

IBM Mobile Systems

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ThinkPad i Series 1400 (2611)

Hardware Maintenance Manual

August 1999

Before using this information and the product it supports, be sure to read the general information under "Introduction" on page 1, "Read This First" on page 20 (for Part I), and "Read This First" on page 106 (for Part II).

Third Edition (August 1999)

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Preface

About This Manual

This manual contains service and reference information for IBM ThinkPad i Series 1400 (2611) 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.
 - Part I (begins on page 19) covers the following ThinkPad i Series 1400 models: 2611-411, 2611-435, 2611-451, 2611-410, 2611-434, 2611-450, 2611-436-JP
 - Part II (begins on page 105) covers the following ThinkPad i Series 1400 models: 2611-472, 2611-452, 2611-412, 2611-476, 2611-456, 2611-40M, 2611-40A, 2611-49M, 2611-43M, 2611-40T, 2611-49A, 2611-43A, 2611-40C, 2611-49T, 2611-43T, 2611-40H, 2611-49C, 2611-43C, 2611-40K, 2611-49H, 2611-43H, 2611-40F, 2611-49K, 2611-43K, 2611-49F, 2611-47F

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 4 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 |

| Publication | Part, Form Number |
|---|--------------------------|
| 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) Mainte- nance 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) Refer- ence Diskette | 42G2023, S42G-2023 |
| ThinkPad 720/720C (9552) Ref- erence 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 |

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Introduction

Important Service Information

Important

Diskette fixes are customer installable. The diskette fixes are located on the PC Company Bulletin Board Service (BBS). The direct phone line for modem connection is 919-557-0001 or tieline 255-0001.

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. The Canadian BBS phone numbers are:

Montreal 514-938-3022

Toronto 905-316-4255

Vancouver 604-664-6464

Winnipeg 204-934-2735

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.

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. The following example shows which digits display the shorter POST error messages and also defines the SCSI information in an eight-digit error message.

POST

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 |

The following table provides identification information for 5.25-inch diskette drives.

| Diskette Drive | Identifying Mark |
|------------------------------|-------------------------|
| 5.25-Inch - 360KB (External) | Asterisk on bezel |
| 5.25-Inch - 1.2MB (Internal) | 1.2 on the eject button |

The following table provides compatibility information for 5.25-inch diskettes and 5.25-inch diskette drives.

| Diskette Capacity | 360KB Drive | 1.2MB Drive |
|-------------------|----------------|-------------|
| 360KB | Read/Write | Read/Write |
| 1.2MB | Not Compatible | Read/Write |

Note: A 360KB diskette written to or formatted on a 1.2MB drive can be read reliably only on a 1.2MB drive.

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, muß sichergestellt werden, daß keine Schrauben, Federn oder andere Kleinteile fehlen oder im Gehäuse vergessen wurden. Der Computer muß geschüttelt und auf Klappergeräusche geprüft werden. Metallteile oder -splitter können Kurzschlüsse erzeugen.

Prima di accendere l'elaboratore dopo che è stata effettuata la sostituzione di una FRU, accertarsi che tutte le viti, le molle e tutte le altre 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 después 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 provocarán. Las piezas metálicas pueden causar cortocircuitos eléctricos.

Safety Notice 2

Some standby batteries contain a small amount of nickel and cadmium. Do not disassemble it, recharge it, throw it into fire or water, or short-circuit it. 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.

Certaines batteries de secours contiennent du nickel et du cadmium. Ne les démontez pas, ne les rechargez pas, ne les exposez ni au feu ni à l'eau. Ne les mettez pas en court-circuit. Pour les mettre au rebut, conformez-vous à la réglementation en vigueur. Lorsque vous remplacez la pile de sauvegarde ou celle de l'horloge temps réel, veillez à n'utiliser que les modèles cités dans la liste de pièces détachées adéquate. Une batterie ou une pile inappropriée risque de prendre feu ou d'exploser.

Die Bereitschaftsbatterie, die sich unter dem Diskettenlaufwerk befindet, kann geringe Mengen Nickel und Cadmium enthalten. Sie darf nur durch die Verkaufsstelle oder den IBM Kundendienst ausgetauscht werden. Sie darf nicht zerlegt, wiederaufgeladen, kurzgeschlossen, oder Feuer oder Wasser ausgesetzt werden. Die Batterie kann schwere Verbrennungen oder Verätzungen verursachen. Bei der Entsorgung die örtlichen Bestimmungen für Sondermüll beachten. Beim Ersetzen der Bereitschafts- oder Systembatterie nur Batterien des Typs verwenden, der in der Ersatzteilliste aufgeführt ist. Der Einsatz falscher Batterien kann zu Entzündung oder Explosion führen.

Alcune batterie di riserva contengono una piccola quantità di nichel e cadmio. Non smontarle, ricaricarle, gettarle nel fuoco o nell'acqua né cortocircuitarle. Smaltirle secondo la normativa in vigore (DPR 915/82, successive disposizioni e disposizioni locali). Quando si sostituisce la batteria dell'RTC (real time clock) o la batteria di supporto, utilizzare soltanto i tipi inseriti nell'appropriato Catalogo parti. L'impiego di una batteria non adatta potrebbe determinare l'incendio o l'esplosione della batteria stessa.

Algunas baterías de reserva contienen una pequeña cantidad de níquel y cadmio. No las desmonte, ni recargue, ni las eche al fuego o al agua ni las cortocircuite. Deséchelas tal como dispone la normativa local. Utilice sólo baterías que se encuentren en la lista de piezas. La utilización de una batería no apropiada puede provocar la ignición o explosión de la misma.

Safety Notice 3

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.

La batterie contient du nickel. Ne la démontez pas, ne l'exposez ni au feu ni à l'eau. Ne la mettez pas en court-circuit. Pour la mettre au rebut, conformez-vous à la réglementation en vigueur. Lorsque vous remplacez la batterie, veillez à n'utiliser que les modèles cités dans la liste de pièces détachées adéquate. En effet, une batterie inappropriée risque de prendre feu ou d'exploser.

Akkus enthalten geringe Mengen von Nickel. Sie dürfen nicht zerlegt, wiederaufgeladen, kurzgeschlossen, oder Feuer oder Wasser ausgesetzt 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 contiene piccole quantità di nichel. Non smontarla, gettarla nel fuoco o nell'acqua né cortocircuitarla. Smaltirla secondo la normativa in vigore (DPR 915/82, successive disposizioni e disposizioni locali). Quando si sostituisce la batteria, utilizzare soltanto i tipi inseriti nell'appropriato Catalogo parti. L'impiego di una batteria non adatta potrebbe determinare l'incendio o l'esplosione della batteria stessa.

Las baterías contienen pequeñas cantidades de níquel. No las desmonte, ni recargue, ni las eche al fuego o al agua ni las cortocircuite. Deséchelas tal como dispone la normativa local. Utilice sólo baterías que se encuentren en la lista de piezas al sustituir la batería. La utilización de una batería no apropiada puede provocar la ignición o explosión de la misma.

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 température 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 Systematterie ist eine Lithiumatterie. 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 è una batteria al litio e può 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.

La batería de repuesto es una batería 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 Kurzschluss 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 Notice 8

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

Avant de retirer une unité remplaçable en clientèle, mettez le système hors tension, débranchez tous les cordons d'alimentation des socles de prise de courant, retirez la batterie et déconnectez tous les cordons d'interface.

Die Stromzufuhr muß abgeschaltet, alle Stromkabel aus der Steckdose gezogen, der Akku entfernt und alle Verbindungskabel abgenommen sein, bevor eine FRU entfernt wird.

Prima di rimuovere qualsiasi FRU, spegnere il sistema, scollegare dalle prese elettriche tutti i cavi di alimentazione, rimuovere la batteria e poi scollegare i cavi di interconnessione.

Antes de quitar una FRU, apague el sistema, desenchufe todos los cables de las tomas de corriente eléctrica, quite la batería y, a continuación, desconecte cualquier cable de conexión entre dispositivos.

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

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 generatorsand 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 nehládte 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.

ThinkPad i Series 1400 Hardware Maintenance Manual (Part I)

Part I of this Hardware Maintenance Manual covers the following ThinkPad i Series 1400 computer models:

- 2611-410
- 2611-411
- 2611-434
- 2611-435
- 2611-436-JP
- 2611-450
- 2611-451

Read This First

Before you go to the check procedures, be sure to read this section.

Important Notes

- Only certified trained personnel should service the computer.
- Read the FRU service procedures before replacing any FRUs.
- Be extremely careful during write operations such as copying, saving, or formatting. Drives in the computer that you are servicing might have been rearranged or the drive startup sequence might have been altered. If you select an incorrect drive, data or programs could be overwritten.
- Ensure that you replace FRUs with the appropriate model. When you replace the FRU, make sure that the model of the machine and FRU part number are correct by referring to the part list.
- FRUs 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.

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 the other false error codes being displayed.

How to Diagnose Multiple FRUs

If the adapter or device has more than one FRU, the error code could be caused by either FRU. Before replacing multiple FRUs, try removing or exchanging each FRU one by one in the designated sequence, to see if the symptoms change.

What to Do First

The 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 or not the damage applies to the warranty by referring to the following:

Note for Warranty: During the warranty period, the customer may be responsible for repair costs if the computer damage was caused by misuse, accident, modification, unsuitable physical or operating environment, or improper maintenance by the customer. The following list provides some common items that are not covered under warranty and some symptoms that may indicate 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 PCMCIA card or installation of an incompatible card.
- 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 drive damage caused by excessive force, shock, or by being dropped.
- Fuses blown by attaching a nonsupported device.
- Forgotten computer password (making computer unusable).

If the following symptoms are present, they may indicate damage caused by by non-warranted activity:

- 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.

Screw Notices

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

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

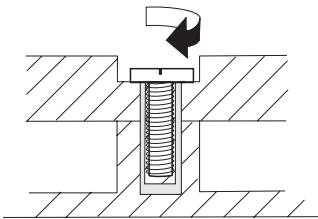
Do the following when you service this machine:

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

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

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

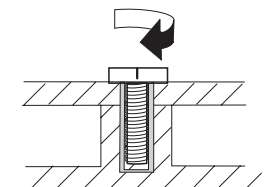
90 degrees more



(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.**

Power-On and Setup Password

To clear a password from the system, first identify the system password switch by referring to "Switch Locations" on page 95, then follow these steps:

1. Turn off the computer.
2. Unplug the AC Adapter and remove the battery.
3. Remove the keyboard by referring to "Keyboard" on page 63, and the thermal plate by referring to "Hard Disk Drive and HDD Heatsink" on page 65.
4. Move the password switch (SW2, switch 2) from OFF to ON to bypass the password.

Note: SW2 has four switches, the second upper switch (switch 2) is the password bypass/check switch. Turning the switch to the left (ON position) is "bypass password"; the right (OFF position) is "check password". Refer to "Switch Locations" on page 95.

5. Plug in the AC adapter and turn on the system.
6. While the ThinkPad logo is being displayed, wait for a beep before pressing **F1** to enter the BIOS Utility.
7. Select "System Security" from the BIOS Utility main menu and press **Enter**.
8. Set the "Power-On Password" setting to 'None' to clear the password.
9. Save and exit the BIOS Utility.
10. Turn off the system and unplug the AC Adapter.
11. Move the password switch from ON to OFF to enable the password function.
12. Reinstall the thermal plate and keyboard.
13. Reinstall the battery pack and plug in the AC Adapter.

To use the password function again, enter the BIOS Utility and set a password.

Check Procedures

Use the following procedure as a guide for computer problems.

Notes:

1. 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.
2. Some test items require tools as shown below:
 - Audio Wrap cable (P/N: 66G5180)
 - Eraseable 2HD diskette
 - Parallel Wrap plug (P/N: 72X8546)
 - Parallel test cable (P/N: 05K2580)
 - Serial Wrap plug (P/N: 72X8546)
 - Screwdriver Kit (P/N: 95F3598)
 - Screwdriver Kit (P/N: 05K4693)
 - Torque Screwdriver (P/N: 05K4695)
 - 5mm Socket Wrench (P/N: 05K4694)
 - PCMCIA: PC test card (P/N: 35G4703)
 - CD-ROM: Any data and audio CDs
 - ThinkPad i Series 1400 Diagnostics Diskette (P/N: 01K4841)
 - ThinkPad i Series 1400 Utility Diskette (P/N: 01K4842)
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.
3. Use the following table with the verified symptom to determine which page to go to. Search the symptoms column and find the description that best matches your symptom; then go to the page shown in the "Go to" column.

| Symptoms (Verified) | Go to |
|---|--|
| Power failure. (The power-on indicator does not go on or stay on.) | "Power Systems Check" on page 25, then use table in "Power-Related Symptoms" on page 42. |
| POST does not complete. No beeps or error codes/messages are indicated. | "Symptom-to-FRU Index" on page 36, then use table in "No Beep Symptoms" on page 38. |
| POST detected an error and displayed numeric error code with error message. | "Symptom-to-FRU Index" on page 36. |

| Symptoms (Verified) | Go to |
|---------------------|---|
| Other symptoms | Appropriate check instructions in this section, then use appropriate tables in "Symptom-to-FRU Index" on page 36. |

Power Systems Check

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

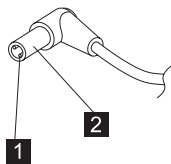
1. Remove the battery pack, diskette drive, and hard disk drive.
2. Connect the AC Adapter and check that power is supplied.
3. Install the diskette drive or hard disk drive one at a time, and check that power is supplied from each power source.

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

- "Checking the AC Adapter"
- "Checking the Operational Charging" on page 26
- "Checking the Battery Pack" on page 26

Checking the AC Adapter: If the computer fails only when the AC Adapter is used or if the power-on indicator of the AC Adapter does not turn on, make sure of the following:

- Power cord is not damaged.
- Power cord is securely connected to the AC Adapter and AC power outlet.



If the above confirmation does not solve the problem, replace the AC Adapter.

If the power-on indicator of the AC Adapter is on, then proceed to the next step.

1. Unplug the AC Adapter cable from the computer and measure the output voltage at the plug of the AC Adapter cable.

| Pin | Voltage (V dc) |
|-----|----------------|
| 1 | 19.0 20.5 |
| 2 | Ground |

- If the measured voltage is correct, replace the system board.
 - If the problems still persist, go to “Undetermined Problems” on page 45.
 - If the voltage is not correct, go to the next step.
2. Unplug the AC Adapter cable from the AC power outlet and wait for five minutes or longer to allow the over-voltage protection circuit of the AC Adapter to be fully discharged and initialized.
 3. Plug the AC Adapter cable into the AC power outlet.
 4. Measure the output voltage of the AC Adapter.
 5. If the voltage is still not correct, replace the AC Adapter.

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

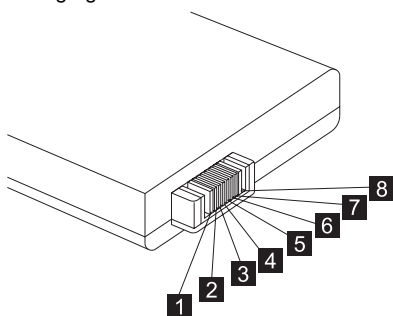
Checking the Operational Charging: To check operational charging, use a discharged battery pack or a battery pack that has less than 50% of the total power remaining when installed in the computer.

Perform operational charging:

1. If the battery indicator does not turn on, remove the battery pack and leave it to return to room temperature.
2. Reinstall the battery pack. If the charge indicator still does not turn on, replace the battery pack.

Checking the Battery Pack: To check the battery pack, do the following:

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



| Terminal | Signal / Voltage (V dc) |
|----------|-------------------------|
| 1 | Sense |
| 2 | Power (> 8 V dc) |

| Terminal | Signal / Voltage (V dc) |
|----------|-------------------------|
| 3 | Reserved |
| 4 | Reserved |
| 5 | Thermal |
| 6 | Sense |
| 7 | Ground |

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 +8 V dc, recharge the battery pack.

If the voltage is still less than +8 V dc after recharging, replace the battery.

System Board Check

The system board performs processing functions. Thus, the system board can cause processor problems. To verify the problem, do the following:

1. Boot from the diagnostics diskette and start the PQA program (please refer to “Running the PQA Diagnostics Program” on page 49).
2. Run the **System Board** test to verify the symptom. This test verifies both the system board and the processor board.

If the tests detect a system board problem, replace the system board.

Note: Don't touch the keyboard and pointing device when the system board test is running. This may cause an unexpected error.

Memory Check

DIMM are available for increasing memory capacity.

| DIMM | DIMM | Total Memory |
|-------|-------|--------------|
| 32MB | 0MB | 32MB |
| 0MB | 32MB | 32MB |
| 32MB | 32MB | 64MB |
| 64MB | 0MB | 64MB |
| 0MB | 64MB | 64MB |
| 64MB | 32MB | 96MB |
| 32MB | 64MB | 96MB |
| 64MB | 64MB | 128MB |
| 128MB | 0MB | 128MB |
| 0MB | 128MB | 128MB |
| 128MB | 32MB | 160MB |

| DIMM | DIMM | Total Memory |
|-------|-------|--------------|
| 32MB | 128MB | 160MB |
| 128MB | 64MB | 192MB |
| 64MB | 128MB | 192MB |
| 128MB | 128MB | 256MB |

CAUTION:

This system cannot work without DIMM memory.

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

Use the following procedure to isolate memory problems:

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

1. Power off the computer and replace the DIMM.
2. Boot from the diagnostics diskette and start the PQA program (please refer to “Running the PQA Diagnostics Program” on page 49).
3. Run the **Memory** item to run the memory test.

If no error appears, install a new DIMM; if an error appears, replace the system board.

Keyboard and External Input Device Check

Note: If an external keyboard is attached, remove it if the internal keyboard has to be tested.

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

If the tests do not detect a keyboard problem, run the Keyboard test by doing the following:

1. Boot from the diagnostics diskette and start the PQA program (please refer to “Running the PQA Diagnostics Program” on page 49).
2. Go to **Diag** and select **Manual Test**, then choose **Keyboard** from the Test Item and press **F2** to execute.
3. Check that when each key is pressed, the key's position on the keyboard layout on the screen changes to a black square.

Note: Press **Y+Enter** to close the test.

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

- Ensure the keyboard switch is correctly set.

- Reconnect the keyboard flexible cables.
- Replace the TrackPoint board.
- Replace the keyboard.
- Replace the system board.

The following external input devices are supported for this computer:

- Numeric keypad
- Mouse (PS/2 compatible)
- Keyboard

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

If the problem still exists, replace the device, and then the system board.

Audio Function Check

Do as follows:

1. Boot from the diagnostics diskette and start the PQA program (please refer to “Running the PQA Diagnostics Program” on page 49).
2. If the test detects an audio board problem, do the following actions, one at a time, to correct the problem. Do not replace a non-defective FRU.
 - Check the speaker and the speaker connections.
 - Replace the Audio I/O board.
 - Replace the Audio and Battery Function Connection Board.
 - Replace the system board.

TrackPoint IV Check

The TrackPoint does automatic compensations to adjust the pointer sensor. During this process, the pointer moves on the screen automatically for a short time. This self-acting pointer movement can occur when a slight, steady pressure is applied to the TrackPoint pointer while the computer is powered on or while the system is running, or when readjustment is required because the temperature has exceeded its normal temperature range. This symptom does not indicate a hardware problem. No service actions are necessary if the pointer movement stops in a short period of time.

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

1. Boot from the diagnostics diskette and start the PQA program (please refer to “Running the PQA Diagnostics Program” on page 49).

2. Go to **Diag** and select **Manual Test**, then choose **Pointing Dev.** from the Test Item and press **F2** to execute.

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

1. Reconnect the keyboard flexible cables and the TrackPoint flexible cable.
2. Replace the TrackPoint board.
3. Replace the keyboard.
4. Replace the system board.

Diskette Drive Check

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

CAUTION:

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

Do the following to select the test device:

1. Boot from the diagnostics diskette and start the PQA program (please refer to “Running the PQA Diagnostics Program” on page 49).
2. Go to **Diag** and select **Manual Test**, then choose **Diskette Drive** from the Test Item and press **F2** to execute.

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

If the error still remains:

1. Reconnect the diskette drive cable.
2. Replace the diskette drive cable.
3. Replace the diskette drive.
4. Replace the system board.

CD-ROM Drive Check

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

Do the following to select the test device:

1. Boot from the diagnostics diskette and start the PQA program (please refer to “Running the PQA Diagnostics Program” on page 49).
2. Go to **Diag** and select **Manual Test**, then choose **CD-ROM** from the Test Item and press **F2** to execute.

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

If the error still remains:

1. Reconnect the CD-ROM drive cable.
2. Replace the CD-ROM drive cable.
3. Replace the CD-ROM drive.
4. Replace the system board.

Modem Board Check

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

1. Boot from the diagnostics diskette and start the PQA program (please refer to “Running the PQA Diagnostics Program” on page 49).
2. Follow the instructions on the screen to complete the test.

If an error occurs with the internal modem, do the following:

1. Change another telephone line and test again.
2. Re-plug the telephone connector.
3. Reconnect the modem board.
4. Replace the modem connector.
5. Replace the system board.

BIOS Utility

Your computer has a BIOS Utility that allows you to configure the computer and its hardware settings.

Note: The computer is also bundled with a Windows-based computer management utility called the Notebook Manager that is similar in function with the BIOS Utility.

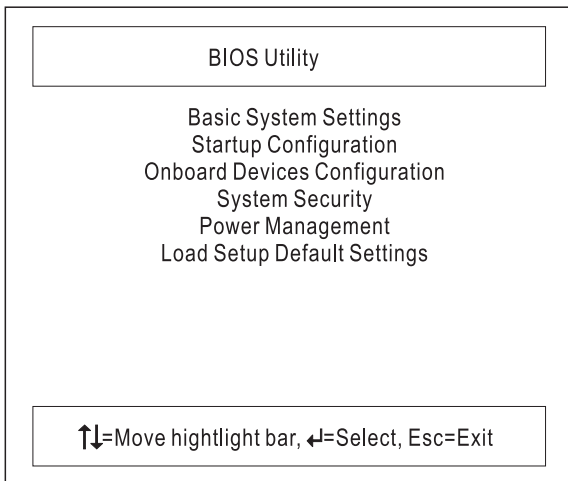
The computer is already correctly configured for you. If you make any changes to the computer or you receive an Equipment Configuration Error message (error code 246) after you turn on the computer, you need to run the BIOS Utility.

The BIOS Utility has the following functions:

- Change the system date or time
- Set the power-saving modes and timers
- Set, change, or remove a system password
- Change the system boot drive or display device
- Add or remove serial and parallel devices
- Set the video display features

While the ThinkPad logo is being displayed, wait for a beep before pressing **F1** to enter the BIOS Utility. The main screen displays (as shown below).

Note: If the Setup password is set, you need to enter the Setup password to gain access to the BIOS Utility.



There are six main menu items:

- Basic System Settings
- Startup Configuration
- Onboard Devices Configuration

- System Security
- Power Management
- Load Setup Default Settings

Navigating the BIOS Utility

Keep in mind the following when using the BIOS Utility:

- From the main menu screen, press the **up or down arrow keys** to move from one menu item to another; then press **Enter** to enter the selected menu.
- Parameters displayed in low brightness (grayed out) are not user-configurable. The computer detects and sets the values for these parameters.
- Press the **up or down arrow keys** to move from one parameter to another. Press the **left or right arrow keys** to change parameter settings. You have to change some settings when you add a component to the computer.
- Most of the parameters are self-explanatory.
- To exit a main menu item, press **Esc**.
- When you press **Esc** to exit the BIOS Utility from the main menu screen, the following prompt appears:

Do you want to save CMOS data?

[Yes] [NO]

Select **Yes** to save the changes you made to the configuration values or **No** to abandon the changes and retain the current values.

Power Management Features

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

Screen Blanking Mode

When in screen blanking mode, the following occurs:

- The LCD backlight turns off.

Events that cause the computer to enter standby mode:

- Screen blanking requested by the Fn key (Fn+F3).

Standby Mode

When in standby mode, the following occurs:

- The LCD backlight turns off.
- The hard disk motor stops.
- Processor stops the clock.

Events that cause the computer to enter standby mode:

Note: The standby mode indicator turns on when system is in standby mode.

- Standby requested by the Fn key (Fn+F4).
- The LCD is closed (if the "Will not Enter Standby Even if the Lid is Closed" parameter in the Power Management menu of the BIOS Utility is set to [Enabled]).
- The system (keyboard, mouse, hard disk drive, parallel connector, or diskette drive, etc.) is idle for a certain period of time.
- The battery power is critically-low. The "Sleep upon Battery-low" in the Power Management menu of the BIOS Utility is set to [Enabled]. Sleep Manager is not installed and the hibernation file is not present or invalid.

Note: Before entering standby mode, if "Battery-low Warning Beep" in the Power Management menu of the BIOS Utility is set to [Enabled], four short beeps will be issued every minute for three minutes. If a powered AC Adapter is not attached, then the beeps will be continuously issued every minute until the system shuts down.

Events that cause the computer to exit standby mode:

- The LCD is opened (if the system entered standby mode from closing the lid).
- A serial or PCMCIA device signals the modem ring indicator (RI).
- Any key or pointing device operation.

Note: If the computer enters standby mode and the computer is using a communication or I/O PC Card, the PC Card and application program remain active.

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:

- Function combination key (Fn+F12) is pressed.
- The battery power is at a critically-low level.

Note: Before entering standby mode, if "Battery-low Warning Beep" in the Power Management menu of the BIOS Utility is set to [Enabled], four short beeps will be issued every minute for three minutes.

- The system (keyboard, mouse, hard disk drive, parallel connector, or diskette drive, etc.) is idle for a certain period of time.

Note: The computer cannot enter hibernation mode when the computer is using a communication or I/O PC Card.

Events that cause the computer to exit hibernation mode:

- The power-on switch is operated.

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.

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 45.

