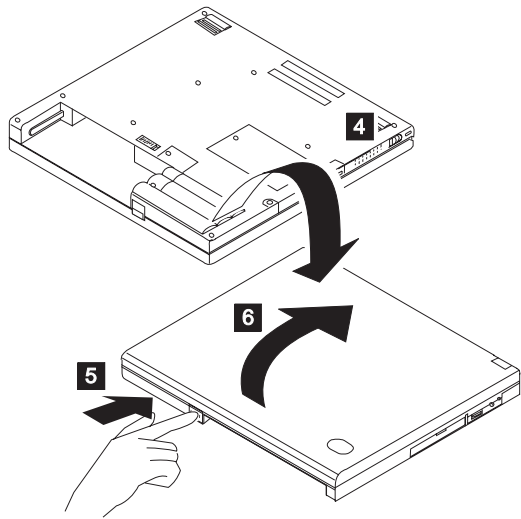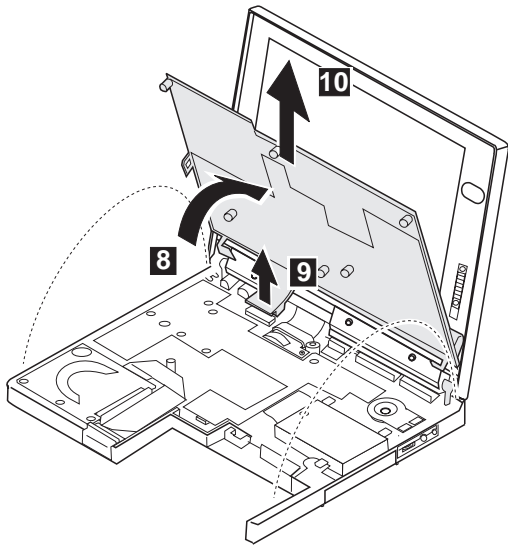
Latch

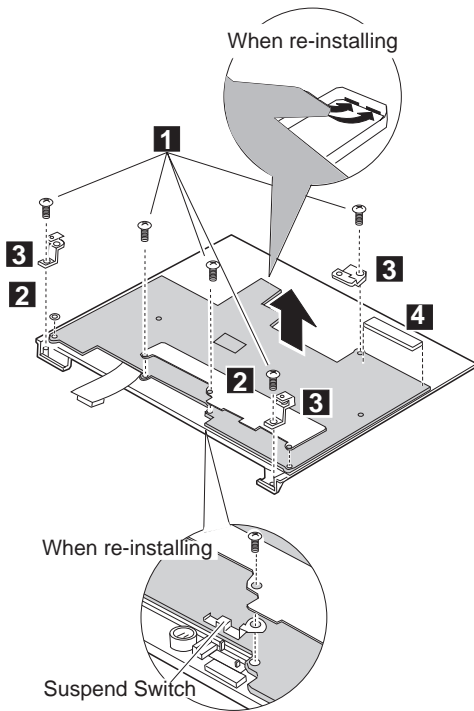You can easily disassemble the LCD release latch. To reassemble it, do as shown:

1060 Keyboard Unit

Battery Pack **(1030)**
Keyboard Bezel **(1050)**

After removing the screws 1 , remove the left and right
hinge support brackets 2 , the three brackets 3 , and the
gasket 4 .

When re-installing

When re-installing

Suspend Switch

Step	Size (Quantity)	Torque
1	M2.5 x 4 mm, black plain-head (5)	4 kgcm

When re-installing: Make sure you use the correct screw,
and tighten all screws firmly to the torque shown in the table if
you have a torque screwdriver. **Never use a screw that you
removed. Use a new one. Make sure the screws are
tightened firmly** (see "Screw Tightening Information" on
page 4 if you do not have a torque screwdriver).

1070 LCD Assembly

Battery Pack **(1030)**
Keyboard Bezel **(1050)**

**Note:** For the LCD Assembly removal and replacement, go to "2010 LCD Front Cover" on page 64.

When re-installing
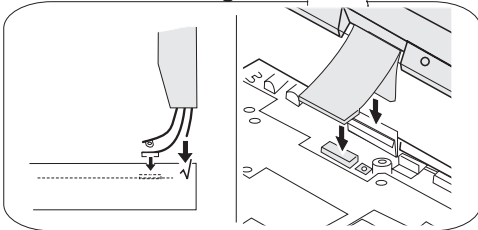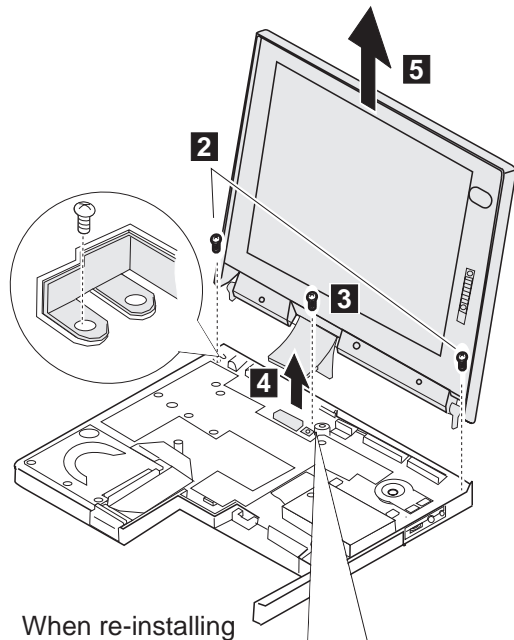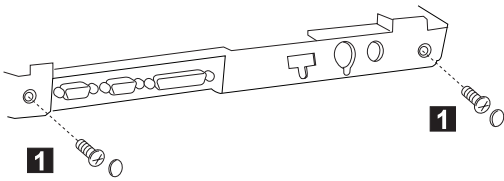
Step	Size (Quantity)	Torque
1	M2.5 x 7 mm, black plain-head (2)	4 kgcm
2	M2.5 x 5 mm, yellow bind (2)	4 kgcm

