IBM

ThinkPad R Series Hardware
Maintenance Manual

Before using this information and the product it supports, be sure to read the general information under "Introduction" on page 1, and "Notices" on page 102.

Preface

About this manual

This manual contains service and reference information for
IBM ThinkPad R Series products. Use this manual along
with the advanced diagnostic 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.

Important

This manual is intended for trained servicers who
are familiar with ThinkPad products. Use this
manual along with the advanced diagnostic tests to
troubleshoot problems effectively. Before servicing
an IBM ThinkPad product, be sure to review the
safety information under "Safety Notices
(Multi-lingual Translations)" on page 3 and "Safety
Information" on page 11.

Related publications

The following product publications are available through
IBM or your IBM Authorized Dealer.

Publication	Part, Form Number
Mobile Systems HMM Volume 1: Laptop, Notebook, Portable, and ThinkPad Computers (Models L40, CL57, N45, N51, P70/P75, ThinkPad 300, 350, 500, 510, 710T, Expansion Unit, Dock I, Dock II)	30H2356, S82G-1501-01
Mobile Systems HMM Volume 2: ThinkPad Computers (Models 340, 355, 360, 370, 700, 701, 720, 750, 755)	30H2357, S82G-1502-03
Mobile Systems HMM Volume 3: ThinkPad Computers (Models 365, 380, 385, 560, 760, SelectaDock)	84H8099, S82G-1503-05
Mobile Systems HMM Volume 4: ThinkPad Computers (Models 380, 385, 560, 760, 765)	05L1271, S05L-1270-01

Related diskettes

The following diskettes are available through IBM or your IBM Authorized Dealer.

Diskette	Part, Form Number
ThinkPad 300 (2615) Advanced Diagnostics Diskette	33G9361, S33G-9361
ThinkPad 350, 350C, 425, 425C (2618) Advanced Diagnostics Diskette	A211000, GA21-1000
ThinkPad 365 (2625) Advanced Diagnostics Diskette	76H7578, S30H-2498
ThinkPad 380/385 (2635) Maintenance Diskette	06J0333, S06J-0333
ThinkPad 500 (2603) Advanced Diagnostics Diskette	71G3702, S71G-3702
ThinkPad 510 (2604) Advanced Diagnostics Diskette	83G8095, S83G-8095
ThinkPad 700 (9552) Reference Diskette	42G2017, S42G-2017
ThinkPad 700C (9552) Reference Diskette	42G2023, S42G-2023
ThinkPad 720/720C (9552) Reference Diskette	61G1194, S61G-1194
ThinkPad i Series 1400 (2611) Diagnostic and Utilities diskettes	01K4841, S01K-4841-00
ThinkPad Hardware Maintenance Diskette (for all Models 355, 360, 560, 750, 755, 760)	78H5384, S78H-5384
ThinkPad Dock I (3545)	71G4140, S71G-4140
Docking Station (3550)	42G2428, S42G-2428
Data/Fax Modem	61G1556, S61G-1556
FaxConcentrator/A	84F8540, S84F-8540

Contents

ThinkPad R Series Hardware Maintenance Manual

Introduction

Important Service Information

> **Important**
>
> Diskette fixes are customer-installable. The diskette
> fixes are posted on the IBM support site
> http://www.pc.ibm.com/support/ .
>
> Advise customers to contact the PC Company
> HelpCenter at 800-772-2227 if they need assistance
> in obtaining or installing any diskette fixes.
>
> Customers in Canada should call IBM HelpPC at
> 800-565-3344 for assistance or download
> information.

FRU Replacement Strategy

> **Before Replacing Parts**
>
> Ensure that all diskette fixes are installed prior to
> replacing any FRUs listed in this manual.

Use the following strategy to prevent unnecessary FRU
replacement and service expense:

- **If you are instructed to replace a FRU and that does
  not correct the problem, reinstall the original FRU
  before you continue.**
- Some computers have both a processor board and a
  system board. If you are instructed to replace either the
  processor board or the system board, and the first board
  that you replaced does not correct the problem, reinstall
  the original board, then replace the other (processor or
  system) board.
- If an adapter or device consists of more than one FRU,
  an error code may be caused by any of the FRUs.
  Before replacing the adapter or device, remove the
  FRUs, one by one, to see if the symptoms change.
  Replace only the FRU that changed the symptoms.

Attention: A customized setup configuration (other than
default settings) may exist on the computer you are
servicing. Running Automatic Configuration may alter those
settings. Note the current configuration settings (using the
View Configuration option) and verify that the settings are
in place when service is complete.

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Hard Disk Drive Replacement Strategy

Always try to run a low-level format before replacing a hard disk drive.

Attention: The drive startup sequence in the computer you are servicing might have been changed. Be extremely careful during write operations such as copying, saving, or formatting. Data or programs can be over-written if you select an incorrect drive.

How to Use Error Messages

Use the error codes displayed on the screen to diagnose failures. If more than one error code is displayed, begin the diagnosis with the first error code. The cause of the first error code can result in false error codes being displayed. If no error code is displayed, see if the error symptom is listed in the Symptom-to-FRU Index for the computer you are servicing.

How to Read POST Error Messages

POST error messages are displayed on the screen as three, four, five, or eight digits. The error messages that can be displayed as shorter POST messages are highlighted in this index. Some digits will represent different information for SCSI errors versus non-SCSI errors.

All SCSI devices are set to a different SCSI ID. Duplicate SCSI ID settings can generate a false error message. Use the SCSI ID to determine whether the error message is coming from an internal or an external device.

Drive and Diskette Compatibility Matrix

The following table provides identification information for 3.5-inch drives.

Diskette Drive	Identifying Mark
3.5-Inch - 1.44MB	1.44 on the eject button
3.5-Inch - 2.88MB	2.88 on the eject button

The following table provides compatibility information for 3.5-inch diskettes and 3.5-inch diskette drives.

Diskette Capacity	1.44MB Drive	2.88MB Drive
1.0MB	Read/Write	Read/Write
2.0MB	Read/Write	Read/Write
4.0MB	Not Compatible	Read/Write

Safety Notices (Multi-lingual Translations)

In this manual, safety notices appear in English with a page number reference to the appropriate multi-lingual, translated safety notice found in this section.

The following safety notices are provided in English, French, German, Italian, and Spanish languages.

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 shorts.

Avant de remettre l'ordinateur sous tension après remplacement d'une unité en clientèle, vérifiez que tous les ressorts, vis et autres pièces sont bien en place et bien fixées. Pour ce faire, secouez l'unité et assurez-vous qu'aucun bruit suspect ne se produit. Des pièces métalliques ou des copeaux de métal pourraient causer un court-circuit.

Bevor nach einem FRU-Austausch der Computer wieder angeschlossen wird, muβ sichergestellt werden, daβ keine Schrauben, Federn oder andere Kleinteile fehlen oder im Gehäuse vergessen wurden. Der Computer muβ geschüttelt und auf Klappergeräusche geprüft werden. Metallteile oder -splitter können Kurzschlüsse erzeugen.

Prima di accendere l'elaboratore dopo che é stata effettuata la sostituzione di una FRU, accertarsi che tutte le viti, le molle e tutte le altri parti di piccole dimensioni siano nella corretta posizione e non siano sparse all'interno dell'elaboratore. Verificare ciò scuotendo l'elaboratore e prestando attenzione ad eventuali rumori; eventuali parti o pezzetti metallici possono provocare cortocircuiti pericolosi.

Antes de encender el sistema despues de sustituir una FRU, compruebe que todos los tornillos, muelles y demás piezas pequeñas se encuentran en su sitio y no se encuentran sueltas dentro del sistema. Compruébelo agitando el sistema y escuchando los posibles ruidos que provocarían. Las piezas metálicas pueden causar cortocircuitos eléctricos.

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.

La pile de sauvegarde contient du lithium. Elle présente des risques d'incendie, d'explosion ou de brûlures graves. Ne la rechargez pas, ne retirez pas son connecteur polarisé et ne la démontez pas. Ne l'exposez pas à une temperature supérieure à 100°C, ne la faites pas brûler et n'en exposez pas le contenu à l'eau. Mettez la pile au rebut conformément à la réglementation en vigueur. Une pile inappropriée risque de prendre feu ou d'exploser.

Die Systembatterie ist eine Lithiumbatterie. Sie kann sich entzünden, explodieren oder schwere Verbrennungen hervorrufen. Batterien dieses Typs dürfen nicht aufgeladen, zerlegt, über 100 C erhitzt oder verbrannt werden. Auch darf ihr Inhalt nicht mit Wasser in Verbindung gebracht oder der zur richtigen Polung angebrachte Verbindungsstecker entfernt werden. Bei der Entsorgung die örtlichen Bestimmungen für Sondermüll beachten. Beim Ersetzen der Batterie nur Batterien des Typs verwenden, der in der Ersatzteilliste aufgeführt ist. Der Einsatz falscher Batterien kann zu Entzündung oder Explosion führen.

La batteria di supporto e una batteria al litio e puo incendiarsi, esplodere o procurare gravi ustioni. Evitare di ricaricarla, smontarne il connettore polarizzato, smontarla, riscaldarla ad una temperatura superiore ai 100 gradi centigradi, incendiarla o gettarla in acqua. Smaltirla secondo la normativa in vigore (DPR 915/82, successive disposizioni e disposizioni locali). L'impiego di una batteria non adatta potrebbe determinare l'incendio o l'esplosione della batteria stessa.

(Continued)

La bateria de repuesto es una bateria de litio y puede provocar incendios, explosiones o quemaduras graves. No la recargue, ni quite el conector polarizado, ni la desmonte, ni caliente por encima de los 100°C (212°F), ni la incinere ni exponga el contenido de sus celdas al agua. Deséchela tal como dispone la normativa local.

Safety Notice 5

If the LCD breaks and the fluid from inside the LCD gets into your eyes or on your hands, immediately wash the affected areas with water for at least 15 minutes. Seek medical care if any symptoms from the fluid are present after washing.

Si le panneau d'affichage à cristaux liquides se brise et que vous recevez dans les yeux ou sur les mains une partie du fluide, rincez-les abondamment pendant au moins quinze minutes. Consultez un médecin si des symptômes persistent après le lavage.

Die Leuchtstoffröhre im LCD-Bildschirm enthält Quecksilber. Bei der Entsorgung die örtlichen Bestimmungen für Sondermüll beachten. Der LCD-Bildschirm besteht aus Glas und kann zerbrechen, wenn er unsachgemäß behandelt wird oder der Computer auf den Boden fällt. Wenn der Bildschirm beschädigt ist und die darin befindliche Flüssigkeit in Kontakt mit Haut und Augen gerät, sollten die betroffenen Stellen mindestens 15 Minuten mit Wasser abgespült und bei Beschwerden anschließend ein Arzt aufgesucht werden.

Nel caso che caso l'LCD si dovesse rompere ed il liquido in esso contenuto entrasse in contatto con gli occhi o le mani, lavare immediatamente le parti interessate con acqua corrente per almeno 15 minuti; poi consultare un medico se i sintomi dovessero permanere.

Si la LCD se rompe y el fluido de su interior entra en contacto con sus ojos o sus manos, lave inmediatamente las áreas afectadas con agua durante 15 minutos como mínimo. Obtenga atención medica si se presenta algún síntoma del fluido despues de lavarse.

Safety Notice 6

To avoid shock, do not remove the plastic cover that surrounds the lower portion of the inverter card.

Afin d'éviter tout risque de choc électrique, ne retirez pas le cache en plastique protégeant la partie inférieure de la carte d'alimentation.

Aus Sicherheitsgründen die Kunststoffabdeckung, die den unteren Teil der Spannungswandlerplatine umgibt, nicht entfernen.

Per evitare scosse elettriche, non rimuovere la copertura in plastica che avvolge la parte inferiore della scheda invertitore.

Para evitar descargas, no quite la cubierta de plástico que rodea la parte baja de la tarjeta invertida.

Safety Notice 7

Though main batteries have low voltage, a shorted or grounded battery can produce enough current to burn combustible materials or personnel.

Bien que le voltage des batteries principales soit peu élevé, le court-circuit ou la mise à la masse d'une batterie peut produire suffisamment de courant pour brûler des matériaux combustibles ou causer des brûlures corporelles graves.

Obwohl Hauptbatterien eine niedrige Spannung haben, können sie doch bei Kurzschluβ oder Erdung genug Strom abgeben, um brennbare Materialien zu entzünden oder Verletzungen bei Personen hervorzurufen.

Sebbene le batterie di alimentazione siano a basso voltaggio, una batteria in corto circuito o a massa può fornire corrente sufficiente da bruciare materiali combustibili o provocare ustioni ai tecnici di manutenzione.

Aunque las baterías principales tienen un voltaje bajo, una batería cortocircuitada o con contacto a tierra puede producir la corriente suficiente como para quemar material combustible o provocar quemaduras en el personal.

Safety Information

The following section contains the safety information that you need to be familiar with before servicing an IBM mobile computer.

General Safety

Follow these rules to ensure general safety:

- Observe good housekeeping in the area of the machines during and after maintenance.
- When lifting any heavy object:
  1. Ensure you can stand safety without slipping.
  2. Distribute the weight of the object equally between your feet.
  3. Use a slow lifting force. Never move suddenly or twist when you attempt to lift.
  4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back. *Do not attempt to lift any objects that weigh more than 16 kg (35 lb) or objects that you think are too heavy for you.*

- Do not perform any action that causes hazards to the customer, or that makes the equipment unsafe.
- Before you start the machine, ensure that other service representatives and the customer's personnel are not in a hazardous position.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the machine.
- Keep your tool case away from walk areas so that other people will not trip over it.
- Do not wear loose clothing that can be trapped in the moving parts of a machine. Ensure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.
- Insert the ends of your necktie or scarf inside clothing or fasten it with a nonconductive clip, approximately 8 centimeters (3 inches) from the end.
- Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.

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

Electrical Safety
Observe the following rules when working on electrical equipment.

Important

Use only approved tools and test equipment. Some hand tools have handles covered with a soft material that does not insulate you when working with live electrical currents. Many customers have, near their equipment, rubber floor mats that contain small conductive fibers to decrease electrostatic discharges. Do not use this type of mat to protect yourself from electrical shock.

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.

- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Disconnect all power before:
  - Performing a mechanical inspection
  - Working near power supplies
  - Removing or installing main units
- Before you start to work on the machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine and to lock the wall box in the off position.
- If you need to work on a machine that has exposed electrical circuits, observe the following precautions:
  - Ensure that another person, familiar with the power-off controls, is near you.

    Attention: Another person must be there to switch off the power, if necessary.
  - Use only one hand when working with powered-on electrical equipment; keep the other hand in your pocket or behind your back.

    Attention: There must be a complete circuit to cause electrical shock. By observing the above rule, you may prevent a current from passing through your body.
  - When using testers, set the controls correctly and use the approved probe leads and accessories for that tester.
  - Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames.

  Observe the special safety precautions when you work with very high voltages; these instructions are in the safety sections of maintenance information. Use extreme care when measuring high voltages.
- Regularly inspect and maintain your electrical hand tools for safe operational condition.
- Do not use worn or broken tools and testers.
- Never assume that power has been disconnected from a circuit. First, check that it has been powered-off.
- Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, nongrounded power extension cables, power surges, and missing safety grounds.
- Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and machine damage.

- Do not service the following parts with the power on when they are removed from their normal operating places in a machine:
  - Power supply units
  - Pumps
  - Blowers and fans
  - Motor generators

  and similar units. (This practice ensures correct grounding of the units.)
- If an electrical accident occurs:
  - **Use caution; do not become a victim yourself.**
  - **Switch off power.**
  - **Send another person to get medical aid.**

Safety Inspection Guide

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

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

- Electrical hazards, especially primary power (primary voltage on the frame can cause serious or fatal electrical shock).
- Explosive hazards, such as a damaged CRT face or bulging capacitor.
- Mechanical hazards, such as loose or missing hardware.

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

Checklist:

1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Power-off the computer. Disconnect the power cord.
3. Check the power cord for:
   a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground

continuity for 0.1 ohm or less between the external ground pin and frame ground.

   b. The power cord should be the appropriate type as specified in the parts listings.

   c. Insulation must not be frayed or worn.

4. Remove the cover.

5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.

6. Check inside the unit for any obvious unsafe conditions, such as metal filings, contamination, water or other liquids, or signs of fire or smoke damage.

7. Check for worn, frayed, or pinched cables.

8. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Handling Electrostatic Discharge-Sensitive Devices

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

Notes:

1. Use product-specific ESD procedures when they exceed the requirements noted here.

2. Make sure that the ESD protective devices you use have been certified (ISO 9000) as fully effective.

When handling ESD-sensitive parts:

- Keep the parts in protective packages until they are inserted into the product.

- Avoid contact with other people.

- Wear a grounded wrist strap against your skin to eliminate static on your body.

- Prevent the part from touching your clothing. Most clothing is insulative and retains a charge even when you are wearing a wrist strap.

- Use the black side of a grounded work mat to provide a static-free work surface. The mat is especially useful when handling ESD-sensitive devices.

- Select a grounding system, such as those listed below, to provide protection that meets the specific service requirement.

   Note: The use of a grounding system is desirable but not required to protect against ESD damage.

- – Attach the ESD ground clip to any frame ground, ground braid, or green-wire ground.
- – Use an ESD common ground or reference point when working on a double-insulated or battery-operated system.
- – You can use coax or connector-outside shells on these systems.
- – Use the round ground-prong of the AC plug on AC-operated computers.

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

Laser Compliance Statement

Some IBM Personal Computer models are equipped from the factory with a CD-ROM drive. CD-ROM drives are also sold separately as options. The CD-ROM drive is a laser product. The CD-ROM drive is certified in the U.S. to conform to the requirements of the Department of Health and Human Services 21 Code of Federal Regulations (DHHS 21 CFR) Subchapter J for Class 1 laser products. Elsewhere, the drive is certified to conform to the requirements of the International Electrotechnical Commission (IEC) 825 and CENELEC EN 60 825 for Class 1 laser products.

When a CD-ROM drive is installed, note the following.

CAUTION:
Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.

O uso de controles, ajustes ou desempenho de procedimentos diferentes daqueles aqui especificados pode resultar em perigosa exposição à radiação.

凡未在这里指明的任何控制用法、调整、行为，

都会导致严重后果。

Pour éviter tout risque d'exposition au rayon laser, respectez les consignes de réglage et d'utilisation des commandes, ainsi que les procédures décrites.

Werden Steuer- und Einstellelemente anders als hier festgesetzt verwendet, kann gefährliche Laserstrahlung auftreten.

Az itt előírt eljárásoktól, beállításoktól és vezérlésektől eltérni a lézersugárzás veszélye miatt kockázatos !

L'utilizzo di controlli, regolazioni o l'esecuzione di procedure diverse da quelle specificate possono provocare l'esposizione a

Использование элементов настройки и выполнение процедур иных, чем указано здесь, может привести к опасному радиационному облучению.

Použitie kontrôl, úprav alebo iných vykonaní od iných výrobcov, ako je v tomto špecifikované, mohlo by mať za následok nebezpečenstvo vystavenia sa vyžiarovaniu.

El uso de controles o ajustes o la ejecución de procedimientos distintos de los aquí especificados puede provocar la exposición a radiaciones peligrosas.

Opening the CD-ROM drive could result in exposure to hazardous laser radiation. There are no serviceable parts inside the CD-ROM drive. **Do not open.**

Some CD-ROM drives contain an embedded Class 3A or Class 3B laser diode. Note the following.

DANGER

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

Radiação por raio laser ao abrir. Não olhe fixo no feixe de luz, não olhe diretamente por meio de instrumentos óticos e evite exposição direta com o feixe de luz.

开启时会有激光发射时，请勿盯视激光光束，请勿直接查看视觉仪器，并且避免直接接触在激光光束之中。

Rayonnement laser si carter ouvert. Évitez de fixer le faisceau, de le regarder directement avec des instruments optiques, ou de vous exposer au rayon.

Laserstrahlung bei geöffnetem Gerät. Nicht direkt oder über optische Instrumente in den Laserstrahl sehen und den Strahlungsbereich meiden.

Kinyitáskor lézersugár ! Ne nézzen bele se szabad szemmel, se optikai eszközökkel. Kerülje a sugárnyalábbal való érintkezést !

Aprendo l'unità vengono emesse radiazioni laser. Non fissare il fascio, non guardarlo direttamente con strumenti ottici e evitare l'esposizione diretta al fascio.

Открывая, берегитесь лазерного излучения. Не смотрите на луч, не разглядывайте его с помощью оптических инструментов, а также избегайте прямого воздействия лазерного луча.

Keď je laserová jednotka otvorená. Vyhnite sa priamemu pohľadu a nehľadte priamo s optickými nástrojmi do lúča a vyhnite sa priamemu vystaveniu lúčov.

Radiación láser al abrir. No mire fijamente ni examine con instrumental óptico el haz de luz. Evite la exposición directa al haz.

