



**IBM Mobile Systems
ThinkPad Computer
Hardware Maintenance Manual**

February 2002

This manual supports:

**ThinkPad A30, A30p, A31, A31p
(MT 2652/2653/2654)
ThinkPad Dock (MT 2631)**

Note

Before using this information and the product it supports, be sure to read the general information under “Notices” on page 162.

First Edition (February 2002)

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About this manual

This manual contains service and reference information for IBM ThinkPad A30, A30p, A31, A31p (MT2652, 2653, 2654), and ThinkPad Dock (MT2631) products. Use this manual along with the advanced diagnostic tests to troubleshoot problems.

The manual is divided into sections as follows:

- The common sections provide general information, guidelines, and safety information required in servicing computers.
- The product-specific section includes service, reference, and product-specific parts information.

Important

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

Before servicing an IBM ThinkPad product, be sure to review the safety information under “Safety notices: multilingual translations” on page 3, “Safety information” on page 12, and “Laser compliance statement” on page 16.

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Introduction

Important service information

Important

BIOS and device driver fixes are customer-installable. The BIOS and device drivers are posted on the IBM support site <http://www.ibm.com/pc/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 multi-lingual, translated safety notice found in this section.

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

Safety notice 1

Before the computer is powered-on after FRU replacement, make sure all screws, springs, 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 altre parti di piccole dimensioni siano nella corretta posizione e non siano sparse all'interno dell'elaboratore. Verificare ciò scuotendo l'elaboratore e prestando attenzione ad eventuali rumori; eventuali parti o pezzetti metallici possono provocare cortocircuiti pericolosi.

Antes de encender el sistema 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



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 Systematterie 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)

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.

(continued)

(continuation of safety notice 3)

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.

(continued)

(continuation of safety notice 4)

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

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

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

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

Safety notice 5

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

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

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

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

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

Safety notice 6



To avoid shock, do not remove the plastic cover that 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 toolbox 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.

Safety information

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 ohm 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.

Safety information

- 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 an optical storage device; such as a CD-ROM drive or DVD-ROM drive. They are also sold separately as options. The 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, DVD drive or the other laser product 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, beállítástól 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 kontrol, 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, DVD-ROM drive or the other optical storage device could result in exposure to hazardous laser radiation. There are no serviceable parts inside those drives. **Do not open.**

Laser compliance statement

Some CD-ROM drives, DVD-ROM drives or the other optical storage devices 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 !.

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

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

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

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

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

Read this first

- ___ 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
- Distortion, deformation or discoloration of the 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 becomes noisy, it may have been subjected to excessive force, or dropped.

Related service information

This section provides information about the following:

- “Service web site”
- “Product recovery program”
- “Passwords” on page 23
- “Power management” on page 26

Service web site

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

Product recovery program

Restoring the pre-installed software:

If the data on a hard-disk drive is damaged or accidentally erased, you can restore the software that was shipped with the computer. This software includes the pre-installed operating system, applications, and device drivers.

To restore the pre-installed software, you can use either the Product Recovery program or a Recovery CD.

The Product Recovery program is in the Service Partition, a section of the hard-disk drive that is not displayed by Windows Explorer. Use the Recovery CD if it was provided with the computer.

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

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

1. Save all files and shut down the desktop.
2. Turn off the computer.
3. Turn on the computer. A message appears on the screen: **“To start the Product Recovery program, press F11”**; or, for Windows XP models, **“Press F11 to invoke the IBM Product Recovery program”**. Press F11 quickly; this message is displayed for only a few seconds.

Note: If this message does not appear, you can use a Recovery Repair diskette to get access to the Product Recovery program. (Directions for making a Recovery Repair diskette are given in “To create a recovery repair diskette” on page 22.)

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

Creating the service partition:

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

To create the Service Partition (SP):

1. Erase all partitions on the hard-disk drive, using FDISK or a similar application.
2. Boot with the Recovery CD (and the boot diskette if required).
3. Following message appears: **“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 do not receive this message ; go to step 1.

4. Enter **Y**. The Service Partition is created and loaded with the Product Recovery program files.

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

5. At next window, press Enter to continue.
 - The Service Partition is created. The system automatically reboots during this process.
 - The recovery process copies some files to the Service Partition and, PKUNZIPs others.
 - Follow the prompts. You may be prompted to change CDs.
 - When the process is complete, the system reboots. Continue to step 6 to install preloaded system.

Install preloaded system from CD:

6. Boot with the Recovery CD (and the boot diskette if required.)
7. If the hard-disk drive is blank, the following message appears: **“Your computer originally included a Product Recovery program ... Reinstall the Product Recovery Program? (Y/N) []”**.
 - To install the Service Partition, go to step 4.
 - To preload the hard-disk drive without installing the Service Partition, press the N key.
8. If you get a message asking which operating system to install, highlight the proper operating system and press Enter.
9. A message appears: **“Full Recovery:”**. Press Enter to select.
10. Enter the **Y** at each of the next three windows.
11. Follow the prompts to complete Recovery.

To create a recovery repair diskette

If the prompt needed for access to the Product Recovery program does not appear, you can recover it by use of the

Recovery Repair diskette. Make a Recovery Repair diskette and save it for future use. To make a Recovery Repair diskette:

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

To use the recovery repair diskette:

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

Note

Should the hard-disk drive need to be replaced, you must order a Recovery CD with the hard-disk drive so that you can recover the new hard-disk drive with the pre-installed software when it arrives. For information on which CD to order, see "Recovery CDs" on page 150.

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).

If any of these passwords have been set, a prompt for it appears on the screen whenever the computer is turned on. The computer does not start until the password is entered.

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

Power-on password:

A power-on password (POP) protects the system from being powered on by an unauthorized person. The password must be entered before an operating system can be booted.

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**. The **Master + User** mode requires two HDPs; the system administrator enters both in the same operation. The system administrator then provides the user HDP to the system user.

Attention: If the user HDP has been forgotten, check whether a master HDP has been set. If it has, it can be used for access to the hard-disk drive. If no master HDP is available, IBM does not provide any services to reset either the user or the master HDP, or to recover data from the hard-disk drive. The hard-disk drive can be replaced for a scheduled fee.

Supervisor password:

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

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

How to remove the power-on password

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

(A) If no SVP has been set:

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 “1040 Backup battery” on page 67.

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 an SVP has been set and is known by the servicer:

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. At the Enter Current Password field, enter the SVP.
6. When the Enter New Password field opens, leave it blank and press Enter twice.
7. In the Changes have been saved window, press Enter.
8. Press F10; then, in the Setup confirmation window, select **Yes** .

How to remove the hard-disk password

Attention: If **User only** mode is selected and the user HDP has been forgotten and cannot be made available to the servicer, IBM does not provide any services to reset the user HDPs or to recover data from the hard-disk drive. The hard-disk drive can be replaced for a scheduled fee.

To remove a user HDP that has been forgotten, when the SVP and the master HDP are known, 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 **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 will have been removed.

Power management

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

Notes

- Screen blank mode is called *standby mode* in Windows 95 and Windows NT.
- Standby mode is called *suspend mode* in Windows 95 and Windows NT.

Screen blank mode

Screen blank mode has three variants, as follows:

1. If you press Fn + F3, or the time set on the “LCD off timer” in IBM BIOS Setup Utility expires,
 - The LCD backlight turns off.
 - The hard-disk drive motor stops.
 - The speaker is muted.
2. If you are using the ACPI operating system and you press Fn + F3,
 - The LCD backlight turns off.
 - The hard-disk drive motor stops.
3. If the time set on the “Turn off monitor” timer in the operating system expires,
 - The LCD backlight turns off.

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, press Fn + F4.

Note: You can change the action of Fn + F4, if you are using the ACPI operating system.

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 that time.

- 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 for the APM operating system:

Even if you do not set the low-battery alarm, the charge indicator notifies you when 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.

If you are using the ACPI operating system, only the low-battery alarm is available.

To cause the computer to return from standby mode and resume operation, do one of the following:

- Press the Fn key.
- Open the LCD cover (only if you are using Windows Me and you entered standby mode by closing the LCD cover.)
- Turn on the power switch.

Also, the computer automatically returns from standby mode and resumes operation in either of the following events:

- The ring indicator (RI) is signaled by a serial device or a PC Card device (Windows 2000 does not support the ring indicator (RI) resume by PC Card device.)
- The time set on the resume timer elapses. In Windows 98, the **Scheduled Tasks** setting takes 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

Note for Windows NT

If you are using Windows NT in the default format, NTFS, you cannot create a hibernation file. If you want to use hibernation mode, you will need to reinstall Windows NT with FAT format.

In hibernation mode, the following occurs:

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

Related service information

- The system is powered off.

Note: If the computer enters the hibernation mode while it is docked to the docking station, do not undock it from the docking station before resuming normal operation. If you do undock it and then try to resume normal operation, you will get an error message, and you will have to restart the system.

To cause the computer to enter hibernation mode, do any of the following:

- Press the Fn + F12 keys.
- If you are using the APM operating system and have set the mode to **Power switch mode [Hibernation]**, turn off the power switch.
- If you are using the ACPI operating system and have defined one of the following actions as the event that causes the system to go into hibernation mode, perform that action.
 - Closing the lid.
 - Pressing the power button.
 - Pressing Fn + F4 keys.

Also, the computer goes into hibernation mode automatically in either of the following conditions:

- If a “hibernation time” has been set on the timer, and the user does not do any operation with the keyboard, the TrackPoint, the hard-disk drive, the parallel connector, or the diskette drive within that time.
- If the timer conditions are satisfied in suspend mode.
- If you are using the APM operating system and have set the mode to **Hibernate when battery becomes low**, and the battery charge becomes critically low.

When the power is turned on, the computer returns from 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 37.

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 use of the IBM BIOS Setup Utility before you run PC-Doctor. On the IBM BIOS Setup Utility screen, press F9, Enter, F10, and 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.

PC-Doctor cannot be used to test a device that is in the docking station, even if the computer supports the docking station. To test a USB device, connect it to the USB connector of the computer. To test the Ultrabay 2000 device, install it in the Ultrabay 2000 slot of the computer.

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 32, and check the power sources.

Checkout guide

If an error code appears, go to “Symptom-to-FRU index” on page 45.

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.

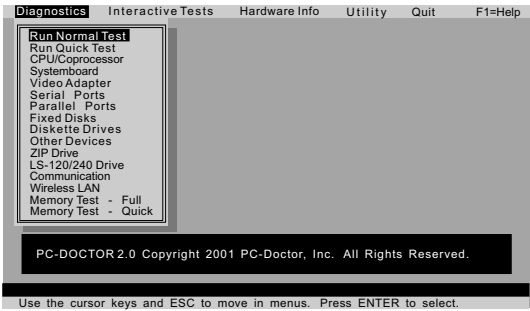
A pull-down menu appears. (Its exact form depends on the model.)

The options on the test menu are as follows:

Diagnostics	Interactive Tests
<ul style="list-style-type: none">• Run Normal Test• Run Quick Test• CPU/Coprocessor• Systemboard• Video Adapter• Serial Ports• Parallel Ports• Fixed Disks• Diskette Drives• Other Devices• ZIP Drive• LS-120/240 Drive• Communication• Wireless LAN• Memory Test – Full• Memory Test – Quick	<ul style="list-style-type: none">• Keyboard• Video• Internal Speaker• Mouse• Joystick Test• Diskette• System Load• CD-ROM/DVD Test• Stereo Speaker• 802.11 Wireless Radio Test

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.
- The 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** in **Diagnostics**.
- **Video Adapter** test supports only the LCD display on ThinkPad. Before running PC-Doctor DOS, detach the external Monitor.
- To test **ZIP Drive** or **LS-120/240 Drive**, each media is needed to be inserted before start testing.
- To test **Digital Signature Chip**, the chip must be enabled and initialized.



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.

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

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 a symptom, 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”
- “Checking operational charging” on page 33
- “Checking the battery pack” on page 33
- “Checking the backup battery” on page 34

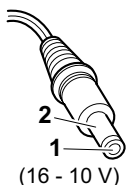
Checking the ac adapter

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”.

To check the ac adapter, do the following:

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

3. If the voltage is not correct, replace the ac adapter.
4. If the voltage is acceptable, do the following:
 - Replace the system board.
 - If the problem persists, go to “Product overview” on page 37.

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

Checking operational charging

To check whether the battery charges properly during operation, 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 it is still not charged, go to the next section.

Checking the battery pack

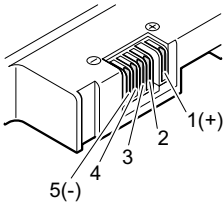
Battery charging does not start until the Power Meter shows that less than 95 % of the total power remains; under this condition the battery pack can charge to 100 % of its capacity. This protects the battery pack from being overcharged or from having a shortened life.

To 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 +12.6
5	Ground (-)

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

Checkout guide

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.

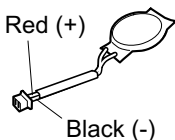
4. If the voltage is more than +11.0 V dc, measure the resistance between battery terminals 4 and 5. The resistance must be 4 to 30 K Ω .

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. Turn the computer upside down.
3. Remove the battery pack (see "1010 Battery pack" on page 56).
4. Remove the backup battery (see "Checking the battery pack" on page 33).
5. 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.

ThinkPad A30, A30p, A31, A31p

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Product overview

This section presents the following product-unique information:

- “Specifications”
- “Status indicators” on page 40
- “FRU Tests” on page 42
- “Fn key combinations” on page 43

Specifications

The following table lists the specifications of the ThinkPad A3* series:

Feature	Description
Processor	<p>MT2652 and MT2654 (A30)</p> <ul style="list-style-type: none"> • Mobile Intel® Pentium® III processor 933 MHz - M • Mobile Intel® Pentium® III processor 1.0 GHz - M • Mobile Intel® Pentium® III processor 1.13 GHz - M <p>MT2653 (A30p)</p> <ul style="list-style-type: none"> • Mobile Intel® Pentium® III processor 1.2 GHz - M <p>MT2652 and MT2654 (A31)</p> <ul style="list-style-type: none"> • Mobile Intel® Pentium® 4 processor 1.4 GHz • Mobile Intel® Pentium® 4 processor 1.5 GHz • Mobile Intel® Pentium® 4 processor 1.6 GHz <p>MT2653 (A31p)</p> <ul style="list-style-type: none"> • Mobile Intel® Pentium® 4 processor 1.7GHz
Bus architecture	<p>A30, A30p</p> <ul style="list-style-type: none"> • 133 MHz PSB • HUB Link • PCI Bus • LPC Bus • 133 MHz SDRAM <p>A31, A31p</p> <ul style="list-style-type: none"> • 400 MHz PSB • HUB Link • PCI Bus • LPC Bus • 266 MHz DDR SDRAM (PC2100)
Internal modem	56.6 Kbps
Audio	<ul style="list-style-type: none"> • Internal stereo speakers • Software control volume

(continued)

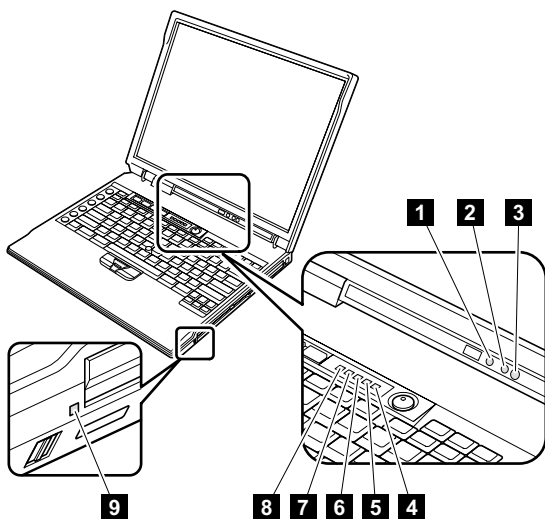
Feature	Description
Memory (standard)	<p>A30, A30p</p> <ul style="list-style-type: none"> • 128 MB DIMM card × 1 <p>A31, A31p</p> <ul style="list-style-type: none"> • 128 MB DIMM card × 1 • 256 MB DIMM card × 1
Memory (optional)	<p>A30, A30p</p> <ul style="list-style-type: none"> • 64 MB, 128 MB, 256 MB, or 512 MB DIMM card (maximum of 1024 MB) <p>A31, A31p</p> <ul style="list-style-type: none"> • 128 MB, 256 MB, or 512 MB DIMM card (maximum of 1024 MB)
Graphic memory	<p>MT2652 and MT2654 (A30)</p> <ul style="list-style-type: none"> • 16 MB DDR SDRAM (on the system board) <p>MT2653 (A30p)</p> <ul style="list-style-type: none"> • 32 MB DDR SDRAM (on the system board) <p>MT2652 and MT2654 (A31)</p> <ul style="list-style-type: none"> • 16 MB DDR SDRAM (on the system board) • 32 MB DDR SDRAM (on the system board) <p>MT2653 (A31p)</p> <ul style="list-style-type: none"> • 64 MB DDR SDRAM (on the system board)
CMOS RAM	242 bytes
Hard-disk drive	<p>MT2652 and MT2654 (A30)</p> <ul style="list-style-type: none"> • 20.0 GB, 2.5-inch, IDE interface • 30.0 GB, 2.5-inch, IDE interface <p>MT2653 (A30p)</p> <ul style="list-style-type: none"> • 48.0 GB, 2.5-inch, IDE interface <p>MT2652 and MT2654 (A31)</p> <ul style="list-style-type: none"> • 20.0 GB, 2.5-inch, IDE interface • 30.0 GB, 2.5-inch, IDE interface • 40.0 GB, 2.5-inch, IDE interface <p>MT2653 (A31p)</p> <ul style="list-style-type: none"> • 60.0 GB, 2.5-inch, IDE interface
Infrared transfer	IrDA 1.1
Mini PCI adapter	Mini PCI Type-IIIa IEEE 802.11b wireless LAN/modem combo card
PC Card	One Type-III or two Type-II
AC adapter	72-watt type

(continued)

Feature	Description
Display	<p>MT2652 and MT2654 (A30, A31)</p> <ul style="list-style-type: none"> • 14.1-inch, 16M colors, XGA (1024 × 768 resolution) TFT color LCD • 15.0-inch, 16M colors, XGA (1024 × 768 resolution) TFT color LCD • 15.0-inch, 16M colors, SXGA+ (1400 × 1050 resolution) TFT color LCD • 15.0-inch, 16M colors, SXGA+ (1400 × 1050 resolution) IPS (CVRM) TFT color LCD <p>MT2653 (A30p, A31p)</p> <ul style="list-style-type: none"> • 15.0-inch, 16M colors, UXGA IPS (1600 × 1200 resolution) TFT color LCD
I/O port	<ul style="list-style-type: none"> • External monitor • Stereo headphone jack • IEEE 1394 connector (only for A30p, A31p) • Infrared port • Stereo line-in jack • Monaural microphone jack • Parallel connector • Docking connector • RJ11 • RJ45 • Serial connector • TV-out connector • TV-in connector (only for A30p, A31p) • UltraPort connector (only for A30p, A31p) • Universal serial bus (USB) connectors
Ultrabay device	<p>MT2652 and MT2654 (A30)</p> <ul style="list-style-type: none"> • 10-24x CD-ROM drive • 8x DVD-ROM drive <p>MT2653 (A30p)</p> <ul style="list-style-type: none"> • DVD/CD-RW combo drive <p>MT2652 and MT2654 (A31)</p> <ul style="list-style-type: none"> • 1.44 MB (3-mode), 3.5-inch diskette drive • 10-24x CD-ROM drive • 8x DVD-ROM drive • DVD/CD-RW combo drive <p>MT2653 (A31p)</p> <ul style="list-style-type: none"> • DVD/CD-RW combo drive
UltraPort device (option only for A30p, A31p)	<ul style="list-style-type: none"> • UltraPort camera • Bluetooth UltraPort module
Preinstalled operating system	<p>Models x3x, x5x: Windows XP Professional</p> <p>Models x4x, x6x: Windows 2000</p> <p>Models xAx, xBx, xCx: Windows 98</p> <p>Models xEx, xFx: Windows XP Home Edition</p>

Status indicators

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



Indicator	Meaning
1 Bluetooth status	Green: The Bluetooth is operational. This indicator is on when the Bluetooth is on and not in suspend mode.
2 Battery status	<p>Green: The battery is in use and has enough power. The ac adapter has charged the battery completely.</p> <p>Blinking green: The battery is being charged, but still has enough power to operate. (At regular intervals, the indicator light turns off briefly.)</p> <p>Orange: The battery is being charged, but the battery power is still low.</p> <p>Blinking orange: The battery needs to be charged. When the indicator starts blinking orange, the computer beeps three times.</p>

(continued)

Indicator	Meaning
3 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.
4 Power on	Green: The computer is on and ready to use. This indicator stays lit whenever the computer is on and is not in standby mode.
5 Scroll lock	Green: Scroll Lock mode is enabled. The Arrow keys can be used as screen-scroll function keys. The cursor cannot be moved with the Arrow keys. Not all application programs support this function. To enable or disable Scroll Lock mode, press the ScrLk key.
6 Caps lock	Green: Caps Lock mode is enabled. To enable or disable Caps Lock mode, press the Caps Lock key.
7 Num lock	Green: The numeric keypad on the keyboard is enabled. To enable or disable the keypad, press and hold the Shift key, and press the NumLk (ScrLk) key.
8 Drive in use	Green: Data is being read from or written to the hard-disk drive, the diskette drive, or the drive in the Ultrabay device. 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.
9 Ultrabay status	Green: An Ultrabay 2000 device is installed and in use. Blinking green: An Ultrabay 2000 device is in the process of being detached. Turn off: An Ultrabay 2000 device is ready to be attached or detached. Note: If you are using Windows 2000, the Ultrabay status indicator does not blink while an Ultrabay 2000 device is being detached. Instead, a message box pops up when the process is completed; then the indicator turns off.

FRU Tests

The following table shows the test for each FRU.

FRU	Applicable test
System board	<ol style="list-style-type: none"> 1. Diagnostics --> CPU/Coprocessor 2. Diagnostics --> Systemboard
Power	Diagnostics --> Other Devices --> IBM AC Adapter, IBM Battery 1 (IBM Battery 2)
LCD unit	<ol style="list-style-type: none"> 1. Diagnostics --> Video Adapter 2. Interactive Tests --> Video
Modem	<ol style="list-style-type: none"> 1. Make sure the modem is set up correctly. 2. Replace the modem jack and the modem card in turn, and run the following test in Diagnostics --> Communication : <ol style="list-style-type: none"> a. Lucent Modem (M2) Loopback b. Lucent Modem (M2) Dialtone/DTM c. Lucent Soft Modem Loopback d. Lucent Soft Modem Dialtone e. Intel Modem Register (A30/A30p only) f. Intel Modem Loopback/DTMF (A30/A30p only) g. Intel SP Modem Register h. Intel SP Modem Loopback/DTMF i. 3Com MiniPCI Modem Test (A30/A30p only) j. 3Com MiniPCI Dialtone Test (A30/A30p only)
Audio	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. Diagnostics --> Systemboard --> Keyboard 2. Interactive Tests --> Keyboard
TrackPoint or pointing device	<p>If the TrackPoint does not work, check the configuration in the ThinkPad Configuration program. If the TrackPoint is disabled, select Enable to enable it.</p> <p>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. If the pointer stops after a short time, no service action is necessary.</p> <p>If enabling the TrackPoint does not correct the problem, continue with the following :</p> <ul style="list-style-type: none"> • Interactive Tests --> Mouse

(continued)

FRU	Applicable test
Hard-disk drive	Diagnostics --> Fixed Disks
Diskette drive	<ol style="list-style-type: none"> Diagnostics --> Diskette Drives Interactive Tests --> Diskette
CD-ROM or DVD drive	<ol style="list-style-type: none"> Diagnostics --> Other Devices --> CD-ROM/DVD Interactive Tests --> CD-ROM/DVD Test
Memory	<ol style="list-style-type: none"> If two DIMMs are installed, remove one of them and run Diagnostics --> Memory Test - Quick. If the problem does not recur, return the DIMM to its place, remove the other one, and run the test again. If the test does not detect the error, run Diagnostics --> Memory Test - Full.
Fan	<ol style="list-style-type: none"> Turn on the computer and check the air turbulence at the louver near the power switch. Run Diagnostics --> Other Devices --> IBM Fan.

