Before using this information and the product it supports, be sure to read the general information under “Read This First” on page 2.

First Edition (September 1999)

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Contents

ThinkPad 390X Hardware Maintenance Manual

About This Manual

This manual contains service and reference information for the IBM ThinkPad 390X products. Use this manual along with the advanced diagnostics tests to troubleshoot problems effectively.

The manual is divided into sections as follows:

- The introduction section provides general information, guidelines, and safety information required to service computers.
- The product-specific section includes service, reference, and product-specific parts information.

This manual is intended for trained servicers who are familiar with ThinkPad products. Use this manual along with the advanced diagnostics tests to troubleshoot problems effectively.

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 service procedures before replacing any FRUs.
- **Use new nylon-coated screws when you replace 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 for 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 non-defective FRU.

What to Do First

The servicer must include the following in the parts exchange form or parts return form that is attached to the returned FRU:

1. Name and phone number of servicer
2. Date of service
3. Date when part 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 or not the damage applies to the warranty by referring to the following:

Note for Warranty: Durign 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 stresses beyond normal use:

The following is not covered under warranty:

- LCD panel cracked by applying 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 the diskette drive cover being pressed or by the insertion of a diskette with multiple labels
- Damaged or bent diskette eject button
- CD-ROM drive damage caused by excessive force, shock, or from being dropped
- Fuses blown by attachment of a nonsupported device
- Forgotten computer password (making the computer unusable)

The following symptoms might indicate damage caused by by nonwarranted activities:

- Missing parts might be a symptom of unauthorized service or modification.
- Hard Disk spindles can become noisy from being subjected to excessive force or from being dropped.

How to Disable the Password

There are three passwords used at a typical customer site: the Setup password, the Hard Disk password, and the Power On password.

- Power On password:
  1. Power off the computer.
  2. Remove the battery pack and AC Adapter.

3. Remove the backup battery (RTC) for 20 minutes or use a screwdriver to touch the backup battery (RTC) for 1 second.
4. Put back the backup battery (RTC).
5. Power on the computer and wait until POST ends.
6. Verifty that the password prompt does not appear.

- Supervisor and Hard Disk passwords:

  The Supervisor password and Hard Disk password (Hard Disk1 and Hard Disk2) are security features that are used to protect the system and the hard disk drive data from unauthorized access. No overriding capability is provided, so it 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.

Service Web site

When the latest maintenance diskette and system program service diskette are available, they are posted on:

Maintenance diskette:

`http://www.pc.ibm.com/partner/infotips`

System program service diskette:

`http://pcbbs.raleigh.ibm.com/`

Product Overview

The following shows an overview of the system features of the ThinkPad 390X computer.

Feature	Description
Processor	• Intel** Mobile Pentium** II processor 400 MHz, on-die L2 cache • Intel** Mobile Celeron** processor 400 MHz, L2 cache
Bus architecture	PCI Bus
Memory	2 DIMM slots, no memory on the system board 32 MB, 64 MB or 128 MB DIMM card (max. 256 MB)
Video	• 12.1–inch, 64K colors, 800x600 pixel TFT color LCD • 14.1–inch, 64K colors, 1024x768 pixel TFT color LCD • 15.0–inch, 64K colors, 1024x768 pixel TFT color LCD
Audio	• 16–bit audio • Internal stereo speakers • Internal microphone • Wavetable MIDI
Diskette drive	1.44MB (3–mode), 3.5–inch
Hard disk drive	• 4.8 GB, 2.5–inch, IDE interface • 6.4 GB, 2.5–inch, IDE interface • 10.0 GB, 2.5–inch, IDE interface
CD-ROM drive	5.25–inch, 24X speed, E-IDE interface
DVD-ROM drive (option)	5.25–inch, 4X speed, E-IDE interface
I/O ports	• External monitor • Headphone/line-out • Line-in • Microphone-in • Mouse/keyboard • Parallel • Serial • USB • RJ45 or RJ11 • TV-out (S-video)
Infrared transfer	IrDA 1.1

Feature	Description
Internal modem	56Kbps (depends on the model) PCI
PC Card (PCMCIA)	One Type III or two Type II CardBus, ZV port support
AC Adapter	56–Watt type

Fn Key Combinations

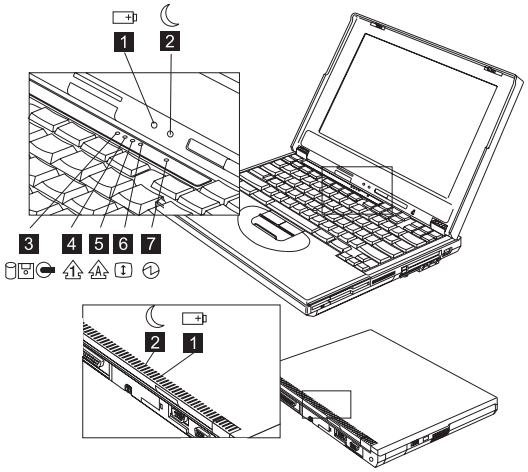
The following table shows the Fn key and function key combinations and their corresponding functions.

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

Fn +	**Result**
F2	Fuel-Gauge display on and off
F3	Standby mode
F4	Suspend mode
F7	Switch between the LCD, the external monitor, and both the LCD and external monitor
F8	Expand/shrink screen
F11	Switch power mode
F12	Hibernation mode

Status Indicators

The system status LED indicators show the current computer status. The following shows the location of each indicator symbol and the meaning of each indicator.



Symbol	Color	Meaning
(1) Battery status	Green	Enough battery power remains for operation.
	Blinking orange	The battery pack needs to be charged
	Orange	The battery pack is being charged.
(2) Suspend mode	Green	The computer is in suspend mode.
	Blinking green	The computer is entering suspend mode.
(3) Drive in use	Orange	Data is being read from or written to the hard disk drive, diskette drive, or data is being read from the CD-ROM drive. Do not enter hibernation mode or power off the computer when this indicator is on.
(4) Numeric lock	Green	The numeric keypad on the keyboard is enabled. You enable or disable the keypad by pressing and holding the **Shift** key, and pressing the **NumLk** key. For details, see the User's Reference.

Symbol	Color	Meaning
(5) Caps lock 	Green	Caps Lock mode is enabled. All alphabetic characters *(A-Z)* are entered in capital letters without the **Shift** key being pressed. You enable or disable the Caps Lock mode by pressing the **Caps Lock** key.
(6) Scroll lock 	Green	Scroll Lock mode is enabled. The **Arrow** keys can be used as screen-scroll function keys. The cursor cannot be moved with the **Arrow** keys. *Not all application programs support this function.* You enable or disable Scroll Lock mode by pressing the **ScrLk** key.
(7) Power on 	Green	The computer is operational. This indicator is always on when the computer is on and not in suspend mode.

Checkout Guide

Use the following procedure as a guide for computer problems. Besides the checkout tests described in this section, there are other items you can test for using the PC-Doctor DOS diagnostics program. See “PC-Doctor DOS System Diagnostics” on page 32 for details.

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 recreate 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 32
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-on indicator does not go on or stay on.)	“Power System Checkout” on page 16, then use table in “Power-Related Symptoms” on page 27.
POST does not complete. No beeps or error codes/messages are indicated.	“Symptom-to-FRU Index” on page 22, then use table in “No Beep Symptoms” on page 25.
POST beeps, but no error codes are displayed.	“Symptom-to-FRU Index” on page 22.
POST detected an error and displayed numeric error codes.	“Symptom-to-FRU Index” on page 22, then use table in “Numeric Error Codes” on page 23.
The diagnostic test detected an error and displayed a FRU code.	“Running the Diagnostics” on page 32.
Other symptoms (such as LCD display problems).	“Symptom-to-FRU Index” on page 22.
Symptoms cannot be recreated (intermittent problems).	Use the customer-reported symptoms, and go to “Symptom-to-FRU Index” on page 22.

Audio Checkout

Do as follows:

1. Boot from and start PC-Doctor DOS. (See “PC-Doctor DOS System Diagnostics” on page 32 for details.)
2. Select **Interactive Tests**.
3. Select **Internal Speaker**.

   If no sound is played, replace the speaker or the system board.
4. Select **Stereo Speaker**.

   If no music is played, replace the speaker or the system board.

Diskette Drive Checkout

Do the following to isolate the problem to a controller, drive, or diskette. A scratch, write-enabled, non-defective, high-density (2HD) diskette is required.

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

Do the following to select the test device. See “Running the Diagnostics” on page 32 for details.

1. Boot from and start PC-Doctor DOS. (See “PC-Doctor DOS System Diagnostics” on page 32 for details.)
2. Select **Diagnostics**.
3. Select **Diskette Drives**.
4. Follow the instructions in the message window.

If an error occurs with the internal diskette drive, reseat the connector on the system board.

If the error still remains:

1. Reseat the Combobay ASM.
2. Reseat the Diskette Drive (FDD ASM).
3. Replace the Diskette Drive (FDD ASM).
4. Replace the Combobay Interposer card ASM.
5. Replace the system board.

CD-ROM ASM Checkout

Do the following to isolate the problem to a controller, drive, or CD-ROM. Make sure that the CD-ROM disc does not have any label attached to it. The label can cause damage to the drive or can cause the drive to fail.

Do the following to select the test device:

1. Boot from and start PC-Doctor DOS. (See “PC-Doctor DOS System Diagnostics” on page 32 for details.)
2. Select **Interactive Tests**.

3. Select **CD-ROM/DVD Test**.
4. Follow the instructions in the message window.

If an error occurs, reseat the connector on the system board.

If the error still remains:

1. Reseat the Combobay ASM.
2. Reseat the CD-ROM ASM.
3. Replace the CD-ROM ASM.
4. Replace the Combobay Interposer card ASM.
5. Replace the system board.

Fan ASM Checkout

To check the Fan ASM, do the following:

1. Boot from and start PC-Doctor DOS. (See “PC-Doctor DOS System Diagnostics” on page 32 for details.)
2. Select **Diagnostics**.
3. Select **Other Devices**.
4. Select **Fan**.
5. Follow the instructions in the message window.

Keyboard and Auxiliary Input Device Checkout

Note: Remove the external keyboard if the internal keyboard is to be tested.

If the internal keyboard does not work or an unexpected character appears, make sure that the flexible cable extending from the keyboard is correctly seated in the connector.

If the keyboard cable connection is correct, run the Keyboard Test.

1. Boot from and start PC-Doctor DOS. (See “PC-Doctor DOS System Diagnostics” on page 32 for details.)
2. Select **Interactive Tests**.
3. Select **Keyboard**.
4. Follow the instructions in the message window.

If the test detects a keyboard problem, do the following one at a time to correct the problem. Do not replace a non-defective FRU.

1. Replace the keyboard.
2. 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 reoccur, replace the device and then the system board.

Memory Checkout

DIMM are available for increasing memory capacity.

Slot 1 (MB)	Slot 2 (MB)	Total Memory (MB)
32	0	32
0	32	32
32	32	64
64	0	64
0	64	64
64	32	96
32	64	96
64	64	128
128	0	128
0	128	128
128	32	160
32	128	160
128	64	192
64	128	192
128	128	256

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

Use the following procedure to isolate memory problems:

1. Boot from and start PC-Doctor DOS. (See “PC-Doctor DOS System Diagnostics” on page 32 for details.)
2. Select **Memory Test - Full** and/or **Memory Test - Quick**.
3. Follow the instructions in the message window.

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

System Programs in Flash Memory: System setup programs are stored in the flash memory.

Flash Memory Update: The flash memory update is required for the following conditions:

- New versions of system programs
- New features or options

Modem Board Checkout

Do the following to isolate the problem to the system internal modem:

1. Boot from and start PC-Doctor DOS. (See “PC-Doctor DOS System Diagnostics” on page 32 for details.)
2. Select **Diagnostics**.
3. Select **Other Devices**.
4. Run **Modem Loopback Test** and **Modem Dialtone/DTMF Test**.
5. Follow the instructions in the message window.
6. If the test detects a modem problem, replace the modem card.

Power System Checkout

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

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

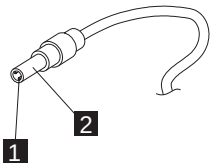
If you suspect a power problem, refer the the appropriate power supply check listed below:

- "Checking the AC Adapter"
- "Checking the Operational Charging" on page 17
- "Checking the Battery ASM" on page 17

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 ThinkPad Port Replicator with Advanced Etherjet Feature.
- 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 the Operational Charging" on page 17.

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	+15.5 to +17.0
2	Ground

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

If the voltage is within the range, do the following:

- Replace the DC-DC & BATT board.
- Replace the system board.
- If the problem is not corrected, go to "Undetermined Problems" on page 29

Note: An audible noise from the AC Adapter does not always indicate a defective adapter.

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

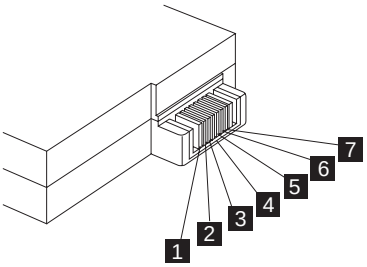
Perform operational charging. If the battery status indicator does not turn on, remove the Battery ASM and let it return to room temperature. Reinstall the Battery ASM.

If the charge indicator still does not turn on, replace the Battery ASM. If the charge indicator still does not turn on, replace the DC-DC & BATT board, then the system board. Then reinstall the Battery ASM. If the reinstalled Battery ASM is not charged, go to the next section.

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

Do the following:

1. Power off the computer.
2. Remove the Battery ASM and measure the voltage between battery terminals 1(+) and 7(-). See the following figure:



   Note: Signal lines, not used in these steps, are used for communications between the system and the battery.

3. If the voltage is less than 10.8V (Li-Ion) or 9.6V (NiMH), the Battery ASM has been discharged, recharge the Battery ASM. If the voltage is still less than 10.8V (Li-Ion) or 9.6V (NiMH), replace the battery.
4. If the voltage is more than 10.8V (Li-Ion) or 9.6V (NiMH), measure the resistance between battery terminals 1 and 3. The resistance must be 390 ohm (Li-Ion) or 4 to 30K ohm. If the resistance is not correct, replace the Battery ASM. If the resistance is correct, replace the DC-DC & BATT board then the system board.

TrackPoint Checkout

If the external mouse is connected, the TrackPoint does not work. In this case, please detach the external mouse to check the TrackPoint.