Step	Size (Quantity)	Torque
3	M2.5 x 2 mm, yellow bind (1)	2 kgcm

When re-installing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. **Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly** (see "Screw Tightening Information" on page 4 if you do not have a torque screwdriver).
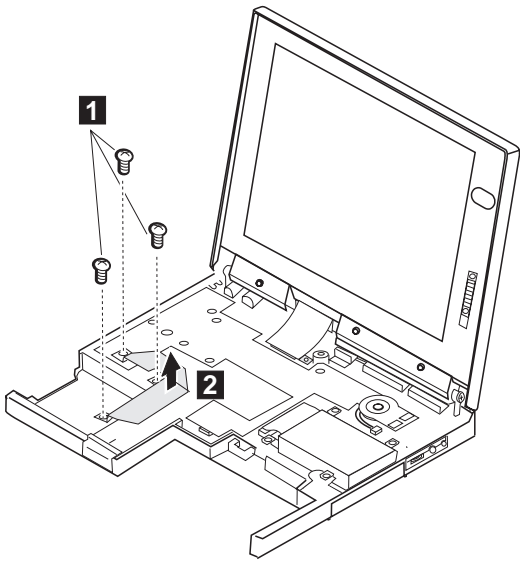
1080 Speaker

Battery Pack **(1030)**
Keyboard Bezel **(1050)**
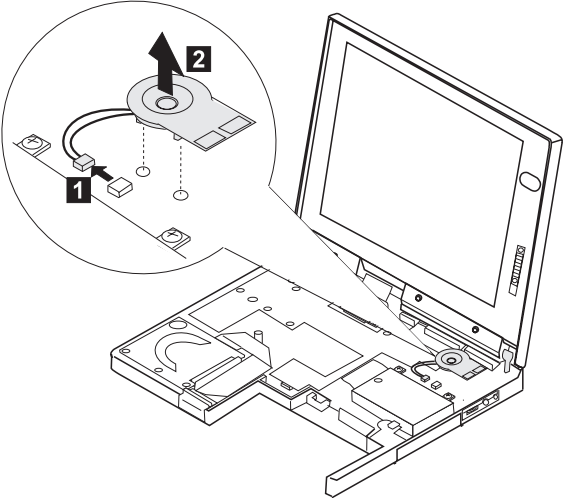
1081 HDD Flat Cable

Battery Pack **(1030)**
Keyboard Bezel **(1050)**

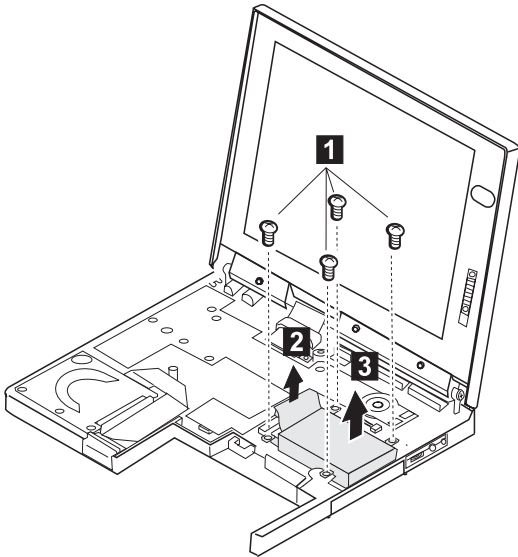| Step	Size (Quantity)	Torque
1	M2.5 x 5 mm, yellow bind (3)	3 kgcm

When re-installing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. **Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly** (see "Screw Tightening Information" on page 4 if you do not have a torque screwdriver).

1090 PC Card Slot Assembly

Battery Pack **(1030)**
Keyboard Bezel **(1050)**

Note: Before removing and replacing the PC Card slot
assembly, make sure that the PC Cards are
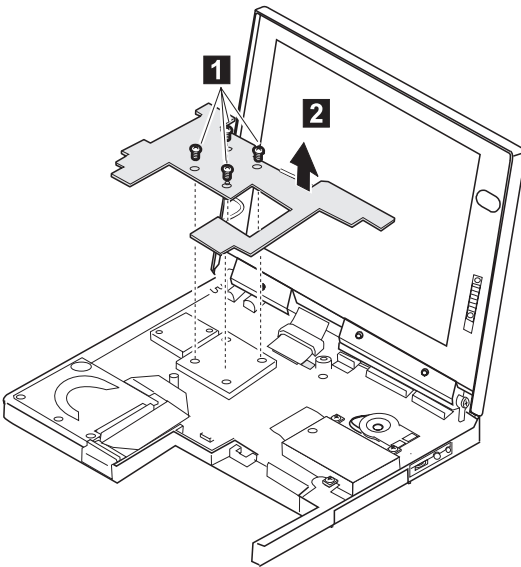removed and the eject levers are not sticking out.

Step	Size (Quantity)	Torque
1	M2.5 x 4 mm, black bind (4)	4 kgcm

When re-installing: Make sure you use the correct screw,
and tighten all screws firmly to the torque shown in the table if
you have a torque screwdriver. **Never use a screw that you
removed. Use a new one. Make sure the screws are
tightened firmly** (see "Screw Tightening Information" on
page 4 if you do not have a torque screwdriver).