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 + F1	Reserved.
Fn + F2	Reserved.
Fn + F3	Turn off the LCD display, leaving the screen blank. To turn the LCD display on again, press any key or the TrackPoint stick.
Fn + F4	<p>Turn standby mode on. To return to normal operation, press the Fn key independently, without pressing a function key.</p> <p>Notes:</p> <ol style="list-style-type: none"> This mode is called <i>suspend mode</i> in Windows 95 and Windows NT. In Windows 2000, this combination of buttons functions as a sleep button. The 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	Reserved.
Fn + F6	Reserved.
Fn + F7	Switch between the LCD and an external monitor (CRT). If an external monitor is attached, computer output is displayed in the following three patterns by turns: <ul style="list-style-type: none"> • External monitor • LCD + External monitor • LCD
Fn + F8	Turn screen expansion on or off. (There is no symbol on the key.) Note: This function is not supported in Windows 2000.
Fn + F9	Reserved.
Fn + F10	Reserved.
Fn + F11	Reserved.
Fn + F12	Turn hibernation mode on. To return to normal operation, press the power button for less than four seconds. Note: To use Fn + F12 for hibernation in Windows 2000, IBM PM device driver must have installed on the computer.
Fn + PgUp	Turn the ThinkLight on or off.
Fn + Home	The LCD becomes brighter.
Fn + End	The LCD becomes less bright.
Fn + Spacebar	Magnify desktop and maximize application windows. Note: To use Fn +Space (Fullscreen Magnifier), On Screen Display must be installed.

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 51.

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.
0190 Critical low battery error.	<ol style="list-style-type: none"> Charge the battery pack. Battery pack.

Symptom or error	FRU or action, in sequence
0195 Security hardware tamper detected.	<ol style="list-style-type: none"> 1. Enter IBM BIOS Setup Utility by entering supervisor password, and select "Password" --> "IBM Security Chip" --> "Clear IBM Security Chip" to clear this error. 2. Security chip. 3. System board.
0196 Security hardware removed.	<ol style="list-style-type: none"> 1. Enter IBM BIOS Setup Utility by entering supervisor password, and select "Password" --> "IBM Security Chip" --> "Clear IBM Security Chip" to clear this error. 2. Security chip. 3. System board.
0197 Invalid Remote change requested.	The remote configuration for the security chip has failed. Confirm the operation and try again.
01C8 More than one modem devices are found — Remove one of them. Press Esc to continue.	<ol style="list-style-type: none"> 1. Remove either a Mini PCI modem card or an modem daughter card, otherwise press Esc to ignore the warning message. 2. System board.
01C9 More than one Ethernet devices are found — Remove one of them. Press Esc to continue.	<ol style="list-style-type: none"> 1. Remove either a Mini PCI Ethernet card or an Ethernet daughter card, otherwise press Esc to ignore the warning message. 2. System board.
0200 Hard disk error — The hard disk is not working.	<ol style="list-style-type: none"> 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.

Symptom or error	FRU or action, in sequence
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.	Replace the backup battery and run IBM BIOS Setup Utility to reset the time and date.
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.
02B2 Incorrect drive A type.	1. Diskette drive. 2. External FDD cable. 3. I/O card.
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.	<ol style="list-style-type: none"> 1. Load Setup Defaults in IBM BIOS Setup Utility. 2. Backup battery. 3. System board.
Allocation error for device.	<ol style="list-style-type: none"> 1. Load Setup Defaults in IBM BIOS Setup Utility. 2. Backup battery. 3. System board.
Failing bits: nnnn.	<ol style="list-style-type: none"> 1. DIMM. 2. System board.
Invalid system configuration data.	<ol style="list-style-type: none"> 1. DIMM. 2. System board.
I/O device IRQ conflict.	<ol style="list-style-type: none"> 1. Load Setup Defaults in IBM BIOS Setup Utility. 2. Backup battery. 3. System board.
Operating system not found.	<ol style="list-style-type: none"> 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. Diskette drive. 6. Hard-disk drive. 7. System board.
Hibernation error.	<ol style="list-style-type: none"> 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.
Thermal sensing error.	System board.

Beep symptoms

Symptom or error	FRU or action, in sequence
One beep and a blank, unreadable, or flashing LCD.	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 1. System board. 2. LCD assembly. 3. DIMM.
Two short beeps with error codes.	POST error. See “Numeric error codes” on page 45.
Two short beeps with blank screen.	<ol style="list-style-type: none"> 1. System board. 2. DIMM.
Three short beeps, pause, three more short beeps, and one short beep.	<ol style="list-style-type: none"> 1. DIMM. 2. System board
Five short beeps.	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.	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 1. Reseat DIMM. 2. System board.
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:

- **XGA:** 8 or more bright dots, 8 or more dark dots, or a total of 9 or more bright and dark dots.
- **SXGA+:** 11 or more bright dots, 13 or more dark dots, or a total of 16 or more bright and dark dots.
- **UXGA:** 11 or more bright dots, 16 or more dark dots, or a total of 16 or more bright and dark dots.

Note: 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.
<ul style="list-style-type: none"> • LCD backlight not working. • LCD too dark. • LCD brightness cannot be adjusted. • LCD contrast cannot be adjusted. 	<ol style="list-style-type: none"> 1. Reseat the LCD connectors. 2. LCD assembly. 3. System board.
<ul style="list-style-type: none"> • LCD screen unreadable. • Characters missing pixels. • Screen abnormal. • Wrong color displayed. 	<ol style="list-style-type: none"> 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.

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, wrong devices are installed, a short circuit is suspected, or the system is inoperative. Follow these procedures to isolate the failing FRU (do not isolate FRUs that have no defects).

Verify that all attached devices are supported by the computer.

Verify that the power supply being used at the time of the failure is operating correctly. (See “Power system checkout” on page 32.)

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. CD-ROM and diskette drive in the UltralimBay
 - i. PC Cards
4. Power on the computer.
5. Determine whether the problem has changed.
6. If the problem does not recur, reconnect the removed devices one at a time until you find the failing FRU.
7. If the problem remains, replace the following FRUs one at a time (do not replace a nondefective FRU):
 - a. System board
 - b. LCD assembly

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. In IBM ThinkPad computer, this problem is addressed 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.

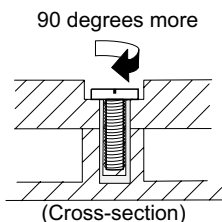
Do the following when you service this machine:

- Keep the screw kit (for the P/N, see “Miscellaneous parts” on page 156) in your tool bag.
- Always use new screws.
- Use a torque screwdriver if you have one.

Tighten screws as follows:

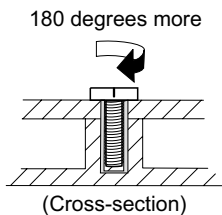
- **Plastic to plastic**

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 1.62, 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 1.62 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

FRU replacement notices

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 1.62, 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 directions and drawings for use in removing and replacing a FRU. Be sure to observe the following general rules:

1. Do not try to service any 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 52.
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 132.
8. When replacing a FRU, use the correct screw as shown in the procedures.

DANGER

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

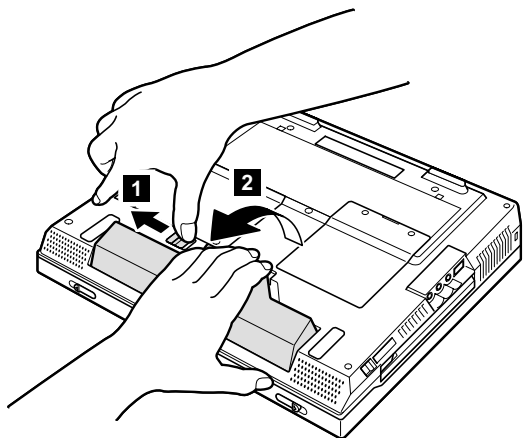
Attention: Before the computer is powered on after FRU replacement, make sure that all screws, springs, and other small parts are in place and are not loose inside the computer. Verify this by shaking the computer gently and listening for rattling sounds. Metallic parts or metal flakes can cause electrical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

Attention: The system board is sensitive to, and can be damaged by, electrostatic discharge. Before touching it, establish personal grounding by touching a ground point with one hand or by using an electrostatic discharge (ESD) strap (P/N 6405959).

1010 Battery pack

 **DANGER**

Use only the battery in the parts listing for your computer. Use of an incorrect battery can result in ignition or explosion of the battery.

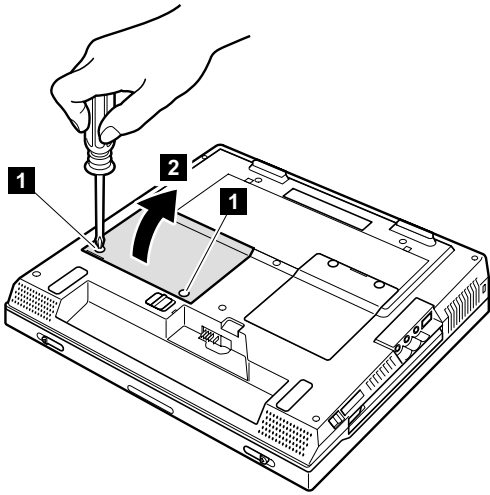


1020 Mini PCI adapter

For access, remove this FRU:

- “1010 Battery pack” on page 56

Note: Loosen the screws **1**, but do not remove them.

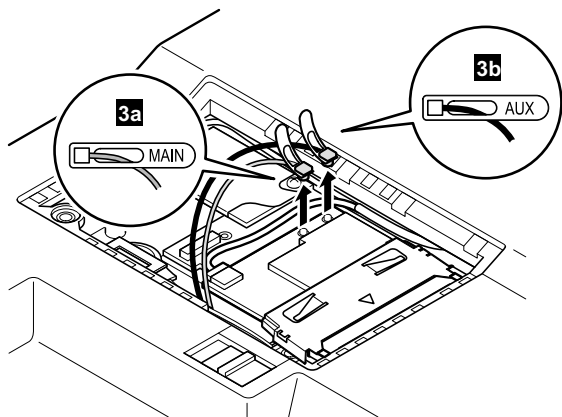


(continued)

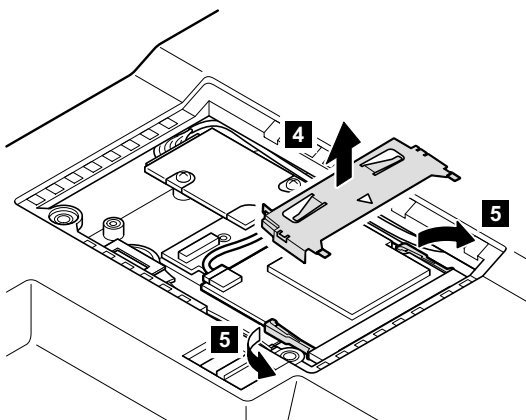
Removing and replacing a FRU

The following illustrations show the wireless LAN/modem combo card. Antenna cables **3a** and **3b** are for the wireless LAN feature, and **6** is for the modem feature. This slot also supports a Mini PCI modem card.

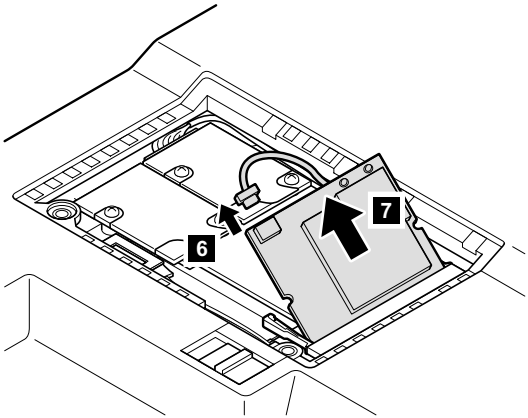
Note: When unplugging the antenna jack, do not pull the cable; it might snap. Unplug the jack by pulling a tab with your fingers.



When installing: Plug the gray antenna cable with the tab marked "MAIN" (**3a**) into jack *J1*, and the black antenna cable with the tab marked "AUX" (**3b**) into jack *J2*.



(continued)



When installing: With the notched end of the card toward the socket, insert the card into the socket, and then press it firmly. Pivot the card until it snaps into place. Make sure that the card is firmly fixed in the slot and does not move easily.

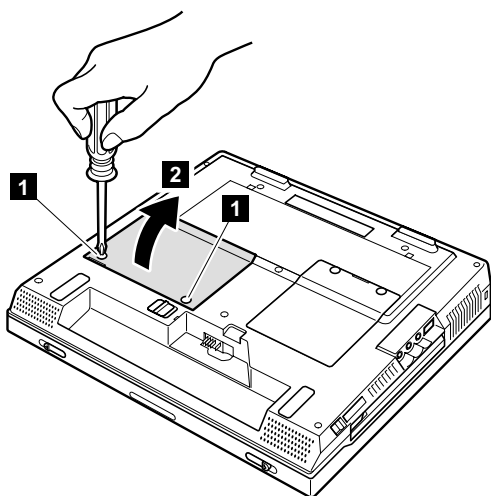
Removing and replacing a FRU

1030 Communication daughter card (CDC)

For access, remove this FRU:

- “1010 Battery pack” on page 56

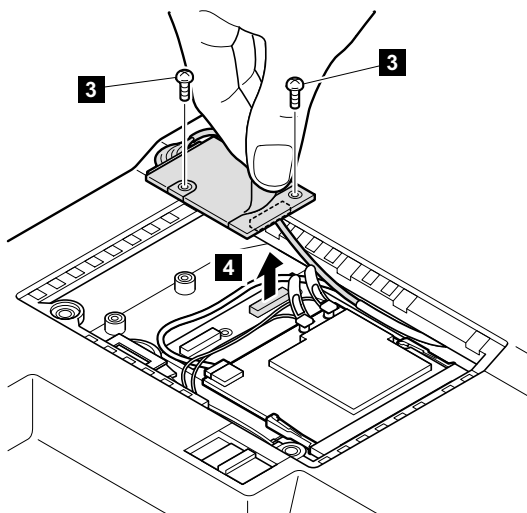
Note: Loosen the screws **1**, but do not remove them.



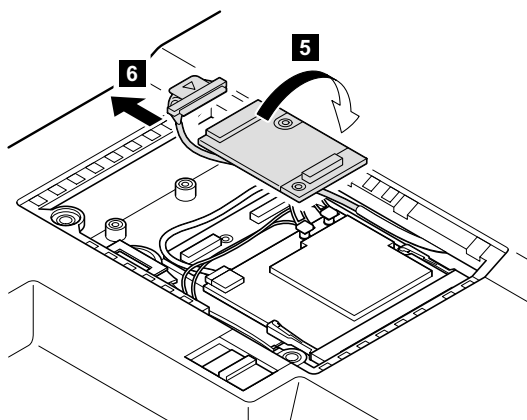
(continued)

Ethernet daughter card

Following illustrations show the combination of the MiniPCI combo (modem/wireless LAN) card and Ethernet daughter card.



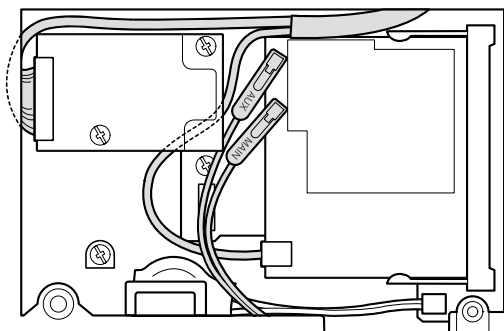
Step	Screw (quantity)	Torque
3	CDC screw (2)	0.392 Nm (4 kgfcm)



When installing: Make sure that connectors **4** and **6** are firmly attached.

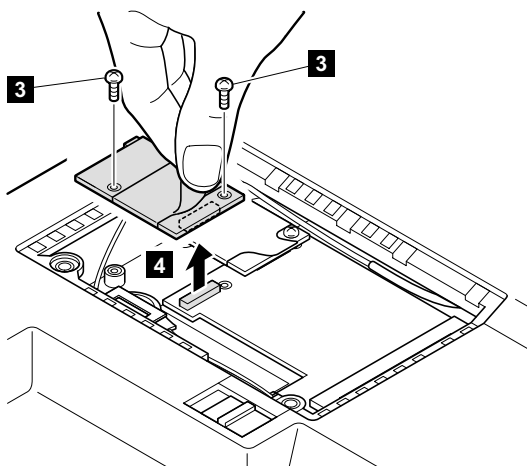
Removing and replacing a FRU

Cable routing: When attaching the Ethernet daughter card, route the cable as this figure.

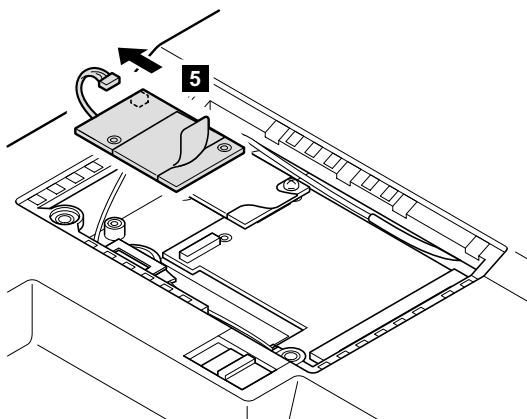


Modem daughter card

Following illustrations show the combination of the Ethernet daughter card and Modem daughter card.



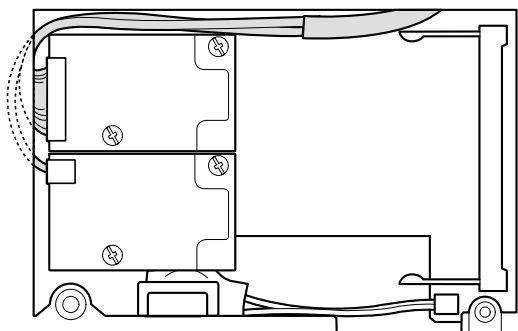
Step	Screw (quantity)	Torque
3	CDC screw (2)	0.392 Nm (4 kgfcm)



When installing: Make sure that connectors **4** and **6** are firmly attached.

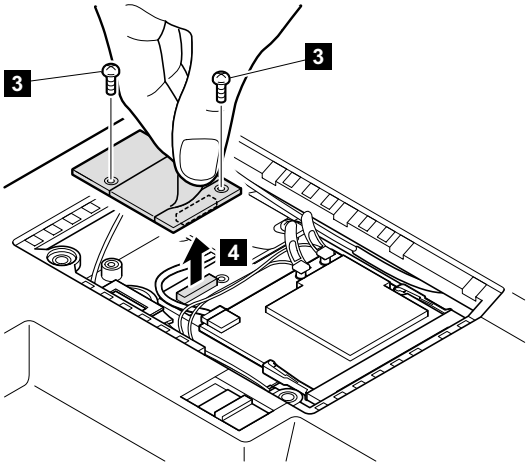
Removing and replacing a FRU

Cable routing: When attaching the Modem daughter card, route the cable as this figure.

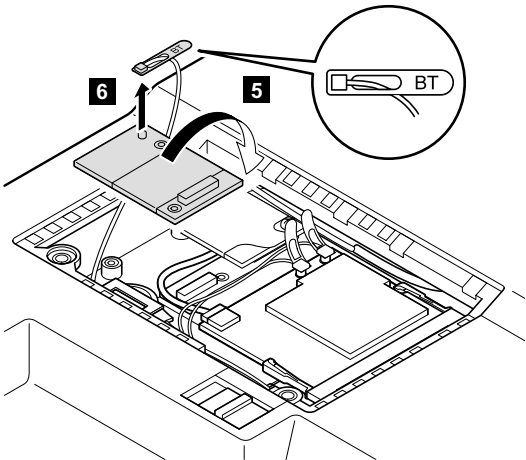


Bluetooth daughter card

Following illustrations show the combination of the MiniPCI combo (modem/wireless LAN) card, Ethernet daughter card, and Bluetooth daughter card.



Step	Screw (quantity)	Torque
3	CDC screw (2)	0.392 Nm (4 kgfcm)

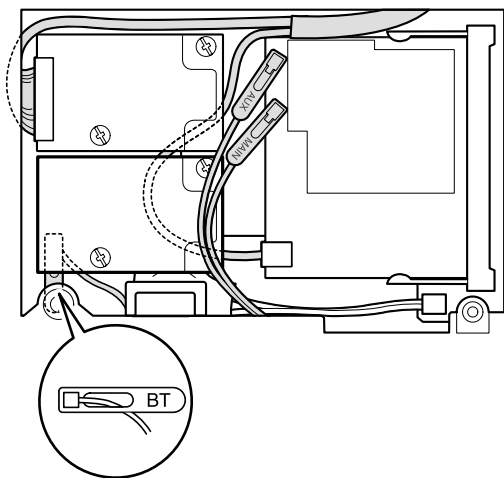


When installing:

1. Make sure that the connector **4** is firmly attached.
2. Plug the white cable with the tab marked "BT" into the jack on the Bluetooth daughter card.

Removing and replacing a FRU

Cable routing: When attaching the Bluetooth daughter card, route the cable as this figure.



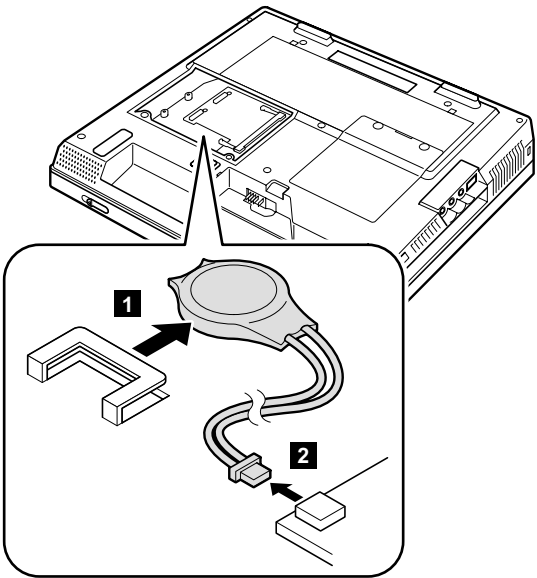
1040 Backup battery

 DANGER

Use only the battery in the parts listing for your computer. Use of an incorrect battery can result in ignition or explosion of the battery.