General Descriptions

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

Read this first

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

Important Notes:

- **Only certified trained personnel should service the computer.**
- **Read the entire FRU 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 could be overwritten.
- **Replace FRUs only for the correct model.** When you replace a FRU, make sure that 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 failure can occur for a variety of reasons that have nothing to do with a hardware defect, such as: cosmic radiation, electrostatic discharge, or software error. FRU replacement should be considered only when a recurring problem exists. In this case, clear the error log and run the test again. Do not replace 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 display, and beep symptoms
6. Procedure index and page number in which failing FRU was detected
7. Failing FRU name and part number
8. Machine type, model number and serial number
9. Customer's name and address

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

Note for Warranty:
For Warranty:

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

The following is not covered under warranty:

- LCD panel cracked by applying excessive force
  or by being dropped.
- Scratched (cosmetic) parts.
- Cracked or broken plastic parts, broken latches,
  broken pins, or broken connectors caused by
  excessive force.
- Damage caused by liquid spilled into the system.
- Damage caused by improperly inserting a PC
  Card or installation of an incompatible card.
- Damage caused by foreign material in the FDD.
- Diskette drive damage caused by pressing the
  diskette drive cover or inserting diskettes with
  multiple labels.
- Damaged or bent diskette drive eject button.
- CD-ROM/DVD-ROM drive damage caused by
  excessive force, shock, or by being dropped.
- Fuses blown by attaching a nonsupported device.
- Forgotten computer password (making the
  computer unusable).

**The following symptoms might indicate damage
caused by non-warranted activities:**

- Missing parts may be a symptom of unauthorized
  service or modification.
- HDD spindles can become noisy if subjected to
  excessive force or by being dropped.
- I9990303 errors can be caused by exposure to
  strong magnetic fields.

'

FRU replacement notices

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

LCD replacement notice

The TFT LCD for the computer contains many 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:

- XGA : 8 or more bright dots, 8 or more dark dots, or a total of 9 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 08K6560) 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:

90 degrees more

(Cross-section)
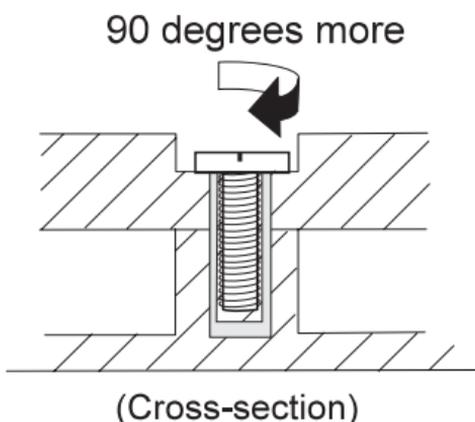
- Logic card to plastic

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

180 degrees more

(Cross-section)
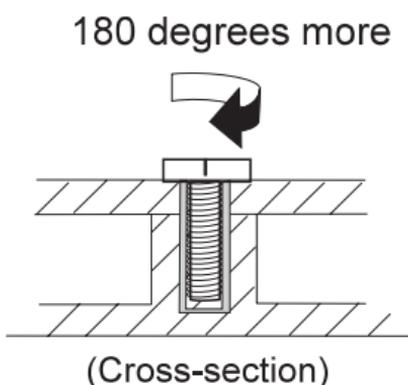
- Torque driver

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

- Make sure you use the correct screw, 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.**

System board/LCD/Inverter replacement notice

Restoring the LCD panel ID

The EEPROM on the inverter 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 blew to set the LCD panel ID:

1. Install the ThinkPad CE Utility Diskette and restart the computer.
2. Select **1. LCD Panel ID Utility** from the main menu.

3. Follow the instruction on screen to read current or to set new LCD Panel ID code.

4. Restart computer : the new LCD should work normally.

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

CAUTION:
Make sure the new ID code you choose corresponds with the LCD brand and type. If you write a wrong ID into inverterm, just reboot and re-execute the program and input the correct ID code.

Note: If LCD cannot display after change ID code, make sure you write the correct ID code, or try reseating the LCD coaxial cable connectors.

Thermal Sensor

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

System experiencing frequent auto sensor shutdown may need to reset the thermal sensor threshold and execute the fan test to ensure the normal operation of the cooling fan.

Follow the steps below to set thermal threshold:

1. Install the ThinkPad CE Utility Diskette and restart the computer.

2. Select **2. Thermal Sensor Utility** from the main menu.

3. Select **1. Read Thermal Setting** to view the original setting or **2. Set Default Thermal Setting** to restore the default setting.

UUID

The Universal Unique Identifier (UUID) is a 128–bit number uniquely assigned to your computer at production and stored in the EEPROM of your 24RF08. The algorithm that generates the unique number is designed to provide unique IDs until the year A.D. 3400. Consequently, no tow computers in the world will have the same number.

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

1. Install the ThinkPad CE Utility Diskette and restart the computer.

2. Select **3. UUID Data Utility** from the main menu then make a selection to read or create the UUID data.

A new UUID is created and written. If a valid UUID already exists, it is not overwritten.

Related service information

This section provides information about the following:

- "Power button as reset switch"
- "Running a low-level format"
- "Service Web site"
- "Passwords"
- "Power management features" on page 28
- "Fn key combinations" on page 30
- "Product recovery program" on page 30

Power button as reset switch

The power button acts as a reset switch when pressed for more than 4 seconds. This resets the system (regardless of the microcode status) and forces the power off. Use this only when power is not completely off or the microcode is in a hung state.

Running a low-level format

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

To format the hard disk, select **Utility**, and then use the **Full Erase Hard Drive** or **Quick Erase Hard Drive** in Utility of the PC-Doctor for DOS program. Refer to "Testing the computer" on page 33.

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://www.pc.ibm.com/us/files.html or
    http://www.pc.ibm.com/us/support/thinkpad/tpopsys.html

Passwords

When the power-on password (POP), hard disk password (HDP), and supervisor password (SVP) are used, the following situations may occur:

- **If the POP is the same as the HDP**, the POP prompt appears, but the HDP prompt does not appear.
- **If the POP is not the same as the HDP**, both prompts appear.
- **When SVP is set**, POST should invoke BIOS setup without erasing POP. Before entering BIOS setup SVP

will be prompted. If correct SVP is entered, POST enters BIOS setup without erasing POP. To boot up the system user should override POP by SVP at the password sub-menu.

• **When SVP is not set**, POST erase the POP and then boots up the system.

Power-on passwords
Power-on password is a security feature that is used to protect the system from unauthorized access. If power-on is forgotten, follow the procedure described in ″ Removing the Power-on password″.

Supervisor password
A supervisor password (SVP) protects the system information stored in the IBM BIOS Setup Utility . The SVP must be entered in order to access the IBM BIOS Setup Utility and make changes to system configuration settings.

Attention: If the SVP has been forgotten and cannot be made available to the servicer, there is no service procedure to reset the password. The system board must be replaced for a scheduled fee.

Removing the power-on password
If the customer forgets the power-on password, follow this procedure to erase POP if SVP is not set:

1. Turn off the system.
2. Set DIP SW3, Bit 4 to ON.
3. Turn on the system, and confirm the system starts without prompting for Power-on password.
4. Turn off the system.
5. Set DIP SW3, Bit 4 to OFF.

If SVP is set, do the followings to erase POP:

1. Power on the computer and press **F1** to enter the BIOS Utility menu.
2. Enter correct SVP (Supervisor password) at the password prompt.

3. The main screen displays as below:


```
                    IBM BIOS Setup Utility

  ▶ Config
  ▶ Date/Time
  ▶ Password
  ▶ Startup
  ▶ Restart

    BIOS version                   1.01a (TWET77WW)
    BIOS date (Year-Month-Day)     2000-04-30
    Embedded Controller Version    1.00b
    System-unit serial number      262851UZZ12345
    System board serial number     1Z0FZ123456
    CPU Type                       Pentium(R) III
    CPU Speed                      450 MHz
    Installed Memory               64 MB
    UUID                           81e76001-3db9-11d8-9a8d-990840c067f1
    MAC Address (Internal LAN)     00 20 35 E7 C7 8E

  F1    Help ↑ Select Item  F5/F6  Change Values   F9  Setup Defaults
  F2/ESC Exit  Select Menu  Enter  Select Sub-Menu F10 Save and Exit
```

4. Using the up or down arrow key, select **Password**.

5. Press the **Enter** key.

   The following submenu is displayed:

   * Power-On password
   * Supervisor password
   * Lock BIOS setting
   * Hard disk x password

6. Select **Power-On password** and press **Enter** .

7. Type in correct SVP at ″**Enter Current Password**″ and press **Enter**.

8. Press **Enter** at ″**Enter New Password**″.

9. Press **Enter** at ″**Confirm New Password**″.

10. Press **Enter** in the Changes have been saved window.

11. Press **F10**; then select **Yes** in the Setup confirmation window.

Hard disk password
The hard disk password is a security feature that is used to protect the hard disk data from unauthorized access.

Attention: If the hard disk password is forgotten, IBM does not provide any services to reset the hard drive password nor recover data from the hard drive. The hard drive can be replaced for a scheduled fee.

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

Standby mode

When in standby mode, the following occurs:

- The LCD backlight turns off.
- The hard disk motor either spins down or stops (controlled by OS).
- Suspend LED turns on.

Events that cause the computer to enter standby mode:

Note: These events depend on the **Power button, Sleep button and Lid** settings (options set to standby mode) in the ″Advanced″ page of the ″Power Management Properties″ screen.

- Standby requested by the Sleep button (Fn+F4)
- Standby requested by the power button
- Standby requested by closing the lid.

Events that cause the computer to exit standby mode:

- RTC alarm
- Power-on switch is operated
- Fn key is pressed
- The LCD is opened (if the system entered standby mode from closing the lid).

  Note: This is true if **When I close the lid of my portable computer:** is set to **Standby** in the ″Advanced″ page of the ″Power Management Properties″ screen.

- An embedded modem signals the modem ring indicator
- The battery power is at a critical level.

Display off mode

When in display off mode, the following occur:

- The LCD backlight turns off.

Events that cause the computer to enter display off mode:

- Hotkey : Fn+F3

Events that cause the computer to exit display off mode:

- Anykey or mouse operation

Hibernation mode

When 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.

Events that cause the computer to enter hibernation mode:

Note: These events depend on the **Power button, Sleep button and Lid** settings (options set to hibernate mode) in the ″Advanced″ page of the ″Power Management Properties″ screen.

- Hibernation requested by the Sleep button (Fn+F4) or (Fn+F12)
- Hibernation requested by the power button
- Hibernation requested by closing the lid.

Events that cause the computer to exit hibernation mode:

- RTC alarm
- Power-on switch is operated
- WOL (wake on Lan)

When power is turned on, the hibernation history in the boot record on the hard disk is recognized and the system status is restored from the hard disk to resume operation.

Fn key combinations

The following table shows the Fn key and function key combinations and their corresponding functions. Some of the keys do not work if proper device drivers and utilities are not installed.

Fn key	Function
Fn+F3	Display off
Fn+F4	Sleep button
Fn+F7	Switch display output location.
Fn+F8	Display expansion
Fn+F12	Hibernation
Fn+PageUp	Thinkpad light
Fn+Home	Brightness up
Fn+End	Brightness down

Product recovery program

Restoring the Pre-installed Software
To restore the pre-installed software, you can use either the Product Recovery program or a Recovery CD. The Product Recovery program is in a section of the hard disk drive (the Service Partition) that is not displayed by Windows Explorer. Use the Recovery CD if it was provided with the computer.

Note: The recovery process might take up to 2 hours.

To use the Product Recovery program to restore the pre-installed software, do the following:

1. Save all files and shut down the desktop.
2. Turn off the computer.
3. Turn on the computer. Quickly press **F11** when this message is displayed on the screen: ...″**To start the Product Recovery program, press F11**″ .....This message is displayed for only a few seconds.

   Note: If this message does not appear, you can use a Recovery Repair diskette to get access to the Product Recovery program.(see"Creating a Recovery Repair diskette" on page 32 for instructions for making the Recovery Repair diskette)

4. From the list displayed on the screen, select the operating system you want to recover.
5. Select the recovery options you want, and follow the instructions on the screen.

Creating the Service Partition
To create Service Partition and install the preloaded system from Recovery CD, do the following;

To create Service Partition [SP]:

1. Erase all partitions on the hard-disk drive using FDISK or similar application.
2. Boot with Recovery CD (and boot diskette if required).
3. A menu will appear stating ″**Your computer originally included a Product Recovery program ... Reinstall the Product Recovery Program? (Y/N) [ ]**″.¨.

   Note: If the hard-disk drive contains any partitions, you will not receive this menu - go to step 1.

4. Enter ″Y″ and Service Partition will be created and loaded with D2D files.

   Note: If you do not want to create Service Partition, press ″N″ , and the d then go to step 8.

5. Press ″**Enter**″ at next window to continue.

   * Service Partition will be created. System will automatically reboot during this process.

   * Recovery process will copy some files to the Service Partition, PKUNZIP others

   * Follow prompts - you may be prompted to change CDs.

   * System will reboot when complete, continue to step 6 to install preloaded system.

   Install preloaded system from CD:

6. Boot with Recovery CD (and boot diskette if required)

7. If the hard-disk drive is blank, a menu will appear stating ″**Your computer originally included a Product Recovery program ... Reinstall the Product Recovery Program? (Y/N) [ ]**″.

   * To install Service Partition, go to step 4.

   * To preload hard-disk drive without installing Service Partition, press ″N″.

8. If a menu appears asking which operating system to install, highlight proper operating system and press ″″**ENTER**″.

9. A menu will appear stating ″Full Recovery:″. Press ″″**ENTER**″ to select.

10. Enter ″Y″ at the three windows which follow.

11. Follow prompts to complete Recovery.

Creating a Recovery Repair diskette

The Recovery Repair diskette is used to recover the prompt that is needed to access the Product Recovery program, if the prompt does not appear. Make a Recovery Repair diskette and save it for future use.

To make a Recovery Repair diskette:

1. Shut down and turn off the computer.
2. Attach the external diskette drive to the computer.
3. At the prompt, press**F11**. (The option to press**F11** appears for only a few seconds. You must press **F11** quickly.) The Product Recovery program main menu appears.
4. If you are using Windows 2000 Professional, you will be prompted to select the appropriate operating system setting. This menu does not appear for Windows 98 SE.
5. Select System Utilities from the main menu. Press **Enter**.
6. Select Create a Recovery Repair diskette. Press **Enter**.
7. Follow the on-screen instructions.
8. When the process is completed, label the diskette as the Recovery Repair diskette and save it for future use.

To use the Recovery Repair diskette:

1. Shut down and turn off the computer.
2. Attach the external diskette drive to the computer.
3. Insert the Recovery Repair diskette into the drive; then turn on the computer.
4. Follow the on-screen instructions.

Checkout guide

Use the following procedure as a guide for computer problems.

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

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

Testing the computer

The ThinkPad computer has a test program called PC-Doctor DOS (hereafter called *PC-Doctor*). You can detect errors by running the diagnostics test of PC-Doctor. This section is an overview on detecting the problem. Refer to "Product overview" on page 39 for details that depend on model-unique functions.

To run the test, do the following:

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

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

   If the computer cannot be powered on, go to "Power systems checkout" on page 35 and check the power sources.

   If an error code appears, go to "Symptom-to-FRU Index" on page 44.

   The PC-Doctor main panel appears.

2. Select **Diagnostics** with the arrow keys, and press **Enter**.

   A pull-down menu appears:

   Note: The pull-down menu differs depending on the model.

3. Run the applicable function test.
4. Follow the instructions on the screen. If there is a problem, PC-Doctor shows some messages.
5. Reseat the cable or connector of the detected FRU and run the test again.

If the error recurs, replace the FRU that caused the error.

Note: With some FRUs, especially the system board, the problem may be caused by peripheral FRUs. Verify that each peripheral FRU, such as the flexible cable, has no problem by doing the following:

   a. Replace each peripheral FRU one at a time, and run the test again.

   b. If the peripheral FRUs have no problem, replace the main FRU itself.

   To see the FRU structure of each model, refer to "Product overview" on page 39.

6. To exit the test, select **Quit – Exit Diag**.

   To cancel the test, press **Esc**.

The following table lists the options on the test menu.

Diagnostics	Interactive Tests
• Run Normal Test	• Keyboard
• Run Quick Test	• Video
• CPU/Coprocessor	• Internal Speaker
• Systemboard	• Mouse
• Video Adapter	• Joystick Test
• Serial Port	• Diskette Test
• Parallel Port	• System Load
• Fixed Disks	• CD-ROM/DVD
• Diskette Drives	• Stereo Speaker
• Other Devices	
• Wireless network controller (802.11b)	
• Memory Test – Full	
• Memory Test – Quick	

Note: In **Keyboard** test within **Interactive Tests**, the **Fn** key is scanned only once. Each key should be pressed for at least 2 seconds; otherwise, it cannot be sensed.

Related service information

PC-Doctor can detect the following system information:

Hardware Info:
- System Configuration
- Memory Contents
- Physical Disk Drive
- Logical Disk Drive

- VGA Information
- IDE Drive Information
- PCI Information
- PNPISA Information
- SMBIOS Information
- FRU Information
- VESA LCD Information

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

Power systems checkout

To verify the symptom of the power problem on the computer, do the following:

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

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

- "Checking the AC Adapter"
- "Checking operational charging" on page 36
- "Checking the Battery ASM" on page 37

Checking the AC Adapter
You care here because the computer fails only when the AC Adapter is used:

- If the power-on indicator does not turn on, check the power cord of the AC Adapter for correct continuity and installation.
- If the operational charge does not work, go to "Checking operational charging".

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:
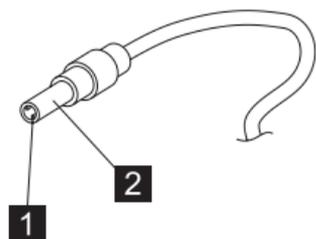
Pin	Voltage (V dc)
1	15.5 V. - 17.0 V.
2	Ground

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

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

- Replace the system board.
- If the problems still persist, go to "Undetermined Problems" on page 57.

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

Checking operational charging
To check operational charging, use a discharged battery pack (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 or icon does not turn on, remove the Battery ASM and let it return to room temperature. Reinstall the Battery ASM. If the charge indicator or icon still does not turn on, replace the Battery ASM.

If the charge indicator still does not turn on, replace 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

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

Do the following:

1. Power off the computer.
2. Remove the battery pack and measure the voltage between battery terminals 1 (+) and 6 (-). See the following figure.
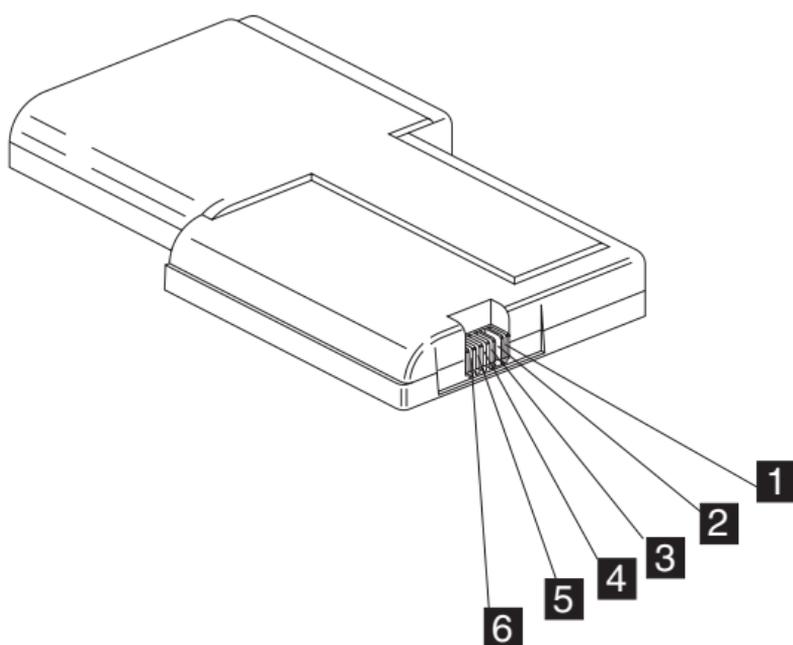
Terminal	Pin No.	Description
1	1	+0 to +12.6 for LiION
		+0 to +13V for NiMH
2	Slit	Isolation slit
3	4	Thermistor
4	5	Battery —

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 +11.0 V dc, the battery pack has been discharged. Note: Recharging will take at least 3 hours, even if the indicator does not turn on. If the voltage is still less than +11.0 V dc after recharging, replace the battery.
4. If the voltage is more than 8V for NiMH, 9V for LiION, measure the resistance between battery terminals 5 and 6. The resistance must be 4 to 30KΩ. If the

resistance is not correct, replace the Battery ASM. If
the resistance is correct, replace the system board.

Product overview

The following shows an overview of the system features.