If this does not correct the TrackPoint problem, continue with the following.

After you use the TrackPoint, the pointer drifts on the screen for a short time. This self-acting pointer movement can occur when a slight, steady pressure is applied to the TrackPoint pointer. This symptom is not a hardware problem. No service actions are necessary if the pointer movement stops ina short period of time.

If a click button problem or pointing stick problem occurs, do the following:

1. Boot from and start PC-Doctor DOS. (See “PC-Doctor DOS System Diagnostics” on page 32 for details.)
2. Select **Interactive Tests**.
3. Select **Mouse**.
4. Follow the instructions in the message window.

If either the pointing stick or the click button does not work, do the following actions one a time to correct the problem. Do not replace a non-defective FRU.

1. Reseat the keyboard cables.
2. Replace the keyboard.
3. Replace the system board.

Power Management Features

Three power management modes are available in the computer system to reduce power consumption and to prolong battery life.

Standby Mode: In standby mode, the following occurs:

- The LCD backlight turns off.
- The audio amplifier turns off. (Fn+F3)

Events that cause the computer to enter standby mode:

- Standby mode requested by the Fn key (Fn+F3).

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

Suspend Mode: In suspend mode, the following occurs:

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

Events that cause the computer to enter suspend mode:

- Suspend mode requested by the Fn key (Fn+F4).
- The Lid is closed (BIOS Setup).
- The specified time has elapsed.
- Battery low occurs and hibernation conditions are insufficient.

  Note: When battery is low, the battery status indicator blinks orange.
- The computer is ejected from the ThinkPad Port Replicator with Advanced Etherjet Feature (BIOS Setup).
- The UltraBay FX (Combobay) switch is pressed.

Notes:

1. In the IBM BIOS Setup Utility, the computer can be set to suspend when lid is closed.
2. In the IBM BIOS Setup Utility, the computer can be set to suspend when docked.

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

- The Lid is opened.
- The real time clock alarm is signaled.
- The ring indicator (RI) is signaled by the internal modem or a PC Card device.
- The Fn key is pressed.
- Wake on LAN occurs.
- Power switch is pressed.

The computer also exits suspend mode when timer conditions are satisfied for entering hibernation mode.

Hibernation Mode: For Windows NT or OS/2 user:

A Windows NT or OS/2 user cannot create a hibernation file in a Windows NT or OS/2 system that uses the NTFS/HPFS format system. If you want to use hibernation mode, you should reinstall Windows NT with a FAT format system. Also, if boot manager is installed, the computer cannot enter hibernation mode.

Note: Before using hibernation mode, you need a hibernation file.

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 when docked.
2. The computer cannot enter hibernation mode when it is attached to the ThinkPad Port Replicator with Advanced Etherjet Feature.

Events that cause the computer to enter hibernation mode:

- Hibernation mode requested by function key (Fn+F12).
- Timer conditions are satisfied in suspend mode when hibernate by timer is enabled.
- A critically low battery condition occurs.
- The power switch is pressed. (BIOS Setup)

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

The following events cause the computer to resume operation from hibernation mode.

- The power switch is pressed.
- The real time clock alarm is signaled.
- Wake on LAN occurs.

How to Create the Hibernation Function: Do as follows:

- Start the ThinkPad Configuration program.
- Click on the **Power Management** icon.
- Click on the **Hibernation Options** tab.

- Click on **Enable Hibernation**.
- Click on **OK**.

Note: If you change the memory size, you need to recreate the hibernation file or partition. For partition-based hibernation, use the hibernation utility to delete the partition first before creating a new one.

Symptom-to-FRU Index

The Symptom-to-FRU Index lists the symptoms and errors and 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 columns. If a FRU replacement does not solve the problem, put the original part back in the computer. Do not replace a non-defective FRU.

This index can also be used to help you decide the next possible FRUs to be replaced when servicing a computer.

Numeric error codes show the errors detected in POST or system operation (runtime). 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 29.

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

Numeric Error Codes

The following is a list of the message that the BIOS can display. Most of them occur during POST. Some of them display information about a hardware device, e.g., the amount of memory installed. Others may indicate a problem witha device, such as the way it has been configured. Following the list are explanations of the messages and remedies for reported problems.

If the system fails after you make changes in the Setup menus, reset the computer, enter Setup and install Setup defaults or correct the error.

Symptom/Error	FRU/Action in Sequence
0200 Failure Fixed Disk	1. Reseat hard disk drive. 2. Load Setup Defaults in BIOS Setup Utility. 3. Hard disk drive 4. System board
021x Keyboard error	Go to “Keyboard and Auxiliary Input Device Checkout” on page 13.
023x Memory error	1. DIMM 2. BIOS ROM 3. System board
0250 System battery error	Replace backup battery (RTC) and run BIOS Setup Utility to reconfigure the system time, then reboot the system.
0251 System CMOS checksum bad — Default configuration used	1. Backup battery (RTC) 2. Run BIOS Setup Utility to reconfigure the system, then reboot the system.
0260 System timer error	1. Backtup battery (RTC) 2. Run BIOS Setup Utility to reconfigure the system, then reboot the system. 3. System board
0270 Real time clock error	1. Backtup battery (RTC) 2. Run BIOS Setup Utility to reconfigure the system, then reboot the system. 3. System board
0271 Check date and time setting	1. Run BIOS Setup Utility and verify date and time. 2. Backup battery (RTC) 3. System board

Symptom/Error	FRU/Action in Sequence
0281 Memory size found by POST differed from CMOS	1. Load Setup Defaults in the BIOS Setup Utility. 2. DIMM 3. System board
02Bx Diskette drive A error	1. Check that the drive is defined with the proper diskette type in BIOS Setup Utility. 2. Go to “Diskette Drive Checkout” on page 11.
02D0 System cache error — Cache disabled	1. CPU card 2. System board

Error Messages

Symptom/Error	FRU/Action in Sequence
Device Address Conflict	1. Load Setup Defaults in BIOS Setup Utility. 2. Backup battery (RTC) 3. System board
Allocation Error for: device	1. Load Setup Defaults in BIOS Setup Utility. 2. Backup battery (RTC) 3. System board
Failing Bits: nnnn	1. DIMM 2. BIOS ROM 3. System board
Invalid System Configuration Data	1. Load Setup Defaults in BIOS Setup Utility. 2. BIOS ROM 3. System board
I/O device IRQ conflict	1. Load Setup Defaults in BIOS Setup Utility. 2. Backup battery (RTC) 3. System board
Operating system not found	1. Enter BIOS Setup Utiltiy and see if the hard disk drive and diskette drive A: are properly identified. 2. Diskette drive (FDD ASM) 3. Hard disk drive 4. System board
Critical battery low	Save your work; then connect the AC Adapter to the computer to recharge the battery.
ERROR EDO RAM exist, system halt! Non PC100 SDRAM exist, system halt!	1. DIMM 2. System board

No Beep Symptoms

Symptom/Error	FRU/Action in Sequence
No beep, power-on indicator on, LCD blank, no POST	• Ensure every connector is connected tightly and correctly. • DIMM • Reseat CPU card. • CPU card • System board

Symptom/Error	FRU/Action in Sequence
No beep, power-on indicator off, LCD blank during POST	• Battery ASM • AC Adapter • DC-DC & BATT board ASM • System board
No beep, power-on indicator on, LCD blank during POST	• Reseat DIMM. • CPU card • System board
No beep during POST but system runs correctly.	Speaker

LCD-Related Symptoms

Symptom/Error	FRU/Action in Sequence
LCD backlight not working LCD too dark LCD brightness cannot be adjusted LCD contrast cannot be adjusted	1. Reseat the LCD connector. 2. Check the LCD inverter ID 3. LCD FPC ASM 4. LCD inverter 5. LCD 6. System board
LCD screen unreadable Screen abnormal Wrong color displayed	1. Reseat the LCD connector. 2. Check the LCD inverter ID 3. LCD FPC ASM 4. LCD inverter 5. LCD 6. System board
LCD has extra horizontal or vertical lines displayed.	1. Check the LCD inverter ID 2. LCD FPC ASM 3. LCD inverter 4. LCD 5. System board

Keyboard-Related Symptoms

Symptom/Error	FRU/Action in Sequence
Keyboard (one or more keys) doesn't work.	1. Reseat the keyboard cable. 2. Keyboard 3. System board

Indicator-Related Symptoms

Symptom/Error	FRU/Action in Sequence
Indicator incorrectly remains off or on, but system runs correctly.	1. Reseat the LED board. 2. LED board 3. System board

Power-Related Symptoms

Symptom/Error	FRU/Action in Sequence
Power shuts down during operation.	1. Battery 2. AC Adapter 3. DC/DC & Charger board ASM 4. System board
The system will not power on.	1. Battery ASM 2. AC Adapter 3. DC/DC & Charger board ASM 4. System board
The system will not power off.	1. Press and hold the power switch for more than 4 seconds 2. DC/DC & Charger board ASM 3. System board
Battery can't be charged.	• Battery • DC/DC & Charger board ASM • Combobay board • System board

PC Card (PCMCIA)-Related Symptoms

Symptom/Error	FRU/Action in Sequence
System cannot detect the PC Card (PCMCIA)	1. PC Card (PCMCIA) slots assembly 2. System board

Speaker-Related Symptoms

Symptom/Error	FRU/Action in Sequence
Speakers make noise or no sound comes from system.	1. Speaker 2. System board
In DOS or Windows multimedia programs, no sound comes from the computer.	1. Speaker 2. System board

Power Management-Related Symptoms

Symptom/Error	FRU/Action in Sequence
The system will not enter hibernation mode.	1. Check if hibernation file is created. 2. Keyboard (if control is from the keyboard) 3. Hard disk drive 4. System board

Symptom/Error	FRU/Action in Sequence
The system will not wake up from hibernation mode.	1. Keyboard (if control is from the keyboard) 2. Hard disk drive 3. System board
The system will not enter suspend mode after closing the LCD.	1. Lid switch 2. System board
Battery fuel-gauge does not go higher than 90%.	1. Remove Battery ASM and let it cool for 2 hours. 2. Refresh battery (continue using battery in BIOS Setup mode until powe off, then charge battery). 3. Battery 4. DC/DC & Charger board 5. System board
System configuration does not match the installed devices.	1. Load Setup Defaults and reboot the system. 2. Reseat the Combobay ASM.
System hangs intermittently.	1. Reseat Hard Disk/Combobay ASM. 2. Fan ASM 3. System board

Peripheral-Device-Related Symptom

Symptom/Error	FRU/Action in Sequence
External display does not work correctly.	System board
USB does not work correctly.	System board
Print problems.	• Run printer self-test. • Printer driver • Printer cable • System board
Serial or parallel port device problems.	• Device driver • Device cable • Device • System board

Note: If you cannot find a symptom or an error in this list and the problem remains, see “Undetermined Problems” on page 29.

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, electronic 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 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, which installed devices are incorrect, whether a short circuit is suspected, or whether the system is inoperative. Follow these procedures to isolate the failing FRU (do not isolate nondefective FRUs).

Verify that the power supply being used at the time of the failure is operating correctly. (See “Power System Checkout” on page 16).

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 ThinkPad Port Replicator with Advanced Etherjet Feature
   c. Printer, mouse, and other external devices
   d. Battery ASM
   e. Hard disk drive
   f. DIMM
   g. CD-ROM and Diskette Drive (FDD ASM) in the Combobay (UltraBay FX)
   h. PC Cards (PCMCIA)
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 non-defective FRU.
   a. System board
   b. LCD panel ASM
   c. CPU card

CE Utility Program Diskette

Note: You can download the CE Utility Program Diskette from the IBM website.

Setting the LCD Panel ID

There is an EEPROM in the inverter which stores its supported LCD type ID code. If you replace a LCD with one of a different brand or use a new inverter, the ID information in the inverter EEPROM should be updated.

Follow the steps below to set the LCD Panel ID:

1. Boot from the Utility Program Diskette.
2. Select **LCD Panel ID Utility** from PC DOS 7.0 Startup Menu.
3. Follow the instructions on the screen to read the current or to set a new LCD Panel ID code.

   Note: When you set a new LCD Panel ID and the new LCD is not yet enabled (to function), connect an external CRT to see the program execution process.

   Attention: Make sure the new ID code you choose corresponds to the LCD brand and type. If you write a wrong ID into the inverter, just reboot and re-execute the program and input the correct ID code.
4. Restart the computer — the new LCD should work normally.

Note: If the LCD cannot display after changing the ID code, make sure you write the correct ID code or try reconnecting the LCD FPC cable connectors.

Setting the Thermal Sensor

The system is equipped with sensors to protect against system overheating. By setting the system and processor thermal thresholds, the system can turn on the cooling Fan ASM or shut down automatically when the temperature reaches the defined threshold parameters.

System experiencing frequent auto sensor shutdown may need to reset the thermal sensor threshold and execute the Fan ASM test to ensure the normal operation of the cooling Fan ASM (refer to “Fan ASM Checkout” on page 12).

Follow the steps below to set the thermal threshold:

1. Boot from the Utility Program Diskette.
2. Select **Thermal Sensor Utility** from PC DOS 7.0 Startup menu, then press **F4**.

Writing the RFID Data

The EEPROM on the system board contains the system unit serial number and the system board serial number. When you replace the system board, restore the system unit serial number using the RFID Utility in the ThinkPad CE Utility Diskette. The serial number label is attached to the computer.

This utility allows you to

- add S/N data to the EEPROM (option 1)
- read S/N data from the EEPROM (option 2)
- delete S/N data from the EEPROM (option 3)

Follow the instructions on the screen.

Flash UUID

The EEPROM on the system board contains the Universal Unique ID (UUID) — that is, for Microsoft or Internet use. When you replace the system board using the Flash UUID Utility in the ThinkPad CE Utility Diskette. The UUID utility will automatically assign the UUID via Windows.

Running the Diagnostics

PC-Doctor DOS is used to perform diagnostics on the ThinkPad 390X.

PC-Doctor DOS System Diagnostics

Note: Some test items require tools as shown below:

- Diskette Drive: Erasable 2HD diskette
- Parallel: Tri-Connector Wrap plug (P/N: 72X8546)
- Serial: Tri-Connector Wrap plug (P/N: 72X8546)
- PCMCIA: PC test card (P/N: 35G4703)
- USB: USB Parallel Test cable (P/N: 05K2580)
- CD-ROM: Any data and audio CDs
- ThinkPad 390X PC-Doctor DOS Diskettes 1 and 2 (available from the website)
- ThinkPad 390X CE Utility Diskette (available from the website)

To run PC-Doctor DOS:

1. Shutdown the computer.
2. Insert the PC-Doctor DOS diskette into the diskette drive.
3. Turn on the computer.
4. Select the correct model name:
   - Option 1: TP-390X without audio
   - Option 2: TP-390X with audio

   and press **Enter**.
5. Follow the message on the screen.