1100 Heat Sink

Battery Pack **(1030)**
Keyboard Bezel **(1050)**

| Step	Size (Quantity)	Torque
1	M2 x 4 mm, yellow pan-head (4)	2 kgcm
When re-installing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. **Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly** (see "Screw Tightening Information" on page 4 if you do not have a torque screwdriver).		

1110 CPU Mini Cartridge

Battery Pack **(1030)**
Keyboard Bezel **(1050)**
Heat Sink **(1100)**

When removing:

In order to avoid damaging the CPU cartridge, do not tilt it
for more than 10 mm from the system board.
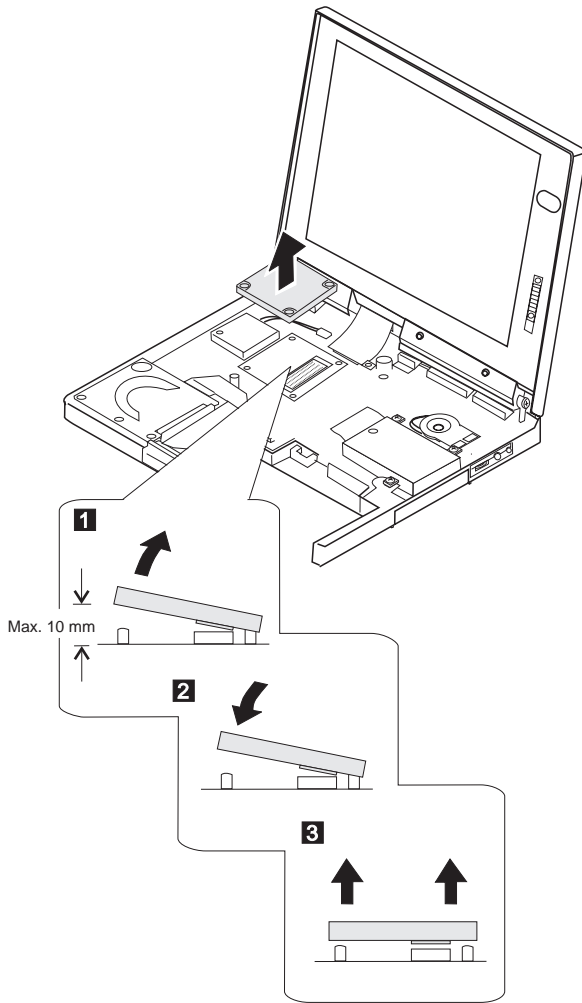
When re-installing:

1. Do not touch the connector pins.
2. Do not touch the module.
3. Place the CPU mini cartridge on the system board so the the screw holes align with posts **A**, **B**, **C**, and **D** on the system board.
4. Press and hold down Area 1 1 ; then, press Area 2 2 .
5. Apply grease (0.2 grams) over the module.
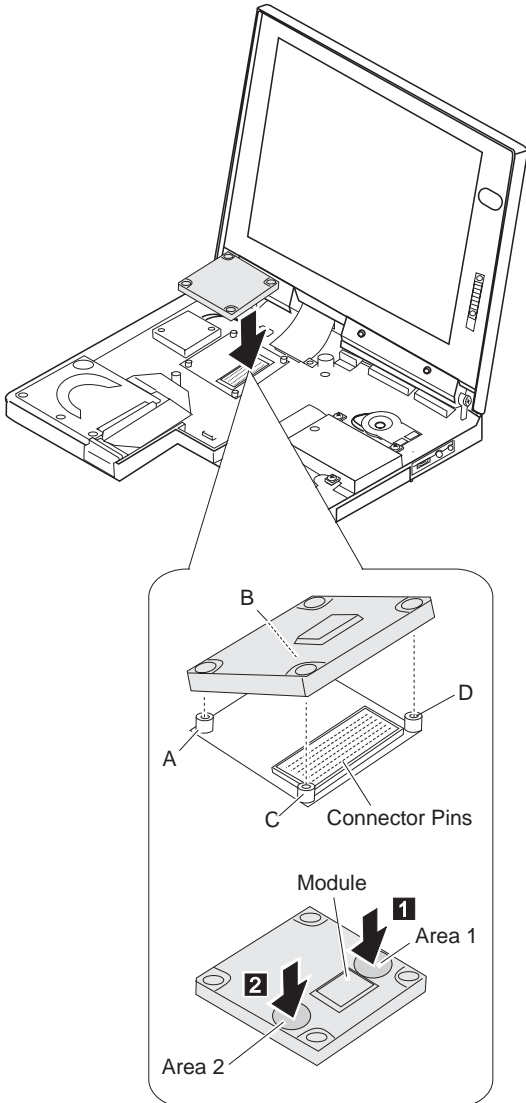
1120 Fan

Battery Pack **(1030)**
Keyboard Bezel **(1050)**
Heat Sink **(1100)**

Apply grease (0.2 grams) over the module. Refer to step 5 on page 60 for the location of the module.

Notes:

1. Do not touch the rotor or the blade of the fan when assembling or disassembling. You may break it.

2. Do not pinch the fan cable when re-installing the fan.

Step	Size (Quantity)	Torque
1	M2 x 8 mm, yellow flat-head (2)	2 kgcm

When re-installing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. **Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly** (see "Screw Tightening Information" on page 4 if you do not have a torque screwdriver).

1130 System Board

DIMM (If Installed) **(1020)**
Battery Pack **(1030)**
Hard Disk Drive **(1040)**
Keyboard Bezel **(1050)**
LCD Assembly **(1070)**
Speaker **(1080)**
HDD Flat Cable **(1081)**
PC Card Slot Assembly **(1090)**
Heat Sink **(1100)**
CPU Mini Cartridge **(1110)**
Fan **(1120)**

Apply grease (0.2 grams) over the module. Refer to step
5 on page 60 for the location of the module.