Feature	Description
Processor	Intel Pentium III Celeron processor 800/100, 900/100 MHz, 1 GHz, L2 cache
Bus architecture	Host bus 64bits/100 MHz, PCI 32 bits/33 MHz, ISA 16 bits/8.33 MHz, PCMCIA 16 bits/33MHz, Cardbus 32 bits/32 MHz
System memory	64 MB or 128 MB base main memory on system board PC 133 Two 144pins SODIMM slots supports 64 MB, 128MB, 256MB, and 512MB DIMM card Maximum frequency: PC 133 Maximum size: 1024 MB
CMOS RAM	242 bytes + 4 Kbytes
Video	Trident Cyberblade Aladdin i1 with 2D/3D Graphics accelerator. 8MB Video RAM (share with system memory) 13.3–inch, 32 bit true colors, 1024x768 pixel TFT XGA color LCD 14.1–inch, 32 bit true colors, 1024x768 pixel TFT XGA color LCD
Audio	AC97 audio based on the Ali M1535 AC link DMA engine 16–bit audio Internal stereo speakers
Diskette drive (optional)	External 1.44MB (3–mode), 3.5 inch floppy drive via USB interface (Bootable)
Hard disk drive	10GB, 15GB or 30GB, 2.5–inch 9.5mm height, E-IDE interface
CD-ROM drive	CD-ROM: 5.25–inch, 24X speed, E-IDE interface DVD— ROM : 8X speed DVD/ CD— RW : 6X DVD/ 4X, 24X CD-RW CD-RW
Modem	Integrated CDC soft Modem based on the Ali M1535 AC link DMA engine 56 Kbps Data/Fax Modem

Feature	Description
Ethernet (optional)	Intel 82550GY on board . It supports 10/100Mbps
IEEE 1394 (optional)	Ti TSB43AB22 1394 controller on board
	IEEE 1394.a 4–pin connector — no cable power
	100Mbps, 200Mbps and 400Mbps
PC Card (PCMCIA)	One Type I/II or Type III
I/O ports	External monitor
	Speaker-out
	Microphone-in
	DC-in
	TV-out (S-Video out)
	Parallel
	Two USB
	IEEE 1394a (optional)
	Telephone (RJ11)
	LAN (RJ45, optional)
Power	72–Watt AC Adapter
	6–cell Li-Ion & 8–cell NiMH Battery Packs (Dumb Battery)

Status indicators

The system-status indicators on the computer show the current status of your computer by their on or off states and colors (green and orange). Each indicator is identified with a symbol. The following shows the location and the

meaning of each icon:

Symbol	Color	Meaning
(1) Drive in use	Green	Data is being read from or written to the hard disk. Do not enter standby mode or power off the computer when this indicator is on.
(2) 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
(3) 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.
(4) 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.
(5) Power on	Green	The computer is operational. This indicator is on when the computer is on.
(6) Battery status	Green	Enough battery power remains for operation.
	Blinking green	The battery power charges up to 80% full power
	Blinking orange	The battery pack needs to be charged
	Orange	The battery pack is being charged.
(7) Standby mode	Green	The computer is in standby mode

FRU tests

The following table shows the applicable test for each FRU using PC-Doctor.

FRU	Applicable test
System board	1. CPU/Coprocessor (**Diagnostics**) 2. System board (**Diagnostics**)
Power	Battery (**Diagnostics**)
LCD unit	1. Video Adapter (**Diagnostics**) 2. Video (**Interactive Tests**)

FRU	Applicable test
Modem	1. Make sure the modem set up correctly. 2. Replacing the modem jack and modem card one at a time, run the modem tests in Other Devices (**Diagnostics**)
Audio	Internal Speaker (**Interactive Tests**) Stereo Speaker (**Interactive Tests**)
Speaker	System beeper: Internal Speaker (**Interactive Tests**)
PC Card slots	System board (**Diagnostics**)
Keyboard	1. Keyboard (**Diagnostics**) 2. Keyboard (**Interactive Tests**)
TrackPont or Pointing device	If the TrackPoint does not work, see if an external PS/2 mouse is connected to the mouse/keyboard connector and remove it. The TrackPoint is automatically disabled if an external PS/2 mouse is attached. Check also if the TrackPoint driver is correctly installed by accessing Windows Device Manager via the System icon in the Control Panel. 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 in a short period of time. If this does not correct the TrackPoint problem, continue with the following: Mouse (**Interactive Tests**).
Hard disk drive	Fixed Disks (**Diagnostics**)
CD-ROM drive	CD-ROM, DVD, CD-RW, DVD/CD-RW (**Interactive Tests**)
Memory	1. If a DIMM is installed, remove it and run Memory Test-Quick (**Diagnostics**) 2. If the problem does not recur, replace the DIMM and run the test again. 3. If the test does not detect the error, run Memory Test-Full (**Diagnostics**)
Fan	1. Power on system and check the air turbulence at the louver at the rear of the computer. 2. Run the fan test in Other Devices (**Diagnostics**).

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 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 which FRUs should be available 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 57.

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

Numeric Error Codes and Messages

Error Code	Message	Meanings	Comment
0200	Failure Fixed Disk	Fixed disk is not working or not configured properly. Check to see if fixed disk is attached properly. Run setup. Find out if the fixed-disk type is correctly identified.	
0210	Stuck key	Stuck key on keyboard.	
0211	Keyboard error	Keyboard not working.	
0212	Keyboard Controller Falied	Keyboard Controller Falied test. May require replacing keyboard controller.	
0213	Keyboard locked Unlock key switch	Unlock the system to proceed.	

Error Code	Message	Meanings	Comment
0220	Monitor type does not match CMOS Run SETUP	Monitor type not correctly identified is Setup.	
0230	Shadow RAM failed at offset : nnnn	Shadow RAM failed at offset nnnn of the 64k block at which the error was detected.	
0231	System RAM failed at offset : nnnn	System RAM failed at offset nnnn of in the 64k block at which the error was detected.	
0232	Extended RAM Failed at offset : nnnn	Extended memory not working or not configured properly at offset nnnn,	
0250	System battery is dead Replace and run SETUP	The CMOS clock battery indicator shows the battery is dead. Replace the battery and run Setup to reconfigure the system.	
0251	System CMOS checksum bad-default configuration	System CMOS has been corrupted or modified incorrectly, perhaps by an application program that changes data stored in CMOS. The BIOS installed Default Setup Values. If you do not want these values, enter Setup and enter your own values. If the error persists, check the system battery or contact your dealer.	
*0260	System timer error	The timer test failed. Requires repair of system board.	
0270	Real time clock error	Real-Time Clock fails BIOS hardware test. May require board repair.	

Error Code	Message	Meanings	Comment
0271	Check date and time settings	BIOS found date or time out of range and reset the Real-Time Clock. May require setting legal date (1991–2099).	
0280	Previous boot incomplete-Default configuration used	Previous POST did not complete successfully. POST loads default values and offers to run Setup. If the failure was caused by incorrect values and they are not corrected, the next boot will likely fail. On system with control of wait states, improper Setup settings can also teminate POST and cause this error on the next boot. Run Setup and verify that wait-state configuration is correct. This error is cleared the next time the system is booted.	IBM customized not to display this message.
0281	Memory Size found by POST differed from CMOS	Memory size found by POST differed from CMOS.	
02B0	Diskette drive A error Diskette drive B error	Drive A: or B: is present but fails the BIOS POST diskette tests. CHeck to see that the drive is defined with the proper diskette type in Setup and that the diskette drive is attached corretly.	
02B2	Incorrect Drive A type — run SETUP	Type of floppy drive A: not correctly identified in Setup	
02B3	Incorrect Drive B type — run SETUP	Type of floppy drive B: not correctly identified in Setup	

Error Code	Message	Meanings	Comment
02D0	System cache error- Cache disabled	RAM cache failed and BIOS disabled the cache. On older boards, check the cache jumpers. You may have to replace that cache. See your dealer. A disabled cache slows system performance considerably.	
02F0:	CPU ID:	CPU socket number for Multi-Processor error.	
02F4:	EISA CMOS not writeable	ServerBIOS2 test error: Cannot write to EISA CMOS.	
02F5:	DMA Test Failed	ServerBIOS2 test error: Cannot write to extended DMA (Direct Memory Access) registers.	
02F6:	Software NMI Failed	ServerBIOS2 test error: Cannot generate software NMI(Non-Maskable Interrupt).	
02F7:	Fail-Safe Timer NMI Failed	ServerBIOS2 test error: Fail-Safe Timer takers too long.	
	device Address Conflict	Address conflict for specified device.	
	Allocation Error for: device	Run ISA or EISA configuration Utility to resolve resource conflict for the specified device.	
	CD ROM Drive	CD ROM Drive identified.	
	Entering SETUP	Starting Setup program	

Error Code	Message	Meanings	Comment
	Failing Bits: nnnn	The hex number nnnn is a map of the bits at the bits at the RAM address which failed the memory test. Each 1 (one) in the map indicates a failed bit. See errors 230, 231, or 232 above for offset address of the failure in System,Extended, or Shadow memory.	
	Fixed Disk n	Fixed disk n (0–3) identified.	
	Invalid System Configuration Data	Problem with NVRAM (CMOS) data.	
	I/O device IRQ conflict	I/O device IRQ conflict error.	
	PS/2 Mouse Boot Summary Screen:	PS/2 Mouse installed	
	nnnn kB Extended RAM Passed	Where nnnn is the amount of RAM in kilobytes successfully tested.	
	nnnn Cache SRAM Passed	Where nnnn is the amount of system cache in kliobytes successfully tested.	
	nnnn kB Shadow RAM Passed	Where nnnn is the amount of shadow RAM in kilobytes successfully tested.	
	nnnn kB System RAM Passed	Where nnnn is the amount of system RAM in kilobytes successfully tested.	
	One or more I2O Block Storage Devices were excluded from the Setup Boot Menu	There was not enough room in the IPL table to display all installed I2O block-storage devices.	
	Operating system not found	Operating system cannot be located on either drive A: or drive C:. Enter Setup and see if fixed disk and drive A: are properly identified.	

Error Code	Message	Meanings	Comment
	Parity Check 1 nnnn	Parity error found in the system bus. BIOS attempts to locate the address and display it on the screen. If it cannot locate the address, it displays ????. Parity is a method for checking errors in binary data. A parity error indicates that some data has been corrupted.	
	Parity Check 2 nnnn	Parity error found in the I/O bus. BIOS attempts to locate the address and display it on the screen. If it cannot locate the address, it displays ????.	
	Press F1 to resume, F2 to Setup, F3 for previous	Displayed after any recoverable error message. Press F1 to start the boot process or F2 to enter Setup and change the settings. Press F3 to display the previous screen (usually an initialization error of an Option ROM, i.e., an add-on card). Write down and follow the information shown on the screen.	
	Press F2 to enter Setup	Optional message displayed during POST. Can be turned off in Setup.	IBM customized ″F2″ to ″F1″
	PS/2 Mouse:	PS/2 mouse identified.	
	Run the I2O Configuration Utility	One or more unclaimed block storage devices have the Configuration Request bit set in the LCT. Run an I2O Configuration Utility (e.g. the SAC utility).	

Error Code	Message	Meanings	Comment
	System BIOS shadowed	System BIOS copied to shadow RAM.	
	UMB upper limit segment address: nnnn	Displays the address nnnn of the upper limit of Upper Memory Blocks, indicating released segments of the BIOS which can be reclaimed by a virtual memory manager.	
	Video BIOS shadowed	Video BIOS successfully copied to shadow RAM	
0175	Bad CRC1, stop POST task	EEPROM CRC1 is not correct (block #6).	Replace planar.
0187	EAIA data access error	EEPROM access (read or write) is failed.	
0188	Invalid RFID Serialization Information Area or Bad CRC2	EEPROM checksum is not correct (block #0,1).EEPROM CRC2 is not correct (block #6).	Replace planar. Box serial number needs to be reinstalled.
0189	Invalid RFID Configuration Information Area	EEPROM checksum is not correct (block #4,5).	Replace planar. UUID needs to be reinstalled.
0190	Critical low-battery error	Critical Low Battery.	
0193	RF antenna had been removed	RFID antenna has been removed, which was once installed.	RFID model only.
0194	The computer is carried through the security gate	The computer is carried through the security gate (portal gate).	RFID model only.
1801	Unsupported docking station is attached - Power off and remove the docking station	Attached docking station is not supported by the product.	
	Fan error	Cooling fan is failing.	

Error Code	Message	Meanings	Comment
	Do you want abort resume from hibernation? (Y/N)System memory removed, press F3 to power off systemand restore memory chip, press F4 to normal boot	DIMM is removed during hibernation state.	
	Docking station is removed or its ID is different,press F3 to power off system and restore correctdocking station, press F4 to normal boot.	Undocked during hibernation state, or docked to another docking station during hibernation state.	No error appears when; undock -> hibernation -> dock -> wakeup. The docking is configured by OS.
	WRONG MEMORY: Serial Presence Detected (SPD) indicates 66MHz Memory. This processor requires 100MHz memory. Shut system down.	In 100MHz clock system 66MHz Memory are installed.	Shut system down.(Stop this point)

Beep Symptoms

Event	Description	S1/S3	Beep
POST			
Diagnostic boot	End Diagnostic boot	N/A	1 short beep
Post error		N/A	3 short beeps
Low battery warning beep		N/A	4 short beeps
Critical Thermal	System POST	N/A	3 long beeps
DRAM type error	PC133 SDRAM only	N/A	2 long beeps

Responses of Boot Block BIOS Flash	Success	N/A	2 long, 1 short, and then 1 long beep
	BIOS file size mismatch	N/A	1 long, 1 short beep
	BIOS file reading error	N/A	1 long, 2 short beeps
	Floppy drive not installed	N/A	2 short beeps

Run Time / Sleep state			
BaySwap alarm	Inhibit bay swap	Yes	Continuous 2 short, 1 long beeps .
AC attach/detach		NO	1 short beep
Power Control Beep	System enters / resume from S1/S3/S4 state.	N/A	1 short beep
Volume control beep	Volume key Up/Down	N/A	1 short beep

LCD-Related Symptoms

> **LCD FRU Replacement Notice**
>
> The TFT LCD for the computer contains many 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:
>
> • XGA : 8 or more bright dots, 8 or more dark dots, or a total of 9 or more bright and dark dots.

Symptom/Error	FRU/Action in Sequence
LCD backlight does not work. LCD is too dark. LCD brightness cannot be adjusted.	• Keyboard (if contrast and brightness function keys do not work) • Reseat LCD connector • Check LCD inverter ID • LCD Cable ASM • LCD Inverter/LED board (13.3″/14.1″) • LCD • System board
Unreadable LCD screen. Missing pixels in characters. Abnormal screen Wrong color displayed.	• Reseat LCD connector • Check LCD inverter ID • LCD Cable ASM • LCD Inverter/LED board (13.3″/14.1″) • LCD • System board

Symptom/Error	FRU/Action in Sequence
LCD has extra horizontal or vertical lines displayed.	• Check LCD inverter ID • LCD Cable ASM • LCD Inverter/LED board (13.3″/14.1″) • LCD • System board

Keyboard/TrackPoint-Related Symptoms

Symptom/Error	FRU/Action in Sequence
Keyboard (one or more keys) doesn't work.	• Go to "FRU tests" on page 42. • Reseat keyboard cable. • Keyboard • System board
TrackPoint does not work.	• Go to "FRU tests" on page 42. • Reseat keyboard cable. • Keyboard • System board

Indicator-Related Symptoms

Symptom/Error	FRU/Action in Sequence
Indicator incorrectly remains off or on, but system runs correctly.	• Reseat Inverter/LED board (13.3″/14.1″) • Inverter/LED board (13.3″/14.1″) • System board • Coaxial cable

Power-Related Symptoms

Symptom/Error	FRU/Action in Sequence
Power shuts down during operation.	• Go to "Power systems checkout" on page 35. • AC Adapter • Battery assembly • Keyboard • System board

Symptom/Error	FRU/Action in Sequence
The system doesn't power on.	• Go to "Power systems checkout" on page 35. • AC Adapter • Battery assembly • Keyboard • System board
The system doesn't power off.	• Go to "Power systems checkout" on page 35. • Hold and press the power switch for more than 4 seconds. • Keyboard • System board
Battery can't be charged.	• Go to "Power systems checkout" on page 35. • Battery assembly • System board

Memory-Related Symptom

Symptom/Error	FRU/Action in Sequence
Memory count (size) appears different from the actual size. (The main memory with 8MB of VGA.)	• Go to "FRU tests" on page 42. • Enter BIOS Utility and execute "Load Setup Default Settings"; then reboot the system. • DIMM • System board

Audio-Related Symptoms

Symptom/Error	FRU/Action in Sequence
Internal speakers make noise or emit no sound.	• Speaker volume control • Go to "FRU tests" on page 42. • Speaker(s)
External speakers make noise or emit no sound.	• Speaker volume control • Go to "FRU tests" on page 42. • Speaker(s)
In DOS or Windows, multimedia programs, no sound comes from the computer. (Only system beeps are heard at power-on.)	• Speaker volume control • Go to "FRU tests" on page 42. • Speaker(s)

PC Card (PCMCIA)-Related Symptoms

Symptom/Error	FRU/Action in Sequence
System cannot detect the PC Card (PCMCIA)	• PC Card (PCMCIA) holder assembly • System board
PCMCIA slot pin is damaged.	PC Card (PCMCIA) holder assembly

Power Management-Related Symptoms

Symptom/Error	FRU/Action in Sequence
The system doesn't enter hibernation mode.	• Go to "Hibernation mode" on page 29. • Boot an operating system and press **Fn+F12** and see if the computer enters hibernation mode. • Keyboard • Hard disk drive connector • Hard disk drive • System board
The system doesn't resume from hibernation mode.	• Go to "Hibernation mode" on page 29. • Hard disk drive connector • Hard disk drive • System board
The system doesn't enter into or resume from sleep mode after closing the LCD.	• Lid switch • System board • Lid close action in the power operation properties of the OS
System configuration does not match the installed devices.	• Enter BIOS Utility and execute "Load Setup Default Settings"; then reboot the system. • Reseat Hard disk/diskette/CD-ROM drive connector.
System hangs intermittently.	• Reseat hard disk/diskette/CD-ROM drive connector. • Fan ASM (go to "FRU tests" on page 42). • System board

Peripheral-Device-Related Symptoms

Symptom/Error	FRU/Action in Sequence
External display does not work correctly.	• Both display mode, press Fn+F7. • System board
Printer problems.	• Run printer self-test. • Printer driver • Printer cable • Ensure that ″Parallel Port″ in the ″Config sub-menu″ menu of the BIOS Utility is correctly set. • System board
Parallel port device problems.	• Device driver • Device cable • Device • Ensure that ″Parallel Port″ in the ″Config sub-menu″ menu of the BIOS Utility is correctly set. • System board

Modem-Related Symptom

Symptom/Error	FRU/Action in Sequence
Internal modem does not work correctly	• Go to ″FRU tests″ on page 42. • Modem connector • Modem board • System board

Operating System-Related Symptom

Symptom/Error	FRU/Action in Sequence
Operating system not found	• Check that the operating system has no failure and is installed correctly. • Check the Boot device list in the startup/Boot sub-menu is enabled on each bootable device. • Enter IBM BIOS Setup Utility and see whether the hard disk drive and the diskette drive are properly identified. • Reseat the hard disk drive. • Reinstall the operating system. • Diskette drive • Hard disk drive • System board

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 only be considered when a recurring problem exists.

When analyzing on intermittent problem, do the following:

1. Run the diagnostic test for the system board at least 10 times.
2. If no error is detected, do not replace any FRUs.
3. If any error is detected, replace the FRU. Rerun the test to verify that there are no more errors.

Undetermined Problems

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 the procedures below to isolate the failing FRU.

Verify that the power supply being used at the time of the failure is operating correctly.

1. Power off the computer.
2. Check the cables, wires, and connectors for short circuits and open circuits. Visually check them for damage. If any problems are found, replace the FRU.
3. Remove or disconnect all of the following devices:
   • Non-IBM devices

- Printer, external mouse & keyboard, and other external devices
- Battery pack
- Hard disk drive
- CD-ROM drive/Diskette drive (optional)
- PC Card (PCMCIA)

4. Power on the computer.

5. Determine if the problem has changed.

6. If the problem does not occur again, 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.
   - Hard disk drive connection board
   - LCD assembly
   - 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.
- Any FRUs that must be removed before removing the failing FRU are listed at the top of the page.
- To replace a FRU, reverse the removal procedure and follow any notes that pertain to replacement. See "Locations" on page 86 for internal cable connections and arrangement information.
- When replacing a FRU, use the correct screw size, as shown in the procedure.

Safety Notice 1

Translations in ″Safety Notices (Multi-lingual Translations)″ section: 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 shorts.

Safety Notice 3

Translations in ″Safety Notices (Multi-lingual Translations)″ section: The battery pack contains small amounts of nickel. Do not disassemble it, throw it into fire or water, or short-circuit it. Dispose of the battery pack as required by local ordinances or regulations. Use only the battery in the appropriate parts listing when replacing the battery pack. Use of an incorrect battery can result in ignition or explosion of the battery.

> **Safety Notice 8**
> Translations in ″Safety Notices (Multi-lingual Translations)″ section: Before removing any FRU, power-off the computer, unplug all power cords from electrical outlets, remove the battery pack, then disconnect any interconnecting cables.

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

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

1010 Battery assembly
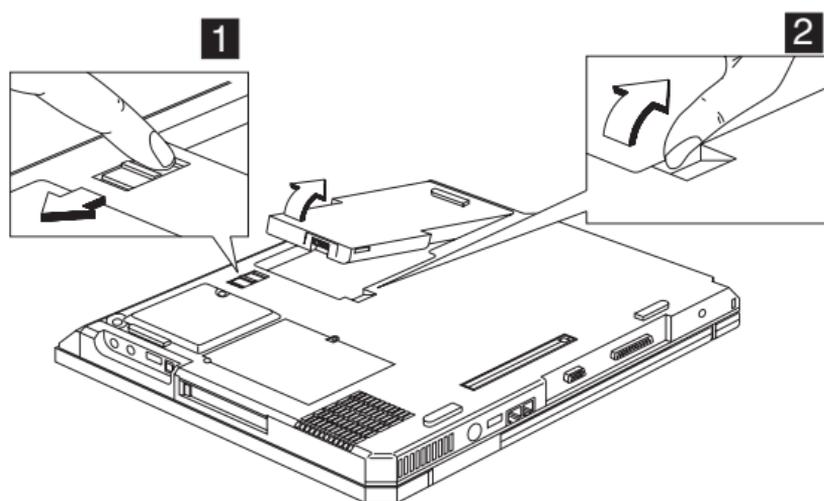
> **Warning**
> Battery packs are capable of delivering high currents for a significant amount of time. Do not short the battery terminals.