   The PC-Doctor DOS diagnostics program screen appears.

To use PC-Doctor DOS:

1. Press the **left and right arrow keys** to move around the main menu. Press **Enter** to enable the highlighted option. The main options are:
   - Diagnostics
   - Interactive Tests
   - Hardware Info
   - Utility
   - Quit
2. Press the **up and down arrow keys** to move in a selected menu. Press **Enter** to enable the highlighted option.

Note: You can press **F1** for help.

The Diagnostics and Interactive Tests menus contain test items you perform on the computer. After performing a test, press **F3** to view the test result log for detailed information.

PC-Doctor DOS Diagnostics Error Codes and Messages: The following table does not include user-initiated aborts, which display the error type 195.

Error Code 0-199

Error Code	Test(s)	Message
0-199	Y2K	Year 2000 issue detected

FRU/Action in Sequence:

- Backup battery (RTC)
- System board

Error Code 1-1 to 1-260

Error Code	Test(s)	Message
1-1	SMBUS	No SMBUS detected (if iFailNoSmbus=1)
1-34	DMA	DMA transfer buffer allocate
1-198	SMBUS	No SMBUS detected (if iFailNoSmbus=0)
1-254	DMA	DMA transfer
1-255	DMA	DMA page register
1-256	DMA	DMA register
1-260	IRQ	IRQ controller

FRU/Action in Sequence:

- System board

Error Code 1-286 to 1-300

Error Code	Test(s)	Message
1-286	Timer	Timer 0
		BIOS timer
1-287	Timer	Timer 1
		RAM refresh
1-288	Timer	Timer 2
1-292	CMOS RAM	Pattern test
1-298	RTC	Time update
1-299	RTC	Periodic interrupt
1-300	RTC	Alarm interrupt

FRU/Action in Sequence:

- Check BIOS setting
- Backup battery (RTC)
- System board

Error Code 5-16 to 15-36

Error Code	Test(s)	Message
5-16	Video	Memory pattern failed
5-24	Video	Video page test failed
5-26	Video	Register failed
5-199	Video	Could not initialize mode 13H for register test
11-2	COM	Timeout sending
11-13	COM	LCR/MCR fail
11-14	COM	Internal loopback
11-15	COM	External loopback
11-40	COM	No interrupt detected
11-197	COM	No FIFO part (can't run FIFO test)
		IR mode enabled (can't run serial test)
		No external loopback adapter (if prompt times out)
11-198	COM	Aborted
11-286	COM	Baudrate register
11-290	COM	DLAB
14-15	LPT	External loopback fail
14-40	LPT	No interrupt
14-196	LPT	Test aborted (too many failures)
14-197	LPT	No loopback (prompt timed out)
14-250	LPT	Data register
15-1	USB	Not detected
15-36	USB	Register failed

FRU/Action in Sequence:

- System board

Error Code 18-1 to 18-27

Error Code	Test(s)	Message
18-1	PCMCIA	No PCMCIA detected
18-5	PCMCIA	Incorrect PCMCIA version
18-9	PCMCIA	Incorrect number of sockets
18-24	PCMCIA	Index register failed
18-27	PCMCIA	Socket configuration read error

FRU/Action in Sequence:

- PCMCIA holder
- System board

Error Code 20-1 to 71-41

Error Code	Test(s)	Message
20-1	PCI	No PCI detected
20-5	PCI	Incorrect PCI BIOS version
20-27	PCI	Problem reading PCI configuration
20-196	PCI	Too many PCI errors
25-14	IDE	Controller data loop
25-32	IDE	Inquiry data change between reads
25-195	IDE	User abort
25-198	IDE	No drive parameters readable
		Testing parameters out of range
25-250	IDE	POST/BIST
25-260	IDE	Read/verify
25-262	IDE	Seek error
71-1	SB	PNPISA sound card detected, but not enabled
		PCI sound card detected, but not enabled
		Sound card not detected
71-11	SB	DSP data loopback failed
71-40	SB	IRQ test failed
71-41	SB	DMA test failed

FRU/Action in Sequence:

- System board

Error Code 75-1

Error Code	Test(s)	Message
75-1	ACCHARGER	AC Charger not supported

FRU/Action in Sequence:

- DC-DC & BATT board ASM
- System board

Error Code 89-250 to 89-294

Error Code	Test(s)	Message
89-250	CPU	Math coprocessor
89-266	CPU	Registers
		MMX
89-278	CPU	Arithmetics
89-282	CPU	Logical ops
89-286	CPU	String ops
89-294	CPU	Exceptions

FRU/Action in Sequence:

- Reload BIOS default setting
- CPU card
- System board

Error Code 170-1 to 175-198

Error Code	Test(s)	Message
170-1	LM80/LM81	Chip not detected (iFailNoLm80=1)
170-27	LM80/LM81	All interrupts masked
170-198	LM80/LM81	Chip not detected (iFailNoLm80=0)
170-250	LM80/LM81	Interrupt condition detected
175-1	LM75/ Max1617/ FAN	Chip not detected (iFailNoLm80=1)
		Fan test not supported
		No fan detected
175-198	LM75/ Max1617	Chip not detected (iFailNoLm80=0)

FRU/Action in Sequence:

- System board

Error Code 175-199

Error Code	Test(s)	Message
175-199	FAN	Fan test failed

FRU/Action in Sequence:

- Fan ASM
- System board

Error Code 175-250 to 185-262

Error Code	Test(s)	Message
175-250	LM75/ Max1617	Interrupt condition detected
185-1	RFID/ ALERTPACK	Asset ID not supported
		SMBUS not detected (if not required)
		AlertPack not supported
		AlertPack not detected (if not required)
185-2	ALERTPACK	Transmission timeout
185-5	ALERTPACK	Invalid revision
185-9	RFID/ ALERTPACK	SMBUS not detected (if required)
		AlertPack not detected (if required)
185-16	ALERTPACK	Pattern test
185-262	RFID/ ALERTPACK	Problem reading EEPROM
		Bad header checksum
		Bad area checksum
		Problem detecting antenna
		No antenna detected

FRU/Action in Sequence:

- System board

Error Code 201-1 to 201-198

Error Code	Test(s)	Message
201-1	DIMM	No SMBus detected (iFailNoSmbus=1)
		No DIMMs detected (iFailNoDimms=1)
201-13	DIMM	EEPROM write protect failed (iFailEpWr=1)
201-25	DIMM	Bad EEPROM checksum
201-198	DIMM	No SMBus detected (iFailNoSmbus=0)

FRU/Action in Sequence:

- DIMM
- System board

Error Code 202-1 to 202-18

Error Code	Test(s)	Message
202-1	CACHE	CPU not in correct mode for test
202-3	CACHE	NMI detected during cache test
202-18	CACHE	Cache failed random pattern test

FRU/Action in Sequence:

- System board

Error Code 206-16 to 206-290

Error Code	Test(s)	Message
206-16	FD	Sector pattern test failed
206-27	FD	Read failure (not able to detect disk size)
206-198	FD	Not able to detect disk size parameters
206-262	FD	Read, write or verify failure
206-290	FD	Seek failed

FRU/Action in Sequence:

- Reseat diskette drive cable
- Diskette drive (FDD ASM)
- System board

Error Code 215-1 to 215-254

Error Code	Test(s)	Message
215-1	CDROM	No drive or MSCDEX driver detected
215-196	CDROM	Too many errors
215-254	CDROM	Sector read failed

FRU/Action in Sequence:

- Reseat CD-ROM cable
- CD-ROM drive
- System board

Error Code 217-14 to 217-262

Error Code	Test(s)	Message
217-14	HD	Controller data loop
217-32	HD	Inquiry data change between reads
217-195	HD	User abort
217-198	HD	No drive parameters readable
		Testing parameters out of range
217-250	HD	POST/BIST
217-260	HD	Read/verify
217-262	HD	Seek error

FRU/Action in Sequence:

- Reload BIOS default setting
- Hard disk connector
- Hard disk drive

Error Code 301-250 to 301-266

Error Code	Test(s)	Message
301-250	KBD	Interrupt
301-254	KBD	POST
301-258	KBD	Stuck keys
301-266	KBD	Interface

FRU/Action in Sequence:

- Reseat keyboard connector
- Keyboard
- System board

Error Code 304-1 to 304-199

Error Code	Test(s)	Message
304–1	BATTERY	No battery installed
		No battery detected
304–199	BATTERY	General battery failure

FRU/Action in Sequence:

- Battery pack
- DC-DC & BATT board ASM
- System board

Error Code 415-1 to 415-250

Error Code	Test(s)	Message
415-1	MODEM	PNPISA modem detected but not enabled
		PCI modem detected but not enabled
		Modem not detected
415-250	COM/Modem	Modem ATZ
		No dialtone detected

FRU/Action in Sequence:

- Reseat Modem card
- Modem card
- System board

FRU Removals and Replacements

This section contains information about removals and replacements.

- Do not damage any parts. Only certified and trained personnel should service the computer.
- The arrows in this 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 callout, 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.
- When replacing a FRU, use the correct screw size, as shown in the procedures.

Safety Notice 1:

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 circuit.

Safety Notice 4:

The lithium battery can cause a fire, explosion, or severe burn. 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 only the battery in the appropriate parts listing. Use of an incorrect battery can result in ignition or explosion of the battery.

Safety Notice 8:

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

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

FRU Service Procedures

Review the following procedures before replacing any FRU.

LCD FRU Replacement Notice: 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:

- SVGA (12.1"): 4 or more bright dots, 4 or more dark dots, or a total of 8 or more bright and dark dots
- XGA (15.1"/14.1"): 7 or more bright dots, 7 or more dark dots, or a total of 8 or more bright and dark dots

Screw Notices: 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.
- They need additional force to tighten.
- They should be used only once.

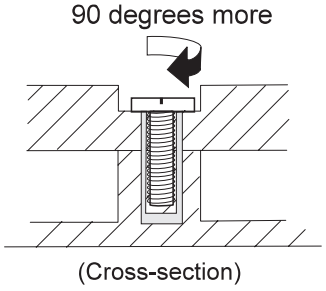
Do the following when you service this machine:

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

Loose screws can cause a reliability problem. The IBM ThinkPad computer addresses this problem with nylon-coated screws. Tighten screws as follows:

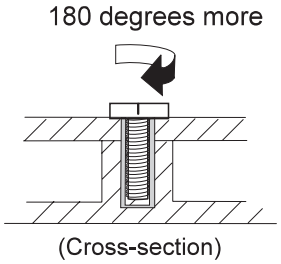
- Plastic to plastic

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



- Logic card to plastic

  Turn an additional **180 degrees** after the screw head touches the surface of the plastic part:



- Torque driver

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

Replacing the System Board: When you replace the system board, restore the system unit serial number using the RFID Utility and reassign the UUID using the Flash UUID Utility in the ThinkPad 390X CE Utility Diskette. See “Writing the RFID Data” on page 31 and “Flash UUID” on page 31 respectively.

Note: Do not power off the computer while restoring the RFID.

Important Notice

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

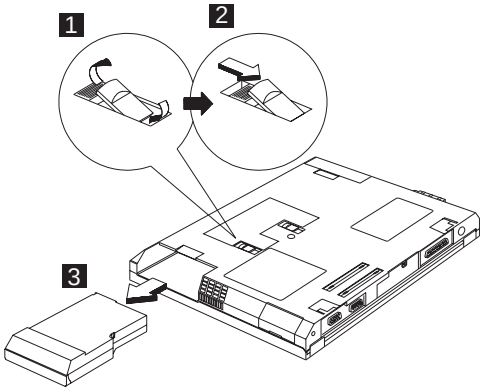
- They maintain tight connections.
- They do not easily come loose, even with shock or vibration.
- They need additional force to tighten.
- They should be used only once.

Do the following when you service this machine:

- Have a screw kit (05K5489) available.
- Always use new screws if you are instructed.
- Use a torque screwdriver if you have one.

Battery ASM

To remove the Battery ASM, press the latch to release, then pull out the Battery ASM.



Reverse the steps described above when installing a new battery pack.

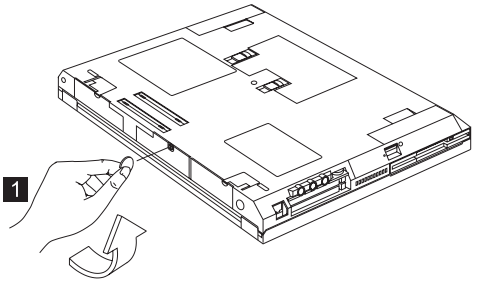
Hard Disk Drive

Warning

- 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 on the drive.
- Before removing the drive, have the user make a backup copy of all the informaiton on the drive if possible.
- Never remove the drive while the system is operating or is in suspend mode.

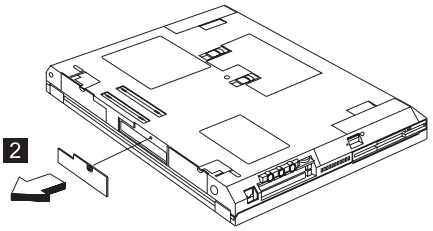
To remove the hard disk drive:

1. Use a coin to unscrew the hard disk drive screw.

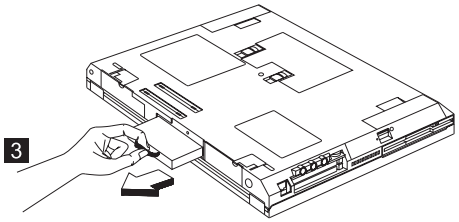


   Note: The screw cannot be removed from the cover.

2. Gently pull out the cover of the hard disk drive module.

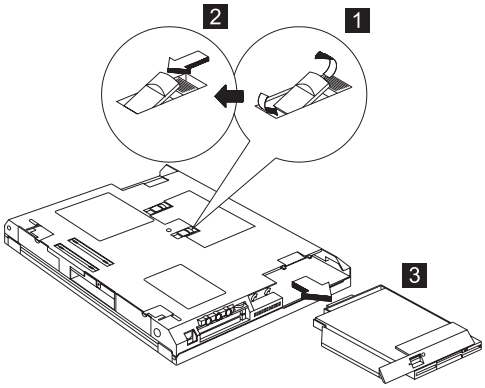


3. Carefully slide out the hard disk drive module to remove.



Combo Bay

To remove the Combo Bay, press and hold the lock to release, then slide out the Combo Bay module to remove.