Notes:

 1. The system unit serial number must be restored when
    the system board is replaced. Select the option **Set
    system identification** on the maintenance diskette.
    The flash ROM on the system board contains the vital
    product data (VPD)—that is, the system unit serial
    number, system board system number, and other
    computer-unique data.

 2. Do not power off the computer when restoring the
    VPD. The system unit serial number label is attached
    to the base cover.

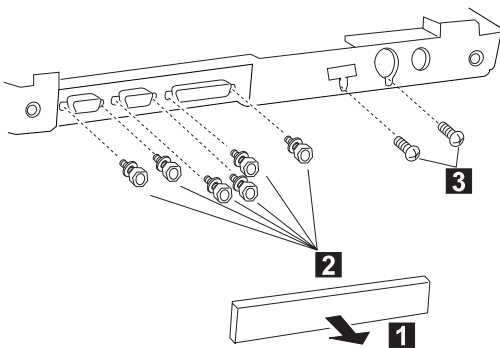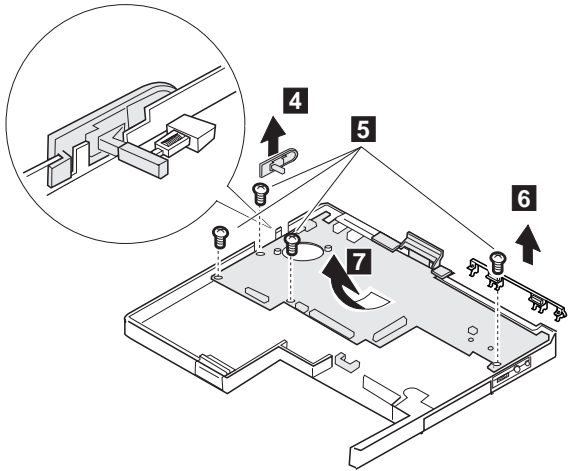| Step	Size (Quantity)	Torque
2	Hex stud screw, silver hex-head (6)	4 kgcm
3	M2 x 3 mm, yellow pan-head (2)	1.5 kgcm
When re-installing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. **Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly** (see "Screw Tightening Information" on page 4 if you do not have a torque screwdriver).		

Step	Size (Quantity)	Torque
5	M2.5 x 4 mm, black bind (4)	4 kgcm

When re-installing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. **Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly** (see "Screw Tightening Information" on page 4 if you do not have a torque screwdriver).

2010 LCD Front Cover

Battery Pack **(1030)**
Keyboard Bezel **(1040)**
Keyboard Unit **(1050)**
LCD Assembly **(1060)**

Important

The LCD for the notebook computer contains over
2,359,296 thin-film transistors (TFTs). A small number
of missing, discolored, or constantly lighted dots 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 **21 or
more**.

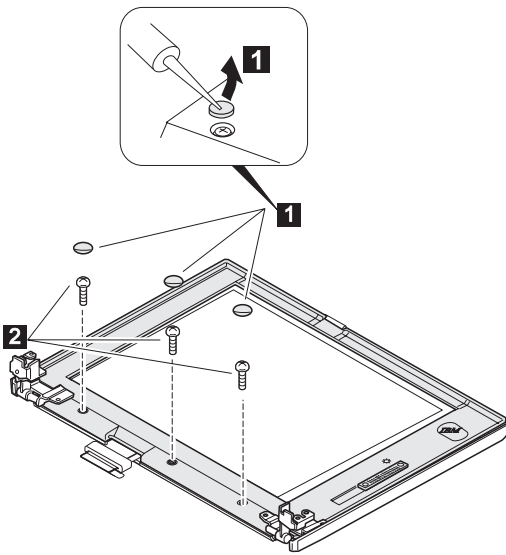| Step	Size (Quantity)	Torque
2	M2.5 x 5.5 mm, brass flat-head (3)	3 kgcm
When re-installing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. **Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly** (see "Screw Tightening Information" on page 4 if you do not have a torque screwdriver).		

The LCD front cover has several latches. Release
the latches as shown in step   3 .

Hooks

When re-installing

Reverse side
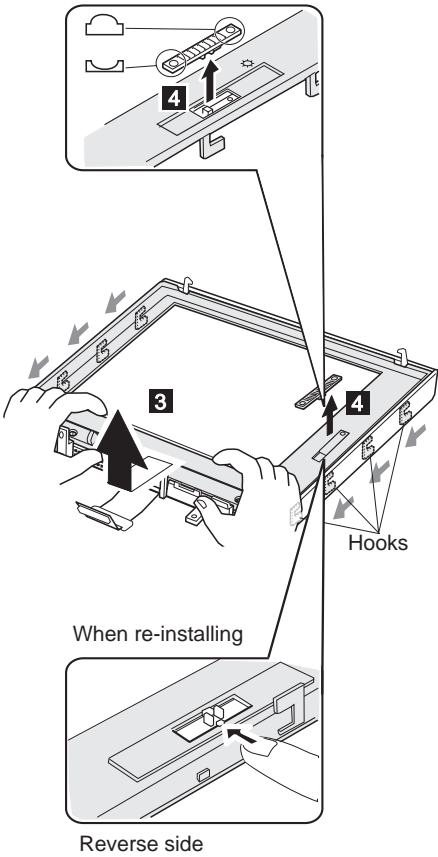
When re-installing:
Make sure that all eight hooks are engaged
properly.
Make sure that the slide knobs work correctly.

2020 LCD Panel

Battery Pack **(1030)**
Keyboard Bezel **(1040)**
Keyboard Unit **(1050)**
LCD Assembly **(1060)**
LCD Front Cover **(2010)**

When re-installing

Step	Size (Quantity)	Torque
1	M2.5 x 5.5 mm, brass flat-head (4)	3 kgcm
When re-installing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. **Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly** (see "Screw Tightening Information" on page 4 if you do not have a torque screwdriver).		