For access, remove these FRUs, in order:

- “1010 Battery pack” on page 56
- “1030 Communication daughter card (CDC)” on page 60

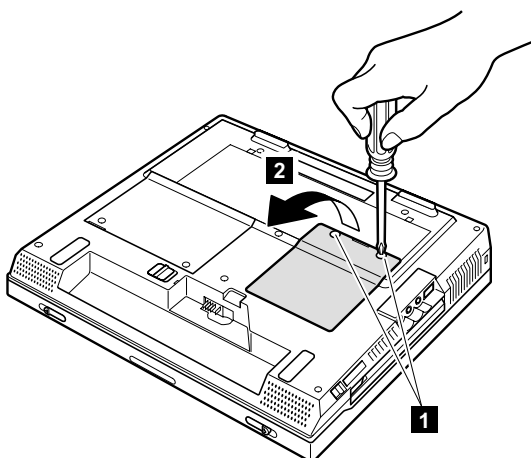


1050 DIMM

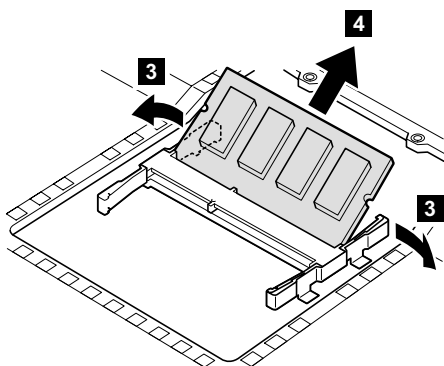
For access, remove this FRU:

- “1010 Battery pack” on page 56

Note: Loosen the screws **1**, but do not remove them.



The shape of the socket varies from model to model. In some models, the shape might be slightly different from the socket in this figure, but the removal procedures are common for all models.



When installing: With the notched end of the DIMM toward the socket, insert the DIMM into the socket, and then press it firmly. Pivot the DIMM until it snaps into place. Make sure that the card is firmly fixed in the slot and does not move easily.

1060 Hard-disk drive

Attention

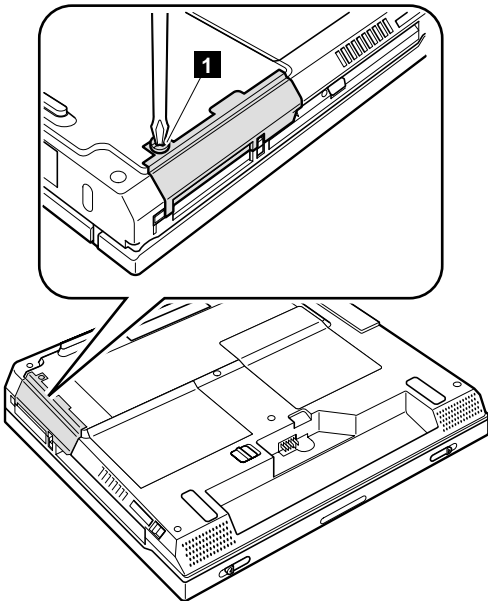
Do not drop or apply any shock to the hard-disk drive. The hard-disk drive is sensitive to physical shock. Incorrect handling can cause damage and permanent loss of data.

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.

For access, remove this FRU:

- “1010 Battery pack” on page 56

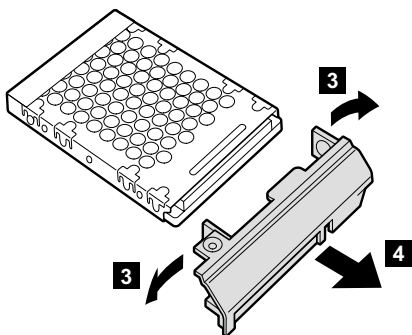
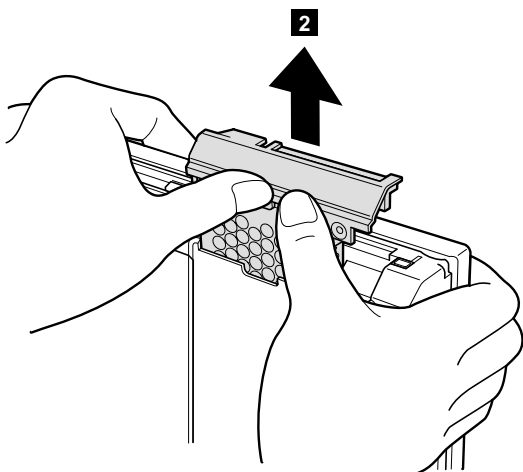


Note: The hard disk is attached to the cover.

Step	Screw (quantity)
1	HDD screw (1) or security screw (1)
Note: Use a 2.5-mm Allen wrench to remove the security screw.	

(continued)

Removing and replacing a FRU



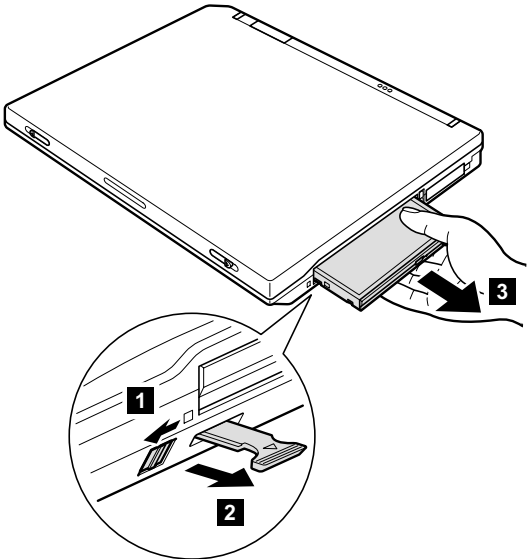
When installing: Make sure that the hard-disk connector is firmly connected.

1070 Ultrabay Plus device

Note

Ultrabay Plus does not support Ultrabay 2000 battery. For supported devices, see “Optional FRUs” on page 159. The procedure for installing and removing is the same for every device.

Note: When you release the switch in step **1** the lever pops out. Pull the lever a little in step **2** to release the device from the bay.

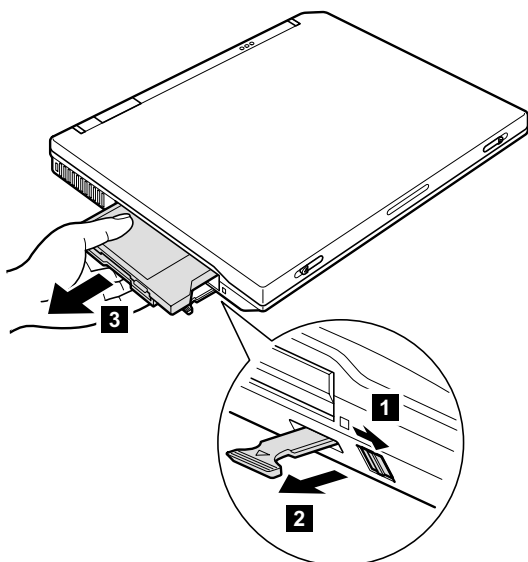


1080 Ultrabay 2000 device

Note

Ultrabay 2000 does not support Ultrabay Plus devices. For supported devices, see “Optional FRUs” on page 159. The procedure for installing and removing is the same for every device.

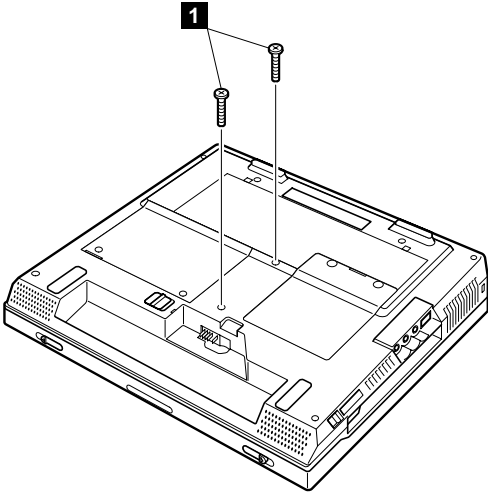
Note: When you release the switch in step **1** the lever pops out. Pull the lever a little in step **2** to release the device from the bay.



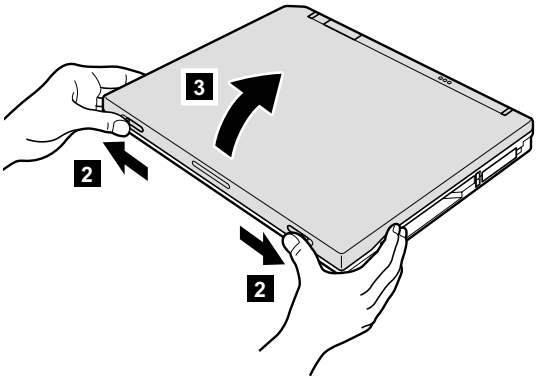
1090 Keyboard

For access, remove these FRUs, in order:

- “1010 Battery pack” on page 56
- “1070 Ultrabay Plus device” on page 71
- “1080 Ultrabay 2000 device” on page 72



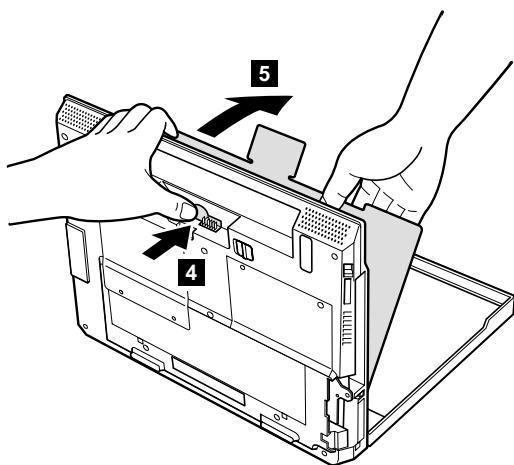
Step	Screw (quantity)	Torque
1	M2.5 x 16 mm, nylon-coated (2)	0.392 Nm (4 kgfcm)



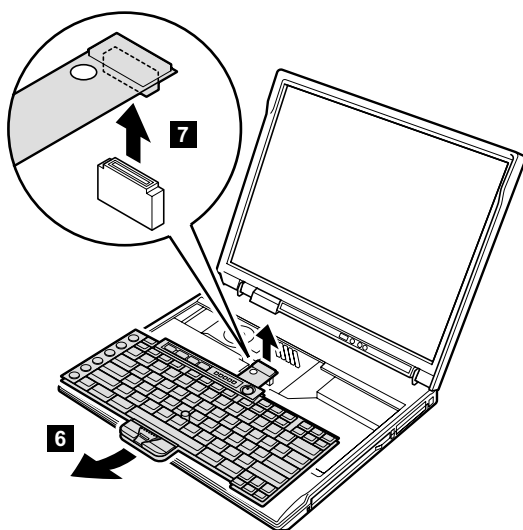
(continued)

Removing and replacing a FRU

In step **5**, open the keyboard slightly in the direction of the arrow.

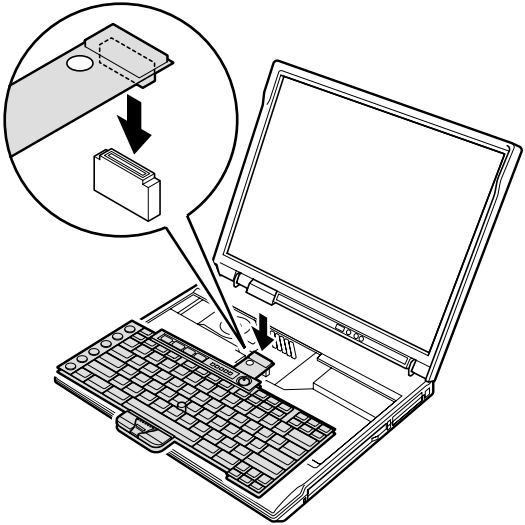


In step **6**, draw the keyboard a little in the direction of the arrow, and then detach the connector **7**.

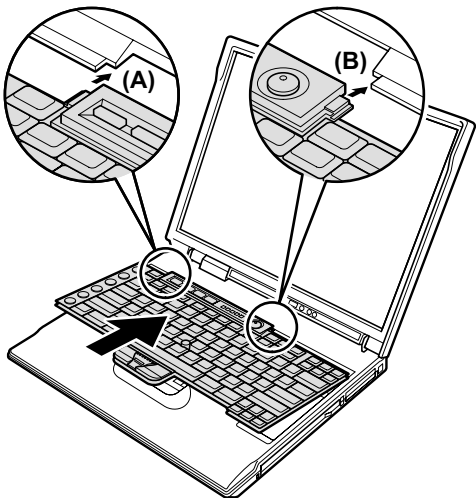


When installing: Install the new keyboard, following the directions below.

1. Attach the connector.



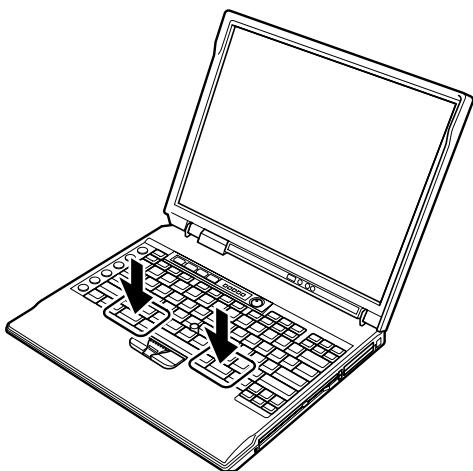
2. Make sure that the keyboard edges, shown in the figure as **(A)** and **(B)**, are under the frame.



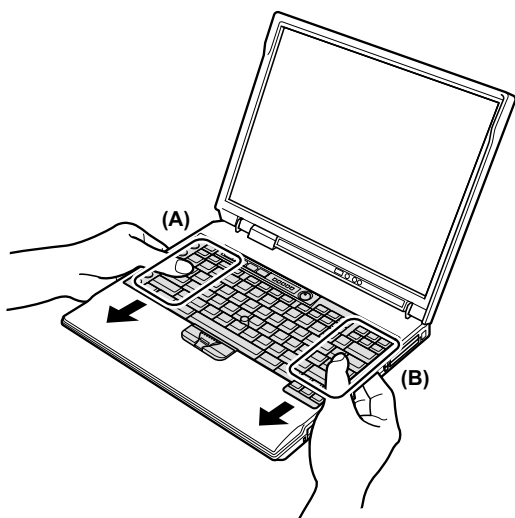
(continued)

Removing and replacing a FRU

3. Press the keys indicated by arrows to latch the keyboard firmly in place.



4. To make sure that the front side of the keyboard is housed firmly, insert your fingers into the left and right slots of the Ultrabay; then, with your fingers in those slots, gently press the shift keys with your thumbs and try to slide the keyboard towards you. Do not push hard on parts **(A)** and **(B)** on the keyboard; to do so might distort the Ultrabay slots.

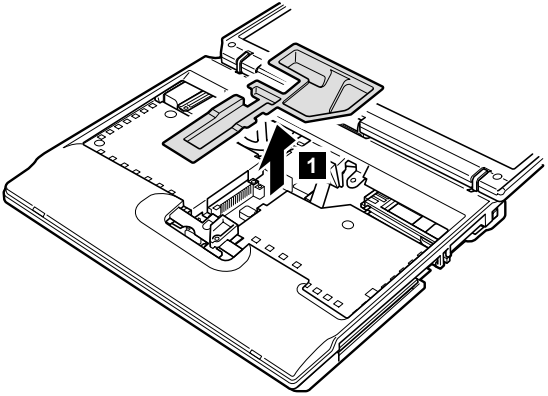


5. Replace the screws, using the new screws provided with the keyboard.

1100 Keyboard CRU insulator

For access, remove these FRUs, in order:

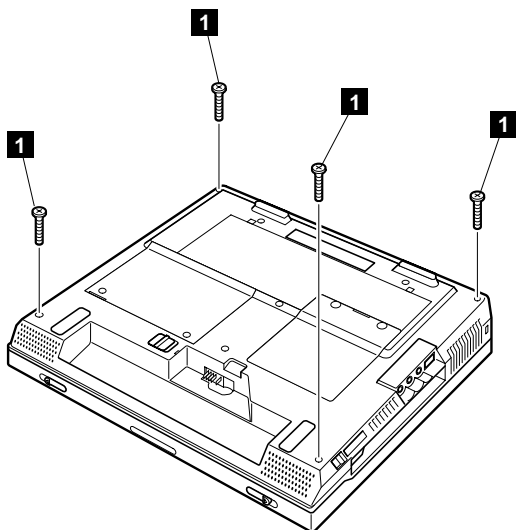
- “1010 Battery pack” on page 56
- “1070 Ultrabay Plus device” on page 71
- “1080 Ultrabay 2000 device” on page 72
- “1090 Keyboard” on page 73



1110 Keyboard bezel

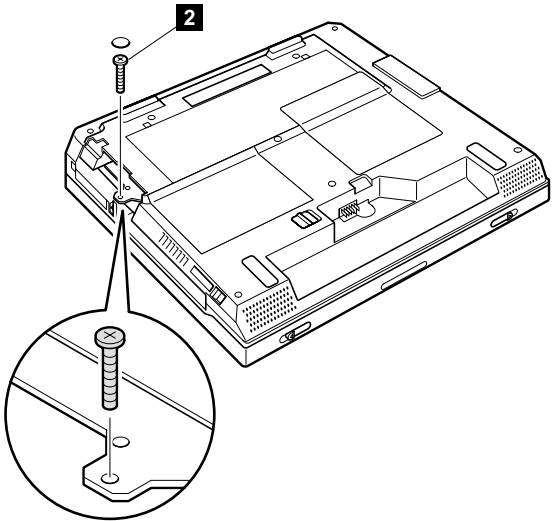
For access, remove these FRUs, in order:

- “1010 Battery pack” on page 56
- “1070 Ultrabay Plus device” on page 71
- “1080 Ultrabay 2000 device” on page 72
- “1090 Keyboard” on page 73
- “1100 Keyboard CRU insulator” on page 77



Step	Screw (quantity)	Torque
1	M2.5 x 16 mm, nylon-coated (4)	0.392 Nm (4 kgfcm)

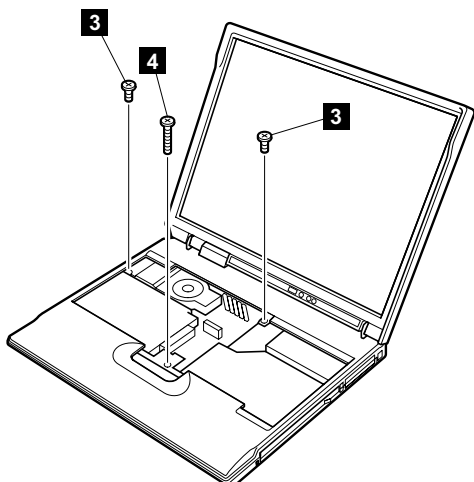
(continued)



Step	Screw (quantity)	Torque
2	M2 x 15 mm, nylon-coated (1)	0.245 Nm (2.5 kgfcm)

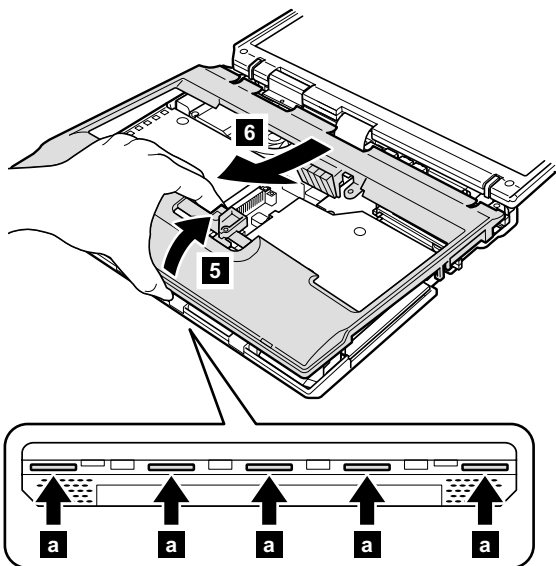
(continued)

Removing and replacing a FRU



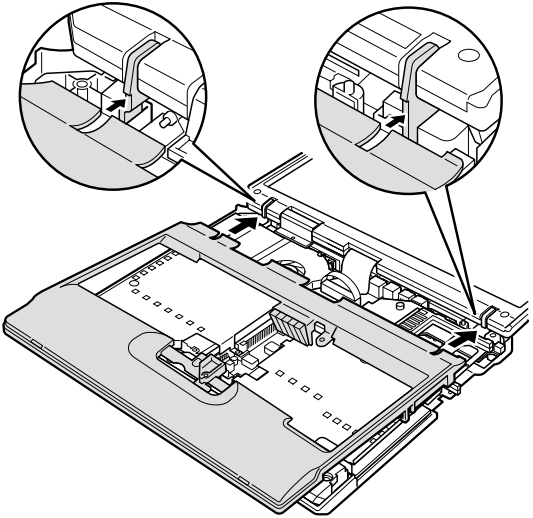
Step	Screw (quantity)	Torque
3	M2.5 x 4.8 mm, nylon-coated (2)	0.392 Nm (4 kgfcm)
4	M2.5 x 19.5 mm, nylon-coated (1)	0.392 Nm (4 kgfcm)

In step **5**, make sure that all of the latches (**a**) on the front side of the computer are detached, and then remove the keyboard bezel.

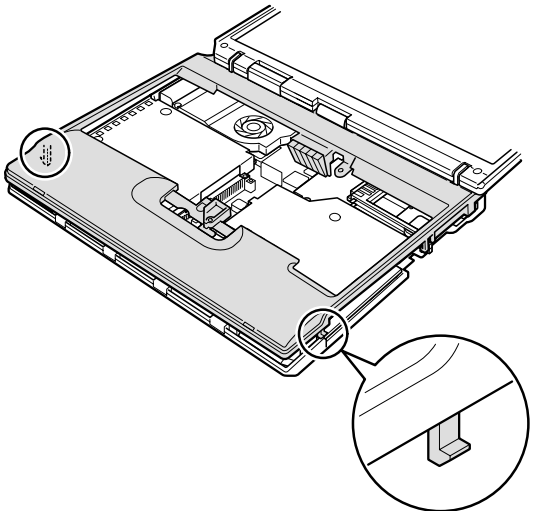


When installing the keyboard bezel, do the following:

1. Attach the keyboard bezel to the computer, aligning two dents of the bezel with the hinges.



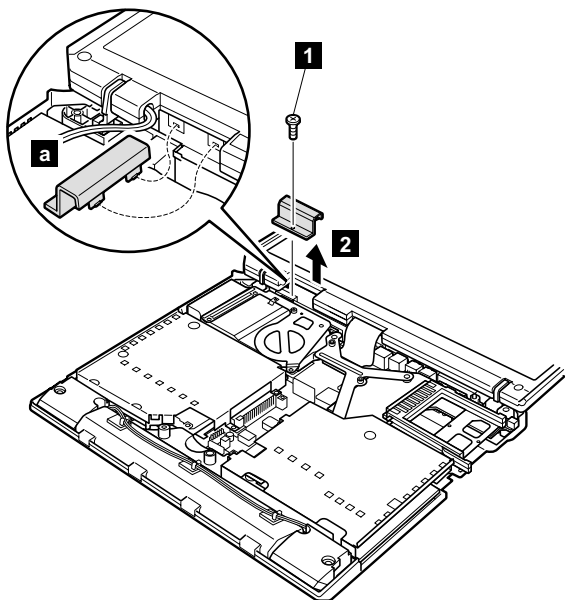
2. Make sure that all of the latches on the front side of the computer (**a** in removal step **5**) are firmly attached.
3. Make sure that both the left and right latches on the bottom side of the bezel are firmly attached.