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 | FRU/Action in Sequence |
|------------|--|---|
| POST | | |
| 010 | Memory Error at MMMM: SSSS: OOOOh (R:xxxxh, W:xxxxh) | <ul style="list-style-type: none">• Go to "Memory Check" on page 27.• DIMM• System board |
| 040 | Diskette Drive Controller Error | <ul style="list-style-type: none">• Go to "Diskette Drive Check" on page 30.• Ensure the diskette drive configuration setting in BIOS Utility is correct.• Diskette drive cable• Diskette drive• System board |
| 047 | Diskette Drive(s) Disabled | <ul style="list-style-type: none">• Ensure the diskette drive is not set to [Disabled] in the "System Security" menu of the BIOS Utility.• Diskette drive cable• Diskette drive |

| Error Code | Message | FRU/Action in Sequence |
|-------------------|-----------------------------------|---|
| 050 | IDE Drive 0 Error | <ul style="list-style-type: none"> • Ensure the hard disk drive is set to [Auto] in the "Basic System Settings" menu of the BIOS Utility. • Hard disk connection board • Hard disk drive • System board |
| 054 | IDE Drive(s) Disabled | <ul style="list-style-type: none"> • Ensure the hard disk drive is not set to [None] in the "Basic System Settings" menu of the BIOS Utility. • Hard disk drive cable • Hard disk drive |
| 056 | IDE Drive 0 Auto Detection Failed | <ul style="list-style-type: none"> • Ensure the hard disk drive is set to [Auto] in the "Basic System Settings" menu of the BIOS Utility. • Hard disk connection board • Hard disk drive • System board |
| 070 | Real Time Clock Error | <ul style="list-style-type: none"> • Reset time in the "Basic System Settings" menu of the BIOS Utility. • Backup battery (RTC battery) • System board |
| 071 | CMOS Battery Bad | <ul style="list-style-type: none"> • Enter BIOS Utility and execute "Load Setup Default Settings". • Backup battery (RTC battery) • System board |
| 072 | CMOS Checksum Error | <ul style="list-style-type: none"> • Enter BIOS Utility and execute "Load Setup Default Settings"; then reboot the system. • Backup battery (RTC battery) • System board |

| Error Code | Message | FRU/Action in Sequence |
|-----------------------------------|--|---|
| 006 | Equipment Configuration Error | <ul style="list-style-type: none"> • Ensure the equipment (diskette drive, hard disk drive, keyboard, external mouse, etc.) is connected properly and is correctly set in the BIOS Utility. • Hard disk connection board • Hard disk drive • System board |
| System Operation (Runtime) | | |
| 103 | Press <Esc> to turn off NMI or other key to reboot | <ul style="list-style-type: none"> • Enter BIOS Utility and execute "Load Setup Default Settings"; then reboot the system. • Remove the non-factory-installed adapter card and reboot the system. |

Beep Symptoms

| Symptom/Error | FRU/Action in Sequence |
|--|---|
| Five short beeps, power-on indicator turns on then off and LCD is blank. | <ul style="list-style-type: none"> • Ensure that "System Boot Drive" in the "System Security" menu of the BIOS Utility is not set to [Drive A]. • Battery |
| Four short beeps every minute and system doesn't enter hibernation mode. | <ul style="list-style-type: none"> • Go to "Hibernation Mode" on page 35. • Hard disk connection board • Hard disk drive • System board |

No Beep Symptoms

| Symptom/Error | FRU/Action in Sequence |
|--|--|
| <p>Insert system diskette and press <Enter> key to reboot.</p> | <ul style="list-style-type: none"> • Ensure that "System Boot Drive" in the "System Security" menu of the BIOS Utility is not set to [Drive A]. • Ensure the diskette drive configuration in the "Basic System Settings" menu of the BIOS Utility is not set correctly. • Diskette drive cable • Diskette drive • Hard disk connection board • Hard disk drive • System board |
| <p>No beep, power-on indicator turns off and LCD is blank.</p> | <ul style="list-style-type: none"> • Power source (battery and adapter). See "Power Systems Check" on page 25. • Ensure every connector is connected tightly and correctly. • Charger board • Battery pack • AC Adapter • System board |
| <p>No beep, power-on indicator turns on and LCD is blank.</p> | <ul style="list-style-type: none"> • Power source (battery and adapter). See "Power Systems Check" on page 25. • Reconnect the LCD connector • Charger board • Processor board • Reconnect the DIMM. • System board |
| <p>No beep, power-on indicator turns on and LCD is blank. But you can see POST on an external CRT.</p> | <ul style="list-style-type: none"> • Reconnect the LCD connectors. • LCD inverter ID • LCD LVDS board (for 13.3-inch LCD) • LCD FPC cable • LCD inverter • LCD • System board |
| <p>No beep, power-on indicator turns on and a blinking cursor shown on LCD during POST.</p> | <ul style="list-style-type: none"> • Ensure every connector is connected tightly and correctly. • System board |

| Symptom/Error | FRU/Action in Sequence |
|--|--|
| No beep during POST but system runs correctly. | <ul style="list-style-type: none"> Adjust the audio volume control. Speaker connector System board <p>Note: The buzzer is on the System board.</p> |

Keyboard/TrackPoint-Related Symptoms

| Symptom/Error | FRU/Action in Sequence |
|---|---|
| Keyboard (one or more keys) doesn't work. | <ul style="list-style-type: none"> Go to "Keyboard and External Input Device Check" on page 28. Reconnect keyboard cables. Keyboard System board |
| TrackPoint does not work. | <ul style="list-style-type: none"> Go to "TrackPoint IV Check" on page 29. Reconnect keyboard cables. TrackPoint board Keyboard System board |

LCD-Related Symptoms

LCD FRU Replacement Notice

The TFT LCD for the notebook computer contains over 2,359,296 thin-film transistors (TFTs). A small number of missing, discolored, or lighted dots (on all the time) is characteristic of TFT LCD technology, but excessive pixel problems can cause viewing concerns. The LCD should be replaced if the number of missing, discolored, or lighted dots in any background is:

- SVGA (12.1"): 5 or more bright dots, 5 or more dark dots, or a total of 9 or more bright and dark dots
- XGA (13.3"): 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 |
|--|---|
| <p>No beep, power-on indicator turns on and LCD is blank.</p> | <ul style="list-style-type: none"> • Power source (battery and adapter). See "Power Systems Check" on page 25. • Reconnect the LCD connector • Charger board • Processor board • Hard disk drive • LCD inverter ID • LCD LVDS board (for 13.3-inch LCD) • LCD FPC cable • Inverter • LCD • System board |
| <p>LCD backlight doesn't work. LCD is too dark. LCD brightness cannot be adjusted. LCD contrast cannot be adjusted.</p> | <ul style="list-style-type: none"> • Enter BIOS Utility and execute "Load Setup Default Settings"; then reboot the system. • Reconnect the LCD connectors • Keyboard (if contrast and brightness function keys do not work) • LCD inverter ID • LCD LVDS board (for 13.3-inch LCD) • LCD FPC cable • LCD inverter • LCD • System board |
| <p>Unreadable LCD screen. Missing pixels in characters. Abnormal screen Wrong color displayed.</p> | <ul style="list-style-type: none"> • Reconnect all LCD connectors • LCD inverter ID • LCD FPC cable • LCD inverter • LCD • System board |
| <p>LCD has extra horizontal or vertical lines displayed.</p> | <ul style="list-style-type: none"> • LCD • LCD FPC cable • LCD inverter ID • Inverter • System board |

Indicator-Related Symptoms

| Symptom/Error | FRU/Action in Sequence |
|---|---|
| Indicator incorrectly remains off or on, but system runs correctly. | <ul style="list-style-type: none"> • Reconnect the indicator board connector. • Indicator board |

Power-Related Symptoms

| Symptom/Error | FRU/Action in Sequence |
|------------------------------------|---|
| Power shuts down during operation. | <ul style="list-style-type: none"> • Go to "Power Systems Check" on page 25. • AC Adapter • Battery pack • Audio and battery function connection board • Charger board • System board |
| The system doesn't power on. | <ul style="list-style-type: none"> • Go to "Power Systems Check" on page 25. • AC Adapter • Charger board • System board |
| The system doesn't power off. | <ul style="list-style-type: none"> • Go to "Power Systems Check" on page 25. • Hold and press the power switch for more than 4 seconds. • Charger board • System board |
| Battery can't be charged. | <ul style="list-style-type: none"> • Go to "Power Systems Check" on page 25. • Battery pack • Charger board • System board |

Memory-Related Symptoms

| Symptom/Error | FRU/Action in Sequence |
|---|---|
| Memory count (size) appears different from the actual size. | <ul style="list-style-type: none"> • Go to "Memory Check" on page 27. • 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. | <ul style="list-style-type: none"> • Speaker volume control • Go to “Audio Function Check” on page 29. |
| External speakers make noise or emit no sound. | <ul style="list-style-type: none"> • Speaker volume control • Go to “Audio Function Check” on page 29. |
| In DOS or Windows, multimedia programs, no sound comes from the computer. (Only system beeps are heard at poweron.) | <ul style="list-style-type: none"> • Speaker volume control • Go to “Audio Function Check” on page 29. |

PC Card (PCMCIA)-Related Symptoms

| Symptom/Error | FRU/Action in Sequence |
|---|---|
| System cannot detect the PC Card (PCMCIA) | <ul style="list-style-type: none"> • PC Card (PCMCIA) slots assembly • System board |
| PCMCIA slot pin is damaged. | PC Card (PCMCIA) slots assembly |

Power Management-Related Symptoms

| Symptom/Error | FRU/Action in Sequence |
|--|---|
| The system doesn't enter hibernation mode and four short beeps every minute are heard. | <ul style="list-style-type: none"> • Go to “Hibernation Mode” on page 35. • Boot an operating system and press Fn+F12 to see if the computer enters hibernation mode. • TrackPoint board • Keyboard • Hard disk connection board • Hard disk drive • System board |
| The system doesn't resume from hibernation mode. | <ul style="list-style-type: none"> • Go to “Hibernation Mode” on page 35. • Hard disk connection board • Hard disk drive • System board |
| The system doesn't enter standby mode after closing the LCD. | <ul style="list-style-type: none"> • Chassis (LCD cover switch on chassis) • System board |
| The system doesn't resume from standby mode after opening the LCD. | <ul style="list-style-type: none"> • Chassis (LCD cover switch on chassis) • System board |

| Symptom/Error | FRU/Action in Sequence |
|--|---|
| Battery fuel-gauge doesn't go higher than 90%. | <ul style="list-style-type: none"> Remove battery pack and let it cool for 2 hours. Refresh battery (continue using battery until power off, then charge the battery). Battery pack Charger board System board |
| System configuration does not match the installed devices. | <ul style="list-style-type: none"> Enter BIOS Utility and execute "Load Setup Default Settings"; then reboot the system. Reconnect hard disk/diskette/CD-ROM drive connector. |
| System hangs intermittently. | <ul style="list-style-type: none"> Hard disk/diskette/CD-ROM drive connector Fan (go to "Running the PQA Diagnostics Program" on page 49). System board |

Peripheral-Device-Related Symptom

| Symptom/Error | FRU/Action in Sequence |
|---|--|
| External display does not work correctly. | <ul style="list-style-type: none"> Press Fn+F3, LCD/CRT/Both display switching. System board |
| Printer problems. | <ul style="list-style-type: none"> Run printer self-test. Printer driver Printer cable Ensure that "Parallel Port" in the "Onboard Devices Configuration" menu of the BIOS Utility is correctly set. System board |
| Serial or parallel port device problems. | <ul style="list-style-type: none"> Device driver Device cable Device Ensure that "Serial Port" and "Parallel Port" in the "Onboard Devices Configuration" menu of the BIOS Utility is correctly set. System board |

Modem-Related Symptoms

| Symptom/Error | FRU/Action in Sequence |
|--|---|
| Internal modem does not work correctly | <ul style="list-style-type: none"> • Go to “Modem Board Check” on page 31. • Modem connector • Modem board • 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 the 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
 - Diskette drive/CD-ROM drive
 - 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.
 - TrackPoint board
 - Charger board
 - Audio & battery function connection board
 - LCD assembly
 - System board

Related Service Procedures

This section provides information about the following:

- “Flash Memory Update”
- “Status Indicators”
- “Power Switch” on page 49
- “Diagnostic Program Diskette” on page 49
- “Utility Program Diskette” on page 54
- “Fn Key Combinations” on page 55

Flash Memory Update

Setup Utility and BIOS programs are stored in flash memory. A flash memory update is required for the following conditions:

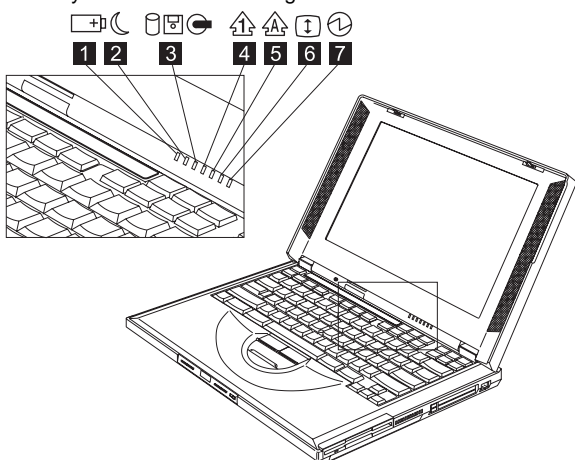
- New versions of system programs
- New features or options are added.








To update the flash memory, do the following:

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

Status Indicators

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



| Symbol | Color | Meaning |
|---|-----------------|---|
| (1) Battery status  | Green | Enough battery power remains for operation. |
| | Blinking orange | The battery pack needs to be charged |
| | Orange | The battery pack is being charged. |
| (2) Standby mode  | Green | The computer is in standby mode. |
| | Blinking green | The computer is entering or resuming from hibernation mode. |
| (3) Drive in use  | Orange | Data is being read from or written to the hard disk, floppy drive, or data is being read from the CD-ROM drive. Do not enter hibernation mode or power off the computer when this indicator is on. |
| (4) Numeric lock  | Green | The numeric keypad on the keyboard is enabled. You enable or disable the keypad by pressing and holding the Shift key, and pressing the NumLk key. For details, see the <i>User's Reference</i> . |
| (5) Caps lock  | Green | Caps Lock mode is enabled. All alphabetic characters (A-Z) are entered in capital letters without the Shift key being pressed. You enable or disable the Caps Lock mode by pressing the Caps Lock key. |
| (6) Scroll lock  | Green | Scroll Lock mode is enabled. The Arrow keys can be used as screen-scroll function keys. The cursor cannot be moved with the Arrow keys. <i>Not all application programs support this function.</i> You enable or disable Scroll Lock mode by pressing the ScrLk key. |
| (7) Power on  | Green | The computer is operational. This indicator is always on when the computer is on. |

Power Switch

The system has no power shutdown switch. If the computer cannot be turned off by pressing the power switch, try pressing (sliding and holding) it for more than 4 seconds to force the system to shutdown.

Diagnostic Program Diskette

The Diagnostic Program Diskette contains the following seven programs:

- PQA System Test
- Modem Dial and Data Transfer Test
- PCMCIA IBM Wrap Card Test
- Audio and Speaker-Out Test
- CD Player Test
- Thermal Sensor Test
- USB Register and Connection Test

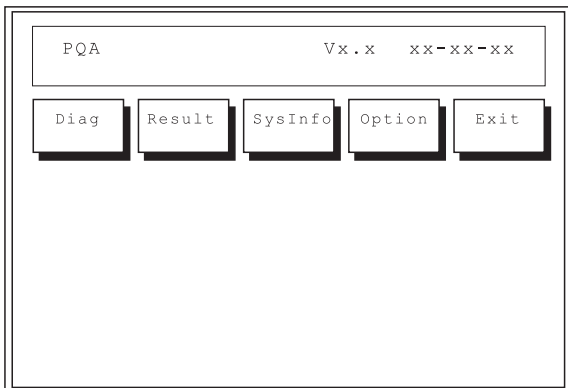
Note: Some test items require tools as shown below:

- Audio Wrap cable (P/N: 66G5180)
- Eraseable 2HD diskette
- Parallel Wrap plug (P/N: 72X8546)
- Parallel test cable (P/N: 05K2580)
- Serial Wrap plug (P/N: 72X8546)
- Screwdriver Kit (P/N: 95F3598)
- Screwdriver Kit (P/N: 05K4693)
- Torque Screwdriver (P/N: 05K4695)
- 5mm Socket Wrench (P/N: 05K4694)
- PCMCIA: PC test card (P/N: 35G4703)
- CD-ROM: Any data and audio CDs
- ThinkPad i Series 1400 Diagnostics Diskette (P/N: 01K4841)
- ThinkPad i Series 1400 Utility Diskette (P/N: 01K4842)

Running the PQA Diagnostics Program:

Attention: Before running the PQA Diagnostic Program, make sure that the write enable tab of the Diagnostic Program Diskette is set to enable.

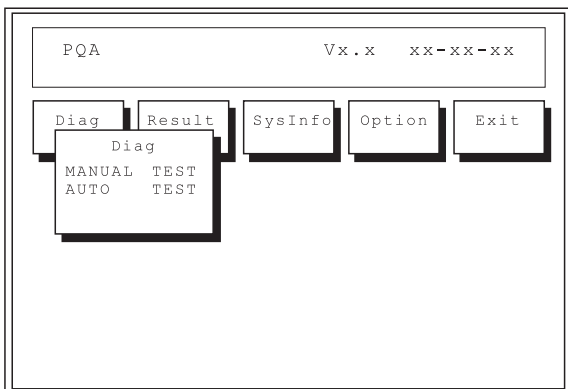
Boot from the Diagnostic Program Diskette and select "PQA System Diagnostics Program" from PC DOS 7.0 Startup Menu. The PQA main menu appears on the screen.



Press the **left and right arrow keys** to move around the main menu. Press **Enter** to enable the selected option. The main options are Diag, Result, SysInfo, Option and Exit.

The Diag option lets you select testing items and testing times.

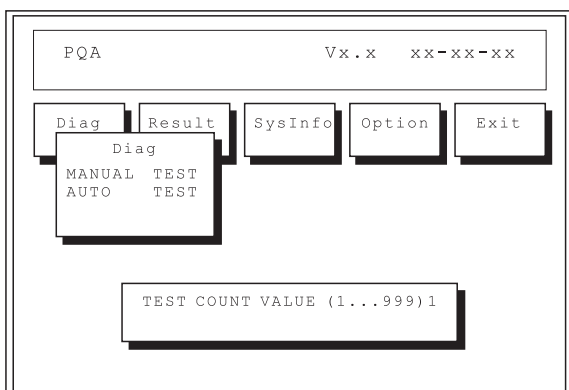
The following screen appears when you select Diag from the main menu.



This screen allow syou to specify the number of tests to perform. The options are as follows:

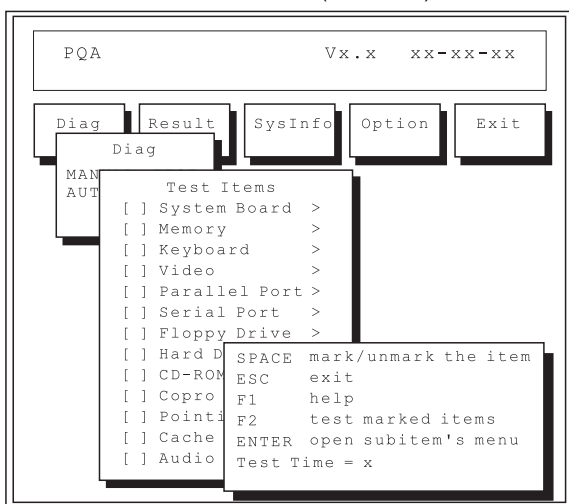
- Manual Test performs a single test and manually checks the selected test items in sequence.
- Auto Test performs multiple tests and auto-checks the selected test items in sequence.

The screen below appears if you select Auto Test.



Specify the desired number of tests and press **Enter**.

After you specify the number of tests to perform, the screen shows a list of test items (see below).



Press the **up and down arrow keys** to move the highlight bar from one item to another. Press **Space** to enable or disable the item. The > mark indicates that there are available sub-options. Press **Enter** to view the available sub-options of each selected item. Press **Esc** to close the submenu.

The right corner screen information gives you the available function keys and the specified test number.

- Space enables/disables the item.
- Esc exits the program.
- F1 accesses help.
- F2 tests the selected item(s).
- Enter opens the available suboptions.

- Test Times show the number of tests to perform.

Note: The F1 and F2 keys function only after you finish configuring the Test option.

PQA Diagnostic Program Error Codes and Messages

| Error Code | Message | FRU/Action in Sequence |
|-------------------|-----------------------------------|--|
| 16XX | RTC (backup battery) error | Backup battery |
| 1XXX | Processor or System board error | <ul style="list-style-type: none"> • Reload BIOS default setting. • Processor board • System board |
| 2XXX | Memory error | <ul style="list-style-type: none"> • Reconnect Processor board. • DIMM • System board |
| 3XXX | Keyboard error | <ul style="list-style-type: none"> • Reconnect keyboard. • Keyboard • System board |
| 4XXX | Video error | System board |
| 5XXX | Parallel port error | System board |
| 6XXX | Serial port or system board error | System board |
| 7XXX | Diskette drive error | <ul style="list-style-type: none"> • Diskette drive • System board |
| 8XXX | Hard disk error | <ul style="list-style-type: none"> • Load BIOS default setting • Hard disk connection board • Hard disk drive |
| 9XXX | CD-ROM error | <ul style="list-style-type: none"> • Reconnect CD-ROM drive cable. • CD-ROM drive • System board |
| 10XXX | Processor or System board error | <ul style="list-style-type: none"> • Processor board • System board |

| Error Code | Message | FRU/Action in Sequence |
|------------|-----------------------|--|
| 11XXX | Pointing device error | <ul style="list-style-type: none"> • TrackPoint board FPC cable • TrackPoint board • Keyboard • System board |

Running Modem Dial and Data Transfer

Test: Boot from the Diagnostic Program Diskette and select "Modem Dial and Data Transfer Test" from PC DOS 7.0 Startup Menu. Follow the instructions on the screen to execute modem test. If the test fails, go to "Modem Board Check" on page 31.

Note: A telephone line is required for completing modem test.

Running PCMCIA Wrap Card Test: Boot from the Diagnostic Program Diskette and select "PCMCIA Wrap Card Test" from PC DOS 7.0 Startup Menu. Follow the instructions on the screen to run the PCMCIA test.

The green LED on the PC test card lights up when the PCMCIA test is running. If the LED does not light up, check whether the card is installed correctly by reconnecting the card. If it still does not light up after it is reconnected, try using another slot for the test. If the LED still does not turn on and the test fails, go to "PC Card (PCMCIA)-Related Symptoms" on page 43 to replace the possible defective FRU.

Running Audio and Speaker-out Test: Boot from the Diagnostic Program Diskette and select "Running Audio Resource and Speaker-Out Test" from PC DOS 7.0 Startup Menu. Follow the instructions on the screen to execute the audio test. If the test fails, go to "Audio Function Check" on page 29.

Attention: You should execute this program two times (one for internal and the other for external speakers) to verify if the system's audio function is in working order.

Running CD-Player Test: Boot from the Diagnostic Program Diskette and select "CD Player Test" from PC DOS 7.0 Startup Menu. Follow the instructions on the screen to execute the CD player test. If the test fails, go to "CD-ROM Drive Check" on page 30.

Running USB Register and Connection

Test: Boot from the Diagnostic Program Diskette and select "Running USB Connect/Disconnect Test" from PC DOS 7.0 Startup Menu. Follow the instructions on the screen to execute the USB test. If the test fails, go to "System Board Check" on page 27.

Utility Program Diskette

The Utility Program Diskette provides the three following functions:

- "Setting the Inverter ID"
- "Setting the Thermal Sensor"
- "Writing the VPD Data" on page 55

Setting the Inverter ID: There is an EEPROM in the inverter, which store its supported LCD type and ID code. If you replace the LCD with one of a different brand, the ID information in the inverter EEPROM should be updated.

Follow the steps below to set the LCD inverter ID:

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

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

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

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

Note: If the LCD has no display after changing the ID code, make sure you write the correct ID code or try reconnecting the LCD FPC cable connectors.

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

System experiencing frequent auto sensor shutdown may need to reset the thermal sensor threshold.

Follow the steps below to set the thermal threshold:

1. Boot from the Utility Program Diskette.
2. Select Thermal Sensor Utility from PC DOS 7.0 Startup menu.
3. Follow the instructions on the screen to set the thresholds.

Writing the VPD Data: The EEPROM on the System board contains the vital product data (VPD) — that is, a system unit serial number and a System board serial number. When you replace the System board, restore the system unit serial number using the VPD Data Utility. The serial number label is attached to the computer.

Edit the batch file in the diskette A:\active.bat

- VPD_BUILDID
- VPD_BOXSERIAL
- VPD_PLANARSERIAL

Fn Key Combinations

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

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

| Fn + | Result |
|-------|---|
| F1 | The ShortCut Keys Utility program appears. The ShortCut Keys Utility defines all Fn key functions as well as ShortCut keys that can be customized. |
| F2 | The Power Management Properties window appears. |
| F3 | The computer blanks the screen to save power. |
| F4 | The computer enters standby mode. |
| F5–F8 | These are customizable ShortCut Keys. Use the ShortCut Keys Utility (Fn+F1) to choose programs or files to launch with the customized ShortCut key. |
| F9 | The display output location changes. |
| F12 | The computer enters hibernation mode. |
| Home | The screen brightness increases. |
| End | The screen brightness decreases. |

Product Overview

The following shows an overview of the system features.

| Feature | Description |
|------------------|---|
| Processor | Intel** Pentium** processor 266 or 300 MHz –or– AMD-K6-2** processor 300 MHz |
| Bus architecture | PCI 5V |
| System memory | 32MB or 64MB DIMM card, maximum 128MB (144-pin SDRAM) |
| CMOS RAM | 256KB |
| Video | 12.1-inch, 65,536 colors, 800x600 pixel TFT color SVGA LCD or 13.3-inch, 256 colors, 1024x768 pixel TFT color XGA LCD |
| Audio | Internal system buzzer Internal speakers and microphone Internal line-in/microphone-in/headphone jack |
| Diskette drive | 1.44MB (3-mode), 3.5-inch |
| Hard disk drive | 3GB, 4GB or 5GB, 2.5-inch, E-IDE interface |
| CD-ROM drive | 5.25-inch, 20X or 24X speed, E-IDE interface |
| PC Card (PCMCIA) | One Type III or two Type II CardBus, ZV port support (upper slot only) |
| Modem | 56Kbps (depends on the model) |

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 93 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.

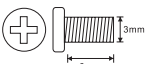
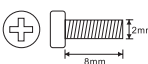
Attention: The system board is sensitive and can be damaged by electronic discharge. Establish personal

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.

Before FRU Removals and Replacements

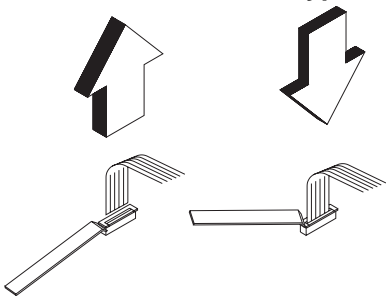
Screw Type Example Explanation

| Illustration | Size | Head & Color |
|---|---------|----------------------------|
|  | M3 x 6L | Bind head, black or silver |
|  | M2 x 8L | Pan head, black or silver |

Note: Some screws have nylok paste (on the grooves), also referred to as nylon-coated screws, for better friction and increased stability.

Some screws have bracket supports.

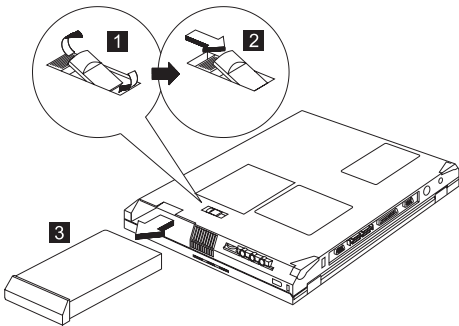
FPC Cable Connector Type



Unplugging the Cable: To unplug the cable, first unlock the connector by pulling up the two clasps on both sides of the connector with a plastic stick. Then carefully pull out the cable from the connector.

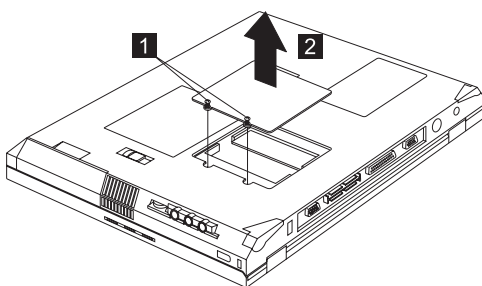
Plugging the Cable: To plug the cable back, first make sure that the connector is unlocked, then plug the cable into the connector. With a plastic stick, press the two clasps on both sides of the connector to secure the cable in place.

Battery Assembly

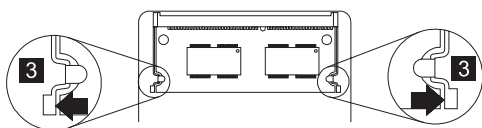


Reverse the steps described above when installing a new battery pack.