2030 LCD Inverter Card

Battery Pack **(1030)**
Keyboard Bezel **(1040)**
Keyboard Unit **(1050)**
LCD Assembly **(1060)**
LCD Front Cover **(2010)**
LCD Panel **(2020)**
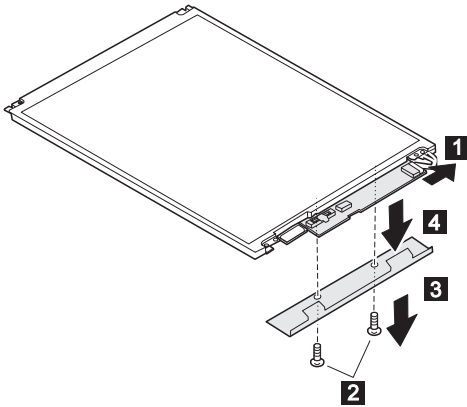
Step	Size (Quantity)	Torque
2	M2.5 x 3.0 mm, brass flat-head (2)	3 kgcm

When re-installing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. **Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly** (see "Screw Tightening Information" on page 4 if you do not have a torque screwdriver).
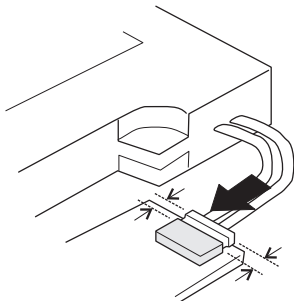
Warning: Be careful of high voltage on the cable. Connect the LCD connector firmly to the inverter card by lining them up straight:

2040 LCD Cable and Hinges

DIMM (If Installed) **(1020)**
Battery Pack **(1030)**
Keyboard Bezel **(1040)**
Keyboard Unit **(1050)**
LCD Assembly **(1060)**
LCD Front Cover **(2010)**
LCD Panel **(2020)**

1 2 : LCD cable

3 4 : Hinges

Copper Tape

When re-installing the
LCD cable, see the next page.

When re-installing the
left hinge, see the next page.

Step	Size (Quantity)	Torque
1	M2.5 x 5.5 mm, brass flat-head (2)	3 kgcm
3	M2.5 x 5.5 mm, brass flat-head (3)	3 kgcm

When re-installing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. **Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly** (see "Screw Tightening Information" on page 4 if you do not have a torque screwdriver).
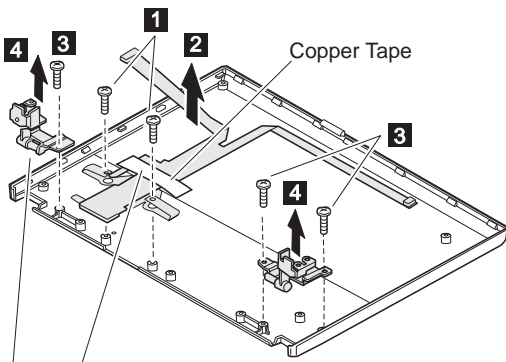
When re-installing:
See the following figure:

Copper
Tape
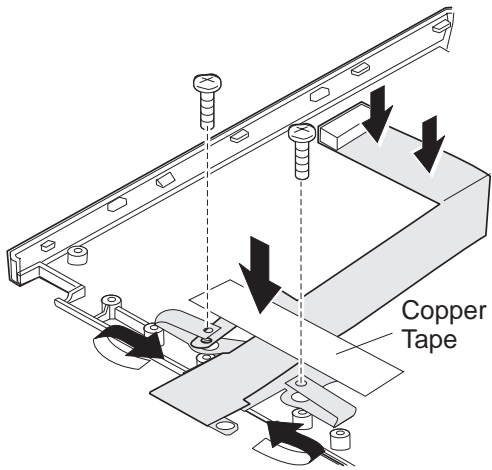
If you are replacing hinges of the TFT panel, put a
spacer (P/N 05K4658) on the left hinge as shown
below:
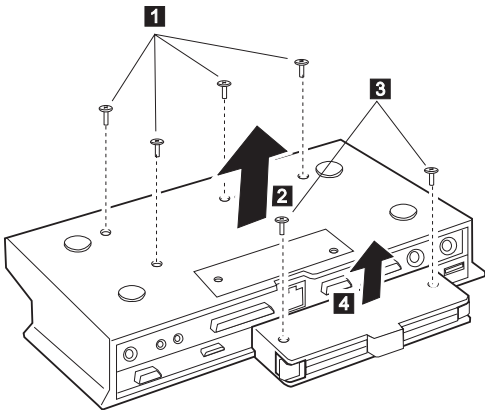
Hinge spacer

Left hinge

3010 ThinkPad Port Replicator with Advanced EtherJet Feature

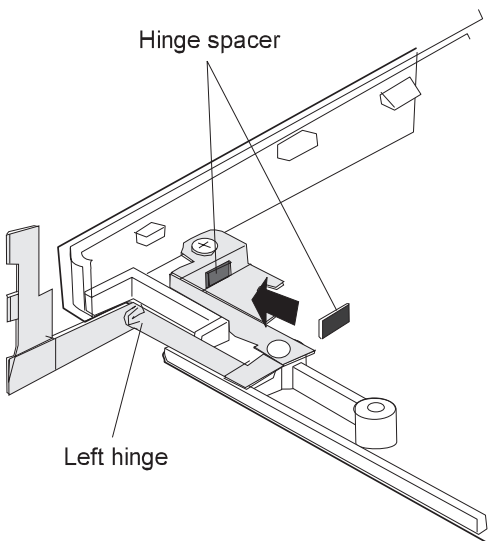| Step	Size (Quantity)	Torque
1	M2.5 x 5.5 mm, brass flat-head (2)	3 kgcm
3	M2.5 x 5.5 mm, brass flat-head (3)	3 kgcm