1120 Hinge cover

For access, remove these FRUs, in order:

- “1010 Battery pack” on page 56
- “1070 Ultrabay Plus device” on page 71
- “1080 Ultrabay 2000 device” on page 72
- “1090 Keyboard” on page 73
- “1100 Keyboard CRU insulator” on page 77
- “1110 Keyboard bezel” on page 78



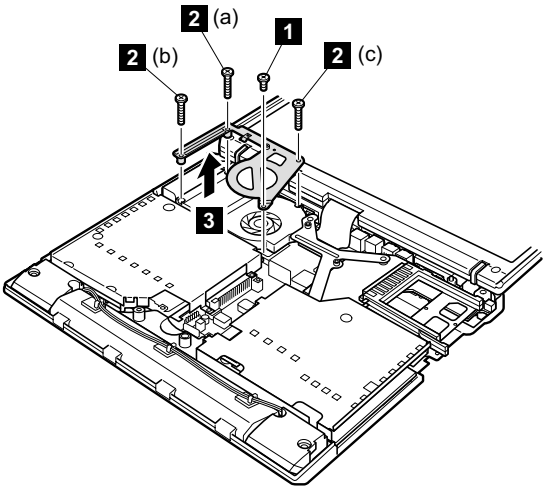
Step	Screw (quantity)	Torque
1	M2.5 x 4.8 mm, nylon-coated (2)	0.392 Nm (4 kgfcm)

When installing: Attach the hinge cover, aligning the two projections on the rear side with the two small square holes of the base cover.
(**a**)

1130 Fan assembly

For access, remove these FRUs, in order:

- “1010 Battery pack” on page 56
- “1030 Communication daughter card (CDC)” on page 60
- “1040 Backup battery” on page 67
- “1060 Hard-disk drive” on page 69
- “1070 Ultrabay Plus device” on page 71
- “1080 Ultrabay 2000 device” on page 72
- “1090 Keyboard” on page 73
- “1100 Keyboard CRU insulator” on page 77
- “1110 Keyboard bezel” on page 78
- “1120 Hinge cover” on page 82



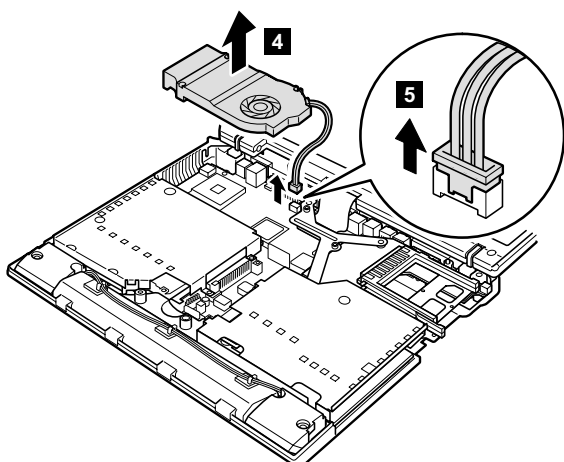
Step	Screw (quantity)	Torque
1	M2.5 × 4.8 mm, nylon-coated (1)	0.392 Nm (4 kgfcm)
2	M2 × 15 mm, nylon-coated (3)	0.245 Nm (2.5 kgfcm)

When installing: When securing the screws, do as follows:

1. Secure the screw **1** temporarily.
2. Secure the screws **2** in order of **(a)**, **(b)**, and **(c)**.
3. Tighten the screw **1** to secure the bracket and the fan assembly firmly.

(continued)

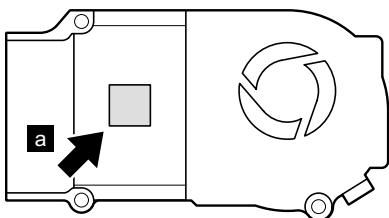
Removing and replacing a FRU



When installing: Make sure that the connector **5** is firmly attached.

Note

Apply thermal grease on the **a**-part of the fan, shown in the following figure.



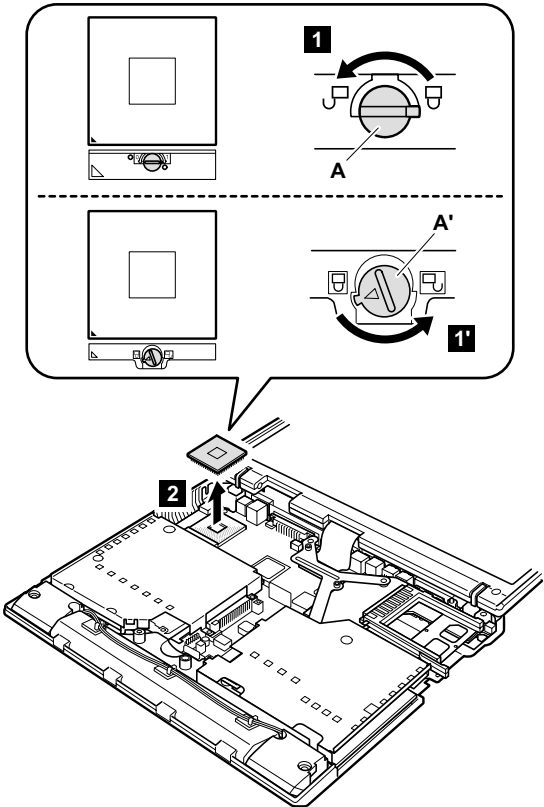
1140 CPU

For access, remove these FRUs, in order:

- “1010 Battery pack” on page 56
- “1030 Communication daughter card (CDC)” on page 60
- “1040 Backup battery” on page 67
- “1060 Hard-disk drive” on page 69
- “1070 Ultrabay Plus device” on page 71
- “1080 Ultrabay 2000 device” on page 72
- “1090 Keyboard” on page 73
- “1100 Keyboard CRU insulator” on page 77
- “1110 Keyboard bezel” on page 78
- “1120 Hinge cover” on page 82
- “1130 Fan assembly” on page 83

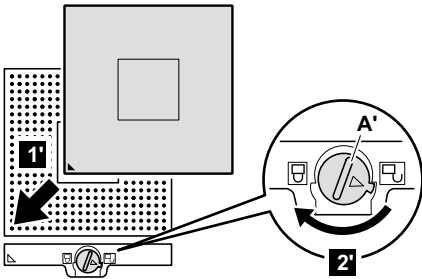
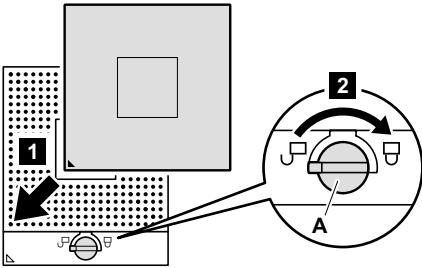
Note: There are two types of CPU socket. Confirm the socket type of the computer first.

Rotate the head of the screw (A) in the direction of the arrow **1** to release the lock; then remove the CPU **2**.



Removing and replacing a FRU

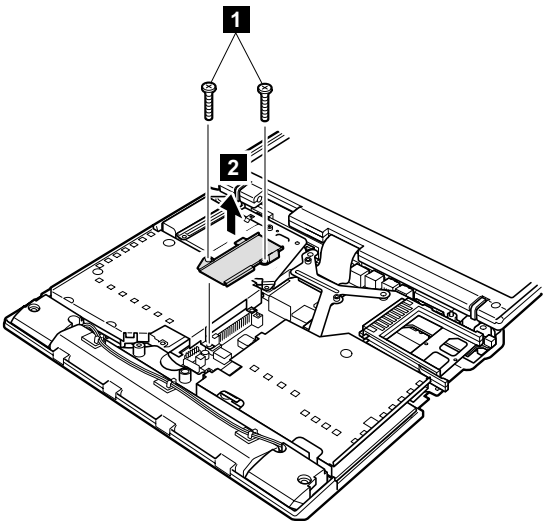
When installing: Place the CPU on the CPU socket (**1**), and then rotate the head of the screw (**A**) in the direction of arrow **2** to lock the CPU.



1150 Ultrabay Plus slot

For access, remove these FRUs, in order:

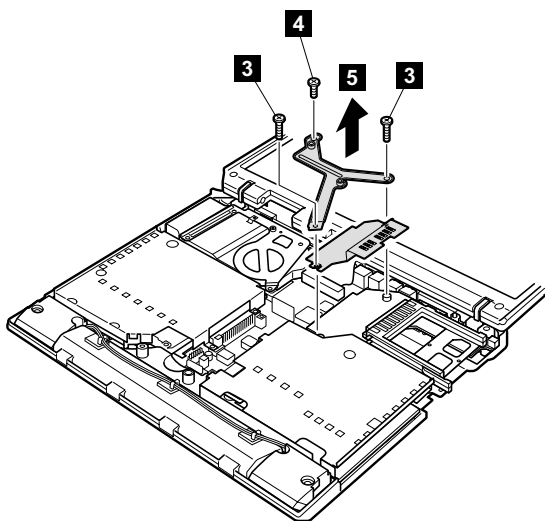
- “1010 Battery pack” on page 56
- “1030 Communication daughter card (CDC)” on page 60
- “1040 Backup battery” on page 67
- “1060 Hard-disk drive” on page 69
- “1070 Ultrabay Plus device” on page 71
- “1080 Ultrabay 2000 device” on page 72
- “1090 Keyboard” on page 73
- “1100 Keyboard CRU insulator” on page 77
- “1110 Keyboard bezel” on page 78



Step	Screw (quantity)	Torque
1	M2.5 x 16 mm, nylon-coated (2)	0.392 Nm (4 kgfcm)

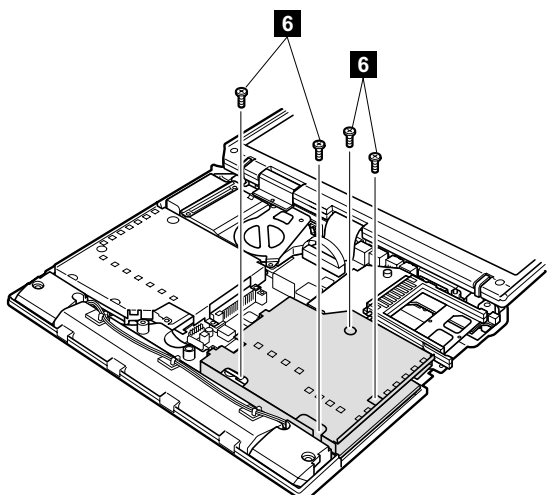
(continued)

Removing and replacing a FRU



Step	Screw (quantity)	Torque
3	M2.5 × 16 mm, nylon-coated (2)	0.392 Nm (4 kgfcm)
4	M2.5 × 4.8 mm, nylon-coated (1)	0.392 Nm (4 kgfcm)

(continued)

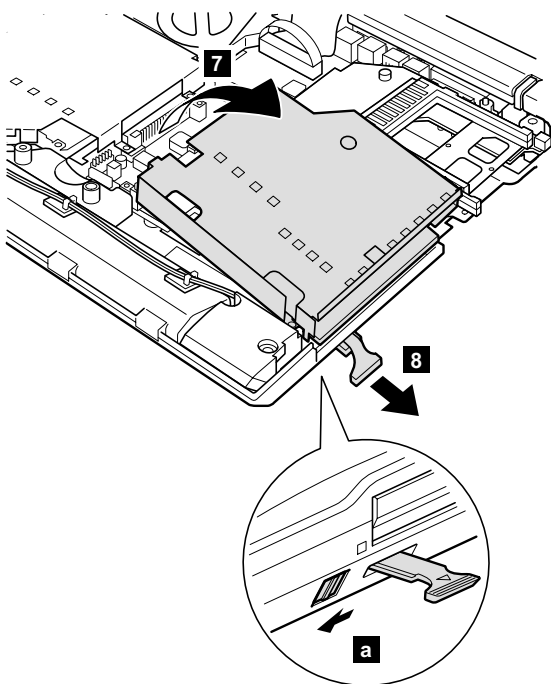


Step	Screw (quantity)	Torque
6	M2.5 × 4.8 mm, nylon-coated (4)	0.392 Nm (4 kgfcm)

(continued)

Removing and replacing a FRU

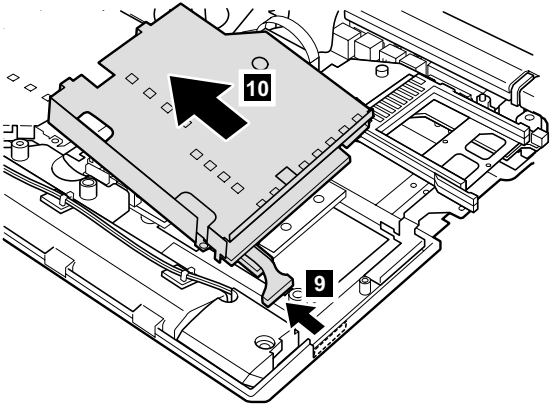
The Ultrabay release lever pops out (**8**) when the bay slot is slightly lifted as in step **7** .



When installing: After inserting the Ultrabay release lever into the rectangular hole of base cover, slide the Ultrabay latch knob toward you until it snaps (**a**). Then attach the bay to the computer.

(continued)

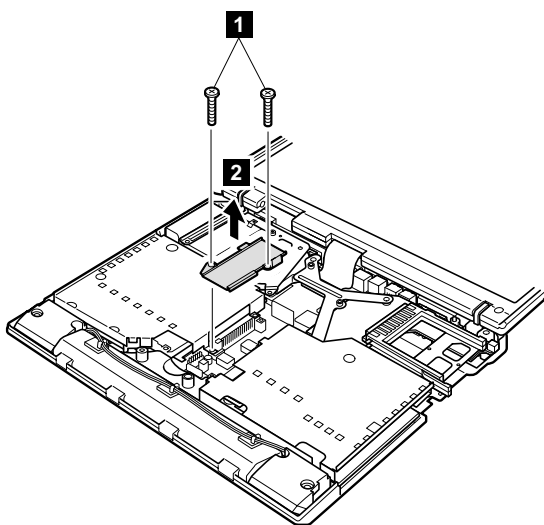
Detach the bay slot in the direction of arrow **10**, avoid damaging the Ultrabay release lever **9**.



1160 Ultrabay 2000 slot

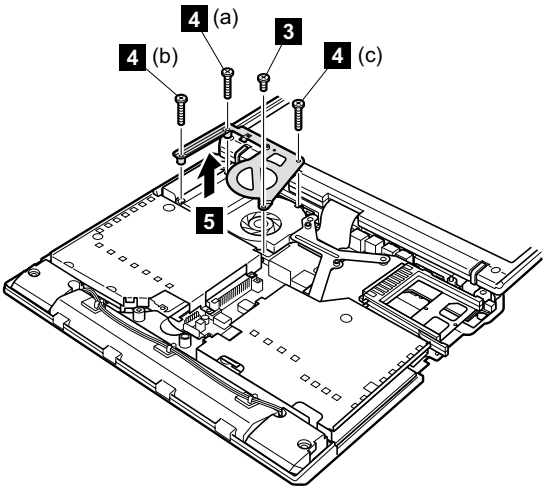
For access, remove these FRUs, in order:

- “1010 Battery pack” on page 56
- “1030 Communication daughter card (CDC)” on page 60
- “1040 Backup battery” on page 67
- “1060 Hard-disk drive” on page 69
- “1070 Ultrabay Plus device” on page 71
- “1080 Ultrabay 2000 device” on page 72
- “1090 Keyboard” on page 73
- “1100 Keyboard CRU insulator” on page 77
- “1110 Keyboard bezel” on page 78



Step	Screw (quantity)	Torque
1	M2.5 x 16 mm, nylon-coated (2)	0.392 Nm (4 kgfcm)

(continued)



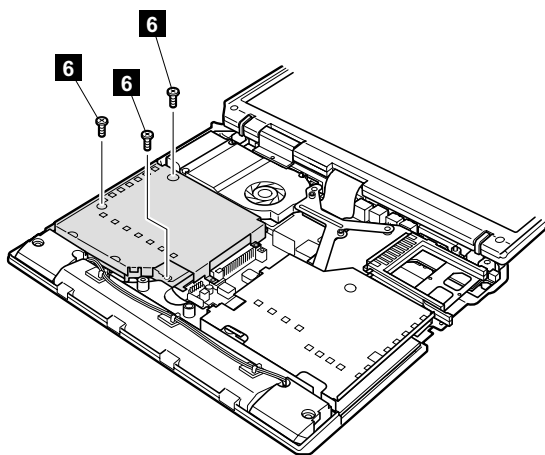
Step	Screw (quantity)	Torque
3	M2.5 × 4.8 mm, nylon-coated (1)	0.392 Nm (4 kgfcm)
4	M2 × 15 mm, nylon-coated (3)	0.245 Nm (2.5 kgfcm)

When installing: When securing the screws, do as follows:

1. Secure the screw **3** temporarily.
2. Secure the screws **4** in order of **(a)**, **(b)**, and **(c)**.
3. Tighten the screw **3** to secure the bracket and the fan assembly firmly.

(continued)

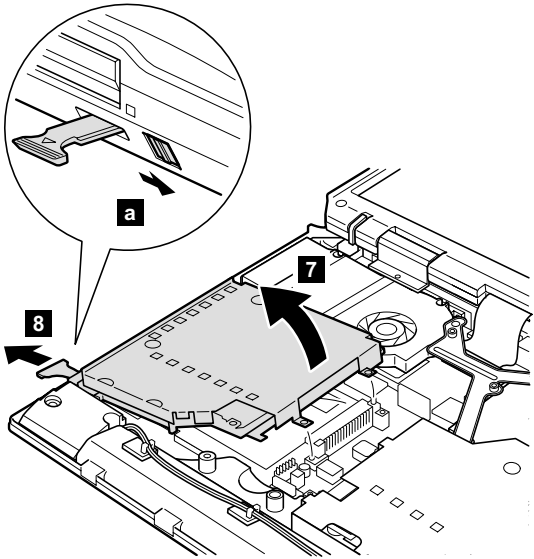
Removing and replacing a FRU



Step	Screw (quantity)	Torque
6	M2.5 x 4.8 mm, nylon-coated (3)	0.392 Nm (4 kgfcm)

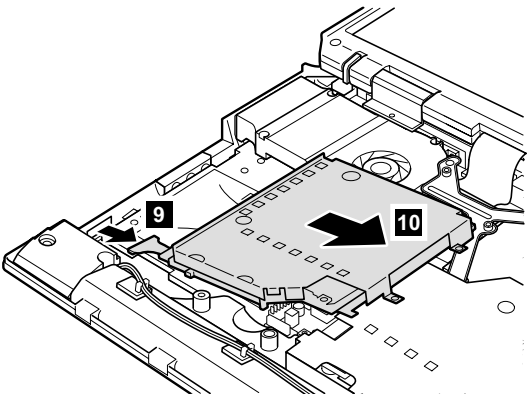
(continued)

The Ultrabay release lever pops out (**8**) when the bay slot is slightly lifted as in step **7** .



When installing: After inserting the Ultrabay release lever into the rectangular hole of base cover, slide the Ultrabay latch knob toward you until it snaps (**a**). Then attach the bay to the computer.

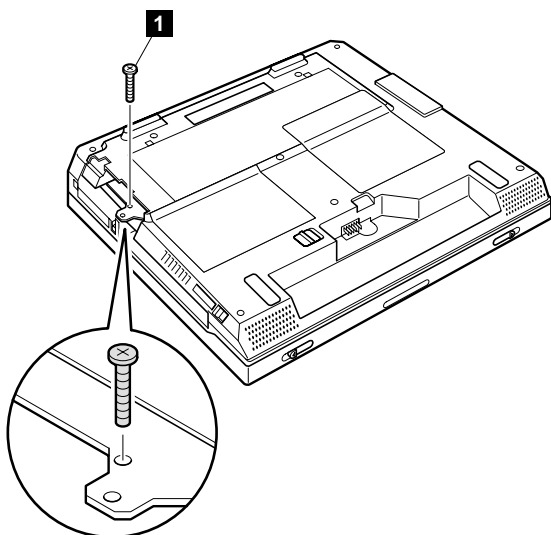
Detach the bay slot to the direction of arrow **10** , to avoid damaging the Ultrabay release lever **9** .



1170 Sub card for PC Card slot

For access, remove these FRUs, in order:

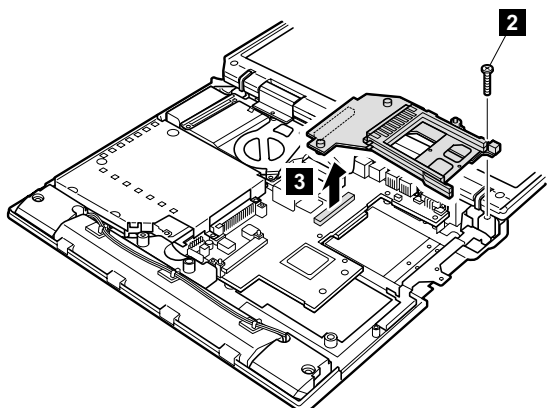
- “1010 Battery pack” on page 56
- “1030 Communication daughter card (CDC)” on page 60
- “1040 Backup battery” on page 67
- “1060 Hard-disk drive” on page 69
- “1070 Ultrabay Plus device” on page 71
- “1080 Ultrabay 2000 device” on page 72
- “1090 Keyboard” on page 73
- “1100 Keyboard CRU insulator” on page 77
- “1110 Keyboard bezel” on page 78
- “1150 Ultrabay Plus slot” on page 87



Step	Screw (quantity)	Torque
1	M2 x 9 mm, nylon-coated (1)	0.245 Nm (2.5 kgfcm)

(continued)

Removing and replacing a FRU



Step	Screw (quantity)	Torque
2	M2 x 15 mm, nylon-coated (1)	0.245 Nm (2.5 kgfcm)

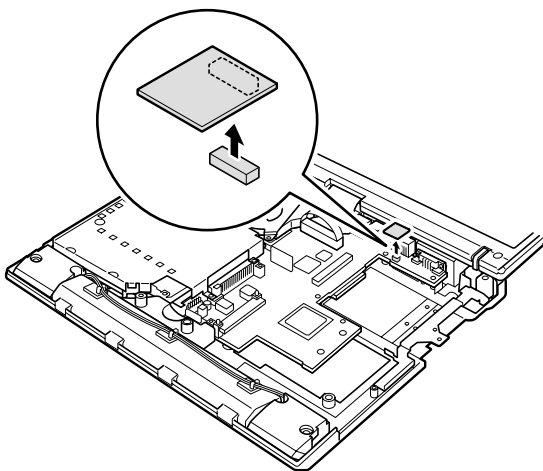
1180 Security chip

Note

Some ThinkPad computers may have an embedded security chip, which the customer ordered as an option. If the ThinkPad computer you are servicing has the security chip, remove or reinstall it as follows:

For access, remove these FRUs, in order:

- “1010 Battery pack” on page 56
- “1020 Mini PCI adapter” on page 57
- “1030 Communication daughter card (CDC)” on page 60
- “1040 Backup battery” on page 67
- “1050 DIMM” on page 68
- “1060 Hard-disk drive” on page 69
- “1070 Ultrabay Plus device” on page 71
- “1080 Ultrabay 2000 device” on page 72
- “1090 Keyboard” on page 73
- “1100 Keyboard CRU insulator” on page 77
- “1110 Keyboard bezel” on page 78
- “1120 Hinge cover” on page 82
- “1150 Ultrabay Plus slot” on page 87
- “1170 Sub card for PC Card slot” on page 96

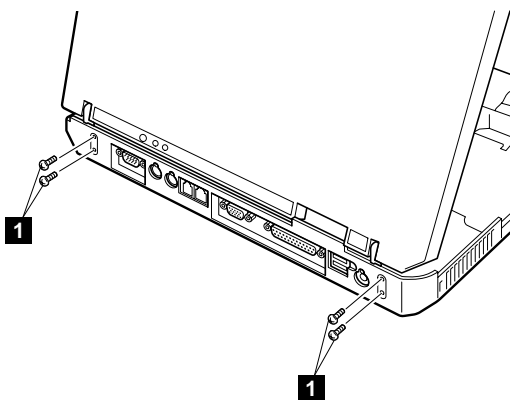


When installing: Make sure that the connector is firmly attached.