DIMM and DIMM Cover

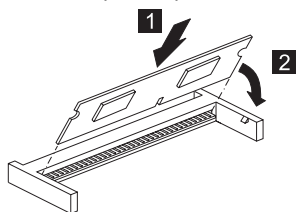


| Step | Size (Quantity) | Head & Color | Torque | Memo |
|--|-----------------|------------------|------------|------|
| 1 | M2 x 5L (2) | Bind head, black | 1.6 kgf-cm | |
| Note: The screw cannot be separated from the DIMM door. | | | | |

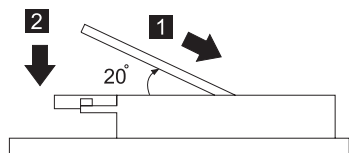


To install the DIMM:

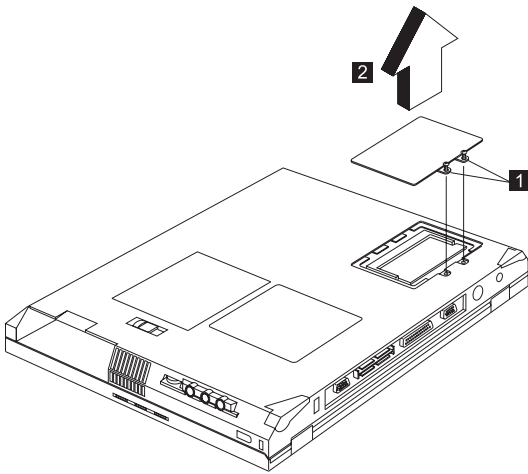
With the notched end of the DIMM toward the right side of the socket, insert the DIMM, at an angle of approximately 20°, into the socket; then press it firmly. Pivot the DIMM until it snaps into place.



Side View



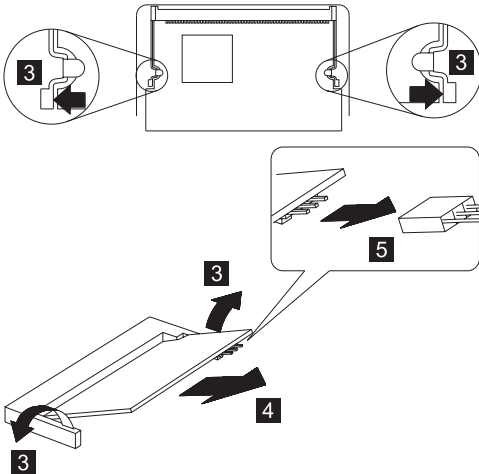
Modem Board Cover and Modem Board



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|-----------|------|
| 1 | M2 x 5L (2) | Bind head, black | 1.6kgf-cm | |
| Note: The screws do not separate from the modem board cover. | | | | |

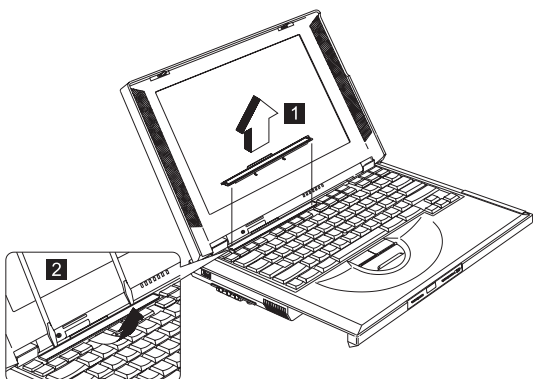
To remove the modem board:

Press the release latches on both sides of the modem board (3), then pull out the modem board (4). Then disconnect the modem cable (5).

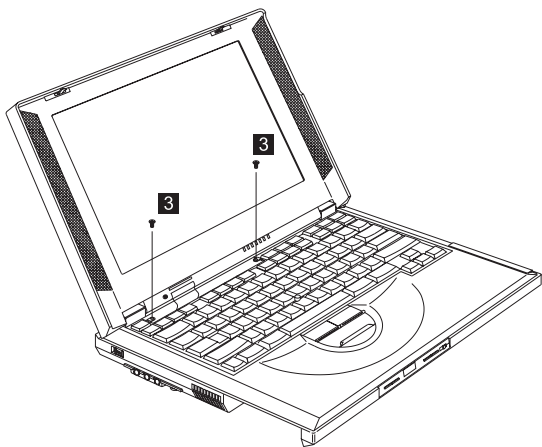


Keyboard

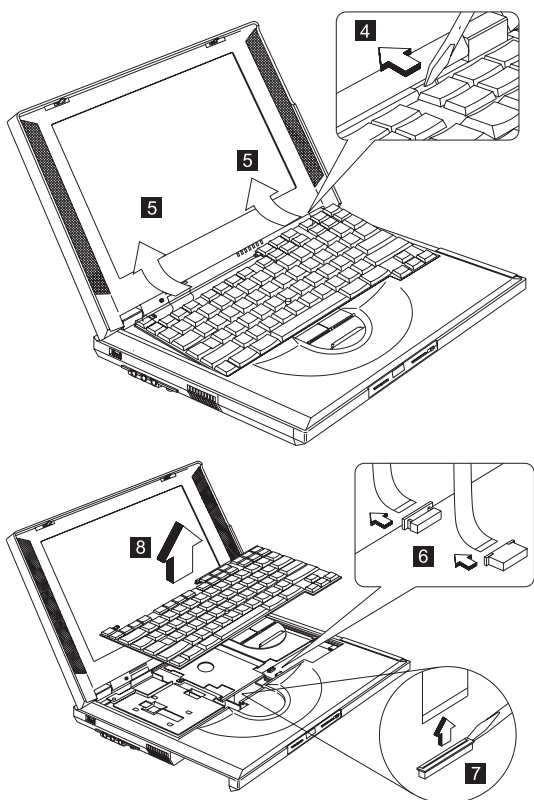
- “Battery Assembly” on page 60



Note: Be careful not to scratch the surface of the name plate cover.



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



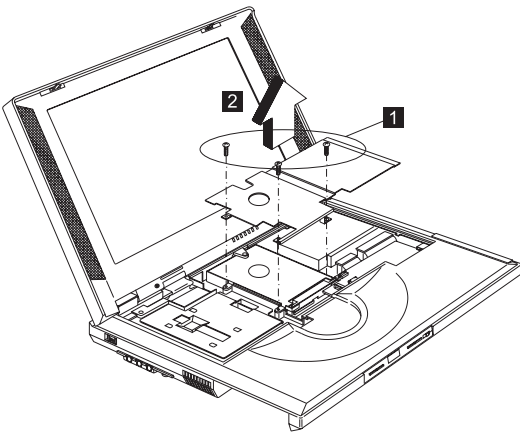
When replacing the keyboard, make sure that the 3 cables are clean and insert them directly into the connectors, making sure they contact with the bottom of the connector. Now press down on the latch of the connector to secure.

Note: If the cables do not touch the bottom of the connector, the keyboard function will be rendered useless.

Attention: The cables of the keyboard are fragile and could be damage. Be careful in pulling out the cables.

Hard Disk Drive and HDD Heatsink

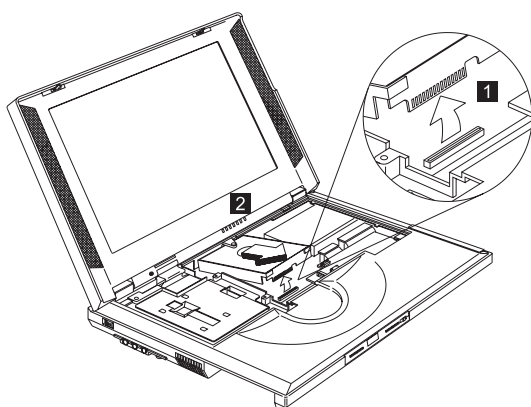
- “Battery Assembly” on page 60
- “Keyboard” on page 63



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|--------------------|------------------------|---------------|----------------------|
| 1 | M2.5 x 6L (3) | Bind head, black | 3.2 kgf-cm | w/ nylok paste |
| Note: Make sure you use the correct screw for replacement. | | | | |

Hard Disk Drive

- “Battery Assembly” on page 60
- “Keyboard” on page 63
- “Hard Disk Drive and HDD Heatsink” on page 65



Reverse the steps described above when installing a new hard disk drive.

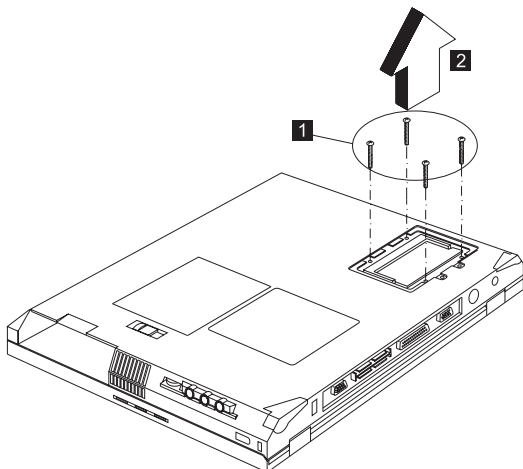
Attention: When removing the hard drive, pull them up at an angle. It cannot be removed when pulled straight up.

CAUTION:

Do not 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 hard disk. Before removing the hard disk drive, the user must have a backup copy of all the information on the hard disk drive. Never remove the hard disk drive while the system is operating or is in hibernation mode.

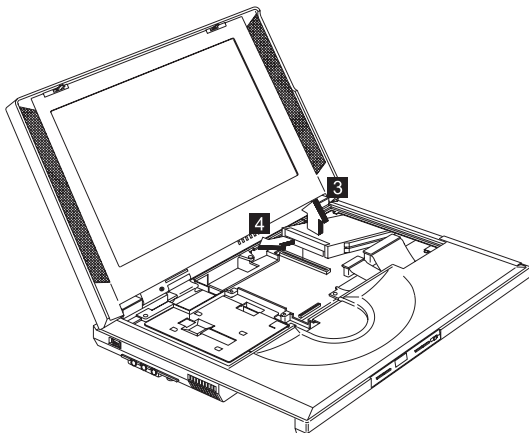
PCMCIA Holder

- “Battery Assembly” on page 60
- “Modem Board Cover and Modem Board” on page 62
- “Keyboard” on page 63
- “Hard Disk Drive and HDD Heatsink” on page 65



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|--------------------|------------------------|---------------|------|
| 1 | M2 x 14L (4) | Pan head, silver | 1.6 kgf-cm | |
| Note: Make sure you use the correct screw for replacement. | | | | |

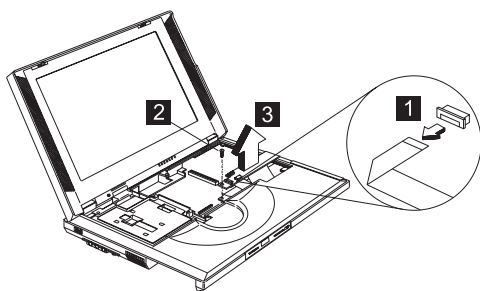
Note: Before removing and replacing the PCMCIA holder, make sure that the PCMCIA cards are removed and the eject levers are not sticking out.



Attention: When removing the PCMCIA holder, pull them up at an angle. It cannot be removed when pulled straight up.

TrackPoint Board

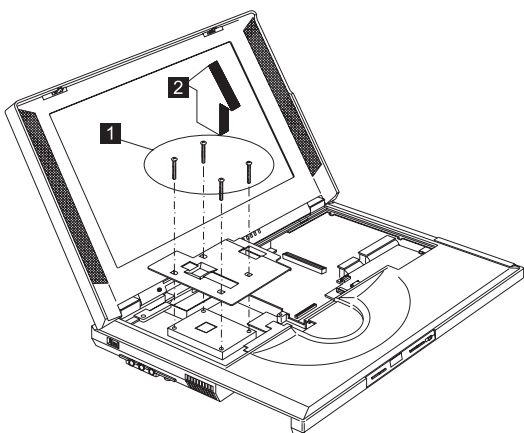
- “Battery Assembly” on page 60
- “Keyboard” on page 63
- “Hard Disk Drive and HDD Heatsink” on page 65



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|------|
| 2 | M2.5 x 6L (1) | Bind head, black | 3.2 kgf-cm | |
| Note: Make sure you use the correct screw for replacement. | | | | |

Processor Heatsink

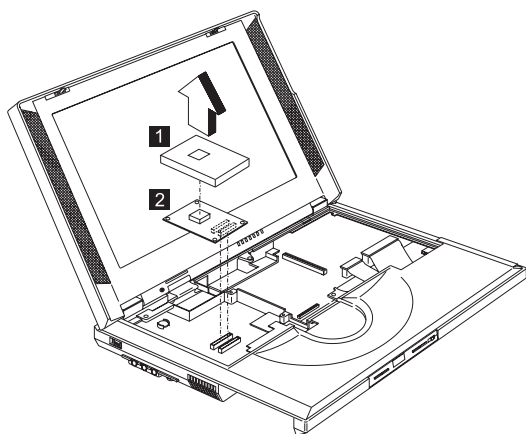
- “Battery Assembly” on page 60
- “Keyboard” on page 63



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|--------------------|------------------------|---------------|------|
| 1 | M2 x 14L (4) | Pan head, silver | 1.6 kgf-cm | |
| Note: Make sure you use the correct screw for replacement. | | | | |

Processor EMI Bracket and Processor Board

- “Battery Assembly” on page 60
- “Keyboard” on page 63
- “Processor Heatsink” on page 69



Attention: The processor board is ESD-sensitive and can be damaged easily, especially the pins around the processor chip. When replacing the processor board, press the processor board's edges. DO NOT touch the pins of the processor.

RTC Battery (Backup Battery)

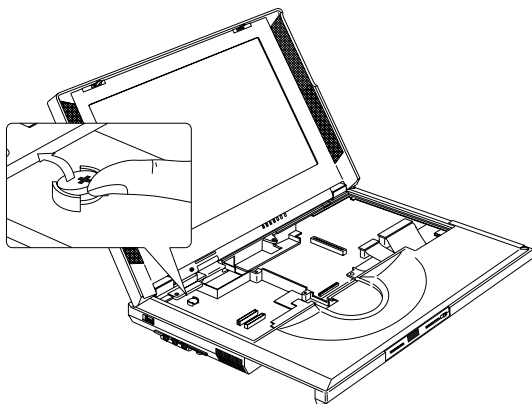
Safety Notice 4:

Translations in "Safety Notices (Multi-lingual Translations)" section:

CAUTION:

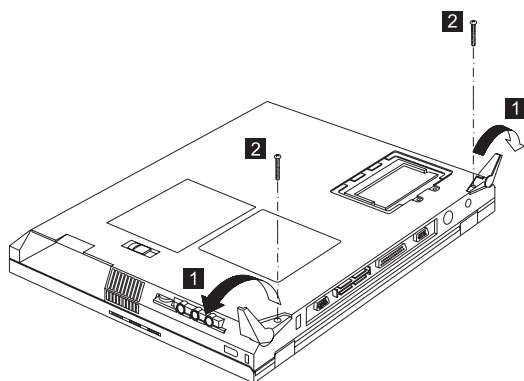
The backup battery is a lithium battery and can cause fire, explosion or severe burns. Do not recharge it, remove its polarized connector, disassemble it, heat it above 100°C (212°F), incinerate it, or expose its cell contents to water. Dispose of the battery as required by local ordinances or regulations.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

- "Battery Assembly" on page 60
- "Keyboard" on page 63
- "Processor Heatsink" on page 69



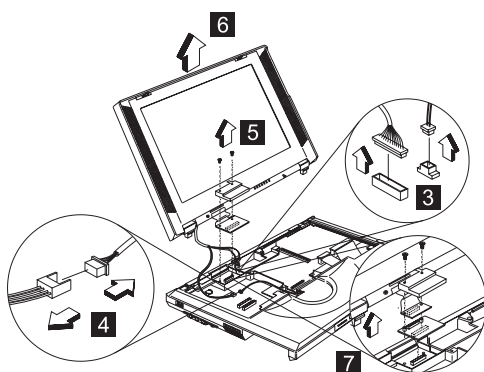
LCD Assembly

- “Battery Assembly” on page 60
- “Keyboard” on page 63
- “Processor Heatsink” on page 69



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|------|------------------|-----------------|------------|----------------|
| 2 | M2.5 x 13.5L (2) | Pan head, black | 4.5 kgf-cm | w/ nylok paste |

Note: Make sure you use the correct screw for replacement.



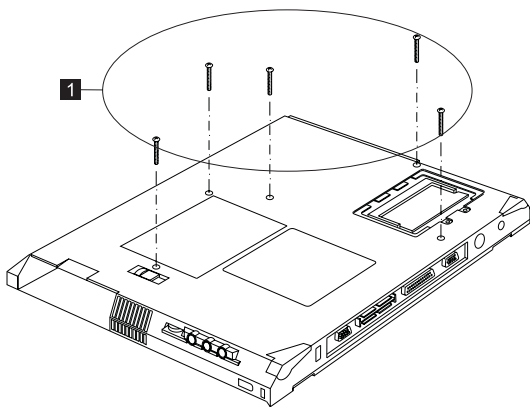
Note: For 13.3-inch LCD models, a LVDS board is additionally installed as shown at 7.

| Step | Size (Quantity) | Head & Color | Torque | Memo |
|------|-----------------|------------------|------------|------|
| 5 | M2 x 14L (2) | Pan head, silver | 1.6 kgf-cm | |

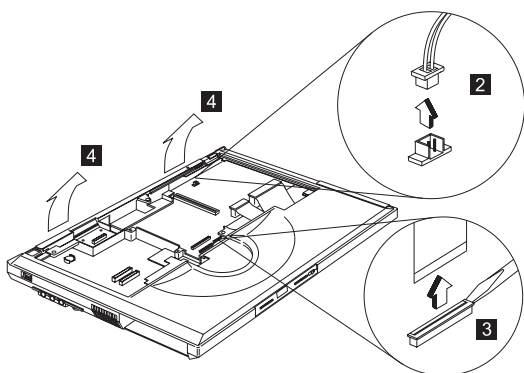
Note: Make sure you use the correct screw for replacement.

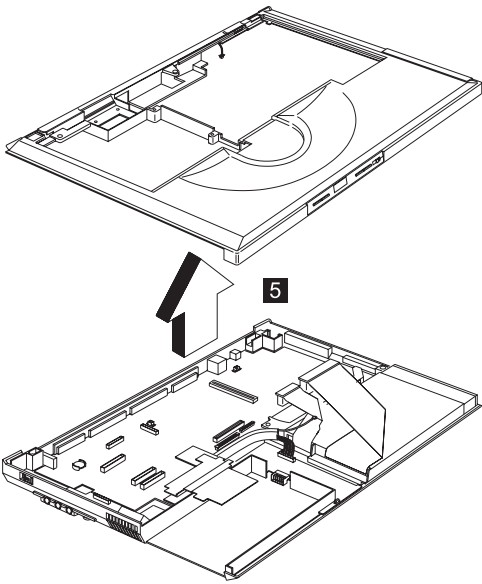
Upper Cover (Keyboard Bezel)

- “Battery Assembly” on page 60
- “Keyboard” on page 63
- “Hard Disk Drive and HDD Heatsink” on page 65
- “Processor Heatsink” on page 69
- “LCD Assembly” on page 72



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|------------------|-----------------|------------|----------------|
| 1 | M2.5 x 13.5L (5) | Pan head, black | 2.5 kgf-cm | w/ nylok paste |
| Note: Make sure you use the correct screw for replacement. | | | | |

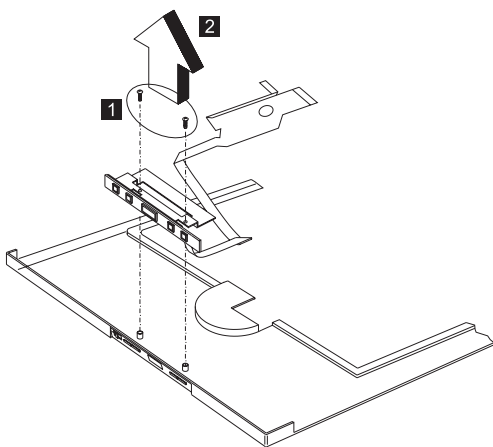




Note: The upper cover has several latches. When removing the upper cover from the base cover, gently release these latches, then raise the side of the upper cover facing the palm rest to remove it. Be careful not to break the latches.

CD Control Card

- “Battery Assembly” on page 60
- “Keyboard” on page 63
- “Hard Disk Drive and HDD Heatsink” on page 65
- “Processor Heatsink” on page 69
- “LCD Assembly” on page 72
- “Upper Cover (Keyboard Bezel)” on page 73

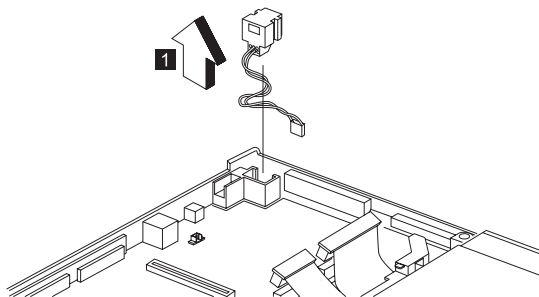


| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|--------------------|------------------------|---------------|------|
| 1 | M2 x 4L (2) | Pan head, silver | 1.6 kgf-cm | |
| Note: Make sure you use the correct screw for replacement. | | | | |

Modem Connector (RJ11 Cable Assembly)

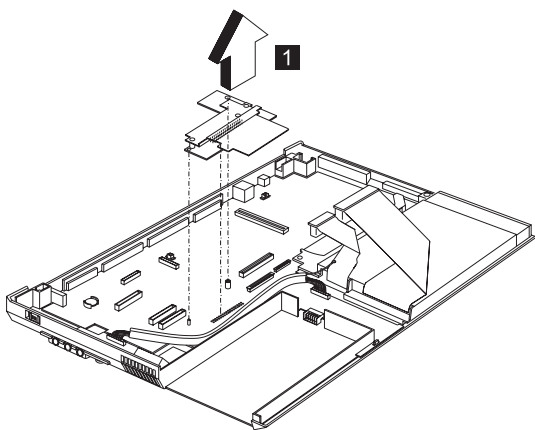
- “Battery Assembly” on page 60
- “Modem Board Cover and Modem Board” on page 62
- “Keyboard” on page 63
- “Hard Disk Drive and HDD Heatsink” on page 65
- “Processor Heatsink” on page 69
- “LCD Assembly” on page 72
- “Upper Cover (Keyboard Bezel)” on page 73

Note: Before removing the modem phone jack, make sure that the other end has been disconnected from the modem board.



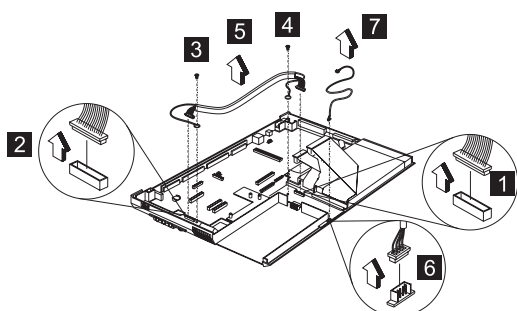
DC/DC Charger

- “Battery Assembly” on page 60
- “Keyboard” on page 63
- “Hard Disk Drive and HDD Heatsink” on page 65
- “Processor Heatsink” on page 69
- “LCD Assembly” on page 72
- “Upper Cover (Keyboard Bezel)” on page 73



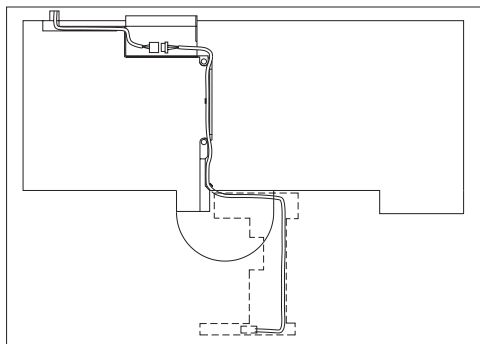
Audio Cable and Speaker Cable

- “Battery Assembly” on page 60
- “Keyboard” on page 63
- “Hard Disk Drive and HDD Heatsink” on page 65
- “Processor Heatsink” on page 69
- “LCD Assembly” on page 72
- “Upper Cover (Keyboard Bezel)” on page 73



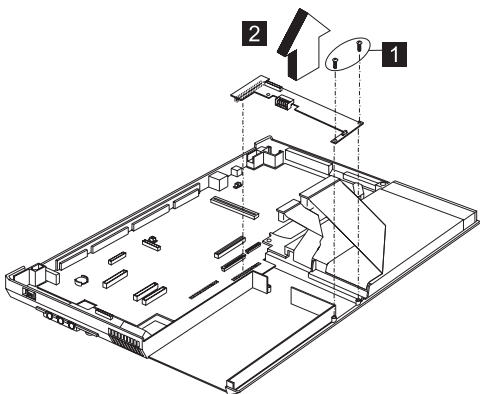
| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|----------------|
| 3 | M2.5 x 6L | Bind head, black | 1.6 kgf-cm | w/ ground ring |
| 4 | M2.5 x 6L | Bind head, black | 1.6 kgf-cm | w/ nylok paste |
| Removing the audio cable: 1→2→3→4→5 Removing the speaker cable: 6→7 Note: Make sure you use the correct screw for replacement. | | | | |

To install the speaker cable: When re-inserting the speaker cable, one end is connected to the Audio PCB underneath the palm rest. You then align the cable, following the border of the chassis and connect it to the inverter cable as shown in the diagram.



Audio PCB

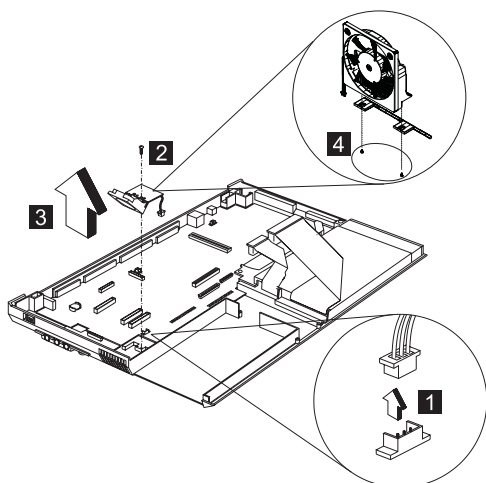
- “Battery Assembly” on page 60
- “Keyboard” on page 63
- “Hard Disk Drive and HDD Heatsink” on page 65
- “Processor Heatsink” on page 69
- “LCD Assembly” on page 72
- “Upper Cover (Keyboard Bezel)” on page 73



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|----------------|
| 1 | M2.5 x 6L (2) | Bind head, black | 3.2 kgf-cm | w/ nylok paste |
| Note: Make sure you use the correct screw for replacement. | | | | |

Fan Assembly

- “Battery Assembly” on page 60
- “Keyboard” on page 63
- “Hard Disk Drive and HDD Heatsink” on page 65
- “Processor Heatsink” on page 69
- “LCD Assembly” on page 72
- “Upper Cover (Keyboard Bezel)” on page 73

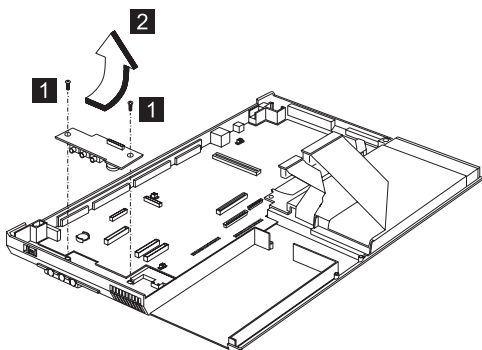


| Step | Size (Quantity) | Head & Color | Torque | Memo |
|------|-----------------|------------------|------------|----------------|
| 2 | M2.5 x 6L (2) | Bind head, black | 1.6 kgf-cm | w/ nylok paste |
| 4 | M2.5 x 3.5L (2) | Bind head, black | 1.6 kgf-cm | w/ nylok paste |

Note: Make sure you use the correct screw for replacement.

