IBM Mobile Systems
ThinkPad Computer
Hardware Maintenance Manual

December 2000

This manual supports:
ThinkPad TransNote (MT 2675)

Note

Before using this information and the product it supports, be sure to read the general information under “Notices” on page 144.

Second Edition (December 2000)

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Introduction

Important service information

Important

Diskette fixes are customer-installable. The diskette fixes are posted on the IBM support site (`http://www.pc.ibm.com/support/`).

Advise customers to contact the PC Company HelpCenter at 800-772-2227 if they need assistance in obtaining or installing any diskette fixes.

Customers in Canada should call IBM HelpPC at 800-565-3344 for assistance or download information.

Strategy for replacing FRUs

Before replacing parts

Make sure that all diskette fixes are installed before 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 but the replacement 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 replacing one of them does not correct the problem, reinstall that board, and then replace the other one.
- If an adapter or device consists of more than one FRU, any of the FRUs may be the cause of the error. 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

The setup configuration on the computer you are servicing may have been customized. Running Automatic Configuration may alter the settings. Note the current configuration settings (using the View Configuration option); then, when service has been completed, verify that those settings remain in effect.

Strategy for replacing a hard-disk drive

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 may have been changed. Be extremely careful during write operations such as copying, saving, or formatting. If you select an incorrect drive, data or programs can be overwritten.

How to use error messages

Use the error codes displayed on the screen to diagnose failures. If more than one error code is displayed, begin the diagnosis with the first error code. Whatever causes the first error code may also cause false error codes. 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.

Diskette compatibility matrix

The compatibility of each of the drives with the diskettes for it is as follows:

Diskette drive	Diskette capacity	Compatibility
3.5-inch	1.0 MB	Read and write
	2.0 MB	Read and write
	4.0 MB	Not compatible

Safety notices: multilingual translations

In this manual, safety notices appear in English with a page number reference to the appropriate translation in this section.

The safety notices are provided in English, French, German, Italian, and Spanish, as follows:

Safety notice 1

Before the computer is powered-on after FRU replacement, make sure all screws, springs, and 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 é stata effettuata la sostituzione di una FRU, accertarsi che tutte le viti, le molle e tutte le altri parti di piccole dimensioni siano nella corretta posizione e non siano sparse all'interno dell'elaboratore. Verificare ci ÚÚ scuotendo l'elaboratore e prestando attenzione ad eventuali rumori; eventuali parti o pezzetti metallici possono provocare cortocircuiti pericolosi.

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

Safety notice 2

⚠ **DANGER:**

Some standby batteries contain a small amount of nickel and cadmium. Do not disassemble a standby battery, 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.

(continued)

Continuation of Safety notice 2

⚠ DANGER:

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

⚠ DANGER:

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

⚠ **DANGER:**

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

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

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

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

(continued)

Continuation of Safety notice 4

⚠ **DANGER:**

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

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, and 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 toolcase 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. Make sure 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: An electrical shock can occur only when there is a complete circuit. By observing the above rule, you may prevent a current from passing through your body.
  - When using testers, set the controls correctly and use the approved probe leads and accessories for that tester.
  - Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames.

  Observe the special safety precautions when you work with very high voltages; these instructions are in the

safety sections of maintenance information. Use extreme care when measuring high voltages.
- Regularly inspect and maintain your electrical hand tools for safe operational condition.
- Do not use worn or broken tools and testers.
- *Never assume* that power has been disconnected from a circuit. First, *check* that it has been powered off.
- Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, nongrounded power extension cables, power surges, and missing safety grounds.
- Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and machine damage.
- Do not service the following parts *with the power on* when they are removed from their normal operating places in a machine:
  - Power supply units
  - Pumps
  - Blowers and fans
  - Motor generators

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

Safety inspection guide

The purpose of this inspection guide is to assist you in identifying potentially unsafe conditions. As each machine was designed and built, required safety items were installed to protect users and service personnel from injury. This guide addresses only those items. You should use good judgment 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 a bulging capacitor
- Mechanical hazards, such as loose or missing hardware

To determine whether there are any potentially unsafe conditions, use the following checklist at the beginning of every service task. 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 Ω or less between the external ground pin and frame ground.
   b. The power cord should be the type specified in the parts list.
   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 or DVD drive. CD-ROM drives or DVD drives are also sold separately as options. The CD-ROM drive or DVD drive is a laser product. The CD-ROM drive or DVD 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 or DVD 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 or DVD drive could result in exposure to hazardous laser radiation. There are no serviceable parts inside the CD-ROM drive or DVD drive. **Do not open.**

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

⚠ DANGER:

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

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

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

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

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

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

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

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

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

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

General descriptions

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

Read this first

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

Important notes

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

What to do first:

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

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

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

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

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

The following are not covered under warranty:
- LCD panel cracked from the application of excessive force or from being dropped
- Scratched (cosmetic) parts
- Cracked or broken plastic parts, broken latches, broken pins, or broken connectors caused by excessive force
- Damage caused by liquid spilled into the system
- Damage caused by the improper insertion of a PC Card or the installation of an incompatible card
- Damage caused by foreign material in the diskette drive
- Diskette drive damage caused by pressure on the diskette drive cover or by the insertion of a diskette with multiple labels
- Damaged or bent diskette eject button
- Fuses blown by attachment of a nonsupported device
- Forgotten computer password (making the computer unusable)
- Sticky keys caused by spilling a liquid onto the keyboard

The following symptoms might indicate damage caused by nonwarranted activities:
- Missing parts might be a symptom of unauthorized service or modification.
- If the spindle of a hard-disk drive become noisy, it may have been subjected to excessive force, or dropped.

Related service information

This section provides information about the following:

- "Service Web site"
- "Using Recovery CD"
- "Passwords" on page 22
- "Power management" on page 24

Service Web site

When the latest maintenance diskette and the system program service diskette are available, a notice will be posted on `http://www.pc.ibm.com/partner/infotips/`

Using Recovery CD

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

To create Service Partition [SP]:

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

   Note: If the hard-disk drive contains any partitions, you will not receive this menu — go to step 1.
4. Enter "**Y**" and Service Partition will be created and loaded with D2D files.

   Note: If you do not want to create Service Partition, press "**N**", and then go to step 8.
5. Press "**ENTER**" at next window to continue.
   - Service Partition will be created. System will automatically reboot during this precess.
   - Recovery process will copy some files to the Service Partition, PKUNZIP others.
   - Follow prompts — you may be prompted to change CDs.
   - System will reboot when complete, continue to step 6 to install preloaded system.

Install preloaded system from CD:

6. Boot with Recovery CD (and boot diskette if required)
7. If the hard-disk drive is blank, a menu will appear stating "**Your computer originally included a Product Recovery program ... Reinstall the Product Recovery Program? (Y/N) [ ]**".
   - To install Service Partition, go to step 4.
   - To preload hard-disk drive without installing Service Partition, press "**N**".

8. If a menu appears asking which operating system to install, highlight proper operating system and press "**ENTER**".
9. A menu will appear stating "**Full Recovery:**". Press "**ENTER**" to select.
10. Enter "**Y**" at the three windows which follow.
11. Follow prompts to complete Recovery.

Passwords

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

Exception: If only SVP is installed, the password prompt does not appear when the operating system is booted.

When any of these passwords is used, a password prompt appears on the screen whenever the computer is turned on. The computer does not start until the password is entered.

Power-on password:

A power-on password (POP) protects the system from being powered on by an unauthorized person. Without knowing the password, nobody can start the system.

Hard-disk password:

There are two hard-disk passwords (HDPs):

- User HDP—for the user
- Master HDP—for the system administrator, who can use it to get access to the hard disk even if the user has changed the user HDP

Note: There are two modes for the HDP: **User only** and **Master + User**. You can enter two HDPs when you select **Master + User**.

Attention

If the master HDP has been forgotten, there is no way to delete it. But you can still get access to the hard disk if you remember the user HDP. If both user HDP and master HDP have been forgotten, the password cannot be removed and the hard disk will not be accessible.

Supervisor password:

A supervisor password (SVP) protects the system information stored in the IBM BIOS Setup Utility so that

without knowing the password, nobody can change the configuration of the computer.

Attention

If the SVP has been forgotten, there is no way to reset it.

How to remove the power-on password

To remove a POP that you have forgotten, do the following:

(A) If SVP is not installed:

1. Turn off the computer.
2. Remove the battery pack.
   For how to remove the battery pack, see "1010 Battery pack" on page 56.
3. Remove the backup battery.
   For how to remove the backup battery, see "1060 Backup battery and sub-battery" on page 73.
4. Turn on the computer and wait until the POST ends. After the POST ends, the password prompt does not appear. The POP has been removed.
5. Reinstall the backup battery and the battery pack.

(B) If SVP is installed:

1. Turn on the computer by pressing and holding **F1**.
2. Enter the SVP. The IBM BIOS Setup Utility menu appears.
3. Select **Password**, using the cursor keys to move down the menu.
4. Select **Power-On Password**.
5. Enter the SVP, at the Enter Current Password field.
6. When the Enter New Password field opens, leave it blank and press **Enter** twice.
7. Press **Enter** in the Changes have been saved window.
8. Press **F10**; then select **Yes** in the Setup confirmation window.

How to remove the hard-disk password

Attention

If **User only** mode is selected and the user HDP is forgotten, there is no way to reset it.

To remove the user HDP that you have forgotten, do the following:

1. Power on the computer by pressing and holding **F1**.
2. Enter the SVP. The IBM BIOS Setup Utility menu appears.

3. Select **Password**, using the cursor keys to move down the menu.
4. Select **Hard-disk** *x* **password**, where *x* is the letter of the hard-disk drive. A pop-up window opens.
5. Select either **User HDP** or **Master HDP**.
6. Enter the master HDP; then leave the New Password field blank and press **Enter** twice.
7. Press **F10**.
8. Select **Yes** in the Setup Configuration window.

   Both user HDP and master HDP have been removed.

Power management

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

Screen blank mode:

In screen blank mode, the following occurs:

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

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

Standby mode:

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

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

To enter standby mode, do any of the following:

- Press **Fn** + **F4**.
- Close the ThinkPad TransNote computer. (To prevent the computer from entering standby mode when the computer is closed, click **Will not suspend even if LCD is closed** in the Power Management Properties window. Then only the LCD turns off.)

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

- If a “suspend time” has been set on the timer, and the user does not do any operation with the keyboard, the TrackPoint, the hard disk, the parallel connector, or the diskette drive within the time set.
- If the ac adapter is plugged in.

- If the battery indicator blinks orange, indicating that the battery power is low. (Alternatively, if **Hibernate when battery becomes low** has been selected in the ″Power Management Properties″ window, the computer goes into hibernation mode.)

Note: Even if you don't set the low-battery alarm, the charge indicator lets you know that the battery is low, and then the computer enters the power-saving mode automatically. This default low-battery behavior is independent of the operating system; so if you have set the low-battery alarm, the computer may not do what you specified. It chooses either your setting or the default setting, whichever is appropriate.

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

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

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

Hibernation mode:

In hibernation mode, the following occurs:

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

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

- The **Fn + F9** keys are pressed.
- The power switch is turned off and the mode is set to **Power switch mode [Hibernation]**.
- The timer conditions are satisfied in suspend mode (for operating systems other than Windows 98).
- A critically low battery condition occurs and the mode is set to **Hibernate when battery becomes low**.

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

Checkout guide

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

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

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

Testing the computer

The ThinkPad computer has a test program called PC-Doctor® DOS (hereafter called *PC-Doctor*). You can detect errors by running the diagnostics test included in PC-Doctor. This section is an overview of the procedure. For details that depend on model-unique functions, refer to “Product overview” on page 35.

For some possible configurations of the computer, PC-Doctor might not run correctly. To avoid this problem, you need to initialize the computer setup by using the IBM BIOS Setup Utility before you run PC-Doctor. In the IBM BIOS Setup Utility screen, press **F9**, **Enter**, **F10**, then **Enter**.

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

To run the test, do as follows:

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

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

   If the computer cannot be powered on, go to “Power system checkout” on page 28, and check the power sources.

   If an error code appears, go to “Symptom-to-FRU index” on page 41.

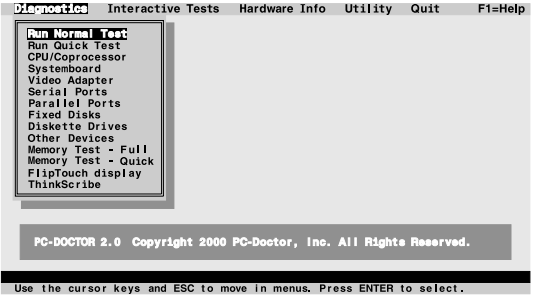
   On the first screen, select the model and press **Enter**. Follow the instructions on the screen.
2. The main panel of PC-Doctor appears.

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

   A pull-down menu appears. (Its exact form depends on the model.) The options on the test menu are as follows:

Diagnostics	Interactive Tests
• Run Normal Test • Run Quick Test • CPU/Coprocessor • Systemboard • Video Adapter • Serial Ports • Parallel Ports • Fixed Disks • Diskette Drives • Other Devices • Memory Test – Full • Memory Test – Quick • FlipTouch Display • ThinkScribe	• Keyboard • Video • Internal Speaker • Mouse • Joystick Test • Diskette • System Load • CD-ROM/DVD Test • Stereo Speaker • ThinkScribe LCD Test • ThinkScribe LED Test • ThinkScribe Interactive Test • FlipTouch Display

Notes:
- In the **Keyboard** test in **Interactive Tests**, the **Fn** key is scanned only once. Each key should be held down for at least 2 seconds; otherwise, it cannot be sensed.
- Sound Card is not recognized in the **Stereo Speaker** in the **Interactive Tests**. To test it, use the audio device test in the **Other Devices** (**Diagnostics**).
- **Video Adapter** test supports only the LCD display on ThinkPad TransNote. Before running PC-Doctor DOS, detach the external monitor.



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

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

Notes:
1. After executing PC-Doctor, check the system time/date and reset them if needed.

2. Following test items in the **Serial Ports** test are FAILED even if these devices are working properly.
   - **External Loopback** test for the FlipTouch display, ThinkScribe, or Debug Port.
   - **Registers And Interrupts** test for the Debug Port.

Detecting system information with PC-Doctor

PC-Doctor can detect the following system information:

Hardware Info

- System Configuration
- Memory Contents
- Physical Disk Drives
- Logical Disk Drives
- VGA Information
- IDE Drive Info
- PCI Information
- PNPISA Info
- SMBIOS Info
- VESA LCD Info

Utility

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

Power system checkout

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

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

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

- “Checking the ac adapter” on page 29
- “Checking operational charging” on page 29

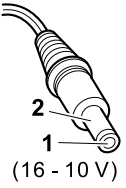
- “Checking the battery pack” on page 30
- “Checking the backup battery” on page 31
- “Checking the sub-battery” on page 31

Checking the ac adapter

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

- If the power problem occurs only when the port replicator is used, replace the port replicator.
- If the power-on indicator does not turn on, check the power cord of the ac adapter for correct continuity and installation.
- If the computer does not charge during operation, go to ″Checking operational charging.″

1. Unplug the ac adapter cable from the computer.
2. Measure the output voltage at the plug of the ac adapter cable. See the following figure:



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

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

If the voltage is acceptable, do the following:

- Replace the system board.
- If the problem persists, go to “Product overview” on page 35.

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

Checking operational charging

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

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

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

Checking the battery pack

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

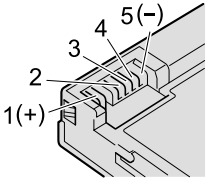
To ensure a maximum battery charge continue charging the battery for about 30 minutes after the charge indicator reaches 100%.

To check the status of your battery, move your cursor to the Power Meter icon in the icon tray of the Windows taskbar and wait for a moment (but do not click), and the percentage of battery power remaining is displayed. To get detailed information about the battery, double-click the Power Meter icon.

Note: If the battery pack becomes hot, it may not be able to charge. Remove it from the computer and leave it at room temperature for a while. After it cools down, reinstall and recharge it.

To check the battery pack, do the following:

1. Power off the computer.
2. Remove the battery pack and measure the voltage between battery terminals 1 (+) and 5 (−). See the following figure:



Terminal	Voltage (V dc)
1	+ 0 to + 16.8
5	Ground (−)

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

   Note: Recharging will take at least 3 hours, even if the indicator does not turn on.

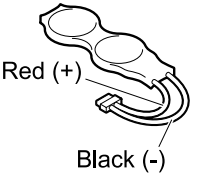
   If the voltage is still less than +11.0 V dc after recharging, replace the battery.
4. If the voltage is more than +11.0 V dc, measure the resistance between battery terminals 4 and 5. The resistance must be 4 to 30 KΩ.

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

Checking the backup battery

Do the following:

1. Power off the computer, and unplug the ac adapter from it.
2. Remove the battery pack (for the removal procedure, see “1010 Battery pack” on page 56).
3. Remove the backup battery (for the removal procedure, see “1060 Backup battery and sub-battery” on page 73).
4. Measure the voltage of the backup battery. See the following figure.



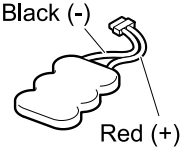
Wire	Voltage (V dc)
Red	+2.5 to +3.2
Black	Ground

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

Checking the sub-battery

Do the following:

1. Recharge the sub-battery; it might have been discharged.
2. Power off the computer, and unplug the ac adapter from it.
3. Remove the battery pack (for the removal procedure, see “1010 Battery pack” on page 56).
4. Remove the sub-battery (for the removal procedure, see “1060 Backup battery and sub-battery” on page 73).
5. Measure the voltage of the sub-battery. See the following figure.



Wire	Voltage (V dc)
Red	+6.0 to +9.0
Black	Ground

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

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Product overview

This section presents the following product-unique information:

- “Specifications”
- “Status indicators” on page 36
- “FRU tests” on page 38
- “Fn key combinations” on page 39

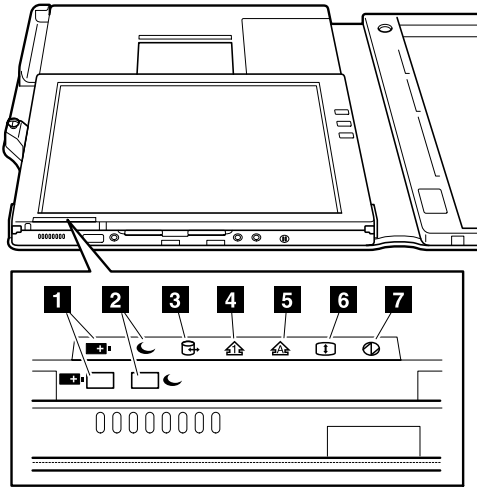
Specifications

The following table lists the specifications of the ThinkPad TransNote:

Feature	Description
Processor	Intel® mobile Pentium® III processor 600 featuring Intel® SpeedStep™ technology
Bus architecture	PCI Bus
Memory (standard)	64 MB (on the system board)
Memory (optional)	64 MB, 128 MB, or 256 MB DIMM card (maximum of 320 MB)
CMOS RAM	114 bytes + 4 Kbytes
Display	10.4-inch, 16M colors, SVGA (800×600 resolution) TFT color LCD with touch screen display
Hard-disk drive	10.0 GB, 2.5-inch, IDE interface
I/O port	• External monitor • Line-in • Headphone • Microphone • Port replicator connector • Universal serial bus (USB) connectors • RJ11 • RJ45
CompactFlash	CompactFlash card
Internal modem	56.6 Kbps
Audio	• Internal microphone • Internal speaker • Software control volume
Infrared transfer	IrDA 1.1
PC Card	Type-I or II
AC adapter	56-watt type or 72-watt type

Status indicators

The system status indicators show the status of the computer, as follows:



Indicator	Meaning
1 Battery	**Green:** The battery is fully charged. **Blinking green:** The battery has enough power to operate, but is being charged. **Orange:** The battery power is low. The battery is being charged. **Blinking orange:** The battery needs to be charged. When the indicator starts blinking orange, the computer beeps three times.
2 Standby status	**Green:** The computer is in standby mode. **Blinking green:** The computer is entering standby mode or hibernation mode, or is resuming normal operation. This indicator does not blink in Windows 98, Windows 2000 and Windows Me.