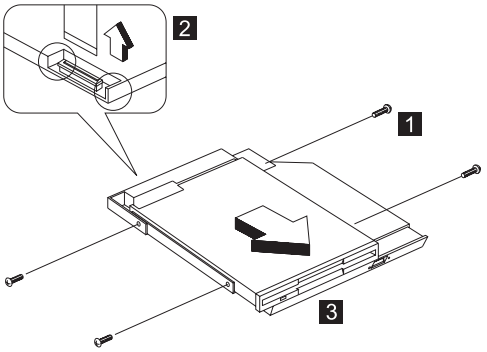


Diskette Drive (FDD ASM)

To remove the Diskette Drive (FDD ASM):

1. Remove the four screws securing the Diskettte Drive (FDD ASM) as shown.
2. Disconnect the Diskette Drive (FDD ASM) cable from the connector.

   Note: Lift both sides of the connector.
3. Slide out the Diskette Drive (FDD ASM) to remove.

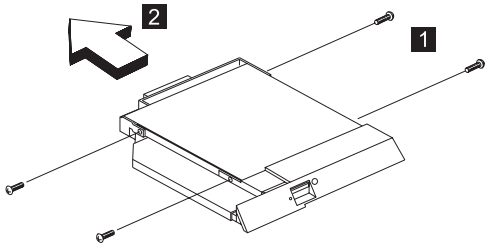


Step	Size (Quantity)	Head & Color	Torque
1	M2.5 x 3.5L (3)	Flat head, black	1.6 kgf-cm
Note: Make sure you use the correct screw for replacement.			

CD-ROM ASM

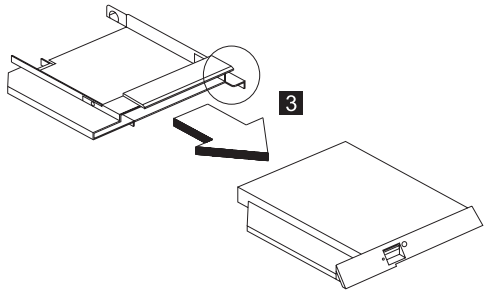
To remove the CD-ROM ASM:

1. Remove the four screws securing the CD-ROM ASM.



2. Carefully slide out the CD-ROM ASM to remove.

   Note: Watch out for the sharp edges on the CD-ROM ASM.

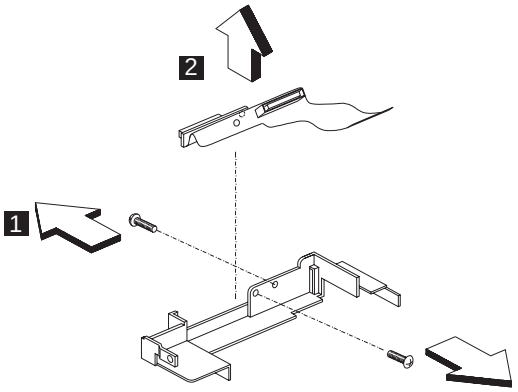


Step	Size (Quantity)	Head & Color	Torque
1	M2.5x 4L (4)	Flat head, silver	1.6 kgf-cm
Note: Make sure you use the correct screw for replacement.			

Combo Bay FPC

To remove the Combo Bay FPC:

1. Remove the two screws securing the Combo Bay FPC.
2. Carefully disconnect the Combo Bay FPC from the connector.

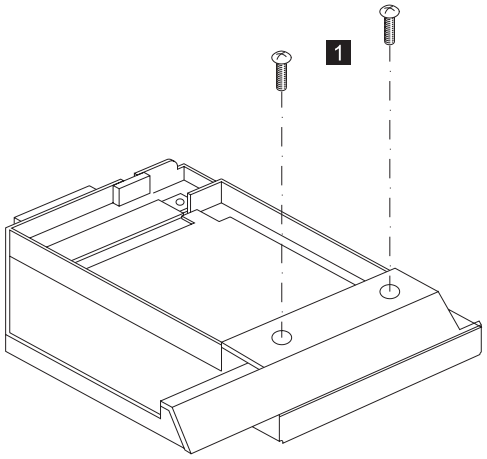


Step	Size (Quantity)	Head & Color	Torque
1	M2.5x 3.5L (2)	Flat head, black	1.6 kgf-cm
Note: Make sure you use the correct screw for replacement.			

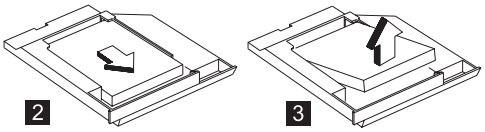
Hard Disk Adapter Combo Bay ASM

To remove the second hard disk drive from the hard disk drive adapter:

1. Remove the two screws of the Combo Bay adapter.



2. Slide the hard disk drive out and up to remove.



Step	Size (Quantity)	Head & Color	Torque
1	M3 x 5L (2)	Pan head, black	1.6 kgf-cm
Note: Make sure you use the correct screw for replacement.			

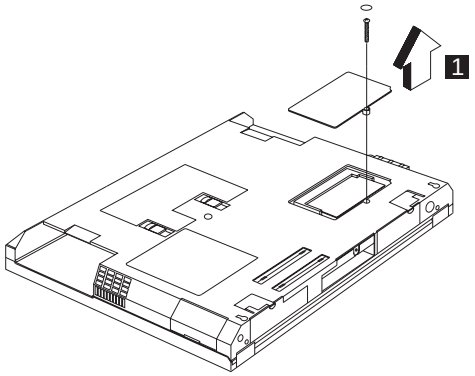
Modem Card

- “Battery ASM” on page 45

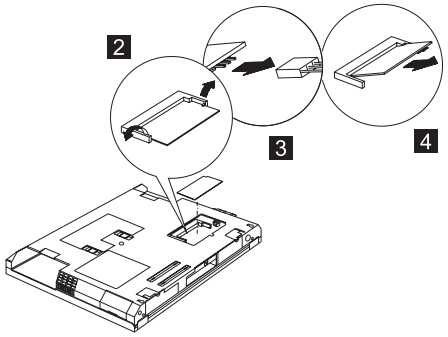
Note: Never remove or attach the card before removing the Battery ASM.

To remove the modem card:

1. Use a flat-bladed screwdriver to remove the screw on the modem door.



2. Carefully release the latches on both sides of the modem card.
3. Gently pull out the cable from the connector to remove the modem card.



Step	Size (Quantity)	Head & Color	Torque
1	M2.5 x 5L (1)	Flat head, black	2.0kgf-cm
Note: The screws do not separate from the modem board cover.			

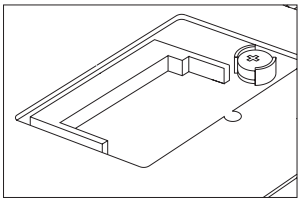
Backup Battery (RTC)

- “Battery ASM” on page 45
- “Modem Card” on page 52

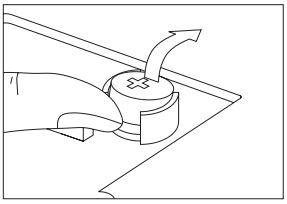
Warning

The lithium batery can cause a fire, explosion, or severe burn. 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 the battery as required by local ordinances or regulations. Use only the battery in the appropriate parts listing. Use of an incorrect battery can result in ignition or explosion of the battery.

Use your thumb first to pull out the backup battery (RTC).



1

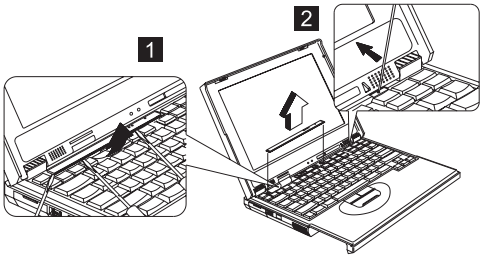


Keyboard

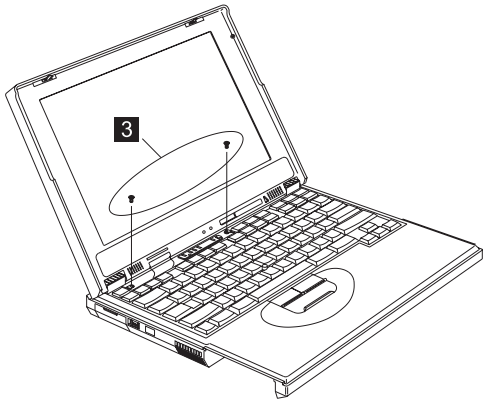
- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46

To remove the keyboard:

1. Use a 1/8" alignment tool to release the latches to lift the middle cover away.



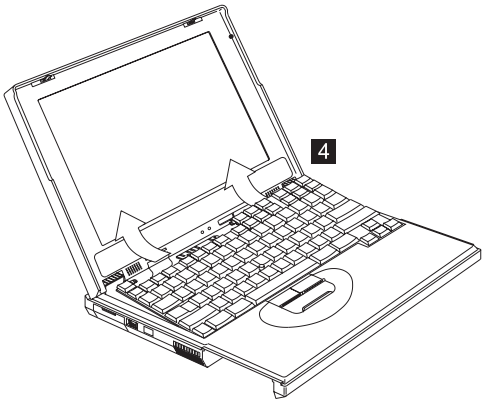
2. Remove the two screws securing the keyboard.



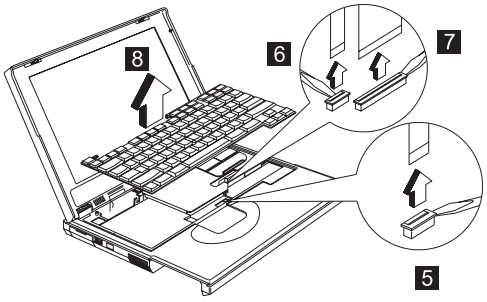
Step	Size (Quantity)	Head & Color	Torque
3	M2 x 4L (2)	Flat head, silver	1.6 kgf-cm
Note: Make sure you use the correct screw for replacement.			

3. Carefully lift the keyboard up to expose the keyboard connector.

   Note: Be careful of the keyboard cable as it is fragile.



4. Use a flat-bladed screwdriver to release the cable from the connector.
5. Remove the keyboard from the lower case.

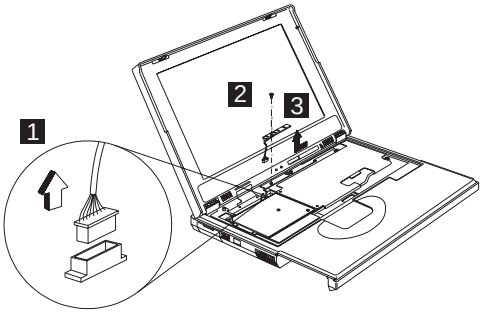


LED Board

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Keyboard” on page 54

To remove the LED board:

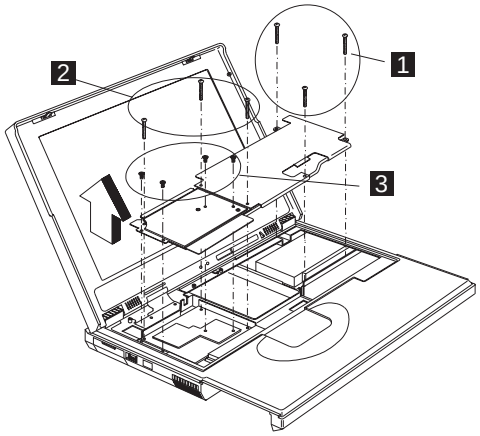
1. Remove the screw securing the LED board then disconnect the LED cable from the connector.
2. Lift the LED board.



Step	Size (Quantity)	Head & Color	Torque
2	M2 x 4L (1)	Flat head, silver	1.6 kgf-cm
Note: Make sure you use the correct screw for replacement.			

Upper Heatsink

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Keyboard” on page 54



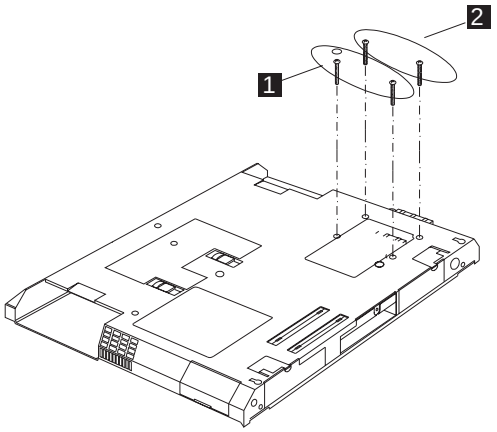
Step	Size (Quantity)	Head & Color	Torque
1	M2.5 x 18L (3)	Pan head, black	2.0 kgf-cm
2	M2 x 18L (3)	Pan head, black	2.0 kgf-cm
3	M2 x 4L (4)	Flat head, silver	1.6 kgf-cm
Note: Make sure you use the correct screw for replacement.			

PCMCIA Slots

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Keyboard” on page 54
- “Upper Heatsink” on page 57

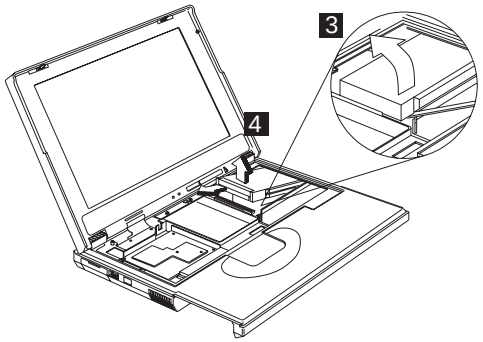
To remove the PCMCIA slots:

1. Remove the three screws securing the PCMCIA slot board.

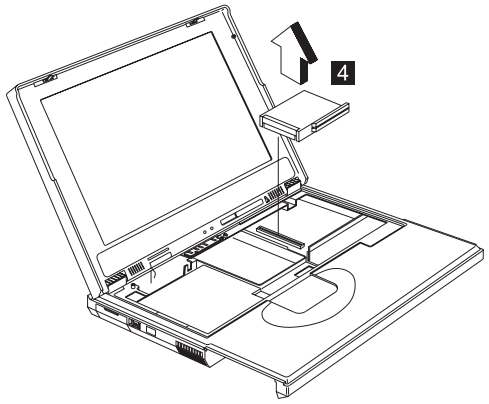


Step	Size (Quantity)	Head & Color	Torque
1	M2 x 18L (2)	Pan head, black	2.0 kgf-cm
2	M2 x 14L (2)	Flat head, silver	2.0 kgf-cm
Note: Make sure you use the correct screw for replacement.			