Audio Connection Board

- “Battery Assembly” on page 60
- “Keyboard” on page 63
- “Hard Disk Drive and HDD Heatsink” on page 65
- “Processor Heatsink” on page 69
- “LCD Assembly” on page 72
- “Upper Cover (Keyboard Bezel)” on page 73

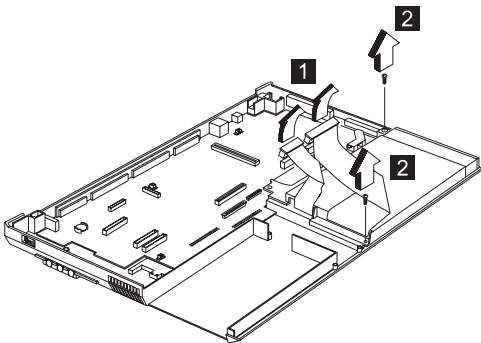


| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|--------------------|------------------------|---------------|----------------------|
| 1 | M2.5 x 6L (2) | Bind head, black | 3.2 kgf-cm | w/ nylok paste |
| Note: Make sure you use the correct screw for replacement. | | | | |

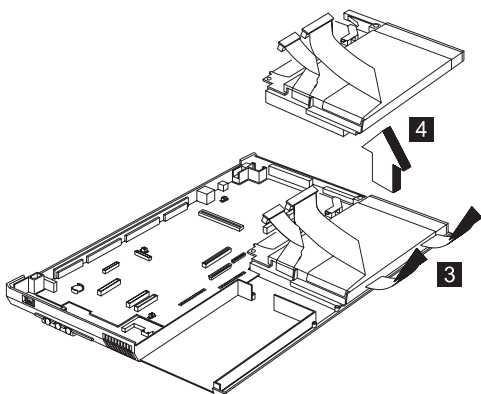
Attention: When removing the Audio Connection Board, pull it up at an angle. It cannot be removed when pulled straight up.

Diskette and CD-ROM Drives Assembly

- “Battery Assembly” on page 60
- “Keyboard” on page 63
- “Hard Disk Drive and HDD Heatsink” on page 65
- “Processor Heatsink” on page 69
- “LCD Assembly” on page 72
- “Upper Cover (Keyboard Bezel)” on page 73

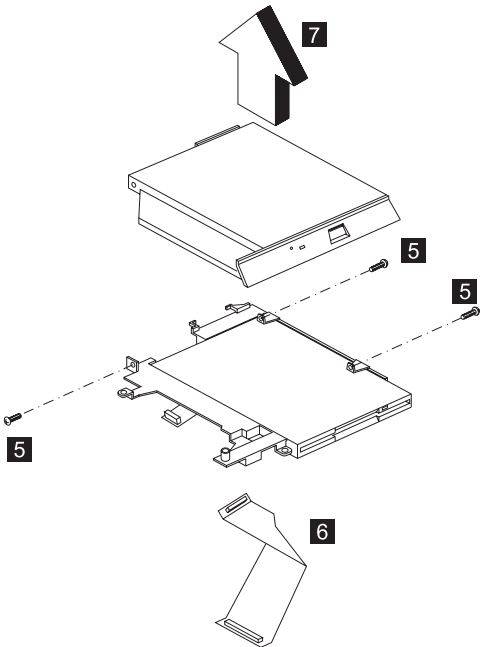


| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|----------------|
| 2 | M2.5 x 6L (2) | Bind head, black | 3.2 kgf-cm | w/ nylok paste |
| Note: Make sure you use the correct screw for replacement. | | | | |



Attention: You must pull out the CD tray before removing the Diskette and CD-ROM Drives Assembly. Use a small stick to press the CD-ROM-drive-emergency-eject hole to open the CD-tray.

CD-ROM Module



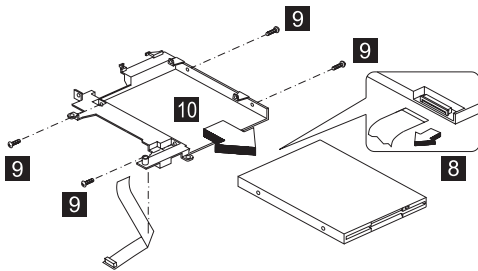
| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|------|
| 5 | M2 x 4L (3) | Pan head, silver | 1.2 kgf-cm | |
| Note: Make sure you use the correct screw for replacement. | | | | |

CAUTION:

Do not disassemble the CD-ROM; there is no user adjustments or serviceable parts inside. The use of controls, adjustments or performing procedures other than those specified may result in hazardous radiation exposure.

Do not apply any extra force to the CD-ROM drive when removing it.

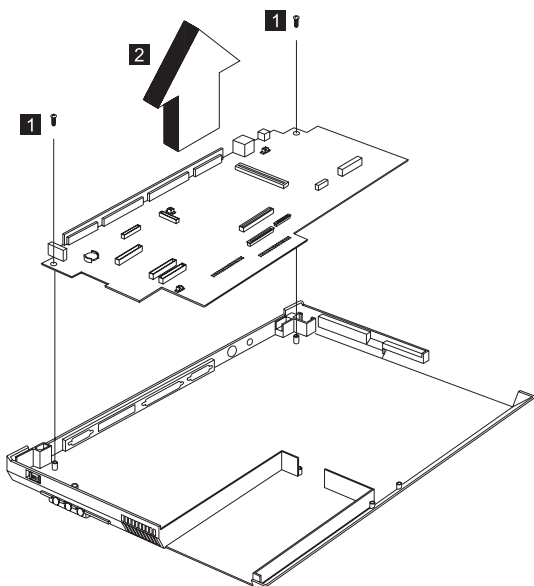
Diskette Drive with Bezel



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|----------------|
| 9 | M2.5 x 3.5L (4) | Bind head, black | 1.6 kgf-cm | w/ nylok paste |
| Note: Make sure you use the correct screw for replacement. | | | | |

System Board

- “Battery Assembly” on page 60
- “Keyboard” on page 63
- “Hard Disk Drive and HDD Heatsink” on page 65
- “Processor Heatsink” on page 69
- “LCD Assembly” on page 72
- “Upper Cover (Keyboard Bezel)” on page 73



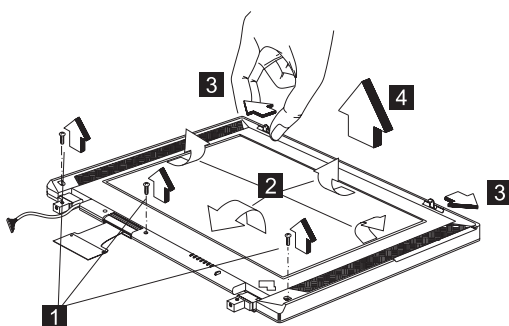
| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|----------------|
| 1 | M2.5 x 6L (2) | Bind head, black | 3.2 kgf-cm | w/ nylok paste |
| Note: Make sure you use the correct screw for replacement. | | | | |

Notes:

1. When removing the system board from the base cover, gently raise the side of the system board facing the rear I/O ports; then pull out the system board.
2. When replacing the system board, align the power switch and power actuator. Make sure that the power switch operates correctly before securing the screws.

LCD Front Cover

- “Battery Assembly” on page 60
- “Keyboard” on page 63
- “Hard Disk Drive and HDD Heatsink” on page 65
- “Processor Heatsink” on page 69
- “LCD Assembly” on page 72



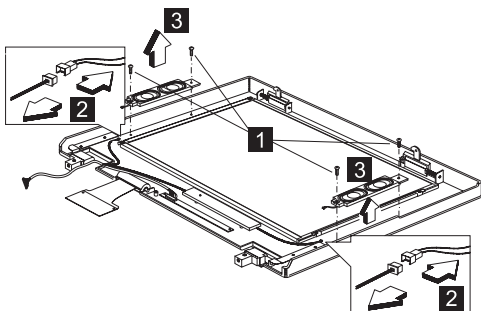
| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|--------------------|------------------------|---------------|----------------------|
| 1 | M2.5 x 6L (3) | Bind head, black | 1.6 kgf-cm | w/ nylok paste |
| Note: Make sure you use the correct screw for replacement. | | | | |

Note: When removing the LCD, take note of the following:

1. Be careful not to scratch the LCD cover when removing the screw covers.
2. The LCD front cover has several latches. Release these latches; then remove the LCD cover. Be careful not to break these latches.
3. Gently push the two hooks (3) outward to remove the LCD front cover.

Speakers

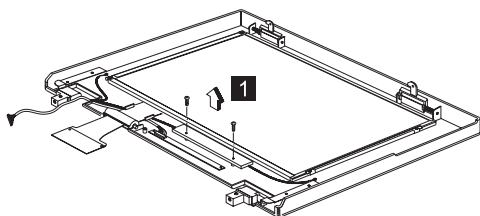
- “Battery Assembly” on page 60
- “Keyboard” on page 63
- “Hard Disk Drive and HDD Heatsink” on page 65
- “Processor Heatsink” on page 69
- “LCD Assembly” on page 72
- “Upper Cover (Keyboard Bezel)” on page 73



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

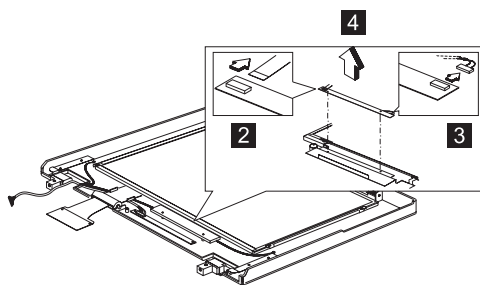
Inverter

- “Battery Assembly” on page 60
- “Keyboard” on page 63
- “Hard Disk Drive and HDD Heatsink” on page 65
- “Processor Heatsink” on page 69
- “LCD Assembly” on page 72
- “Upper Cover (Keyboard Bezel)” on page 73



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|------|-----------------|------------------|------------|------|
| 1 | M2 x 4L (2) | Pan head, silver | 2.0 kgf-cm | |

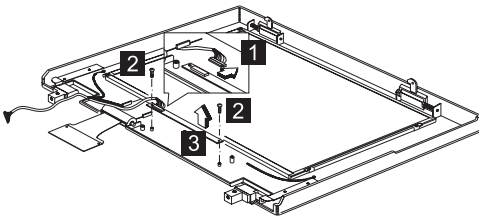
Note: Make sure you use the correct screw for replacement.



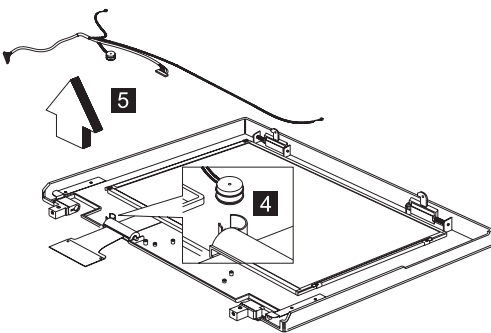
Attention: After you replace the LCD or inverter, follow the instructions in “Writing the VPD Data” on page 55.

Indicator Board and Microphone Cable Assembly

- “Battery Assembly” on page 60
- “Keyboard” on page 63
- “Hard Disk Drive and HDD Heatsink” on page 65
- “Processor Heatsink” on page 69
- “LCD Assembly” on page 72
- “Upper Cover (Keyboard Bezel)” on page 73



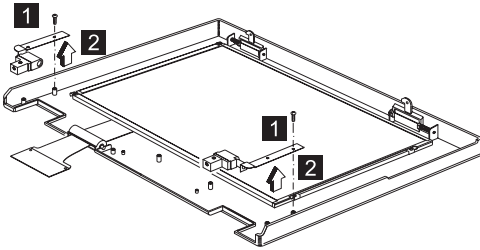
| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|------|
| 2 | M2 x 4L (2) | Pan head, silver | 2.0 kgf-cm | |
| Note: Make sure you use the correct screw for replacement. | | | | |



Note: There are tape adhesive attached to the microphone cable assembly. Do not forget to put them back when reinstalling.

Hinge

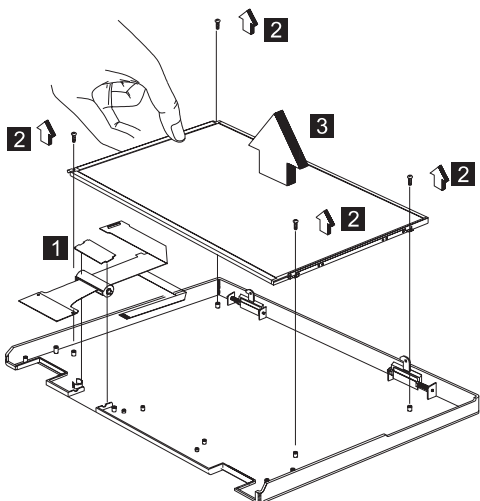
- “Battery Assembly” on page 60
- “Keyboard” on page 63
- “Hard Disk Drive and HDD Heatsink” on page 65
- “Processor Heatsink” on page 69
- “LCD Assembly” on page 72



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|----------------|
| 1 | M2.5 x 6L (2) | Bind head, black | 3.2 kgf-cm | w/ nylok paste |
| Note: Make sure you use the correct screw for replacement. | | | | |

LCD Panel and LCD Cable

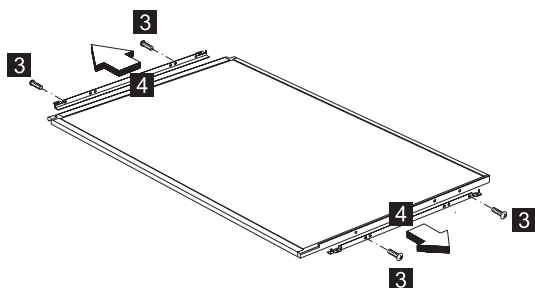
- “Battery Assembly” on page 60
- “Keyboard” on page 63
- “Hard Disk Drive and HDD Heatsink” on page 65
- “Processor Heatsink” on page 69
- “LCD Assembly” on page 72
- “Upper Cover (Keyboard Bezel)” on page 73



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

Attention: After you replace the LCD or inverter, follow the instructions in “Setting the Inverter ID” on page 54.

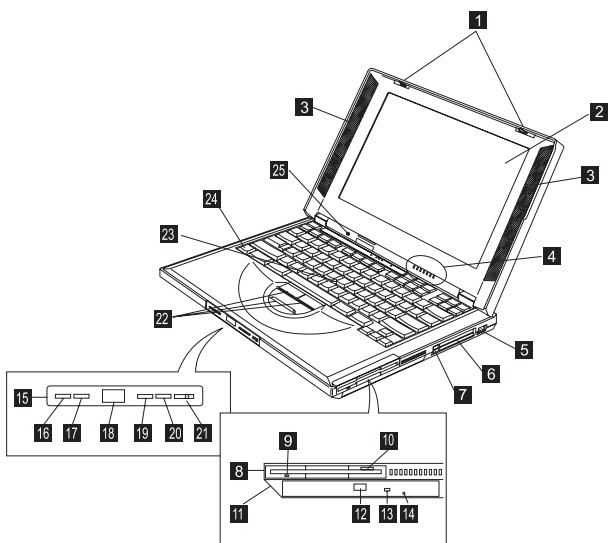
13.3-inch LCD Unit



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|----------------------------|-----------------------------|---------------|-------------|
| 1 | M3 x 3.5L (4) | Bind head, silver | 1.6 kgf-cm | |
| Note: Make sure you use the correct screw for replacement. | | | | |

Locations

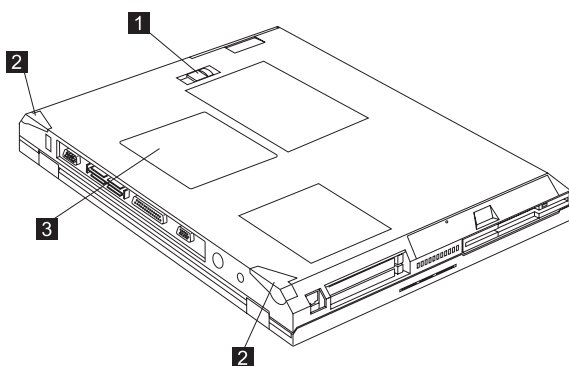
Front View



1. LCD latches
2. LCD
3. Speakers
4. Indicator panel
5. Internal modem port
6. PC Card slots
7. PC Card eject buttons
8. Diskette drive
9. Diskette-drive-activity indicator
10. Diskette eject button
11. CD-ROM drive
12. CD-ROM eject button
13. CD-ROM-drive-activity indicator
14. CD-ROM-drive-emergency-eject hole
15. CD-ROM audio control panel
16. CD-ROM previous track button
17. CD-ROM next track button
18. CD-ROM status LCD
19. CD-ROM play/pause button
20. CD-ROM stop/eject button
21. CD-ROM power switch
22. TrackPoint buttons

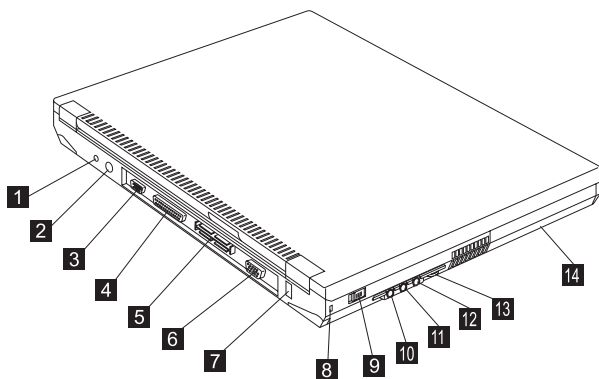
- 23. TrackPoint
- 24. Fn key
- 25. Built-in microphone

Bottom View



- 1. Battery-pack latch
- 2. Tilt feet
- 3. Memory slot door

Rear View

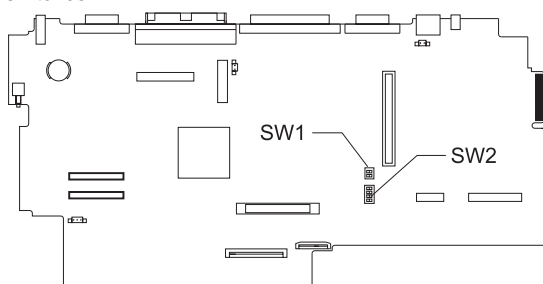


- 1. Power jack
- 2. External-input-device (PS/2) connector
- 3. Serial connector
- 4. Parallel connector
- 5. Expansion connector
- 6. External monitor connector
- 7. Universal serial bus (USB) connector
- 8. Security keyhole
- 9. Power switch
- 10. Line-out/headphone jack
- 11. Line-in jack

- 12. Microphone-in jack
- 13. Audio volume control
- 14. Battery pack

Switch Locations

There are two switches found on the system board. Refer to the figure and tables below on how to set these switches.



Note: There is no switch to set the processor voltage and speed. The processor board can sense the correct working voltage and speed itself.

Password (SW2, Switch 2) Setting

| Password | Bypass | Check |
|----------|--------|-------|
| Switch 2 | On | Off |

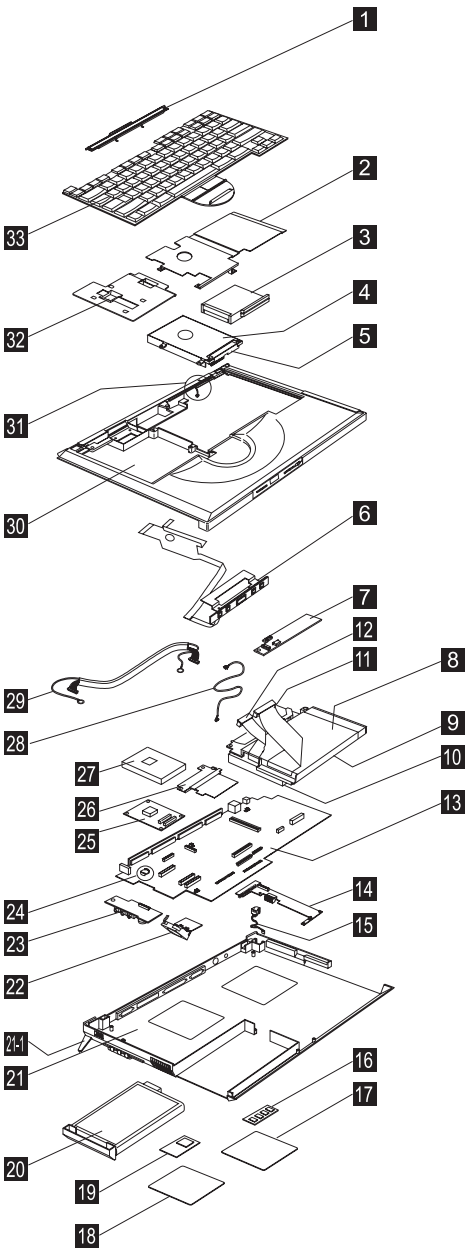
Keyboard Language (SW2, Switch 3 and 4) Setting

| Keyboard Language | Japanese | U.S. | European |
|-------------------|----------|------|----------|
| Switch 3 | On | Off | Off |
| Switch 4 | Off | Off | On |

Un-configured Switches

| Reserved | Default Settings |
|---------------|------------------|
| SW1, Switch 1 | Off |
| SW1, Switch 2 | Off |
| SW2, Switch 1 | Off |

System Unit Parts Listing

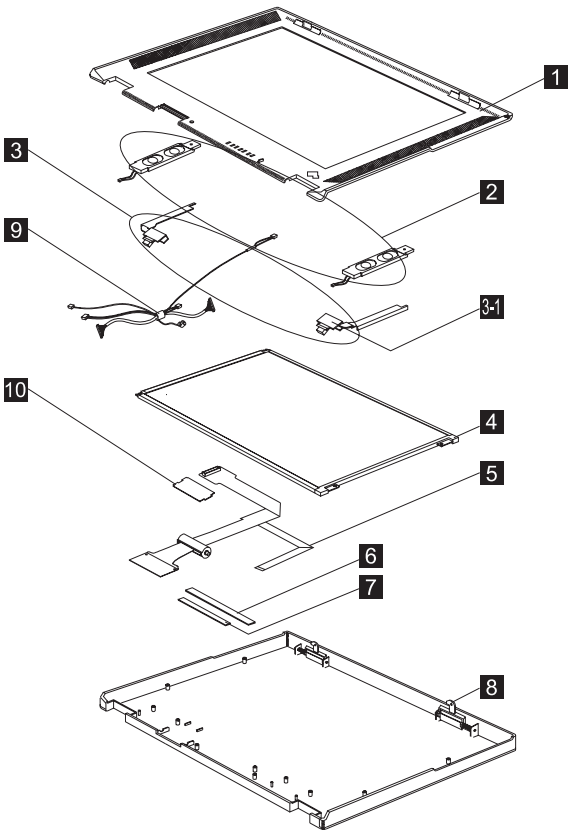


| No. | Description | FRU No. | Qty. |
|------|-----------------------------|---------|------|
| 1 | Nameplate cover | 05K5950 | 1 |
| 2 | Heatsink HDD | 05K5680 | 1 |
| 3 | PCMCIA holder | 05K5476 | 1 |
| 4 | HDD module assy 3.2 GB | 05K8974 | 1 |
| | HDD module assy 4.0 GB | 05K8975 | 1 |
| | HDD module assy 4.8 GB | 05K9115 | 1 |
| | HDD module assy 5.0 GB | 05K9107 | 1 |
| 5 | Kitting, HDD | 05K5677 | 1 |
| 6 | CD control card | 10L1170 | 1 |
| 7 | Trackpoint board | 10L1171 | 1 |
| 8 | Diskette Drive W/ bezel | 05K8957 | 1 |
| 9 | CD ROM chassis | 05K5678 | 1 |
| 10 | CD ROM module | 05K8956 | 1 |
| | CD ROM module 24X | 05K9073 | 1 |
| 11 | FPC CD ROM | 05K2806 | 1 |
| 12 | FPC Diskette Drive | 05K2799 | 1 |
| 13 | System board | 10L1175 | 1 |
| | System board | 10L1272 | 1 |
| 14 | Audio PCB | 10L1172 | 1 |
| 15 | RJ11 cable assembly | 05K2803 | 1 |
| 16 | DIMM 32MB | 10L1226 | 1 |
| | DIMM 64MB | 10L1227 | 1 |
| 17 | DIMM cover | 05K5951 | 1 |
| 18 | Modem cover | 05K5952 | 1 |
| 19 | Modem | 10L1176 | 1 |
| | Modem | 10L1274 | 1 |
| 20 | Battery assy (NiMH) | 02K6526 | 1 |
| 21 | Bottom base | 05K5684 | 1 |
| 21-1 | Leg (L,R) | 05K5953 | 1 |
| 22 | Fan assembly | 05K5683 | 1 |
| 23 | Audio connector board | 10L1173 | 1 |
| 24 | RTC battery | 11J8591 | 1 |
| 25 | Processor board 266MHz | 10L1198 | 1 |
| | Processor board 300MHz | 10L1268 | 1 |
| | Processor board AMD 300MHz | 10L1293 | 1 |
| 26 | DC/DC charger | 10L1177 | 1 |
| | DC/DC charger AMD processor | 02K6605 | 1 |
| 27 | Bracket processor EMI | 05K5685 | 1 |
| 28 | Cable assembly | 05K2798 | 1 |
| 29 | Audio cable assembly | 05K2800 | 1 |

| No. | Description | FRU No. | Qty. |
|-----|--------------------------------|---------|------|
| 30 | KBD bezel | 05K5676 | 1 |
| | KBD bezel | 10L1938 | 1 |
| 31 | Lid S/W asm | 05K5479 | 1 |
| 32 | Heatsink processor | 05K5682 | 1 |
| | Heatsink AMD processor | 10L1293 | 1 |
| 33 | Keyboard (US) | 02K4737 | 1 |
| | Keyboard (Japan) | 02K4738 | 1 |
| | Keyboard (Germany) | 02K4739 | 1 |
| | Keyboard (Traditional Chinese) | 02K4741 | 1 |
| | Keyboard (Danish) | 02K4742 | 1 |
| | Keyboard (France) | 02K4743 | 1 |
| | Keyboard (Korea) | 02K4745 | 1 |
| | Keyboard (UK) | 02K4748 | 1 |
| | Keyboard (Belgian) | 02K4750 | 1 |
| | Keyboard (Swiss) | 02K4751 | 1 |
| | Keyboard (Portuguese) | 02K4752 | 1 |
| | Keyboard (Canadian French) | 02K4744 | 1 |
| | Keyboard (Norwegian) | 02K4747 | 1 |
| | Keyboard (Swedish/Finnish) | 02K4746 | 1 |
| | Keyboard (Dutch) | 02K4740 | 1 |
| | AC Adapter 2-pin inlet | 12J0538 | 1 |
| | AC Adapter 3-pin inlet | 11J8627 | 1 |