(continued)

Indicator	Meaning
3 Drive in use	**Green:** Data is being read from or written to the hard-disk drive. When this indicator is on, do not put the computer into standby mode or turn off the computer. **Note:** Do not move the system while the Green drive in use light is on. Sudden physical shock could cause drive errors.
4 Num lock	**Green:** The numeric keypad on the keyboard is enabled. To enable or disable the keypad, press and hold the **Fn** key while pressing the **NumLk** key.
5 Caps lock	**Green:** Caps Lock mode is enabled. To enable or disable Caps Lock mode, press **Fn** + **Caps Lock** key.
6 Scroll lock	**Green:** Scroll Lock mode is enabled. Arrow keys can be used as screen-scroll function keys, but not to move the cursor. To enable or disable Scroll Lock mode, press **Fn** + **ScrLk** key. Not all application programs support this function.
7 Power on	**Green:** This indicator stays lighted whenever the computer is on. If the power-on indicator is on and the standby indicator is off, the system is ready to use. If both the power-on indicator and the standby indicator are on, you can use the computer after it returns from the standby mode and the standby indicator goes off.

FRU tests

The following table shows the test for each FRU.

FRU	Applicable test
System board	1. **Diagnostics** --> **CPU/Coprocessor** 2. **Diagnostics** --> **Systemboard**
Power	**Diagnostics** --> **Other Devices** --> **IBM AC Adapter, IBM Battery 1**
LCD unit	1. **Diagnostics** --> **Video Adapter** 2. **Interactive Tests** --> **Video**
Modem	1. Make sure the modem is set up correctly. 2. Replace the modem jack and the modem card in turn, and run the following tests in **Diagnostics** --> **Other Devices**: • Modem Register Test • Modem DTMF/Loopback Test
Audio	1. **Interactive Tests** --> Internal Speaker 2. **Diagnostics** --> **Other Devices** --> **Crystal SoundFusion™ Test**
Speaker	**Interactive Tests** --> Internal Speaker
PC Card slots	**Diagnostics** --> **Systemboard** --> **PCMCIA, PCMCIA External Loop**
Keyboard	1. **Diagnostics** --> **Systemboard** --> **Keyboard** 2. **Interactive Test** --> **Keyboard**
TrackPoint or pointing device	If the TrackPoint does not work, check the configuration in the ThinkPad Configuration program. If the TrackPoint is disabled, select **Enable** to enable it. After you use the TrackPoint, the pointer may drift on the screen for a short time. This drift can occur when a slight, steady pressure is applied to the TrackPoint pointer. This symptom is not a hardware problem. No service action is necessary if the pointer stops after a short time. If enabling the TrackPoint does not correct the problem, continue with the following: • **Interactive Tests** --> **Mouse**

(continued)

FRU	Applicable test
Hard-disk drive	**Diagnostics** --> **Fixed Disks**
Diskette drive	1. **Interactive Tests** --> **CD-ROM/DVDDiskette Drives** 2. **Interactive Tests** --> **Diskette**
CD-ROM or DVD drive	**Interactive Tests** --> **CD-ROM/DVD**
Memory	1. Run **Memory Test - Quick**. 2. If the test does not detect the error, run **Diagnostics** --> **Memory Test - Full**.
Fan	1. Turn on the computer and check the air turbulence at the louver of the rear side. 2. Run **Diagnostics** --> **Other Devices** --> **IBM Fan**.
FlipTouch display	See “Identifying problems with the FlipTouch display” on page 47.
ThinkScribe digital notepad	See “Identifying problems with the ThinkScribe digital notepad” on page 47.

Fn key combinations

The following table shows the function of each combination of **Fn** with a function key. The **Fn** key works independently from the operating system.

Key combination	Description
Fn + **F3**	Turn off the computer display, leaving the screen blank. To turn the computer display on again, press any key or the TrackPoint pointer. Also the computer display is turned on if the ac adapter is attached to or detached from the computer.
Fn + **F4**	Put the computer in standby mode. To return to normal operation, press the Fn key. **Note:** In Windows 2000, this combination of buttons functions as a sleep button. Customer can change the settings so that pressing it puts the computer into hibernation mode or even shuts the computer down.

(continued)

Key combination	Description
Fn + **F5**	Brightness down.
Fn + **F6**	Brightness up.
Fn + **F7**	Display output on the computer display, an attached external monitor, or both. Pressing this combination causes the display to go from the computer display to the external monitor, then to both together, and then to the computer display again. **Note:** This function is not supported when the computer is in large desktop mode or when the computer output is driven by the secondary CRT controller.
Fn + **F8**	Switch the computer screen size between expanded and normal mode if your screen image is smaller than the physical display. **Note:** This function is not supported in Windows 2000.
Fn + **F9**	Turn hibernation mode on. To return to normal operation, press the power button for less than four seconds.
Fn + **F10**	Gives the same function as pressing the print screen key.
Fn + **F11**	Gives the same function as pressing the scroll lock key.
Fn + **Spacebar**	Enable or disable the FullScreen Magnifier function.
Fn + **Insert**	The volume decreases.
Fn + **Delete**	The volume increases.
Fn + **Backspace**	The sound is muted.
Fn + **−**	Gives the same function as pressing the numeric lock key.
Fn + ↑	Page up.
Fn + ↓	Page down.
Fn + ←	Gives the same function as pressing the home key.
Fn + →	Gives the same function as pressing the end key.
Fn + **=**	Gives the same function as pressing the break key.
Fn + **Left shift**	Gives the same function as pressing the caps lock key.

Symptom-to-FRU index

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

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

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

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

If no numeric code is displayed, check the narrative descriptions of symptoms. If the symptom is not described there, go to “Intermittent problems” on page 48.

Note

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

Numeric error codes

Symptom or error	FRU or action, in sequence
0175 Bad CRC1, stop POST task — The EEPROM checksum is not correct.	**System board**.
0187 EAIA data access error — The access to EEPROM has failed.	**System board**.
0188 Invalid RFID serialization information area or bad CRC2 — The EEPROM checksum is not correct.	**System board**.
0189 Invalid RFID configuration information area — The EEPROM checksum is not correct.	**System board**.

(continued)

Symptom or error	FRU or action, in sequence
0190 Critical low battery error.	1. **Charge the battery pack**. 2. Battery pack.
0200 Hard disk error — The hard disk is not working.	1. **Reseat the hard-disk drive**. 2. Load Setup Defaults in IBM BIOS Setup Utility. 3. Hard-disk drive. 4. System board.
021x Stuck key — Keyboard error.	**Run interactive tests of the keyboard and the auxiliary input device**.
0220 Monitor type error — Monitor type does not match the one specified in CMOS.	**Load Setup Defaults in IBM BIOS Setup Utility**.
0230 Shadow RAM error — The shadow RAM failure at offset nnnn.	**System board**.
0231 System RAM error — System RAM failure at offset nnnn.	1. **DIMM**. 2. System board.
0232 Extended RAM error — Extended RAM failure at offset nnnn.	1. **DIMM**. 2. System board.
0250 System battery error — System battery is dead.	**Replace the backup battery and run IBM BIOS Setup Utility to reset the time and date**.
0251 System CMOS checksum bad — Default configuration used.	**Reconfigure the settings by running IBM BIOS Setup Utility**.
0252 Password checksum bad — The password is cleared.	**Reset the password by running IBM BIOS Setup Utility**.
0260 System timer error.	1. **Replace the backup battery and run IBM BIOS Setup Utility to reset the time and date**. 2. System board.
0270 Real-time clock error.	1. **Replace the backup battery and run IBM BIOS Setup Utility to reset the time and date**. 2. System board.
0271 Date and time error — Neither the date nor the time is set in the computer.	**Run IBM BIOS Setup Utility to reset the time and date**.

(continued)

Symptom or error	FRU or action, in sequence
0280 Previous boot incomplete — Default configuration used.	1. **Load Setup Defaults in IBM BIOS Setup Utility**. 2. DIMM. 3. System board.
02F4 EISA CMOS not writable.	1. **Load Setup Defaults in IBM BIOS Setup Utility**. 2. Replace the backup battery. 3. System board.
02F5 DIMM test failure.	1. **DIMM**. 2. System board.
02F6 Software NMI failure.	1. **DIMM**. 2. System board.
02F7 Fail-safe timer NMI failure.	1. **DIMM**. 2. System board.

Error messages

Symptom or error	FRU or action, in sequence
Device address conflict.	1. **Load Setup Defaults in IBM BIOS Setup Utility**. 2. Backup battery. 3. System board.
Allocation error for device.	1. **Load Setup Defaults in IBM BIOS Setup Utility**. 2. Backup battery. 3. System board.
Failing bits: nnnn.	1. **DIMM**. 2. System board.
Invalid system configuration data.	1. **DIMM**. 2. System board.
I/O device IRQ conflict.	1. **Load Setup Defaults in IBM BIOS Setup Utility**. 2. Backup battery. 3. System board.
Operating system not found.	1. **Check that the operating system has no failure and is installed correctly.** 2. Enter IBM BIOS Setup Utility and see whether the hard-disk drive and the diskette drive are properly identified. 3. Reseat the hard-disk drive. 4. Reinstall the operating system. 5. If the diskette drive is connected and the operating system is located on/in the drive, replace the diskette drive. 6. Hard-disk drive. 7. System board.
Hibernation error.	1. **Restore the system configuration to what it was before the computer entered hibernation mode**. 2. If memory size has been changed, re-create the hibernation file.
Fan error.	**Fan**.

Beep symptoms

Symptom or error	FRU or action, in sequence
One beep and a blank, unreadable, or flashing LCD.	1. **Reseat the LCD connector**. 2. LCD assembly. 3. External CRT. 4. System board.
One long and two short beeps, and a blank or unreadable LCD.	1. **System board**. 2. LCD assembly. 3. DIMM.
Two short beeps with error codes.	**POST error. See "Numeric error codes" on page 41.**
Two short beeps with blank screen.	1. **System board**. 2. DIMM.
Three short beeps, pause, three more short beeps, and one short beep.	1. **DIMM**. 2. System board
Only cursor appears.	**Reinstall operating system**.

No beep symptoms

Symptom or error	FRU or action, in sequence
No beep, power-on indicator on, LCD blank, and no POST.	1. **Make sure that every connector is connected tightly and correctly**. 2. DIMM. 3. System board.
No beep, power-on indicator on, and LCD blank during POST.	1. **Reseat DIMM**. 2. System board.
No beep during POST, but system runs correctly.	**Speaker connection or speaker**.
The power-on password prompt.	A power-on password or a supervisor password is set. Type the password and press **Enter**.
The hard-disk password prompt.	A hard-disk password is set. Type the password and press **Enter**.
The DOS full screen looks smaller.	Start the ThinkPad Configuration program and set the **Screen expansion** function.

LCD-related symptoms

Important

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

- **SVGA:** 5 or more bright dots, 5 or more dark dots, or a total of 9 or more bright and dark dots. Bright dots means pixel is always on (white or color.) Dark dots means Pixel is always off (black color.)

Symptom or error	FRU or action, in sequence
No beep, power-on indicator on, and a blank LCD during POST.	**System board**.
• LCD backlight not working. • LCD too dark. • LCD brightness cannot be adjusted. • LCD contrast cannot be adjusted.	1. **Reseat all LCD connectors**. 2. LCD assembly. 3. System board.
• LCD screen unreadable. • Characters missing pixels. • Screen abnormal. • Wrong color displayed.	1. **See important note for "LCD-related symptoms."** 2. Reseat all LCD connectors. 3. LCD assembly. 4. System board.
Horizontal or vertical lines displayed on LCD.	**LCD assembly**. **Note:** The LCD assembly refers to the internal LCD glass panel assembly and not the complete LCD and back panel.

Identifying problems with the FlipTouch display

To analyze a problem with the FlipTouch display, do the following:

1. Make sure that the FlipTouch display is enabled:
   - IBM BIOS Setup Utility --> **Config** --> **FlipTouch Display**
2. Insert the PC-Doctor DOS disk in the diskette drive, and turn on the system unit. For details on using PC-Doctor, see “Testing the computer” on page 26.
3. Run **Diagnostics** and select **FlipTouch display**. If the test fails, one or both of the following are defective:
   - LCD panel 10.4-in. TFT with touch panel (05K9623)
   - LCD cable (27L0544)
4. Run **Interactive Tests** and select **FlipTouch display**. If one or more the positions were not detected properly, one or both of the following are defective.
   - LCD panel 10.4-in. TFT with touch panel (05K9623)
   - LCD cable (27L0544)

Identifying problems with the ThinkScribe digital notepad

To analyze a problem with the ThinkScribe digital notepad, do the following:

1. Make sure that the ThinkScribe digital notepad is enabled:
   - IBM BIOS Setup Utility --> **Config** --> **ThinkScribe**
2. Insert the PC-Doctor DOS disk in the diskette drive, and turn on the system unit. For details on using PC-Doctor, see “Testing the computer” on page 26. While PC-Doctor DOS is starting up, turn the ThinkScribe digital notepad off and on. If the error message ″**ThinkScribe not detected**″ is displayed, do the following;
   a. Turn off the ThinkScribe digital notepad.
   b. Start the ThinkScribe POST by doing the following:
      - Press and hold the power button on the ThinkScribe digital notepad.
      - Push the reset switch on the ThinkScribe digital notepad.
      - While continuing to press and hold the power button, wait for 20 seconds.

      If no error message appears on the LCD, the notepad has passed all the tests of ThinkScribe POST. The problem must be one of the following:
      - The System-Digi cable (27L0556) is not connected properly.
      - The System-Digi cable (27L0556) is defective.

      If an error message does appear on the LCD,

- The ThinkScribe digital notepad assembly (02K5881) is defective.

3. Run **Diagnostics** and select **ThinkScribe**. If the device fails any of the tests, the ThinkScribe digital notepad assembly (02K5881) is defective.
4. Run **Interactive Tests**, and select **ThinkScribe LCD Test**. If the device fails any of the tests, the ThinkScribe digital notepad assembly (02K5881) is defective.
5. Run **Interactive Tests** and select **ThinkScribe LED Test**. If the device fails any of the tests, the ThinkScribe digital notepad assembly (02K5881) is defective.
6. Run **Interactive Tests** and select **ThinkScribe Interactive Test**.
7. Drag the pen from center top to center bottom and from center left to center right of ThinkScribe digital notepad. If all position were detected properly:
   - Both ThinkScribe digital notepad and digital pen are OK.

   If one or more positions were not detected properly, the ThinkScribe digital notepad assembly (02K5881) is defective. If all positions were not detected properly:
   - Digital pen (02K5633) battery is depleted, or
   - Digital pen (02K5633) is defective, or
   - The ThinkScribe digital notepad assembly (02K5881) is defective.

   If the digital-pen tip does not move at all when you press down, and recording LED does not respond:
   - Replace the digitizer pen (02K5633).

Intermittent problems

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

When analyzing an intermittent problem, do the following:

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

Undetermined problems

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

Note: Do not replace any FRU if the procedures do not identify it as defective.

Verify that all attached devices are supported by the computer.

Check the power system; see “Power system checkout” on page 28.

1. Power off the computer.
2. Visually check each FRU for damage. Replace any damaged FRU.
3. Remove or disconnect all of the following devices:
   a. Non-IBM devices
   b. Devices attached to the port replicator
   c. Printer, mouse, and other external devices
   d. Battery pack
   e. Hard-disk drive
   f. External diskette drive
   g. DIMM
   h. CompactFlash card
   i. PC Card
4. Power on the computer.
5. Determine whether the problem has been solved.
6. If the problem does not recur, reconnect the removed devices one at a time, and test the system after each reinstallation. Do this until you find the failing FRU.
7. If the problem remains, replace the following FRUs one at a time (do not replace a nondefective FRU):
   a. System board
   b. LCD assembly

FRU replacement notices

This section contains notices related to removing and replacing parts. Read this section carefully before replacing any FRU.

Screw notices

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

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

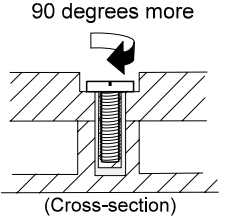
Do the following when you service this machine:

- Keep the screw kit (for the P/N, see “Miscellaneous parts” on page 141) in your tool bag.
- Always use new screws.
- Use a torque screwdriver if you have one.

Tighten screws as follows:

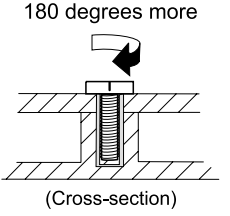
- **Plastic to plastic**

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



- **Logic card to plastic**

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



- **Torque driver**

  If you have a torque driver, refer to the “Torque” column for each step.

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

Retaining serial numbers

This section includes the following descriptions:
- "Restoring the serial number of the system unit"
- "Retaining the UUID"

Restoring the serial number of the system unit

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

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

Before replacing the system board, save the original serial number by doing the following:
1. Install the ThinkPad hardware maintenance diskette version 1.61, and restart the computer.
2. From the main menu, select **1. Set System Identification**.
3. Select **2. Read S/N data from EEPROM**.

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

20: System unit serial number

After you have replaced the system board, restore the serial number by doing the following:
1. Install the ThinkPad hardware maintenance diskette version 1.61 and restart the computer.
2. From the main menu, select **1. Set System Identification**.
3. Select **1. Add S/N data from EEPROM**.

   Follow the instructions on the screen.

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

Retaining the UUID

The Universally Unique Identifier (UUID) is a 128-bit number uniquely assigned to your computer at production and stored in the EEPROM of your system board. The algorithm that generates the number is designed to provide

unique IDs until the year A.D. 3400. No two computers in the world have the same number.

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

1. Install the ThinkPad hardware maintenance diskette version 1.61, and restart the computer.
2. From the main menu, select **4. Assign UUID**.

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

Removing and replacing a FRU

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

1. Do not try to service the computer unless you have been trained and certified. An untrained person runs the risk of damaging parts.
2. Before replacing any FRU, review “FRU replacement notices” on page 50.
3. Begin by removing any FRUs that have to be removed before the failing FRU. Any such FRUs are listed at the top of the page. Remove them in the order in which they are listed.
4. Follow the correct sequence in the steps for removing the FRU, as indicated in the drawings by the numbers in square callouts.
5. When turning a screw to replace a FRU, turn it in the direction indicated by the arrow in the drawing.
6. When removing the FRU, move it in the direction indicated by the arrow in the drawing.
7. To put the new FRU in place, reverse the removal procedure and follow any notes that pertain to replacement. For information about connecting and arranging internal cables, see “Locations” on page 133.
8. When replacing a FRU, use the correct screw as shown in the procedures.

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

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

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

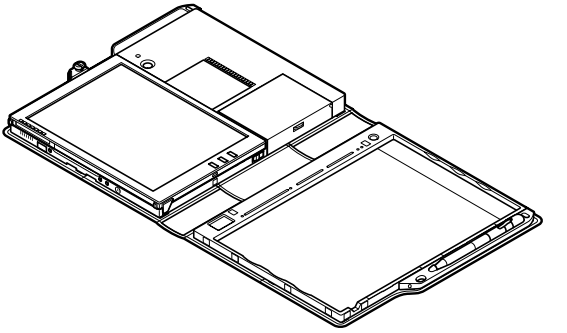
Attention: The system board is sensitive to, and can be damaged by, electrostatic discharge. Establish personal grounding by touching a ground point with one hand before touching these units.

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

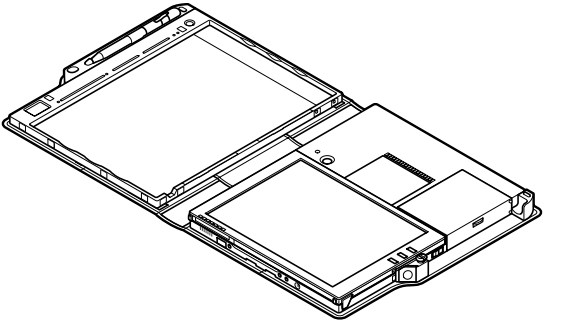
Removing the ThinkPad TransNote

Note: There are two models of the ThinkPad TransNote, one is for a right-handed person and the other or a left-handed person. This manual depicts the right-handed model, but all remove and replace processes remain the same, except the one for the pen holder kit (Section 1070). Section 4010 depicts the process for changing the orientation of a right-handed model to a left-handed model by replacing the Endurimer or leather cover.

The following illustration shows a right-handed ThinkPad TransNote.