2. Use a flat-bladed screwdriver to disconnect the PCMCIA card from the connector.



3. Carefully remove the PCMCIA card.



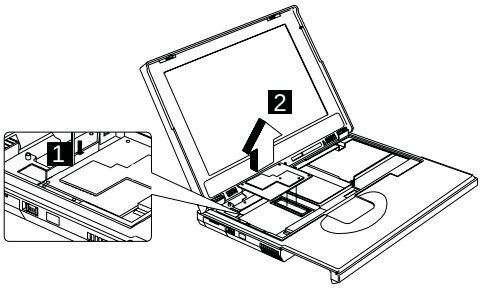
CAUTION:
When reassembling this section of the machine, the upper heatsink must be reassembled first before the PCMCIA slots.

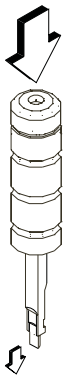
CPU Board

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Keyboard” on page 54

It is recommended that the CPU removal tool be used to release the CPU board.

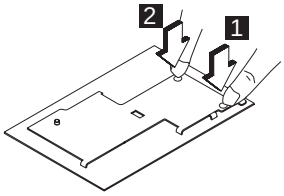
Note: For PSS the tool is for depot use only.





To install the CPU board.

Note: When you replace the CPU board, press only on the places indicated in the figure. Press both sides at the same time. Do not press only one side or any other part of the board.

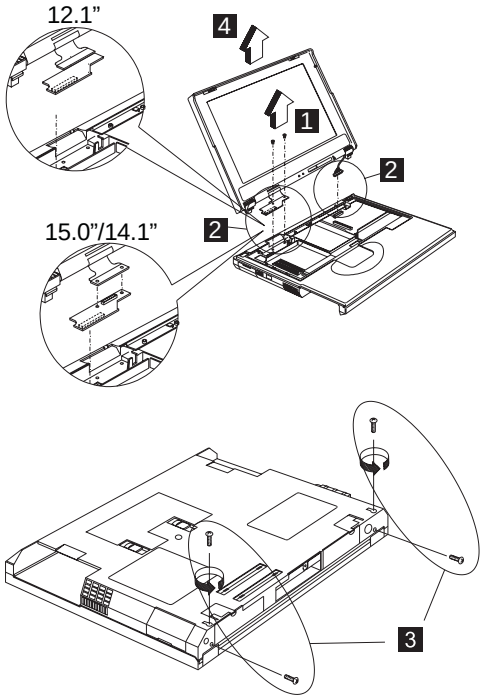


LCD Panel ASM

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Keyboard” on page 54

To remove the LCD Panel ASM:

1. Remove the two screws securing the LCD FPC cable.
2. Remove the LCD FPC cable. Then:
   - Disconnect the LCD FPC cable from the lower case (12.1").
   - Disconnect the LCD FPC cable and LVDS board (15.0" and 14.1").
3. Turn the notebook over; then remove four screws securing the LCD Panel ASM as shown.
4. Pull out the LCD Panel ASM.



Step	Size (Quantity)	Head & Color	Torque
2	M2.5 x 10L (1) M2 x 4L (1)	Pan head, black Flat head, silver	12.1"L 1.6 kgf–cm 12.1"R 1.6kgf-cm

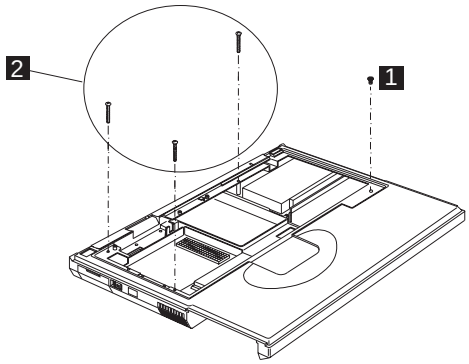
Step	Size (Quantity)	Head & Color	Torque
2	M2.5 x 18L (1) M2 x 10L (1)	Pan head, black Pan head, silver	15.1" and 14.1" L:1.6 kgf-cm R:1.6 kgf-cm
3	M2.5 x 6L (4)	Flat head, black	4.0 kgf-cm
Note: Make sure you use the correct screw for replacement.			

Upper Cover ASM

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54
- “LED Board” on page 56
- “Upper Heatsink” on page 57
- “LCD Panel ASM” on page 61

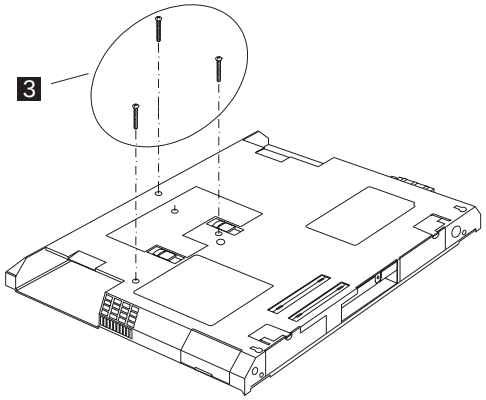
To remove the upper case:

1. Remove the screws from the upper cover ASM.



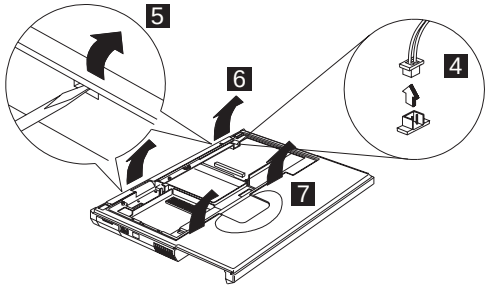
Step	Size (Quantity)	Head & Color	Torque
1	M2 x 4L (1)	Flat head, silver	1.6 kgf-cm
2	M2 x 18L (3)	Pan head, black	1.6 kgf-cm
Note: Make sure you use the correct screw for replacement.			

2. Turn the notebook over. Then remove the 4 screws from the base cover.



Step	Size (Quantity)	Head & Color	Torque
3	M2.5 x 18L (3)	Pan head, black	2.0 kgf-cm
Note: Make sure you use the correct screw for replacement.			

3. Use a flat-bladed screwdriver to remove the latch.
4. Disconnect the cable from the main unit. Now you can remove the upper cover ASM from the base cover ASM.

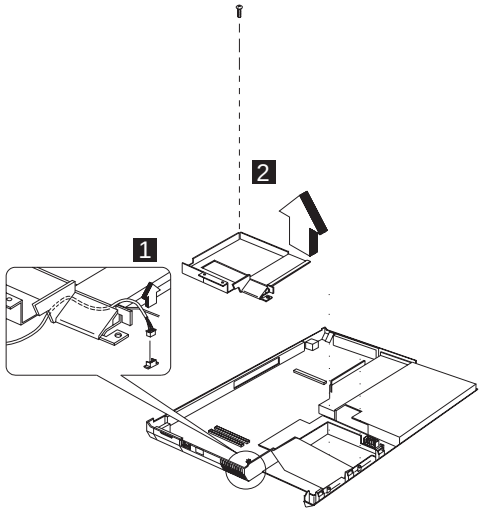


IMM Lower Heatsink ASM

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54
- “LED Board” on page 56
- “Upper Heatsink” on page 57
- “CPU Board” on page 60
- “LCD Panel ASM” on page 61
- “Upper Cover ASM” on page 63

To remove the IMM lower heatsink ASM:

1. Disconnect the fan cable from the connector.
2. Remove the screw securing the IMM lower heatsink ASM. Lift the IMM lower heatsink ASM up to remove.

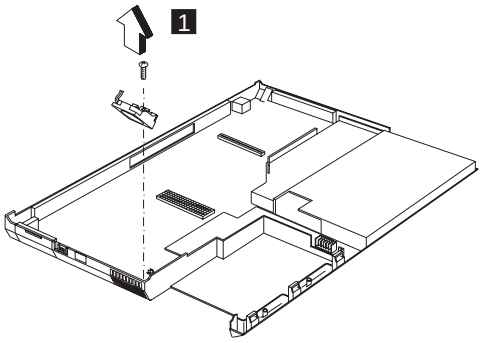


Step	Size (Quantity)	Head & Color	Torque
2	M2 x 10L (1)	Pan head, silver	1.6 kgf-cm
Note: Make sure you use the correct screw for replacement.			

Fan ASM

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54
- “LED Board” on page 56
- “Upper Heatsink” on page 57
- “CPU Board” on page 60
- “LCD Panel ASM” on page 61
- “Upper Cover ASM” on page 63
- “IMM Lower Heatsink ASM” on page 65

Remove the screw securing the fan ASM. Lift the fan ASM up to remove.

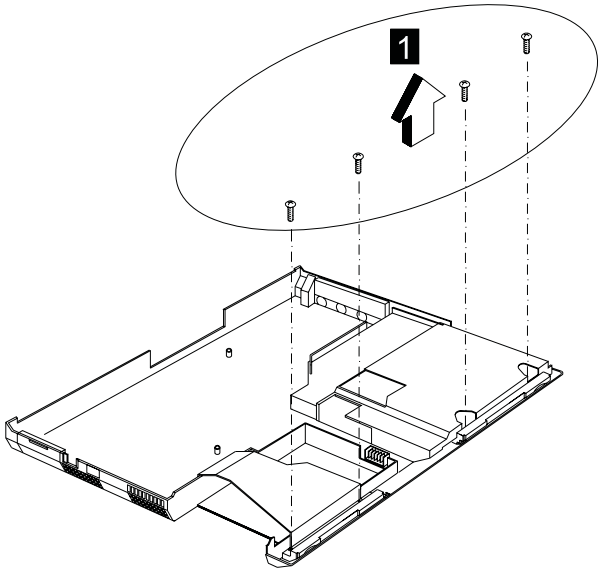


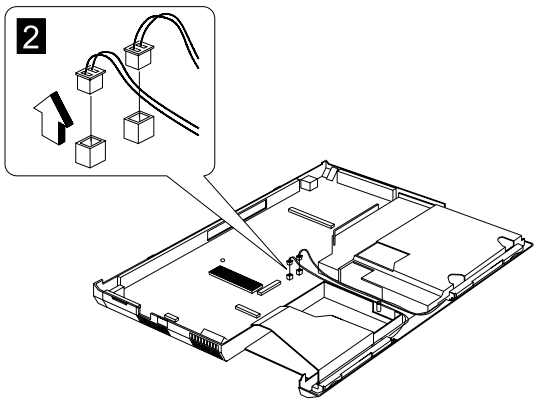
Step	Size (Quantity)	Head & Color	Torque
1	M2 x 4L (1)	Flat head, silver	1.6 kgf-cm
Note: Make sure you use the correct screw for replacement.			

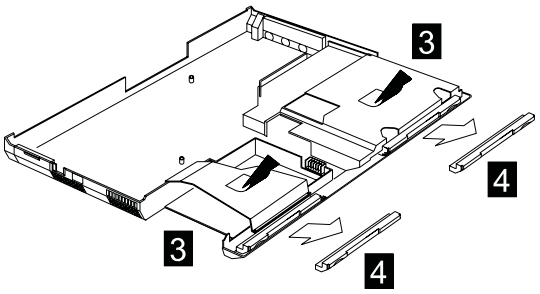
Speakers

Note: This section is only for 15.0–inch LCD models.

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54
- “LED Board” on page 56
- “Upper Heatsink” on page 57







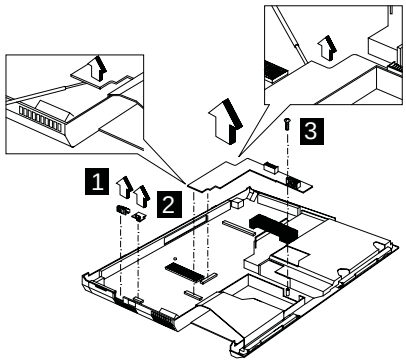
Step	Size (Quantity)	Head & Color	Torque
1	M2.5 x 6L (4)	Flat head, black	2.0 kgf-cm
Note: Make sure you use the correct screw for replacement.			

Power Latch, IR Board, and DC-DC & BATT Board

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54
- “LED Board” on page 56
- “Upper Heatsink” on page 57
- “CPU Board” on page 60
- “LCD Panel ASM” on page 61
- “Upper Cover ASM” on page 63
- “IMM Lower Heatsink ASM” on page 65
- “Fan ASM” on page 66

To remove these boards and latch:

1. Remove the power latch.
2. Remove the IR board.
3. Remove the screw securing the DC-DC & BATT board (using the 1/8" alignment tool) and disconnect the DC-DC & BATT board from the base cover ASM.



Step	Size (Quantity)	Head & Color	Torque
3	M2.5 x 6L (1)	Flat head, black	2.0 kgf-cm
Note: Make sure you use the correct screw for replacement.			

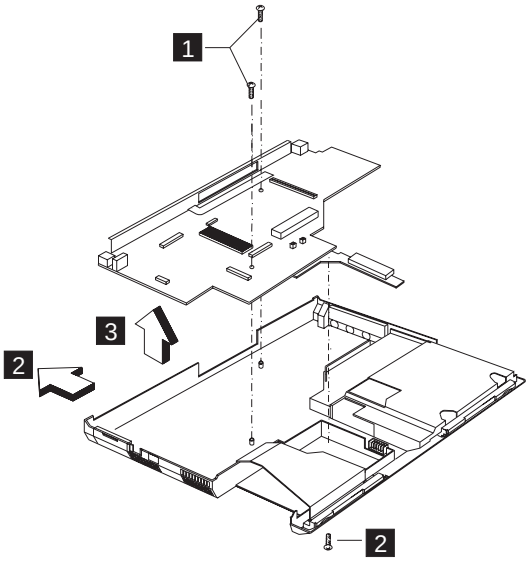
System Board

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54
- “LED Board” on page 56
- “Upper Heatsink” on page 57
- “CPU Board” on page 60
- “LCD Panel ASM” on page 61
- “Upper Cover ASM” on page 63
- “IMM Lower Heatsink ASM” on page 65
- “Fan ASM” on page 66
- “Speakers” on page 67

  Note: Only for 15.0–inch LCD models.
- “Power Latch, IR Board, and DC-DC & BATT Board” on page 69

Note: See “Replacing the System Board” on page 44 before proceeding.