When re-installing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. **Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly** (see "Screw Tightening Information" on page 4 if you do not have a torque screwdriver).
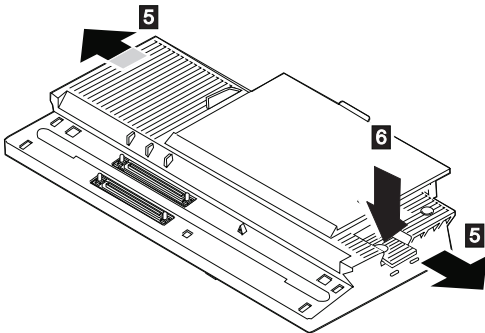
Upper Cover
Assembly
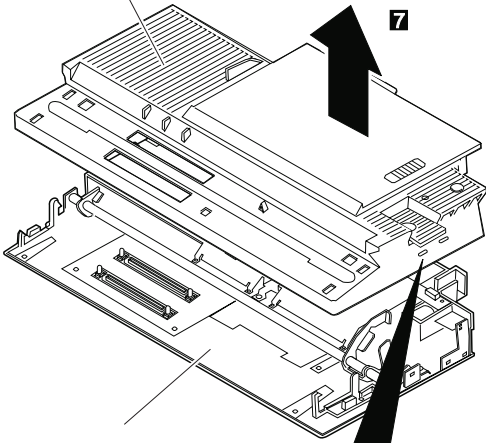
7

Box Assembly
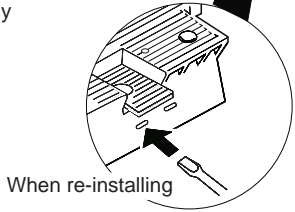
When re-installing

Locations

Front View

1   LCD
2   Brightness Control
3   Headphone Jack
4   Microphone/Line-In Jack
5   Infrared Port
6   PC Card Slots
7   PC Card Eject Buttons
8   Battery Pack
9   TrackPoint, Left and Right Buttons
1   LCD Latch
11   Fn Key
12   Keyboard
13   Indicator Panel
14   Built-in Microphone
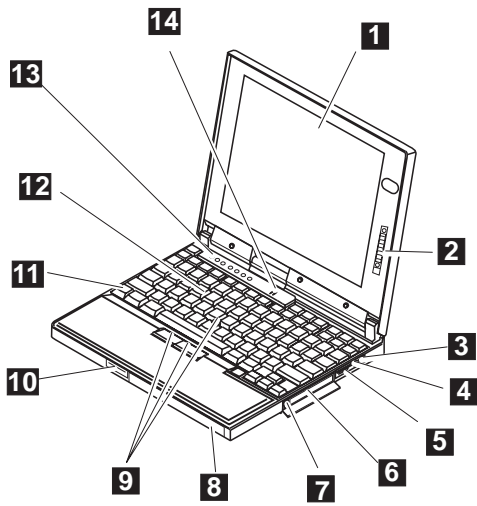
Bottom View

1 System-Expansion Connectors
2 Security Keyhole
3 Memory Slot
4 Hard Disk Drive Slot
5 Battery Pack
6 Battery Pack Latch
7 Backup Battery Slot
8 Power Shutdown Switch
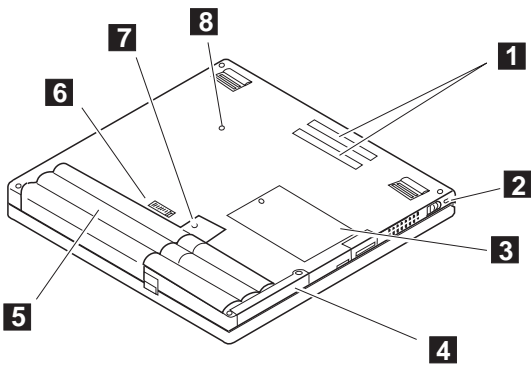
Rear View

1 External Diskette Drive Connector
2 Fan Louver
3 Power Switch
4 Security Keyhole
5 Power Jack
6 External-Input-Device Connector
7 Universal Serial Port
8 Serial Connector
9 Parallel Connector
1 External Monitor Connector
11 Connector Cover
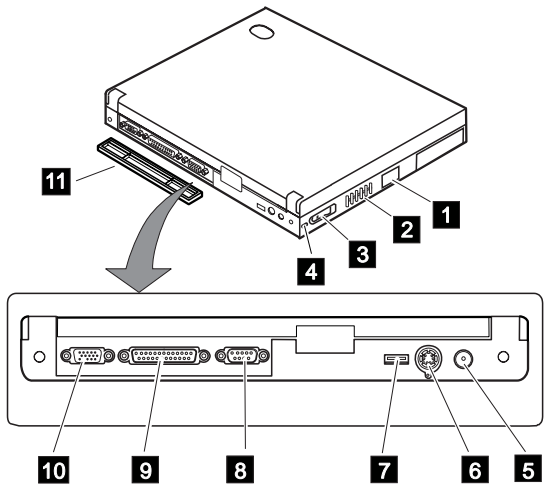
Parts List for Model 560Z