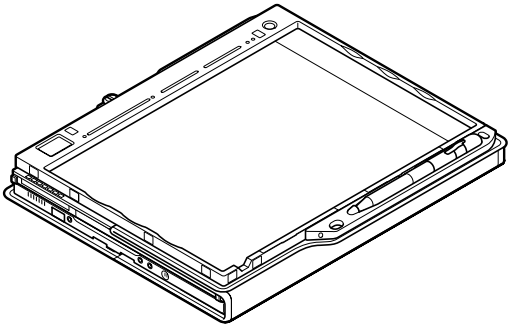


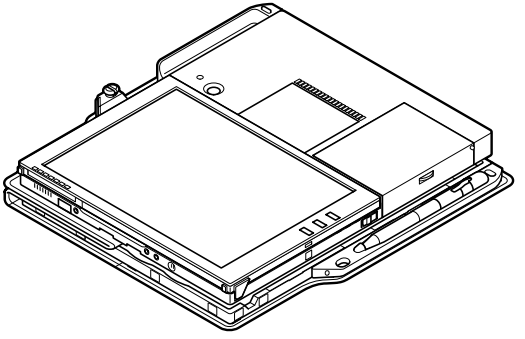
The following illustration shows a left-handed ThinkPad TransNote.



Note for FlexFold hinge

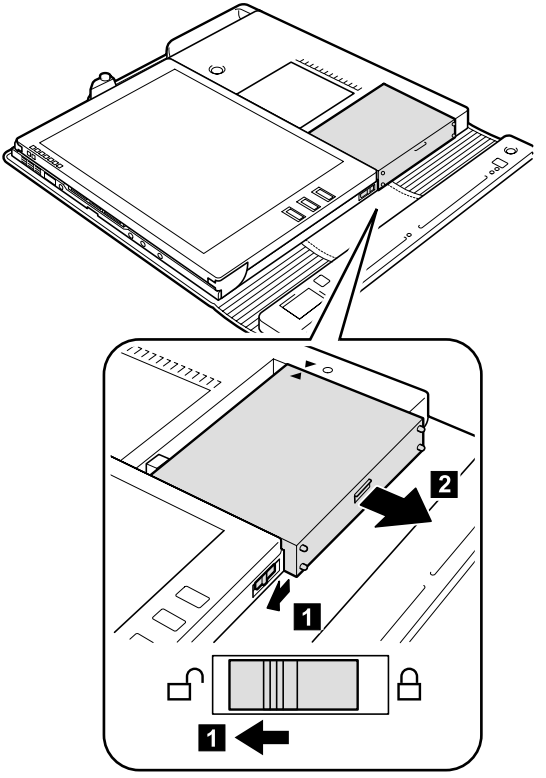
The external portion of the ThinkPad TransNote cover is made of a Endurimer material. This material can be folded in such a way to allow use of the computer or digital notepad without placing either one face down on a surface. See the following examples.





1010 Battery pack

CAUTION:
If the rechargeable battery pack is incorrectly replaced, there is danger of an explosion. The battery pack contains a small amount of harmful substances. To avoid possible injury: (1) replace only with a battery of the type recommended by IBM, or an equivalent, (2) keep the battery pack away from fire, (3) do not expose it to water or rain, (4) do not attempt to disassemble it, (5) do not short-circuit it. Do not put the battery pack in trash that is disposed of in landfills. When disposing of the battery, comply with local ordinances or regulations.



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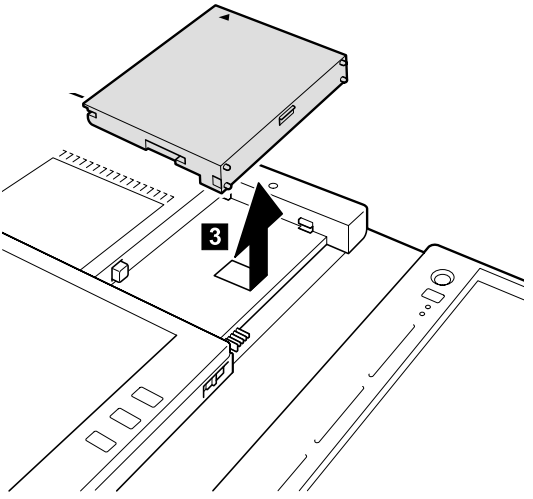
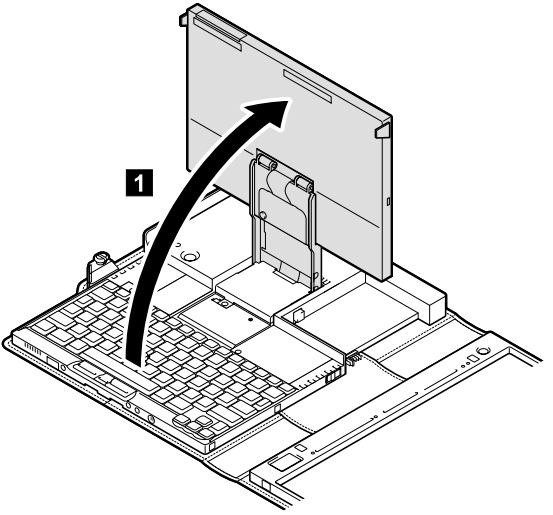
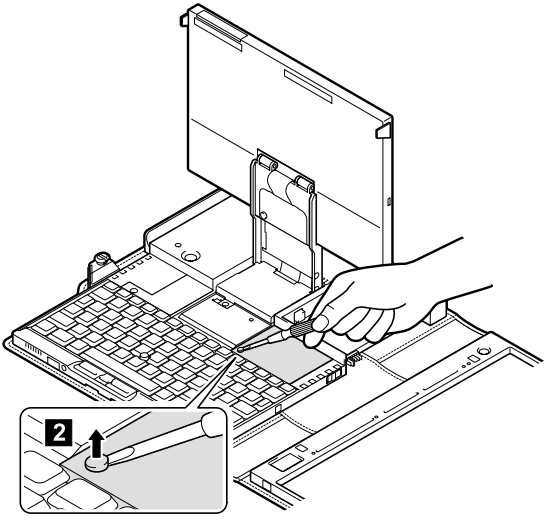

3

1020 DIMM

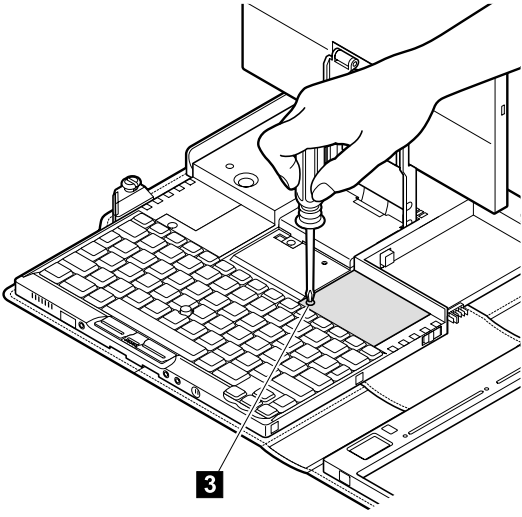
- Battery pack **(1010)**

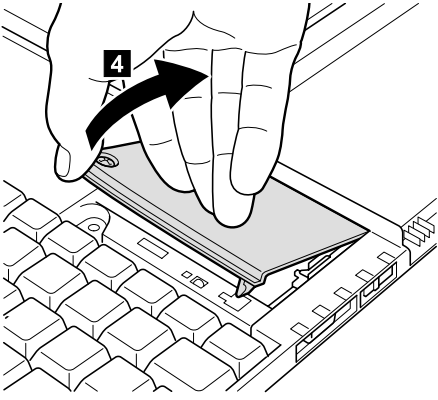




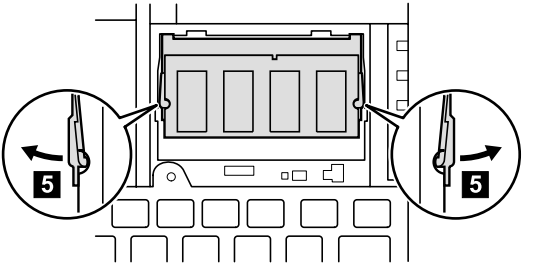
(continued)

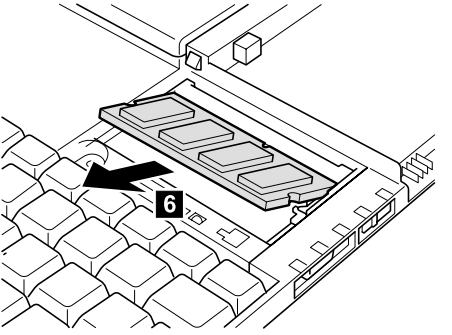
Note: Loosen the screw **3** , but do not remove it.



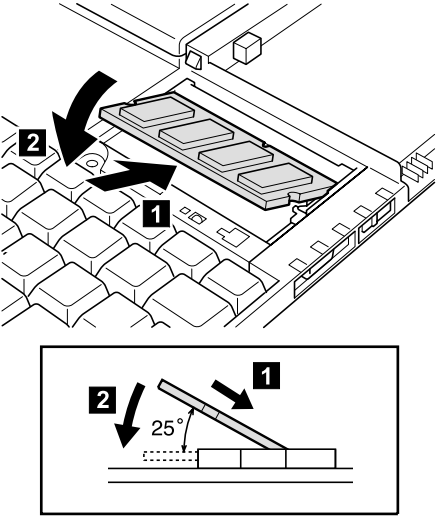


(continued)

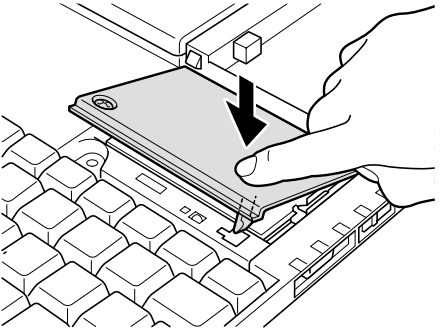

5
5


6

DIMM installation notice:
With the notched end of the DIMM toward the socket, insert the DIMM at an angle of about 25 degrees, into the socket **1** ; then press it firmly. Pivot the DIMM until it snaps into place **2** . Make sure that the card is firmly fixed in the slot and does not move easily.



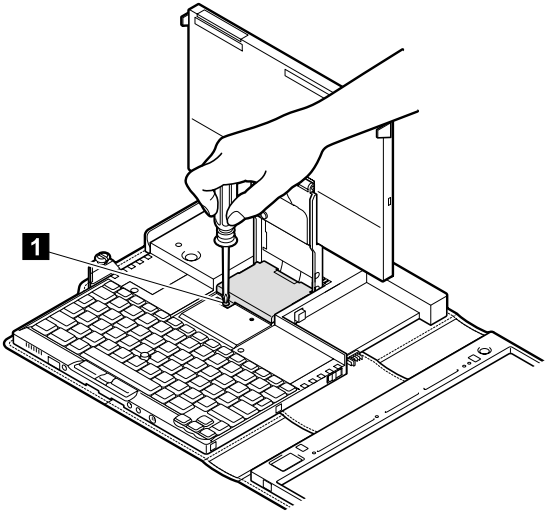
DIMM cover installation notice:
Attach the latch of the cover firmly by pressing the part shown in the following figure, and then tighten the screw.

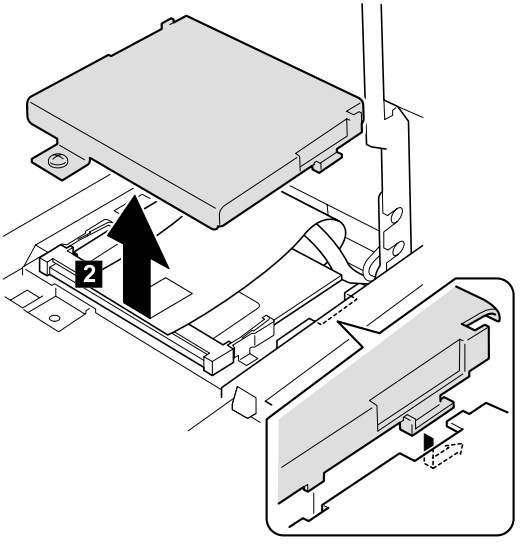


1030 Mini PCI adapter

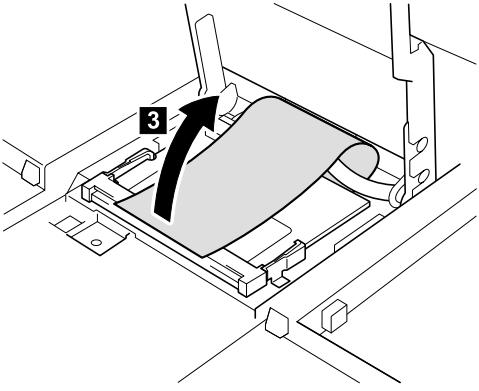
- Battery pack **(1010)**

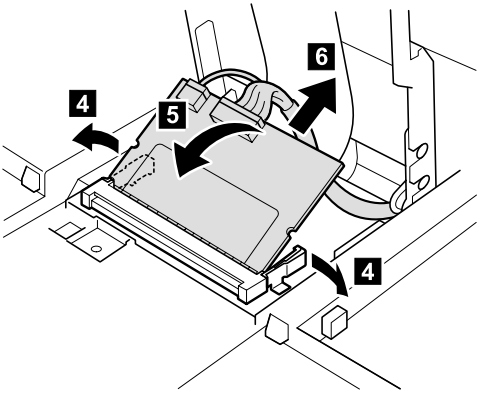
Note: Loosen the screw **1** , but do not remove it.



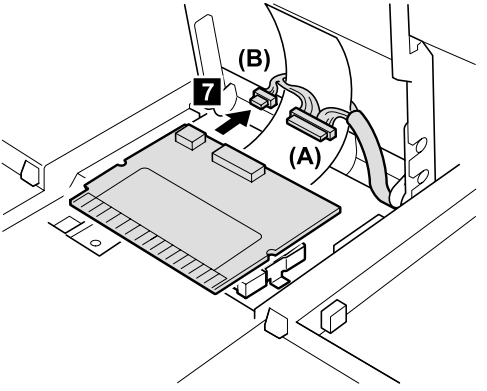


(continued)


3

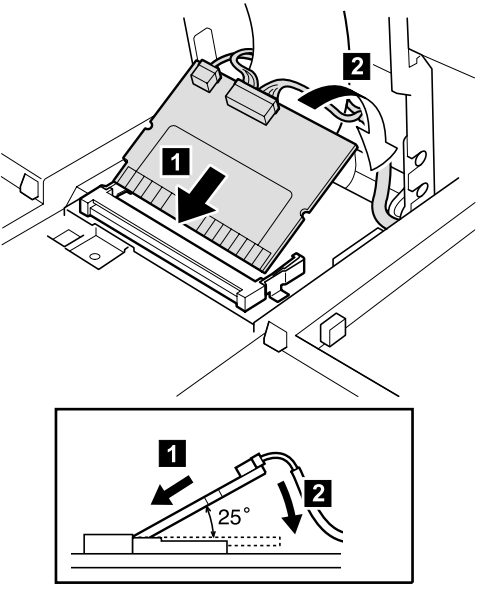

6
4
5
4

Note: The illustration shows the combo card. Connector **(A)** is for the LAN feature and **(B)** is for the modem feature. This slot also supports a Mini PCI modem card or a Mini PCI network card. Step **7** depends on the card type. Disconnect either **(A)**, **(B)** or both.



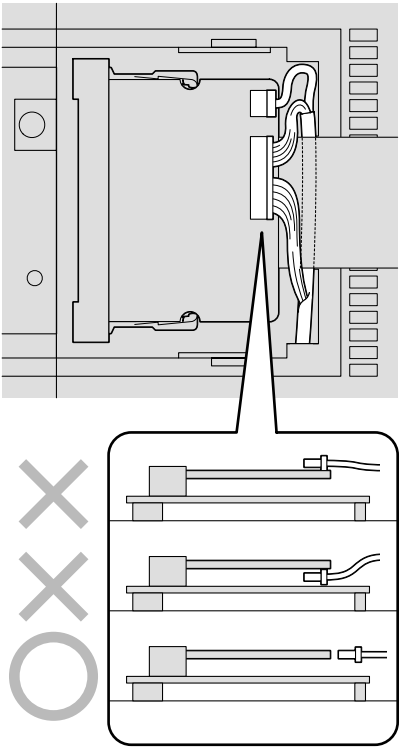
When installing:

Align the contact edge of the combo card or Mini-PCI Card with the corresponding socket contact of the computer at an angle of 25 degrees. Insert the card into the socket **1** . Pivot the card until it snaps into place **2** . Make sure that the card is firmly fixed in the slot and does not move easily.



(continued)

Note: Be sure that connectors and cables are properly housed in the slot as shown in the following figure. Otherwise, the card cannot be seated firmly in it.



After installing the Mini-PCI Card, attach the black sheet to the card. If the sheet does not stick to the slot on the video card, just leave it and install the Mini-PCI slot cover not to pinch the cable or the black sheet.

1040 Hard-disk drive and hard-disk drive cover

Attention

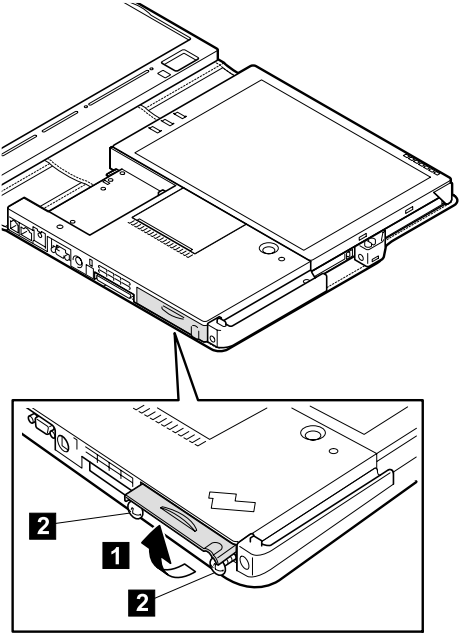
Do not drop or apply any shock to the hard-disk drive. The hard-disk drive is sensitive to physical shock. Incorrect handling can cause damage and permanent loss of data.

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

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

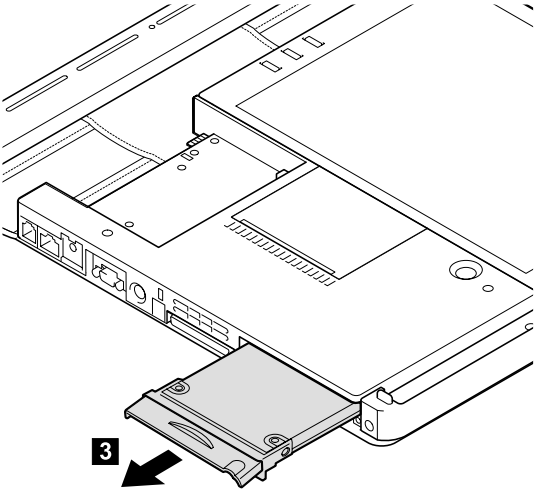
- Battery pack **(1010)**

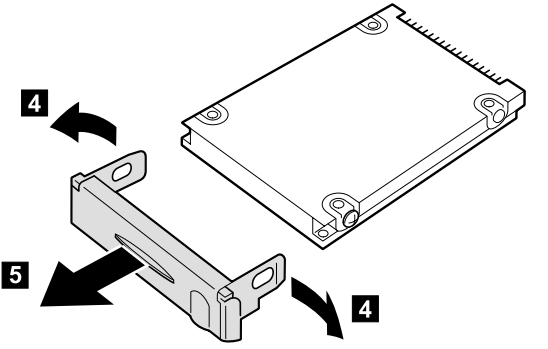
Note: Loosen the screw **2** , but do not remove it.



(continued)

Note: The hard disk is attached to the cover, but the cover is a separate FRU.