CAUTION:
Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

1020 Mini-PCI cover and Mini-PCI card

• "1010 Battery assembly"
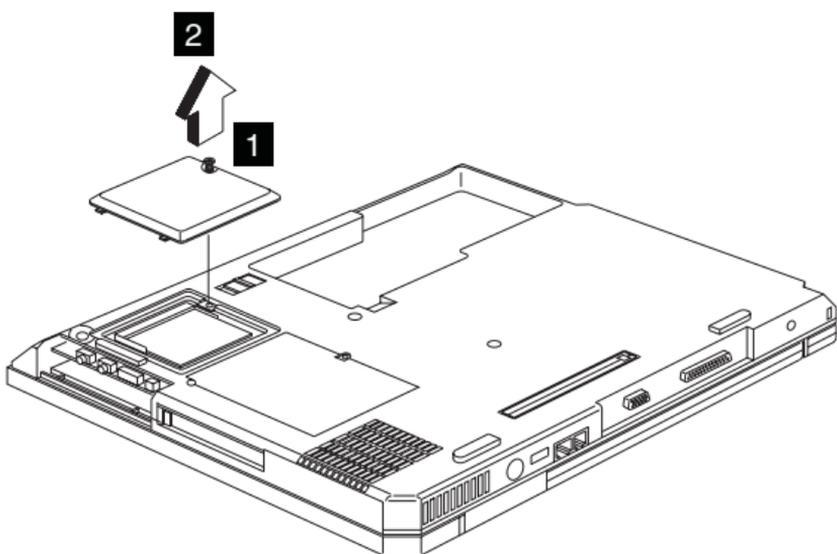
Note: The screw does not separate from the PCI cover.
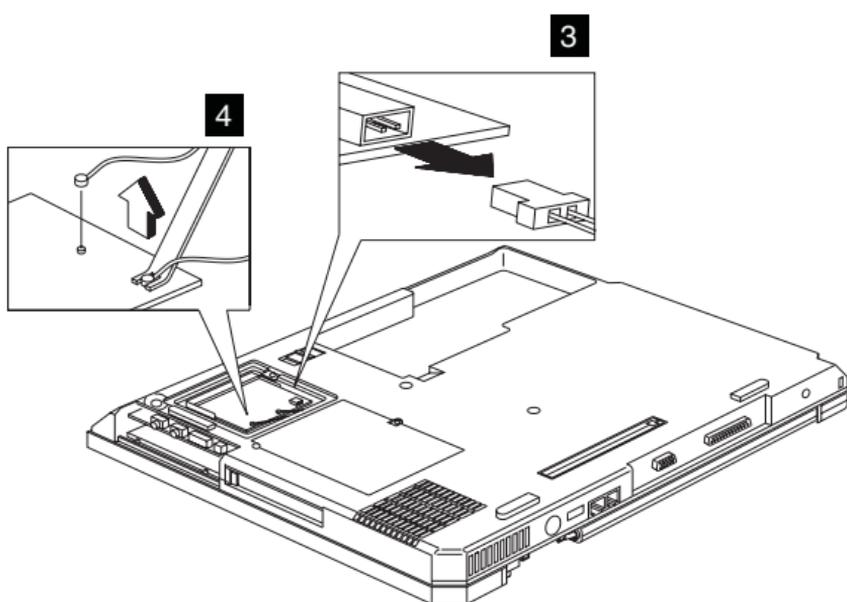
Note: There are 2 cables on step 4 : The gray cable is the main antenna and the black cable is the auxiliarey antenna.
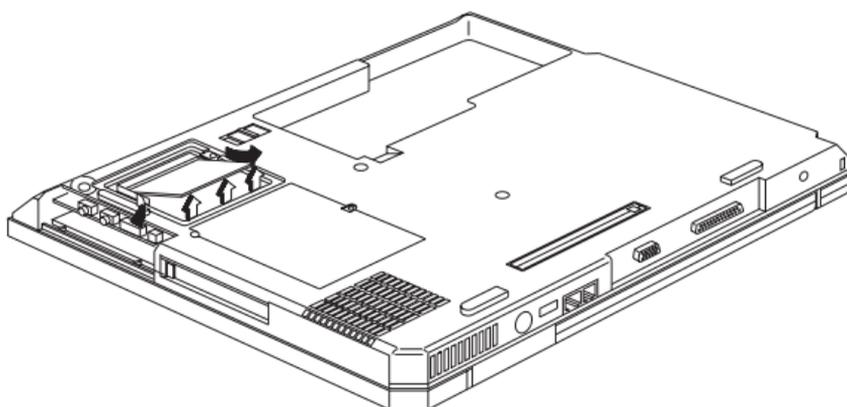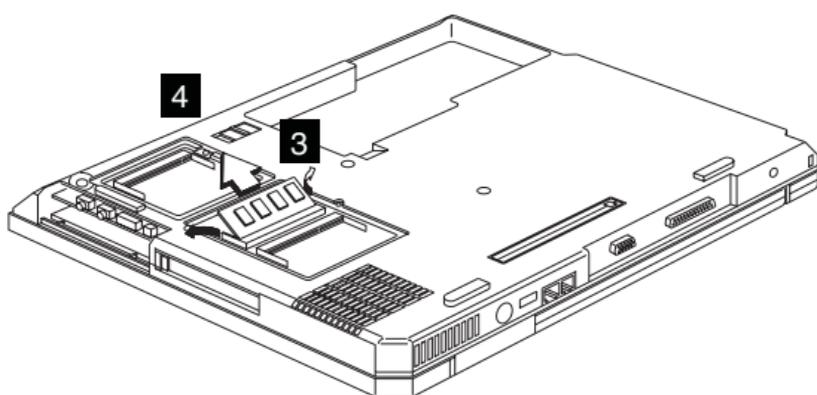

Note: When you install the PCI card, remember to press it down and ensure the connection is well.

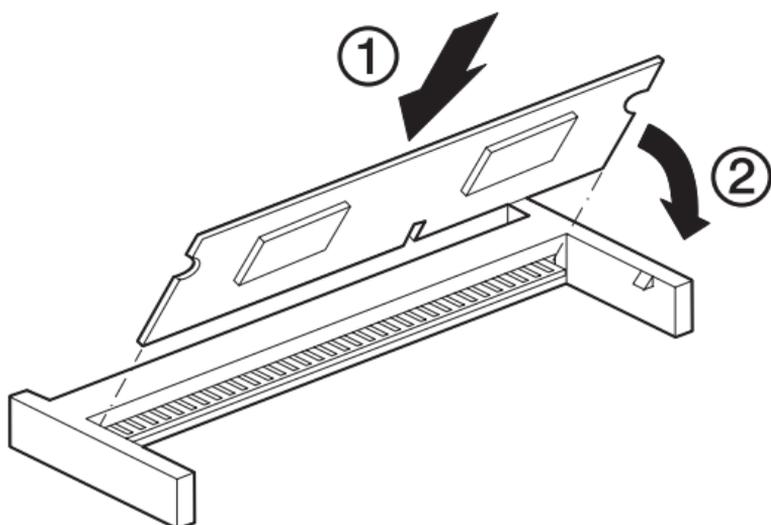# 1030 Memory cover and Memory card

- "1010 Battery assembly" on page 60
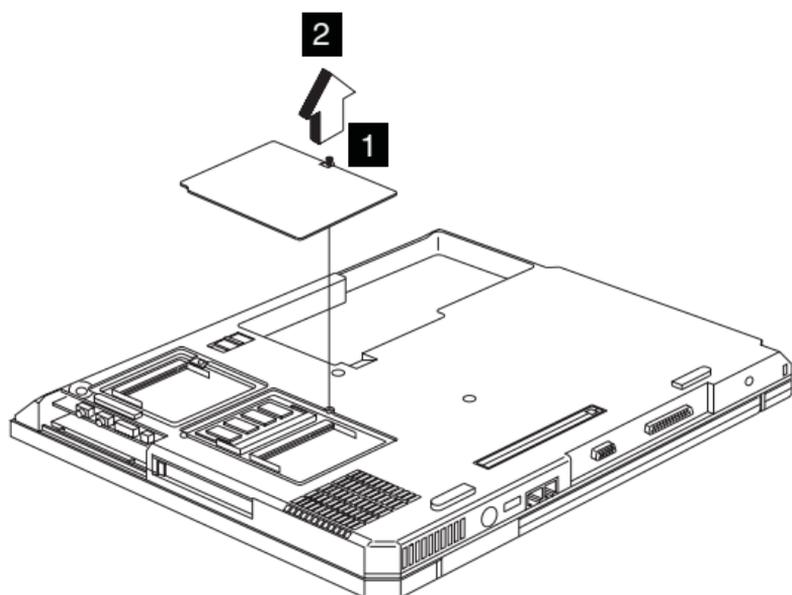
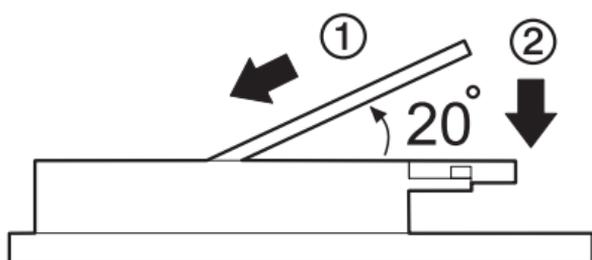**Note:** The screw does not separate from the memory cover.

To install the memory card:

With the notched end of the memory card toward the right side of the socket, insert the memory card, at an angle of approximately 20°, into the socket; then press it firmly.

Pivot the memory card until it snaps into place.

Side View

1040 Hard disk drive assembly

- "1010 Battery assembly" on page 60
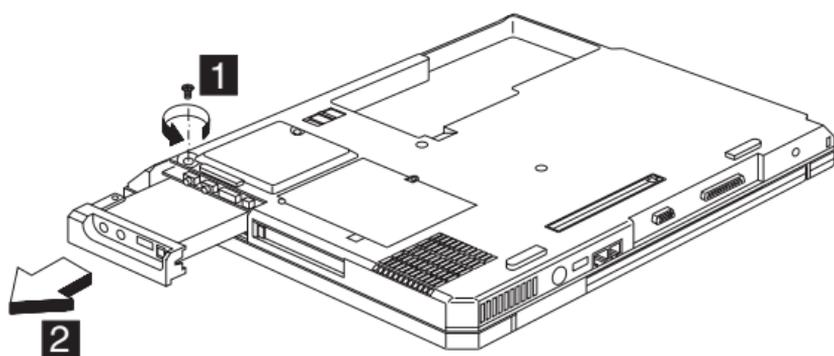
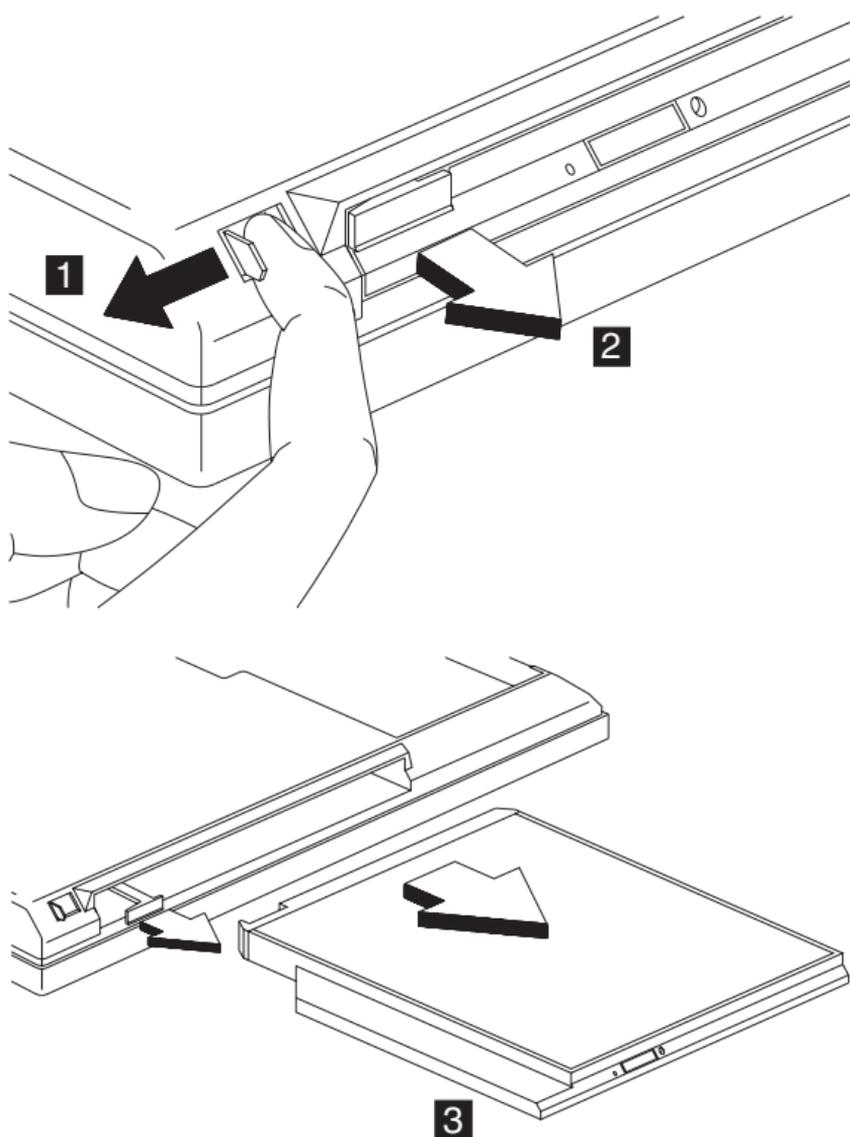| Step	Size (Quantity)	Color	Torque
1	M3 x L4 (1)	Black	3.2 kgf-cm

> **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 information on the drive if
> possible.
>
> Never remove the drive while the system is
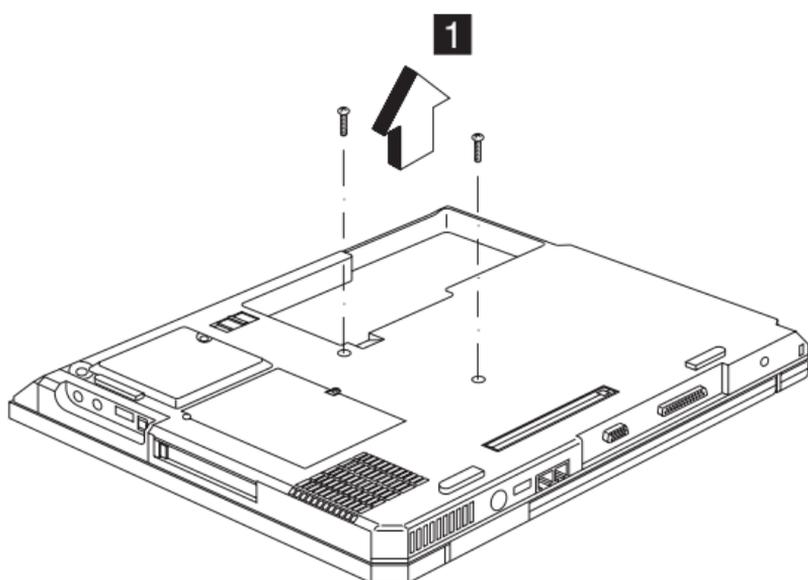> operating or is in suspend mode.

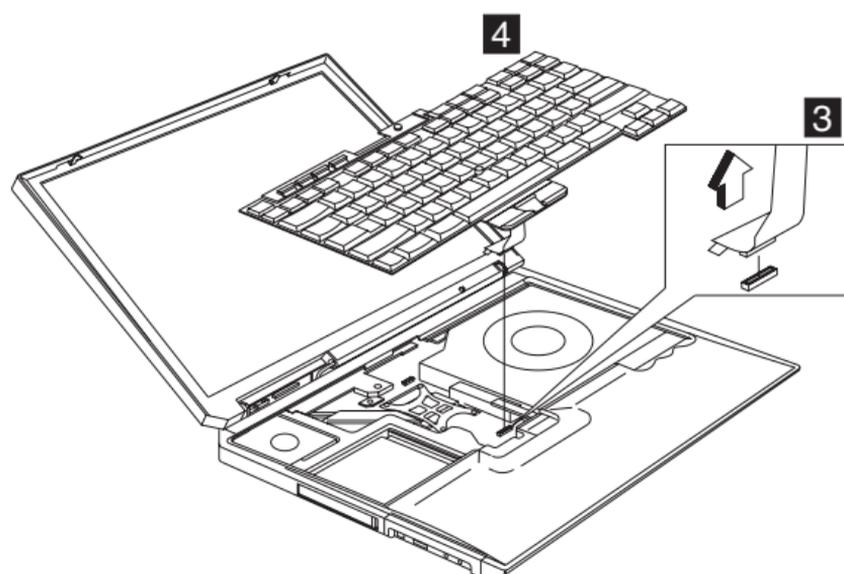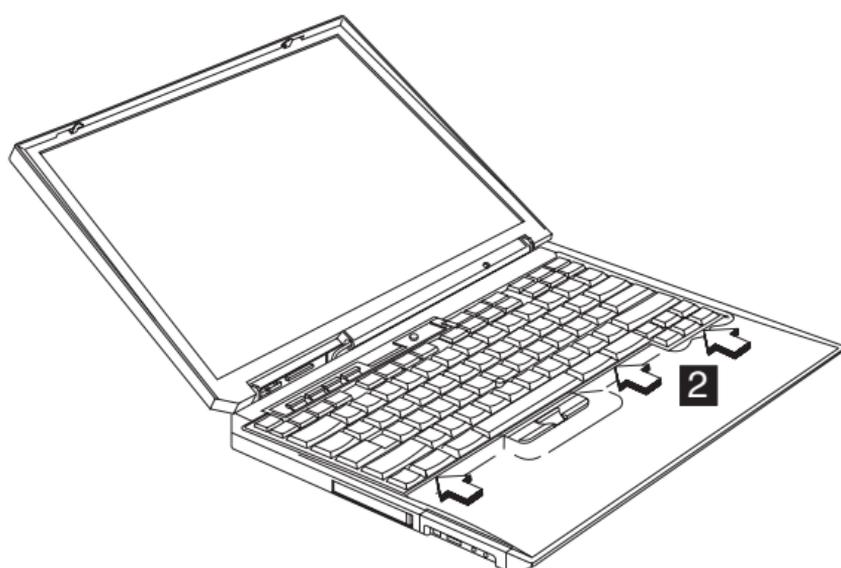## 1050 CD-ROM assembly

- "1010 Battery assembly" on page 60

1060 Keyboard

- "1010 Battery assembly" on page 60

| Step	Size (Quantity)	Color	Torque
1	M2.5 x L10 (2)	Black	3.2 kgf-cm

Notes:

1. When replacing the keyboard, make sure that the cable is clean and insert it directly into the connector, making sure it makes contact with the bottom of the connector.

2. If the cable do not touch the bottom of the connector, the keyboard function will be rendered useless.

3. The cable of the keyboard are fragile and could be damaged. Be careful when pulling out the cable.

1070 Backup battery

- "1010 Battery assembly" on page 60
- "1060 Keyboard" on page 64
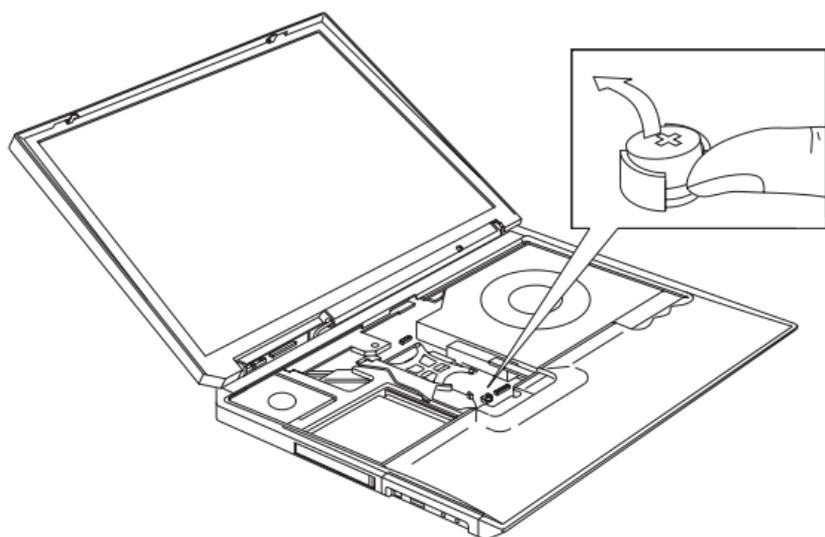

CAUTION:
Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to manufacturer's instruction.