1190 LCD assembly

For access, remove these FRUs, in order:

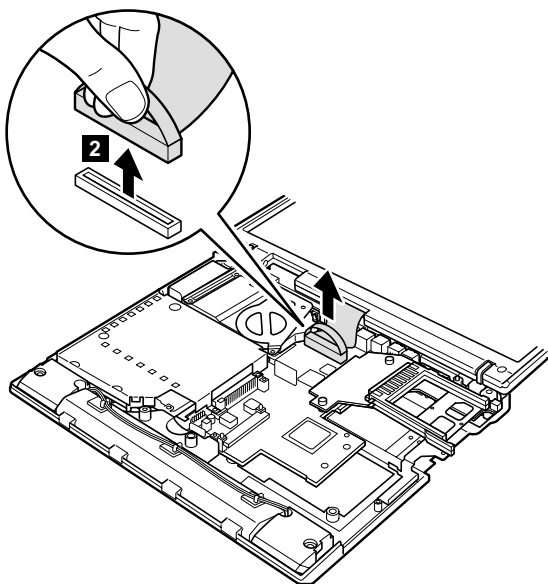
- “1010 Battery pack” on page 56
- “1020 Mini PCI adapter” on page 57
- “1030 Communication daughter card (CDC)” on page 60
- “1040 Backup battery” on page 67
- “1060 Hard-disk drive” on page 69
- “1070 Ultrabay Plus device” on page 71
- “1080 Ultrabay 2000 device” on page 72
- “1090 Keyboard” on page 73
- “1100 Keyboard CRU insulator” on page 77
- “1110 Keyboard bezel” on page 78
- “1120 Hinge cover” on page 82
- “1150 Ultrabay Plus slot” on page 87



Step	Screw (quantity)	Torque
1	M2.5 × 4.8 mm, nylon-coated (4)	0.392 Nm (4 kgfcm)

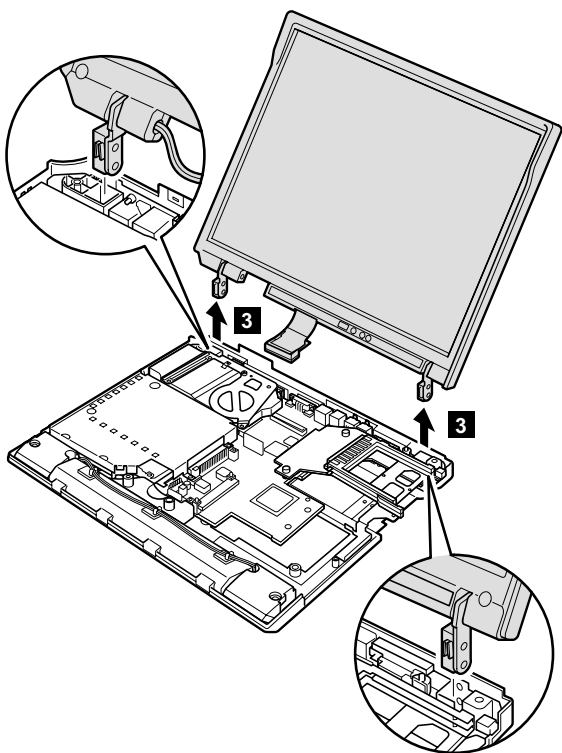
(continued)

Removing and replacing a FRU



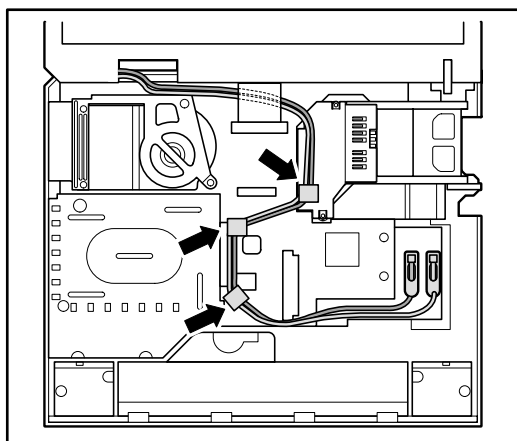
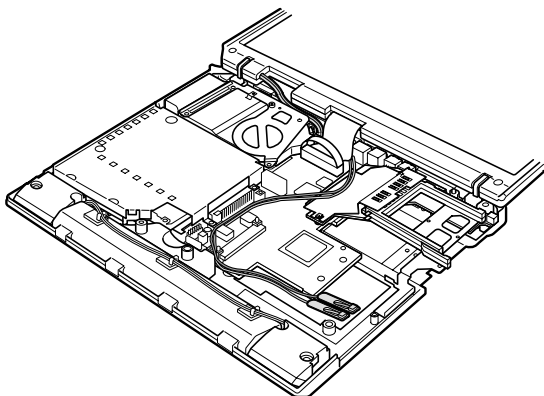
When installing: Make sure that the connector **2** is firmly attached.

(continued)



Installation notice for the model with the wireless LAN feature

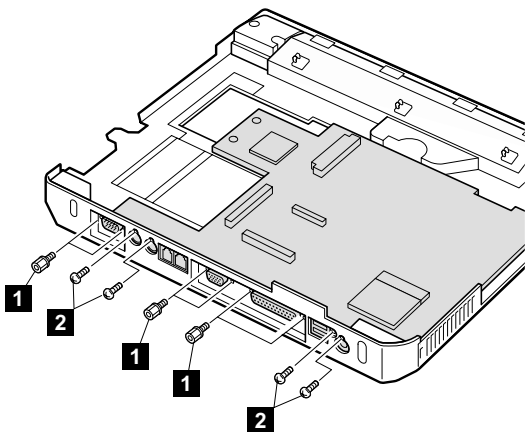
Some models have cables for the wireless LAN antenna. After you attach the LCD assembly, route the antenna cables as shown in the following figure, and secure the cables with new insulation tapes.



1200 System board

For access, remove these FRUs, in order:

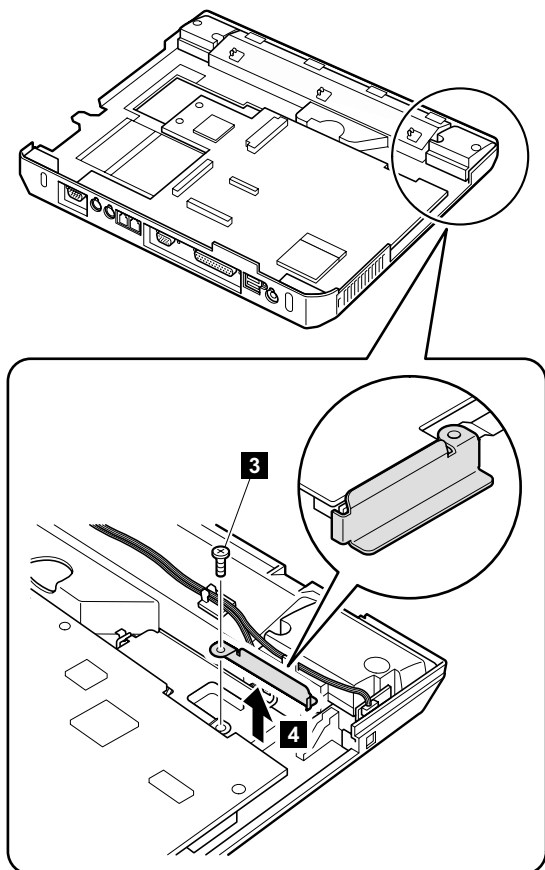
- “1010 Battery pack” on page 56
- “1020 Mini PCI adapter” on page 57
- “1030 Communication daughter card (CDC)” on page 60
- “1040 Backup battery” on page 67
- “1050 DIMM” on page 68
- “1060 Hard-disk drive” on page 69
- “1070 Ultrabay Plus device” on page 71
- “1080 Ultrabay 2000 device” on page 72
- “1090 Keyboard” on page 73
- “1100 Keyboard CRU insulator” on page 77
- “1110 Keyboard bezel” on page 78
- “1120 Hinge cover” on page 82
- “1130 Fan assembly” on page 83
- “1140 CPU” on page 85
- “1180 Security chip” on page 98
- “1150 Ultrabay Plus slot” on page 87
- “1150 Ultrabay Plus slot” on page 87
- “1170 Sub card for PC Card slot” on page 96
- “1190 LCD assembly” on page 99



Step	Screw (quantity)	Torque
1	Hex stud (6)	0.392 Nm (4 kgfcm)
2	M2.5 × 4.8 mm Small head, nylon-coated (4)	0.254 Nm (2.5 kgfcm)

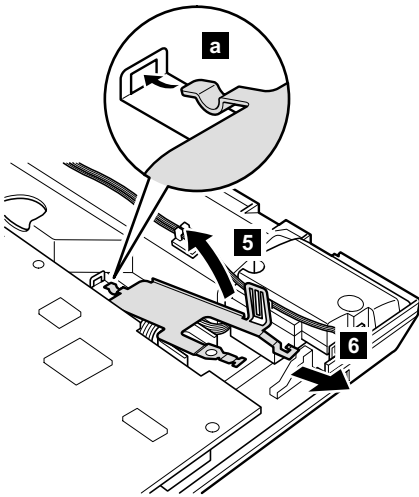
(continued)

Removing and replacing a FRU

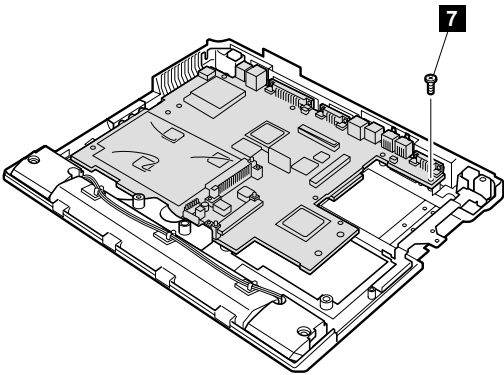


Step	Screw (quantity)	Torque
3	M2.5 x 4.8 mm, nylon-coated (1)	0.392 Nm (4 kgfcm)

(continued)



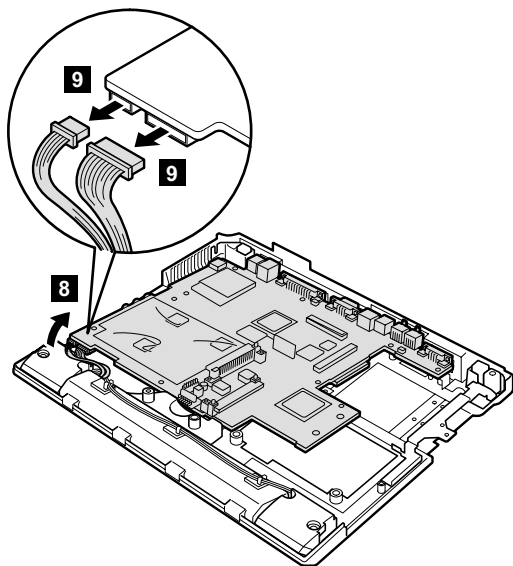
When installing: Do as shown in figure **a**.



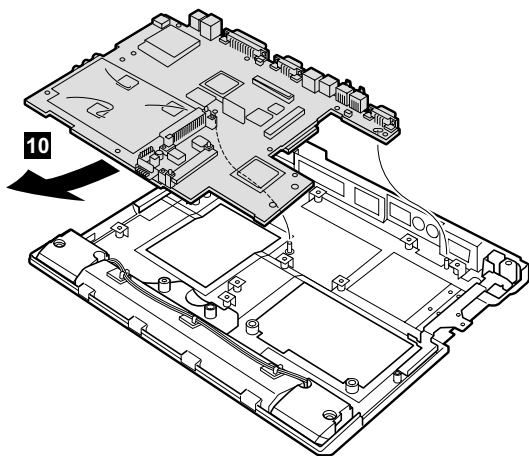
Step	Screw (quantity)	Torque
7	M2.5 × 4.8 mm, nylon-coated (1)	0.392 Nm (4 kgfcm)

(continued)

Removing and replacing a FRU

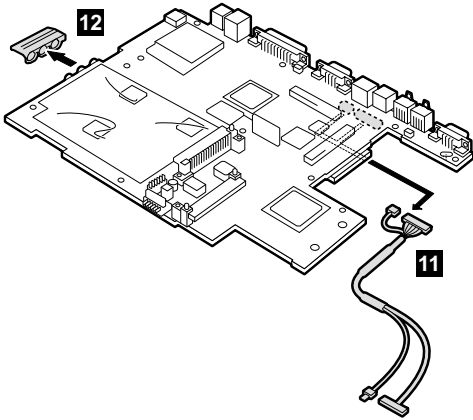


When installing: Make sure that both of the connectors are firmly attached.

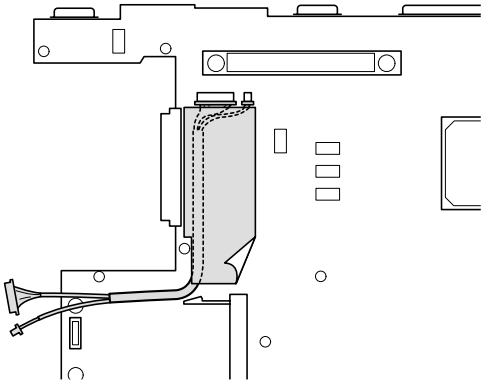


When installing: Attach the system board so that the two small projections on the base cover fit into the holes provided.

(continued)



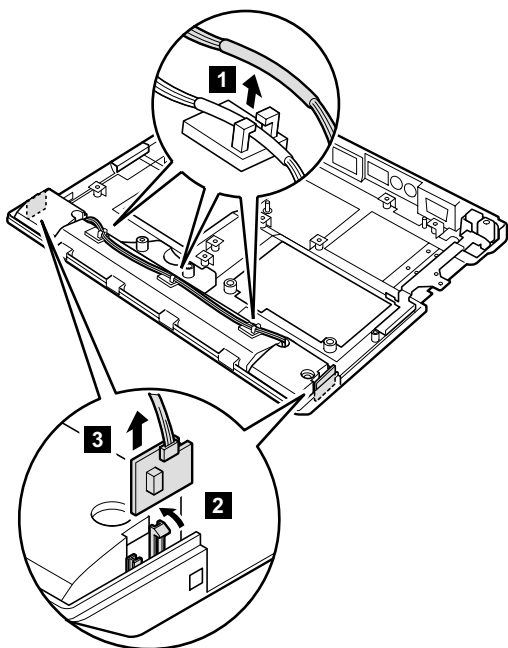
When installing: Make sure that the Ethernet/modem cable is firmly attached to two connectors on the bottom of the system board. And then, stick the EMI tape to secure the cable on the system board.



1210 Ultrabay LED card

For access, remove these FRUs, in order:

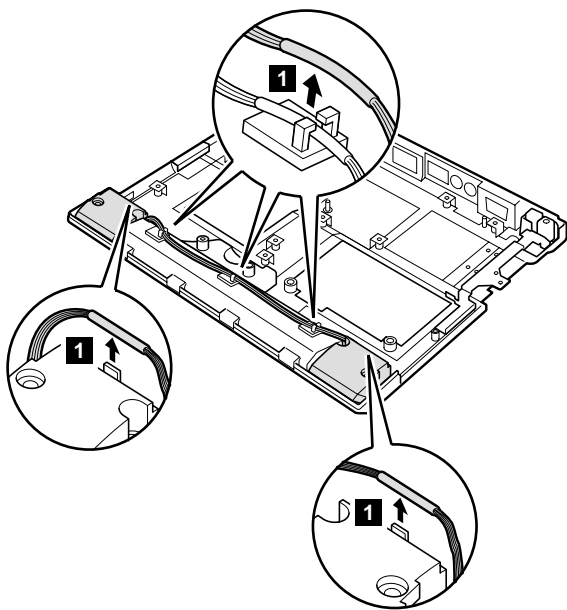
- “1010 Battery pack” on page 56
- “1020 Mini PCI adapter” on page 57
- “1030 Communication daughter card (CDC)” on page 60
- “1040 Backup battery” on page 67
- “1050 DIMM” on page 68
- “1060 Hard-disk drive” on page 69
- “1070 Ultrabay Plus device” on page 71
- “1080 Ultrabay 2000 device” on page 72
- “1090 Keyboard” on page 73
- “1100 Keyboard CRU insulator” on page 77
- “1110 Keyboard bezel” on page 78
- “1120 Hinge cover” on page 82
- “1130 Fan assembly” on page 83
- “1140 CPU” on page 85
- “1150 Ultrabay Plus slot” on page 87
- “1150 Ultrabay Plus slot” on page 87
- “1170 Sub card for PC Card slot” on page 96
- “1190 LCD assembly” on page 99
- “1200 System board” on page 103



1220 Speaker assembly

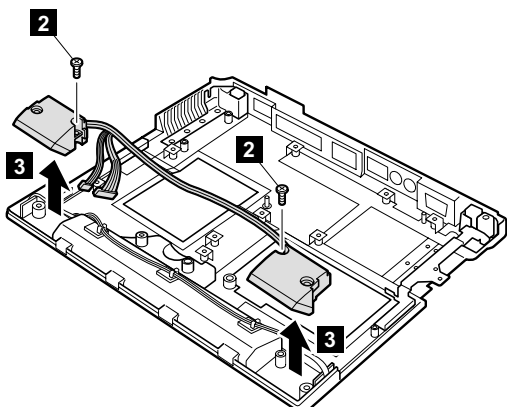
For access, remove these FRUs, in order:

- “1010 Battery pack” on page 56
- “1020 Mini PCI adapter” on page 57
- “1030 Communication daughter card (CDC)” on page 60
- “1040 Backup battery” on page 67
- “1050 DIMM” on page 68
- “1060 Hard-disk drive” on page 69
- “1070 Ultrabay Plus device” on page 71
- “1080 Ultrabay 2000 device” on page 72
- “1090 Keyboard” on page 73
- “1100 Keyboard CRU insulator” on page 77
- “1110 Keyboard bezel” on page 78
- “1120 Hinge cover” on page 82
- “1130 Fan assembly” on page 83
- “1140 CPU” on page 85
- “1150 Ultrabay Plus slot” on page 87
- “1150 Ultrabay Plus slot” on page 87
- “1170 Sub card for PC Card slot” on page 96
- “1190 LCD assembly” on page 99
- “1200 System board” on page 103



(continued)

Removing and replacing a FRU



Step	Screw (quantity)	Torque
2	M2.5 x 4.8 mm, nylon-coated (2)	0.392 Nm (4 kgfcm)

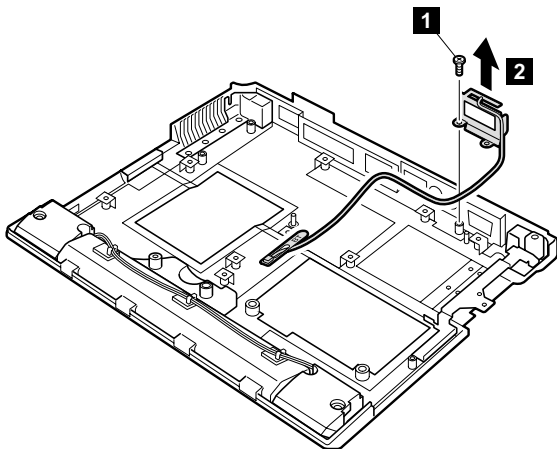
1230 Antenna for Bluetooth

Note

This FRU is not available for all models. Some ThinkPad computers may not have this FRU.

For access, remove these FRUs, in order:

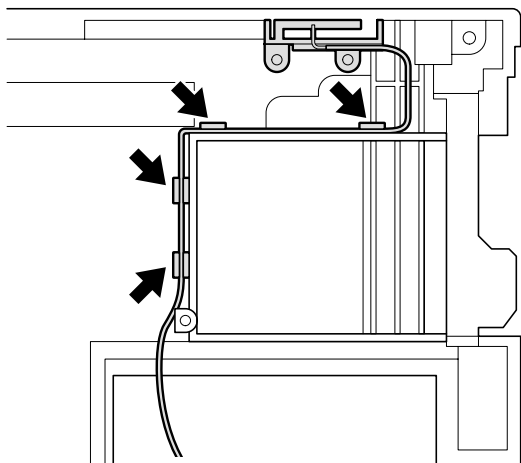
- “1010 Battery pack” on page 56
- “1020 Mini PCI adapter” on page 57
- “1030 Communication daughter card (CDC)” on page 60
- “1040 Backup battery” on page 67
- “1050 DIMM” on page 68
- “1060 Hard-disk drive” on page 69
- “1070 Ultrabay Plus device” on page 71
- “1080 Ultrabay 2000 device” on page 72
- “1090 Keyboard” on page 73
- “1100 Keyboard CRU insulator” on page 77
- “1110 Keyboard bezel” on page 78
- “1120 Hinge cover” on page 82
- “1130 Fan assembly” on page 83
- “1140 CPU” on page 85
- “1150 Ultrabay Plus slot” on page 87
- “1160 Ultrabay 2000 slot” on page 92
- “1170 Sub card for PC Card slot” on page 96
- “1200 System board” on page 103



Step	Screw (quantity)	Torque
1	M2.5 × 4.8 mm, nylon-coated (1)	0.392 Nm (4 kgfcm)

Removing and replacing a FRU

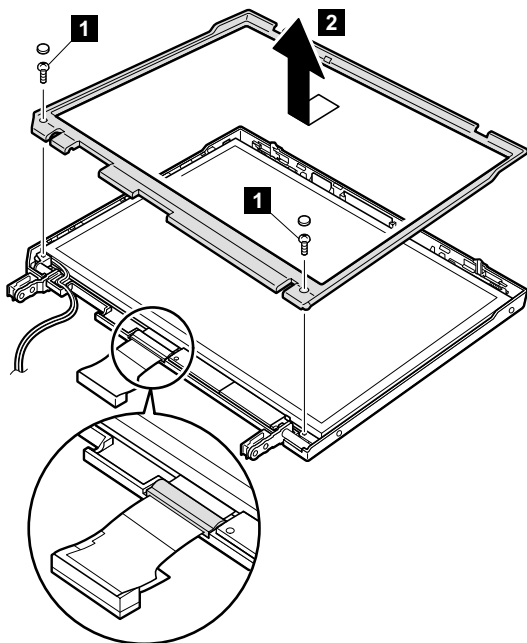
Cable routing: When attaching the antenna for Bluetooth, route the cable to fit into the cable guides on the base cover.