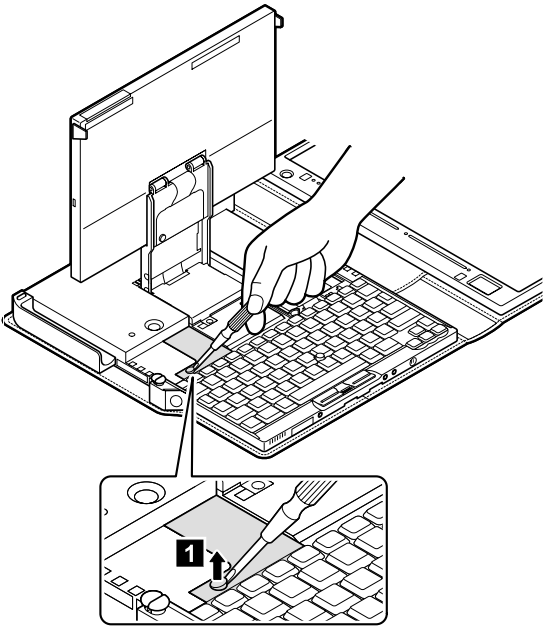




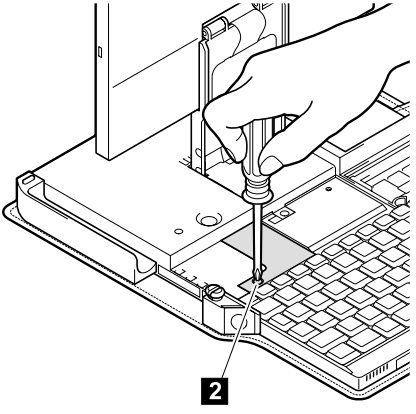
When installing: Make sure that the label on the hard-disk drive faces the bottom side of the computer and that the hard-disk connector is firmly connected.

1050 Keyboard

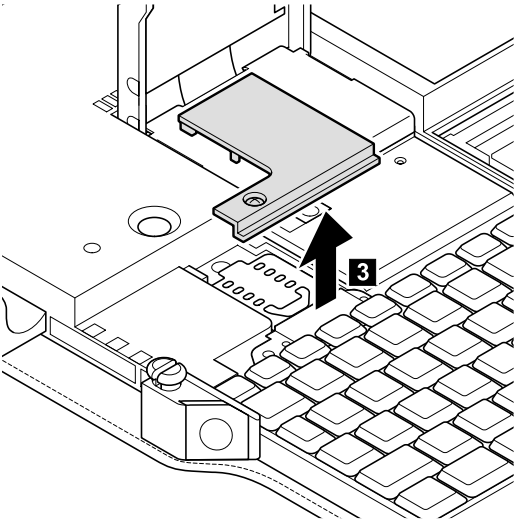
- Battery pack **(1010)**
- DIMM **(1020)**
- Hard-disk drive and hard-disk drive cover **(1040)**

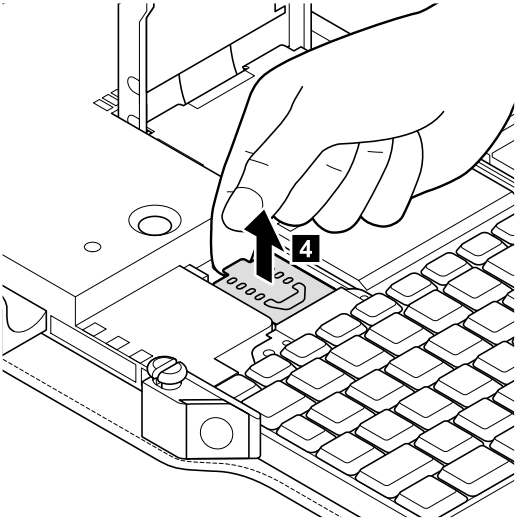


Note: Loosen the screw **2**, but do not remove it.

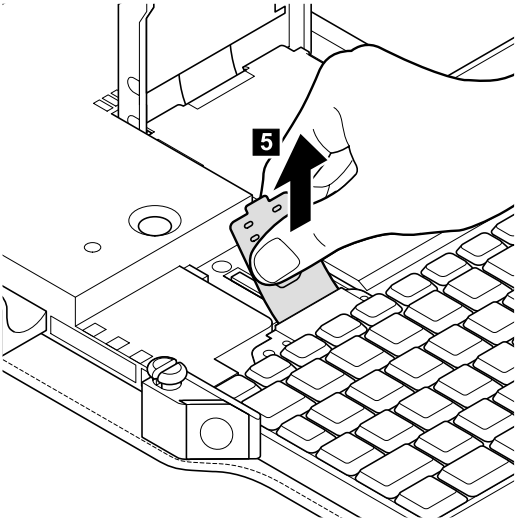


(continued)

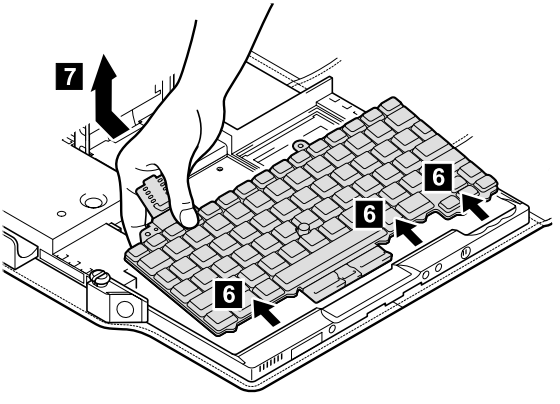




(continued)

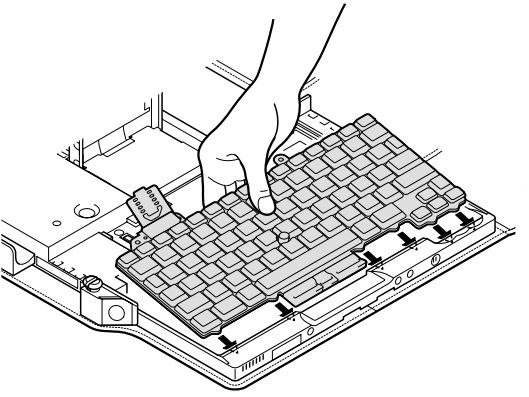


When installing: Make sure that the keyboard connector is firmly attached.

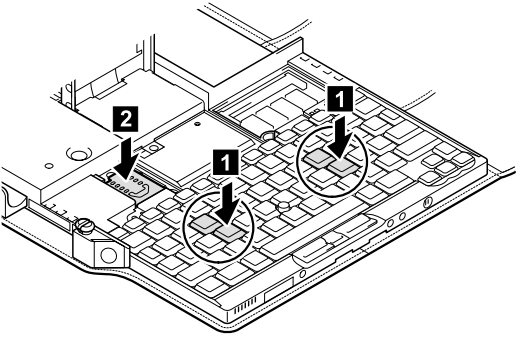


When installing: When installing the keyboard, do as follows:

1. Make sure that the front edges of the keyboard are under the frame as shown in the following figure.



2. Push the **E** key and **D** keys and **O** key and **L** keys **1** to latch the keyboard to the frame; then connect the keyboard connector **2** .

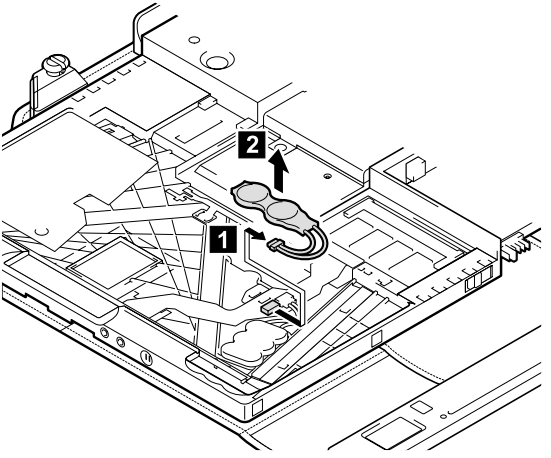


1060 Backup battery and sub-battery

CAUTION:
There is a danger of an explosion if the backup battery is incorrectly replaced. The lithium battery (IBM P/N 02K6572 UL-recognized component [file no. MH12210]) contains lithium and can explode if it is not properly handled or disposed of. Replace only with a battery of the same type. To avoid possible injury or death, do not (1) throw or immerse the battery into water, (2) allow it to heat to more than 100°C (212°F), or (3) attempt to repair or disassemble it. Dispose of it as required by local ordinances or regulations.

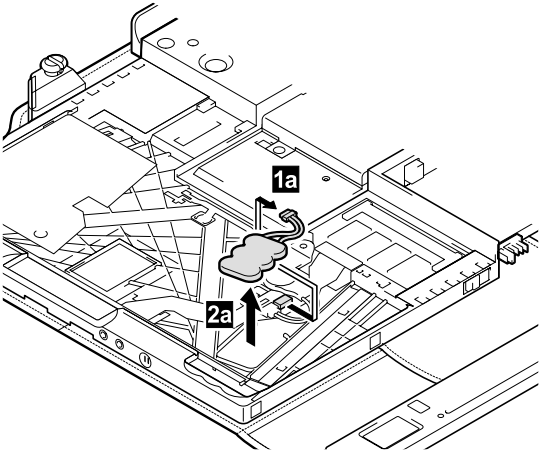
- Battery pack **(1010)**
- DIMM **(1020)**
- Mini PCI adapter **(1030)**
- Hard-disk drive and hard-disk drive cover **(1040)**
- Keyboard **(1050)**

Note: Procedure **1** and **2** are for the backup battery. **1a** and **2a** are for the sub-battery.



When installing: Make sure that the connector is firmly attached.

(continued)

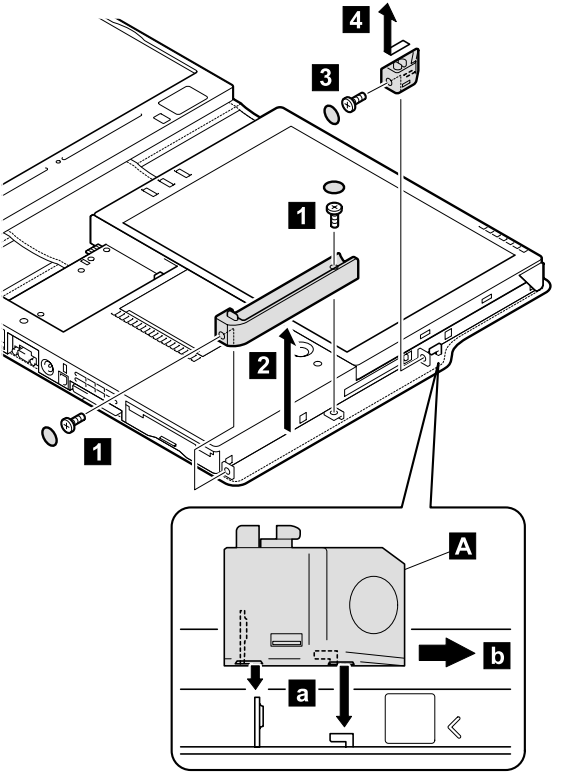


When installing: Make sure that the connector is firmly attached.

1070 Digital-pen holder kit

- Battery pack **(1010)**

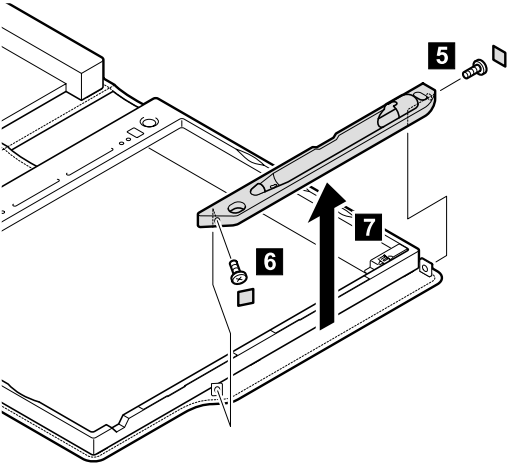
For a right-handed model



Step	Screw (quantity)	Screw cap	Torque
1	M2.5 × 3 mm, nylon-coated (2)	○	39.2 Ncm (4 kgfcm)
3	M2.5 × 3 mm, nylon-coated (1)		39.2 Ncm (4 kgfcm)

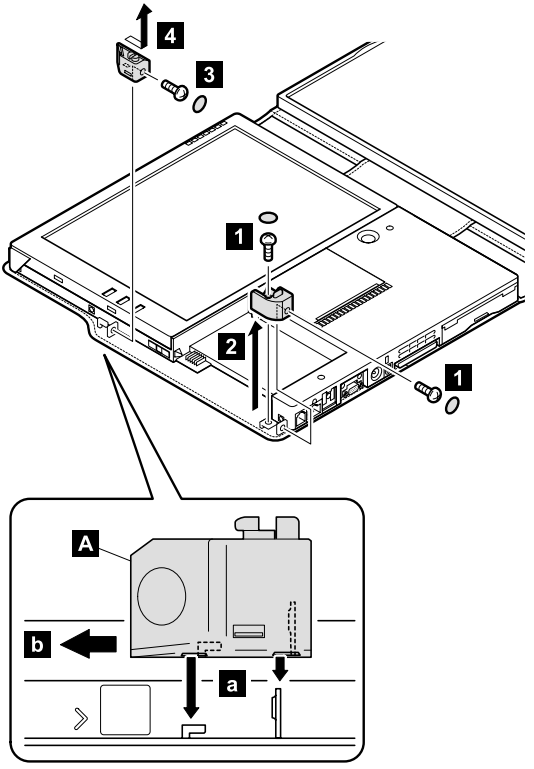
When installing:
When installing part A in the preceding figure, fit the screw-hole plate and the claw into the square holes on the bottom side of A (a) and then slide A in the direction of the arrow b . Then tighten the screw.

(continued)



Step	Screw (quantity)	Screw cap	Torque
5	M2.5 × 3 mm, nylon-coated (1)	▭	39.2 Ncm (4 kgfcm)
6	M2.5 × 3 mm, nylon-coated (1)	▭	39.2 Ncm (4 kgfcm)

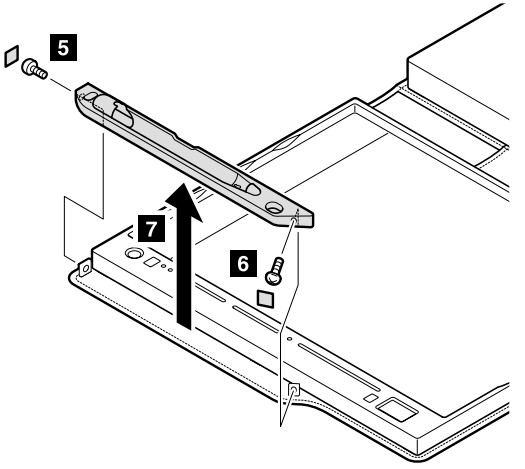
For a left-handed model



Step	Screw (quantity)	Screw cap	Torque
1	M2.5 × 3 mm, nylon-coated (2)	○	39.2 Ncm (4 kgfcm)
3	M2.5 × 3 mm, nylon-coated (1)		39.2 Ncm (4 kgfcm)

When installing:
When installing part A in the preceding figure, fit the screw-hole plate and the claw into the square holes on the bottom side of A (a) and then slide A in the direction of the arrow b . Then tighten the screw.

(continued)

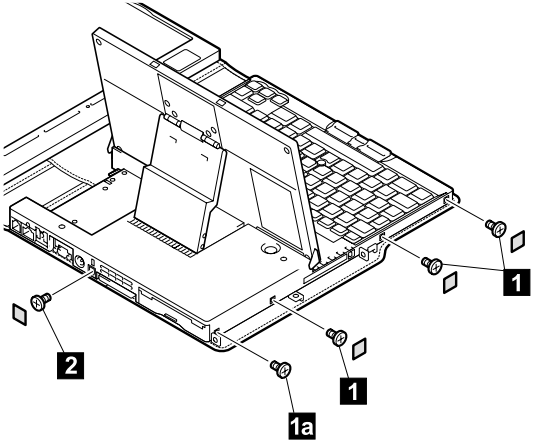


Step	Screw (quantity)	Screw cap	Torque
5	M2.5 × 3 mm, nylon-coated (1)		39.2 Ncm (4 kgfcm)
6	M2.5 × 3 mm, nylon-coated (1)		39.2 Ncm (4 kgfcm)

1080 Computer side

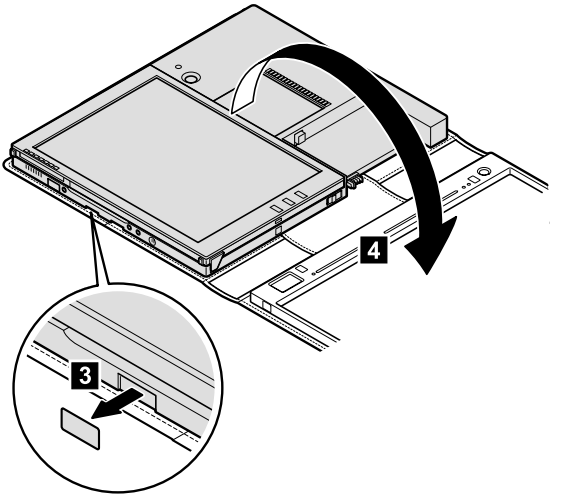
- Battery pack **(1010)**
- Hard-disk drive and hard-disk drive cover **(1040)**
- Digital-pen holder kit **(1070)**

Screw removal notice: When removing the computer side from the Endurimer or leather cover, remove only the screws marked with ″>″ beside the screw holes.

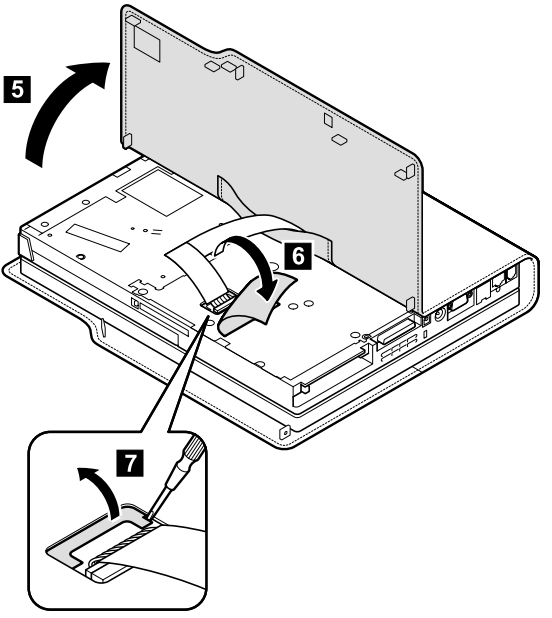


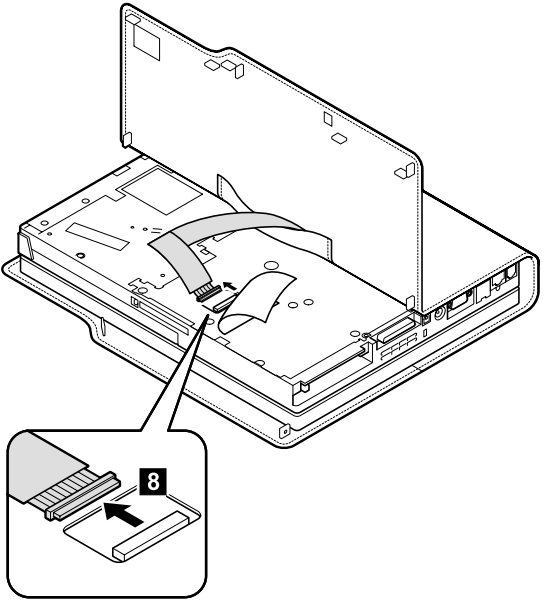
Step	Screw (quantity)	Screw cap	Torque
1a	M2.5 × 3 mm, nylon-coated (1)	none	39.2 Ncm (4 kgfcm)
1	M2.5 × 3 mm, nylon-coated (3)	☐	39.2 Ncm (4 kgfcm)
2	M2.5 × 4.5 mm, nylon-coated (1)		39.2 Ncm (4 kgfcm)

(continued)



(continued)

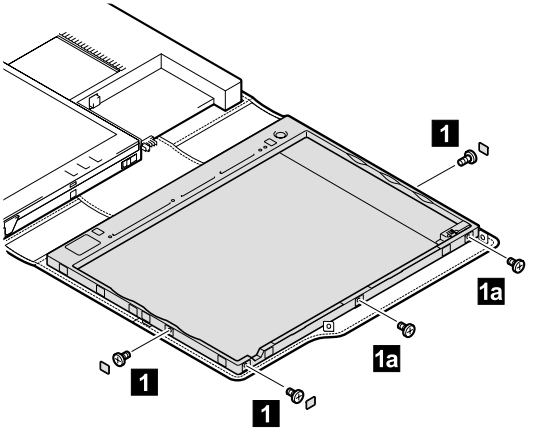

5
6
7


8

1090 ThinkScribe digital notepad assembly

- Battery pack **(1010)**
- Hard-disk drive and hard-disk drive cover **(1040)**
- Digital-pen holder kit **(1070)**

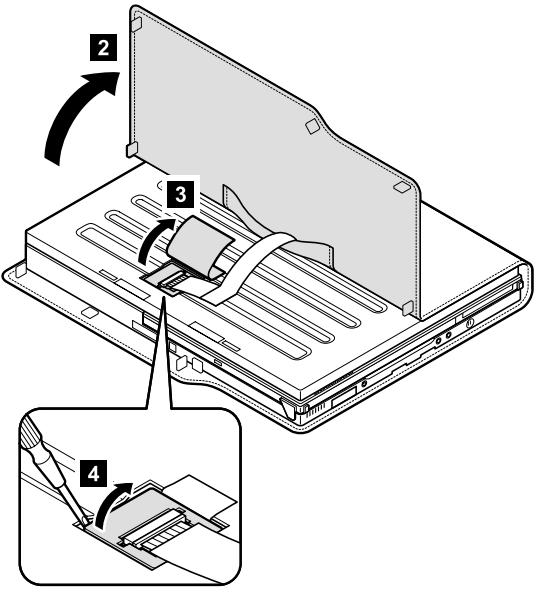
Screw removal notice: When removing the computer side from the Endurimer or leather cover, remove only the screws marked with ″>″ beside the screw holes.