Safety Notice 4

Translation in ″Safety Notices: Multi-lingual Translations″ section: The backup battery is a lithium battery and can cause a fire, an explosion, or severe burns. Do not recharge it, remove its polarized connector, disassemble it, heat it above 100°C (212°F), incinerate it, or expose its cell contents to water. Dispose of the battery as required by local ordinances or regulations. Use of an incorrect battery can result in ignition or explosion of the battery. Replacement batteries can be ordered from IBM or IBM Authorized Dealers.
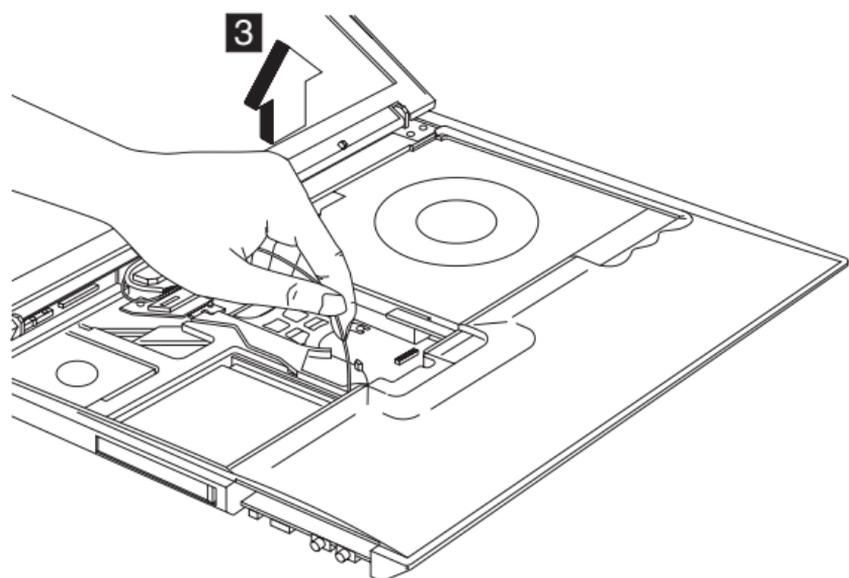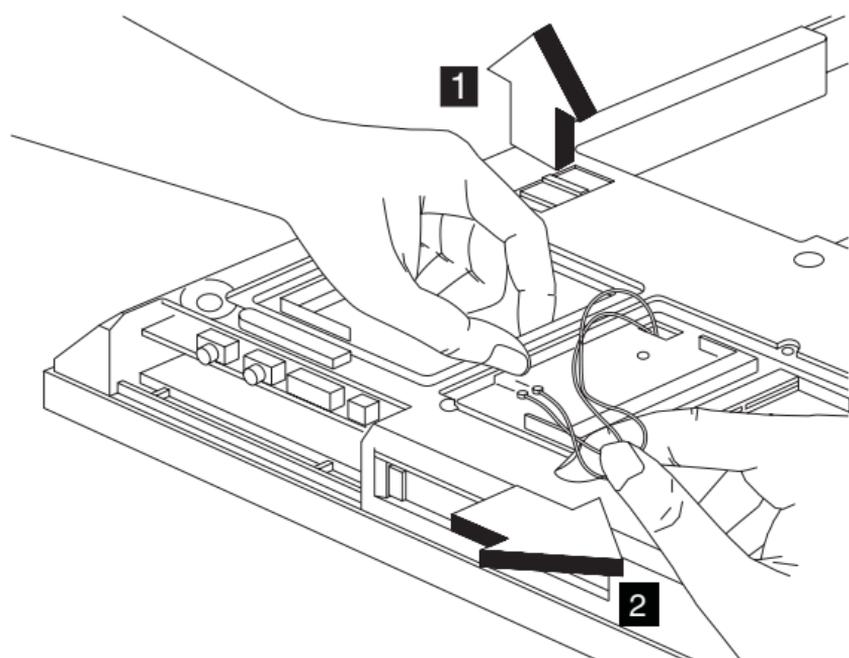

1080 Middle cover
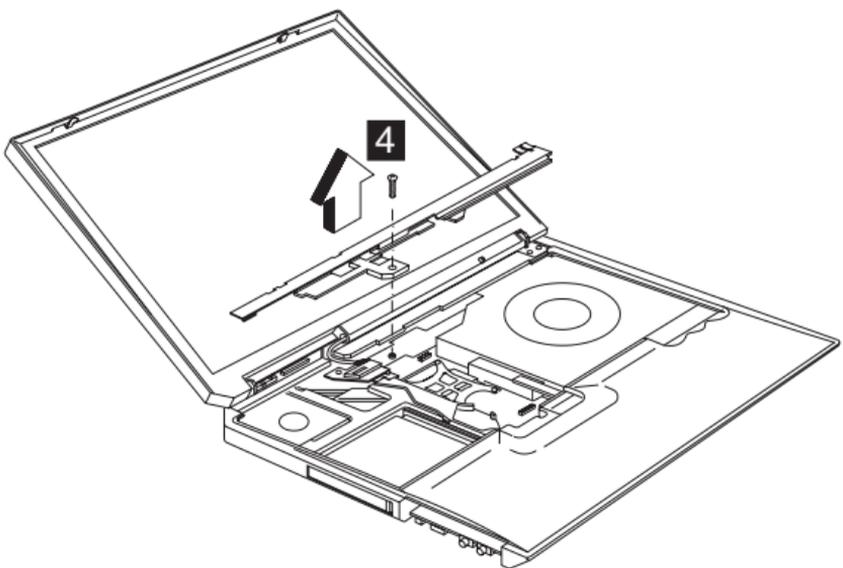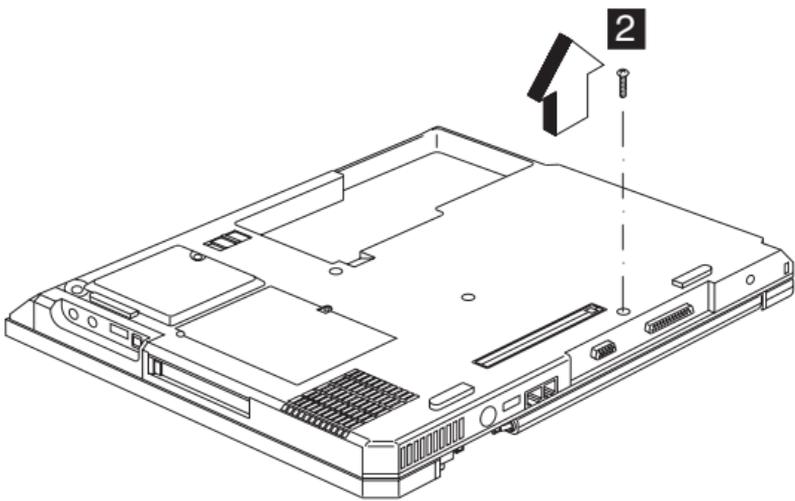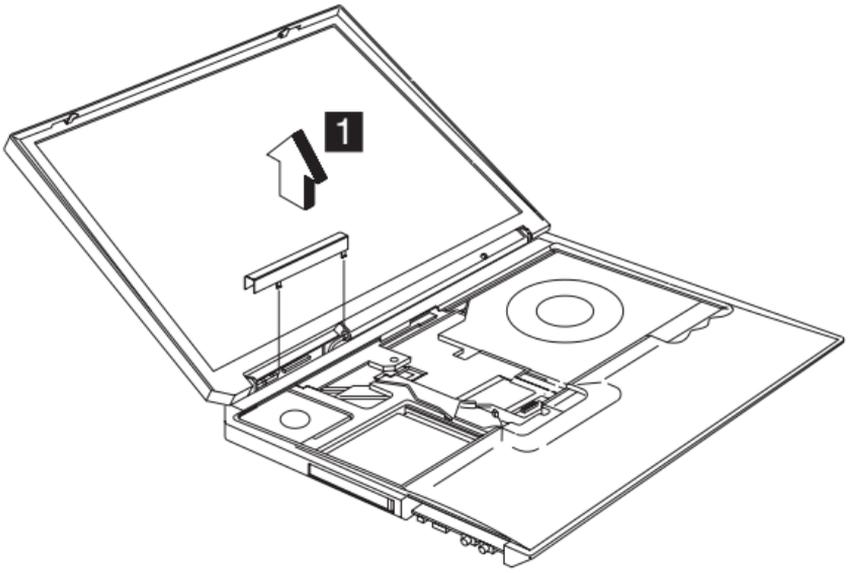
Step	Size (Quantity)	Color	Torque
2	M2.5 x L10 (1)	Black	3.2 kgf-cm
4	M2.5 x L10 (1)	Black	3.2 kgf-cm

1090 LCD assembly

- "1010 Battery assembly" on page 60
- "1060 Keyboard" on page 64
- "1080 Middle cover" on page 67
- "1020 Mini-PCI cover and Mini-PCI card" on page 60
- "1030 Memory cover and Memory card" on page 62

Note: Release the gray cable, which is the main antenna from the system.
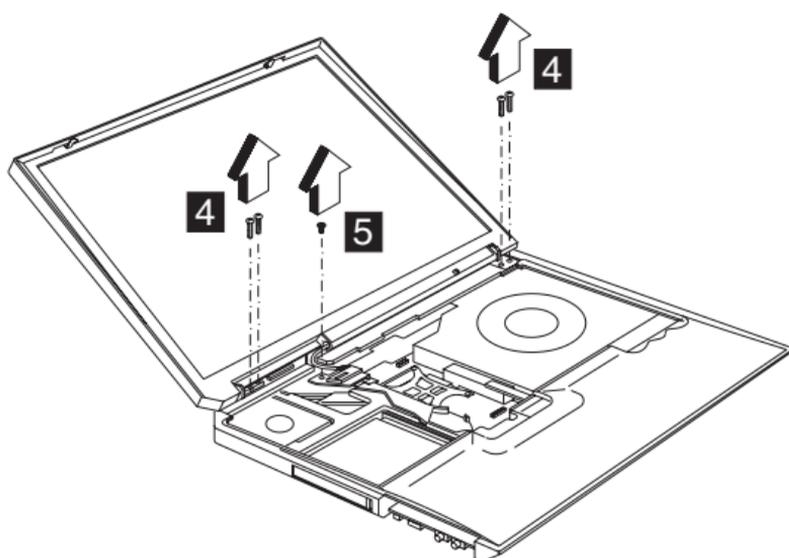
Step	Size (Quantity)	Color	Torque
4	M2.5 x L10 (4)	Black	3.2 kgf-cm
5	M2.5 x L5 (1)	Silver	3.2 kgf-cm
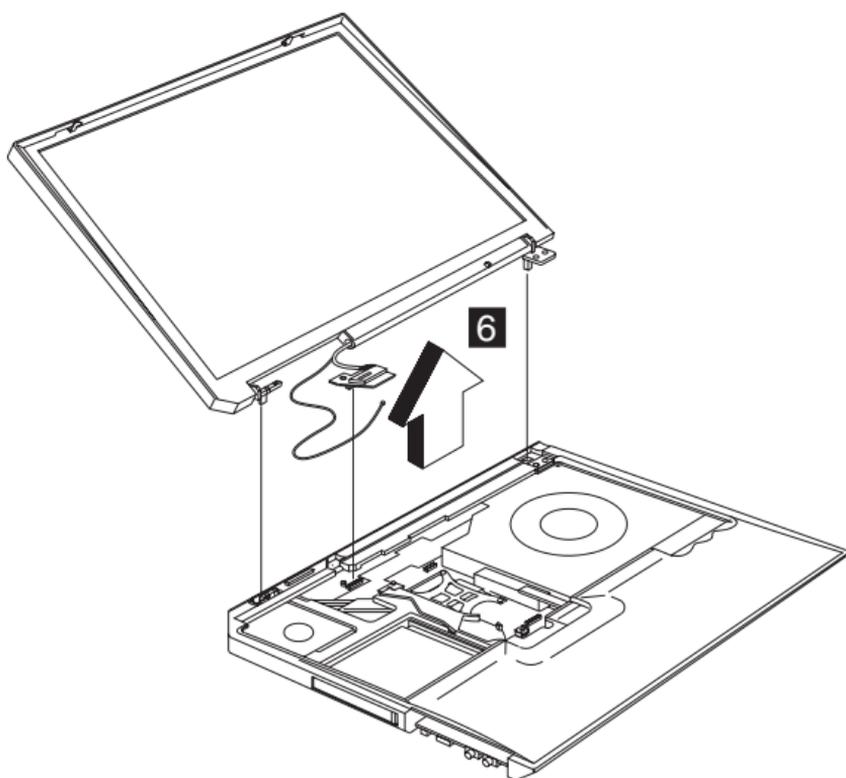
1100 Keyboard bezel

- "1010 Battery assembly" on page 60
- "1060 Keyboard" on page 64
- "1080 Middle cover" on page 67
- "1090 LCD assembly" on page 68
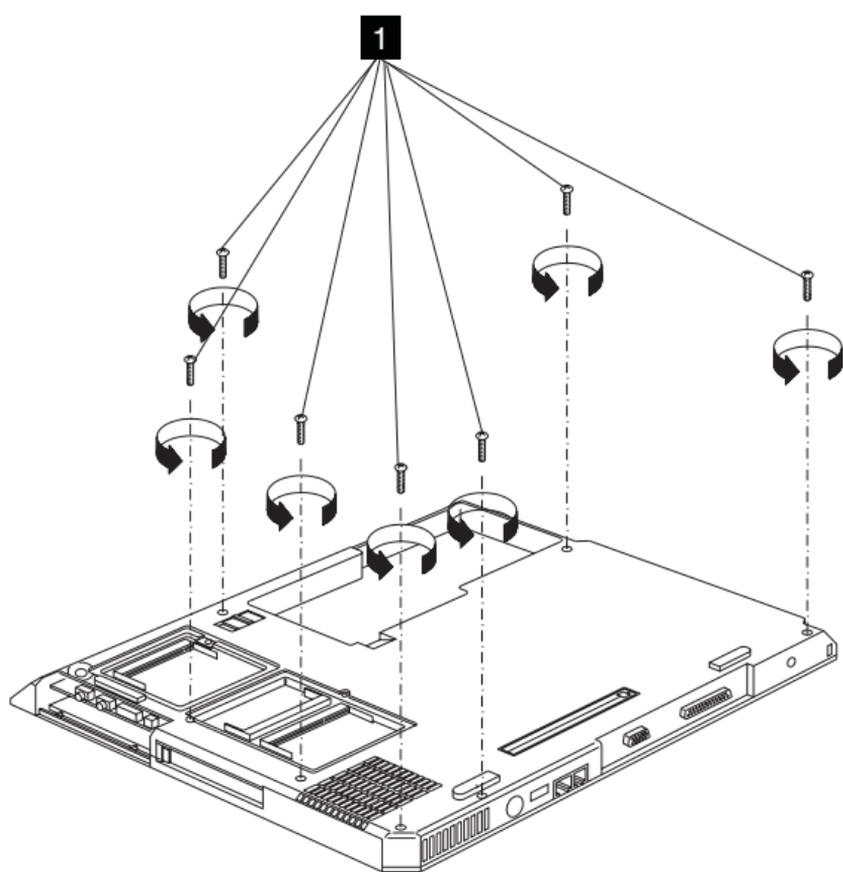
Step	Size (Quantity)	Color	Torque
1	M2.5 x L10 (7)	Black	3.2 kgf-cm

CAUTION:
The keyboard bezel has several latches. When removing the keyboard bezel from the bottom cover, gently release these latches, then raise the side of the keyboard bezel facing the palm rest to remove it. Be careful not to break the latches.

1110 PCMCIA holder

Step	Size (Quantity)	Color	Torque
2	M2 x L6 (3)	Silver	1.6 kgf-cm
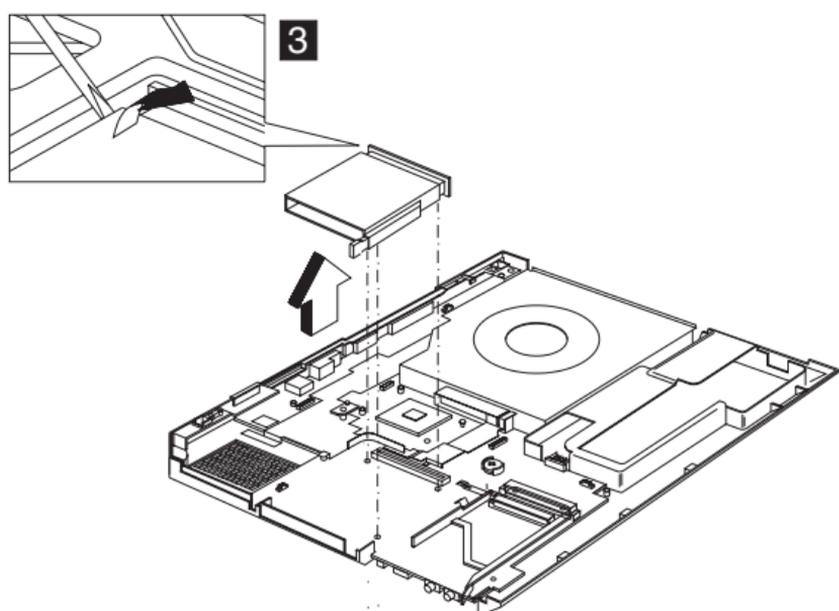
Note: Before removing and replacing the PCMCIA holder, make sure that the PCMCIA cards are removed and the eject levers are sticking out.

1120 Auxiliary Antenna

- "1010 Battery assembly" on page 60
- "1020 Mini-PCI cover and Mini-PCI card" on page 60
- "1030 Memory cover and Memory card" on page 62
- "1060 Keyboard" on page 64
- "1080 Middle cover" on page 67
- "1090 LCD assembly" on page 68
- "1100 Keyboard bezel" on page 69

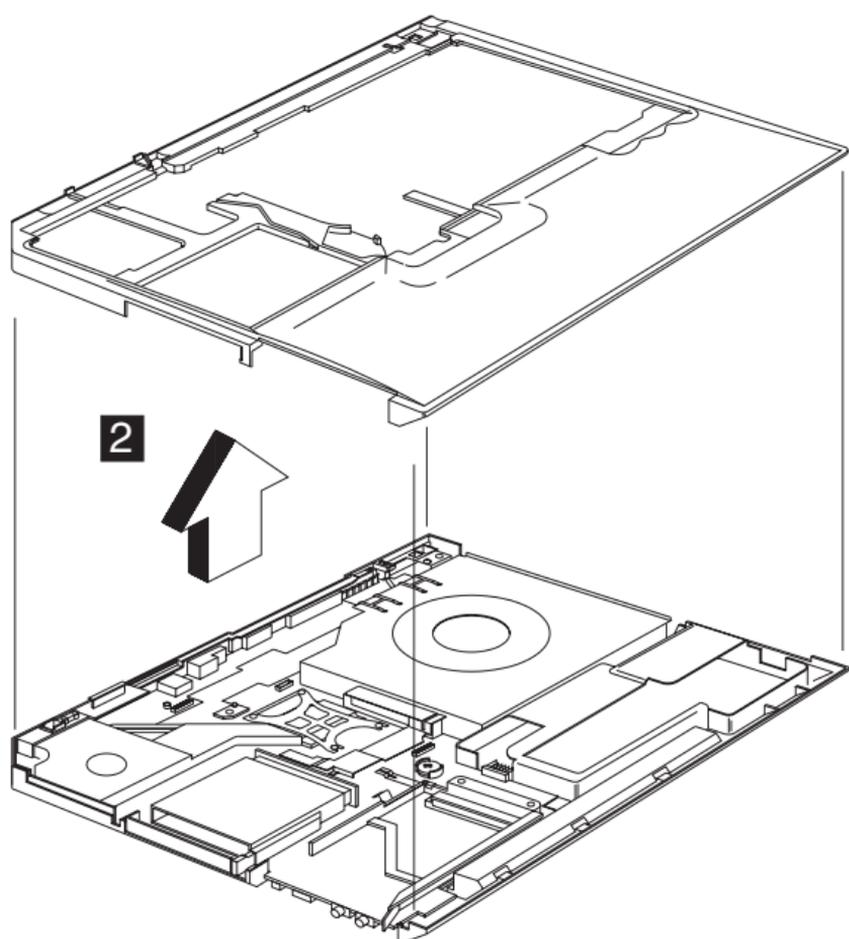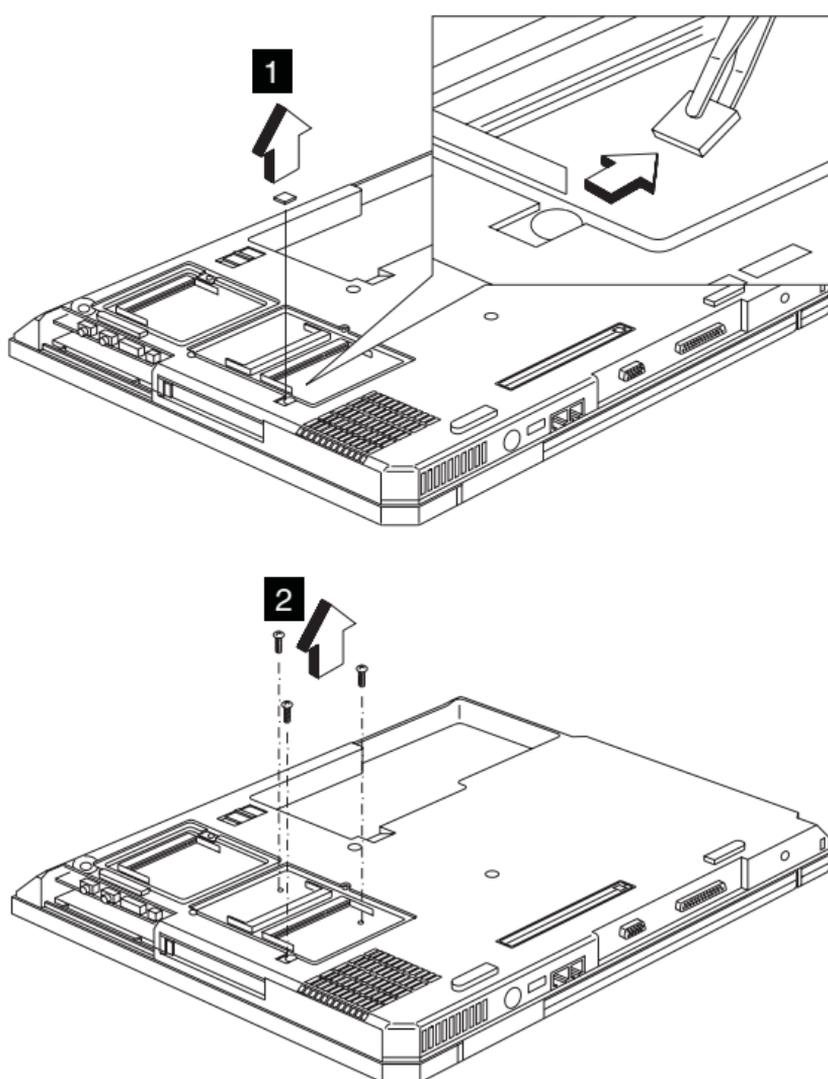| Step	Size (Quantity)	Color	Torque
1	M2 x L4(1)	Silver	2.5 kgf-cm