Remove the two screws from the system board and gently remove the system board from the base cover ASM.



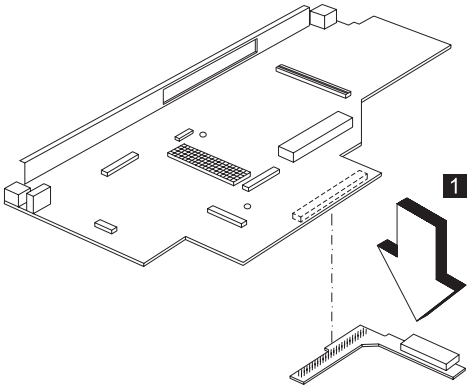
Step	Size (Quantity)	Head & Color	Torque
1	M2.5 x 6L (2)	Flat head, black	2.0 kgf-cm
2	M2.5 x 6L (1)	Flat head, black	2.0 kgf-cm

Step	Size (Quantity)	Head & Color	Torque
Note: Make sure you use the correct screw for replacement.			

Combo Bay Interposer Board

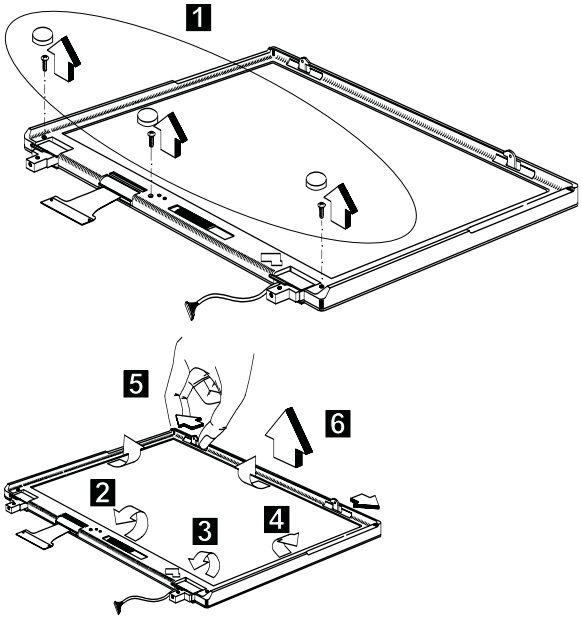
- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54
- “LED Board” on page 56
- “Upper Heatsink” on page 57
- “CPU Board” on page 60
- “LCD Panel ASM” on page 61
- “Upper Cover ASM” on page 63
- “IMM Lower Heatsink ASM” on page 65
- “Fan ASM” on page 66
- “Power Latch, IR Board, and DC-DC & BATT Board” on page 69
- “System Board” on page 70

Disconnect the Combo Bay Interposer Board from the system board.



LCD Bezel ASM 15.0"

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54

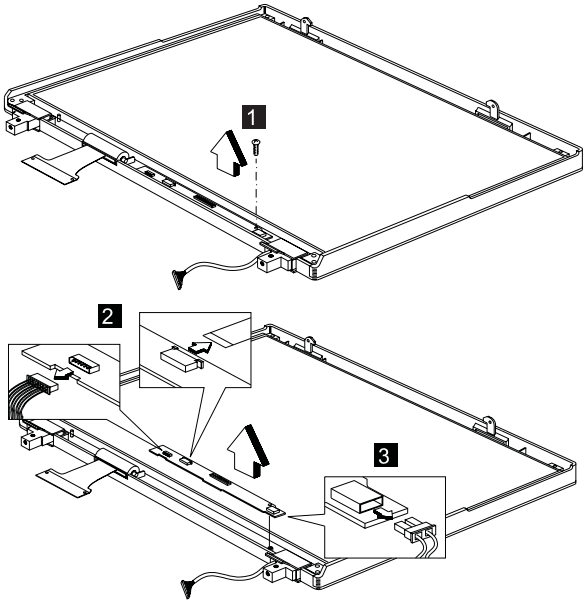


Step	Size (Quantity)	Head & Color	Torque
1	M2.5 x 6L (3)	Flat head, black	2.0 kgf-cm
Note: Make sure you use the correct screw for replacement.			

LCD Inverter ASM 15.0"

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54
- “LCD Bezel ASM 15.0"” on page 73

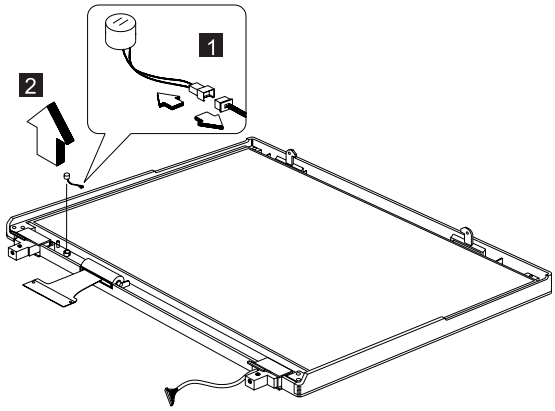
Note: See “Setting the LCD Panel ID” on page 30.



Step	Size (Quantity)	Head & Color	Torque
1	M2 x 4L (1)	Flat head, silver	1.6 kgf-cm
Note: Make sure you use the correct screw for replacement.			

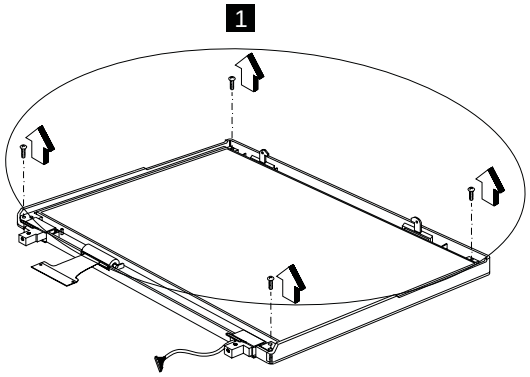
Microphone ASM 15.0"

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54
- “LCD Bezel ASM 15.0"” on page 73
- “LCD Inverter ASM 15.0"”

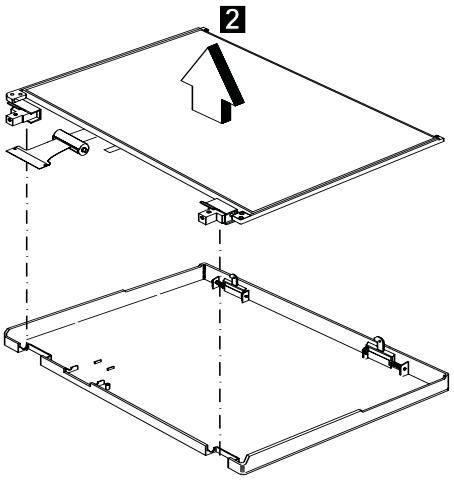

1
2

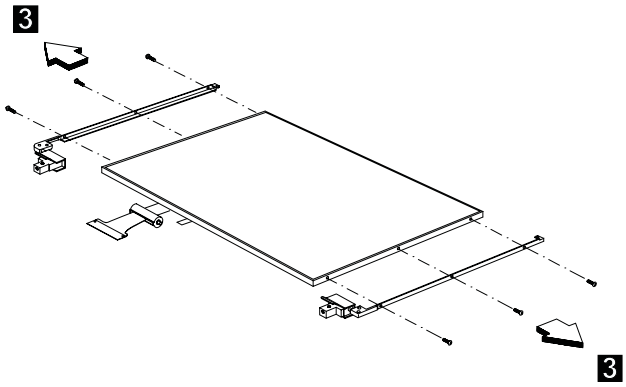
LCD Panel ASM 15.0"

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54
- “LCD Bezel ASM 15.0"” on page 73
- “LCD Inverter ASM 15.0"” on page 74
- “Microphone ASM 15.0"” on page 74

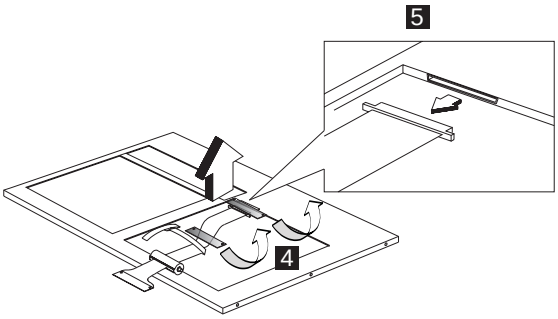


Step	Size (Quantity)	Head & Color	Torque
	M2.5 x 4L (4)	Flat head, black	2.0 kgf-cm
Note: Make sure you use the correct screw for replacement.			



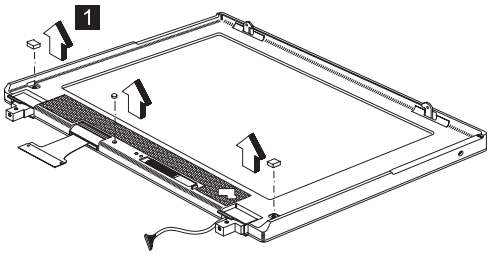


Step	Size (Quantity)	Head & Color	Torque
	M2 x 4L (6)	Flat head, silver	1.6 kgf-cm
Note: Make sure you use the correct screw for replacement.			

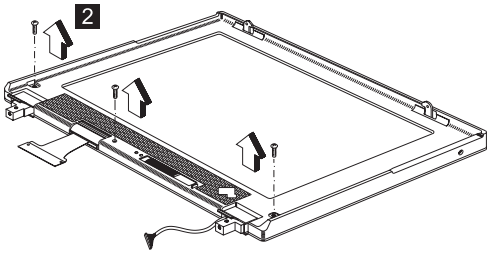


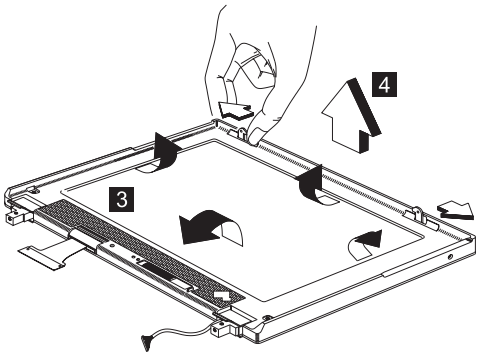
LCD Bezel ASM 14.1"

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54



Remove the three screws securing the LCD bezel.





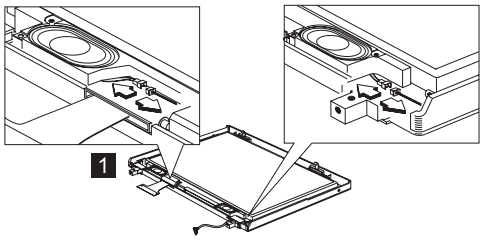
Step	Size (Quantity)	Head & Color	Torque
2	M2.5 x 6L (3)	Pan head, black	2.0 kgf-cm
Note: Make sure you use the correct screw for replacement.			

Speaker ASM 14.1"

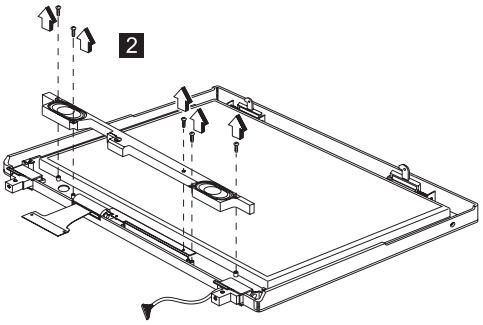
- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54
- “LCD Bezel ASM 14.1"” on page 78

To remove the speaker:

1. Carefully disconnect the speaker cable from the connector.



2. Remove the five screws securing the speaker.
3. Gently lift the speaker away from the display panel.



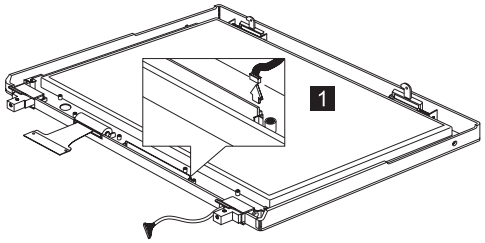
Step	Size (Quantity)	Head & Color	Torque
2	M2 x 4L (5)	Flat head, silver	1.6 kgf-cm
Note: Make sure you use the correct screw for replacement.			

VR Board ASM 14.1"

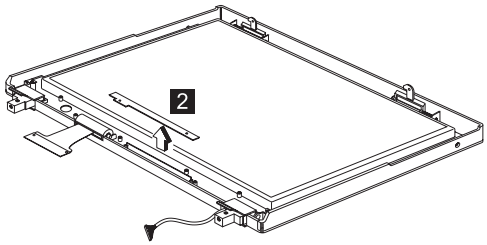
- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54
- “LCD Bezel ASM 14.1"" on page 78
- “Speaker ASM 14.1"" on page 80

To remove the VR board ASM:

1. Disconnect the power cable from the VR board.



2. Carefully remove the VR board from the display panel.

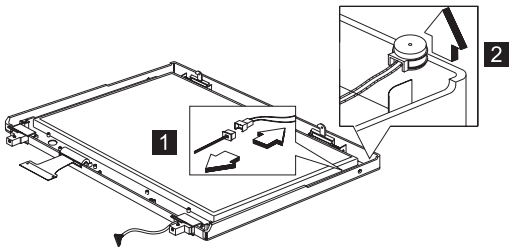


Microphone ASM 14.1"

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54
- “LCD Bezel ASM 14.1"” on page 78
- “Speaker ASM 14.1"” on page 80
- “VR Board ASM 14.1"” on page 81

To remove the microphone ASM:

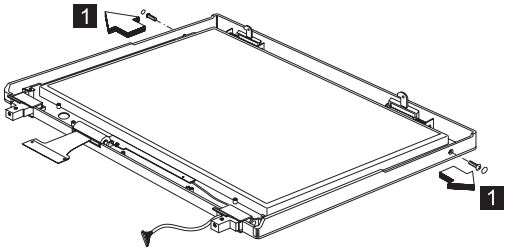
1. Disconnect the power cable from the microphone.
2. Lift the LCD away from the display panel.