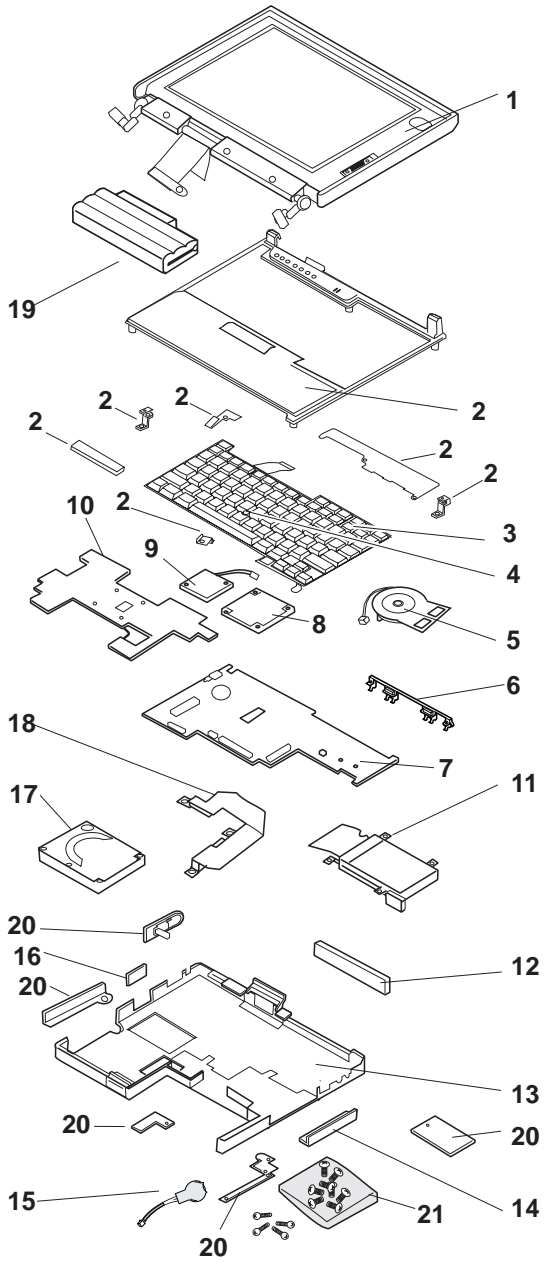| Ref No.	FRU Name	FRU No.
1	LCD Assembly	
	(See LCD Assembly on page 77.)	
2	Keyboard Bezel Kit includes:	05K5424
	Keyboard Bezel Assembly	
	Hinge Support Bracket (Left & Right)	
	Keyboard Bracket (3 Pcs)	
	Gasket	
3	Keyboard (See Keyboards on page 78.)	
4	TrackPoint Cap	84G6536
5	Speaker	05K5421
6	EMI Bracket I/O	46H4032
7	System Board (32MB)	10L1145
	System Board (64MB)	10L1164
8	CPU Mini Cartridge (233 MHz)	10L1023
	CPU Mini Cartridge (300 MHz)	10L1150
9	Fan	05K5420
10	Heat Sink	05K5418
11	Card-Bus Slot	05K5422
12	Rubber Cap I/O	46H4151
13	Base Cover	05K5417
14	PC Card Cover	12J1691
15	Backup Battery	12J1695
16	FDD Connector Cover	12J1692
17	Hard Disk Drive Assembly	
	4.0GB HDD Assembly (9.5 mm)	22L0024
	with Spacer	
	4.0GB HDD Assembly (12.5 mm)	83H7085
	6.4GB HDD Assembly (12.5 mm)	83H7103
18	HDD Flat Cable	05K2759
19	Battery Pack	46H4144
20	Mechanical Parts	05K5423
	HDD Lid	
	Power Switch Knob	
	DIMM Socket Lid	
	Backup Battery Compartment Lid	
	Bracket Battery Guide	
21	Screw Kit	05K5419
	Screw M2-L4 -MC/Heat Sink(10)	4761072
	Screw M2-L8 -Fan(10)	4761170
	Screw M2-L2(10)	05K5571
	Screw M2.5-L2(10)	05K5572
	Screw M2.5-L11(10)	05K5575
	HDD Screw Kit	05K6073
	External FDD (2-mode)	10H4056
	External FDD (3-mode)	39F2086
	External FDD Cable	12J1711
	AC Adapter (56W)	
	2-pin	11J8974
	3-pin	11J8956
	Screw Cap, Front	66G5046
	Screw Cap, Bottom	11J8919

LCD Assembly
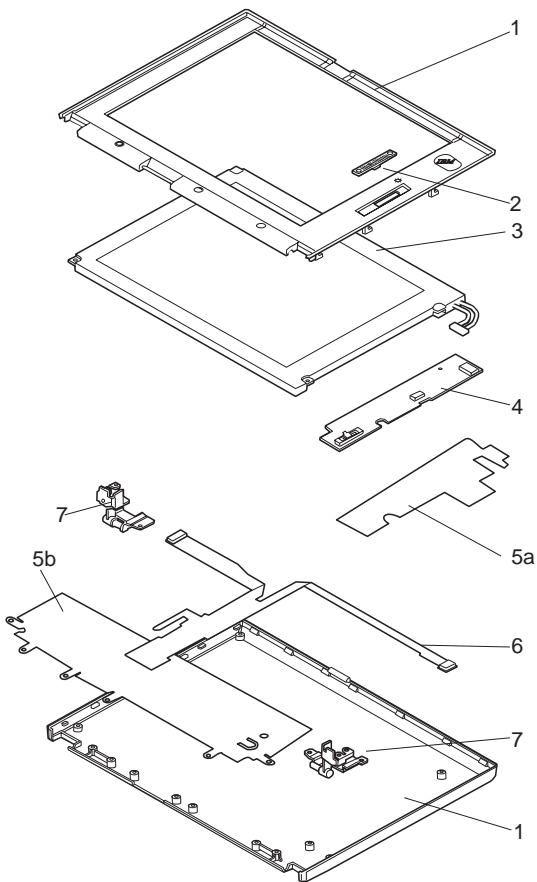
Ref. No.	FRU Name	FRU No.
1	LCD Cover Set	05K4602
2	Control Knob	12J9664
3	LCD Panel	05K9353
4	LCD Inverter Card	10L0916
5	Shield Kit	05K5656
	a.Inverter Shield	
	b.LCD Shield	
6	LCD Cable	05K2794
7	Hinge Left/Right	05K5657