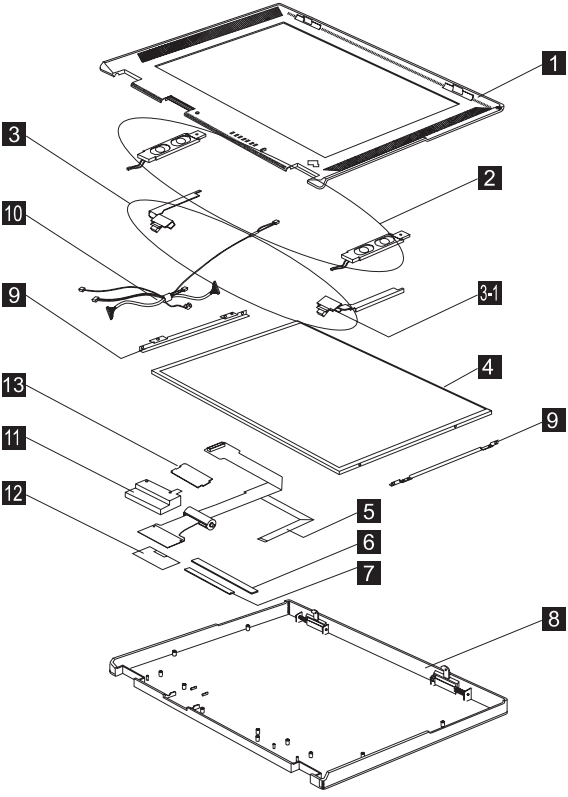
LCD Unit Parts Listing

12.1" LCD Unit Parts Listing



| No. | Description | FRU No. | Qty. |
|------------|------------------------------|----------------|-------------|
| 1 | LCD bezel asm 12.1" | 05K5674 | 1 |
| 2 | Speaker asm (R,L) | 05K2827 | 1 |
| 3 | Hinge (R,L) | 05K5669 | 1 |
| 3-1 | Hinge cover (R,L) | 05K5949 | 1 |
| 4 | 12.1" TFT LCD | 05K9383 | 1 |
| 5 | FPC 12.1" ASSY | 05K2795 | 1 |
| 6 | LCD inverter 12.1" | 10L1151 | 1 |
| 7 | LED BD | 10L1168 | 1 |
| 8 | LCD rear cover asm 12.1" TFT | 05K5672 | 1 |
| 9 | Cable Assembly | 05K2798 | 1 |
| | LG/IBM Logo kit | 05K6044 | 1 |
| 10 | LCD FPC Holder kit | 27L6477 | 1 |

13.3" LCD Unit Parts Listing



| No. | Description | FRU No. | Qty. |
|------------|------------------------------|----------------|-------------|
| 1 | LCD bezel asm 13.3" | 05K5675 | 1 |
| 2 | Speaker asm (R,L) | 05K2827 | 1 |
| 3 | Hinge (R,L) | 05K5669 | 1 |
| 3-1 | Hinge cover (R,L) | 05K5949 | 1 |
| 4 | 13.3" TFT LCD | 05K9372 | 1 |
| 5 | FPC 13.3" ASSY | 05K2797 | 1 |
| 6 | LCD inverter 13.3" | 10L1167 | 1 |
| 7 | LED BD | 10L1168 | 1 |
| 8 | LCD rear cover asm 13.3" TFT | 05K5673 | 1 |
| 9 | 13.3" TFT bracket (R,L) | 05K5670 | 1 |
| 10 | Cable Assembly | 05K2798 | 1 |
| 11 | LVDS Cover | 05K5960 | 1 |
| 12 | LVDS board | 10L1174 | 1 |
| | LG/IBM Logo kit | 05K6044 | 1 |
| 13 | LCD FPC Holder kit | 27L6477 | 1 |

Miscellaneous Parts

| Description | FRU No. | Qty. |
|--|---------|------|
| Rubber pack Rubber feet LCD screw caps | 05K5954 | |
| Mylar pack | 05K6040 | |
| Screw pack | 10L1911 | |
| Nameplate pack | 05K5955 | |
| Headset (for Japan) | 02K4941 | |
| Miscellaneous Screw cap for modem cover Modem phone jack blind cover LCD latch spring LCD latch (L, R) Battery door Battery pack latch knob CD-player power knob CD-player panel | 05K5686 | |

Service Tools

| Description | FRU No. | Qty. |
|-------------------------|---------|------|
| Diagnostic Diskette | 01K4841 | |
| CE Utility Diskette | 01K4842 | |
| Tri-Connector Wrap Plug | 72X8546 | |
| PC Test Card | 35G4703 | |
| Audio Wrap Cable | 66G5180 | |
| Screwdriver Kit | 95F3598 | |
| USB Parallel Test Cable | 05K2580 | |
| Torque Screwdriver | 05K4695 | |
| 5mm Socket Wrench | 05K4694 | |
| Screwdriver | 05K4693 | |

Others

| Description | FRU No. | Qty. |
|--|---------|------|
| AC Adapter 45W (2-pin inlet) | 12J0538 | 1 |
| AC Adapter 45W (3-pin inlet) | 12J0539 | 1 |
| Power cord (Argentina, Australia, Papua New Guinea, New Zealand, Paraguay, Uruguay) | 76H3514 | 1 |
| Power cord (Bahamas, Barbados, Bermuda, Bolivia, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Korea (South), Mexico, Netherlands, Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), U.S.A., Venezuela) | 76H3516 | 1 |
| Power cord (Austria, Belgium, Bulgaria, Czech Republic, Egypt, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sweden, Turkey, former Yugoslavia) | 76H3518 | 1 |
| Power cord (Denmark) | 76H3520 | 1 |
| Power cord (Bangladesh, Pakistan, South Africa, Sri Lanka) | 76H3522 | 1 |
| Power cord (Thailand) | 76H4866 | 1 |
| Power cord (Abu Dhabi, Albania, Antigua, Bahrain, Brunei, Dubai, Fiji, Hong Kong, India, Ireland, Kenya, Kuwait, Macao, Malaysia, Nigeria, Oman, People's Republic of China, Qatar, Singapore, United Kingdom) | 76H3524 | 1 |
| Power cord (Switzerland) | 76H3528 | 1 |
| Power cord (Israel) | 76H3532 | 1 |
| Power cord (Chile, Italy) | 76H3530 | 1 |
| Port replicator | 05K5594 | 1 |
| Psion sage OBI PCMCIA modem (Germany) | 02K4211 | 1 |
| Psion sage OBI PCMCIA modem (France) | 02K4213 | 1 |
| Psion sage OBI PCMCIA modem (UK) | 02K4210 | 1 |
| Psion sage OBI PCMCIA modem (Australia) | 10L7370 | 1 |
| Psion sage OBI PCMCIA modem (New Zealand) | 10L7376 | 1 |
| PCMCIA to RJ-11 Cable | 02K4228 | 1 |

ThinkPad i Series 1400 Hardware Maintenance Manual (Part II)

Part II of this Hardware Maintenance Manual covers the following ThinkPad i Series 1400 computer models:

- 2611-40A
- 2611-40C
- 2611-40F
- 2611-40H
- 2611-40K
- 2611-40M
- 2611-40T
- 2611-412
- 2611-43A
- 2611-43C
- 2611-43H
- 2611-43K
- 2611-43M
- 2611-43T
- 2611-452
- 2611-456
- 2611-472
- 2611-476
- 2611-47F
- 2611-49A
- 2611-49C
- 2611-49F
- 2611-49H
- 2611-49K
- 2611-49M
- 2611-49T

Read This First

Before you go to the check procedures, be sure to read this section.

Important Notes

- Only certified trained personnel should service the computer.
- Read the FRU service procedures before replacing any FRUs.
- Be extremely careful during write operations such as copying, saving, or formatting. Drives in the computer that you are servicing might have been rearranged or the drive startup sequence might have been altered. If you select an incorrect drive, data or programs could be overwritten.
- Ensure that you replace FRUs with the appropriate model. When you replace the FRU, make sure that the model of the machine and FRU part number are correct by referring to the part list.
- FRUs 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.

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 the other false error codes being displayed.

How to Diagnose Multiple FRUs

If the adapter or device has more than one FRU, the error code could be caused by either FRU. Before replacing multiple FRUs, try removing or exchanging each FRU one by one in the designated sequence, to see if the symptoms change.

What to Do First

The 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 or not the damage applies to the warranty by referring to the following:

Note for Warranty: During the warranty period, the customer may be responsible for repair costs if the computer damage was caused by misuse, accident, modification, unsuitable physical or operating environment, or improper maintenance by the customer. The following list provides some common items that are not covered under warranty and some symptoms that may indicate 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 PCMCIA card or installation of an incompatible card.
- 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 drive damage caused by excessive force, shock, or by being dropped.
- Fuses blown by attaching a nonsupported device.
- Forgotten computer password (making computer unusable).

If the following symptoms are present, they may indicate damage caused by by non-warranted activity:

- 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.

Screw Notices

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

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

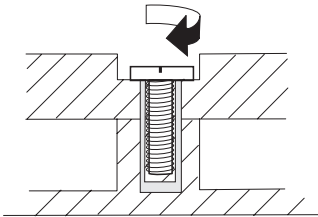
Do the following when you service this machine:

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

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

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

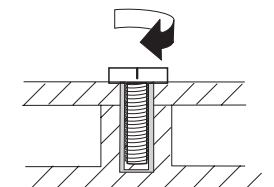
90 degrees more



(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.**

Power-On and Setup Password

To clear a password from the system, first identify the system password switch by referring to "Switch Locations" on page 180, then follow these steps:

1. Turn off the computer.
2. Unplug the AC Adapter and remove the battery.
3. Remove the keyboard by referring to "Keyboard" on page 145, and the thermal plate by referring to "Processor Thermal Plate" on page 147.
4. Move the password switch (SW3, switch 4) from OFF to ON to bypass the password.

Note: SW2 has four switches. Its switch 4 is the password bypass/check switch. Turning the switch to the ON position is "bypass password"; the OFF position is "check password". Refer to "Switch Locations" on page 180.

5. Plug in the AC adapter and turn on the system.
6. While the ThinkPad logo is being displayed, wait for a beep before pressing **F1** to enter the BIOS Utility.
7. Select "System Security" from the BIOS Utility main menu and press **Enter**.
8. Set the "Power-On Password" setting to "None" to clear the password.
9. Save and exit the BIOS Utility.
10. Turn off the system and unplug the AC Adapter.
11. Move the password switch from ON to OFF to enable the password function.
12. Reinstall the thermal plate and keyboard.
13. Reinstall the battery pack and plug in the AC Adapter.

To use the password function again, enter the BIOS Utility and set a password.

Check Procedures

Use the following procedure as a guide for computer problems.

Notes:

1. 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.
2. Some test items require tools as shown below:
 - Audio wrap cable (P/N: 65G5180)
 - Erasable 2HD diskette
 - Parallel: Wrap plug (P/N: 72X8546)
 - Parallel: Test cable (P/N: 05K2580)
 - Serial: Wrap plug (P/N: 72X8546)
 - PCMCIA: PC test card (P/N: 35G4703)
 - CD-ROM/DVD-ROM: Any data and audio CDs
 - Screwdriver kit (P/N: 95F3598)
 - Screwdriver kit (P/N: 05K4693)
 - Torque screwdriver (P/N: 05K4695)
 - 5mm socket wrench (P/N: 05K4694)
 - ThinkPad i Series 1400 Diagnostics Diskette (3 diskette pack, P/N: 09N1020)
 - ThinkPad i Series 1400 Maintenance Diskette (P/N: 09N1025)
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.
3. Use the following table with the verified symptom to determine which page to go to. Search the symptoms column and find the description that best matches your symptom; then go to the page shown in the "Go to" column.

| Symptoms (Verified) | Go to |
|---|--|
| Power failure. (The power-on indicator does not go on or stay on.) | "Power Systems Check" on page 111, then use table in "Power-Related Symptoms" on page 128. |
| POST does not complete. No beeps or error codes/messages are indicated. | "Symptom-to-FRU Index" on page 122, then use table in "No Beep Symptoms" on page 124. |
| POST detected an error and displayed numeric error code with error message. | "Symptom-to-FRU Index" on page 122. |

| Symptoms (Verified) | Go to |
|---------------------|--|
| Other symptoms | Appropriate check instructions in this section, then use appropriate tables in "Symptom-to-FRU Index" on page 122. |

Power Systems Check

To verify the symptom of the problem, power on the computer using each of the power sources as follows:

1. Remove the battery pack, diskette drive, and hard disk drive.
2. Connect the AC Adapter and check that power is supplied.
3. Install the diskette drive or hard disk drive one at a time, and check that power is supplied from each power source.

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

- "Checking the AC Adapter"
- "Checking the Operational Charging" on page 112
- "Checking the Battery Pack" on page 112

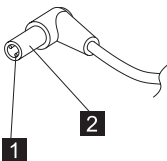
Checking the AC Adapter: If the computer fails only when the AC Adapter is used or if the power-on indicator of the AC Adapter does not turn on, make sure of the following:

- Power cord is not damaged.
- Power cord is securely connected to the AC Adapter and AC power outlet.

If the above confirmation does not solve the problem, replace the AC Adapter.

If the power-on indicator of the AC Adapter is on, then proceed to the next step.

1. Unplug the AC Adapter cable from the computer and measure the output voltage at the plug of the AC Adapter cable.



| Pin | Voltage (V dc) |
|-----|----------------|
| 1 | 19.0 20.5 |
| 2 | Ground |

- If the measured voltage is correct, replace the system board.
 - If the problems still persist, go to “Undetermined Problems” on page 131.
 - If the voltage is not correct, go to the next step.
2. Unplug the AC Adapter cable from the AC power outlet and wait for five minutes or longer to allow the over-voltage protection circuit of the AC Adapter to be fully discharged and initialized.
 3. Plug the AC Adapter cable into the AC power outlet.
 4. Measure the output voltage of the AC Adapter.
 5. If the voltage is still not correct, replace the AC Adapter.

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

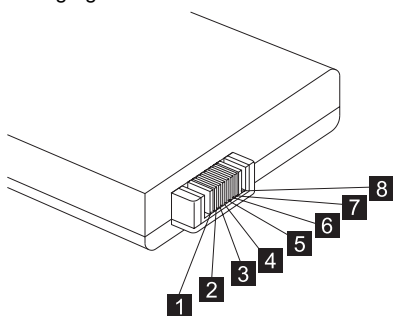
Checking the Operational Charging: To check operational charging, use a discharged battery pack or a battery pack that has less than 50% of the total power remaining when installed in the computer.

Perform operational charging:

1. If the battery indicator does not turn on, remove the battery pack and leave it to return to room temperature.
2. Reinstall the battery pack. If the charge indicator still does not turn on, replace the battery pack.

Checking the Battery Pack: To check the battery pack, do the following:

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



| Terminal | Signal / Voltage (V dc) |
|----------|-------------------------|
| 1 | Sense |
| 2 | Power (> 8 V dc) |

| Terminal | Signal / Voltage (V dc) |
|----------|-------------------------|
| 3 | Reserved |
| 4 | Reserved |
| 5 | Thermal |
| 6 | Sense |
| 7 | Ground |

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

3. If the voltage is less than +8 V dc, recharge the battery pack.

If the voltage is still less than +8 V dc after recharging, replace the battery.

System Board Check

The system board performs processing functions. Thus, the system board can cause processor problems. To verify the problem, do the following:

1. Boot from the diagnostics diskette and start the PC Doctor program (please refer to "Running the PC Doctor Diagnostics Program" on page 135).
2. Run the **System Board** test to verify the symptom. This test verifies both the system board.

If the tests detect a system board problem, replace the system board.

Note: Don't touch the keyboard and pointing device when the system board (system board) test is running. This may cause an unexpected error.

Memory Check

DIMM are available for increasing memory capacity.

| DIMM | DIMM | Total Memory |
|-------|-------|--------------|
| 32MB | 0MB | 32MB |
| 0MB | 32MB | 32MB |
| 32MB | 32MB | 64MB |
| 64MB | 0MB | 64MB |
| 0MB | 64MB | 64MB |
| 64MB | 32MB | 96MB |
| 32MB | 64MB | 96MB |
| 64MB | 64MB | 128MB |
| 128MB | 0MB | 128MB |
| 0MB | 128MB | 128MB |
| 128MB | 32MB | 160MB |
| 32MB | 128MB | 160MB |

| DIMM | DIMM | Total Memory |
|-------|-------|--------------|
| 128MB | 64MB | 192MB |
| 64MB | 128MB | 192MB |
| 128MB | 128MB | 256MB |

CAUTION:

This system cannot work without DIMM memory.

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

Use the following procedure to isolate memory problems:

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

1. Power off the computer and replace the DIMM.
2. Boot from the diagnostics diskette and start the PC Doctor program (please refer to “Running the PC Doctor Diagnostics Program” on page 135).
3. Run the **Memory** item to run the memory test.

If no error appears, install a new DIMM; if an error appears, replace the system board.

Keyboard and External Input Device Check

Note: If an external keyboard is attached, remove it if the internal keyboard has to be tested.

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

If the tests do not detect a keyboard problem, run the keyboard test by doing the following:

1. Boot from the diagnostics diskette and start the PC Doctor program (please refer to “Running the PC Doctor Diagnostics Program” on page 135).
2. Select **Interactive Tests**.
3. Select **Keyboard**.
4. Follow the instructions in the message window.

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

- Ensure the keyboard type switch is correctly set. See “Switch Locations” on page 180.
- Reconnect the keyboard flexible cables.
- Replace the TrackPoint board.
- Replace the keyboard.

- Replace the System board.

The following external input devices are supported for this computer:

- Numeric keypad
- Mouse (PS/2 compatible)
- Keyboard

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

If the problem still exists, replace the device, and then the system board.

Audio Function Check

Do as follows:

1. Boot from the diagnostics diskette and start the PC Doctor program (please refer to “Running the PC Doctor Diagnostics Program” on page 135).
2. Select **Interactive Tests**.
3. Select **Internal Speaker**.
If no sound is played, replace the speaker or the system board.
4. Select **Stereo Speaker**.
If no music is played, replace the speaker or the system board.

TrackPoint IV Check

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

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

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

1. Boot from the diagnostics diskette and start the PC Doctor program (please refer to “Running the PC Doctor Diagnostics Program” on page 135).
2. Select **Interactive Tests**.
3. Select **Mouse**.
4. Follow the instructions in the message window.

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

1. Reconnect the keyboard flexible cables and the TrackPoint flexible cable.
2. Replace the TrackPoint board.
3. Replace the keyboard.
4. Replace the system board.

Diskette Drive Check

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

CAUTION:

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

Do the following to select the test device:

1. Boot from the diagnostics diskette and start the PC Doctor program (please refer to "Running the PC Doctor Diagnostics Program" on page 135).
2. Select **Diagnostics**.
3. Select **Diskette Drives**.
4. Follow the instructions in the message window.

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

If the error still remains:

1. Reconnect the diskette drive cable.
2. Replace the diskette drive cable.
3. Replace the diskette drive.
4. Replace the system board.

CD-ROM/DVD-ROM Drive Check

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

Do the following to select the test device:

1. Boot from the diagnostics diskette and start the PC Doctor program (please refer to "Running the PC Doctor Diagnostics Program" on page 135).
2. Select **Interactive Tests**.
3. Select **CD-ROM/DVD Test**.
4. Follow the instructions in the message window.

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

If the error still remains:

1. Reconnect the CD-ROM/DVD-ROM drive cable.
2. Replace the CD-ROM/DVD-ROM drive cable.
3. Replace the CD-ROM/DVD-ROM drive.
4. Replace the system board.

Modem Board Check

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

1. Boot from the diagnostics diskette and start the PC Doctor program (please refer to “Running the PC Doctor Diagnostics Program” on page 135).
2. Select **Diagnostics**.
3. Select **Other Devices**.
4. Select **Modem Loopback Test** and **Modem Dialtone/DTMF Test**.
5. Follow the instructions in the message window.

If an error occurs with the internal modem, do the following:

1. Change another telephone line and test again.
2. Re-plug the telephone connector.
3. Reconnect the modem board.
4. Replace the modem connector.
5. Replace the system board.

BIOS Utility

Your computer has a BIOS Utility that allows you to configure the computer and its hardware settings.

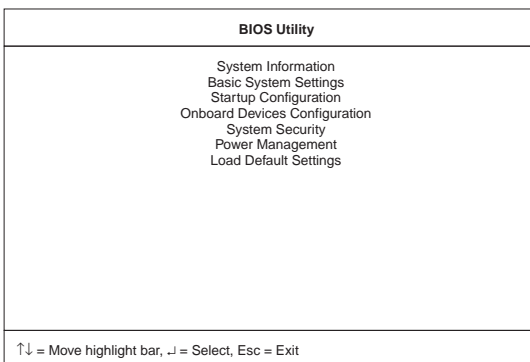
Note: The computer is also bundled with a Windows-based computer management utility similar in function with the BIOS Utility called the Notebook manager.

The computer is already correctly configured for you. If you make any changes to the computer or you receive an Equipment Configuration Error message (error code 246) after you turn on the computer, you need to run the BIOS Utility.

The BIOS Utility has the following functions:

- Change the system date or time
- Set the power-saving modes and timers
- Set, change, or remove a system password
- Change the system boot drive or display device
- Add or remove serial and parallel devices
- Set the video display features

While the ThinkPad logo is being displayed, wait for a beep before pressing **F1** to enter the BIOS Utility. The main screen displays (as shown below).



Note: If the Setup password is set, you need to enter the Setup password to gain access to the BIOS Utility.

There are seven main menu items:

- System Information
- Basic System Settings
- Startup Configuration
- Onboard Devices Configuration
- System Security
- Power Management
- Load Setup Default Settings

Navigating the BIOS Utility

Keep in mind the following when using the BIOS Utility:

- From the main menu screen, press the **up or down arrow keys** to move from one menu item to another; then press **Enter** to enter the selected menu.
- Parameters displayed in low brightness (grayed out) are not user-configurable. The computer detects and sets the values for these parameters.
- Press the **up or down arrow keys** to move from one parameter to another. Press the **left or right arrow keys** to change parameter settings. You have to change some settings when you add a component to the computer.
- Most of the parameters are self-explanatory.
- To exit a main menu item, press **Esc**.
- When you press **Esc** to exit the BIOS Utility from the main menu screen, the following prompt appears:

Do you want to save CMOS data?

[Yes] [NO]

Select **Yes** to save the changes you made to the configuration values or **No** to abandon the changes and retain the current values.

Power Management Features

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

Screen Blanking Mode

When in screen blanking mode, the following occurs:

- The LCD backlight turns off.

Events that cause the computer to enter screen blanking mode:

- Screen blanking requested by the Fn key (Fn+F3).

Standby Mode

When in standby mode, the following occurs:

- The LCD backlight turns off.
- The hard disk motor stops.
- Processor stops the clock.

Events that cause the computer to enter standby mode:

Note: The standby mode indicator turns on when system is in standby mode.

- Standby requested by the Fn key (Fn+F4).
- The LCD is closed (if the "Will not Enter Standby Even if the Lid is Closed" parameter in the Power Management menu of the BIOS Utility is set to "Enabled").
- The system (keyboard, mouse, hard disk drive, parallel connector, or diskette drive, etc.) is idle for a certain period of time.
- The battery power is critically-low. The "Sleep upon Battery-low" in the Power Management menu of the BIOS Utility is set to "Enabled". Sleep Manager is not installed and the hibernation file is not present or invalid.

Note: Before entering standby mode, if "Battery-low Warning Beep" in the Power Management menu of the BIOS Utility is set to "Enabled", four short beeps will be issued every minute for three minutes. If a powered AC Adapter is not attached, then the beeps will be continuously issued every minute until the system shuts down.

Events that cause the computer to exit standby mode:

- The LCD is opened (if the system entered standby mode from closing the lid).
- A serial or PCMCIA device signals the modem ring indicator (RI).
- Any key or pointing device operation.

Note: If the computer enters standby mode and the computer is using a communication or I/O PC Card, the PC Card and application program remain active.

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:

- Function combination key (Fn+F12) is pressed.
- The battery power is at a critically-low level.

Note: Before entering standby mode, if "Battery-low Warning Beep" in the Power Management menu of the BIOS Utility is set to "Enabled", four short beeps will be issued every minute for three minutes.

- The system (keyboard, mouse, hard disk drive, parallel connector, or diskette drive, etc.) is idle for a certain period of time.

Note: The computer cannot enter hibernation mode when the computer is using a communication or I/O PC Card.

Events that cause the computer to exit hibernation mode:

- The power-on switch is operated.

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.

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 131.

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 | FRU/Action in Sequence |
|------------|--|--|
| POST | | |
| 010 | Memory Error at MMMM: SSSS: OOOOh (R:xxxxh, W:xxxxh) | <ul style="list-style-type: none">Go to "Memory Check" on page 113.DIMMSystem board |
| 040 | Diskette Drive Controller Error | <ul style="list-style-type: none">Go to "Diskette Drive Check" on page 116.Ensure the diskette drive configuration setting in BIOS Utility is correct.Diskette drive cableDiskette driveSystem board |
| 047 | Diskette Drive(s) Disabled | <ul style="list-style-type: none">Ensure the diskette drive is not set to "Disabled" in the "System Security" menu of the BIOS Utility.Diskette drive cableDiskette drive |

| Error Code | Message | FRU/Action in Sequence |
|-----------------------------------|--|---|
| 050 | IDE Drive 0 Error | <ul style="list-style-type: none"> • Hard disk connection board • Hard disk drive • System board |
| 054 | IDE Drive(s) Disabled | <ul style="list-style-type: none"> • Hard disk drive cable • Hard disk drive |
| 056 | IDE Drive 0 Auto Detection Failed | <ul style="list-style-type: none"> • Hard disk connection board • Hard disk drive • System board |
| 070 | Real Time Clock Error | <ul style="list-style-type: none"> • Reset time in the "Basic System Settings" menu of the BIOS Utility. • Backup battery (RTC battery) • System board |
| 071 | CMOS Battery Bad | <ul style="list-style-type: none"> • Enter BIOS Utility and execute "Load Setup Default Settings". • Backup battery (RTC battery) • System board |
| 072 | CMOS Checksum Error | <ul style="list-style-type: none"> • Enter BIOS Utility and execute "Load Setup Default Settings"; then reboot the system. • Backup battery (RTC battery) • System board |
| 006 | Equipment Configuration Error | <ul style="list-style-type: none"> • Ensure the equipment (diskette drive, hard disk drive, keyboard, external mouse, etc.) is connected properly and is correctly set in the BIOS Utility. • Hard disk connection board • Hard disk drive • System board |
| System Operation (Runtime) | | |
| 103 | Press <Esc> to turn off NMI or other key to reboot | <ul style="list-style-type: none"> • Enter BIOS Utility and execute "Load Setup Default Settings"; then reboot the system. • Remove the non-factory-installed adapter card and reboot the system. |

Beep Symptoms

| Symptom/Error | FRU/Action in Sequence |
|--|--|
| Five short beeps, power-on indicator turns on then off and LCD is blank. | <ul style="list-style-type: none"> • Ensure that "System Boot Drive" in the "System Security" menu of the BIOS Utility is not set to Drive A'. • Battery |
| Four short beeps every minute and system doesn't enter hibernation mode. | <ul style="list-style-type: none"> • Go to "Hibernation Mode" on page 121. • Hard disk connection board • Hard disk drive • System board |

No Beep Symptoms

| Symptom/Error | FRU/Action in Sequence |
|---|--|
| Insert system diskette and press <Enter> key to reboot. | <ul style="list-style-type: none"> • Ensure that "System Boot Drive" in the "System Security" menu of the BIOS Utility is not set to "Drive A". • Ensure the diskette drive configuration in the "Basic System Settings" menu of the BIOS Utility is not set correctly. • Diskette drive cable • Diskette drive • Hard disk connection board • Hard disk drive • System board |
| No beep, power-on indicator turns off and LCD is blank. | <ul style="list-style-type: none"> • Power source (battery and adapter). See "Power Systems Check" on page 111. • Ensure every connector is connected tightly and correctly. • DC/DC charger • Battery pack • AC Adapter • System board |
| No beep, power-on indicator turns on and LCD is blank. | <ul style="list-style-type: none"> • Power source (battery and adapter). See "Power Systems Check" on page 111. • Reconnect the LCD connector • DC/DC charger • Processor board • Reconnect the DIMM. • System board |

| Symptom/Error | FRU/Action in Sequence |
|---|--|
| No beep, power-on indicator turns on and LCD is blank. But you can see POST on an external CRT. | <ul style="list-style-type: none"> • Reconnect the LCD connectors. • LCD inverter ID • LCD LVDS board (for 14.1-inch LCD) • LCD FPC cable • LCD inverter • LCD • System board |
| No beep, power-on indicator turns on and a blinking cursor shown on LCD during POST. | <ul style="list-style-type: none"> • Ensure every connector is connected tightly and correctly. • System board |
| No beep during POST but system runs correctly. | <ul style="list-style-type: none"> • Adjust the audio volume control. • Speaker connector • System board <p>Note: The buzzer is on the system board.</p> |