2010 Front bezel

For access, remove these FRUs, in order:

- “1010 Battery pack” on page 56
- “1020 Mini PCI adapter” on page 57
- “1030 Communication daughter card (CDC)” on page 60
- “1040 Backup battery” on page 67
- “1060 Hard-disk drive” on page 69
- “1070 Ultrabay Plus device” on page 71
- “1080 Ultrabay 2000 device” on page 72
- “1090 Keyboard” on page 73
- “1100 Keyboard CRU insulator” on page 77
- “1110 Keyboard bezel” on page 78
- “1120 Hinge cover” on page 82
- “1150 Ultrabay Plus slot” on page 87
- “1190 LCD assembly” on page 99



Step	Screw (quantity)	Torque
1	M2.5 × 4.8 mm, nylon-coated (2)	0.392 Nm (4 kgfcm)

Installation of clear plate

When the front bezel is replaced to with a new one, clear plate set must also be installed. The procedure is as follows:

1. There are several clear plates in the clear plate set. Confirm the model name, such as "A30" first, and pick the plate suitable for the computer you are servicing. Check the shape of each plate; there are plates for the front bezel and the LCD rear cover, as follows:

- Clear plate A3*, for the front bezel



- Clear plate A3*p without Bluetooth feature, for the front bezel



- Clear plate with Bluetooth feature, for the front bezel



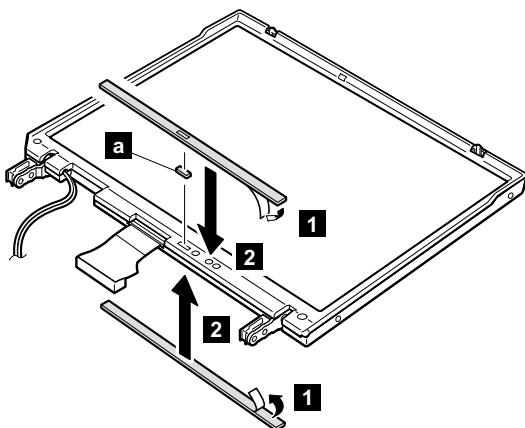
- Clear plate, rear cover, without Bluetooth feature



- Clear plate, rear cover, with Bluetooth feature



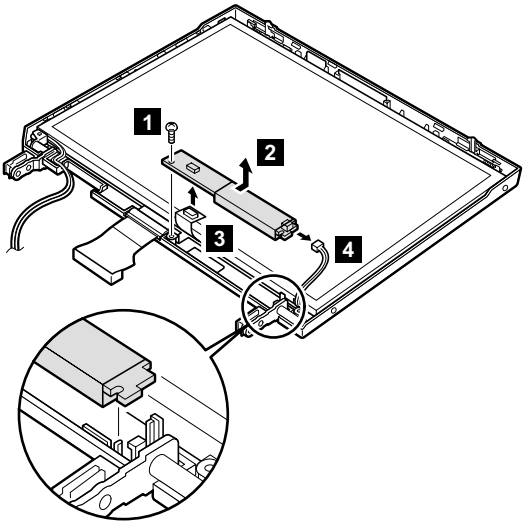
2. If the computer has the Bluetooth feature, you also need to install Bluetooth button **a**, which is contained in the FRU. It is attached to the front bezel side only.
3. Strip off the protection sheet of the insulation tape **1** of the clear plate, and then stick the plate on the front bezel and the rear cover.



2020 Inverter card

For access, remove these FRUs, in order:

- “1010 Battery pack” on page 56
- “1020 Mini PCI adapter” on page 57
- “1030 Communication daughter card (CDC)” on page 60
- “1040 Backup battery” on page 67
- “1060 Hard-disk drive” on page 69
- “1070 Ultrabay Plus device” on page 71
- “1080 Ultrabay 2000 device” on page 72
- “1090 Keyboard” on page 73
- “1100 Keyboard CRU insulator” on page 77
- “1110 Keyboard bezel” on page 78
- “1120 Hinge cover” on page 82
- “1150 Ultrabay Plus slot” on page 87
- “1190 LCD assembly” on page 99
- “2010 Front bezel” on page 113

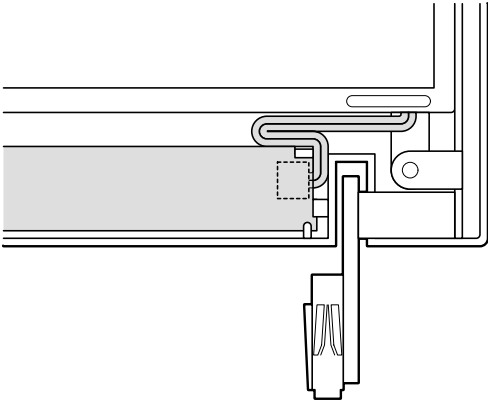


Step	Screw (quantity)	Torque
1	M2.5 × 4.8 mm, nylon-coated (4)	0.392 Nm (4 kgfcm)

When installing: Make sure that both of the connectors **3** and **4** are firmly attached.

Removing and replacing a FRU

Cable routing: When replacing the inverter card, route the connector cable as in the following figure:

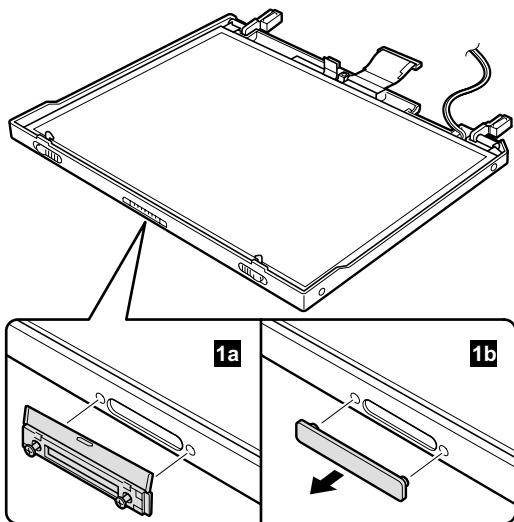


2030 LCD panel

For access, remove these FRUs, in order:

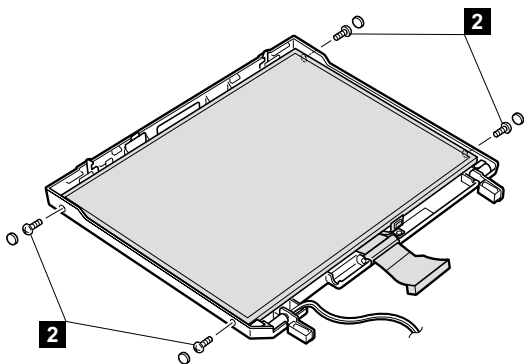
- “1010 Battery pack” on page 56
- “1020 Mini PCI adapter” on page 57
- “1030 Communication daughter card (CDC)” on page 60
- “1040 Backup battery” on page 67
- “1060 Hard-disk drive” on page 69
- “1070 Ultrabay Plus device” on page 71
- “1080 Ultrabay 2000 device” on page 72
- “1090 Keyboard” on page 73
- “1100 Keyboard CRU insulator” on page 77
- “1110 Keyboard bezel” on page 78
- “1120 Hinge cover” on page 82
- “1150 Ultrabay Plus slot” on page 87
- “1190 LCD assembly” on page 99
- “2010 Front bezel” on page 113
- “2020 Inverter card” on page 115

Remove the UltraPort adapter if it has been screwed onto the LCD. To do this, remove the screws from the ends of the screw from both side of the adapter as shown in figure **1a**. Remove the connector cover for the others as shown in figure **1b**.

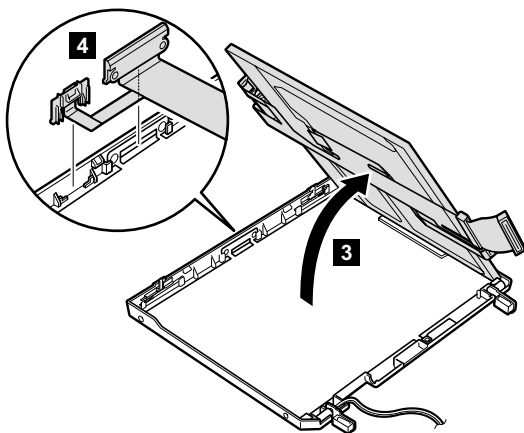


(continued)

Removing and replacing a FRU

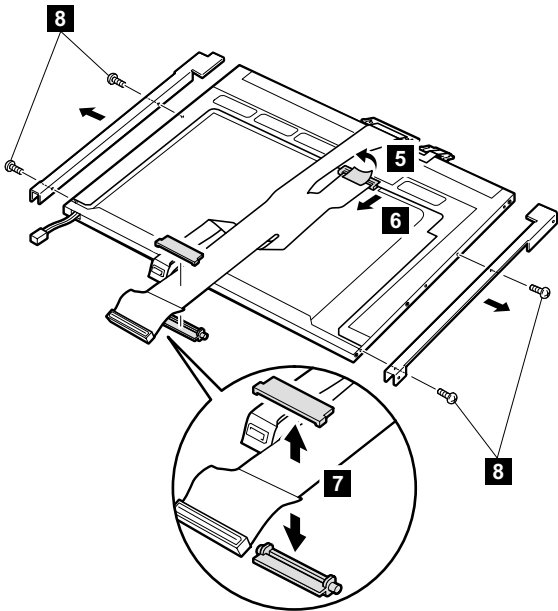


Step	Screw (quantity)	Torque
2	M2 x 5.7 mm, nylon-coated (4)	0.245 Nm (2.5 kgfcm)



(continued)

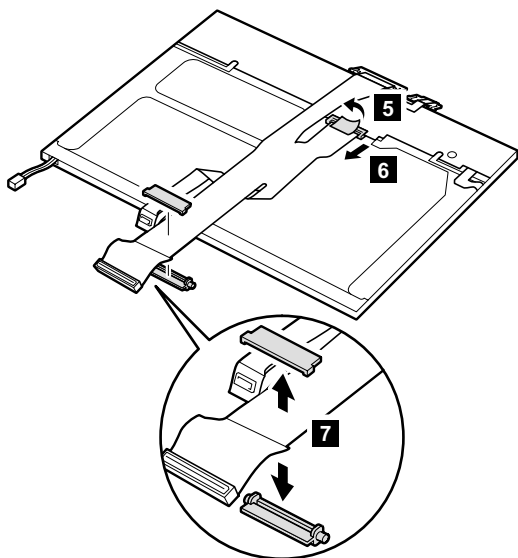
For 14.1-in. LCD panel



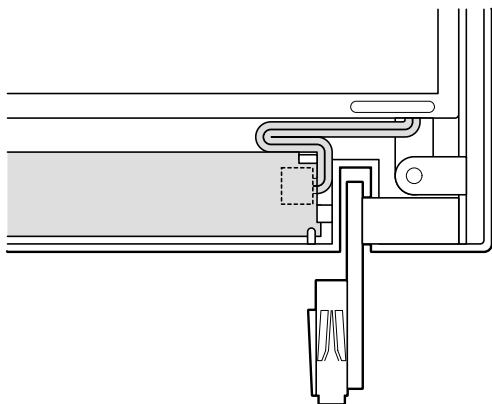
Step	Screw (quantity)	Torque
8	M2 × 3.6 mm, nylon-coated (4)	0.245 Nm (2.5 kgfcm)

Removing and replacing a FRU

For 15.0-in. LCD panel



Cable routing: When installing the LCD, route the connector cable as in the following figure:



2040 Antenna assembly

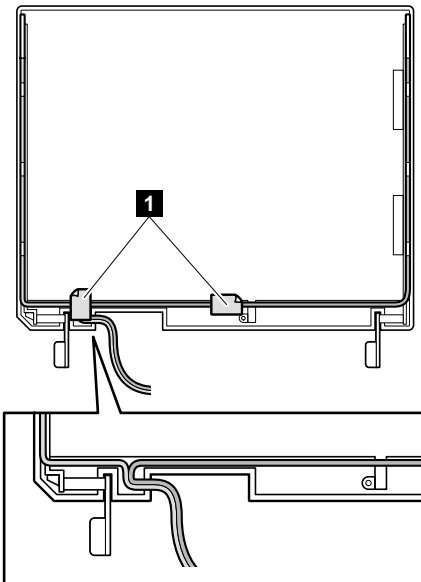
Note

This FRU is not available for all models. Some ThinkPad computers may not have this FRU.

For access, remove these FRUs, in order:

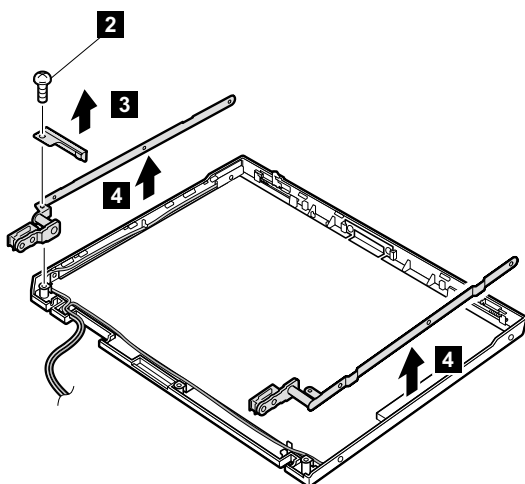
- “1010 Battery pack” on page 56
- “1020 Mini PCI adapter” on page 57
- “1030 Communication daughter card (CDC)” on page 60
- “1040 Backup battery” on page 67
- “1060 Hard-disk drive” on page 69
- “1070 Ultrabay Plus device” on page 71
- “1080 Ultrabay 2000 device” on page 72
- “1090 Keyboard” on page 73
- “1100 Keyboard CRU insulator” on page 77
- “1110 Keyboard bezel” on page 78
- “1120 Hinge cover” on page 82
- “1150 Ultrabay Plus slot” on page 87
- “1190 LCD assembly” on page 99
- “2010 Front bezel” on page 113
- “2020 Inverter card” on page 115
- “2030 LCD panel” on page 117

Strip off the insulation tapes **1** securing the cables.

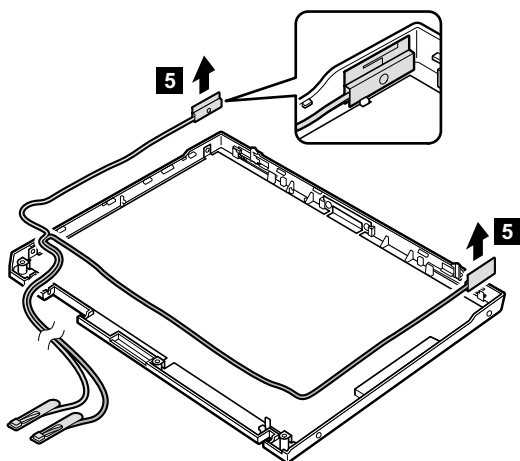


(continued)

Removing and replacing a FRU



Step	Screw (quantity)	Torque
2	M2.5 x 4.8 mm, nylon-coated (1)	0.392 Nm (4 kgfcm)

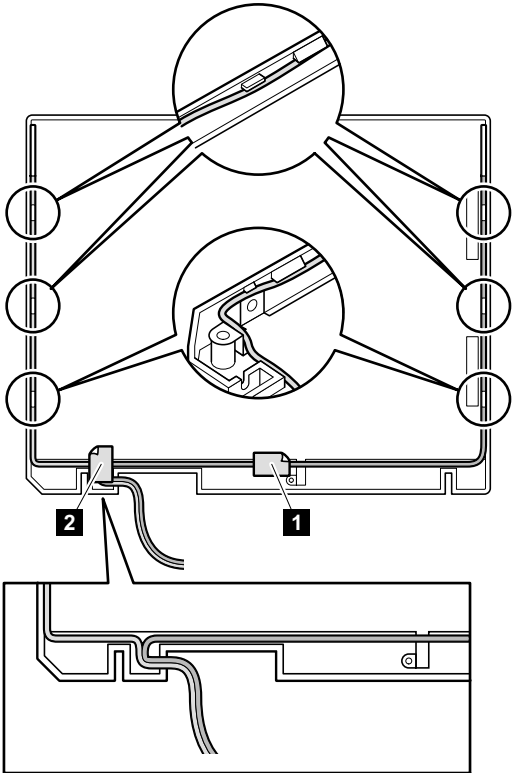


When installing the antenna assembly, do as follows:

1. Attach the antenna and route the cable.

Note: Attach the gray cable (*MAIN*) to the left side and the black cable (*AUX*) to the right side of the LCD cover.

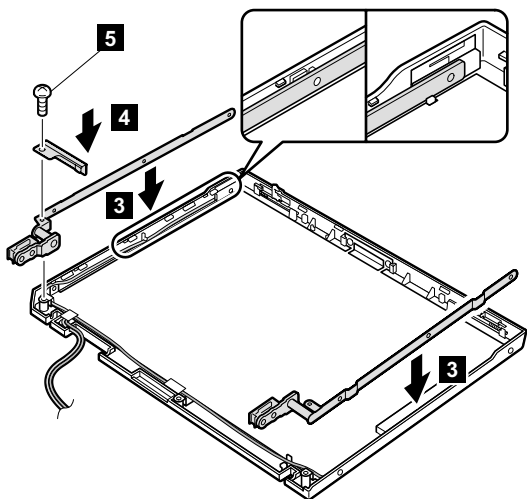
2. Secure the cables with insulation tape in the order shown **1** and **2**.



(continued)

Removing and replacing a FRU

3. Attach the hinges **4**. Then attach the bracket **5** and tighten the screw **6**.

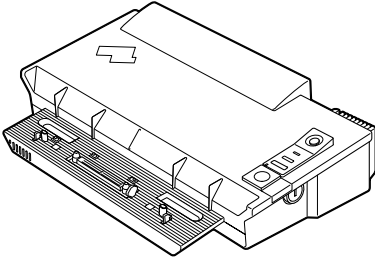


3010 ThinkPad Dock PCI cover

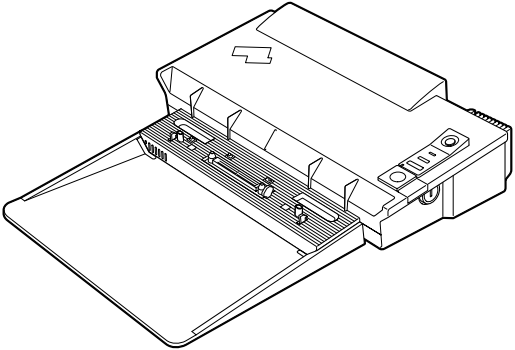
Before replacing the PCI cover:

There are two types of ThinkPad Dock as follows:

- ThinkPad Dock: FRU part no. 08N1546 (PCI cover: FRU part no. 05K6246)



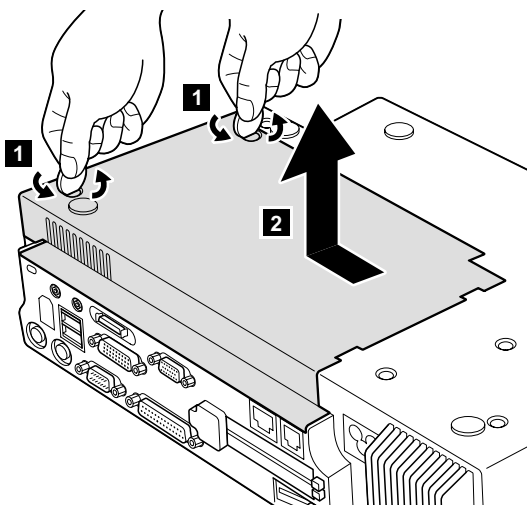
- ThinkPad Dock with extension plate: FRU part no. 08N1537 (PCI cover: FRU part no. 08N7317)



Make sure that the PCI cover FRU suits the ThinkPad Dock you are servicing.

Removing and replacing a FRU

Note: Following illustration shows the PCI cover removal of ThinkPad Dock (FRU no. 08N1546.) Do the same procedure for the PCI cover removal of ThinkPad Dock with extension plate (FRU part no. 08N1537.)

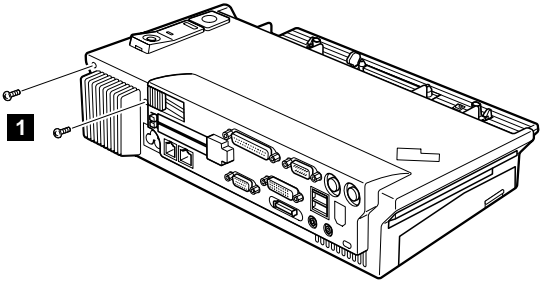


(Bottom view)

3020 ThinkPad Dock top cover

Note

This section is only for the ThinkPad Dock (FRU no. 08N1546.) Top cover and screw kit for ThinkPad Dock (FRU part no. 12P4143) is not available for the ThinkPad Dock with extension plate (FRU part no. 08N1537.)

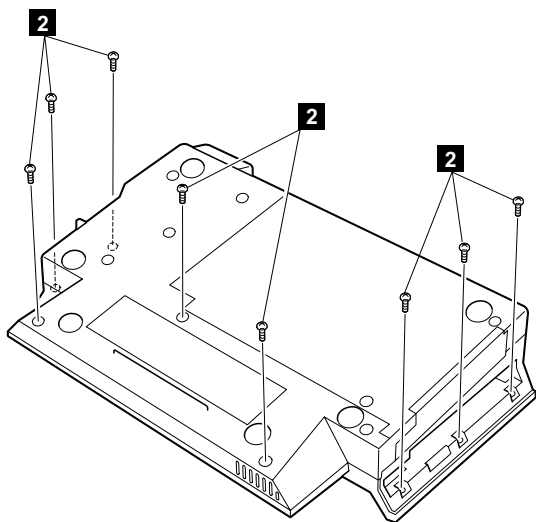


(Rear view)

Step	Screw (quantity)	Torque
1	M2.5 × 4.8 mm (2)	0.392 Nm (4 kgfcm)

(continued)

Removing and replacing a FRU

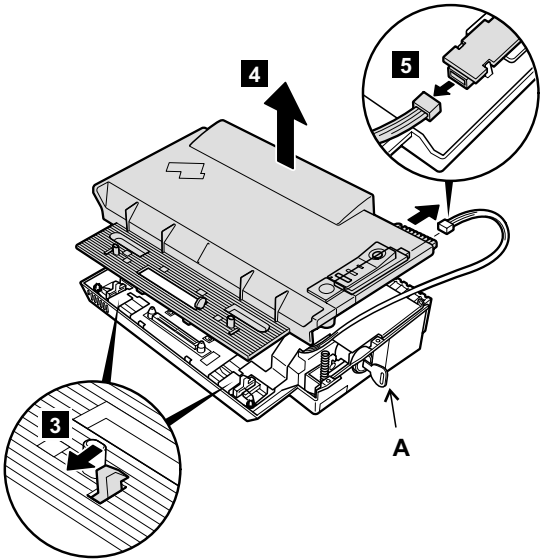


(Bottom view)

Step	Screw (quantity)	Torque
2	M2.5 × 4.8 mm (8)	0.392 Nm (4 kgfcm)

(continued)

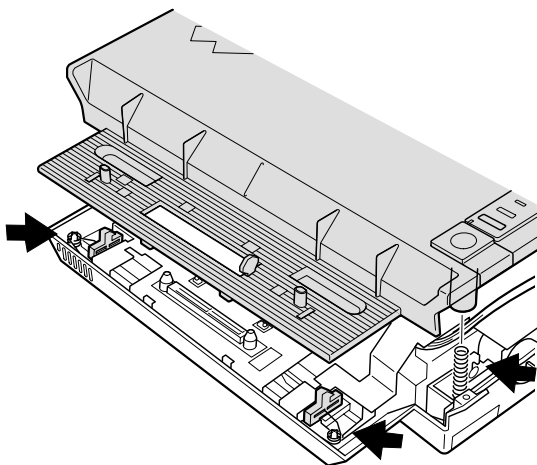
Make sure that the system lock key **A** is set to the Unlock position. Release the front latches in step **3**, and then remove the top cover **4**. For step **5**, see the inside view, shown in the circle.