1120 Speaker

- "1010 Battery assembly" on page 60
- "1060 Keyboard" on page 64
- "1080 Middle cover" on page 67
- "1090 LCD assembly" on page 68
- "1100 Keyboard bezel" on page 69

Step	Size (Quantity)	Color	Torque
2	M2.5 x L4(1)	Black	2.5 kgf-cm

1140 CPU spring

- "1010 Battery assembly" on page 60
- "1060 Keyboard" on page 64
- "1080 Middle cover" on page 67
- "1090 LCD assembly" on page 68
- "1100 Keyboard bezel" on page 69

Step	Size (Quantity)	Color	Torque
1	M2.5 x L5 (2)	Silver	3.2 kgf-cm

1150 Fan assembly

- "1010 Battery assembly" on page 60
- "1060 Keyboard" on page 64
- "1080 Middle cover" on page 67
- "1090 LCD assembly" on page 68
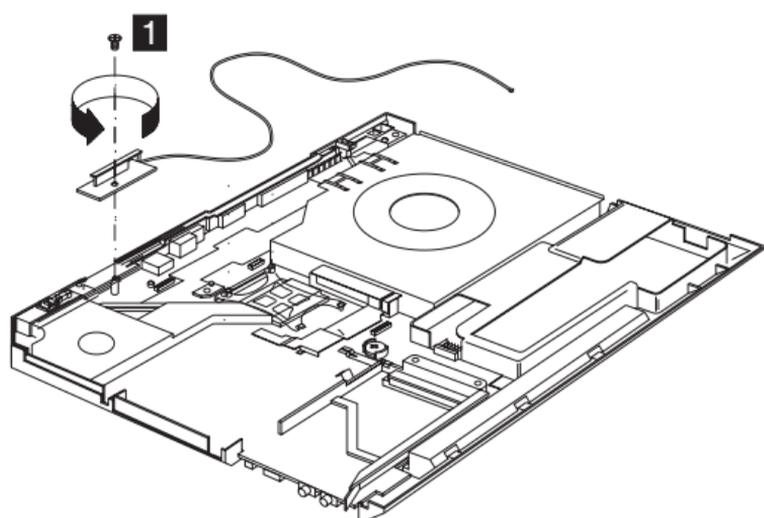- "1100 Keyboard bezel" on page 69
- "1140 CPU spring" on page 73
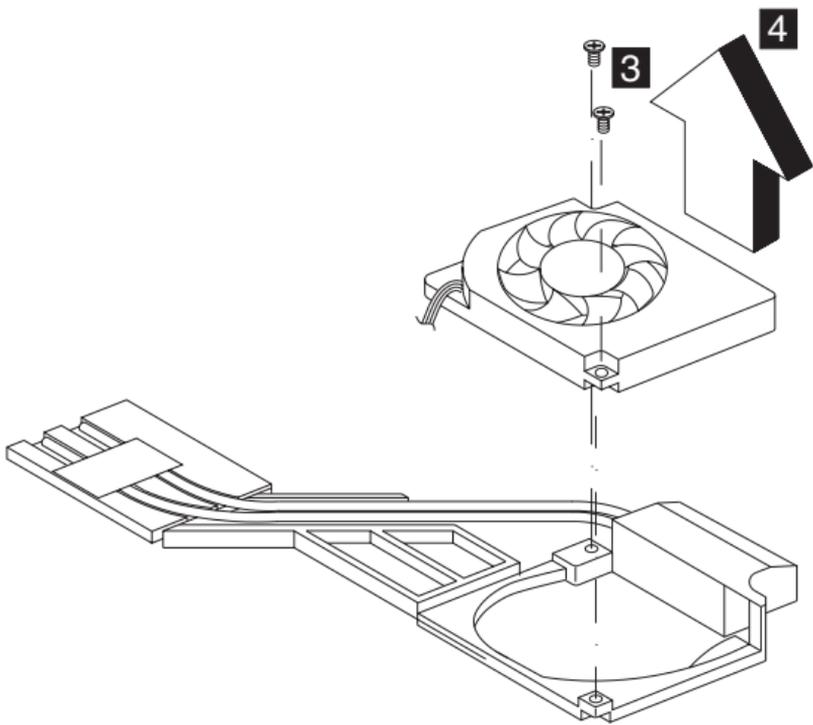
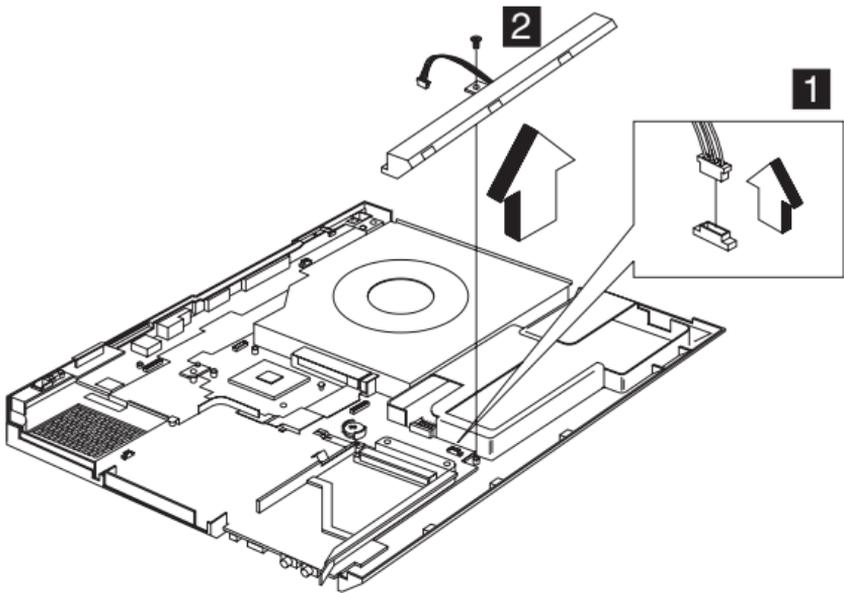| Step	Size (Quantity)	Color	Torque
3	M2.5 x L5 (2)	Silver	3.2 kgf-cm

1160 System board

- "1010 Battery assembly" on page 60
- "1020 Mini-PCI cover and Mini-PCI card" on page 60
- "1030 Memory cover and Memory card" on page 62
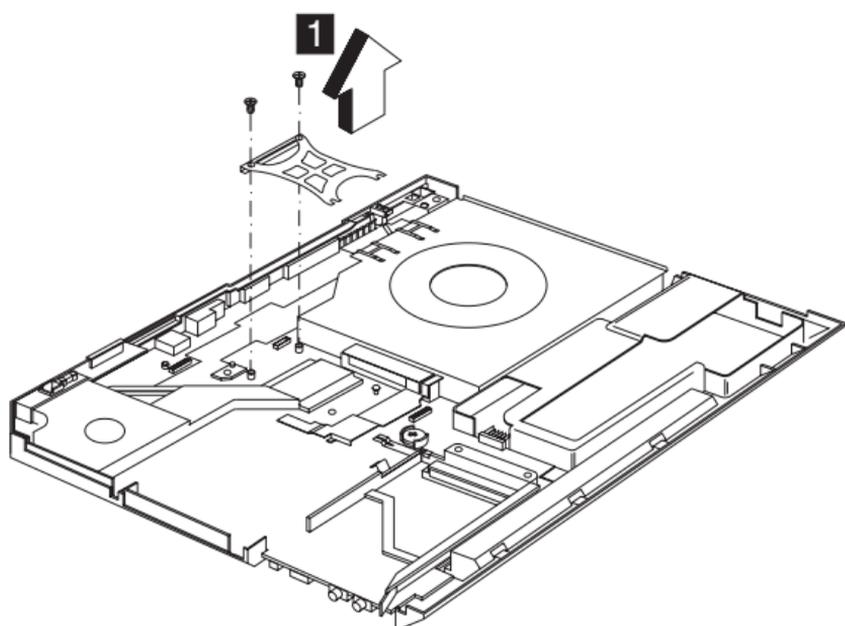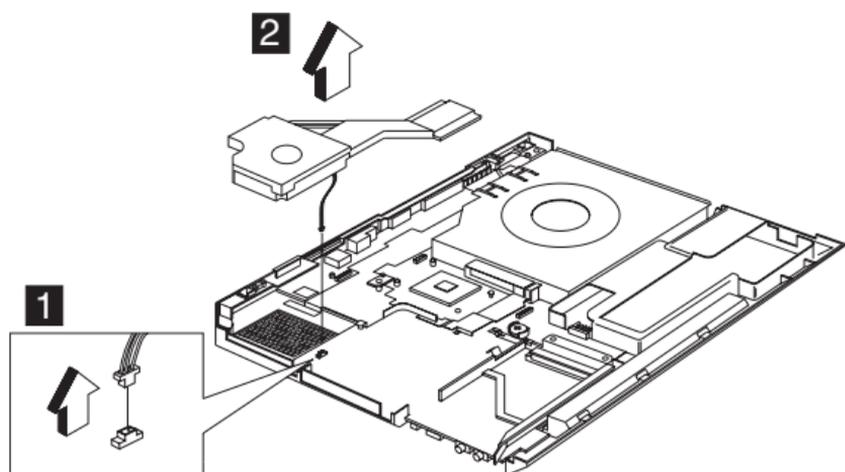- "1040 Hard disk drive assembly" on page 63
- "1050 CD-ROM assembly" on page 64
- "1060 Keyboard" on page 64
- "1080 Middle cover" on page 67
- "1090 LCD assembly" on page 68
- "1100 Keyboard bezel" on page 69
- "1120 Speaker" on page 73
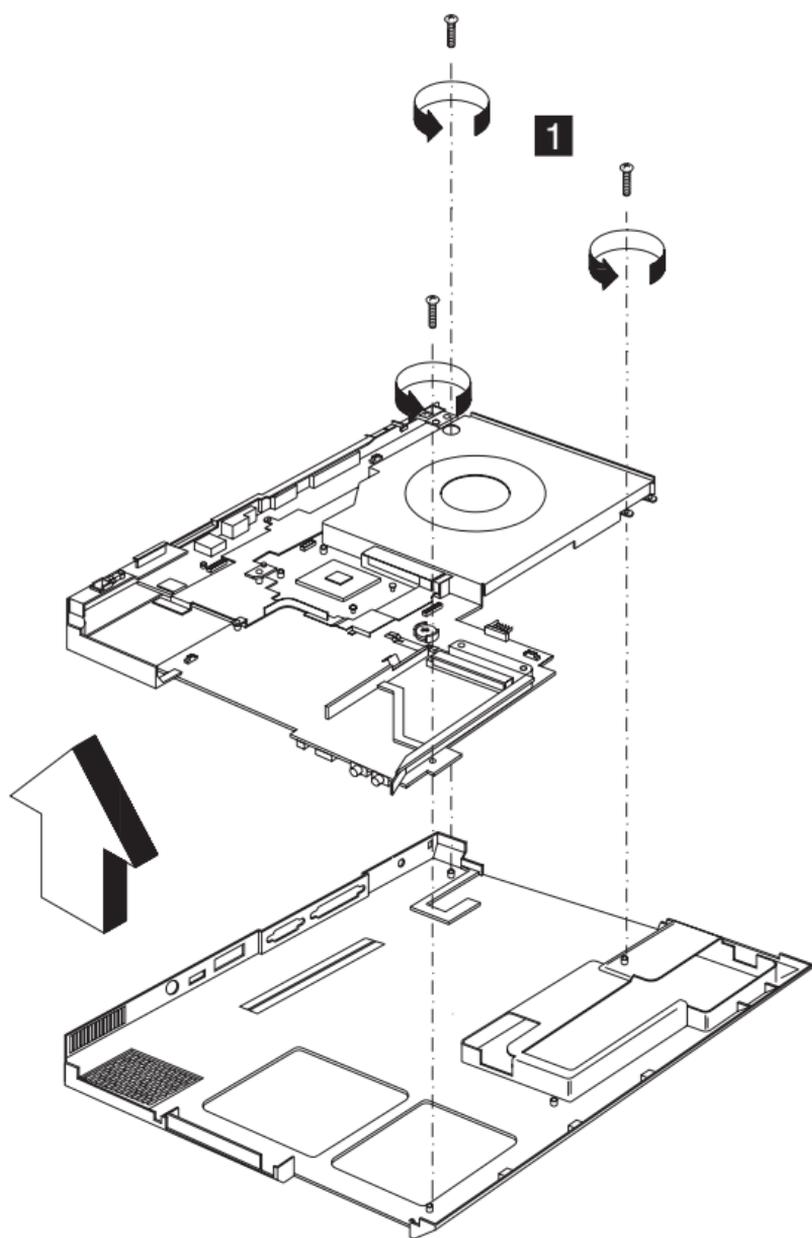
Step	Size (Quantity)	Color	Torque
1	M2.5 x L10(3)	Silver	3.2 kgf-cm

Notes:

1. When removing the system board from the bottom cover, gently raise the side of the system board facing the rear I/O ports; then pull out the system board.

1170 Modem Cable

- "1010 Battery assembly" on page 60
- "1020 Mini-PCI cover and Mini-PCI card" on page 60
- "1030 Memory cover and Memory card" on page 62
- "1040 Hard disk drive assembly" on page 63
- "1050 CD-ROM assembly" on page 64
- "1060 Keyboard" on page 64
- "1080 Middle cover" on page 67

1180 Hard disk drive bezel

Step	Size (Quantity)	Color	Torque
1	M2 x L6 (2)	Silver	1.6 kgf-cm

1090 CD-ROM chassis

- "1180 Hard disk drive bezel" on page 77
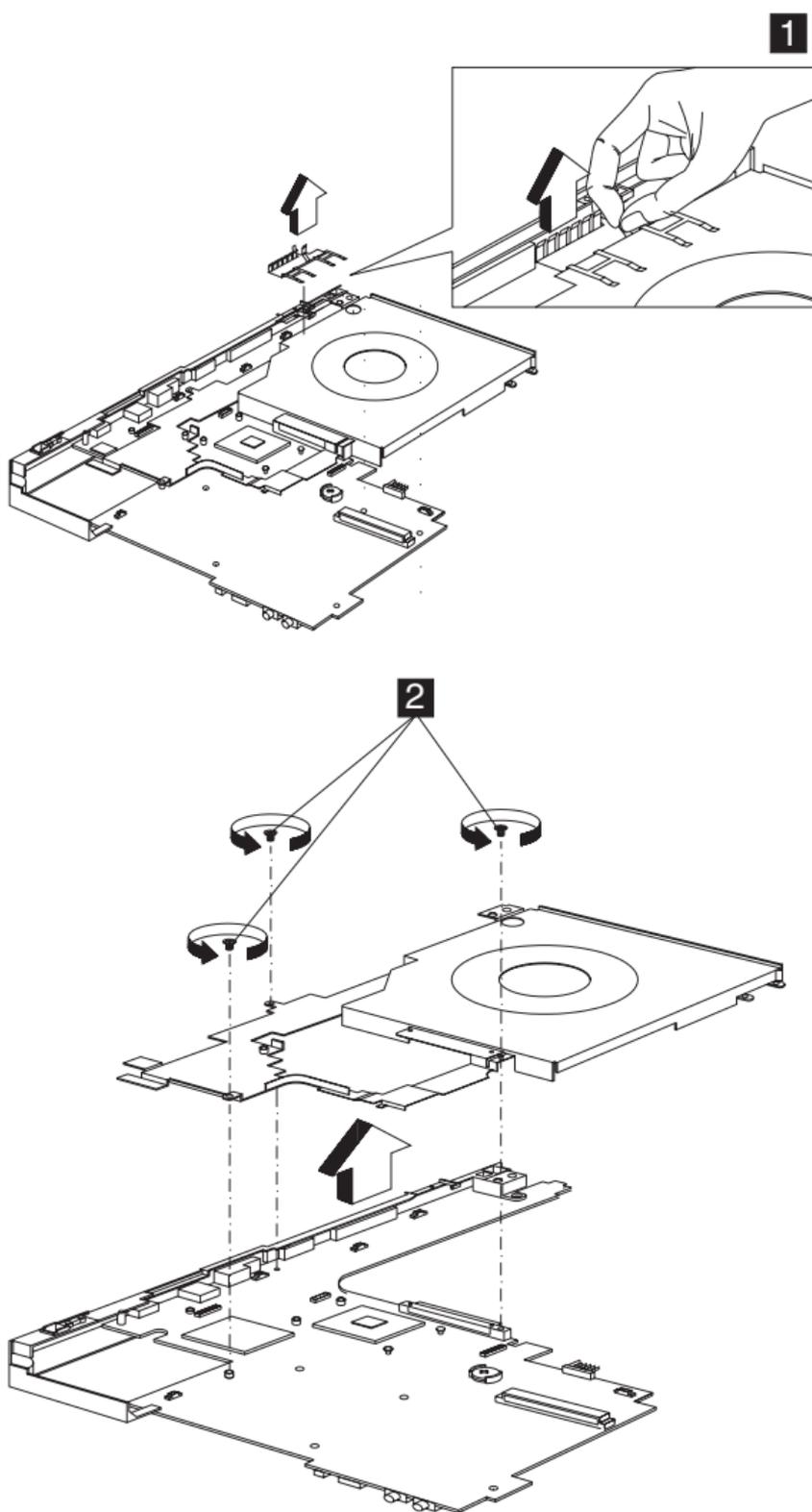
Step	Size (Quantity)	Color	Torque
2	M2.5 x L5 (3)	Silver	3.2 kgf-cm

1200 LCD bezel assembly (13.3″)

- "1010 Battery assembly" on page 60
- "1020 Mini-PCI cover and Mini-PCI card" on page 60
- "1030 Memory cover and Memory card" on page 62

- "1060 Keyboard" on page 64
- "1080 Middle cover" on page 67
- "1090 LCD assembly" on page 68
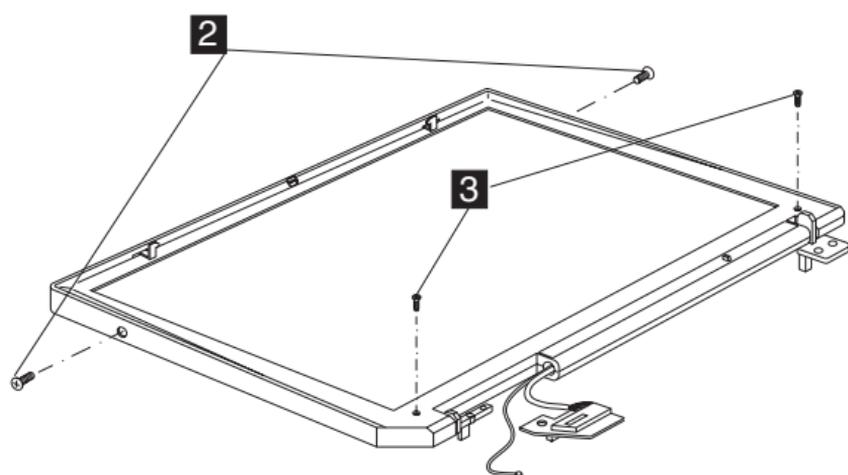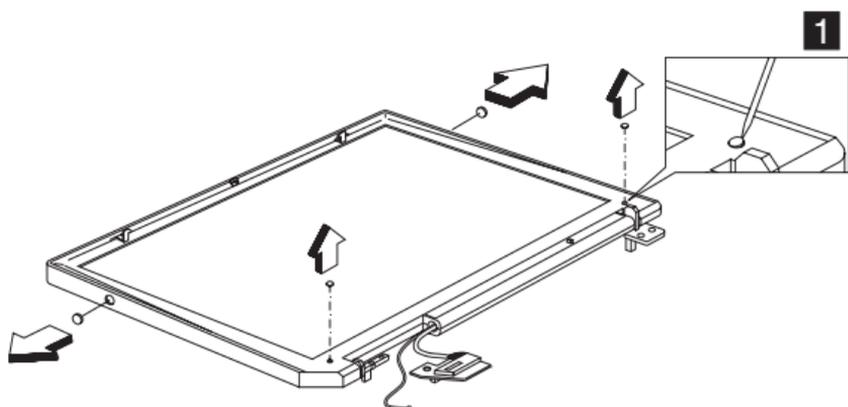
Step	Size (Quantity)	Color	Torque
2	M2 x L4(2)	Silver	2.5 kgf-cm
3	M2.5 x L6(2)	Black	2.5 kgf-cm
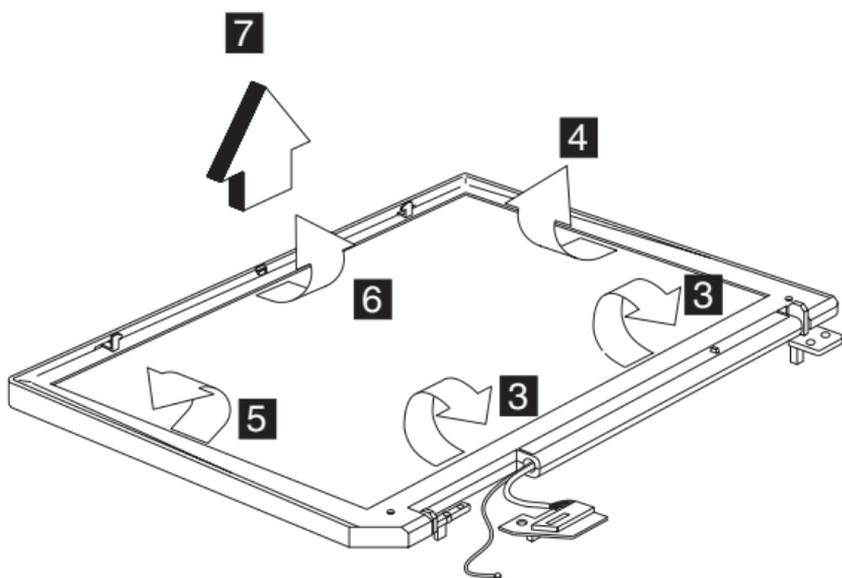
Note: When removing the LCD, take note of the following:

- Be careful not to scratch the LCD bezel when removing the screw mylars.
- The LCD bezel has several latches. Release these latches; then remove the LCD bezel. Be careful not to break these latches.
- Gently push the two LCD latches outward to remove the LCD bezel.