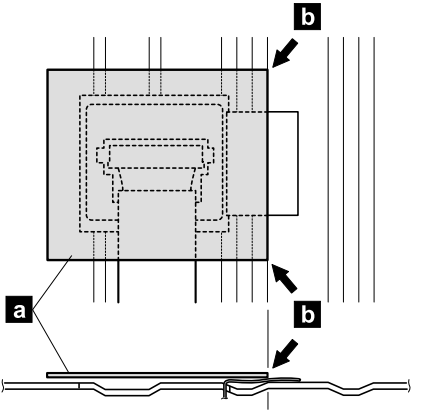
Step	Screw (quantity)	Screw cap	Torque
1	M2.5 × 3 mm, nylon-coated (3)	▭	39.2 Ncm (4 kgfcm)
1a	M2.5 × 3 mm, nylon-coated (2)	none	39.2 Ncm (4 kgfcm)

(continued)

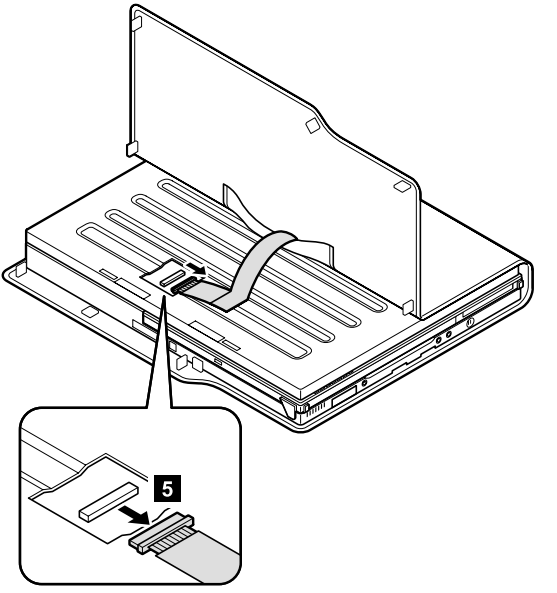
Note: In procedure **3** , remove the base plate tape gently in the direction of the arrow to avoid damaging the copper sheet under the tape; it is to be reused.



When installing: Align the right edge of the base plate tape (**a**) to the **b** -part of the base plate, as shown in the following figure.



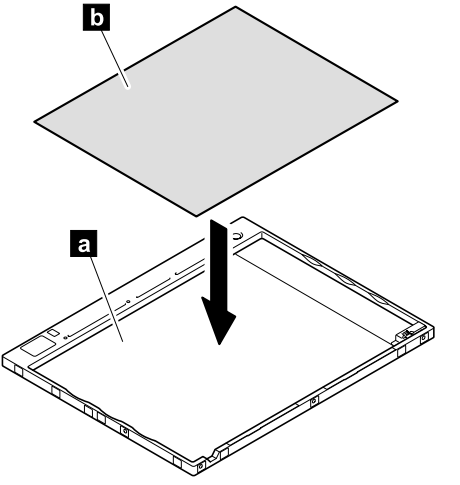
(continued)



Note for a non-English model

Before attaching new digitizer onto the Endurimer, do the followings;

1. Wipe the surface of the digitizer sheet **a** gently with a dry soft cloth to remove a stain or a dust on it.
2. Stick the digitizer label **b** onto the digitizer sheet.

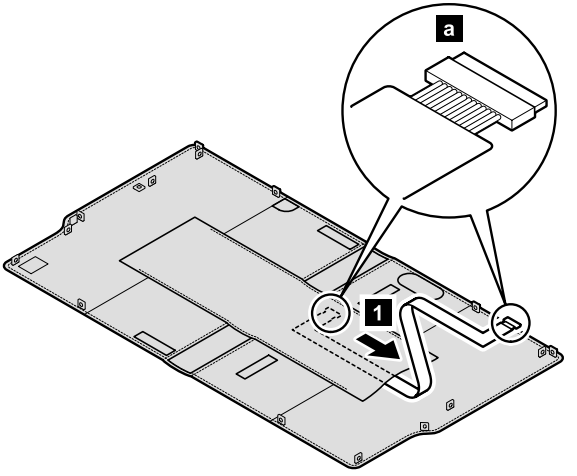


1100 Endurimer and system-digi cable

- Battery pack **(1010)**
- Hard-disk drive and hard-disk drive cover **(1040)**
- Digital-pen holder kit **(1070)**
- Computer side **(1080)**
- ThinkScribe digital notepad assembly **(1090)**

Notes about the optional leather cover

- Scratching or discoloration of the leather cover is not covered under warranty.
- When removing and replacing the leather cover, be very careful not to scratch the surface of the Endurimer material.



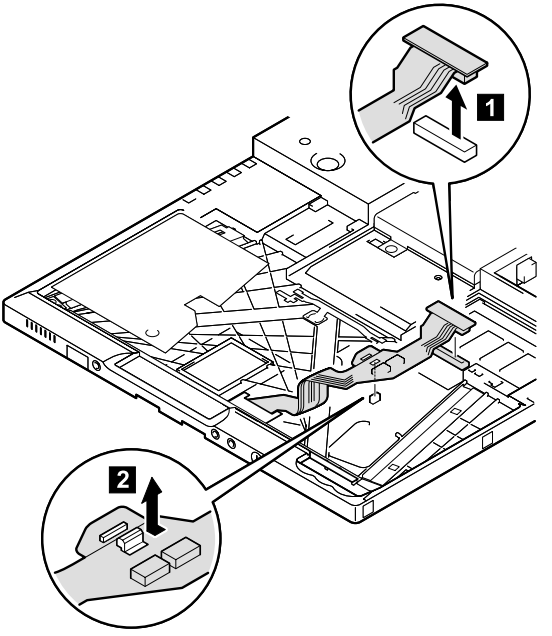
Do not subject the system-digi cable to tension, especially at the base of the cables of the connectors shown in figure **a** . Tension could cause the cable to snap.

Note: When replacing the Endurimer or the system-digi cable, make sure that the black connector of the system-digi cable is attached to the computer and the white connector is attached to the digital notepad assembly.

For the process of changing the cover from right-handed orientation to left-handed orientation, see “4010 Changing the orientation of a left- or right-handed model” on page 124.

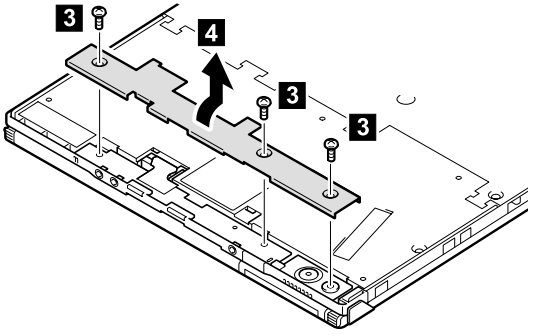
1110 Audio card and speaker

- Battery pack **(1010)**
- Hard-disk drive and hard-disk drive cover **(1040)**
- Keyboard **(1050)**
- Backup battery and sub-battery **(1060)**
- Digital-pen holder kit **(1070)**
- Computer side **(1080)**

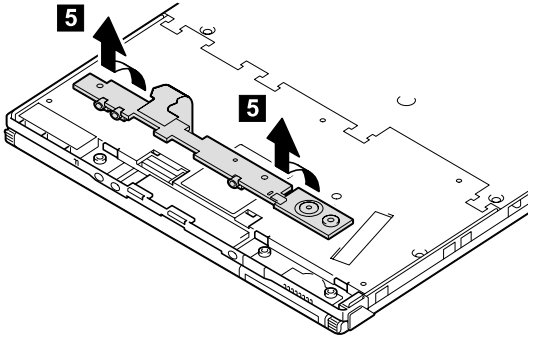


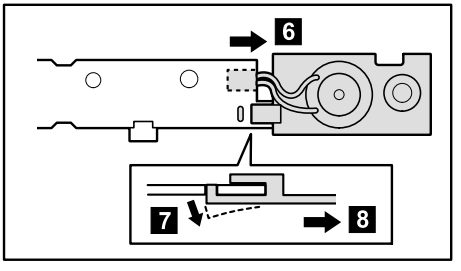
After procedure **2**, lay the LCD unit down and then turn the computer side upside down.

(continued)

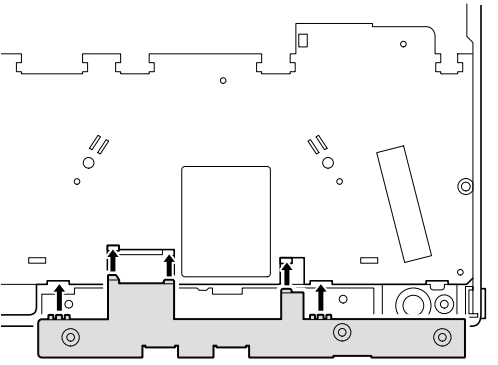


Step	Screw (quantity)	Torque
3	M2.5 × 4 mm, nylon-coated (3)	39.2 Ncm (4 kgfcm)



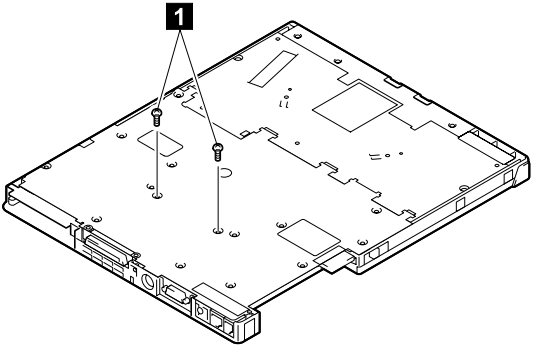


When installing: Make sure that all of the claws of the cover are firmly fixed into place.



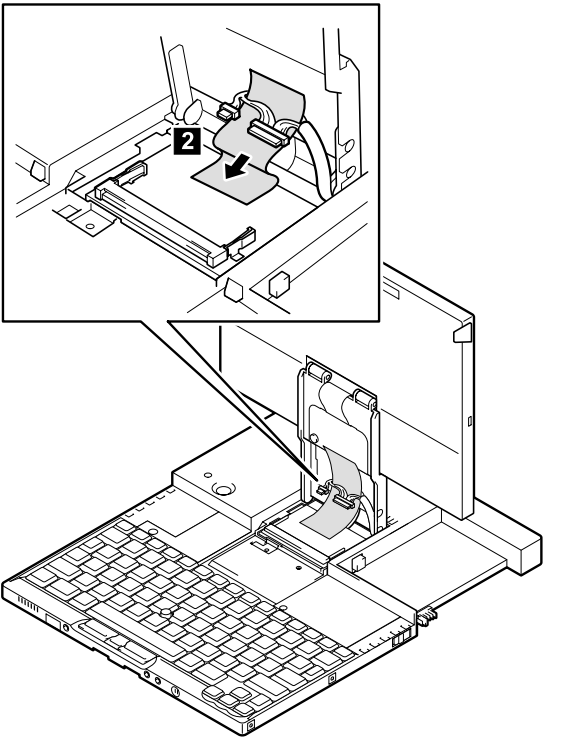
1120 Video card

- Battery pack **(1010)**
- Mini PCI adapter **(1030)**
- Hard-disk drive and hard-disk drive cover **(1040)**
- Digital-pen holder kit **(1070)**
- Computer side **(1080)**



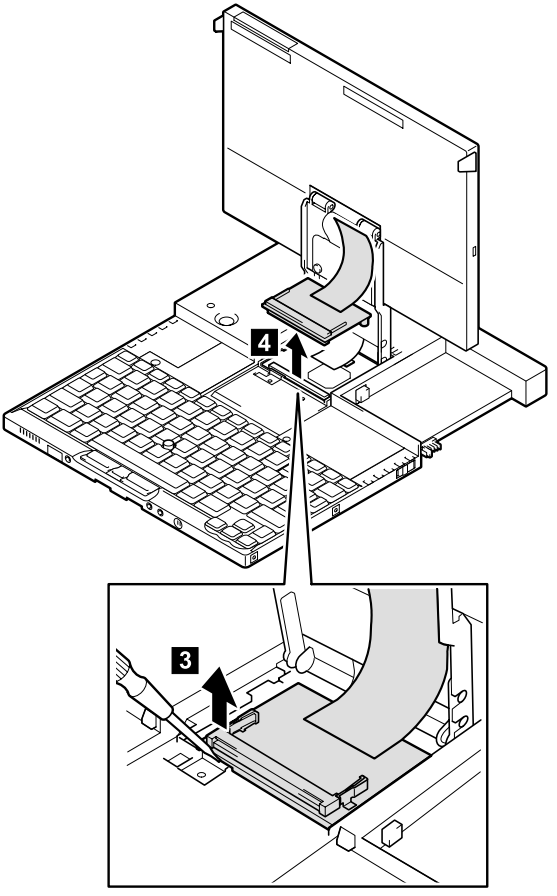
Step	Screw (quantity)	Torque
1	M2.5 × 4 mm, nylon-coated (2)	39.2 Ncm (4 kgfcm)

(continued)



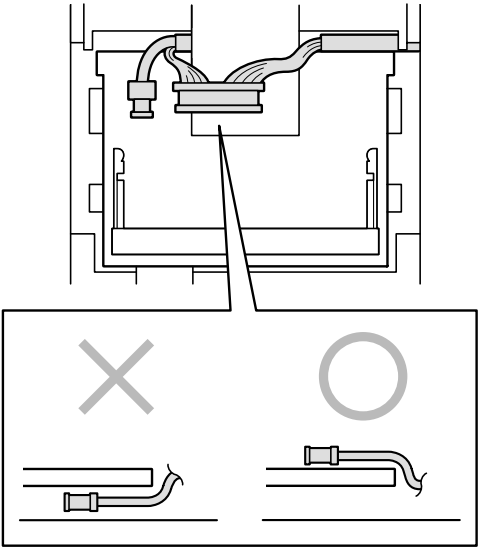
Note: Pull the black sheet out from the space between the connector cables, but do not strip it off from the video card.

(continued)


4
3

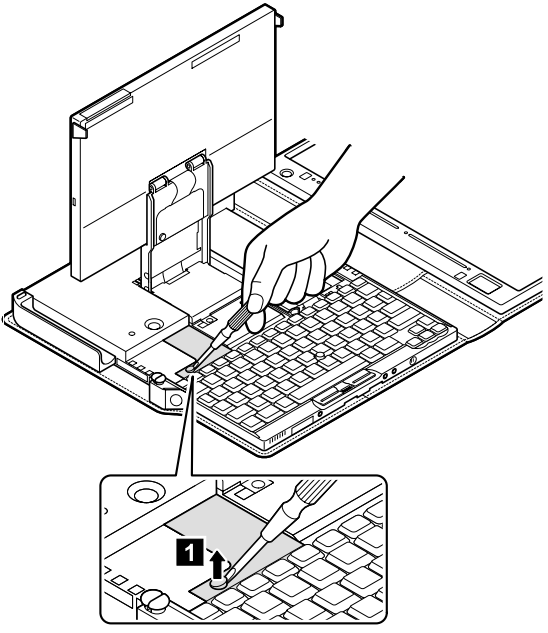
When installing: When installing the video card, do the following:

- Make sure that the connector on the bottom side of the video card is firmly connected.
- Make sure that the connector cables are not pinched under the video card as in the following figure.



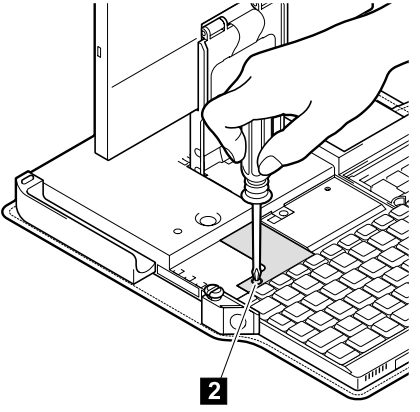
1130 System board and PC card slot assembly

- Battery pack **(1010)**
- DIMM **(1020)**
- Mini PCI adapter **(1030)**
- Hard-disk drive and hard-disk drive cover **(1040)**
- Digital-pen holder kit **(1070)**
- Computer side **(1080)**
- Video card **(1120)**

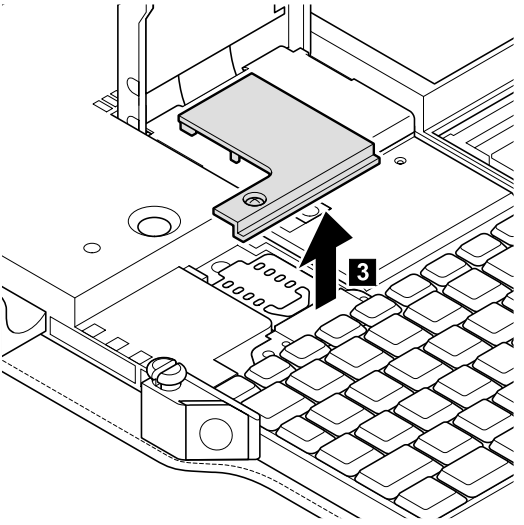


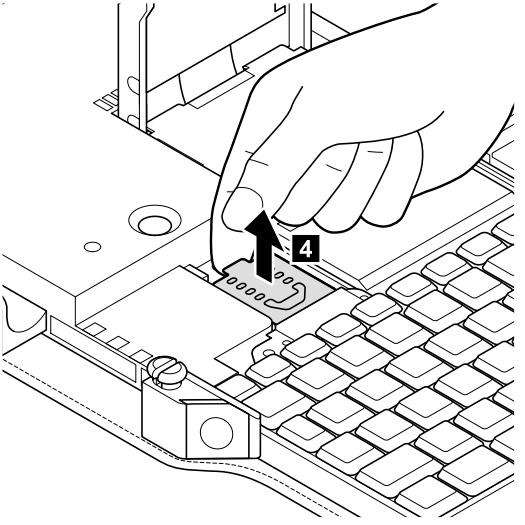
(continued)

Note: Loosen the screw **2** , but do not remove it.