Keyboard/TrackPoint-Related Symptoms

| Symptom/Error | FRU/Action in Sequence |
|---|--|
| Keyboard (one or more keys) doesn't work. | <ul style="list-style-type: none"> • Go to "Keyboard and External Input Device Check" on page 114. • Reconnect keyboard cables. • Keyboard • System board |
| TrackPoint does not work. | <ul style="list-style-type: none"> • Go to "TrackPoint IV Check" on page 115. • Reconnect keyboard cables. • TrackPoint board • Keyboard • System board |

LCD-Related Symptoms

LCD FRU Replacement Notice

The TFT LCD for the notebook computer contains over 2,359,296 thin-film transistors (TFTs). A small number of missing, discolored, or lighted dots (on all the time) is characteristic of TFT LCD technology, but excessive pixel problems can cause viewing concerns. The LCD should be replaced if the number of missing, discolored, or lighted dots in any background is:

- SVGA (12.1"): 5 or more bright dots, 5 or more dark dots, or a total of 9 or more bright and dark dots
- XGA (14.1"): 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 |
|---|---|
| <p>No beep, power-on indicator turns on and LCD is blank.</p> | <ul style="list-style-type: none"> • Power source (battery and adapter). See "Power Systems Check" on page 111. • Reconnect the LCD connector • DC/DC charger • Hard disk drive • LCD inverter ID • LCD LVDS board (for 14.1-inch LCD) • LCD FPC cable • Inverter • LCD • System board |
| <p>LCD backlight doesn't work. LCD is too dark. LCD brightness cannot be adjusted. LCD contrast cannot be adjusted.</p> | <ul style="list-style-type: none"> • Enter BIOS Utility and execute "Load Setup Default Settings"; then reboot the system. • Reconnect the LCD connectors • Keyboard (if contrast and brightness function keys do not work) • LCD inverter ID • LCD LVDS board (for 14.1-inch LCD) • LCD FPC cable • LCD inverter • LCD • System board |

| Symptom/Error | FRU/Action in Sequence |
|--|---|
| Unreadable LCD screen. Missing pels in characters. Abnormal screen Wrong color displayed. | <ul style="list-style-type: none"> • Reconnect all LCD connectors • LCD inverter ID • LCD FPC cable • LCD inverter • LCD • System board |
| LCD has extra horizontal or vertical lines displayed. | <ul style="list-style-type: none"> • LCD • LCD FPC cable • LCD inverter ID • Inverter • System board |

Indicator-Related Symptoms

| Symptom/Error | FRU/Action in Sequence |
|---|--|
| Indicator incorrectly remains off or on, but system runs correctly. | <ul style="list-style-type: none">• Reconnect the indicator board connector.• Indicator board |

Power-Related Symptoms

| Symptom/Error | FRU/Action in Sequence |
|------------------------------------|--|
| Power shuts down during operation. | <ul style="list-style-type: none">• Go to "Power Systems Check" on page 111.• AC Adapter• Battery pack• Audio PCB• DC/DC charger• System board |
| The system doesn't power on. | <ul style="list-style-type: none">• Go to "Power Systems Check" on page 111.• AC Adapter• DC/DC charger• System board |
| The system doesn't power off. | <ul style="list-style-type: none">• Go to "Power Systems Check" on page 111.• Hold and press the power switch for more than 4 seconds.• DC/DC charger• System board |
| Battery can't be charged. | <ul style="list-style-type: none">• Go to "Power Systems Check" on page 111.• Battery pack• DC/DC charger• System board |

Memory-Related Symptoms

| Symptom/Error | FRU/Action in Sequence |
|---|---|
| Memory count (size) appears different from the actual size. | <ul style="list-style-type: none">• Go to "Memory Check" on page 113.• 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. | <ul style="list-style-type: none"> • Speaker volume control • Go to "Audio Function Check" on page 115. |
| External speakers make noise or emit no sound. | <ul style="list-style-type: none"> • Speaker volume control • Go to "Audio Function Check" on page 115. |
| In DOS or Windows, multimedia programs, no sound comes from the computer. (Only system beeps are heard at power on.) | <ul style="list-style-type: none"> • Speaker volume control • Go to "Audio Function Check" on page 115. |

PC Card (PCMCIA)-Related Symptoms

| Symptom/Error | FRU/Action in Sequence |
|---|---|
| System cannot detect the PC Card (PCMCIA) | <ul style="list-style-type: none"> • PC Card (PCMCIA) slots assembly • System board |
| PCMCIA slot pin is damaged. | PC Card (PCMCIA) slots assembly |

Power Management-Related Symptoms

| Symptom/Error | FRU/Action in Sequence |
|--|--|
| The system doesn't enter hibernation mode and four short beeps every minute are heard. | <ul style="list-style-type: none"> • Go to "Hibernation Mode" on page 121. • Boot an operating system and press Fn+F12 to see if the computer enters hibernation mode. • TrackPoint board • Keyboard • Hard disk connection board • Hard disk drive • System board |
| The system doesn't resume from hibernation mode. | <ul style="list-style-type: none"> • Go to "Hibernation Mode" on page 121. • Hard disk connection board • Hard disk drive • System board |
| The system doesn't enter standby mode after closing the LCD. | <ul style="list-style-type: none"> • Chassis (LCD cover switch on chassis) • System board |
| The system doesn't resume from standby mode after opening the LCD. | <ul style="list-style-type: none"> • Chassis (LCD cover switch on chassis) • System board |

| Symptom/Error | FRU/Action in Sequence |
|--|---|
| Battery fuel-gauge doesn't go higher than 90%. | <ul style="list-style-type: none"> Remove battery pack and let it cool for 2 hours. Refresh battery (continue using battery until power off, then charge the battery). Battery pack DC/DC charger System board |
| System configuration does not match the installed devices. | <ul style="list-style-type: none"> Enter BIOS Utility and execute "Load Setup Default Settings"; then reboot the system. Reconnect hard disk/diskette/CD-ROM/DVD-ROM drive connector. |
| System hangs intermittently. | <ul style="list-style-type: none"> Hard disk/diskette/CD-ROM/DVD-ROM drive connector Fan System board |

Peripheral Device-Related Symptoms

| Symptom/Error | FRU/Action in Sequence |
|---|--|
| External display does not work correctly. | <ul style="list-style-type: none"> Press Fn+F9, LCD/CRT/Both display switching. System board |
| Printer problems. | <ul style="list-style-type: none"> Run printer self-test. Printer driver Printer cable Ensure that "Parallel Port" in the "Onboard Devices Configuration" menu of the BIOS Utility is correctly set. System board |
| Serial or parallel port device problems. | <ul style="list-style-type: none"> Device driver Device cable Device Ensure that "Serial Port" and "Parallel Port" in the "Onboard Devices Configuration" menu of the BIOS Utility is correctly set. System board |

Modem-Related Symptoms

| Symptom/Error | FRU/Action in Sequence |
|--|---|
| Internal modem does not work correctly | <ul style="list-style-type: none">• Go to “Modem Board Check” on page 117.• Modem connector• Modem board• 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 the 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
 - Diskette drive/CD-ROM/DVD-ROM drive
 - 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.
 - TrackPoint board
 - DC/DC charger
 - Audio PCB
 - LCD assembly
 - System board

Related Service Procedures

This section provides information about the following:

- “Flash Memory Update”
- “Status Indicators”
- “Power Switch” on page 135
- “Diagnostic Program Diskette” on page 135
- “Maintenance Program Diskette” on page 136
- “Fn Key Combinations” on page 138

Flash Memory Update

The BIOS Utility and BIOS programs are stored in flash memory. A flash memory update is required for the following conditions:

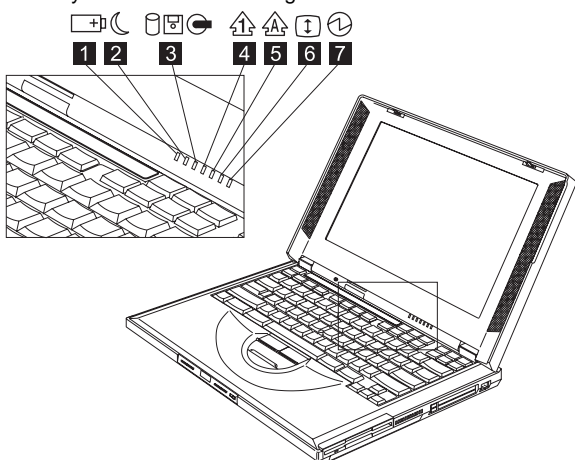
- New versions of system programs
- New features or options are added.








To update the flash memory, do the following:

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

Status Indicators

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



| Symbol | Color | Meaning |
|---|-----------------|---|
| (1) Battery status  | Green | Enough battery power remains for operation. |
| | Blinking orange | The battery pack needs to be charged |
| | Orange | The battery pack is being charged. |
| (2) Standby mode  | Green | The computer is in standby mode. |
| | Blinking green | The computer is entering or resuming from hibernation mode. |
| (3) Drive in use  | Orange | Data is being read from or written to the hard disk, floppy drive, or data is being read from the CD-ROM/DVD-ROM drive. Do not enter hibernation mode or power off the computer when this indicator is on. |
| (4) Numeric lock  | Green | The numeric keypad on the keyboard is enabled. You enable or disable the keypad by pressing and holding the Shift key, and pressing the NumLk key. For details, see the <i>User's Reference</i> . |
| (5) Caps lock  | Green | Caps Lock mode is enabled. All alphabetic characters (A-Z) are entered in capital letters without the Shift key being pressed. You enable or disable the Caps Lock mode by pressing the Caps Lock key. |
| (6) Scroll lock  | Green | Scroll Lock mode is enabled. The Arrow keys can be used as screen-scroll function keys. The cursor cannot be moved with the Arrow keys. <i>Not all application programs support this function.</i> You enable or disable Scroll Lock mode by pressing the ScrLk key. |
| (7) Power on  | Green | The computer is operational. This indicator is always on when the computer is on. |

Power Switch

If the computer cannot be turned off by pressing the power switch, try pressing it for more than 4 seconds to force the system to shutdown.

Diagnostic Program Diskette

The Diagnostic Program Diskette (P/N: 09N1020) contains the PC Doctor diagnostics program. To use PC Doctor, some test items require some test tools as listed below:

- Audio wrap cable (P/N: 65G5180)
- Erasable 2HD diskette
- Parallel: Wrap plug (P/N: 72X8546)
- Parallel: Test cable (P/N: 05K2580)
- Serial: Wrap plug (P/N: 72X8546)
- PCMCIA: PC test card (P/N: 35G4703)
- CD-ROM/DVD-ROM: Any data and audio CDs
- Screwdriver kit (P/N: 95F3598)
- Screwdriver kit (P/N: 05K4693)
- Torque screwdriver (P/N: 05K4695)
- 5mm socket wrench (P/N: 05K4694)

Running the PC Doctor Diagnostics Program:

To run PC Doctor:

1. Shutdown the computer.
2. Insert the PC Doctor for DOS diskette #1 into the diskette drive.
3. Turn on the computer.
4. Select the correct model name and test type while the PC-DOS Startup Menu is shown on the screen:
 - Generic PC-Doctor DOS Testing
 - ThinkPad 240 Series
 - ThinkPad 390E/390X
 - ThinkPad 570 Series
 - ThinkPad 600X
 - ThinkPad i 1400
5. Press **Enter** and follow the instructions on the screen.

Using the PC Doctor Diagnostics Program:

To use PC Doctor:

1. Press the **left and right arrow keys** to move around the main menu; then press **Enter** to enable the high-lighted option.

The main options are: Diagnostics, Interactive Tests, Hardware Info, Utility and Quit.

2. Press the **up and down arrow keys** to move in a selected menu; then press **Enter** to enable the highlighted option.

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

Maintenance Program Diskette

The Maintenance Program Diskette (P/N: 09N1025) provides the three following functions:

- “Setting the LCD Panel ID”
- “Setting the Thermal Sensor” on page 137
- “Writing the VPD Data” on page 137

Running the Maintenance Program

Diskette: To run the Maintenance Program Diskette:

1. Shutdown the computer.
2. Insert the Maintenance Program Diskette into the diskette drive.
3. Turn on the computer.
4. Select the item you want to run while the PC-DOS Startup Menu is shown on the screen:
 - LCD Panel ID Utility
 - Thermal Sensor Utility
 - VPD Data Utility
5. Press **Enter** and follow the instructions on the screen.

Setting the LCD Panel ID: There is an EEPROM in the inverter, which store its supported LCD type and ID code. If you replace the LCD with one of a different brand, the ID information in the inverter EEPROM should be updated.

Follow the steps below to set the LCD inverter ID:

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

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

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

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

Note: If the LCD has no display after changing the ID code, make sure you write the correct ID code or try reconnecting the LCD FPC cable connectors.

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

System experiencing frequent auto sensor shutdown may need to reset the thermal sensor threshold.

Follow the steps below to set the thermal threshold:

1. Boot from the Maintenance Program Diskette.
2. Select Thermal Sensor Utility from PC DOS 7.0 Startup menu.
3. Follow the instructions on the screen to set the thresholds.

Writing the VPD Data: The EEPROM on the system board contains the vital product data (VPD) — that is, a system unit serial number and a system board serial number. When you replace the system board, restore the system unit serial number using the VPD Data Utility. The serial number label is attached to the computer.

Edit the batch file in the diskette A:\active.bat

- VPD_BUILDID
- VPD_BOXSERIAL
- VPD_PLANARSERIAL

Fn Key Combinations

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

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

| Fn + | Result |
|-------|---|
| F1 | The ShortCut Keys Utility program appears. The ShortCut Keys Utility defines all Fn key functions as well as ShortCut keys that can be customized. |
| F2 | The Power Management Properties window appears. |
| F3 | The computer blanks the screen to save power. |
| F4 | The computer enters standby mode. |
| F5–F8 | These are customizable ShortCut Keys. Use the ShortCut Keys Utility (Fn+F1) to choose programs or files to launch with the customized ShortCut key. |
| F9 | The display output location changes. |
| F12 | The computer enters hibernation mode. |
| Home | The screen brightness increases. |
| End | The screen brightness decreases. |

Product Overview

The following shows an overview of the system features.

| Feature | Description |
|-------------------------|--|
| Processor | Intel** Mobile Pentium** processor 366 MHz –or– Intel** Mobile Celeron** processor 366 MHz |
| Bus architecture | PCI |
| System memory | 32MB or 64MB DIMM card, maximum 128MB (144-pin SDRAM) |
| CMOS RAM | 256KB |
| Video | 12.1-inch, 65,536 colors, 800x600 pixel TFT color SVGA LCD or 14.1-inch, 256 colors, 1024x768 pixel TFT color XGA LCD External monitor (VGA) connector and TV-out (S-video) jack (optional) |
| Audio | Internal system buzzer Internal speakers and microphone Internal line-in/microphone- in/headphone jack |
| Diskette drive | 1.44MB (3-mode), 3.5-inch |
| Hard disk drive | 4.8GB or 6.4GB, 2.5-inch, E-IDE interface |
| CD-ROM/DVD-ROM drive | 5.25-inch, 24X speed, E-IDE inter- face CD-ROM drive –or– 5.25-inch, 2X speed, E-IDE inter- face DVD-ROM drive |
| PC Card (PCMCIA) | One Type III or two Type II CardBus, ZV port support (upper slot only) |
| Modem | 56Kbps (depends on the model) |

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 178 for internal cable connections and arrangement information.
- When replacing a FRU, use the correct screw size, as shown in the procedure.

Safety Notice 1

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

Safety Notice 3

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

Safety Notice 8

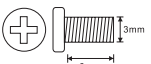
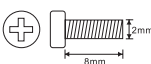
Before removing any FRU, power-off the computer, unplug all power cords from electrical outlets, remove the battery pack, and then disconnect any interconnecting cables.

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 must be used to establish personal grounding.

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

Before FRU Removals and Replacements

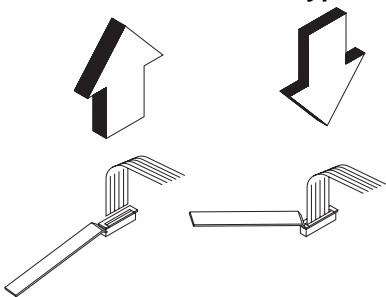
Screw Type Example Explanation

| Illustration | Size | Head & Color |
|---|---------|----------------------------|
|  | M3 x 6L | Bind head, black or silver |
|  | M2 x 8L | Pan head, black or silver |

Note: Some screws have nylock paste (on the grooves) for better friction and increased stability.

Some screws have bracket supports.

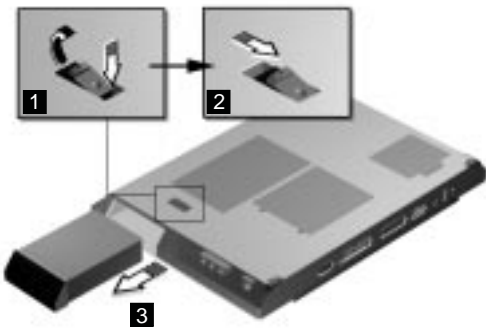
FPC Cable Connector Type



Unplugging the Cable: To unplug the cable, first unlock the connector by pulling up the two clasps on both sides of the connector with a plastic stick. Then carefully pull out the cable from the connector.

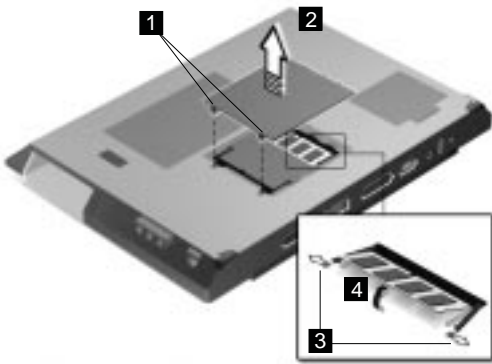
Plugging the Cable: To plug the cable back, first make sure that the connector is unlocked, then plug the cable into the connector. With a plastic stick, press the two clasps on both sides of the connector to secure the cable in place.

Battery Assembly



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

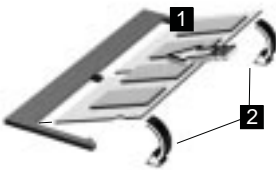
DIMM and DIMM Cover



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|--|-----------------|------------------|------------|------|
| 1 | M2 x 5L (2) | Bind head, black | 1.6 kgf-cm | |
| Note: The screw cannot be separated from the DIMM door. | | | | |

To install the DIMM:

With the notched end of the DIMM toward the right side of the socket, insert the DIMM, at an angle of approximately 20°, into the socket; then press it firmly. Pivot the DIMM until it snaps into place.



Side View



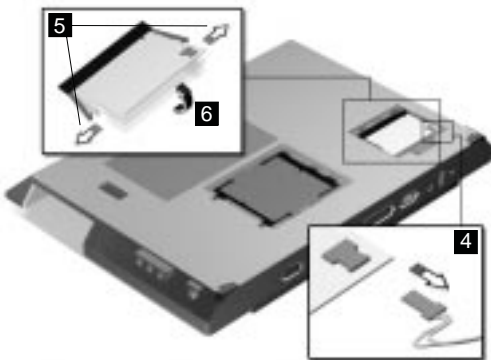
Modem Board Cover and Modem Board



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|-----------|------|
| 2 | M2 x 5L (2) | Bind head, black | 1.6kgf-cm | |
| Note: The screws do not separate from the modem board cover. | | | | |

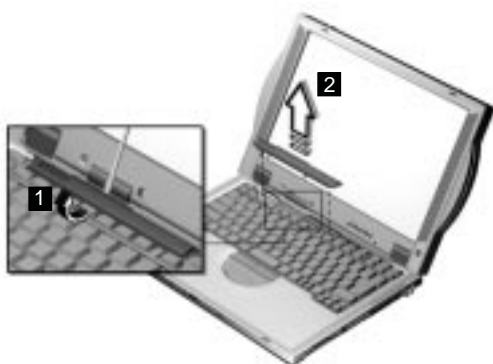
To remove the modem board:

Disconnect the modem cable (4); then press the release latches on both sides of the modem board (5), and pull out the modem board (6).

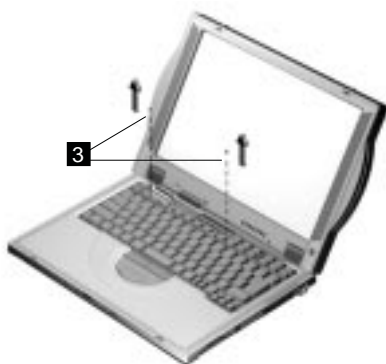


Keyboard

- “Battery Assembly” on page 142

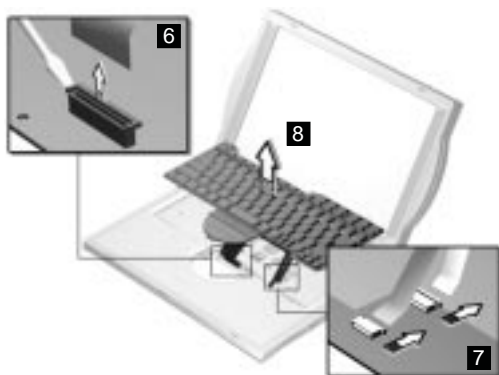
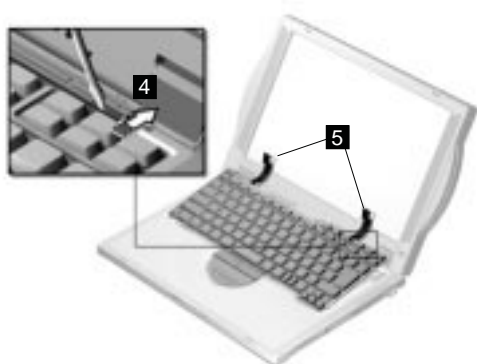


Note: Be careful not to scratch the surface of the name plate cover.



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|------|-----------------|------------------|------------|------|
| 3 | M2 x 4L (2) | Pan head, silver | 1.6 kgf-cm | |

Note: Make sure you use the correct screw for replacement.



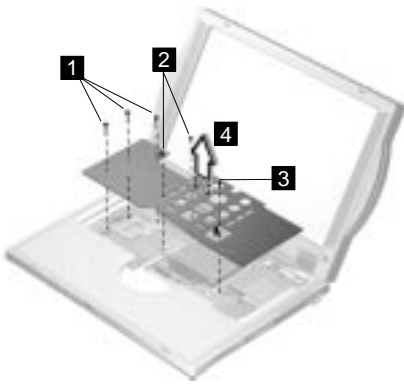
When replacing the keyboard, make sure that the 3 cables are clean and insert them directly into the connectors, making sure they contact with the bottom of the connector. Now press down on the latch of the connector to secure.

Note: If the cables do not touch the bottom of the connector, the keyboard function will be rendered useless.

Attention: The cables of the keyboard are fragile and could be damage. Be careful in pulling out the cables.

Processor Thermal Plate

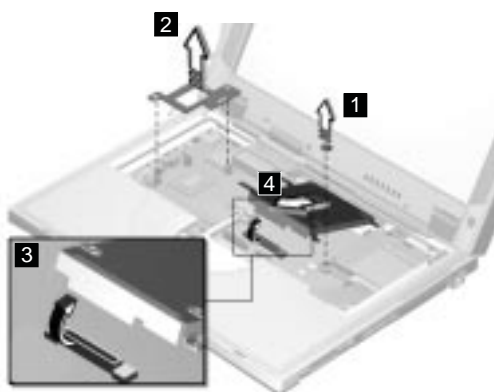
- “Battery Assembly” on page 142
- “Keyboard” on page 145



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|-----------------|
| 1 | M2 x 14L (3) | Pan head, silver | 1.6 kgf-cm | |
| 2 | M2.5 x 6L (2) | Bind head, black | 3.2 kgf-cm | w/ nylock paste |
| 3 | M2.5 x 8L (1) | Pan head, silver | 3.2 kgf-cm | |
| Note: Make sure you use the correct screw for replacement. | | | | |

RTC Battery, Processor EMI Shield and Hard Disk Drive

- “Battery Assembly” on page 142
- “Keyboard” on page 145
- “Processor Thermal Plate” on page 147

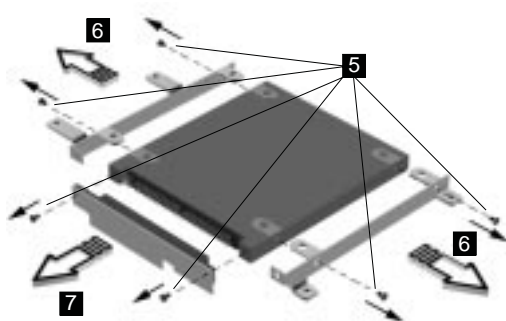


Safety Notice 4

The backup battery (1) 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.

Attention: After removing the processor EMI shield (2), the processor is exposed. The processor is ESD-sensitive and can be damaged easily, especially the pins around the Processor chip. DO NOT touch the pins of the processor.

When removing the hard drive (3), pull them up at an angle (4). It cannot be removed when pulled straight up.



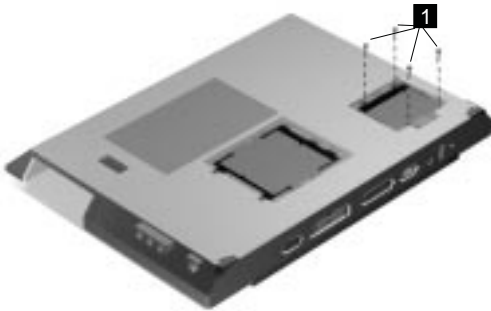
Reverse the steps described above when installing a new hard disk drive.

CAUTION:

Do not 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 hard disk. Before removing the hard disk drive, the user must have a backup copy of all the information on the hard disk drive. Never remove the hard disk drive while the system is operating or is in hibernation mode.

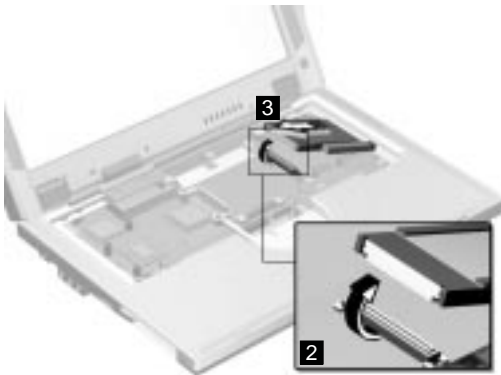
PCMCIA Holder

- “Battery Assembly” on page 142
- “Modem Board Cover and Modem Board” on page 144
- “Keyboard” on page 145
- “Processor Thermal Plate” on page 147



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|------|
| 1 | M2 x 14L (4) | Pan head, silver | 1.6 kgf-cm | |
| Note: Make sure you use the correct screw for replacement. | | | | |

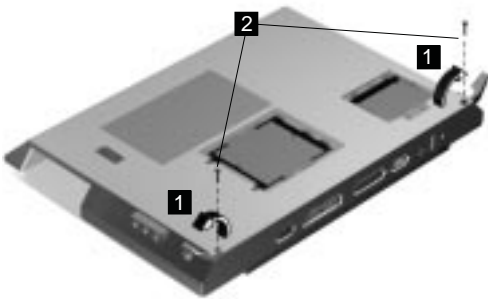
Note: Before removing and replacing the PCMCIA holder, make sure that the PCMCIA cards are removed and the eject levers are not sticking out.



Attention: When removing the PCMCIA holder, pull them up at an angle. It cannot be removed when pulled straight up.