1210 LCD Inveter (13.3″)

- "1010 Battery assembly" on page 60
- "1020 Mini-PCI cover and Mini-PCI card" on page 60
- "1030 Memory cover and Memory card" on page 62
- "1060 Keyboard" on page 64
- "1080 Middle cover" on page 67
- "1090 LCD assembly" on page 68
- "1200 LCD bezel assembly (13.3″)" on page 79
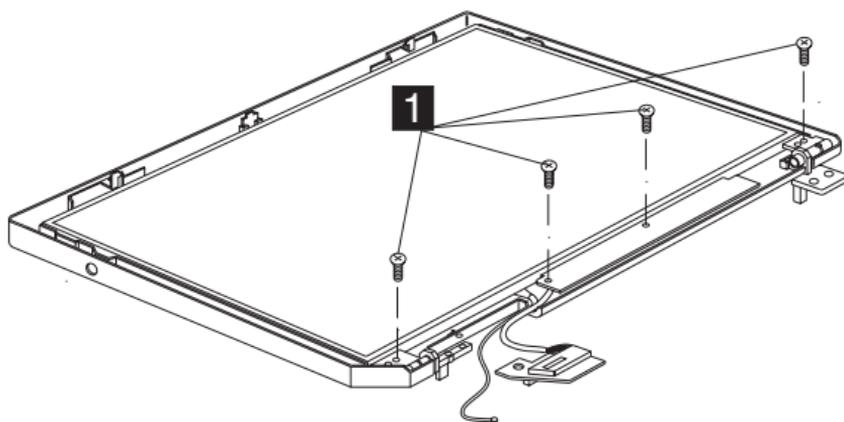
Step	Size (Quantity)	Color	Torque
1	M2 x L10(4)	Black	2.5 kgf-cm

1220 LED board (13.3″)

- "1010 Battery assembly" on page 60
- "1020 Mini-PCI cover and Mini-PCI card" on page 60
- "1030 Memory cover and Memory card" on page 62
- "1060 Keyboard" on page 64
- "1080 Middle cover" on page 67
- "1090 LCD assembly" on page 68
- "1200 LCD bezel assembly (13.3″)" on page 79

1230 LCD bracket hinge assembly (13.3″)

Step	Size (Quantity)	Color	Torque
1	M2 x L4 (4)	Silver	2.5 kgf-cm

1240 LCD FPC assembly (13.3″)
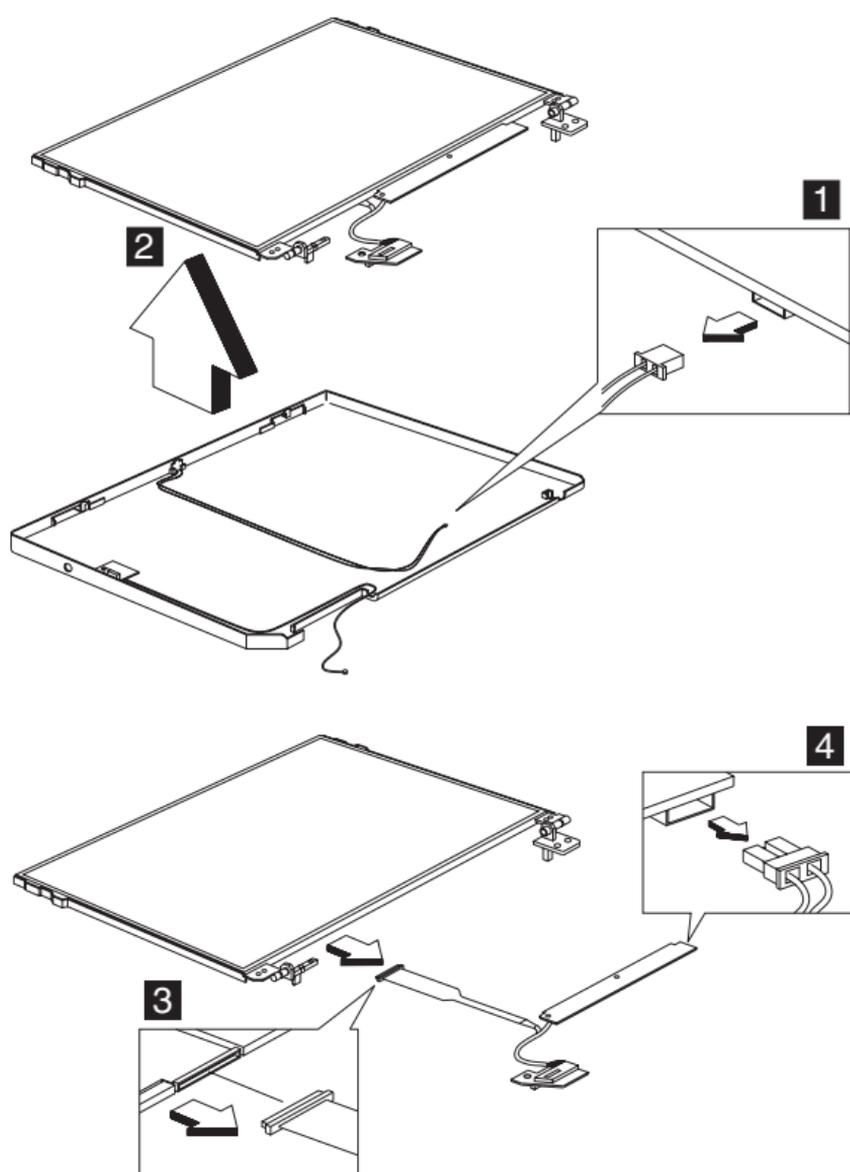
- "1010 Battery assembly" on page 60
- "1020 Mini-PCI cover and Mini-PCI card" on page 60
- "1030 Memory cover and Memory card" on page 62
- "1060 Keyboard" on page 64
- "1080 Middle cover" on page 67
- "1090 LCD assembly" on page 68
- "1200 LCD bezel assembly (13.3″)" on page 79
- "1210 LCD Inveter (13.3″)" on page 81
- "1220 LED board (13.3″)" on page 81
- "1230 LCD bracket hinge assembly (13.3″)" on page 82
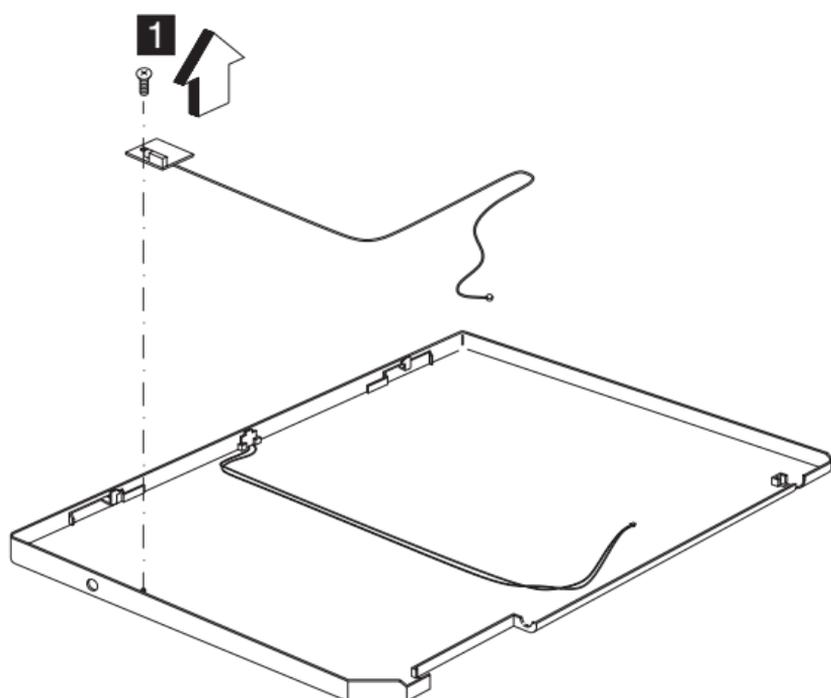
Step	Size (Quantity)	Color	Torque
1	M2 x L4(1)	Silver	2.5 kgf-cm
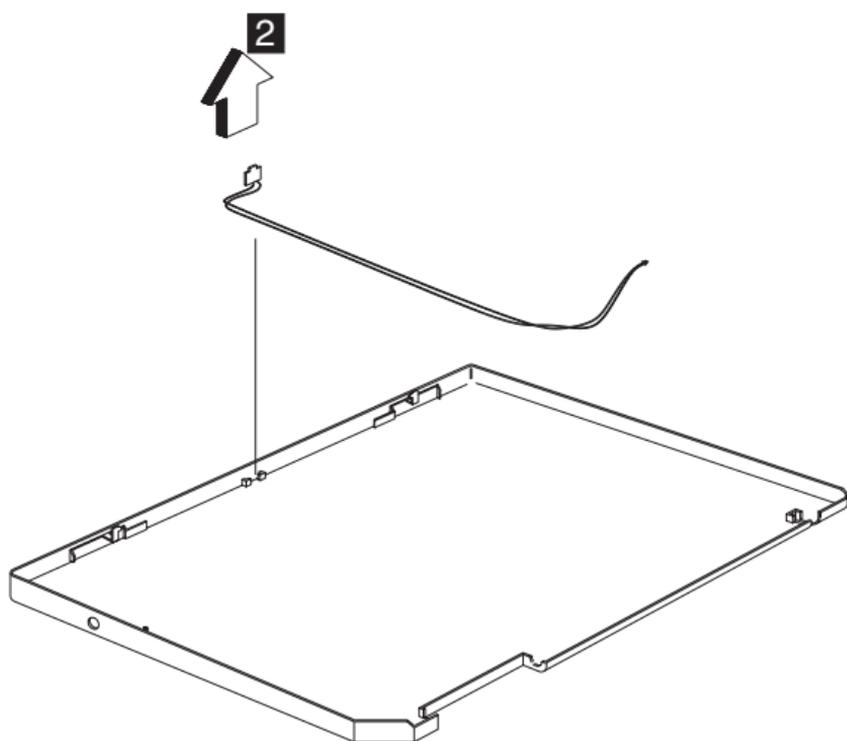
1250 Wireless reassembly

- "1230 LCD bracket hinge assembly (13.3″)" on page 82
- "1220 LED board (13.3″)" on page 81
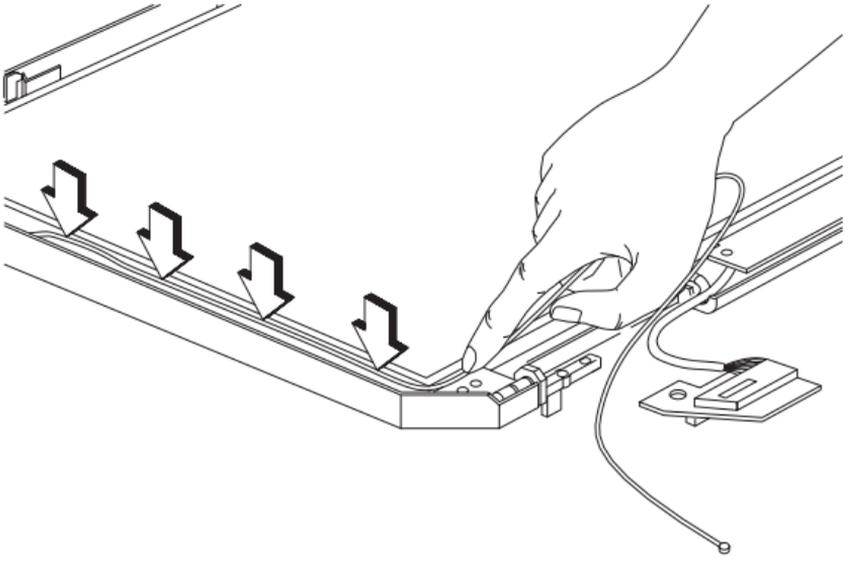
Locations

Front View

System-status indicators

TrackPoint

Computer display

Ultrabay 2000

Rear View

Power jack

Monitor connector

Ethernet connector

USB connector

Modem connector

Bottom View

1. Battery pack

2. Mini-PCI Card slot door
3. Memory slot door
4. Docking connector

Switch Locations

SW3	
Pin3	
1 ■□ 0	1 □■ 0
Boot Block Enabled	Boot Block Disabled
Pin4	
1 ■□ 0	1 □■ 0
Check Password Enabled	Check Password Disabled
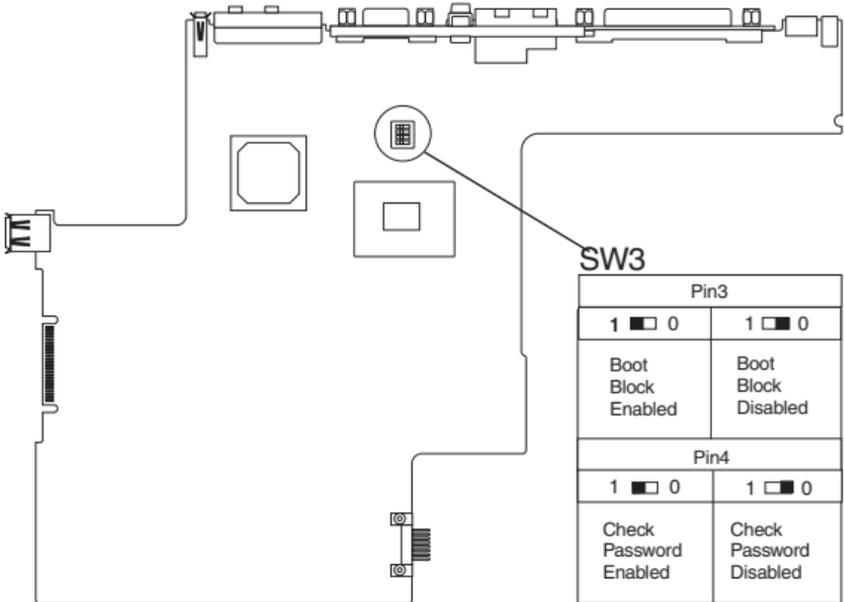
Parts list (ThinkPad R Series)
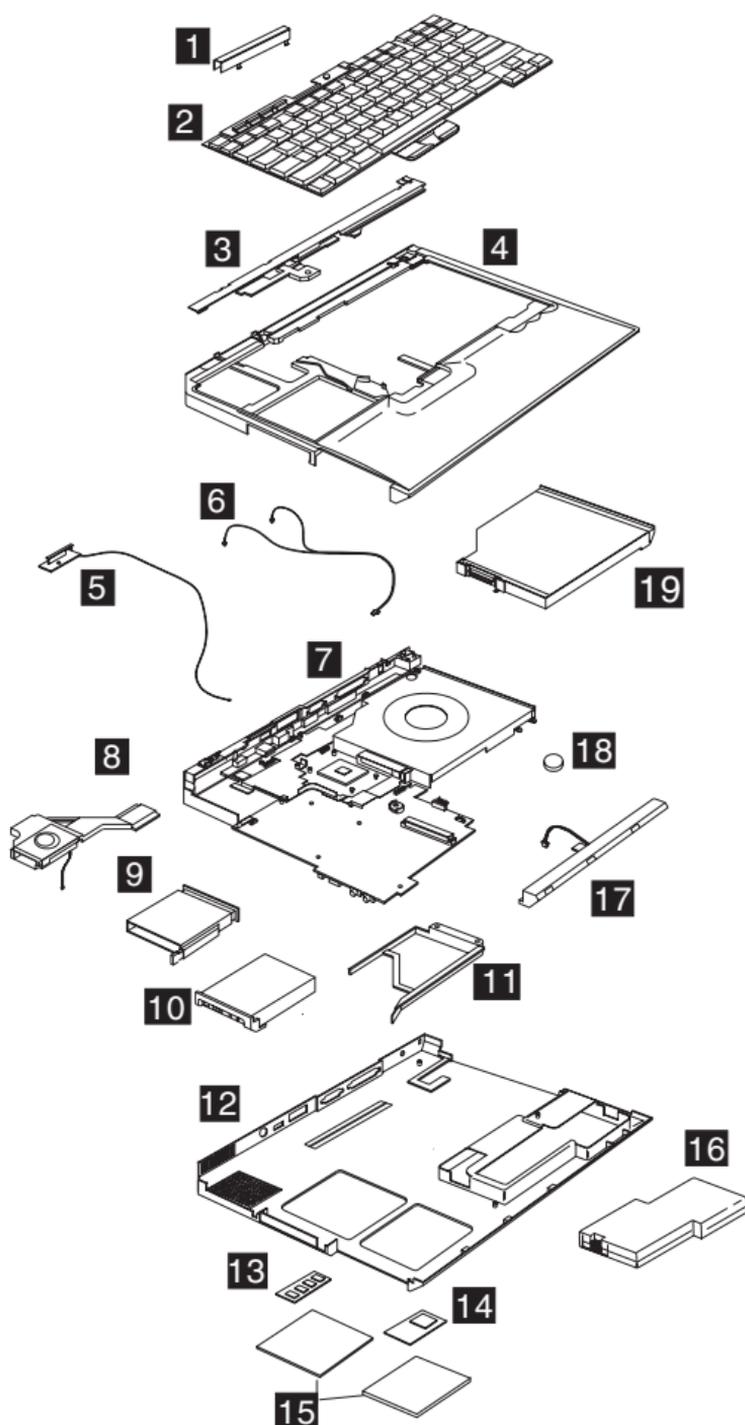
No.	Description	FRU No.
1	Hinge Cap	26P9722
3	Middle Cover ASM WW	26P9727
4	KBD Bezel Asm. WW	26P9725
5	Antenna Kit 13.3″ Antenna Kit 14.1″ Antenna Aux Antenna LCD	26P9712 26P9711

No.	Description	FRU No.
6	Cable Asm. kit , RJ11 and lid switch	27L0689
	RJ-11 Cable for CDC board model	
	RJ-11 Cable mini PCI combo board model	
	Lid switch Cable	
7	Planar P-III 1 GHz	26P8143
	Planar P-III 1 GHz w/1394	26P8145
	Planar Celeron 900MHz	26P8149
	Planar Celeron 800MHz w/1394	26P8151
8	FAN Asm.	26P9723
9	PCMCIA Slot	26P9724
10	HDD w/tray & screws module IBM Assy./10 GB	08K9661
	HDD w/tray & screws module HITACHI //10 GB	08K9662
	HDD w/tray & screws module IBM /15 GB	08K9663
	HDD w/tray & screws module HITACHI /15 GB	08K9664
	HDD w/tray & screws module IBM /30 GB	08K9665
	HDD w/tray & screws module HITACHI /30 GB	05K9666
11	HDD Bezel	26P9737
12	Lower Case w/ label WW	26P9729
	Lower Case w/ label EMEA	26P9730
	Lower Case w/ label IIPC	26P9731
	Lower Case w/ label Korea	26P9732
	Lower Case w/ label W/W-wireless	26P9733
	Lower Case w/ label EMEA-wireless	26P9734
	Lower Case w/ label IIPC-wireless	26P9735
	Lower Case w/ label Korea-wireless	26P9736
13	Modem CDC	26P8070
14	802.11b/Modem combo card	26P8092
15	Mini-PCI / DIMM door kit	26P9739
16	Battery Assy. (Ni-Mh)	
	Sanyo-W/W	02K6827
	Sanyo-Japan	02K6835

No.	Description	FRU No.
	Battery Assy. (Li-Ion)	
	Sanyo-W/W	02K6822
	Sanyo-Japan	02K6830
	Panasonic-W/W	02K6824
	Panasonic-Japan	02K6832
17	Speaker Kit	02K5989
18	RTC Battery	11J8591
19	CD-ROM Module	
	TEAC	27L3436
	HLDS(LG)	08K9545
	DVD-ROM Module	
	HLDS(Hitachi)	27L4236
	CD—RW Module	
	SONY	27L4221
	SONY (for WinXP)	27L4231
	TEACCD—RW / DVD Module	08K9644
	Toshiba	27L4249
	Rubber Kit	26P9742
	PCMCIA screw cap* 3	
	rubber foot * 3	
	LCD bezel screw cap (W/W) *4	
	IEEE-1394 dummy label	
	IEEE-1394 icon label	
	Screw Kit	26P9741
	HDD COIN SCREW	
	M/B HEX SCREW	
	SCREW DIMM COVER STEEL	
	SCREW MACH PAN NYLOK M2.0*13 NI	
	BH MSN+N SCREW M2.0*6	
	SCREW MACH FLAT M3*2.8	
	SCREW HDD M3*L4	
	WCH MSN+CZ SCREW M2.5*5	
	SCREW M2.5L10B 86.9A353100	
	SCREW M2.5*6	
	SCREW M2.4 WAFER NI	