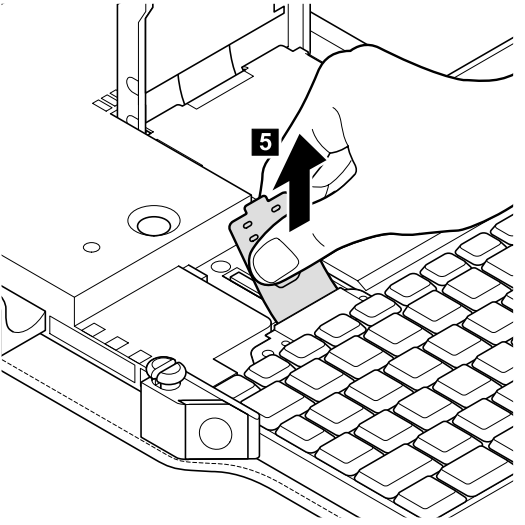


(continued)



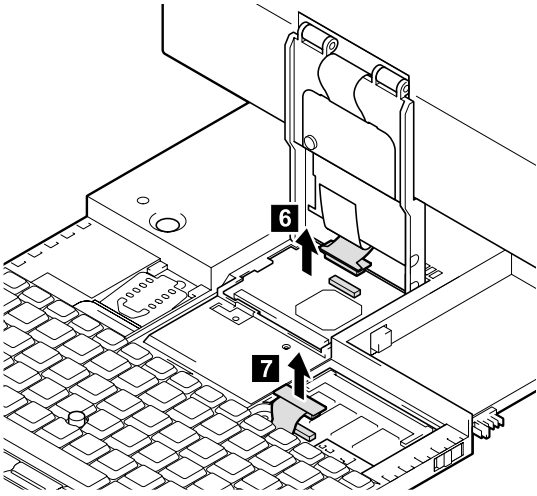


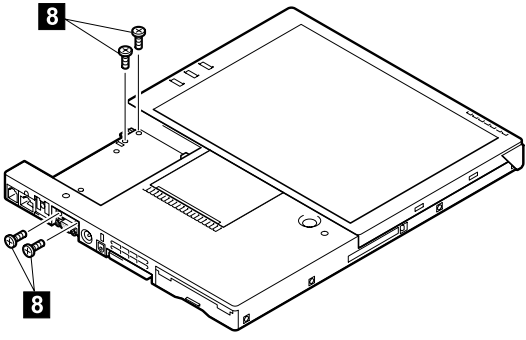
(continued)



When installing: Make sure that the keyboard connector is firmly attached.

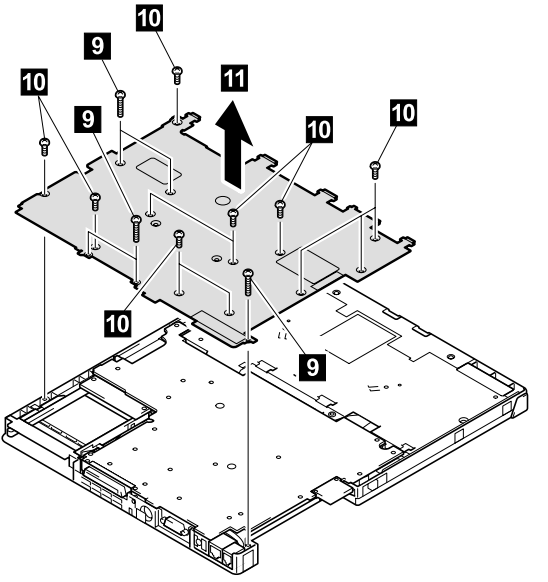
(continued)





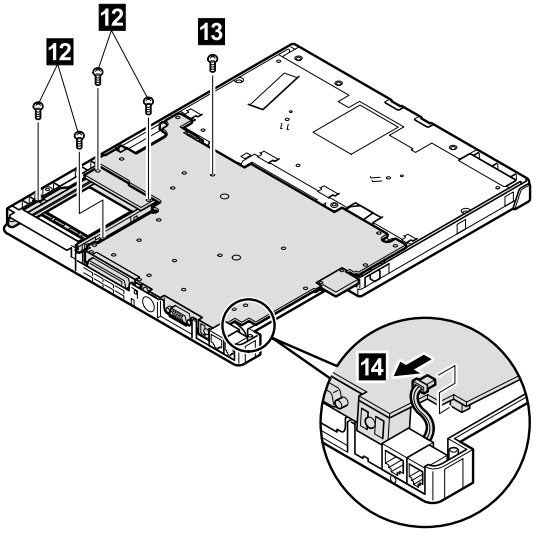
Step	Screw (quantity)	Torque
8	M2.0 × 3.5 mm, nylon-coated (4)	24.5 Ncm (2.5 kgfcm)

(continued)



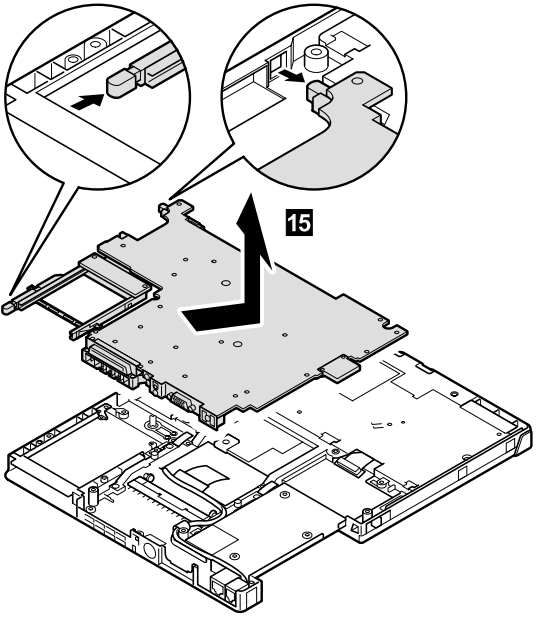
Step	Screw (quantity)	Torque
9	M2.5 × 16 mm, nylon-coated (5)	39.2 Ncm (4 kgfcm)
10	M2.5 × 4.0 mm, nylon-coated (11)	39.2 Ncm (4 kgfcm)

(continued)



Step	Screw (quantity)	Torque
12	M2.0 × 3.5 mm, nylon-coated (4)	24.5 Ncm (2.5 kgfcm)
13	M2.5 × 4.0 mm, nylon-coated (1)	39.2 Ncm (4 kgfcm)

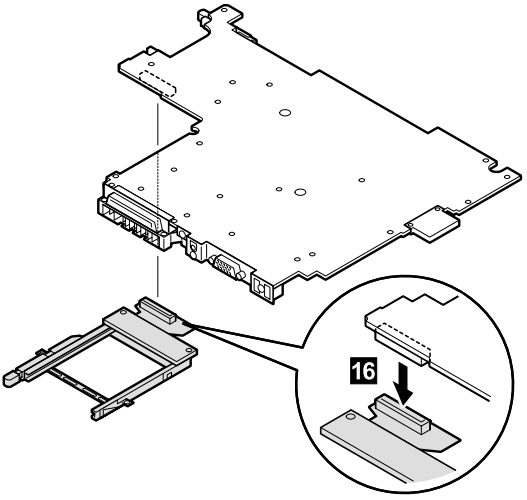
(continued)



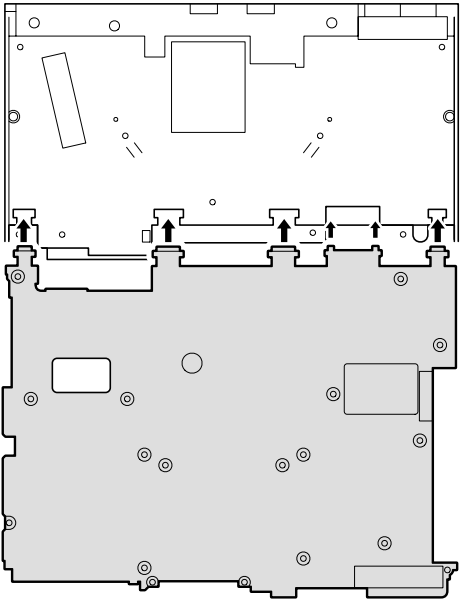
Note

When removing or installing the system board and the PC card slot assembly, take care not to damage the eject buttons.

(continued)

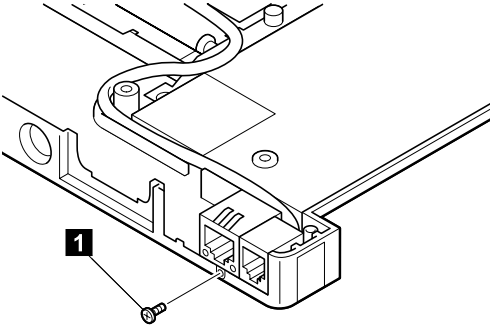

16

When installing: Make sure that all of the claws of the base plate are firmly fixed into place and the plate is firmly attached in the plastic base.



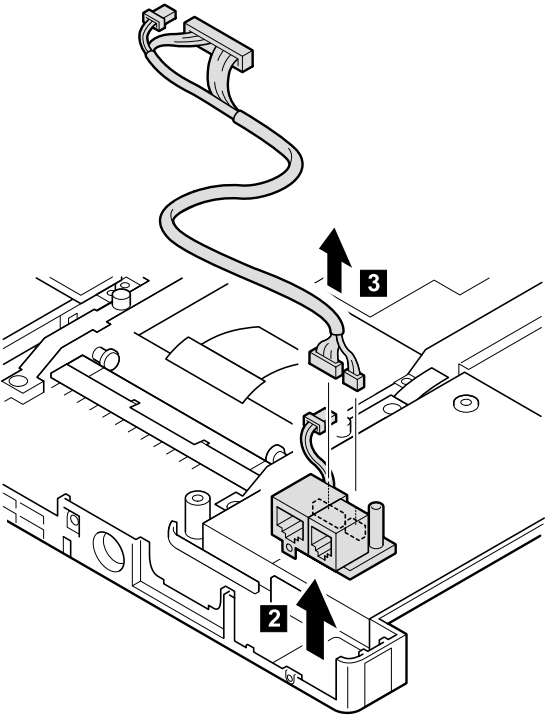
1140 RJ11/45 card and RJ11/45 cable

- Battery pack **(1010)**
- DIMM **(1020)**
- Mini PCI adapter **(1030)**
- Hard-disk drive and hard-disk drive cover **(1040)**
- Digital-pen holder kit **(1070)**
- Computer side **(1080)**
- Video card **(1120)**
- System board and PC card slot assembly **(1130)**

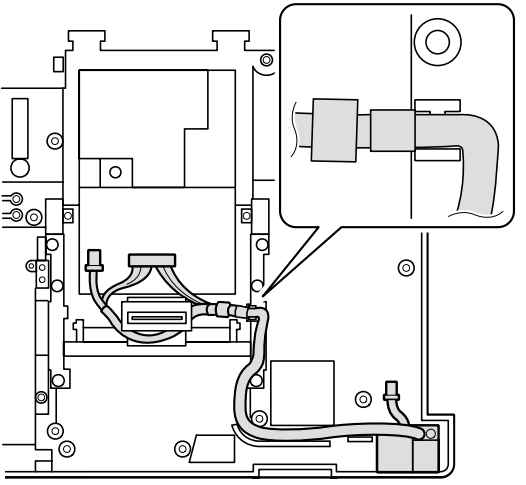


Step	Screw (quantity)	Torque
1	M2.0 × 3.5 mm, nylon-coated (1)	24.5 Ncm (2.5 kgfcm)

(continued)

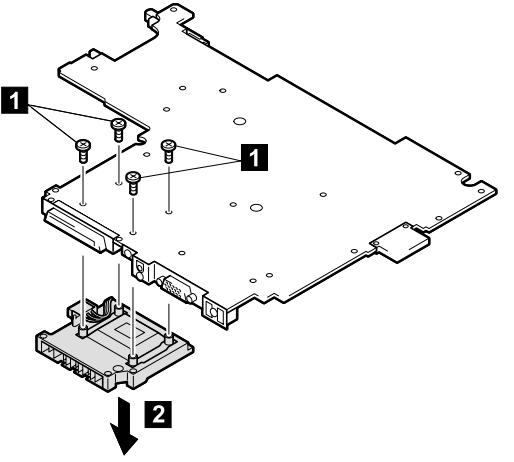

3
2

Cable routing: Route the connector cable as shown in the following figure.



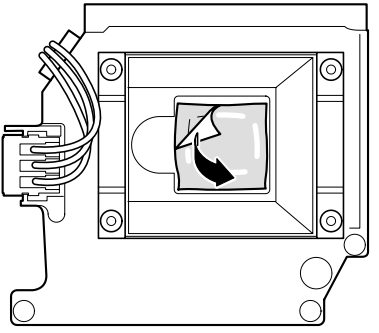
1150 Fan assembly

- Battery pack **(1010)**
- DIMM **(1020)**
- Mini PCI adapter **(1030)**
- Hard-disk drive and hard-disk drive cover **(1040)**
- Digi-pen holder kit **(1070)**
- Computer side **(1080)**
- Video card **(1120)**
- System board and PC card slot assembly **(1130)**



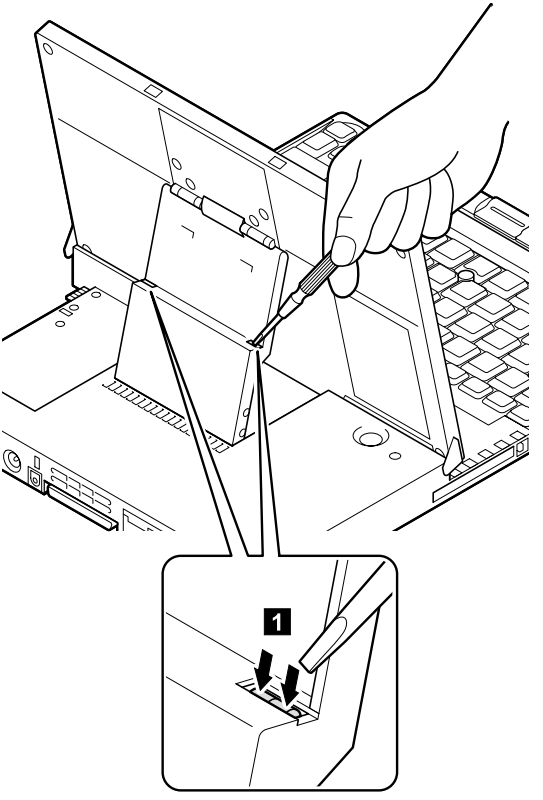
Step	Screw (quantity)	Torque
1	M2.5 × 4.0 mm, nylon-coated (4)	39.2 Ncm (4 kgfcm)

When installing: Remove the protective sheet from the thermal rubber on the fan assembly.

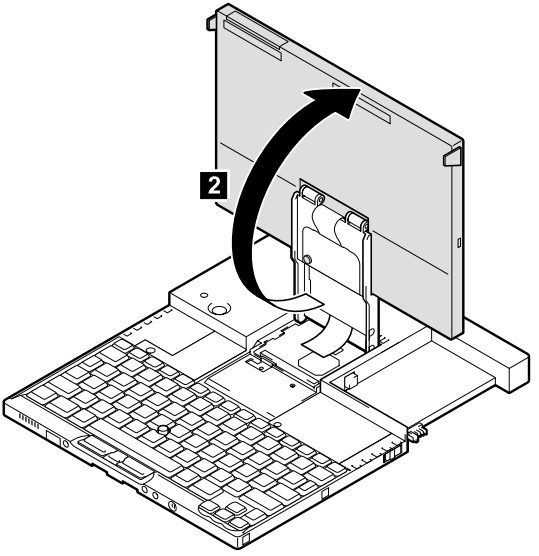


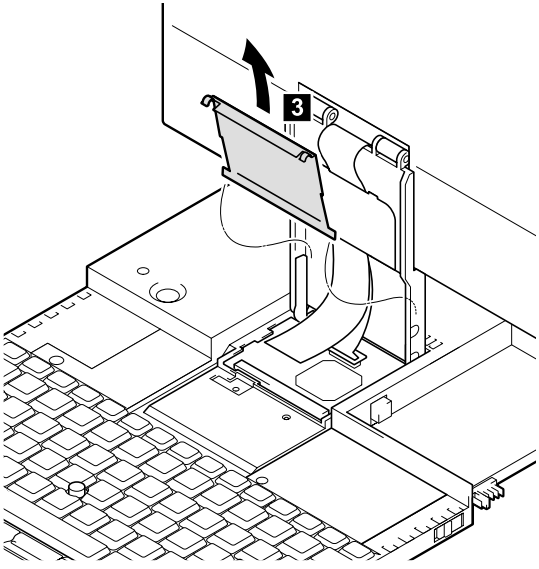
2010 LCD assembly

- Battery pack **(1010)**
- Mini PCI adapter **(1030)**
- Hard-disk drive and hard-disk drive cover **(1040)**
- Digital-pen holder kit **(1070)**
- Computer side **(1080)**
- Video card **(1120)**

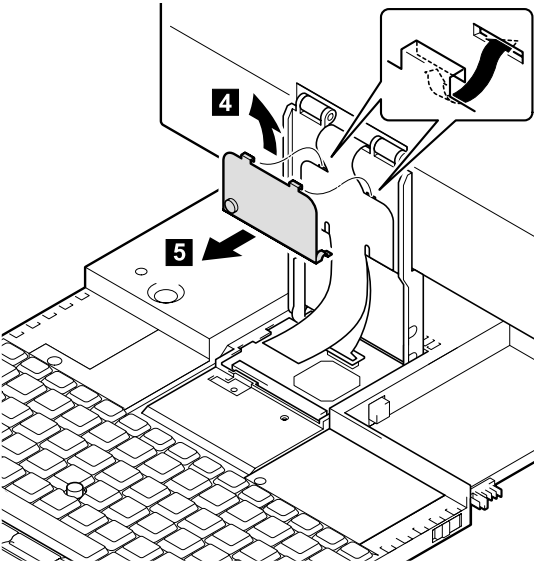


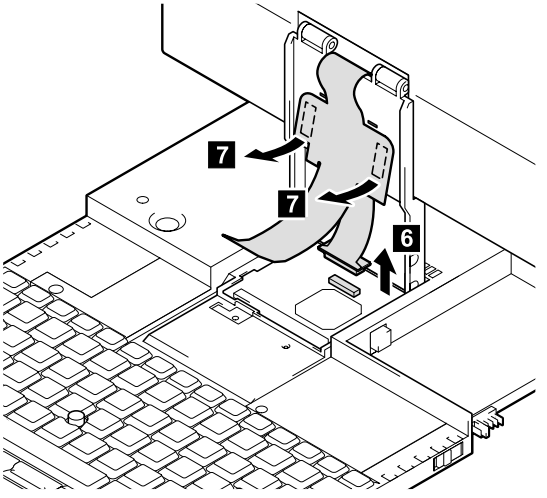
(continued)



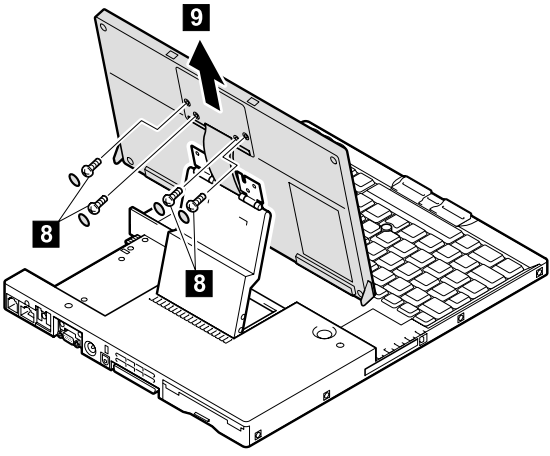


(continued)





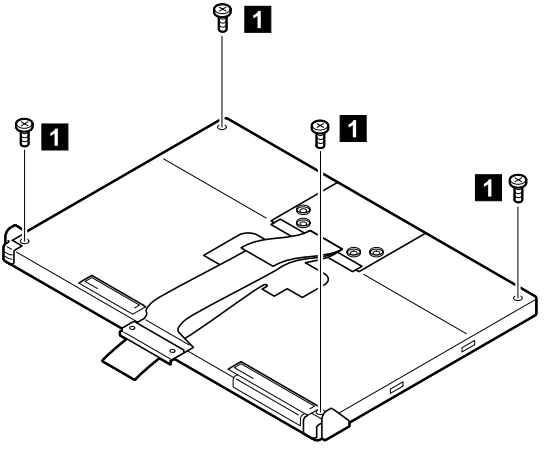
(continued)



Step	Screw (quantity)	Screw cap	Torque
8	M2.5 × 3 mm, nylon-coated (4)	◯	39.2 Ncm (4 kgfcm)