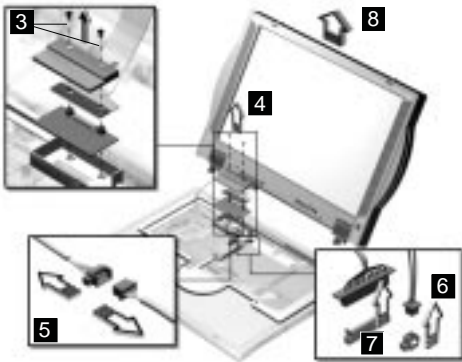
LCD Assembly

- “Battery Assembly” on page 142
- “Keyboard” on page 145
- “Processor Thermal Plate” on page 147



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|------|------------------|-----------------|------------|-----------------|
| 2 | M2.5 x 13.5L (2) | Pan head, black | 3.5 kgf-cm | w/ nylock paste |

Note: Make sure you use the correct screw for replacement.

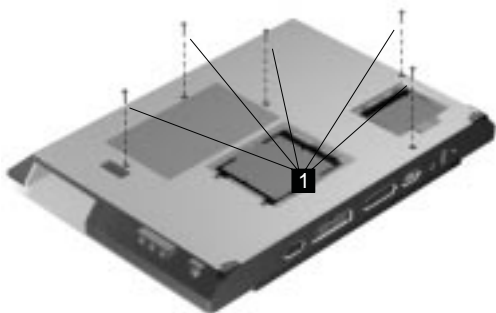


Note: For 14.1-inch LCD models, a LVDS board is additionally installed as shown at 3.

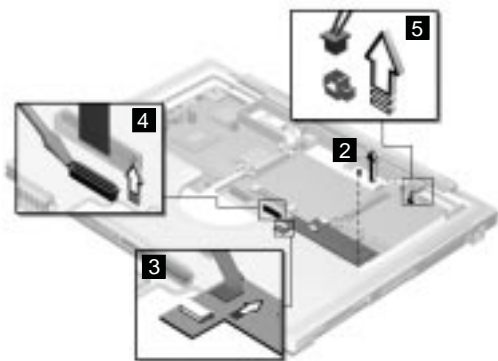
| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|--|------------------|------------|------|
| 3 | M2 x 14L (2) (for 12.1-inch LCD assembly) | Pan head, silver | 1.6 kgf-cm | |
| | M2 x 20L (2) (for 14.1-inch LCD assembly) | Pan head, silver | 1.6 kgf-cm | |
| Note: Make sure you use the correct screw for replacement. | | | | |

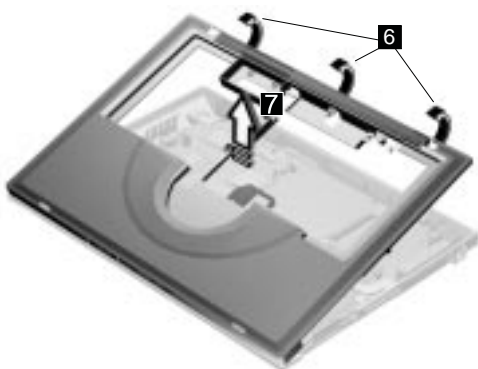
Upper Cover (Keyboard Bezel)

- “Battery Assembly” on page 142
- “Keyboard” on page 145
- “Processor Thermal Plate” on page 147
- “RTC Battery, Processor EMI Shield and Hard Disk Drive” on page 148
- “LCD Assembly” on page 151



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|------------------|-----------------|------------|-----------------|
| 1 | M2.5 x 13.5L (5) | Pan head, black | 3.2 kgf-cm | w/ nylock paste |
| Note: Make sure you use the correct screw for replacement. | | | | |



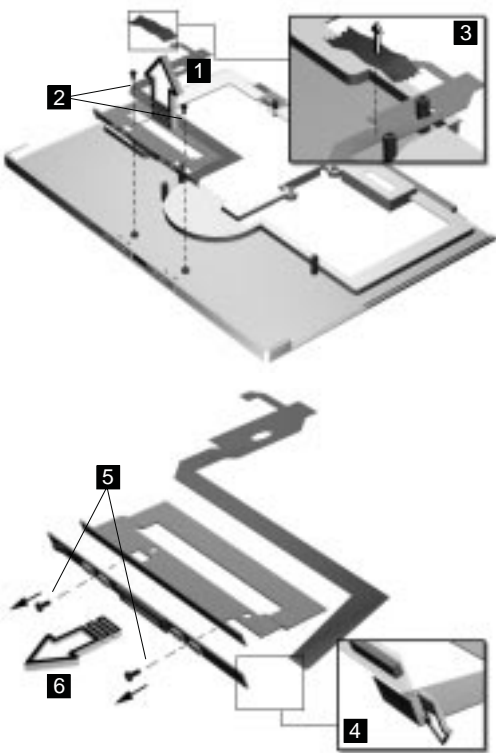


| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|-----------------|------------|-----------------|
| 2 | M2.5 x 6L (1) | Pan head, black | 3.2 kgf-cm | w/ nylock paste |
| Note: Make sure you use the correct screw for replacement. | | | | |

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

CD Control Card

- “Battery Assembly” on page 142
- “Keyboard” on page 145
- “Processor Thermal Plate” on page 147
- “RTC Battery, Processor EMI Shield and Hard Disk Drive” on page 148
- “LCD Assembly” on page 151
- “Upper Cover (Keyboard Bezel)” on page 153

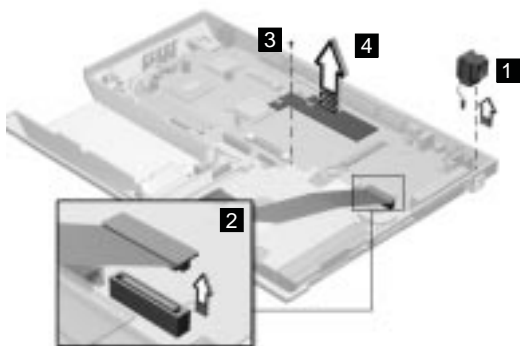


| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|------|
| 1 | M2 x 4L (2) | Pan head, silver | 1.6 kgf-cm | |
| Note: Make sure you use the correct screw for replacement. | | | | |

TrackPoint Board and Modem Connector (RJ11 Cable Assembly)

- “Battery Assembly” on page 142
- “Modem Board Cover and Modem Board” on page 144
- “Keyboard” on page 145
- “Processor Thermal Plate” on page 147
- “RTC Battery, Processor EMI Shield and Hard Disk Drive” on page 148
- “LCD Assembly” on page 151
- “Upper Cover (Keyboard Bezel)” on page 153

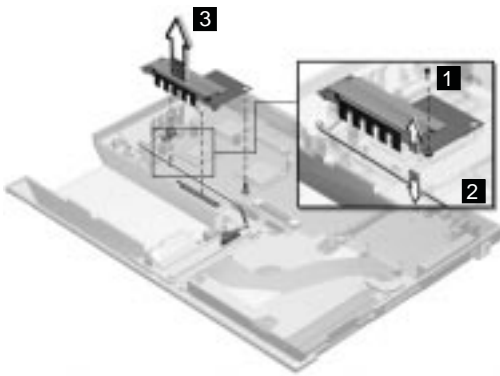
Note: Before removing the modem phone jack, make sure that the other end has been disconnected from the modem board.



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|------|
| 3 | M2.5 x 6L (1) | Bind head, black | 3.2 kgf-cm | |
| Note: Make sure you use the correct screw for replacement. | | | | |

DC/DC Charger

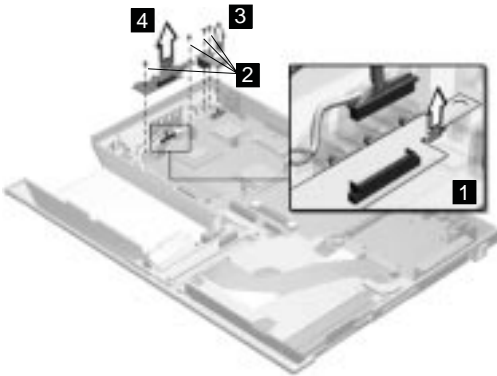
- “Battery Assembly” on page 142
- “Keyboard” on page 145
- “Processor Thermal Plate” on page 147
- “RTC Battery, Processor EMI Shield and Hard Disk Drive” on page 148
- “LCD Assembly” on page 151
- “Upper Cover (Keyboard Bezel)” on page 153



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|------|
| 1 | M2.5 x 8L (1) | Pan head, silver | 3.2 kgf-cm | |
| Note: Make sure you use the correct screw for replacement. | | | | |

Audio Connector Board and S-Video PCB

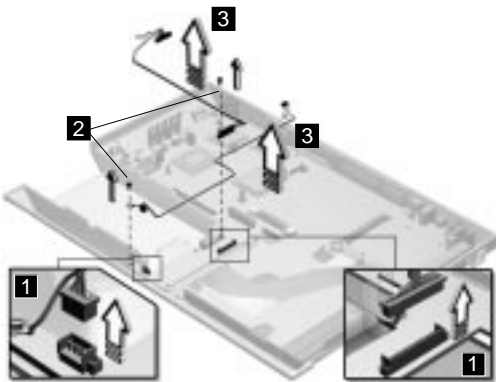
- “Battery Assembly” on page 142
- “Keyboard” on page 145
- “Processor Thermal Plate” on page 147
- “RTC Battery, Processor EMI Shield and Hard Disk Drive” on page 148
- “LCD Assembly” on page 151
- “Upper Cover (Keyboard Bezel)” on page 153



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|-----------------|
| 3 | M2.5 x 6L (2) | Bind head, black | 3.2 kgf-cm | w/ nylock paste |
| Note: Make sure you use the correct screw for replacement. | | | | |

Audio Cable and Speaker Cable

- “Battery Assembly” on page 142
- “Keyboard” on page 145
- “Processor Thermal Plate” on page 147
- “RTC Battery, Processor EMI Shield and Hard Disk Drive” on page 148
- “LCD Assembly” on page 151
- “Upper Cover (Keyboard Bezel)” on page 153



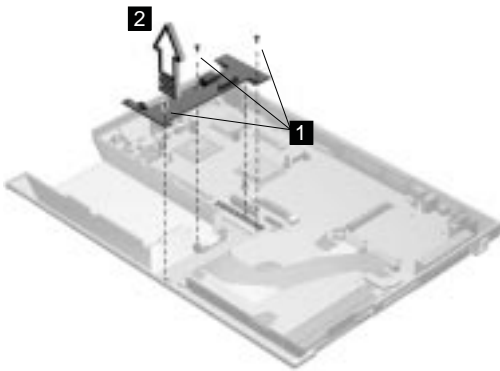
| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|-----------------------------------|
| 2 | M2.5 x 6L (2) | Bind head, black | 1.6 kgf-cm | w/ ground ring w/ nylock paste |
| Note: Make sure you use the correct screw for replacement. | | | | |

To install the speaker cable: When re-inserting the speaker cable, one end is connected to the Audio PCB underneath the palm rest. You then align the cable, following the border of the chassis and connect it to the inverter cable as shown in the diagram.



Audio PCB

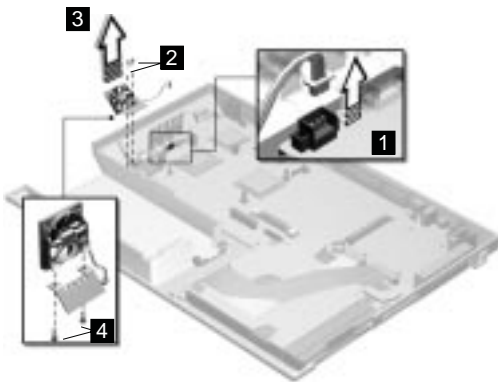
- “Battery Assembly” on page 142
- “Keyboard” on page 145
- “Processor Thermal Plate” on page 147
- “RTC Battery, Processor EMI Shield and Hard Disk Drive” on page 148
- “LCD Assembly” on page 151
- “Upper Cover (Keyboard Bezel)” on page 153



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|-----------------|
| 1 | M2.5 x 6L (2) | Bind head, black | 3.2 kgf-cm | w/ nylock paste |
| Note: Make sure you use the correct screw for replacement. | | | | |

Fan Assembly

- “Battery Assembly” on page 142
- “Keyboard” on page 145
- “Processor Thermal Plate” on page 147
- “RTC Battery, Processor EMI Shield and Hard Disk Drive” on page 148
- “LCD Assembly” on page 151
- “Upper Cover (Keyboard Bezel)” on page 153

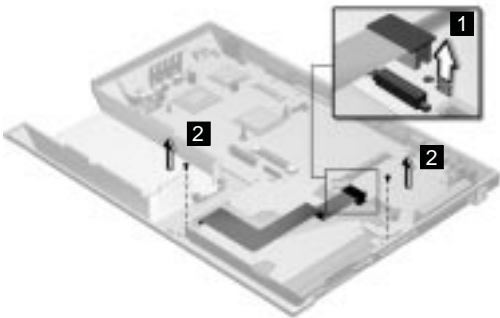


| Step | Size (Quantity) | Head & Color | Torque | Memo |
|------|-----------------|------------------|------------|-----------------|
| 2 | M2.5 x 6L (2) | Bind head, black | 3.2 kgf-cm | w/ nylock paste |
| 4 | M2.5 x 4L (2) | Bind head, black | 3.2 kgf-cm | w/ nylock paste |

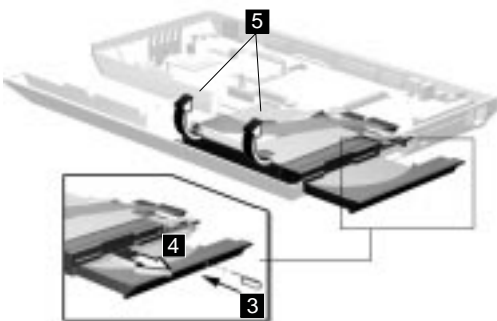
Note: Make sure you use the correct screw for replacement.

Diskette and CD-ROM/DVD-ROM Drives Assembly

- “Battery Assembly” on page 142
- “Keyboard” on page 145
- “Processor Thermal Plate” on page 147
- “RTC Battery, Processor EMI Shield and Hard Disk Drive” on page 148
- “LCD Assembly” on page 151
- “Upper Cover (Keyboard Bezel)” on page 153



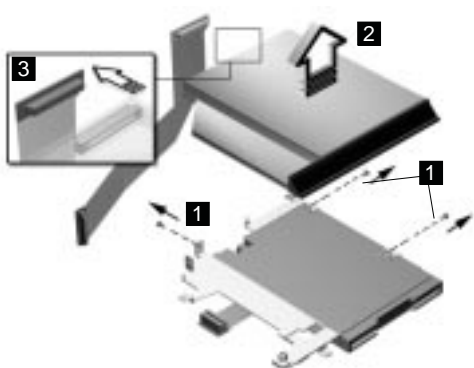
| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|-----------------|
| 2 | M2.5 x 6L (2) | Bind head, black | 3.2 kgf-cm | w/ nylock paste |
| Note: Make sure you use the correct screw for replacement. | | | | |



Attention: You must pull out the CD/DVD tray before removing the Diskette and CD-ROM/DVD-ROM Drives Assembly. Use a small stick to press the

CD-ROM/DVD-ROM-drive-emergency-eject hole to open the CD/DVD tray.

CD-ROM/DVD-ROM Module



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|------|-----------------|------------------|------------|------|
| 1 | M2 x 4L (3) | Pan head, silver | 1.6 kgf-cm | |

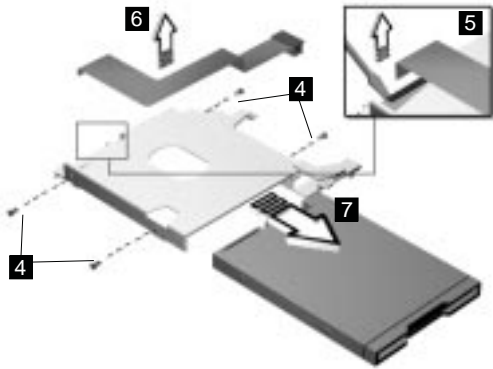
Note: Make sure you use the correct screw for replacement.

CAUTION:

Do not disassemble the CD-ROM/DVD-ROM; there is no user adjustments or serviceable parts inside. The use of controls, adjustments or performing procedures other than those specified may result in hazardous radiation exposure.

Do not apply any extra force to the CD-ROM/DVD-ROM drive when removing it.

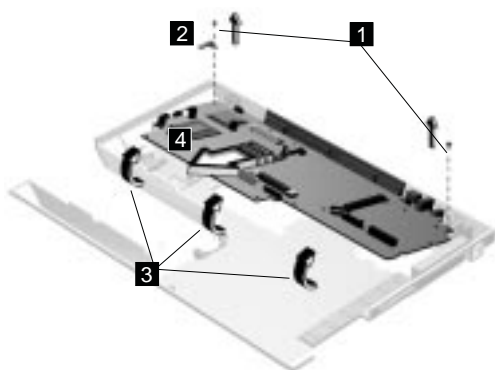
Diskette Drive with Bezel



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|-----------------|
| 4 | M2.5 x 3.5L (4) | Bind head, black | 1.6 kgf-cm | w/ nylock paste |
| Note: Make sure you use the correct screw for replacement. | | | | |

System Board

- “Battery Assembly” on page 142
- “Keyboard” on page 145
- “Processor Thermal Plate” on page 147
- “RTC Battery, Processor EMI Shield and Hard Disk Drive” on page 148
- “LCD Assembly” on page 151
- “Upper Cover (Keyboard Bezel)” on page 153



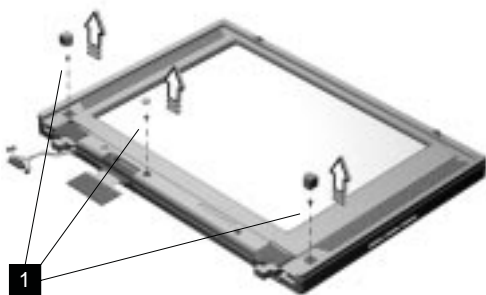
| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|-----------------|
| 1 | M2.5 x 6L (2) | Bind head, black | 3.2 kgf-cm | w/ nylock paste |
| Note: Make sure you use the correct screw for replacement. | | | | |

Notes:

1. When removing the system board from the base cover, gently raise the side of the system board facing the rear I/O ports; then pull out the system board.
2. When replacing the system board, align the power switch and power actuator. Make sure that the power switch operates correctly before securing the screws.

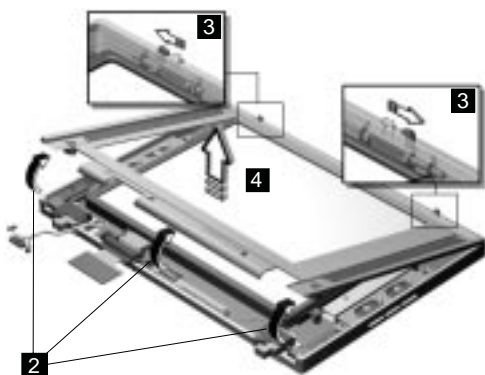
LCD Front Cover (12.1-inch)

- “Battery Assembly” on page 142
- “Keyboard” on page 145
- “Processor Thermal Plate” on page 147
- “RTC Battery, Processor EMI Shield and Hard Disk Drive” on page 148
- “LCD Assembly” on page 151



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|------|-----------------|------------------|------------|-----------------|
| 1 | M2.5 x 6L (3) | Bind head, black | 1.6 kgf-cm | w/ nylock paste |

Note: Make sure you use the correct screw for replacement.



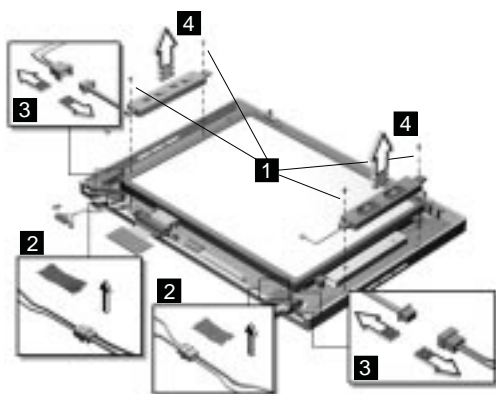
Note: When removing the LCD, take note of the following:

1. Be careful not to scratch the LCD cover when removing the screw covers.

2. The LCD front cover has several latches. Release these latches; then remove the LCD cover. Be careful not to break these latches.
3. Gently push the two hooks (3) outward to remove the LCD front cover.

Speakers

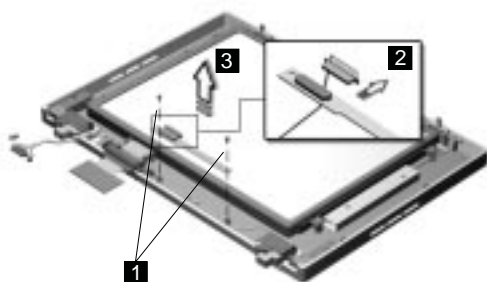
- “Battery Assembly” on page 142
- “Keyboard” on page 145
- “Processor Thermal Plate” on page 147
- “RTC Battery, Processor EMI Shield and Hard Disk Drive” on page 148
- “LCD Assembly” on page 151
- “LCD Front Cover (12.1-inch)” on page 167



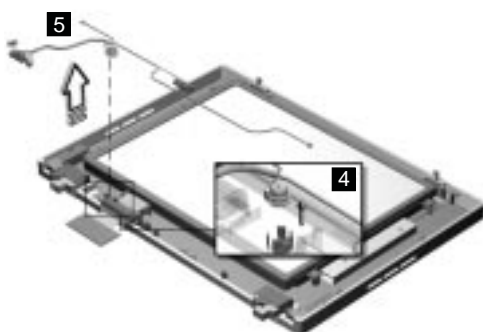
| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|------|
| 1 | M2 x 4L (4) | Pan head, silver | 1.6 kgf-cm | |
| Note: Make sure you use the correct screw for replacement. | | | | |

Indicator Board and Microphone Cable Assembly

- “Battery Assembly” on page 142
- “Keyboard” on page 145
- “Processor Thermal Plate” on page 147
- “RTC Battery, Processor EMI Shield and Hard Disk Drive” on page 148
- “LCD Assembly” on page 151
- “LCD Front Cover (12.1-inch)” on page 167



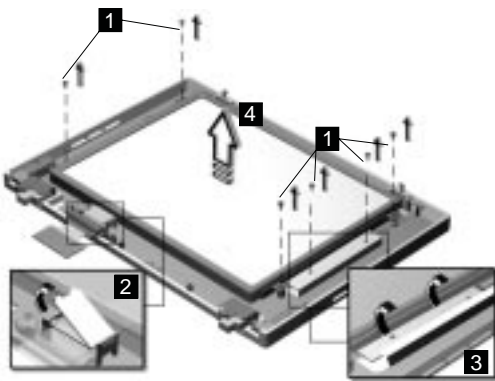
| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|------|
| 1 | M2 x 4L (2) | Pan head, silver | 2.0 kgf-cm | |
| Note: Make sure you use the correct screw for replacement. | | | | |



Note: There are adhesive tape attached to the microphone cable assembly. Do not forget to put them back when reinstalling.

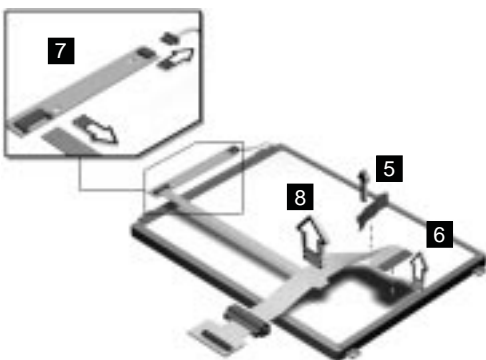
LCD Panel, LCD Cable and Inverter

- “Battery Assembly” on page 142
- “Keyboard” on page 145
- “Processor Thermal Plate” on page 147
- “RTC Battery, Processor EMI Shield and Hard Disk Drive” on page 148
- “LCD Assembly” on page 151
- “LCD Front Cover (12.1-inch)” on page 167



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|------|------------------------------|------------------------|---------------|------|
| 1 | M3 x 5L (2) (LCD) | Bind head, black | 3.2 kgf-cm | |
| | M2 x 4L (2) (Inverter) | Pan head, silver | 2.0 kgf-cm | |

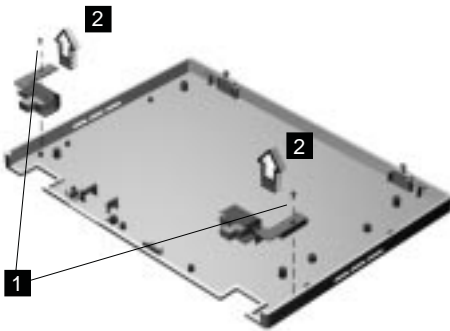
Note: Make sure you use the correct screw for replacement.



Attention: After you replace the LCD or inverter, follow the instructions in “Setting the LCD Panel ID” on page 136.

Hinge

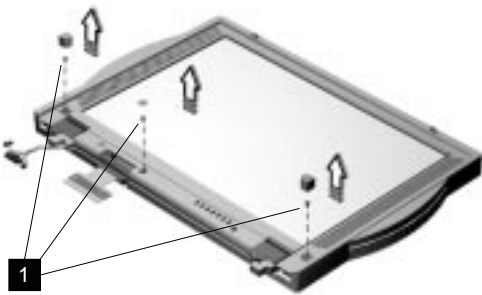
- “Battery Assembly” on page 142
- “Keyboard” on page 145
- “Processor Thermal Plate” on page 147
- “RTC Battery, Processor EMI Shield and Hard Disk Drive” on page 148
- “LCD Assembly” on page 151
- “LCD Front Cover (12.1-inch)” on page 167



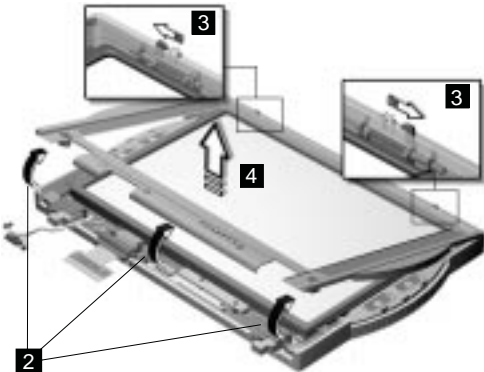
| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|-----------------|
| 1 | M2.5 x 6L (2) | Bind head, black | 3.2 kgf-cm | w/ nylock paste |
| Note: Make sure you use the correct screw for replacement. | | | | |

LCD Front Cover (14.1-inch)

- “Battery Assembly” on page 142
- “Keyboard” on page 145
- “Processor Thermal Plate” on page 147
- “RTC Battery, Processor EMI Shield and Hard Disk Drive” on page 148
- “LCD Assembly” on page 151



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|-----------------|
| 1 | M2.5 x 6L (3) | Bind head, black | 1.6 kgf-cm | w/ nylock paste |
| Note: Make sure you use the correct screw for replacement. | | | | |



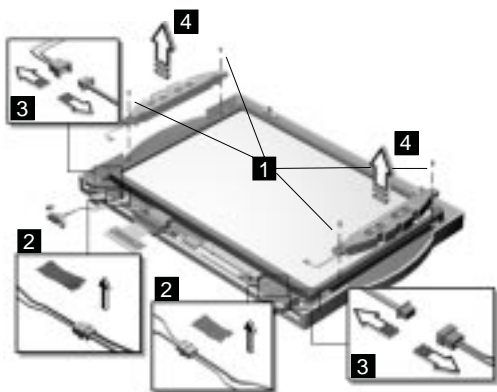
Note: When removing the LCD, take note of the following:

1. Be careful not to scratch the LCD cover when removing the screw covers.

2. The LCD front cover has several latches. Release these latches; then remove the LCD cover. Be careful not to break these latches.
3. Gently push the two hooks (3) outward to remove the LCD front cover.