Keyboards

Nomenclature	FRU No.
U.S. English	02K4785
Japanese	02K4786
U.K. English	02K4787
Canadian French	02K4788
German	02K4789
French	02K4790
Dutch	02K4791
Swedish/Finnish	02K4792
Norwegian	02K4793
Danish	02K4794
Italian	02K4795
Spanish	02K4796
Swiss	02K4797
Portuguese	02K4798
Latin Spanish	02K4799
Korean	02K4800
Belgian	02K4801
Turkish	02K4802
Taiwan	02K4803

Miscellaneous and Option Parts List

Miscellaneous Parts

FRU Name	FRU No.
Screw Kit (including nylon-coated screws)	12J0808
Screw Kit (M2.5 x 3.5 mm, nylon-coated)	97H3917
Screw Kit (M2.5 x 6.5 mm, nylon-coated)	97H3918
Screw Kit (M2.5 x 11.5 mm, nylon-coated)	97H3919
Screw Kit (LCD)	46H4160

Option Parts

> **Notes**
>
> 1. When you replace the AC Adapter, use the one for the country you are in even if the computer is from a different country.
> 2. The warranty for the system unit does not apply to all options.

FRU Name	FRU No.
Headset	85G1529
6.4GB HDD Assembly (12.5 mm)	02K0520
Microphone	66G7871
PS/2 Miniature Mouse	95F5723
ThinkPad Port Replicator with Advanced EtherJet Feature	
Box Assembly	05K4874
Upper Cover Assembly	05K4875
ThinkPad 560 Port Replicator I	05K4645
DIMM 16MB (60 ns)	01K1115
DIMM 32MB (60 ns)	42H2769
DIMM 64MB (60 ns)	42H2817
Interface Cable to System for Keyboard	84G2531
Interface Cable to Keyboard for Keypad	84G2532
Mini-DIN to Mini-DIN Cable	84G6474

Numeric Keypad

FRU Name	FRU No.
Belgian	95F5741
Canadian French	95F5466
Danish	95F5467
Dutch	95F5467
French	95F6313
German	95F6314
Greek	95F5467
Hebrew	95F5741
Icelandic	95F5467
Italian	95F6316
Japanese	79F6401
Norwegian	95F5467
Spanish	95F6315
Swedish or Finnish	95F5468
Swiss French	95F5711
Swiss German	95F5715
Turkish	95F5467
U.K. English	95F5741
U.S. English	95F5741

Black Keypad

FRU Name	FRU No.
French	84G6286
German	84G6280
Italian	84G6292
Norwegian	84G6310
Swedish	84G6304
U.K. English	84G6298
U.S. English	84G2530

Black Keyboard

FRU Name	FRU No.
French	84G6285
German	84G6279
Italian	84G6291
Norwegian	84G6309
Swedish	84G6303
U.K. English	84G6297
U.S. English	84G2529

Accessories

FRU Name	FRU No.
Keyboard/Mouse Cable	54G0444

Tools

FRU Name	*FRU No.*
Tri-Connector Wrap Plug	72X8546
PC Test Card	35G4703
USB Parallel Test Cable	05K2580
Screwdriver Kit	95F3598
Torque Screwdriver	05K4695
5mm Socket Wrench	05K4694
Screwdriver	05K4693

Power Cords

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

For 2-pin power cords:

IBM Power Cord Part Number	Used in These Countries
13H5264	Bahamas, Barbados, Bermuda, Bolivia, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Korea (South), Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Thailand, Trinidad (West Indies), United States of America, Venezuela
13H5267	Abu Dhabi, Albania, Antigua, Bahrain, Brunei, Dubai, Fiji, India, Ireland, Kenya, Kuwait, Macao, Malaysia, Nigeria, Oman, People's Republic of China (including Hong Kong), Qatar, Singapore, United Kingdom
13H5270	Austria, Belgium, Bulgaria, Chile, Czech Republic, Denmark, Egypt, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Israel, Italy, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sweden, Switzerland, Turkey, former Yugoslavia
13H5273	Japan
13H5276	Argentina, Australia, New Guinea, New Zealand, Papua, Paraguay, Uruguay
13H5279	Bangladesh, Pakistan, South Africa, Sri Lanka

For 3-pin slim power cords:

IBM Power Cord P/N	Used in These Countries
76H3514	Argentina, Australia, Papua New Guinea, New Zealand, Paraguay, Uruguay
76H3516	Bahamas, Barbados, Bermuda, Bolivia, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), United States of America, Venezuela, Thailand
76H3518	Austria, Belgium, Bulgaria, Czech Republic, Egypt, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sweden, Turkey, former Yugoslavia
76H3520	Denmark
76H3522	Bangladesh, Pakistan, South Africa, Sri Lanka
76H3524	Abu Dhabi, Albania, Antigua, Bahrain, Brunei, Dubai, Fiji, India, Ireland, Kenya, Kuwait, Macao, Malaysia, Nigeria, Oman, People's Republic of China (including Hong Kong), Qatar, Singapore, United Kingdom
76H3526	Japan
76H3528	Switzerland, Liechtenstein
76H3530	Chile, Ethiopia, Italy, Libya
76H3532	Israel
76H3535	Korea

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