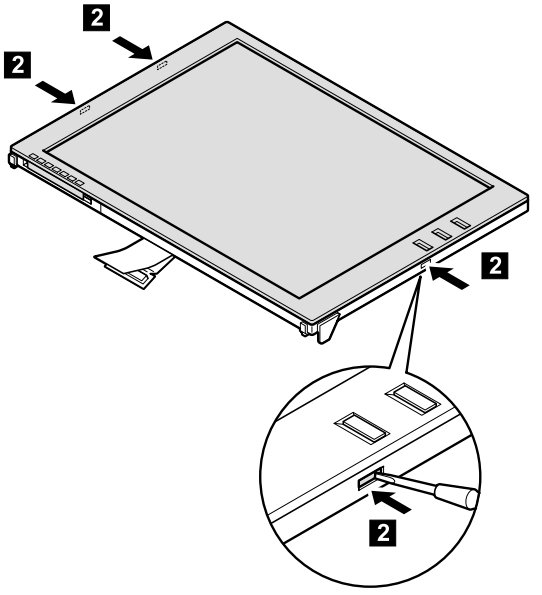
2020 LCD front bezel

- Battery pack **(1010)**
- Mini PCI adapter **(1030)**
- Hard-disk drive and hard-disk drive cover **(1040)**
- Digital-pen holder kit **(1070)**
- Computer side **(1080)**
- Video card **(1120)**
- LCD assembly **(2010)**

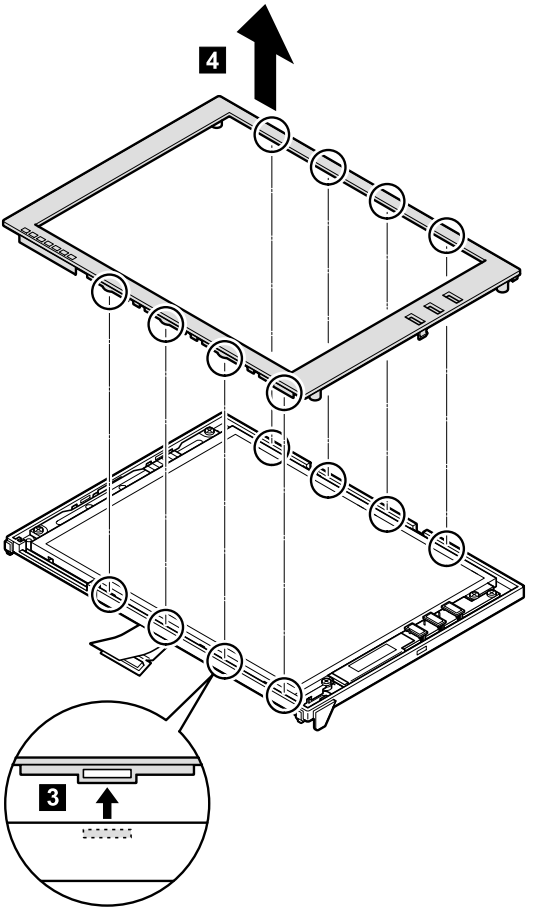


Step	Screw (quantity)	Torque
1	M2.5 × 4.0 mm, nylon-coated (4)	39.2 Ncm (4 kgfcm)

(continued)



(continued)

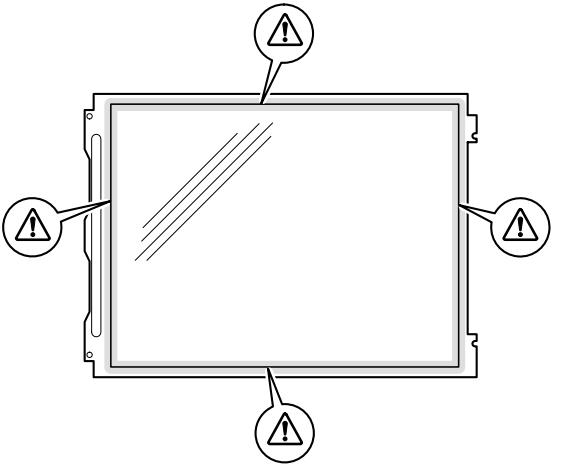


When installing: Before tightening the screws, make sure that all of the latches are firmly latched.

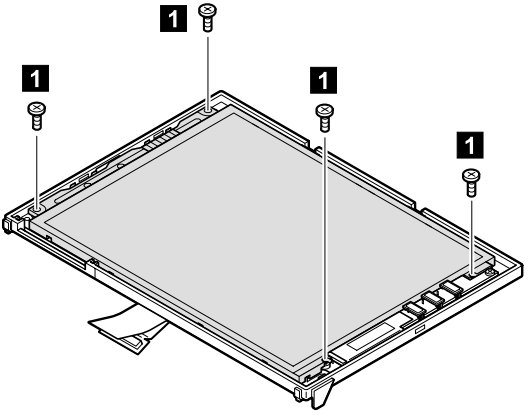
2030 LCD panel and Inverter card

- Battery pack **(1010)**
- Mini PCI adapter **(1030)**
- Hard-disk drive and hard-disk drive cover **(1040)**
- Digital-pen holder kit **(1070)**
- Computer side **(1080)**
- Video card **(1120)**
- LCD assembly **(2010)**
- LCD front bezel **(2020)**

> **CAUTION:**
>
> The FlipTouch panel that covers the LCD display is made of glass. When removing or replacing the LCD panel, take care not to touch the edge of the FlipTouch display glass to avoid personal injury.

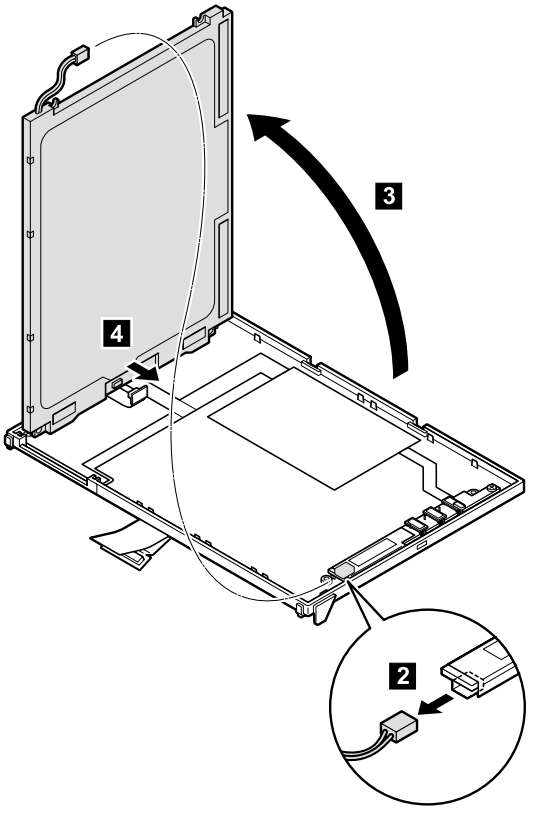


(continued)

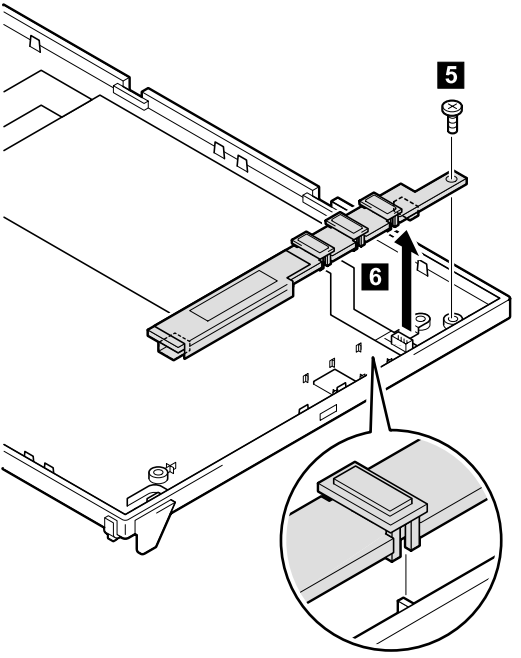


Step	Screw (quantity)	Torque
1	M2.5 × 4.0 mm, nylon-coated (4)	39.2 Ncm (4 kgfcm)

(continued)



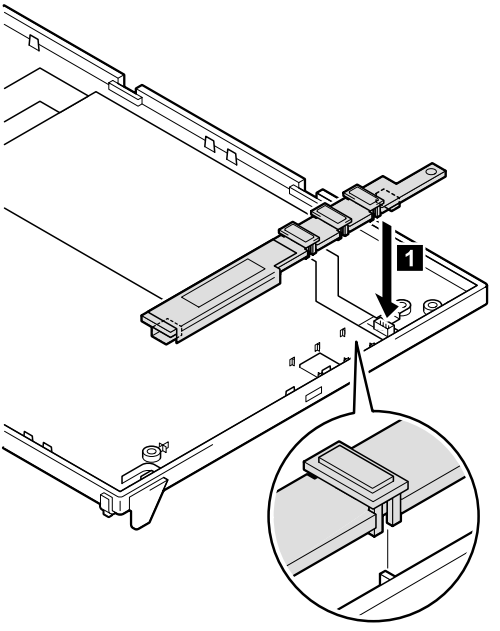
(continued)



Step	Screw (quantity)	Torque
5	M2.5 × 4.0 mm, nylon-coated (1)	39.2 Ncm (4 kgfcm)

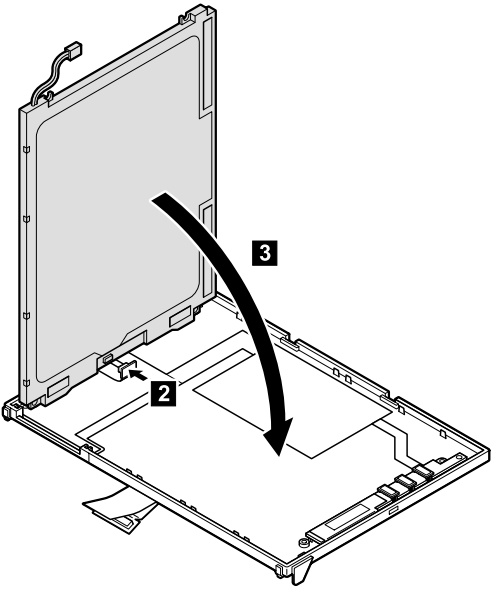
When installing, do as follows:

1. Attach the connector on the bottom side of the inverter card to the LCD cable connector (**1**).

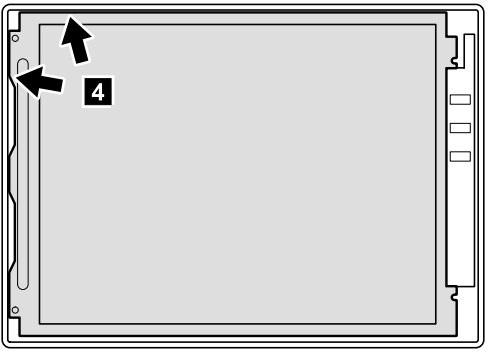


(continued)

2. Attach the LCD cable connector to the connector on the bottom side of the LCD panel (**2**), and then lay the LCD panel on the rear cover (**3**).

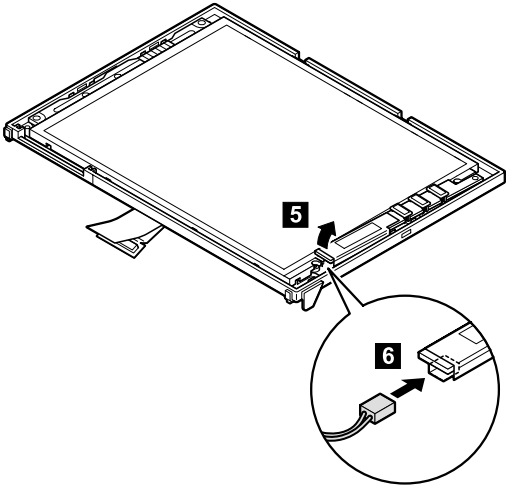


3. Align the upper left corner of the LCD panel with the upper left corner of the rear cover (**4**).

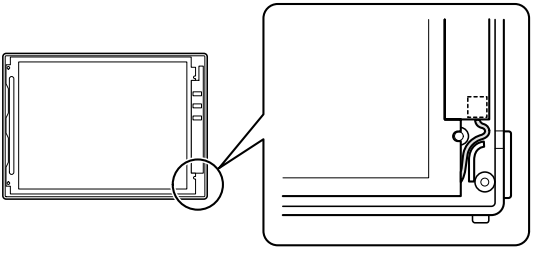


(continued)

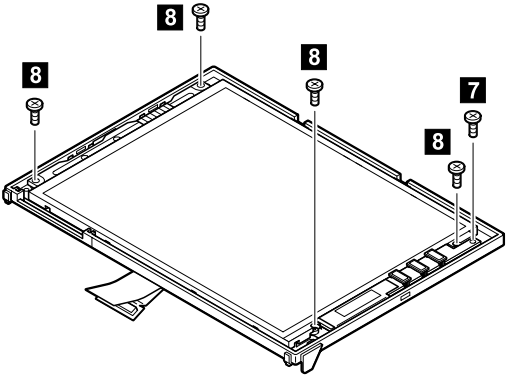
4. Lift the side of the inverter card (**5**) a little and plug the cable into the connector on the bottom side of the inverter card (**6**). Make sure that the other connector, which was connected in the installing procedure **1** , is not disconnected when you lift the inverter card.



When routing the cable, do as following figure.

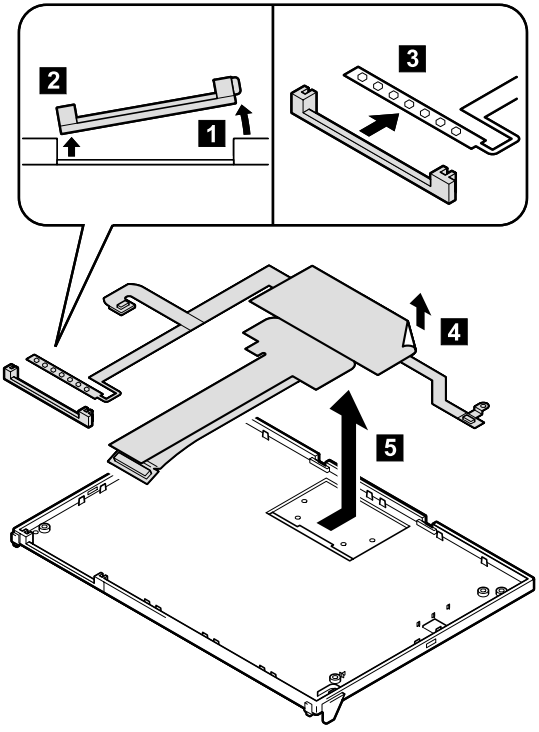


5. Tighten the screws **7** and **8**.

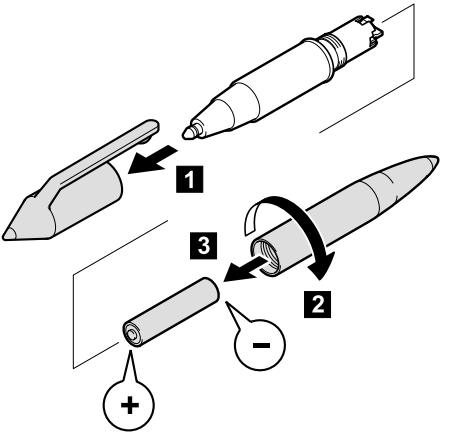


2040 LCD cable

- Battery pack **(1010)**
- Mini PCI adapter **(1030)**
- Hard-disk drive and hard-disk drive cover **(1050)**
- Digital-pen holder kit **(1080)**
- Computer side **(1090)**
- Video card **(1130)**
- LCD assembly **(2010)**
- LCD front bezel **(2020)**
- LCD panel and Inverter card **(2030)**



3010 Digital pen



4010 Changing the orientation of a left- or right-handed model

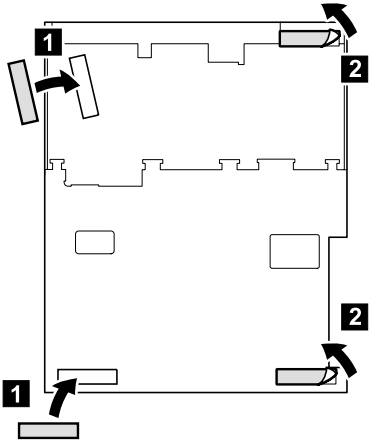
This section contains the procedure for converting a right-handed model to a left-handed model, or vice versa, by replacing the Endurimer or leather cover.

To replace the Endurimer or leather cover, do the following;

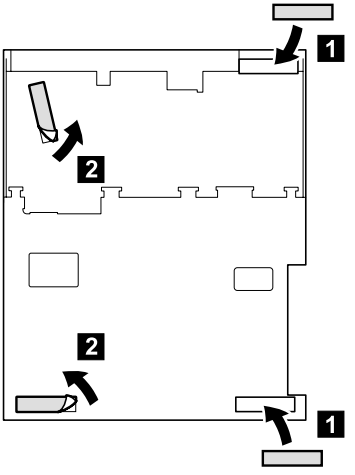
1. Keep the required replacing kit.
   (For the content of the kit and the P/Ns, see "Endurimer/leather cover replacing kit" on page 140.)
2. Remove the digital-pen holder kit.
   (See "1070 Digital-pen holder kit" on page 75.)
3. Remove the computer side.
   (See "1080 Computer side" on page 79.)
4. Remove the ThinkScribe digital notepad.
   (See "1090 ThinkScribe digital notepad assembly" on page 82.)
   (continued)

5. Paste new velcro tapes **1** on the bottom side of the computer side and remove the old tapes **2** as shown in the following figures.

Right-handed model to left-handed model



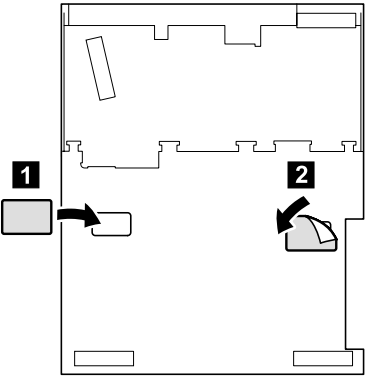
Left-handed model to right-handed model



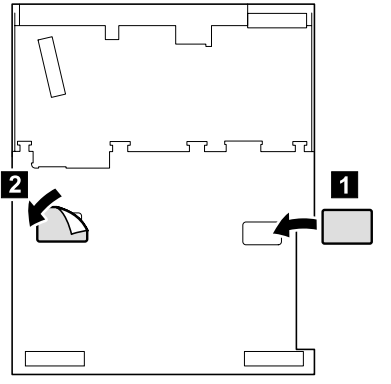
(continued)

6. Paste new base plate tape **1** on the bottom side of the computer side, and then remove the other one **2**.

Right-handed model to left-handed model



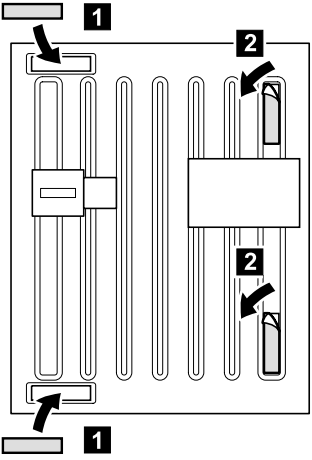
Left-handed model to right-handed model



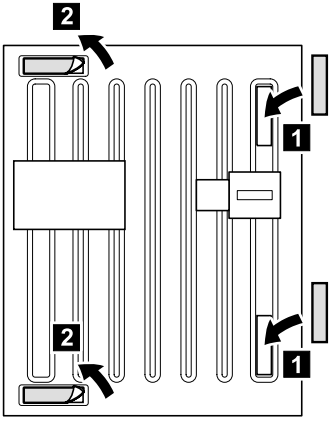
(continued)

7. Paste new velcro tapes **1** on the bottom side of ThinkScribe digital notepad and remove the old tapes **2** as shown in the following figures.

Right-handed model to left-handed model



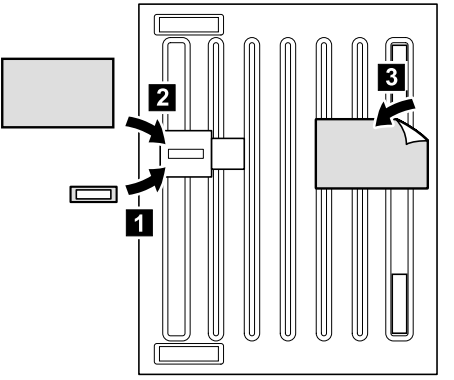
Left-handed model to right-handed model



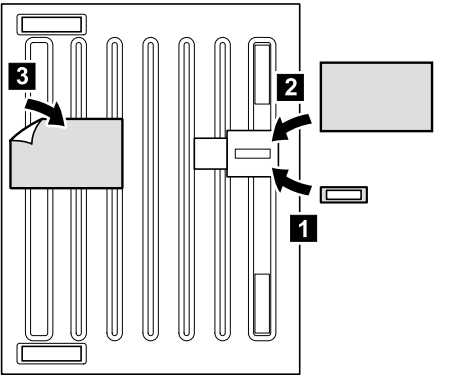
(continued)

8. Paste new tape for digitizer **1** and digitizer base tape **2** on the bottom side of the computer side, and then remove the other one **3** .