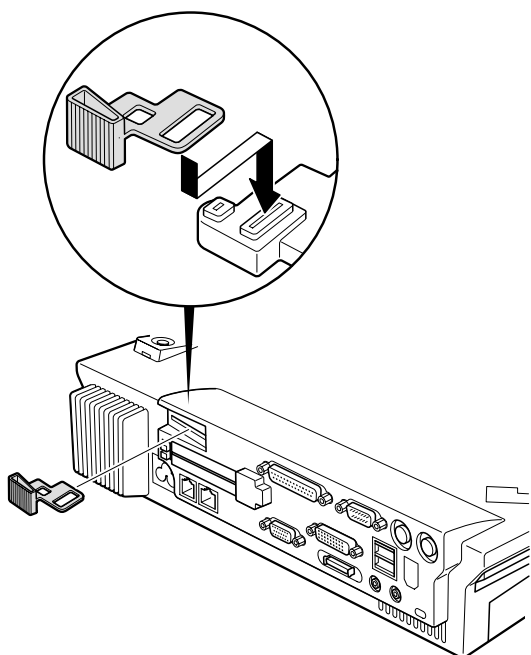
Removing and replacing a FRU

When replacing the top cover, do the following:

- Make sure that the springs are placed correctly.

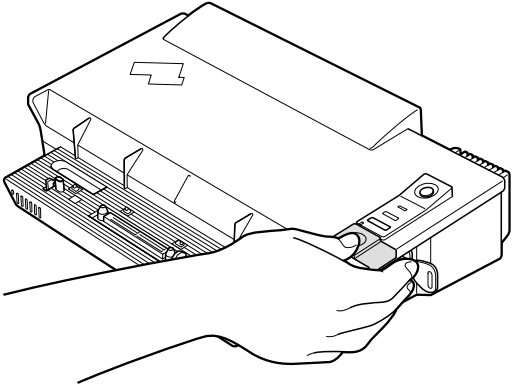


- Make sure that the device release lever is seated correctly.



(continued)

- Make sure that the release button works correctly.



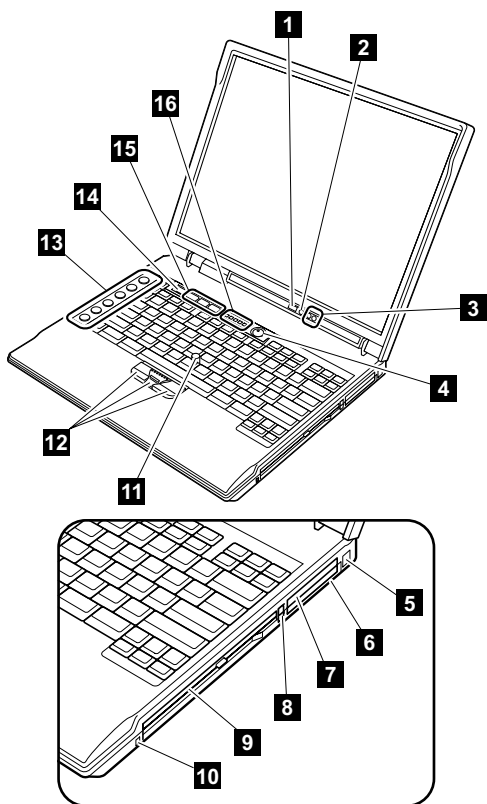
Locations

Front view

- 1** Bluetooth on-off switch (only for MT2653)
- 2** Bluetooth status indicator (only for MT2653)
- 3** Power status indicators
- 4** Power switch
- 5** IEEE 1394 connector (only for MT2653)
- 6** Hard-disk drive
- 7** PC Card slots
- 8** PC Card eject buttons
- 9** Ultrabay Plus device

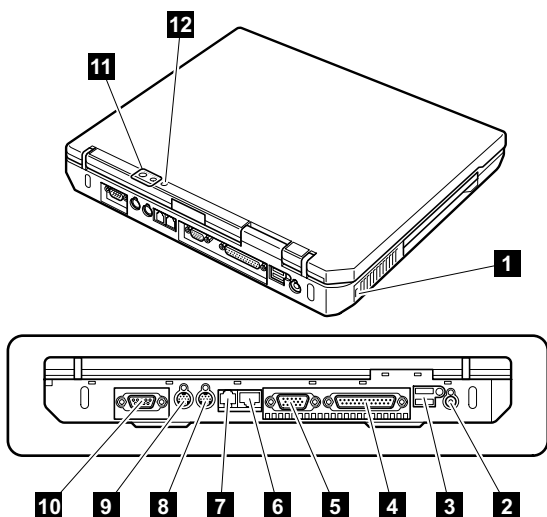
Note: The Ultrabay Plus accepts several storage devices, such as a DVD drive or a CD-ROM drive, and also accepts an Ultrabay Plus carrier. (Ultrabay Plus does not support the Ultrabay 2000 battery.)

- 10** Battery, standby mode, and Ultrabay status indicators
- 11** TrackPoint pointing stick
- 12** TrackPoint buttons
- 13** Web keys
- 14** ThinkPad button
- 15** Volume and mute buttons
- 16** System-status indicators



Rear view

- 1** Security keyhole
- 2** AC power connector
- 3** Universal serial bus (USB) connectors
- 4** Parallel connector
- 5** External-monitor connector
- 6** Ethernet connector
- 7** Modem connector
- 8** Video-out connector
- 9** Video-in connector (only for MT2653)
- 10** Serial connector
- 11** Power status indicators
- 12** Bluetooth status indicator (only for MT2653)

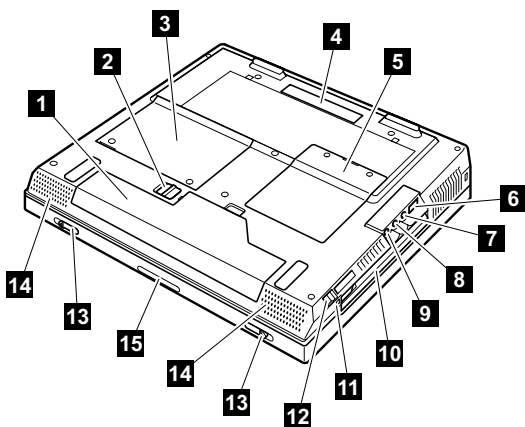


Bottom view

- 1** Battery pack
- 2** Battery pack latches
- 3** Mini PCI card and communication daughter card slots
- 4** Docking connector
- 5** DIMM slots
- 6** Infrared port
- 7** Stereo headphone jack
- 8** Stereo line-in jack
- 9** Microphone jack
- 10** Ultrabay 2000 device

Note: The Ultrabay 2000 accepts storage devices, such as a DVD drive or a CD-ROM drive. (The Ultrabay Plus carriage is supported only by Ultrabay Plus.)

- 11** Battery, standby mode, and Ultrabay status indicator
- 12** Ultrabay latch
- 13** LCD latches
- 14** Built-in stereo speakers
- 15** UltraPort connector



Parts list

A30, A30p, A31 and A31p series includes several models. The following tables summarize the characteristics of each model, to help you determine which FRU in the part list meets your need.

A30 and A30p series model matrix

Model	CDC-slot1/ slot2	Mini PCI adapter	LCD	Right bay device	CPU	
A30 (memory, 128 MB; video memory, 16 MB; HDD, 20 GB)						
2652-1Ax	— / Modem	—	14.1-in. XGA	CD- ROM (24x)	Tual 933 M	
2652-13x, 14x, 1Bx, 1NG, 1RG, 1SG, 1TG, 1TU, 1VG, 1Wx, 1Xx	Ethernet/ Modem					
2652-2Ax	— / Modem		15.0-in. XGA			
2652-23x, 24x, 2Bx	Ethernet/ Modem					
A30 (memory, 128 MB; video memory, 16 MB; HDD, 30 GB)						
2652-33x, 34x, 3B, 3RG, 3SG, 3TG, 3VG, 3WG, 3XG	Ethernet/ Modem	—	15.0-in. SXGA+	DVD- ROM (8x)	Tual 1.0 G	
2652-35x, 36x, 3Cx	Ethernet/ —		802.11b/ Modem			15.0-in. SXGA+ wireless
2652-43x, 44x, 4Bx, 4TU	Etherne t/ Modem	—	15.0-in. XGA			Tual 1.13 G
2654-43x, 44x, 4Bx						
2652-45x, 46x,4Cx	Etherne t/ —	802.11b/ Modem	15.0-in. XGA wireless			
2654-45x, 46x,4Cx						
A30p (memory, 128 MB; video memory, 32 MB; HDD, 48 GB)						
2653-63x, 64x	Ethernet/ Modem	—	15.0-in. UXGA IPS	DVD/ CD-RW	Tual 1.2 G	
2653-65x, 6TU	Ethernet/ —		802.11b/ Modem			15.0-in. UXGA IPS wireless
2653-66x	Ethernet/ Bluetooth					
Tual xxx M(G): Mobile Intel® Pentium® III processor xxx MHz (GHz) - M						

A31 and A31p series model matrix

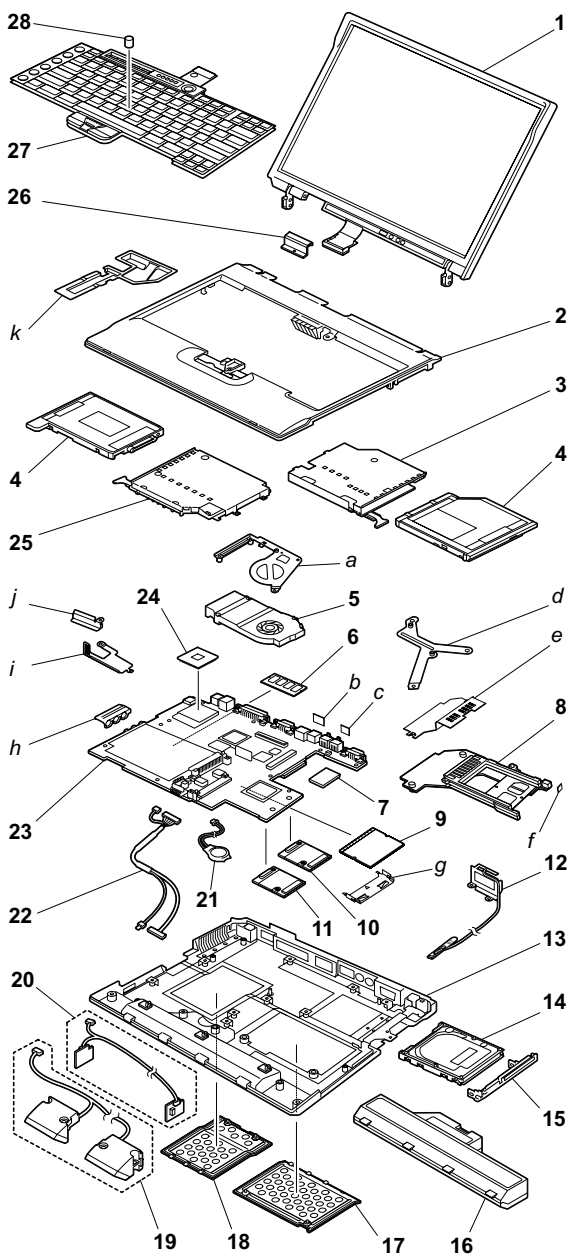
Model	CDC-slot1/ slot2	Mini PCI adapter	LCD	Right bay device	CPU
A31 (memory, 128 MB; video memory, 16 MB; HDD, 20 GB)					
2652-A3x, A4x, AEx	Ethernet/ Modem	—	14.1-in. XGA	CD- ROM (24x)	N1.4 G
2652-A5x, A6x, AFx	Ethernet/ —	802.11b/ Modem	14.1-in. XGA wireless		
2652-B3x, B4x, BEx	Ethernet/ Modem	—	15.0-in. XGA		
2652-B5x, B6x, BFx	Ethernet/ —	802.11b/ Modem	15.0-in. XGA wireless		
2652-AGC, APC	Ethernet/ Modem	—	14.1-in. XGA	DVD- ROM (8x)	
2652-AKC	Ethernet/ —	802.11b/ Modem	14.1-in. XGA wireless		
2652-BGC, BPC	Ethernet/ Modem	—	15.0-in. XGA		
2652-BKC	Ethernet/ —	802.11b/ Modem	15.0-in. XGA wireless		
A31 (memory, 128 MB; video memory, 16 MB; HDD, 30 GB)					
2652-AGx, AHx, APx except xxC	Ethernet/ Modem	—	14.1-in. XGA	DVD- ROM (8x)	N1.4 G
2652-AKx	Ethernet/ —	802.11b/ Modem	14.1-in. XGA wireless		
2652-BGx, BHx, BPx except xxC, xxK	Ethernet/ Modem	—	15.0-in. XGA		
A31 (memory, 256 MB; video memory, 16 MB; HDD, 30 GB)					
2652-BGK, BHK	Ethernet/ Modem	—	15.0-in. XGA	CD- ROM (24x)	N1.4 G
2652-BKK	Ethernet/ —	802.11b/ Modem	15.0-in. XGA wireless		
2652-CGx	Ethernet/ Modem	—	15.0-in. XGA	DVD- ROM (8x)	N1.5 G
2652-CKx	Ethernet/ —	802.11b/ Modem	15.0-in. XGA wireless		
2652-CXG, CWG	Ethernet/ Modem	—	15.0-in. XGA		

(continued)

Parts list

Model	CDC-slot1/ slot2	Mini PCI adapter	LCD	Right bay device	CPU
A31 (memory, 256 MB; video memory, 16 MB; HDD, 30 GB)					
2652-CZG, CYG	Ethernet/ —	802.11b/ Modem	15.0-in. XGA wireless	DVD- ROM (8x)	N1.5 G
2652-C3x, C4x, CGx	Ethernet/ Modem	—	15.0-in. XGA	CD- RW	
2652-C5x, C6x, CKx	Ethernet/ —	802.11b/ Modem	15.0-in. XGA wireless		
2654-C3x, C4x	Ethernet/ Modem	—	15.0-in. XGA		
2654-C5x, C6x	Ethernet/ —	802.11b/ Modem	15.0-in. XGA wireless		
A31 (memory, 256 MB; video memory, 32 MB; HDD, 30 GB)					
2652-E5x, E6x	Ethernet/ —	802.11b/ Modem	15.0-in. SXGA+ IPS wireless	CD- RW	N1.5 G
A31 (memory, 256 MB; video memory, 32 MB; HDD, 40 GB)					
2652-DGC	Ethernet/ Modem	—	15.0-in. SXGA+	DVD- ROM (8x)	N1.6 G
2652-DKC	Ethernet/ —	802.11b/ Modem	15.0-in. SXGA+ wireless		
2652-D3x, D4x, DEx, DGx	Ethernet/ Modem	—	15.0-in. SXGA+	DVD/ CD-RW	
2652-D5x, D6x, DFx, DKx	Ethernet/ —	802.11b/ Modem	15.0-in. SXGA+ wireless		
A31p (memory, 256 MB; video memory, 64 MB; HDD, 60 GB)					
2653-H3x, H4x	Ethernet/ Modem	—	15.0-in. UXGA IPS	DVD/ CD-RW	N1.7 G
2653-H5x, H6x	Ethernet/ Bluetooth	802.11b/ Modem	15.0-in. UXGA IPS wireless		
N xxx G: Mobile Intel® Pentium® 4 processor xxx GHz					

Overall



Parts list

- Each FRU is available for all types or models, unless specific types or models are given.
- The parts marked with asterisk are CRUs (customer replaceable units.)
- FRUs marked with **OP** are also available as optional FRUs.

No.	FRU	P/N
a - k	See "Miscellaneous parts" on page 156.	
1	LCD unit (see "LCD FRUs" on page 146).	
2	Keyboard bezel assembly for A30/A30p	
	all models except xxK	26P9642
	models xxK	26P9844
	Keyboard bezel assembly for A31/A31p	
	all models except xxK	46L6401
	models xxK	46L6402
3	Ultrabay Plus guide rail assembly	26P9631
4	Diskette drive (TEAC)	08K9606*
	Diskette drive (SONY)	08K9607*
	CD-ROM drive 24x (LG) (low power) (2652-1xx, 2xx, B3x, B4x, B5x, B6x, BEx, BFx) OP	08K9545*
	CD-ROM drive 24x (TEAC) (2652-1xx, 2xx, B3x, B4x, B5x, B6x, BEx, BFx) OP	27L3436*
	DVD drive 8x (MKE) (models 3xx, 4xx, Axx, BGx, BHx, BKx, BPx) OP	08K9648*
	DVD drive 8x (HITACHI) (models 3xx, 4xx, Axx, BGx, BHx, BKx, BPx) OP	08K9646*
	CD-RW drive (TEAC) (models Cxx, Exx) OP	27L4297*
	CD-RW drive (SONY) (models Cxx, Exx) OP	27L4231*
	DVD/CD-RW combo drive (TOSHIBA) (2652, 2635-6xx)	27L4249*
	DVD/CD-RW combo drive (KME) (models Dxx, Hxx)	08K9694*
	Travel cover OP	26P9860*
	For optional Ultrabay 2000 devices and Ultrabay Plus devices, see "Optional FRUs" on page 159.	
	5	Fan assembly for A30/A30p
Fan assembly for A31/A31p		46L4697
6	DIMM for A30/A30p	
	128-MB SDRAM SO DIMM (PC133)	19K4653*
	256-MB SDRAM SO DIMM (PC133)	19K4655*

(continued)

No.	FRU	P/N
6	DIMM for A31/A31p	
	128-MB DDR SO DIMM (PC2100)	10K0029*
	256-MB DDR SO DIMM (PC2100)	10K0031*
	512-MB DDR SO DIMM (PC2100)	10K0033*
7	Secure chip for A30p (2653-6xx)	26P8084
	Secure chip for A31p (2653-Hxx)	26P8234
8	Sub card for PC Card slot (all models except 6xx, Hxx)	26P8079
	Sub card for PC Card slot (models 6xx, Hxx)	26P8246
9	Mini PCI 56k/802.11b combo card (models x5x, x6x, xCx, Fxx)	12P3637*
	Mini PCI combo card, Intel OP	06P3809*
	Mini PCI 56k/3Com Ethernet combo card OP	22P6753*
10	Ethernet daughter card (models x3x, x4x, x5x, x6x, xBx, xCx)	26P8181*
11	Modem daughter card	26P8070*
	Modem daughter card (models x1x, x2x, x3x, x4x, xAx, xBx, xEx)	26P8256*
	Bluetooth daughter card (models 65x, 66x, H6x) OP	26P8071*
12	Antenna for Bluetooth (2653-65x, 66x, H6x)	27L0685
13	Base cover for A30/A30 series	
	Base cover for 2652 (all models except xxC, xxK, xxT)	26P9620
	for 2652-xxC	26P9623
	for 2652-xxK	26P9626
	for 2652-xxT	27L6762
	Base cover for 2652 wireless (all models except xxC, xxK, xxT)	27L6753
	for 2652-xxC wireless	27L6756
	for 2652-xxK wireless	27L6759
	for 2652-xxT wireless	27L6763
	Base cover for 2653 (all models except xxC, xxK, xxT)	26P9621
	for 2653-xxC	26P9624
	for 2653-xxK	26P9627
	for 2653-xxT	27L6764

(continued)

Parts list

No.	FRU	P/N	
13	Base cover for A30/A30 series		
	Base cover for 2653 wireless (all models except xxC, xxK, xxT)	27L6754	
	for 2653-xxC wireless	27L6757	
	for 2653-xxK wireless	27L6760	
	for 2653-xxT wireless	27L6765	
	Base cover for 2654 (all models except xxC, xxK, xxT)	26P9622	
	for 2654-xxC	26P9625	
	for 2654-xxK	26P9628	
	for 2654-xxT	27L6766	
	Base cover for 2654 wireless (all models except xxC, xxK, xxT)	27L6755	
	for 2654-xxC wireless	27L6758	
	for 2654-xxK wireless	27L6761	
	for 2654-xxT wireless	27L6767	
	Base cover for A31/A31p series		
	Base cover for 2652 (all models except xxA, xxB, xxC, xxH, xxK, xxT)	46L5006	
	for 2652-xxC	46L5008	
	for 2652-xxK	46L5010	
	for 2652-xxT	46L5012	
	for 2652-xxA, xxB, xxH	46L6573	
	Base cover for 2652 wireless (all models except xxA, xxB, xxC, xxH, xxK, xxT)	46L5007	
	for 2652-xxC wireless	46L5009	
	for 2652-xxK wireless	46L5011	
	for 2652-xxT wireless	46L5013	
	for 2652-xxA, xxB, xxH wireless	46L6574	
	Base cover for 2653 (all models except xxA, xxB, xxC, xxH, xxK, xxT)	46L4689	
	for 2653-xxC	46L4691	
	for 2653-xxK	46L4693	
	for 2653-xxT	46L4695	
	for 2653-xxA, xxB, xxH	46L6575	

(continued)

No.	FRU	P/N
13	Base cover for A31/A31p series	
	Base cover for 2653 wireless (all models except xxA, xxB, xxC, xxH, xxK, xxT)	46L4690
	for 2653-xxC wireless	46L4692
	for 2653-xxK wireless	46L4694
	for 2653-xxT wireless	46L4696
	for 2653-xxA, xxB, xxH wireless	46L6576
	Base cover for 2654 (all models except xxA, xxB, xxC, xxH, xxK, xxT)	46L5014
	for 2654-xxC	46L5016
	for 2654-xxK	46L5018
	for 2654-xxT	46L5020
	for 2654-xxA, xxB, xxH	46L6577
	Base cover for 2654 wireless (all models except xxA, xxB, xxC, xxH, xxK, xxT)	46L5015
	for 2654-xxC wireless	46L5017
	for 2654-xxK wireless	46L5019
	for 2654-xxT wireless	46L5021
	for 2654-xxA, xxB, xxH wireless	46L6578
	14	Hard-disk drive (20.0 GB), STD OP A30: 2652-1xx, 2xx except xxE A31: 2652-A3x, A4x, A5x, A6x, Bxx
Hard-disk drive (20.0 GB), HITACHI OP A30: 2652-1xx, 2xx except xxE A31: 2652-A3x, A4x, A5x, A6x, Bxx		08K9533*
Hard-disk drive (30 GB), HITACHI OP A30: 2652-3xx, 4xx , 2654-4xx A31: 2652-AGx, AHx, APx, AKx, Cxx, Exx		08K9592*
Hard-disk drive (30 GB), STD OP A30: 2652-3xx, 4xx , 2654-4xx A31: 2652-AGx, AHx, APx, AKx, Cxx, Exx		27L4291*
Hard-disk drive (40 GB), STD OP A31: 2652-Dxx		08K9683*
Hard-disk drive (40 GB), HITACHI OP A31: 2652-Dxx		08K9767*
Hard-disk drive (48 GB), STD OP A30p: 2652, 2653-4xx		08K9599*
Hard-disk drive (60 GB), STD OP A31p: 2652-Hxx		08K9700*
15	Cover, hard-disk drive	27L6768*