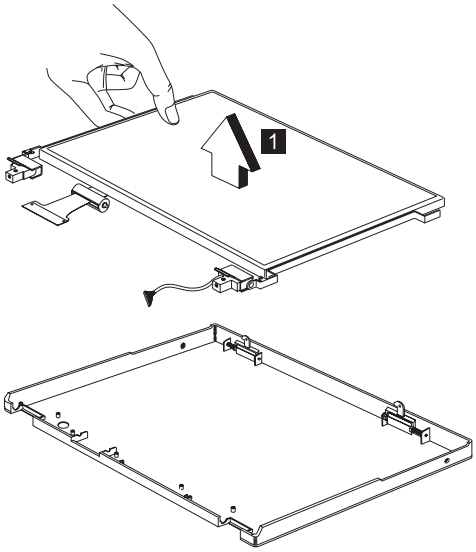


LCD Panel ASM 14.1"

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54
- “LCD Bezel ASM 14.1"” on page 78
- “Speaker ASM 14.1"” on page 80
- “VR Board ASM 14.1"” on page 81
- “Microphone ASM 14.1"” on page 82

Remove the screw covers and screws.





Step	Size (Quantity)	Head & Color	Torque
	M2 x 4L (2)	Flat head, silver	1.6 kgf-cm
Note: Make sure you use the correct screw for replacement.			

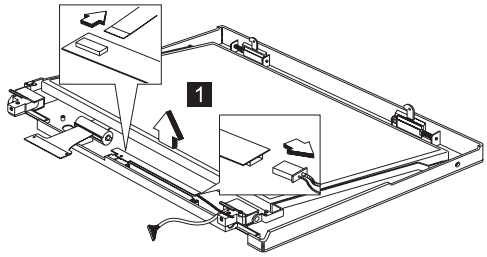
LCD Inverter ASM 14.1"

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54
- “LCD Bezel ASM 14.1"” on page 78
- “Speaker ASM 14.1"” on page 80
- “VR Board ASM 14.1"” on page 81
- “Microphone ASM 14.1"” on page 82
- “LCD Panel ASM 14.1"” on page 83

Note: See “Setting the LCD Panel ID” on page 30.

To remove the LCD inverter ASM:

1. Disconnect the cable from the inverter board.
2. Lift the inverter board away from the display panel.

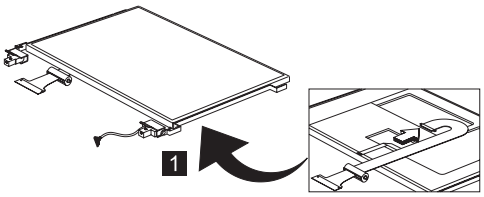


LCD FPC ASM 14.1"

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54
- “LCD Bezel ASM 14.1"” on page 78
- “Speaker ASM 14.1"” on page 80
- “VR Board ASM 14.1"” on page 81
- “Microphone ASM 14.1"” on page 82
- “LCD Panel ASM 14.1"” on page 83

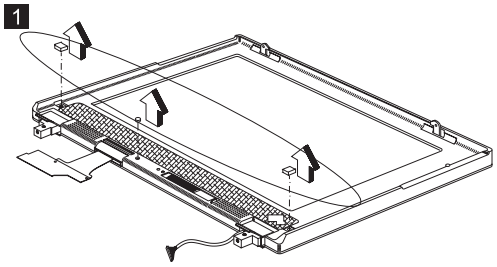
Disconnect the LCD FPC cable from the LCD.

Note: The LCD FPC cable has a double-sided adhesive tape attached on its back side. Two current black tapes (LCD FPC Stopper Tape) must be applied to this cable.

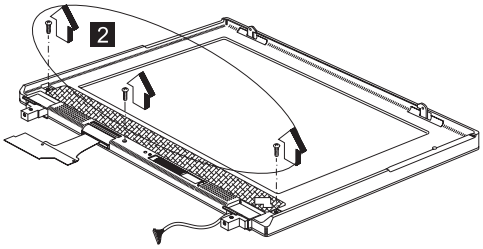


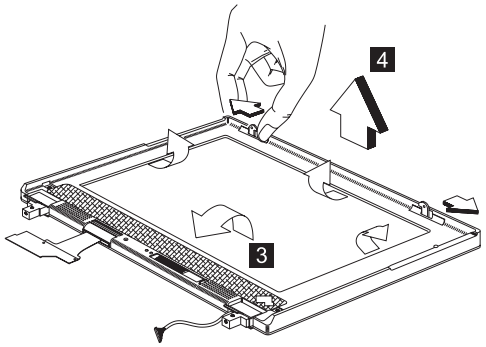
LCD Bezel ASM 12.1"

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54



Remove the three screws securing the LCD bezel.





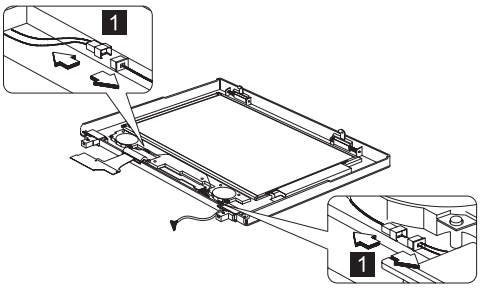
Step	Size (Quantity)	Head & Color	Torque
2	M2.5 x 6L (3)	Flat head, black	2.0 kgf-cm
Note: Make sure you use the correct screw for replacement.			

Speaker ASM 12.1"

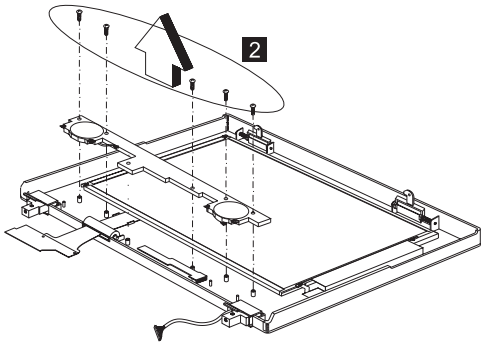
- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54
- “LCD Bezel ASM 12.1"” on page 87

To remove the speaker:

1. Carefully disconnect the speaker cable from the connector.



2. Remove the five screws securing the speaker.
3. Gently lift the speaker away from the display panel.



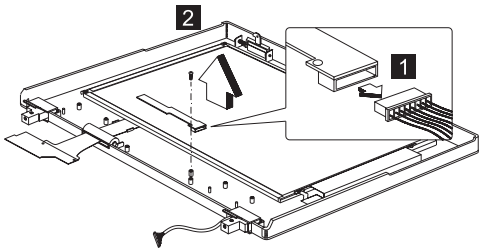
Step	Size (Quantity)	Head & Color	Torque
2	M2 x 4L (5)	Flat head, silver	1.6 kgf-cm
Note: Make sure you use the correct screw for replacement.			

VR Board ASM 12.1"

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54
- “LCD Bezel ASM 12.1"” on page 87
- “Speaker ASM 12.1"” on page 89

To remove the VR board ASM:

1. Disconnect the power cable from the VR board.
2. Carefully remove the VR board from the display panel.



Step	Size (Quantity)	Head & Color	Torque
2	M2 x 4L (1)	Flat head, silver	1.6 kgf-cm
Note: Make sure you use the correct screw for replacement.			

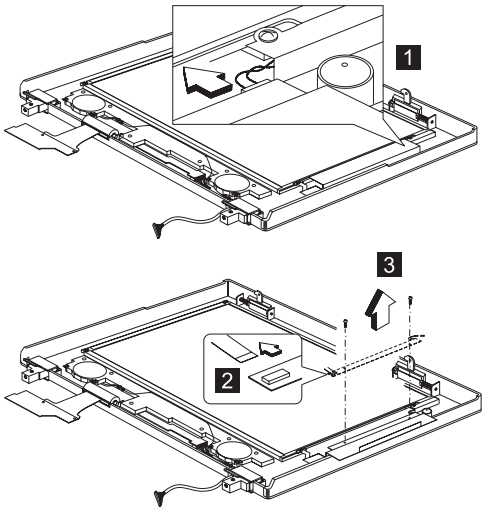
LCD Inverter ASM 12.1"

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54
- “LCD Bezel ASM 12.1"” on page 87
- “Speaker ASM 12.1"” on page 89
- “VR Board ASM 12.1"” on page 90

Note: See “Setting the LCD Panel ID” on page 30.

To remove the LCD inverter ASM:

1. Disconnect the cable from the inverter board.
2. Lift the inverter board away from the display panel.

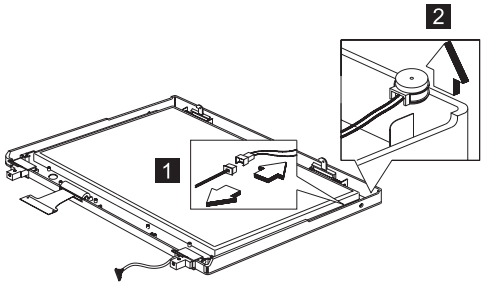


Microphone ASM 12.1"

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54
- “LCD Bezel ASM 12.1"” on page 87
- “Speaker ASM 12.1"” on page 89
- “VR Board ASM 12.1"” on page 90
- “LCD Inverter ASM 12.1"” on page 91

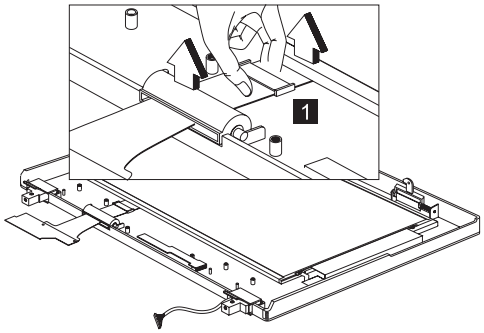
To remove the microphone ASM:

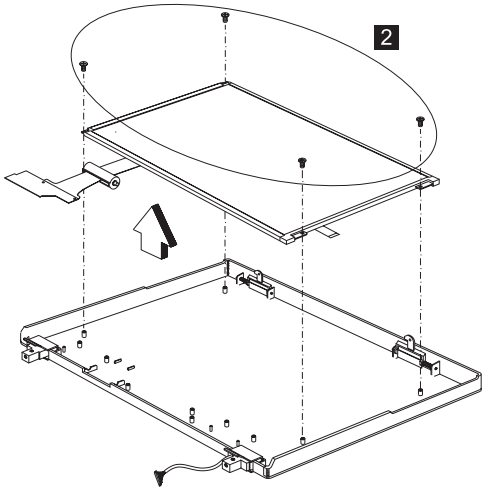
1. Disconnect the power cable from the microphone.
2. Lift the LCD away from the display panel.



LCD Panel ASM 12.1"

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54
- “LCD Bezel ASM 12.1"” on page 87
- “Speaker ASM 12.1"” on page 89
- “VR Board ASM 12.1"” on page 90
- “LCD Inverter ASM 12.1"” on page 91
- “Microphone ASM 12.1"” on page 92



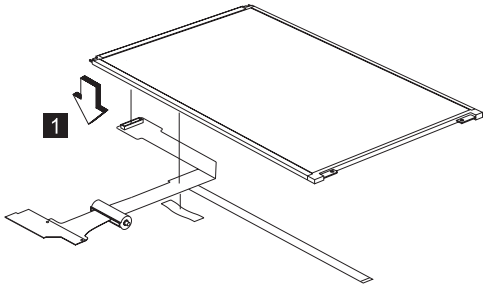


Step	Size (Quantity)	Head & Color	Torque
2	M3 x 5L (4)	Flat head, silver	3.2 kgf-cm
Note: Make sure you use the correct screw for replacement.			

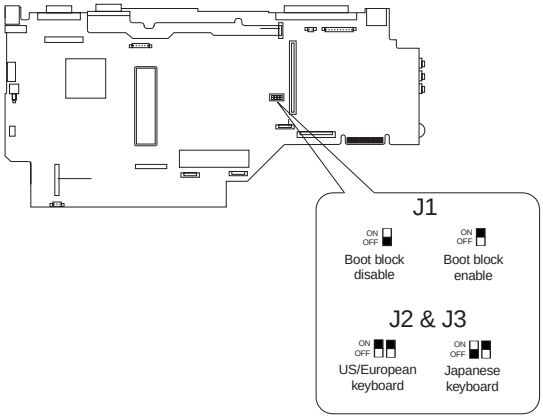
LCD FPC ASM 12.1"

- “Battery ASM” on page 45
- “Hard Disk Drive” on page 46
- “Combo Bay” on page 47
- “Keyboard” on page 54
- “LCD Bezel ASM 12.1"" on page 87
- “Speaker ASM 12.1"" on page 89
- “VR Board ASM 12.1"" on page 90
- “LCD Inverter ASM 12.1"" on page 91
- “Microphone ASM 12.1"" on page 92
- “LCD Panel ASM 12.1"" on page 93

Disconnect the LCD FPC cable from the LCD.

