



IBM Mobile Systems ThinkPad Computer Hardware Maintenance Manual

August 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 182.

First Edition (August 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 13, and “Laser compliance statement” on page 18.

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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 expense for replacing and servicing FRUs:

- **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 multilingual, translated safety notice found in this section.

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

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

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

Safety notice 2

 **DANGER**

Some standby batteries contain a small amount of nickel and cadmium. Do not disassemble a standby battery, recharge it, throw it into fire or water, or short-circuit it. Dispose of the battery as required by local ordinances or regulations. Use only the battery in the appropriate parts listing. Use of an incorrect battery can result in ignition or explosion of the battery.

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

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

(continued)

(continuation of safety notice 2)

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

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

Safety notice 3

 **DANGER**

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

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

Akkus enthalten geringe Mengen von Nickel. Sie dürfen nicht zerlegt, wiederaufgeladen, kurzgeschlossen, oder Feuer oder Wasser ausgesetzt werden. Bei der Entsorgung die örtlichen Bestimmungen für Sondermüll beachten. Beim Ersetzen der Batterie nur Batterien des Typs verwenden, der in der Ersatzteilliste aufgeführt ist. Der Einsatz falscher Batterien kann zu Entzündung oder Explosion führen.

La batteria contiene piccole quantità di nichel. Non smontarla, gettarla nel fuoco o nell'acqua né cortocircuitarla. Smaltirla secondo la normativa in vigore (DPR 915/82, successive disposizioni e disposizioni locali). Quando si sostituisce la batteria, utilizzare soltanto i tipi inseriti nell'appropriato Catalogo parti. L'impiego di una batteria non adatta potrebbe determinare l'incendio o l'esplosione della batteria stessa.

(continued)

(continuation of safety notice 3)

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

Safety notice 4

 **DANGER**

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

La pile de sauvegarde contient du lithium. Elle présente des risques d'incendie, d'explosion ou de brûlures graves. Ne la rechargez pas, ne retirez pas son connecteur polarisé et ne la démontez pas. Ne l'exposez pas à une 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.

(continued)

(continuation of safety notice 4)

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

La batteria di supporto è una batteria al litio e può incendiarsi, esplodere o procurare gravi ustioni. Evitare di ricaricarla, smontarne il connettore polarizzato, smontarla, riscalarla ad una temperatura superiore ai 100 gradi centigradi, incendiarsi 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 médica si se presenta algún síntoma del fluido después de lavarse.

Safety notice 6

 **DANGER**

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

DANGER

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

 **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.

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 presents 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 object that weighs more than 16 kg (35 lb) or objects that you think are too heavy for you.*
- Do not perform any action that causes hazards to the customer, or that makes the equipment unsafe.
- Before you start the machine, ensure that other service representatives and the customer's personnel are not in a hazardous position.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the machine.
- Keep your toolcase away from walk areas so that other people will not trip over it.
- Do not wear loose clothing that can be trapped in the moving parts of a machine. Make sure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.
- Insert the ends of your necktie or scarf inside clothing or fasten it with a nonconductive clip, approximately 8 centimeters (3 inches) from the end.
- Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.

Attention: Metal objects are good electrical conductors.

- Wear safety glasses when you are hammering, drilling, soldering, cutting wire, attaching springs, using solvents, or working in any other conditions that might be hazardous to your eyes.

Safety information

- After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective.
- Reinstall all covers correctly before returning the machine to the customer.

Electrical safety

Observe the following rules when working on electrical equipment.

Important

Use only approved tools and test equipment. Some hand tools have handles covered with a soft material that does not insulate you when working with live electrical currents.

Many customers have, near their equipment, rubber floor mats that contain small conductive fibers to decrease electrostatic discharges. Do not use this type of mat to protect yourself from electrical shock.