(continued)

Parts list

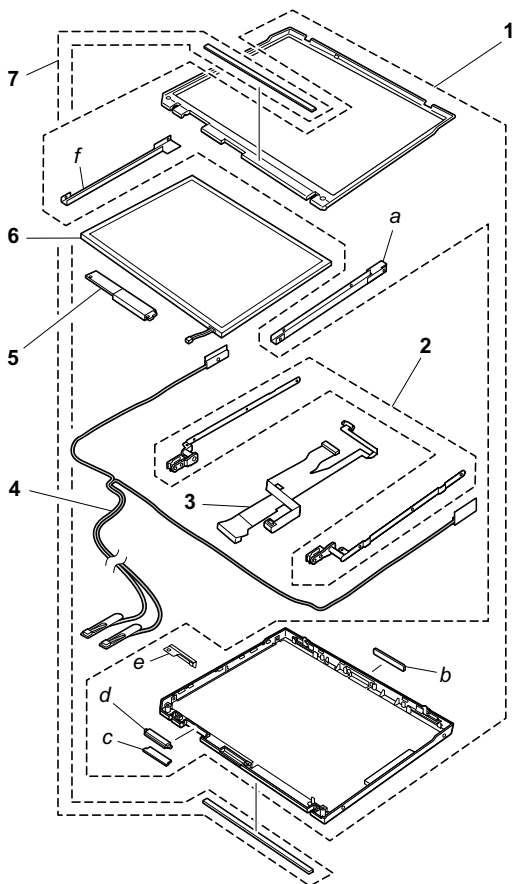
No.	FRU	P/N
16	Battery pack for A30/A30p	
	Battery pack, Li-Ion (6 cell) PANASONIC (all models except xxJ, xxE) OP	02K6793*
	models xxJ, xxE OP	02K6795*
	Battery pack, Li-Ion (6 cell) SANYO (all models except xxJ, xxE) OP	02K6794*
	models xxJ, xxE OP	02K6796*
	Battery pack for A31/A31p	
	Battery pack, Li-Ion (6 cell) 2.0 A, PANASONIC (all models except xxJ, xxE) OP	02K6897*
	models xxJ, xxE OP	02K6899*
	Battery pack, Li-Ion (6 cell) 2.0 A, SANYO (all models except xxJ, xxE) OP	02K6898*
	models xxJ, xxE OP	02K7020*
17	Cover, Mini PCI adapter slot	26P9644*
18	Cover, DIMM slot for A30/A30p	26P9645*
	Cover, DIMM slot for A31/A31p	46L6361*
19	Speaker assembly	02K5988
20	Ultrabay LED card	26P8138
21	Backup battery	02K6572*
22	Modem/Ethernet cable for A30/A30p	27L0679
	Modem/Ethernet cable for A31/A31p	27L0726
23	System board for A30/A30p	
	for 2652, 2654 (all models except 6xx)	26P8287
	for 2653-6xx	26P8286
	System board for A31/A31p	
	for 2652-Axx, Bxx, Cxx, 2654-all	26P8254
	for 2652-Dxx	26P8231
	for 2653-Hxx	26P8232
24	CPU assembly for A30/A30p	
	Pentium III 933 MHz for 2652 (all models except xxE)	26P8001
	Pentium III 1.0 GHz - M (2652-3xx)	26P8122
	Pentium III 1.13 GHz - M (2652, 2654-4xx)	26P8082
	Pentium III 1.2 GHz - M (2653-6xx)	26P8005

(continued)

No.	FRU	P/N
24	CPU assembly for A31/A31p	
	Pentium 4, 1.4 GHz for 2652-Axx, Bxx	26P8250
	Pentium 4, 1.5 GHz for 2652-Cxx, for 2654-all	26P8251
	Pentium 4, 1.6 GHz for 2652-Dxx	26P8242
	Pentium 4, 1.7 GHz for 2653-all	26P8252
25	Ultrabay 2000 guide rail assembly	26P9632
26	Hinge cap	26P9643
27	Keyboard* (see "Keyboard" on page 149.)	
28	Pointing stick cap	26P9212*
—	Telephone cable (SAN TAI)	27L0700*
—	Recovery CD (see "Recovery CDs" on page 150.)	
—	AC adapter (see "AC adapters".)	

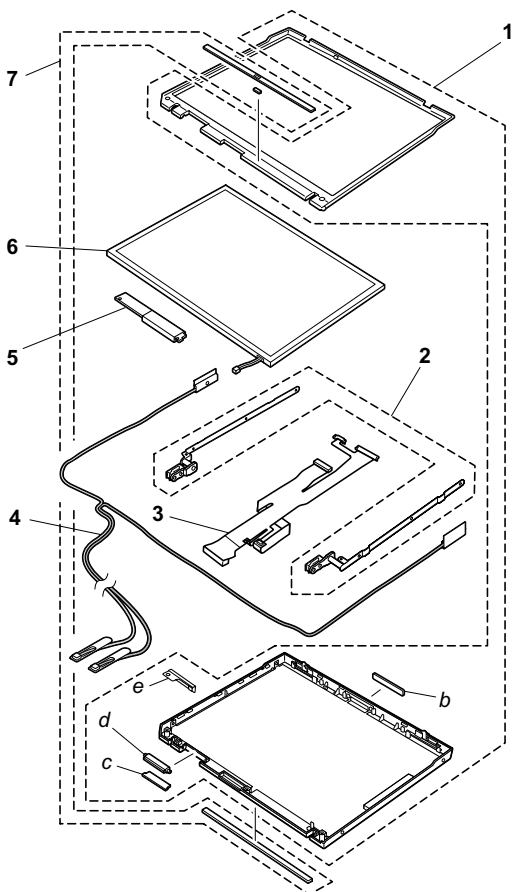
AC adapters

FRU	P/N
2-pin (72 W), ASTEC (models xxE, xxJ, xxP, xxS, xxU, xxX)	02K6753*
2-pin (72 W), DELTA (models xxE, xxJ, xxP, xxS, xxU, xxX)	02K6756*
2-pin (72 W), SANKEN (models xxE, xxJ, xxP, xxS, xxU, xxX)	02K6757*
3-pin (72W), ASTEC (models xxC, xxG, xxH, xxK, xxT)	02K6751*
3-pin (72W), DELTA (models xxC, xxG, xxH, xxK, xxT)	02K6754*

LCD FRUs**14.1-in. XGA TFT**

No.	FRU	P/N
a - f	See "LCD miscellaneous parts" on page 157.	
1	LCD cover kit 14.1-in. (except models xxK)	26P9634
	models xxK	26P9635
2	Hinges	26P9641
3	LCD cable assembly 14.1 XGA	27L0680
4	Antenna assembly for wireless LAN	27L0684
5	Inverter card	26P8132
6	LCD panel, 14.1 XGA (SAMSUNG)	05K9944
7	Clear plate for A30/A30p	46L4904
	Clear plate for A31/A31p	46L5024

15.0-in. XGA TFT



No.	FRU	P/N
<i>b - e</i>	See "LCD miscellaneous parts" on page 157.	
1	LCD cover kit 15.0-in. (except models xxK)	26P9636
	models xxK	26P9637
2	Hinges	26P9641
3	LCD cable assembly 15.0 XGA	27L0681
4	Antenna assembly for wireless LAN	27L0684
5	Inverter card	26P8132
6	LCD panel, 15.0 XGA (LG)	05K9964
	LCD panel, 15.0 XGA (SAMSUNG)	05K9963
7	Clear plate for A30/A30p	46L4904
	Clear plate for A31/A31p	46L5024

15.0-in. SXGA+ TFT

No.	FRU	P/N
1	LCD cover kit 15.0-in. (except models xxK)	26P9636
	models xxK	26P9637
2	Hinges	26P9641
3	LCD cable assembly 15.0 SXGA+	27L0682
4	Antenna assembly for wireless LAN	27L0684
5	Inverter card	26P8132
6	LCD panel, 15.0 SXGA+ (SAMSUNG)	05K9965
	LCD panel, 15.0 SXGA+ (LG)	11P8266
7	Clear plate for A30/A30p	46L4904
	Clear plate for A31/A31p	46L5024

15.0-in. SXGA+ IPS TFT

No.	FRU	P/N
1	LCD cover kit 15.0-in. (except models xxK)	26P9636
	models xxK	26P9637
2	Hinges	26P9641
3	LCD cable assembly 15.0 SXGA+ IPS	27L0714
4	Antenna assembly for wireless LAN	27L0684
5	Inverter card for IPS	26P8133
6	LCD panel, 15.0 SXGA+ IPS (DBU)	11P8206
7	Clear plate for A30/A30p	46L4904
	Clear plate for A31/A31p	46L5024

15.0-in. UXGA IPS TFT

No.	FRU	P/N
1	LCD cover kit 15.0-in. (except models xxK)	26P9636
	models xxK	26P9637
2	Hinges	26P9641
3	LCD cable assembly 15.0 UXGA IPS	27L0683
4	Antenna assembly for wireless LAN	27L0684
5	Inverter card for IPS	26P8133
6	LCD panel, 15.0 UXGA (DBU)	05K9967
7	Clear plate for A30/A30p	46L4904
	Clear plate for A31/A31p	46L5024

Keyboard

Language	P/N
Arabic	02K5980*
Belgian	02K5974*
Chinese, Traditional	02K5963*
Czech	02K5984*
Danish	02K5971*
Dutch	02K5968*
English, U.K.	02K5965*
English, U.S.	02K5959*
French, Canadian	02K5960*
French, European	02K5967*
German	02K5966*
Greek	02K5977*
Hungarian	02K5983*
Hebrew	02K5978*
Italian	02K5972*
Japanese	02K5962*
Korean	02K5964*
Norwegian	02K5970*
Polish	02K5985*
Portuguese	02K5976*
Russian	02K5981*
Slovak	02K5982*
Slovenian	02K5986*
Spanish, European	02K5973*
Spanish, Latin American	02K5961*
Swedish or Finnish	02K5969*
Swiss	02K5975*
Thai	02K5987*
Turkish	02K5979*

Recovery CDs**For Windows 98 (A30/A30p)**

Language	P/N
Arabic (modem enabled)	14P9640*
Chinese, Simplified	46P5584*
Chinese, Traditional	46P4880*
Czech	14P9641*
Danish	14P9631*
Dutch	14P9638*
English, U.K.	14P9627*
English, U.S.	14P9619*
Finnish	14P9637*
French, Canadian	14P9628*
French, European	14P9632*
German	14P9633*
Greek	14P9645*
Hebrew	14P9642*
Hungarian	14P9646*
Italian	14P9636*
Japanese	46P4446*
Norwegian	14P9639*
Polish	14P9643*
Portuguese	14P9630*
Russian	14P9647*
Slovak	14P9649*
Slovenian	14P9648*
Spanish, European	14P9634*
Spanish, Latin American	14P9629*
Swedish	14P9635*
Thai	14P9650*
Turkish	14P9644*

For Windows 2000 (A30/A30p)

Language	P/N
Arabic	14P9104*
Arabic (modern enabled)	14P9103*
Chinese, Simplified	46P5586*
Chinese, Traditional	46P5580*
Czech	14P9105*
Greek	14P9109*
Hebrew	14P9106*
Hungarian	14P9110*
Japanese	46P4448*
Polish	14P9107*
Russian	14P9111*
Turkish	14P9108*

For Windows 2000/Windows NT (A30/A30p)

Language	P/N
Danish	14P9094*
Dutch	14P9101*
English, U.K.	14P9090*
English, U.S.	14P9089*
Finnish	14P9100*
French, Canadian	14P9091*
French, European	14P9095*
German	14P9096*
Italian	14P9099*
Norwegian	14P9102*
Portuguese	14P9093*
Spanish, European	14P9097*
Spanish, Latin American	14P9092*
Swedish	14P9098*

For Windows XP professional (A30/A30p)

Language	P/N
Arabic	14P9005*
Arabic (modern enabled)	14P9004*
Chinese, Simplified	46P5588*
Chinese, Traditional	46P5582*
Czech	14P9006*
Danish	14P8995*
Dutch	14P9002*
English, U.K.	14P8991*
English, U.S.	14P8990*
Finnish	14P9001*
French, Canadian	14P8992*
French, European	14P8996*
German	14P8997*
Greek	14P9010*
Hebrew	14P9007*
Hungarian	14P9011*
Italian	14P9000*
Japanese	46P4450*
Norwegian	14P9003*
Polish	14P9008*
Portuguese	14P8994*
Russian	14P9012*
Slovak	14P9014*
Slovenian	14P9013*
Spanish, European	14P8998*
Spanish, Latin American	14P8993*
Swedish	14P8999*
Thai	14P9015*
Turkish	14P9009*

For Windows 2000 (A31/A31p)

Language	P/N
Arabic	32P6838*
Chinese, Simplified	62P8553*
Chinese, Traditional	62P8550*
Chinese, Traditional (Hong Kong S.A.R.)	62P8556*
Czech	32P6839*
Danish	32P6829*
Dutch	32P6836*
English, U.K.	32P6825*
English, U.S.	32P6824*
Finnish	32P6835*
French, Canadian	32P6826*
French, European	32P6830*
German	32P6831*
Greek	32P6843*
Hebrew	32P6840*
Hungarian	32P6844*
Italian	32P6834*
Japanese	46P6216*
Norwegian	32P6837*
Polish	32P6841*
Portuguese	32P6828*
Russian	32P6845*
Spanish, European	32P6832*
Spanish, Latin American	32P6827*
Swedish	32P6833*
Turkish	32P6842*

For Windows XP professional (A31/A31p)

Language	P/N
Arabic	32P7043*
Chinese, Simplified	62P8555*
Chinese, Traditional	62P8552*
Chinese, Traditional (Hong Kong S.A.R.)	62P8558*
Czech	32P7044*
Danish	32P7034*
Dutch	32P7041*
English, U.K.	32P7030*
English, U.S.	32P7029*
Finnish	32P7040*
French, Canadian	32P7031*
French, European	32P7035*
German	32P7036*
Greek	32P7048*
Hebrew	32P7045*
Hungarian	32P7049*
Italian	32P7039*
Japanese	46P6219*
Norwegian	32P7042*
Polish	32P7046*
Portuguese	32P7033*
Russian	32P7050*
Spanish, European	32P7037*
Spanish, Latin American	32P7032*
Swedish	32P7038*
Turkish	32P7047*

For Windows XP Home Edition (A31/A31p)

Language	P/N
Arabic	32P6941*
Chinese, Simplified	62P8554*
Chinese, Traditional	62P8551*
Chinese, Traditional (Hong Kong S.A.R.)	62P8557*
Czech	32P6942*
Danish	32P6932*
Dutch	32P6939*
English, U.K.	32P6928*
English, U.S.	32P6927*
Finnish	32P6938*
French, Canadian	32P6929*
French, European	32P6933*
German	32P6834*
Greek	32P6946*
Hebrew	32P6943*
Hungarian	32P6947*
Italian	32P6937*
Japanese	46P6222*
Norwegian	32P6940*
Polish	32P6944*
Portuguese	32P6931*
Russian	32P6948*
Spanish, European	32P6935*
Spanish, Latin American	32P6930*
Swedish	32P6936*
Turkish	32P6945*

Miscellaneous parts

FRU	P/N
Screw kit (including nylon-coated screws): <ul style="list-style-type: none"> • M3.0 x 2.8 mm, flat head (4) • M2.5 x 19.5 mm, flat head (1) • M2.5 x 16.0 mm, flat head (10) • M2.5 x 4.8 mm, flat head (18) • M2.0 x 5.7 mm, flat head (4) • M2.0 x 3.6 mm, flat head (4) • M2.0 x 15.0 mm, countersunk head (1) • M2.0 x 9.0 mm, countersunk head (1) • M2.5 x 4.8 mm, pan head (4) • M2.0 x 15.0 mm, pan head (4) • CDC screw (4) • HDD screw (1) • Hex stud (6) • Security screw (1) • Screw caps (not painted) (1) • Screw caps (not painted) (6) 	26P9646
Base miscellaneous parts: <ul style="list-style-type: none"> • Lens, IR • Lens, Ultrabay Plus LED • Lens, Ultrabay 2000 LED • Ultrabay Plus lock lever • Ultrabay Plus lock lever support • Spring, bay eject lever • Ultrabay 2000 lock lever • Ultrabay 2000 lock lever support • Latch, battery lock • Battery holder • Spring, battery lock • Lid, docking (front) • Lid, docking (rear) • Spring, docking lid • Hard-disk guide bracket • Rubber foot (front) • Rubber foot (rear) • Insulation tape for antenna • Thermal grease • Screw caps 	26P9629

(continued)

FRU	P/N
<p>LCD miscellaneous parts:</p> <ul style="list-style-type: none"> • LCD latch, right • LCD latch, left • LCD latch spring • (b) Blank cap, not UltraPort • Blank cap, UltraPort • (a) Bracket, LCD holder (right) • (f) Bracket, LCD holder (left) • (d) FPC holder, upper • (c) FPC holder, lower • (e) Bracket, hinge-L support • Insulation tape • Insulation tape for antenna • Tape for LCD connector • Logo (large) • Logo (large), Korea • Screw caps (no paint) <p>Note: Italicized letters in parentheses are references to the exploded view on page 146 and 147.</p>	26P9640
<p>System miscellaneous parts for A30/A30p:</p> <ul style="list-style-type: none"> • (b) Blank cap (RJ45) • (c) Blank cap (Video-in) • (f) Blank cap (1394) • (h) Audio connector cover • Ultrabay Plus eject lever • Spring, Ultrabay Plus eject lever • Ultrabay 2000 eject lever • Spring, Ultrabay 2000 eject lever • Lock, bay • PC Card slot cover • Spring, PC Card slot cover • (k) Insulator, keyboard CRU • Easy button cover • (a) Fan bracket • (d) LCD connector support • (e) EMI shield, sub card • (g) MiniPCI guide • (i) Cable guide, speaker and bay LED/SW • (j) Cable holder, speaker and bay LED/SW • Security keyhole lock plate • Logo (large) • Thermal grease • Screw caps <p>Note: Italicized letters in parentheses are references to the exploded view on page 139.</p>	26P9633

(continued)

Parts list

FRU	P/N
System board miscellaneous parts for A31, A31p: <ul style="list-style-type: none"> • CDC studs • Insulator for LCD cable • Separator for fan • Blank label, docking guide pin • Insulator for fan opening • EMI shield for modem/Ethernet cable • Insulation tape • Thermal rubber for video • Thermal rubber for chipset • Ferrite tyle for video • Gasket for audio 	46L6362
System miscellaneous parts for A31, A31p: <ul style="list-style-type: none"> • (b) Blank cap (RJ45) • (c) Blank cap (Video-in) • (f) Blank cap (1394) • (h) Audio connector cover • Ultrabay Plus eject lever • Spring, Ultrabay Plus eject lever • Ultrabay 2000 eject lever • Spring, Ultrabay 2000 eject lever • Lock, bay • PC Card slot cover • Spring, PC Card slot cover • (k) Insulator, keyboard CRU • Easy button cover • (a) Fan bracket • (d) LCD connector support • (e) EMI shield, sub card • (g) MiniPCI guide • (i) Cable guide, speaker and bay LED/SW • (j) Cable holder, speaker and bay LED/SW • Security keyhole lock plate • Logo (large) • Track point shielding plate • Screw caps <p>Note: Italicized letters in parentheses are references to the exploded view on page 139.</p>	46L6387

Optional FRUs

Ultrabay devices

FRU	P/N
SuperDisk drive (LS120 x 2)	05K9235*
SuperDisk drive (LS240)	08K9615*
ZIP-250 drive	00N8254*
2nd HDD adapter	08K6067*
Ultrabay 2000 battery, Li-Ion (SANYO) (except -xxJ, xxE)	02K6817*
Ultrabay 2000 battery, Li-Ion (SANYO) (for -xxJ, xxE)	02K6818*
Ultrabay Plus device carrier	26P9388*
Ultrabay Plus numeric keypad	19K2056*
Ultrabay Plus cradle for WorkPad c500 series	26P9389*

Other optional FRUs

FRU	P/N
64-MB SDRAM SO DIMM (PC133)	19K4651*
UltraPort camera	02K5153*
IBM tripod	08K6449*
UltraPort adapter and connector cover	08K6105*
USB cable attachment	08K6108*
USB cable	27L0542*
Bluetooth UltraPort module	09N9813*
ThinkPad Dock	08N1546*
PCI cover	05K6246
ThinkPad Dock with extension plate	08N1537*
PCI cover	08N7317
Top cover and screw kit for ThinkPad Dock	12P4143
ThinkPad Port Replicator	08N1536*
Multiple battery charger	02K6642*
Diskette drive cable	27L0525*
Conversion adapter for diskette drive cable	08K6360*
Video cable	27L0531*

Common parts list

Tools

Triconnector wrap plug	72X8546
PC test card	35G4703
Audio wrap cable	66G5180
USB parallel test cable	05K2580
Screwdriver kit	95F3598
Torque screwdriver	05K4695
5 mm socket wrench	05K4694
Screwdriver	27L8126
ThinkPad hardware maintenance diskette version 1.62 Note: Download the file from the following Web site. http://www.ibm.com/pc/partner/infotips	—

Power cords (system)

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

For 2-pin power cords:

Region	P/N
Canada, U.S.	13H5264*
Japan	13H5273*
Argentina	36L8870*

For 3-pin power cords:

Region	P/N
Australia, New Zealand	76H3514*
Taiwan, Thailand	76H3516*
Italy	76H3530*
Denmark	76H3520*
U.K., China (Hong Kong S.A.R.)	76H3524*
European countries	76H3518*
India, South Africa	76H3522*
Israel	76H3532*
Korea	76H3535*
China (P.R.C.) (other than Hong Kong S.A.R.)	02K0539*
Switzerland	76H3528*

Power cords (docking station)

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

For 3-pin power cords:

Region	P/N
Argentina	36L8868*
Australia, New Zealand	75H8988*
Canada, Thailand, U.S.	75H8989*
Denmark	75H8992*
European countries	75H8990*
India, South Africa	75H8993*
Israel	75H8999*
Italy	75H8998*
Japan	75H8996*
Korea	76H3536*
China (P.R.C.) (other than Hong Kong S.A.R)	02K0540*
Switzerland	75H8997*
U.K.	75H8994*

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Part Number: 24P2959

(1P) P/N: 24P2959