LCD FRU

13.3-inch TFT
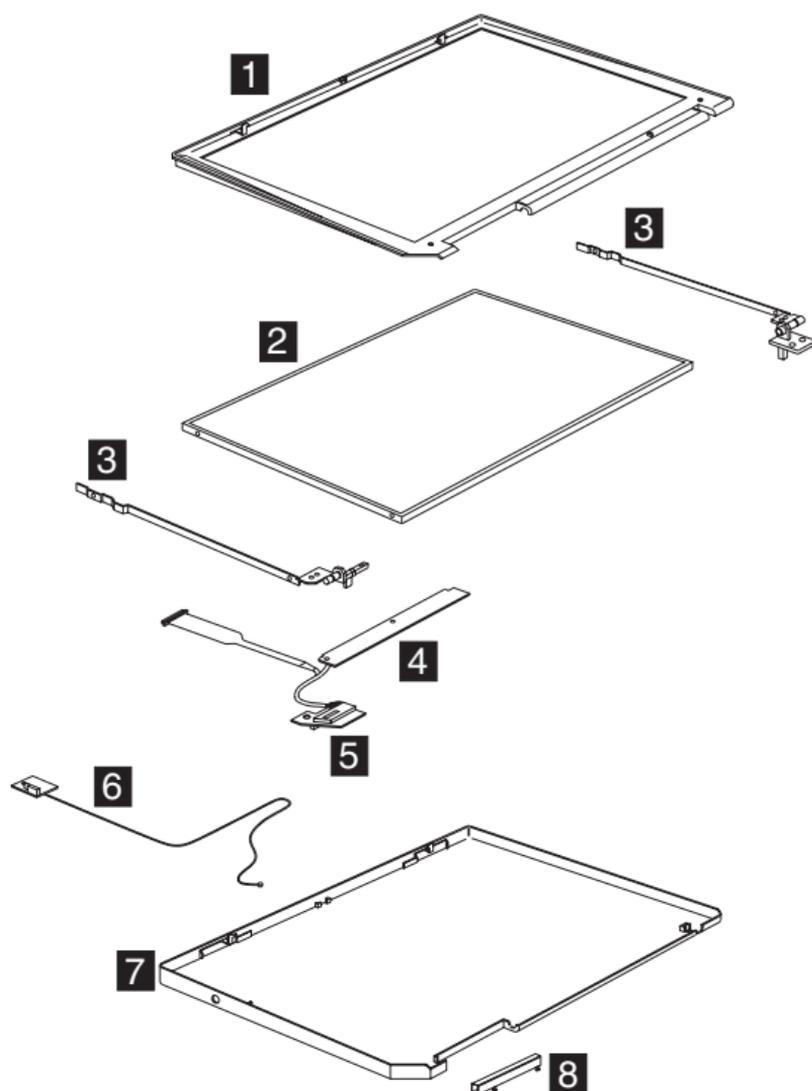
No.	Description	FRU No.
1	13.3″ LCD Bezel	26P9715
2	LCD Panel Asm (13.3″ TFT) Sanyo LG	11P8212 11P8220
3	13.3″ Hinge-Bracket Asm (R,L)	26P9720
4	LCD-Invertor / LED card (for 13.3″ & 14.1″ TFT)	26P8139
5	LCD cable Asm.	27L0687
6	Antenna Kit 13.3″ LCD Antenna w/ 13.3″ LCD Antenna aux	26P9712

No.	Description	FRU No.
7	LCD Rear Cover Asm for 13.3″/14.1″ (for Wireless model) 13.3″/14.1″ LCD rear cover 13.3″/14.1″ LCDPanel W/Wireless IBM Logo	26P9709
	LCD Rear Cover Asm for 13.3″/14.1″ 13.3″/14.1″ LCD rear cover 13.3″/14.1″ LCDPanel W/O Wireless IBM Logo	26P9707
8	LCD Hinge Cap	26P9722
	LG/IBM Logo Kit for LCD Rear Cover for KBD Bezel	08K5860

14.1-inch TFT
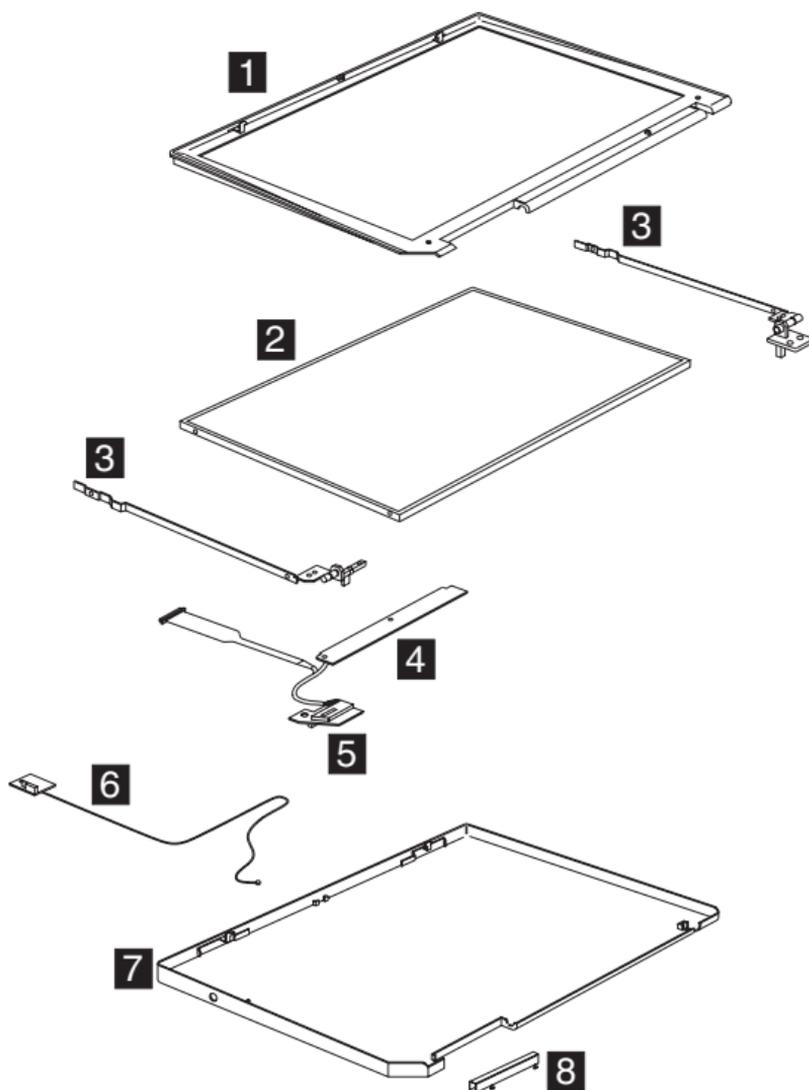
No.	Description	FRU No.
1	14.1″ LCD Bezel (for W/W)	26P9713

No.	Description	FRU No.
2	LCDPanel Asm. (14.1″ TFT)	
	Hyundai	11P8214
	Samsung	11P8215
3	14.1″ Hinge-Bracket Asm (R,L)	26P9719
4	LCD-Invertor / LED card (for 13.3″ & 14.1″ TFT)	26P8139
5	LCD cable Asm.	27L0686
6	Antenna Kit 14.1″ LCD	26P9711
	Antenna w/ 14.1″ LCD	
	Antenna aux	
7	LCD Rear Cover Asm for 13.3″/14.1″ (for W/W)	26P9709
	13.3″/14.1″ LCD rear cover	
	13.3″/14.1″ LCDPanel W/Wireless	
	IBM Logo	
	LCD Rear Cover Asm for 13.3″/14.1″ (for W/O W)	26P9707
	13.3″/14.1″ LCD rear cover	
	13.3″/14.1″ LCDPanel W/O Wireless	
	IBM Logo	
8	LCD Hinge Cap Asm.	26P9722
	LG/IBM Logo Kit	08K5860
	for LCD Rear Cover	
	for KBD Bezel	

Keyboard

Description	Vendor	FRU No.
KBD ASM US English	NMB	02K5990
KBD ASM Canadian French	NMB	02K5992
KBD ASM German	NMB	02K5994
KBD ASM UK English	NMB	02K5996
KBD ASM French	NMB	02K5998
KBD ASM Dutch	NMB	02K6000
KBD ASM Swedish/Finnish	NMB	02K6002
KBD ASM Norwegian	NMB	02K6004
KBD ASM Danish	NMB	02K6006
KBD ASM Italian	NMB	02K6008
KBD ASM European Spanish	NMB	02K6010
KBD ASM Belgian	NMB	02K6012
KBD ASM Switzerland	NMB	02K6014

Description	Vendor	FRU No.
KBD ASM Portuguese	NMB	02K6016
KBD ASM Russian	NMB	02K6020
KBD ASM Slovakian	NMB	02K6036
KBD ASM Slovenian	NMB	02K6034
KBD ASM Traditional Chinese	NMB	02K6040
KBD ASM Turkish	NMB	02K6026
KBD ASM Arabic	NMB	02K6018
KBD ASM Hebrew	NMB	02K6022
KBD ASM Polish	NMB	02K6024
KBD ASM Czech	NMB	02K6028
KBD ASM Hungarian	NMB	02K6030
KBD ASM Greek	NMB	02K6032
KBD ASM Japan	NMB	02K6038
KBD ASM Korea	NMB	02K6042
KBD ASM La Spanish	NMB	02K6044

Common parts list

Tools

Description	FRU No.
Tri-Connector Wrap Plug	72X8546
PC Test Card	35G4703
Audio Wrap Cable	66G5180
USB Parallel Test Cable	05K2580
Screwdriver Kit	95F3598
5mm Socket Wrench	05K4694
Screwdriver	27L8126
Wireless Antenna Connector Tool	08K7159
ThinkPad hardware maintenance diskette version 1.10	

Note: The data may look the same with the sample hmm but the diskette version is different.

Telephone cable

Description	FRU No.
Telephone cable (US/C, TWN, APS, LA, BRZL)	27L0465
Telephone cable (UK, IR, NZ)	27L0442
Telephone cable (Germany)	27L0441
Telephone cable (Italy)	27L0448

Description	FRU No.
Telephone cable (France)	27L0443
Telephone cable (DK, DE, PO)	27L0447
Telephone cable (SW, SU)	27L0445
Telephone cable (FI, NO, NS)	27L0446
Telephone cable (Australia)	27L0467
Telephone cable (ND, NU)	27L0444
Telephone cable (SF, SI, SG, SE)	27L0462
Telephone cable (BE, BK, BS, BD, BF)	27L0451
Telephone cable (Austria)	27L0449
Telephone cable (Spain)	27L0450

AC adapter

Description	FRU No.
AC Adapter, 72W 3-pin (Astec)	02K6751
AC Adapter, 72W 3-pin (Delta)	02K6754
AC Adapter, 72W 2-pin (Delta)	02K6756
AC Adapter, 72W 2-pin (Astec)	02K6753

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

For 2–pin power cords:

IBM power cord part number	Used in these countries or regions
13H5264	Canada, U.S.A.
13H5273	Japan
36L8870	Argentina

For 3–pin power cords:

Note: The grounded adapter is required for full MPRII compliance. If a 3–pin power cord came with your computer, see "Safety Information" on page 11.

IBM power cord part number	Used in these countries or regions
76H3514	Australia, New Zealand
76H3516	Taiwan, Thailand
76H3530	Italy

IBM power cord part number	Used in these countries or regions
76H3520	Denmark
76H3524	UK, Hong Kong
76H3518	European Countries
76H3522	South Africa, India
76H3532	Israel
76H3535	Korea
02K0539	China (P.R.C.)
76H3528	Switzerland

Recovery CD List

Description	FRU No.	Models
Recovery CD Eng-XP Home (US/CA)	32P5395	2656–70U, 6AU, 60U, 50U, 3AU, 30U, 20U, 19U, 2AU
Recovery CD Eng-XP Home (US/CA)	32P5395	2656–70H, 6AH, 60H, 54H, 3AH, 20H, 30H: 2656–60B
Recovery CD Eng-XP Home (UD)	32P5580	2656–60M, 20M
Recovery CD Eng-XP Home (UD)	32P5580	2656–70A, 6AA, 60A, 54A, 3AA, 30A, 20A
Recovery CD Eng-XP Home (CF)	32P5396	2656–6AF, 20F, 19F
Recovery CD LA-SP-W98-XP Home(LA)	32P5397	2656–60S, 20S, 30S
Recovery CD LA-SP-W98-XP Home(LA)	32P5397	2656–60X, 20X, 30X
Recovery CD LA-BR-W98-XP Home(BR)	32P5398	2656–60P, 20P, 30P
Recovery CD Japan-XP Home	46P4469	2656–6AJ, 60J, 42J, 80J
Recovery CD Traditional Chinese-XP Home	46P6120	2656–70T, 6AT, 60T, 54T, 3AT, 30T, 20T, 80T
Recovery CD Simplified Chinese-XP Home	46P6122	2656–70C, 6AC, 60C, 54C, 3AC, 30C
Recovery CD English-W98 (UD)	14P9984	2656–72G, 7BG, 62G, 52G, 3BG, 32G, 22G, 51G, 64G
Recovery CD English-W98 (UD)	14P9984	2656–72A, 7BA, 62A, 55A, 3BA, 32A

Recovery CD English-W98 (UD)	14P9984	2656–72M, 7BM, 62M, 55M, 3BM, 32M, 22M
Recovery CD English-Win2000 (UD)	32P5332	2656–F0G, EAG, E0G, D0G, BAG, BOG, D3G, E2G
Recovery CD English-Win2000 (UD)	32P5332	2656–F0A, EAA, E0A, D1A, BAA, BOA
Recovery CD English-Win2000 (UD)	32P5332	2656–F0M, EAM, E0M, D1M, A0M, A1M
Recovery CD English-W98 (US)	14P9983	2656–7BU, 62U, 3BU, 32U, 22U, 21U, 2BU
Recovery CD English-W98 (US)	14P9983	2656–7BH, 62H,55H: 2656–62B
Recovery CD English-Win2000 (US)	32P5331	2656–EAU, E0U, BAU, BOU, A0U, A1U, A2U
Recovery CD Norway-W98 (NO)	14P9996	2656–72G, 7BG, 62G, 52G, 3BG, 32G, 22G, 51G, 64G
Recovery CD Norway-Win2000 (NO)	32P5344	2656–F0G, EAG, E0G, D0G, BAG, BOG, D3G, E2G
Recovery CD Netherland-W98 (NL)	14P9995	2656–72G, 7BG, 62G, 52G, 3BG, 32G, 22G, 51G, 64G
Recovery CD Netherland-Win2000 (NL)	32P5343	2656–F0G, EAG, E0G, D0G, BAG, BOG, D3G, E2G
Recovery CD Finland-W98 (FI)	14P9994	2656–72G, 7BG, 62G, 52G, 3BG, 32G, 22G, 51G, 64G
Recovery CD Finland-Win2000 (FI)	23P5342	2656–F0G, EAG, E0G, D0G, BAG, BOG, D3G, E2G
Recovery CD Italy-W98 (IT)	14P9993	2656–72G, 7BG, 62G, 52G, 3BG, 32G, 22G, 51G, 64G
Recovery CD Italy-Win2000 (IT)	32P5341	2656–F0G, EAG, E0G, D0G, BAG, BOG, D3G, E2G
Recovery CD Spanish-W98 (SP)	14P9991	2656–72G, 7BG, 62G, 52G, 3BG, 32G, 22G, 51G, 64G
Recovery CD LA-Spanish-W98	14P9986	2656–62S, 22S
Recovery CD LA-Spanish-W98	14P9986	2656–62X, 22X
Recovery CD Spanish-Win2000	32P5339	2656–F0G, EAG, E0G, D0G, BAG, BOG, D3G, E2G

Recovery CD LA Spanish-Win2000	32P5334	2656–E0S
Recovery CD LA Spanish-Win2000	32P5334	2656–E0X
Recovery CD Denmark-W98 (DK)	14P9998	2656–72G, 7BG, 62G, 52G, 3BG, 32G, 22G, 51G, 64G
Recovery CD Denmark-Win2000 (DK)	32P5336	2656–F0G, EAG, E0G, D0G, BAG, BOG, D3G, E2G
Recovery CD Sweden-W98	14P9992	2656–72G, 7BG, 62G, 52G, 3BG, 32G, 22G, 51G, 64G
Recovery CD Sweden-Win2000	32P5340	2656–F0G, EAG, E0G, D0G, BAG, BOG, D3G, E2G
Recovery CD French-W98 (FR)	14P9989	2656–72G, 7BG, 62G, 52G, 3BG, 32G, 22G, 51G, 64G
Recovery CD Canadian French-W98 (CF)	14P9985	2656–7FB, 22F, 21F
Recovery CD French-Win2000 (FR)	32P5337	2656–F0G, EAG, E0G, D0G, BAG, BOG, D3G, E2G
Recovery CD Canadian French-Win2000 (CF)	32P5333	2656–EAF, A0F, A2F
Recovery CD German-W98 (GR)	14P9990	2656–72G, 7BG, 62G, 52G, 3BG, 32G, 22G, 51G, 64G
Recovery CD German-Win2000 (GR)	32P5338	2656–F0G, EAG, E0G, D0G, BAG, BOG, D3G, E2G
Recovery CD Thailand-W98 (TH)	32P5307	2656–72Y, 7BY, 62Y, 55Y, 3BY, 32Y
Recovery CD Portuguese-W98	14P9987	2656–62P, 22P
Recovery CD Portuguese-Win2000	32P5335	2656–E0P
Recovery CD Japan-W98 (JP)	46P4465	2656–61J, 40J
Recovery CD Japan-Win2000 (JP)	46P4467	2656–EBJ, E1J, C0J
Recovery CD T. Chinese-W98 (TC)	46P6119	2656–7BT, 62T, 55T, 32T, 22T
Recovery CD S. Chinese-W98 (SC)	46P6121	2656–7BC, 62C, 55C, 32C
Recovery CD Turkey-W98 (TR)	32P5301	2656–72G, 7BG, 62G, 52G, 3BG, 32G, 22G, 51G, 64G

Recovery CD Turkey-Win2000 (TR)	32P5349	2656–F0G, EAG, E0G, D0G, BAG, BOG, D3G, E2G
Recovery CD Greek-W98 (GK)	32P5302	2656–72G, 7BG, 62G, 52G, 3BG, 32G, 22G, 51G, 64G
Recovery CD Greek-Win2000 (GK)	32P5350	2656–F0G, EAG, E0G, D0G, BAG, BOG, D3G, E2G
Recovery CD Hungary-W98 (HU)	32P5303	2656–72G, 7BG, 62G, 52G, 3BG, 32G, 22G, 51G, 64G
Recovery CD Hungary-Win2000 (HU)	32P5351	2656–F0G, EAG, E0G, D0G, BAG, BOG, D3G, E2G
Recovery CD Russia-W98 (RU)	32P5304	2656–72G, 7BG, 62G, 52G, 3BG, 32G, 22G, 51G, 64G
Recovery CD Russia-Win2000 (RU)	32P5352	2656–F0G, EAG, E0G, D0G, BAG, BOG, D3G, E2G
Recovery CD Slovenia-W98 (SI)	32P5305	2656–72G, 7BG, 62G, 52G, 3BG, 32G, 22G, 51G, 64G
Recovery CD Slovakia-W98 (SK)	32P5306	2656–72G, 7BG, 62G, 52G, 3BG, 32G, 22G, 51G, 64G
Recovery CD Polish-W98 (PO)	32P5300	2656–72G, 7BG, 62G, 52G, 3BG, 32G, 22G, 51G, 64G
Recovery CD Polish-Win2000 (PO)	32P5348	2656–F0G, EAG, E0G, D0G, BAG, BOG, D3G, E2G
Recovery CD Hebrew-W98 (HB)	14P9999	2656–72G, 7BG, 62G, 52G, 3BG, 32G, 22G, 51G, 64G
Recovery CD Hebrew-Win2000 (HB)	32P5347	2656–F0G, EAG, E0G, D0G, BAG, BOG, D3G, E2G
Recovery CD Czech-W98 (CZ)	14P9998	2656–72G, 7BG, 62G, 52G, 3BG, 32G, 22G, 51G, 64G
Recovery CD Czech-Win2000 (CZ)	32P5346	2656–F0G, EAG, E0G, D0G, BAG, BOG, D3G, E2G
Recovery CD Arabic Enalbed-W98 (AR)	14P9997	2656–72G, 7BG, 62G, 52G, 3BG, 32G, 22G, 51G, 64G
Recovery CD Arabic Enalbed-Win2000 (AR)	32P5345	2656–F0G, EAG, E0G, D0G, BAG, BOG, D3G, E2G

Option Parts List

Battery charges

Description	Vendor	FRU No.
Charger Main Battery Li—Ion —W/W	Option	02K6821
Charger Main Battery Li—Ion —Japan	Option	02K6829

Ultrabay devices

Description	FRU No.
CD—RW drive (SONY)	08K9617
Diskette drive (TEAC)	08K9606
Diskette drive (SONY)	08K9607
SuperDisk drive (LS120 x 2)	05K9235
SuperDisk drive (LS240)	08K9615
ZIP—250 drive	00N8254
2nd HDD adapter	08K6067
Ultrabay Plus device carrier	26P9388
Ultrabay Plus numeric keypad	19K2056
Ultrabay Plus cradle for WorkPad c500 series	26P9389

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