Speakers

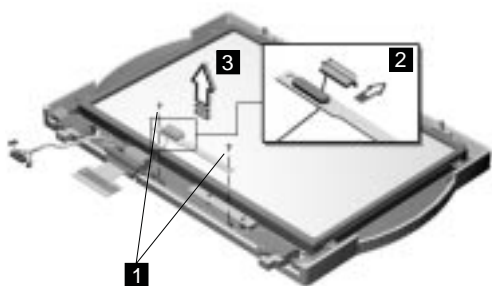
- “Battery Assembly” on page 142
- “Keyboard” on page 145
- “Processor Thermal Plate” on page 147
- “RTC Battery, Processor EMI Shield and Hard Disk Drive” on page 148
- “LCD Assembly” on page 151
- “LCD Front Cover (12.1-inch)” on page 167



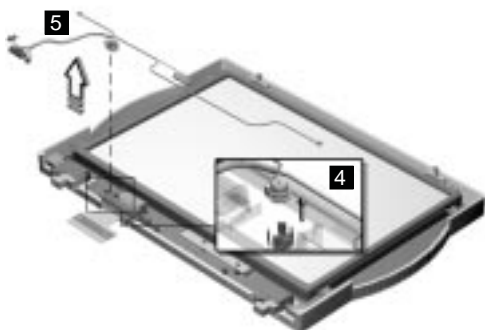
| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|------|
| 1 | M2 x 4L (4) | Pan head, silver | 1.6 kgf-cm | |
| Note: Make sure you use the correct screw for replacement. | | | | |

Indicator Board and Microphone Cable Assembly

- “Battery Assembly” on page 142
- “Keyboard” on page 145
- “Processor Thermal Plate” on page 147
- “RTC Battery, Processor EMI Shield and Hard Disk Drive” on page 148
- “LCD Assembly” on page 151
- “LCD Front Cover (12.1-inch)” on page 167



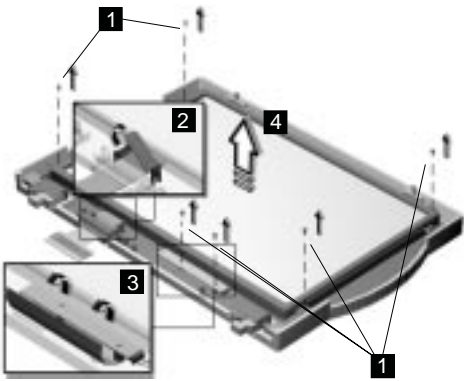
| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|------|
| 1 | M2 x 4L (2) | Pan head, silver | 2.0 kgf-cm | |
| Note: Make sure you use the correct screw for replacement. | | | | |



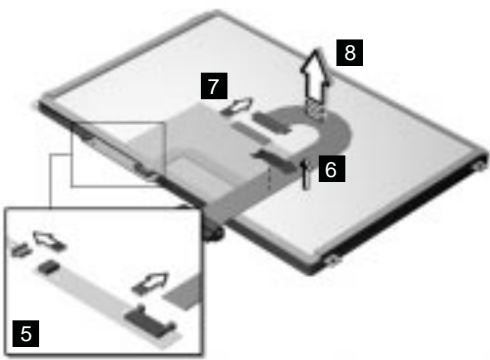
Note: There are adhesive tape attached to the microphone cable assembly. Do not forget to put them back when reinstalling.

LCD Panel, LCD Cable and Inverter

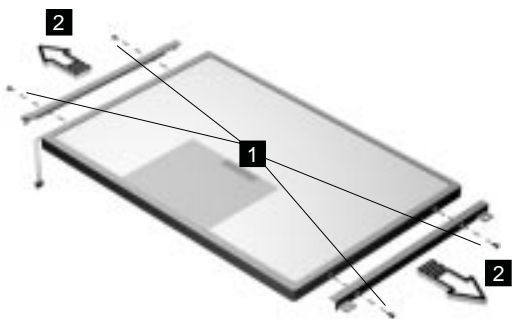
- “Battery Assembly” on page 142
- “Keyboard” on page 145
- “Processor Thermal Plate” on page 147
- “RTC Battery, Processor EMI Shield and Hard Disk Drive” on page 148
- “LCD Assembly” on page 151
- “LCD Front Cover (12.1-inch)” on page 167



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|------------------------|------------------|------------|------|
| 1 | M3 x 5L (2) (LCD) | Bind head, black | 3.2 kgf-cm | |
| | M2 x 4L (2) (Inverter) | Pan head, silver | 2.0 kgf-cm | |
| Note: Make sure you use the correct screw for replacement. | | | | |



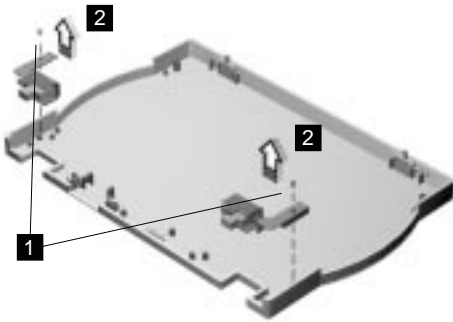
Attention: After you replace the LCD or inverter, follow the instructions in “Setting the LCD Panel ID” on page 136.



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

Hinge

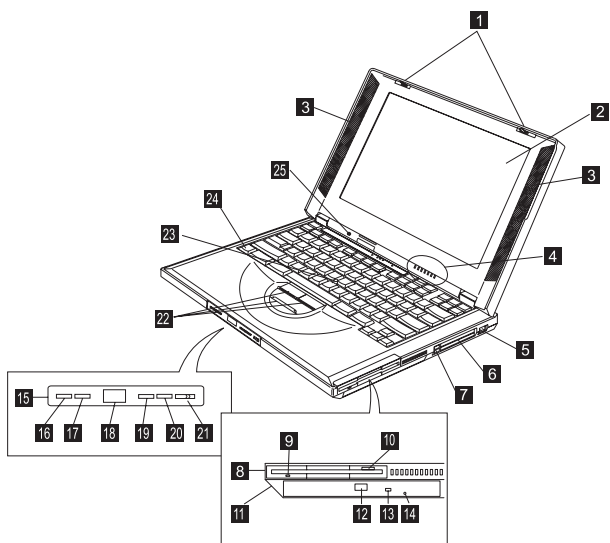
- “Battery Assembly” on page 142
- “Keyboard” on page 145
- “Processor Thermal Plate” on page 147
- “RTC Battery, Processor EMI Shield and Hard Disk Drive” on page 148
- “LCD Assembly” on page 151
- “LCD Front Cover (12.1-inch)” on page 167



| Step | Size (Quantity) | Head & Color | Torque | Memo |
|---|-----------------|------------------|------------|-----------------|
| 1 | M2.5 x 6L (2) | Bind head, black | 3.2 kgf-cm | w/ nylock paste |
| Note: Make sure you use the correct screw for replacement. | | | | |

Locations

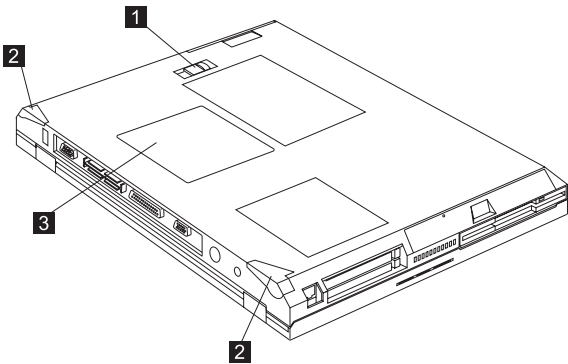
Front View



1. LCD latches
2. LCD
3. Speakers
4. Indicator panel
5. Internal modem port
6. PC Card slots
7. PC Card eject buttons
8. Diskette drive
9. Diskette-drive-activity indicator
10. Diskette eject button
11. CD-ROM/DVD-ROM drive
12. CD-ROM/DVD-ROM eject button
13. CD-ROM/DVD-ROM-drive-activity indicator
14. CD-ROM/DVD-ROM-drive-emergency-eject hole
15. CD-ROM/DVD-ROM audio control panel
16. CD-ROM/DVD-ROM previous track button
17. CD-ROM/DVD-ROM next track button
18. CD-ROM/DVD-ROM status LCD
19. CD-ROM/DVD-ROM play/pause button
20. CD-ROM/DVD-ROM stop/eject button
21. CD-ROM/DVD-ROM power switch
22. TrackPoint buttons

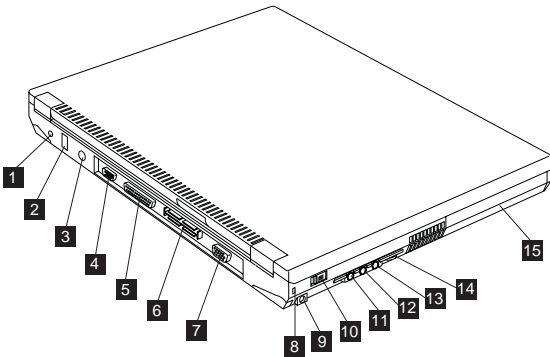
- 23. TrackPoint
- 24. Fn key
- 25. Built-in microphone

Bottom View



- 1. Battery-pack latch
- 2. Tilt feet
- 3. Memory slot door

Rear View



- 1. Power jack
- 2. Universal serial bus (USB) connector
- 3. External-input-device (PS/2) connector
- 4. Serial connector
- 5. Parallel connector
- 6. Expansion connector
- 7. External monitor connector
- 8. Security keyhole
- 9. Power switch
- 10. Line-out/headphone jack
- 11. Line-in jack

- 12. Microphone-in jack
- 13. Audio volume control
- 14. Battery pack

Switch Locations

There are two switches found on the system board. Refer to the tables below on how to set these switches.

Keyboard Language (SW3, Switch 1, 2 and 3) Setting

| Keyboard Language | Japanese | U.S. English | European |
|-------------------|----------|--------------|----------|
| Switch 1 | On | Off | Off |
| Switch 2 | Off | Off | On |
| Switch 3 | Off | On | Off |

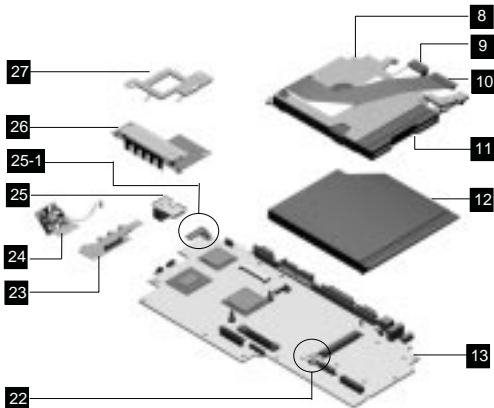
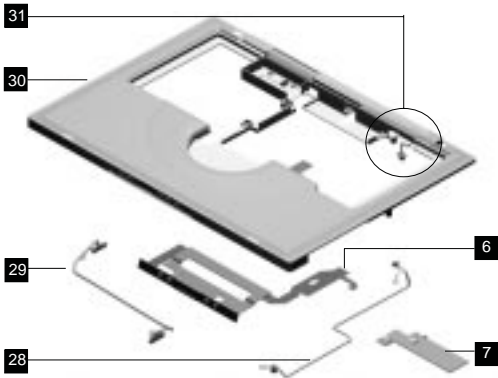
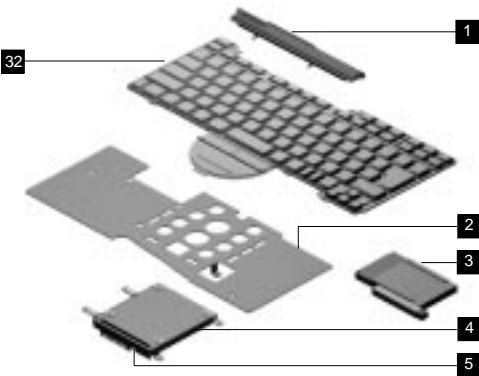
Password (SW3, Switch 4) Setting

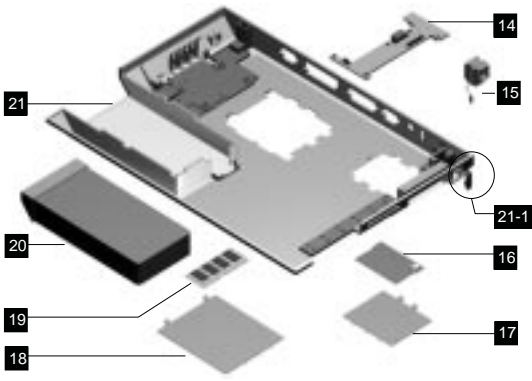
| Password | Bypass | Check |
|----------|--------|-------|
| Switch 4 | On | Off |

Non-configurable Switches (SW4, Switch 1 and 2)

| Reserved | Default Settings |
|----------|------------------|
| Switch 1 | Off |
| Switch 2 | On |

System Unit Parts Listing





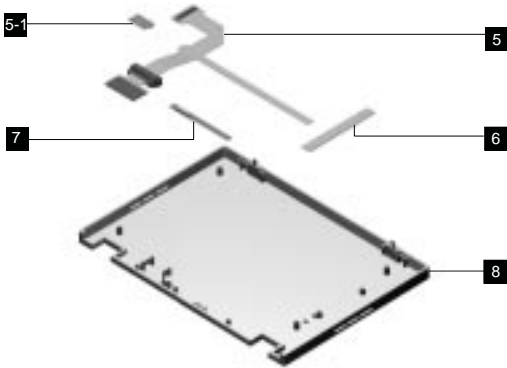
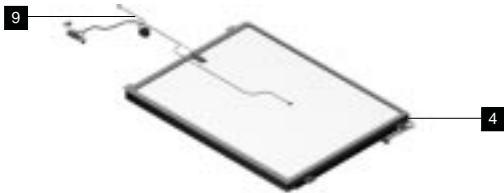
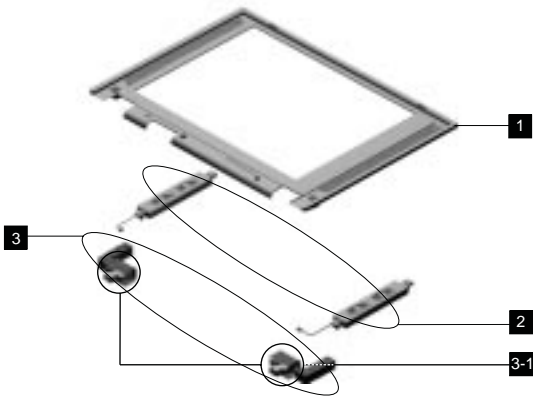
| No. | Description | FRU No. | Qty. |
|------|--|---------|------|
| 1 | Nameplate cover asm | 10L1961 | 1 |
| 2 | Heatsink processor | 05K6236 | 1 |
| 3 | PCMCIA holder | 05K5476 | 1 |
| 4 | HDD module assy 6.4 GB | 05K9116 | 1 |
| | HDD module assy 6.4 GB (HITACHI) | 05K9193 | 1 |
| | HDD module assy 4.8 GB | 05K9115 | 1 |
| | HDD module assy 4.8 GB (HITACHI) | 05K9194 | 1 |
| 5 | Kitting, HDD | 05K5677 | 1 |
| 6 | CD control card | 10L1170 | 1 |
| 7 | Trackpoint board | 10L1317 | 1 |
| 8 | CD ROM chassis | 05K5678 | 1 |
| 9 | FPC CD ROM | 05K2806 | 1 |
| 10 | FPC diskette drive | 05K2799 | 1 |
| 11 | Diskette Drive W/ bezel | 05K8957 | 1 |
| 12 | DVD module | 05K9113 | 1 |
| | 24X CD ROM module (LG) | 05K9165 | 1 |
| | 24X CD ROM module (Teac) (2nd source) | 05K9140 | 1 |
| 13 | System board asm (Dixon) | 10L1285 | 1 |
| | System board asm (Celeron, w/ tv out) | 10L1341 | 1 |
| | System board asm (Celeron, w/o tv out) | 10L1343 | 1 |
| 14 | Audio PCB | 10L1316 | 1 |
| 15 | RJ11 PCI modem connector | 22L1897 | 1 |
| 16 | PCI modem (Ambit) | 10L1296 | 1 |
| | PCI modem (CIS) | 10L1329 | 1 |
| 17 | Modem cover | 05K5952 | 1 |
| 18 | DIMM cover | 05K5951 | 1 |
| 19 | DIMM 32MB | 10L1226 | 1 |
| | DIMM 64MB | 10L1227 | 1 |
| 20 | LI-ION battery asm (9 cells) | 02K6577 | 1 |
| 21 | Bottom case (W/ TV out) | 05K6239 | 1 |
| | Bottom case (W/O TV out) | 27L6572 | 1 |
| 21-1 | LEG (L,R) | 05K5953 | 1 |
| 22 | RTC battery | 11J8591 | 1 |
| 23 | Audio connector board | 10L1339 | 1 |
| 24 | Fan asm | 27L6475 | 1 |
| 25 | S terminal board asm | 10L1286 | 1 |

| No. | Description | FRU No. | Qty. |
|------|--|---------|------|
| 25-1 | S-video bracket | 27L6476 | 1 |
| 26 | DC/DC charger | 10L1345 | 1 |
| 27 | Bracket processor EMI | 05K6237 | 1 |
| 28 | Cable assembly Microphone Microphone rubber Speaker cable LED cable Y-cable for speaker | 05K2798 | 1 |
| 29 | Audio cable asm | 27L0469 | 1 |
| 30 | KBD bezel | 10L1938 | 1 |
| 31 | LID S/W asm | 05K5479 | 1 |
| 32 | Keyboard (ALPS – 1ST source) | | |
| | Keyboard (US) | 02K4737 | 1 |
| | Keyboard (Japan) | 02K4738 | 1 |
| | Keyboard (Germany) | 02K4739 | 1 |
| | Keyboard (Traditional Chinese) | 02K4741 | 1 |
| | Keyboard (Danish) | 02K4742 | 1 |
| | Keyboard (France) | 02K4743 | 1 |
| | Keyboard (Korea) | 02K4745 | 1 |
| | Keyboard (UK) | 02K4748 | 1 |
| | Keyboard (Canadian French) | 02K4744 | 1 |
| | Keyboard (Norwegian) | 02K4747 | 1 |
| | Keyboard (Swedish/Finnish) | 02K4746 | 1 |
| | Keyboard (Dutch) | 02K4740 | 1 |
| | Keyboard (Italy) | 02K6300 | 1 |
| | Keyboard (EURO Spanish) | 02K4749 | 1 |
| | Keyboard (Belgian) | 02K4750 | 1 |
| | Keyboard (Swiss) | 02K4751 | 1 |
| | Keyboard (Portuguese) | 02K4752 | 1 |
| | Keyboard (API – 1ST source) | | |
| | Keyboard (US) | 02K6368 | 1 |
| | Keyboard (Japan) | 02K6382 | 1 |
| | Keyboard (Germany) | 02K6370 | 1 |
| | Keyboard (Traditional Chinese) | 02K6383 | 1 |
| | Keyboard (Danish) | 02K6376 | 1 |
| | Keyboard (France) | 02K6372 | 1 |
| | Keyboard (Korea) | 02K6384 | 1 |
| | Keyboard (UK) | 02K6371 | 1 |
| | Keyboard (Canadian French) | 02K6369 | 1 |

| No. | Description | FRU No. | Qty. |
|-----|----------------------------|---------|------|
| | Keyboard (Norwegian) | 02K6375 | 1 |
| | Keyboard (Swedish/Finnish) | 02K6374 | 1 |
| | Keyboard (Dutch) | 02K6373 | 1 |
| | Keyboard (Italy) | 02K6377 | 1 |
| | Keyboard (EURO Spanish) | 02K6378 | 1 |
| | Keyboard (Belgian) | 02K6379 | 1 |
| | Keyboard (Swiss) | 02K6380 | 1 |
| | Keyboard (Portuguese) | 02K6381 | 1 |
| | AC adapter 2-PIN | 12J0538 | 1 |
| | AC adapter 3-PIN | 12J0539 | 1 |

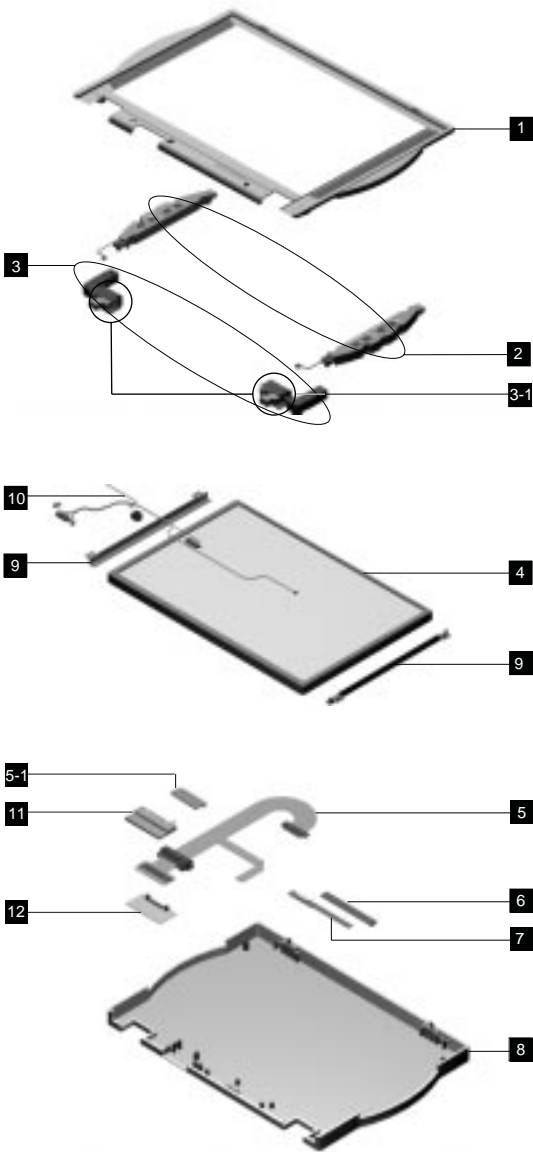
LCD Unit Parts Listing

12.1" LCD Unit Parts Listing



| No. | Description | FRU No. | Qty. |
|------------|--------------------------------------|----------------|-------------|
| 1 | LCD bezel asm 12.1" | 05K5674 | 1 |
| 2 | Speaker asm (R,L) | 05K2827 | 1 |
| 3 | Hinge (R,L) | 05K5669 | 1 |
| 3-1 | Hinge cover (R,L) | 05K5949 | 1 |
| 4 | 12.1" TFT LCD (SANYO) | 05K9528 | 1 |
| | 12.1" TFT LCD (HITACHI) | 05K9383 | 1 |
| 5 | FPC 12.1" assy (for Sanyo LCD) | 27L0477 | 1 |
| | FPC 12.1" assy (for Hitachi LCD) | 27L0506 | 1 |
| 5-1 | LCD FPC holder kit | 27L6477 | 1 |
| 6 | LCD inverter 12.1" (for Sanyo LCD) | 10L1380 | 1 |
| | LCD inverter 12.1" (for Hitachi LCD) | 10L1645 | 1 |
| 7 | LED BD | 10L1168 | 1 |
| 8 | LCD rear cover asm 12.1" TFT | 05K6303 | 1 |
| 9 | Cable assembly | 05K2798 | 1 |
| | LG/IBM logo kit | 05K6044 | 1 |

14.1" LCD Unit Parts Listing



| No. | Description | FRU No. | Qty. |
|------------|---------------------------------|----------------|-------------|
| 1 | LCD bezel asm 14.1" | 05K6232 | 1 |
| 2 | Speaker asm (R,L) FOR 14.1" | 02K6299 | 1 |
| 3 | Hinge (R,L) FOR 14.1" | 05K6234 | 1 |
| 3-1 | Hinge cover (R,L) | 05K5949 | 1 |
| 4 | 14.1" TFT LCD (LG) | 05K9396 | 1 |
| | 14.1" TFT LCD (IBM) | 05K9538 | 1 |
| 5 | FPC 14.1" assy | 05K2851 | 1 |
| 5-1 | LCD FPC holder kit | 27L6477 | 1 |
| 6 | LCD inverter 14.1" | 10L1383 | 1 |
| 7 | LED BD 14.1" | 10L1315 | 1 |
| 8 | LCD rear cover asm 14.1" TFT | 05K6231 | 1 |
| 9 | 14.1" TFT bracket (R,L) | 05K6233 | 1 |
| 10 | Cable assembly | 05K2798 | 1 |
| 11 | LVDS cover | 05K5960 | 1 |
| 12 | LVDS board | 10L1318 | 1 |
| | LG/IBM logo kit for 14.1" bezel | 05K6310 | 1 |

Miscellaneous Parts

| Description | FRU No. | Qty. |
|---|---------|------|
| Kitting pack for rubber Rubber foot-F LCD side screw cap LCD blind cap | 05K5954 | |
| Pointing stick cap | 84G6536 | |
| Port replicator | 05K5594 | |
| MYLAR pack | 05K6040 | |
| Screw kit Screw mach pan M2*14L NI Screw mach pan M2*4L NI Screw wafer NYLO M2.5*6L B-ZN Screw M3*5L 700 Screw M2.5*L 13.5 steel Screw mach pan M2*20L NI Screw wafer NYLO M2.5*3.5 B-ZN Screw hex nut w/ washer #4 NI Screw pan M2.5*8L | 10L1911 | |
| Miscellaneous Screw cap for modem Blind cover RJ11 RJ-11 blank cover for no modem model LCD latch spring Battery door Latch (R) Latch (L) Battery sw knob CD player power knob CD player panel | 05K5686 | |

Telephone/Modem

| Description | FRU No. | Qty. |
|--|---------|------|
| Modem cable (German) | 27L0441 | |
| Modem cable (UK, NZ) | 27L0442 | |
| Modem cable (France) | 27L0443 | |
| Modem cable (Holland) | 27L0444 | |
| Modem cable (Sweden) | 27L0445 | |
| Modem cable (Norway/Fin) | 27L0446 | |
| Modem cable (Danish) | 27L0447 | |
| Modem cable (Italy) | 27L0448 | |
| Modem cable (Austria) | 27L0449 | |
| Modem cable (Spain) | 27L0450 | |
| Modem cable (Belgium) | 27L0451 | |
| Modem cable (Switzerland) | 27L0462 | |
| Modem cable (Portugal) | 27L0463 | |
| Modem cable (US/C, JPN, TWN, APN, LA, BRZ) | 27L0465 | |
| Modem cable (Australia) | 27L0467 | |
| Psion sage OBI PCMCIA modem (Germany) | 02K4211 | 1 |
| Psion sage OBI PCMCIA modem (France) | 02K4213 | 1 |
| Psion sage OBI PCMCIA modem (UK) | 02K4210 | 1 |
| Psion sage OBI PCMCIA modem (Australia) | 10L7370 | 1 |
| Psion sage OBI PCMCIA modem (New Zealand) | 10L7376 | 1 |
| PCMCIA to RJ-11 Cable | 02K4228 | 1 |

Power Cord

| Description | FRU No. | Qty. |
|-----------------------|---------|------|
| US/Canada/Taiwan | 76H3516 | |
| Europe | 76H3518 | |
| UK | 76H3524 | |
| Italy | 76H3530 | |
| Switzerland | 76H3528 | |
| Japan | 13H5273 | |
| China | 02K0539 | |
| Korea | 76H3535 | |
| Australia/New Zealand | 76H3514 | |

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| PC-Doctor | Watergate Software, Inc. |
| PCMCIA | Personal Computer Memory Card Interface Association |
| Pentium | Intel Corporation |



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