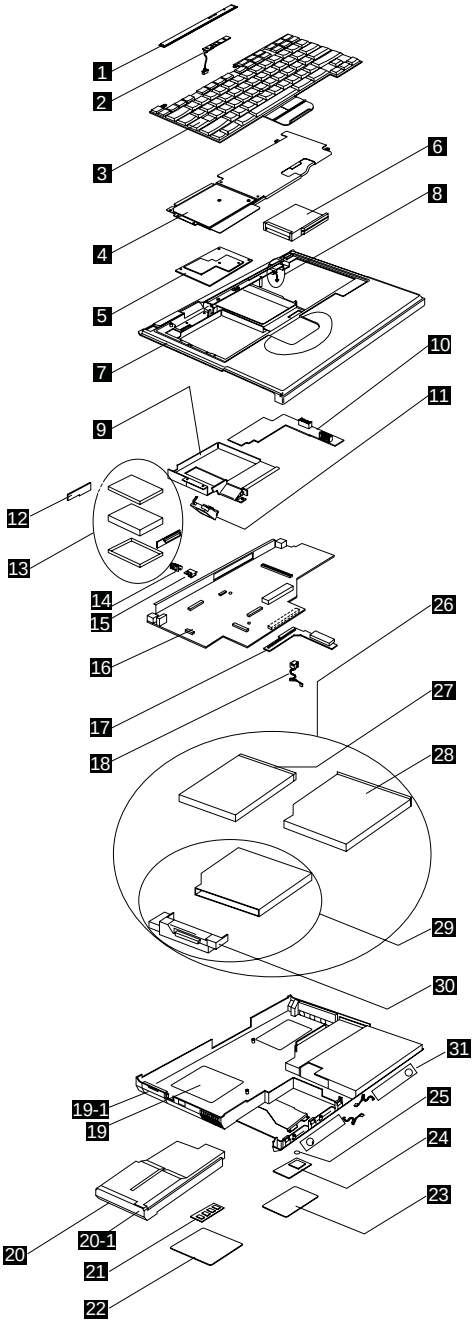


Switch Location



Keyboard Language	US/European	Japanese
J2	ON	OFF
J3	ON	ON

System Unit Parts Listing



Index	Description	FRU Number
1	MIDDLE COVER ASM	05K5481
2	LED BOARD ASM W/ CABLE	10L1154
3	See Keyboard list	
4	UPPER HEATSINK FOR CELERON AND DIXON	10L2113
	UPPER HEATSINK FOR DESCHUTES	05K5474
5	CPU CARD (MMC-II, CELERON-400)	10L1439
	CPU CARD (MMC-II, DIXON–400)	10L1440
6	PCMCIA HOLDER ASM	05K5476
7	UPPER COVER ASM 12.1"	05K5478
	UPPER COVER ASM 14.1"	05K5946
	UPPER COVER ASM 15.0"	08K5832
8	LID SWITCH ASM	05K5479
9	MMO LOWER HEATSINK ASM	08K5837
10	DC-DC & BATT BOARD ASM for 14.1"/12.1"	08K3406
	DC-DC & BATT BOARD ASM for 15.0"	10L1435
11	FAN ASM	05K5468
12	HDD DOOR ASM	08K5834
13	HDD ASM 4.8GB	05K9181
	HDD ASM 6.4GB	05K9182
	HDD ASM 10.0GB	05K8984
	HDD KITTING PARTS ASM	08K5833
	HDD ADAPTER COMBO BAY ASM	05K5525
14	BASE MISC PARTS	05K5487
15	IR BOARD ASM for BT-3	10L1436
16	PLANAR (M/B) (W/ AGP) ASM FOR BT-3	10L1433
	PLANAR BOARD SUPPORT LAN MODULE (for Japan & Korea only)	08K3100
17	COMBO BAY INTERPOSER CARD ASM for 15.0"	10L1434
	COMBO BAY INTERPOSER CARD ASM for 14.1"/12.1"	08K3108
18	PCI MODEM CONNECTOR ASM for BT-3	08K5842
19	BASE COVER ASM (14.1"/12.1") for BT-3	08K5838
	BASE COVER ASM (15.0") for BT-3	08K5839
	BASE COVER ASM for M2624 for BT-3	08K5879

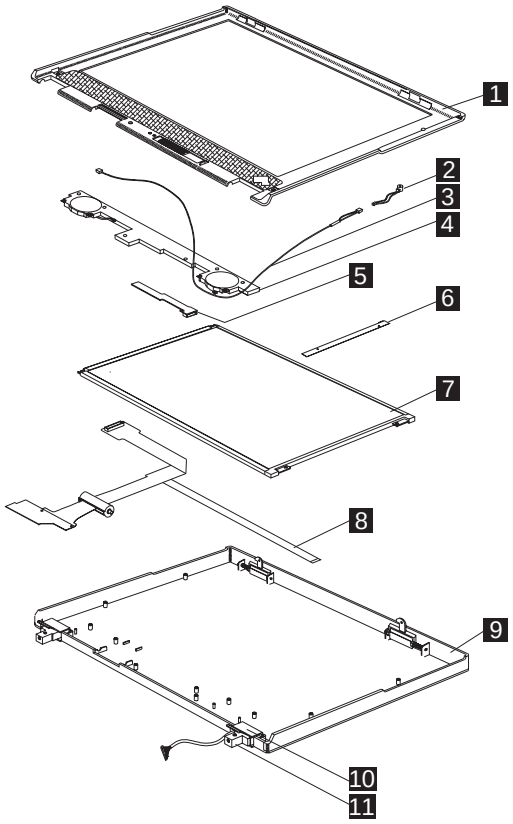
Index	Description	FRU Number
19-1	I/O DOOR	10L1934
20	BATTERY (LIION) ASM	02K6520
	BATTERY (NIMH) ASM (PANASONIC)	02K6521
20-1	BATTERY SLIDER COVER	05K5942
21	32MB DIMM SDRAM (PC-100)	08K3408
	64MB DIMM SDRAM (PC-100)	08K3409
22	DIMM DOOR ASM	05K5484
23	RTC ASM	11J8591
24	PCI MODEM CARD ASM	10L1296
	Ethernet CARD ASM	10L1437
25	MODEM DOOR ASM for BT-3	08K5836
26	COMBO CD-ROM + FDD ASM	05K9189
27	FDD ASM	27L3529
28	CD-ROM ASM (Toshiba)	05K9191
	CD-ROM ASM (LG)	27L3629
	DVD Module for BT-3	08K9163
29	COMBO BAY BRACKET ASM	05K6155
30	COMBO BAY FPC KIT	05K2819
31	Speaker ASM (15.0")	08K5835
	AC ADAPTER	
	AC ADAPTER 3P (SANKEN)	02K6555
	AC ADAPTER 2P (SANKEN)	02K6554
	AC ADAPTER 2P (DELTA)	02K6548
	AC ADAPTER 3P (DELTA)	02K6550
	KEYBOARD	
	KBD ASM US English	02K4705
	KBD ASM Canadian French	02K4706
	KBD ASM German	02K4707
	KBD ASM UK English	02K4708
	KBD ASM French	02K4709
	KBD ASM Dutch	02K4710
	KBD ASM Swedish/Finnish	02K4711
	KBD ASM Norwegian	02K4712
	KBD ASM Danish	02K4713
	KBD ASM Italian	02K4714
	KBD ASM European Spanish	02K4715
	KBD ASM Belgian	02K4716
	KBD ASM Swiss	02K4717
	KBD ASM Portuguese	02K4718

Index	Description	FRU Number
	KBD ASM Greek	02K4719
	KBD ASM Hebrew	02K4720
	KBD ASM Turkish	02K4721
	KBD ASM Arabic	02K4722
	KBD ASM Russian	02K4723
	KBD ASM Slovakian	02K4724
	KBD ASM Slovenian	02K4725
	KBD ASM Hungarian	02K4726
	KBD ASM Czech	02K4727
	KBD ASM Japanese	02K4728
	KBD ASM Traditional Chinese	02K4729
	KBD ASM Korean	02K4730
	KBD ASM LA Spanish	02K4731
	Miscellaneous	
	MISC NAME PLATE LABEL PACK	05K5921
	RUBBER KIT	05K6176
	FPC STOPPER TAPE	05K5914
	MYLAR PACK	05K5982
	SCREW PACK • SCRW M2*4 WAFER NI • SCRW M2*3E STAINLESS BT • SCRW M2*18 PAN B-ZN • SCRW M2*5 28 PAN B-ZN • SCRW MACH PAN NYLOK M2.0*10 NI • SCRW FLAT M3*5L PAN NI • SCRW WAFER NYLO M2.5*6L B-ZN • SCRW WAFER NYLO M2.5*3.5L B-ZN • SCRW MACH PAN NY M2.5*12L B-ZN	05K5489
	FOOT L&R	05K5504
	Others	
	Power cord (Japan 2 PIN)	13H5273
	Power cord (Argentina, Australia, Papua New Guinea, New Zealand, Paraguay, Uruguay)	76H3514

Index	Description	FRU Number
	Power cord (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, Trinidad (West Indies), U.S.A., Venezuela)	76H3516
	Power cord (Austria, Belgium, Bulgaria, Czech Republic, Egypt, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sweden, Turkey, former Yugoslavia)	76H3518
	Power cord (Denmark)	76H3520
	Power cord (Bangladesh, Pakistan, South Africa, Sri Lanka)	76H3522
	Power cord (Thailand)	76H4866
	Power cord (Abu Dhabi, Albania, Antigua, Bahrain, Brunei, Dubai, Fiji, Hong Kong, India, Ireland, Kenya, Kuwait, Macao, Malaysia, Nigeria, Oman, People's Republic of China, Qatar, Singapore, United Kingdom)	76H3524
	Power cord (Switzerland)	76H3528
	Power cord (Israel)	76H3532
	Power cord (Chile, Italy)	76H3530
	Power cord (Japan)	13H5273

LCD Unit Parts Listing

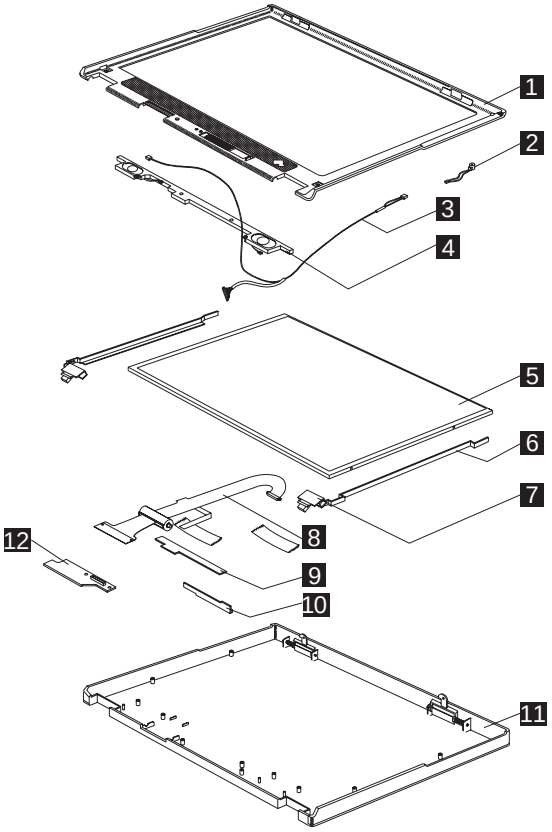
12.1" LCD ASM Parts Listing



Index	System Unit	FRU Number
1	LCD BEZEL ASM (12.1" TFT)	05K5469
2	MICROPHONE ASM W/ HOLDER	05K5477
3	CABLE ASM FOR SPK/MIC/VR BOARD	05K2818
4	SPEAKER ASM (12.1"/13.3")	05K5467
5	VR BOARD ASM (12.1"/13.3")	30L2576
6	LCD INVERTER (12.1" TFT)	10L1645
7	LCD PANEL ASM (12.1" TFT)	08K5844
8	LCD FPC ASM (12.1" TFT)	27L0493
9	LCD REAR COVER ASM (12.1" TFT) for BT-3	08K5845
10	HINGE CAP L,R (12.1"/13.3")	05K5466
11	HINGE L,R (12.1"/13.3")	05K5465

Index	System Unit	FRU Number
	LCD MISC PARTS (LCD latch (L,R), Spring, Brightness/Contrast knob for 12.1", Brightness/Contrast knob for 14.1", LCD bracket for 13.3" only)	05K5488
	LG/IBM Logo Kit	05K6044

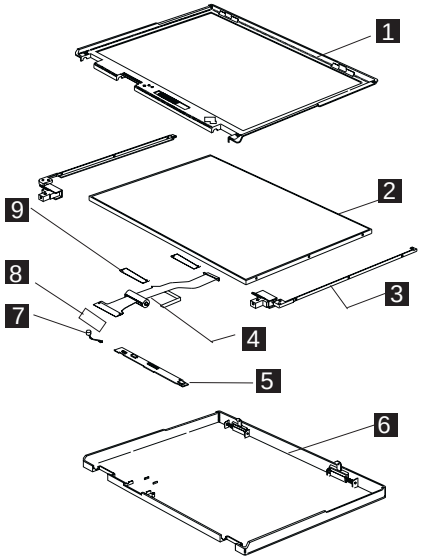
14.1" LCD ASM Parts Listing



Index	System Unit	FRU Number
1	LCD BEZEL ASM (14.1" TFT)	05K5945
2	MICROPHONE ASM W/ HOLDER	05K5477
3	CABLE ASM FOR SPK/MIC/VR BOARD	05K2818
4	SPEAKER ASM (14.1")	02K4869
5	LCD PANEL ASM (14.1" TFT)	05K9538
6	HINGE L,R (14.1")	05K5947
7	HINGE CAP L,R (14.1")	05K5948
8	LCD FPC ASM (14.1" TFT)	10L2112
9	LCD INVERTER (14.1" TFT)	10L1751
10	VR BOARD ASM (14.1")	10L1310
11	LCD REAR COVER ASM (14.1" TFT)	05K6208
12	LVDS BOARD ASM (14.1")	10L1208
13	LCD FPC STOPPER TAPE	05K5914

Index	System Unit	FRU Number
	LCD MISC PARTS (LCD latch (L,R), Spring, Brightness/Contrast knob for 12.1", Brightness/Contrast knob for 14.1", LCD bracket for 13.3" only)	05K5488
	LG/IBM Logo Kit	05K6044

15.0" LCD ASM Parts Listing



Index	System Unit	FRU Number
1	LCD BEZEL ASM (15.0" TFT)	27L0491
2	LCD PANEL ASM (15.0" TFT)	08K5828
3	HINGE BRACKET (L,R) 15.0"	08K5831
4	LCD FPC ASM (15.0" TFT)	27L0491
5	LCD INVERTER (15.0" TFT)	10L1432
6	LCD REAR COVER ASM (15.0" TFT)	08K5829
7	MICROPHONE ASM W/ HOLDER	05K5477
8	LVDS BOARD ASM for BT-3 (THINE CHIP)	08K3421
	LVDS BOARD ASM for BT-3 (NS CHIP)	08K3422
9	FPC STOPPER TAPE	05K5914
	LCD MISC PARTS (LCD latch (L,R), Spring, Brightness/Contrast knob for 12.1", Brightness/Contrast knob for 14.1", LCD bracket for 13.3" only)	05K5488
	LG/IBM Logo Kit	05K6044

Service Tools

Description	FRU No.	Qty.
Tri-Connector Wrap Plug	72X8546	
PC Test Card	35G4703	
Audio Wrap Cable	66G5180	
Screwdriver Kit	95F3598	
USB Parallel Test Cable	05K2580	
CPU removal tool	08K5880	
5.5mm socket	73G5354	
5.0mm socket	73G1466	
ESD Kit (wrist strap and mat)	73G5518	
ESD Wrist Strap	6405959	
ESD Mat	93F2649	

It is recommended that the CPU removal tool be used to release the CPU board.

Note: For PSS the tool is for depot use only.

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