Right-handed model to left-handed model



Left-handed model to right-handed model

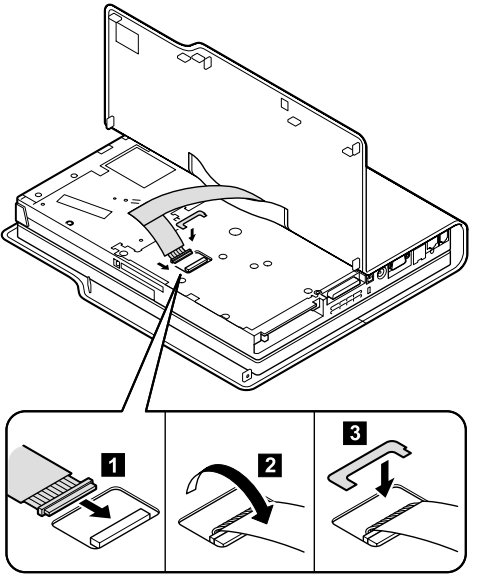


9. Install the system-digi cable to the new Endurimer or leather cover. (See “1100 Endurimer and system-digi cable” on page 85.)

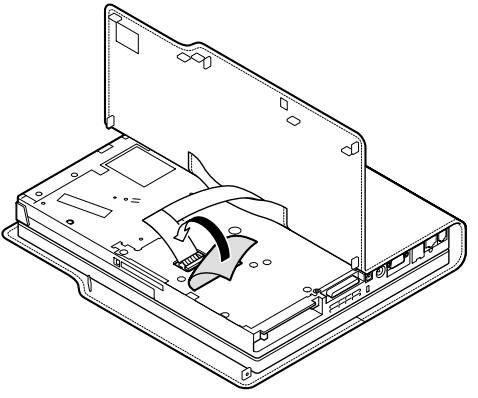
   Note: When replacing the Endurimer or the system-digi cable, make sure that the black connector of the system-digi cable is attached to the computer and the white connector is attached to the digital notepad assembly.

(continued)

10. Install the computer side to the new Endurimer or leather cover as follows;
    a. Connect the system-digi cable to the computer side and then paste new system board plate.



    b. Paste the new tape (Tape for digitizer 2) aligning the ″┌″ marks on the base plate.



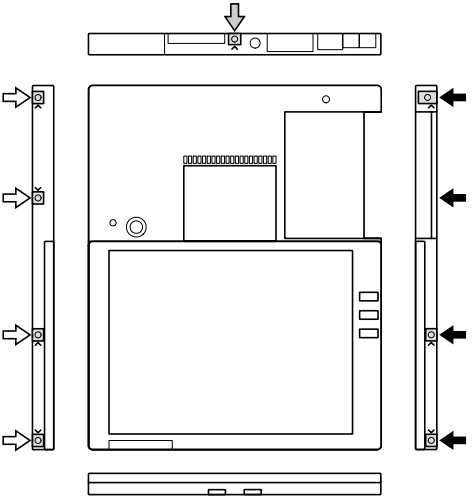
(continued)

c. Tighten the screws and paste the screw caps.

➡ Screw holes for a left-handed model.

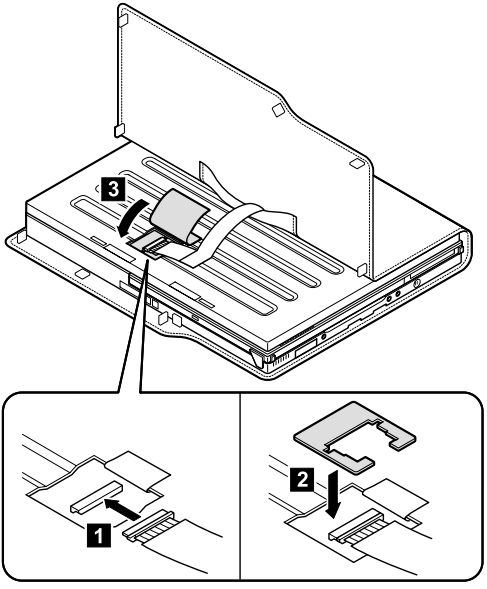
⇨ Screw holes for a right-handed model.

⇨ Screw hole for both models.



(continued)

11. Install the digital notepad to the new Endurimer or leather cover doing as follows;
    a. Connect the system-digi cable **1** to the digital notepad and then paste the digitizer plate **2** .
    b. Paste the new tape (Tape for digitizer 2) **3** aligning the ┌ marks on the digitizer base plate.

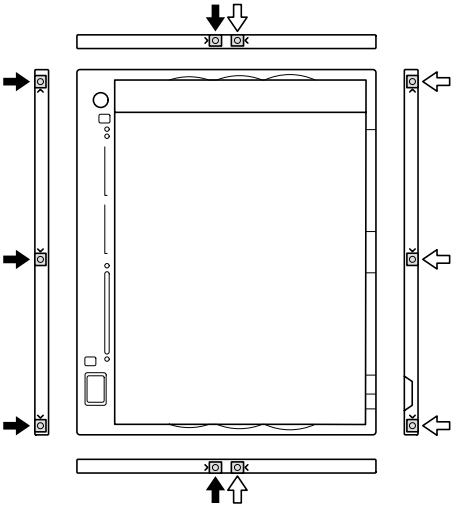


(continued)

c. Tighten the screws and paste the screw caps.

➡ Screw holes for a left-handed model.

⇨ Screw holes for a right-handed model.

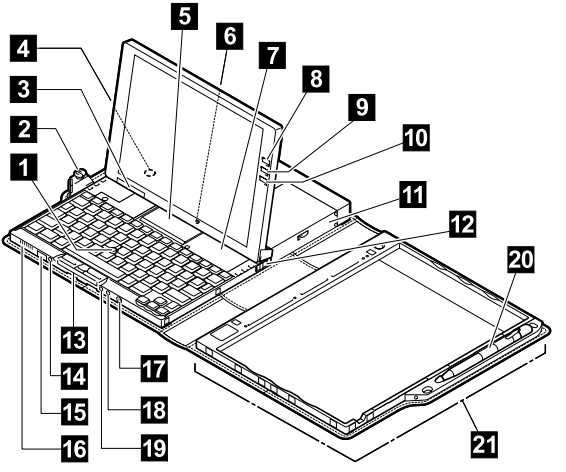


12. Install the digital-pen holder kit. (See “1070 Digital-pen holder kit” on page 75.)

Locations

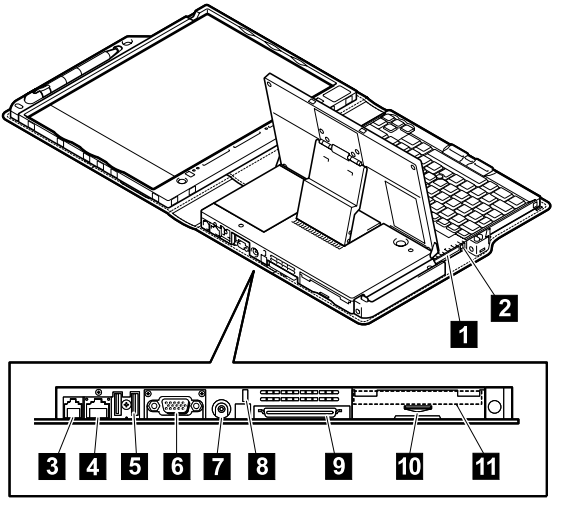
Front view

1 TrackPoint buttons
2 Latch
3 System status indicators
4 Power switch (computer side)
5 Mini PCI Card slot
6 Reset switch (computer side)
7 DIMM slot
8 ThinkPad button
9 FlipTouch control button
10 Mute button
11 Battery pack
12 Battery pack latch
13 TrackPoint buttons
14 Microphone jack
15 Infrared port
16 Built-in monaural speaker
17 Built-in microphone
18 Stereo line-in jack
19 Stereo headphone jack
20 Digital pen
21 ThinkScribe digital notepad (see “ThinkScribe digital notepad” on page 135.)



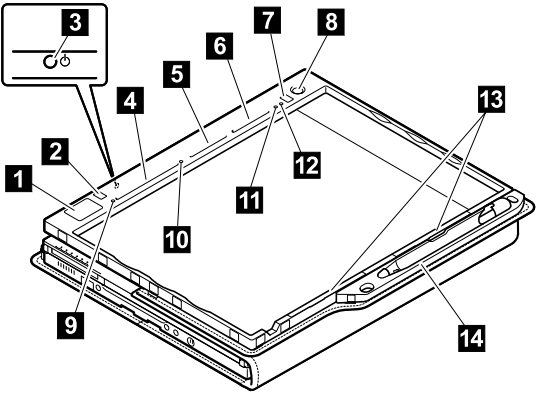
Rear view

1. CompactFlash card slot
2. CompactFlash card eject button
3. Modem connector
4. Network connector
5. Universal serial bus (USB) connector
6. External-monitor connector
7. Power jack
8. Security keyhole
9. Port replicator connector
10. PC card slot
11. Hard-disk drive



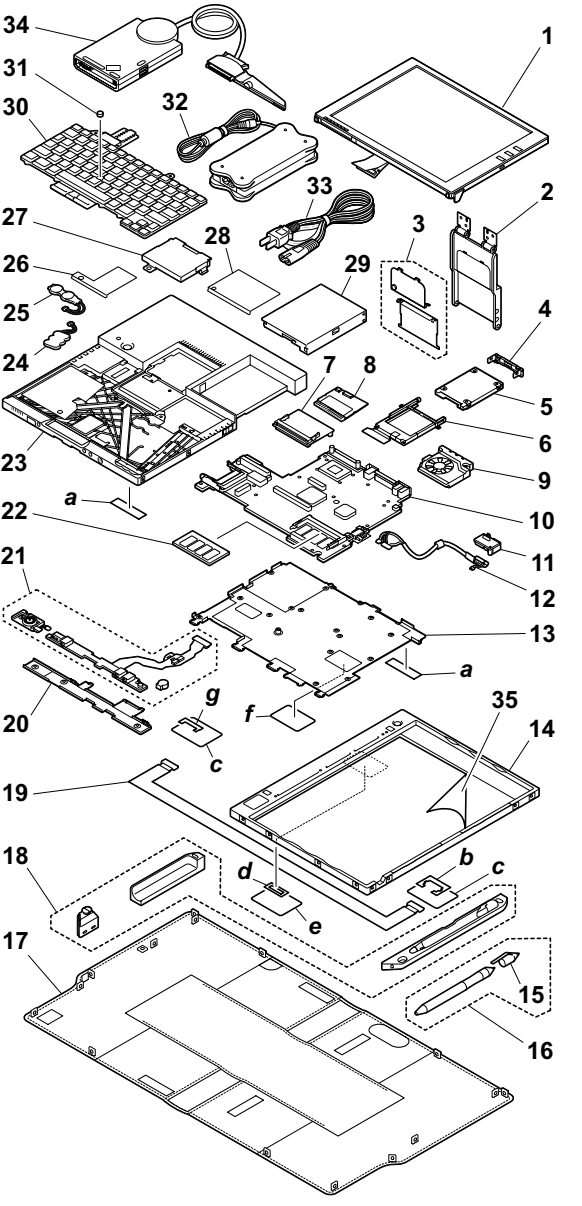
ThinkScribe digital notepad

1. Status display
2. Error indicator light
3. ThinkScribe reset switch
4. Page selector
5. Ink Files selector
6. Actions selector
7. Activity indicator light
8. ThinkScribe power button
9. Page Forward pen button
10. Page Backward pen button
11. Cancel pen button
12. OK pen button
13. Ink refill trays
14. Pen holder



Parts list

Overall



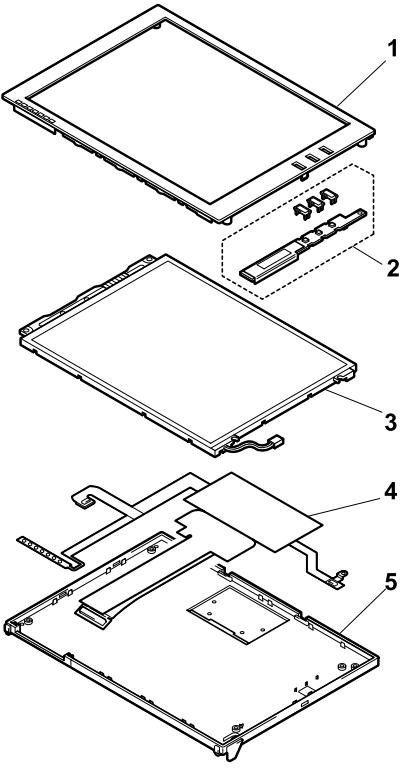
The parts marked with asterisk are CRU (customer replacable unit).

No.	FRU	P/N
a~g	See “Miscellaneous parts” on page 141	
1	LCD unit (see “LCD FRUs” on page 139)	
2	Arm unit	08K6466
3	Arm cover	08K6468
4	Cover, hard-disk drive*	08K6481
5	HDD assembly 10 GB 9.5 H	05K9286
	Optional HDD assembly (see “Optional FRUs” on page 142)	
6	PC card slot	08K6594
7	Video card	08K3158
8	Mini PCI modem card, CR	08K3338
	Mini PCI modem card (Ambit)	08K3252
9	Fan	08K6475
10	System board	08K3188
11	RJ11/45 card	08K3162
12	RJ11/45 cable	27L0574
13	Base plate	08K6496
14	ThinkScribe digital notepad assembly	02K5881
15	Pen cap	04P3688
16	Standard pen	02K5633
	Optional standard pen (see “Optional FRUs” on page 142)	
17	Endurimer (artificial)	
	for right-handed	08K6572
	for left-handed	04P3470
	Endurimer (genuine leather)	
	for right-handed	04P3472
	for left-handed	04P3474
18	Pen holder kit	
	for right-handed	04P3206
	for left-handed	04P3320
19	System-Digi cable	27L0556
20	Plate for audio card	08K6597
21	Audio card	08K3156
22	DIMM* (see “Optional FRUs” on page 142)	
23	Top cover WW	08K6483

(continued)

No.	FRU	P/N
24	Sub battery	02K6684
25	Backup battery	02K6682
26	Cover, keyboard connector	08K6576
27	Cover, Mini PCI slot	08K6574
28	Cover, DIMM slot	08K6578
29	Battery pack (6 cell)*	02K6686
	Optional battery pack (4 cell)* (see “Optional FRUs” on page 142)	
30	Keyboard* (see “Keyboard” on page 140)	
31	Pointing stick cap*	84G6536
32	AC adapter (72 W), 2-pin	
	ASTEC	02K6669
	DELTA	02K6673
	SANKEN	02K6677
	Optional AC adapter (see “Optional FRUs” on page 142)	
	AC adapter (72 W), 3-pin	
	ASTEC	02K6666
	DELTA	02K6670
	Optional AC adapter (see “Optional FRUs” on page 142)	
33	Power code* (see “Power cords (system)” on page 143)	
34	Port replicator*	04P3687
	Optional port replicator* (see “Optional FRUs” on page 142)	
35	Label of digitizer for non-English models	
	for GDL (French)	08K6566
	for EMEA (German and French)	26P9169
	for FUJI (Japanese)	26P9170
-	Telephone cable*	27L0603
-	Form holder	08K7156

LCD FRUs



No.	FRU	P/N
1	LCD front bezel	08K6462
2	Inverter card	08K3154
3	LCD panel 10.4-in. TFT (Hitachi)	05K9623
4	LCD cable	27L0544
5	Rear cover	08K6464

Keyboard

Language	P/N
Belgian	02K5498
Danish	02K5496
Dutch	02K5501
Spanish	02K5503
French	02K5493
German	02K5492
Italian	02K5497
Japanese	02K5504
Norwegian	02K5495
Portuguese	02K5500
Swedish or Finnish	02K5494
Swiss	02K5499
U.K. English	02K5502
U.S. English	02K5218

Endurimer/leather cover replacing kit

FRU	P/N
Right-handed model to left-handed model	
Replacing kit for right-handed to left-handed • Pen holder cap L • Pen holder • Pen protector • Tape for base plate • Tape for digi-base • Tape for digi-base3 • Velcro tape • Screw caps (small) • Screw caps	08K7361
Endurimer for left-handed	04P3470
Leather cover for left-handed	04P3474
Left-handed model to right-handed model	
Replacing kit for left-handed to right-handed • Pen holder cap R • Pen holder • Pen protector • Tape for base plate • Tape for digi-base • Tape for digi-base3 • Velcro tape • Screw caps (small) • Screw caps	08K7360
Endurimer for right-handed	08K6572
Leather cover for right-handed	04P3472

Miscellaneous parts

FRU	P/N
Screw kit (including nylon-coated screws): • M2 x 3.5 mm, flat head (9) • M2.5 x 3 mm, flat head (33) • M2.5 x 4.5 mm, flat head (1) • M2.5 x 4 mm, flat head (31) • M2.5 x 16 mm, flat head (5) • M3 x 2.8 mm, flat head (4) • Screw caps, small • Screw caps, large • Screw caps • Screw caps, pen-A • Screw caps, pen-B • Blank cap for PC	04P3291
System miscellaneous parts: • Insulator on top cover • Door, compact flash card slots • Spring, compact flash card slots • Latch, battery lock • Slide knob, battery lock • Spring, battery lock • Eject knob, battery • Eject spring, battery • Logo • (*a*) Velcro tape • (*f*) Tape for base plate • (*g*) Plate, system board • Tape for video card • Screw caps • Screw caps, small • Screw caps, large	04P3293
Miscellaneous parts, for system board: • I/O bracket • Hex stud • Photo switch spacer • USB insulator • D-sub insulator • HDD insulator • System board insulator • DC shield cap • Shield tape • Shield tape 2 • Spring protection sheet • Screw, M2.5 x 4 mm • System board plate • Screw caps, small • Screw caps, large • Screw caps	04P3292

(continued)

FRU	P/N
Miscellaneous parts, for Digitizer: • (*b*) Plate for digitizer • (*c*) Tape for digitizer 2 • (*d*) Tape for digitizer • (*e*) Tape for digitizer 3 • (*h*) Digitizer label • (*i*) A4 spacer • (*j*) Refill case • (*k*) Velcro tape • (*l*) Boss cap • Copper tape • (*n*) Digitizer insulation sheet • (*m*) Cu tape • Screw caps, pen-A • Screw caps, pen-B • Screw caps	08K6569

Optional FRUs

64-MB SDRAM SO DIMM	20L0264
128-MB SDRAM SO DIMM	20L0265
256-MB SDRAM SO DIMM	33L3070
AC adapter (56W), 2-pin (SANKEN)	02K6554
AC adapter (72W), 2-pin (ASTEC)	02K6669
AC adapter (56W), 3-pin (SANKEN)	02K6555
AC adapter (72W), 3-pin (ASTEC)	02K6666
Battery pack	02K6686
Port replicator	04P3687
Standard pen	02K5633
Hard-disk drive (10.0 GB), SSD	08K9508
Hard-disk drive (10.0 GB), Hitachi	08K9531
Hard-disk drive (20.0 GB), Jasper	27L3427
Common battery charger	02K6642
Multiple battery charger	02K6718

Common parts list

Tools

Triconnector wrap plug	72X8546
PC test card	35G4703
Audio wrap cable	66G5180
Screwdriver kit	95F3598
Torque screwdriver	05K4695
5mm socket wrench	05K4694
Screwdriver	27L8126
External USB FDD Tool kit	27L3452
ThinkPad hardware maintenance diskette version 1.61 **Note:** Download the file from the Web site.	–

Power cords (system)

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

For 2-pin power cords:

Region	**P/N**
Canada, Taiwan, United States of America	13H5264
Japan	13H5273
Argentina	36L8870

For 3-pin power cords:

Region	**P/N**
Australia, New Zealand	76H3514
Thailand	76H3516
Italy	76H3530
Denmark	76H3520
European countries	76H3518
India, South Africa	76H3522
Israel	76H3532
Switzerland	76H3528
UK, Hong Kong	76H3524

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