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Disconnect all power before:
 - Performing a mechanical inspection
 - Working near power supplies
 - Removing or installing main units
- Before you start to work on the machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine and to lock the wall box in the off position.
- If you need to work on a machine that has *exposed* electrical circuits, observe the following precautions:
 - Ensure that another person, familiar with the power-off controls, is near you.

Attention: Another person must be there to switch off the power, if necessary.

- Use only one hand when working with powered-on electrical equipment; keep the other hand in your pocket or behind your back.

Attention: An electrical shock can occur only when there is a complete circuit. By observing the above rule, you may prevent a current from passing through your body.

- When using testers, set the controls correctly and use the approved probe leads and accessories for that tester.
- Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames.

Observe the special safety precautions when you work with very high voltages; these instructions are in the safety sections of maintenance information. Use extreme care when measuring high voltages.

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

and similar units. (This practice ensures correct grounding of the units.)

- If an electrical accident occurs:
 - Use caution; do not become a victim yourself.
 - Switch off power.
 - Send another person to get medical aid.

Safety inspection guide

The purpose of this inspection guide is to assist you in identifying potentially unsafe conditions. As each machine was designed and built, required safety items were installed to protect users and service personnel from injury. This guide addresses only those items. You should use good judgment to identify potential safety hazards due to attachment of non-IBM features or options not covered by this inspection guide.

Safety information

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 devices that are sensitive to electrostatic discharge

Any computer part containing transistors or integrated circuits (ICs) should be considered sensitive to electrostatic discharge (ESD.) ESD damage can occur when there is a difference in charge between objects. Protect against ESD

damage by equalizing the charge so that the machine, the part, the work mat, and the person handling the part are all at the same charge.

Notes

1. Use product-specific ESD procedures when they exceed the requirements noted here.
2. Make sure that the ESD protective devices you use have been certified (ISO 9000) as fully effective.

When handling ESD-sensitive parts:

- Keep the parts in protective packages until they are inserted into the product.
- Avoid contact with other people.
- Wear a grounded wrist strap against your skin to eliminate static on your body.
- Prevent the part from touching your clothing. Most clothing is insulative and retains a charge even when you are wearing a wrist strap.
- Use the black side of a grounded work mat to provide a static-free work surface. The mat is especially useful when handling ESD-sensitive devices.
- Select a grounding system, such as those listed below, to provide protection that meets the specific service requirement.

Note

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

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

Grounding requirements

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

Laser compliance statement

Some IBM Personal Computer models are equipped from the factory with an optical storage device such as a CD-ROM drive or a 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, beállításoktól és vezérlésektől eltérni a lézersugárzás veszélye miatt kockázatos !

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

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

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

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

Opening the CD-ROM drive, 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 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 ópticos e evite exposição direta com o feixe de luz.

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

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

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

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

Aprendo l'unità vengono emesse radiazioni laser. Non fissare il fascio, non guardarla 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.

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

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

General descriptions

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

Read this first

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

Important notes

- **Only certified trained personnel should service the computer.**
- **Read the entire FRU 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

Read this first

- ___ 4. Date of purchase
- ___ 5. Failure symptoms, error codes appearing on the display, and beep symptoms
- ___ 6. Procedure index and page number in which the failing FRU was detected
- ___ 7. Failing FRU name and part number
- ___ 8. Machine type, model number, and serial number
- ___ 9. Customer's name and address

Note for warranty:

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

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

The following are not covered under warranty:

- LCD panel cracked from the application of excessive force or from being dropped
- Scratched (cosmetic) parts
- 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”
- “Restoring the preloaded system”
- “Passwords” on page 26
- “Power management” on page 28

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>

Restoring the preloaded system

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.

Ordering the recovery CD

When the hard-disk drive is replaced because of a failure, no Product Recovery program is on the new hard disk. In this case, you must use the Product Recovery CD for the computer. Order the recovery CD and the hard-disk drive at the same time so that you can recover the new hard-disk drive with the pre-installed software when they arrive. For information on which CD to order, see “Recovery CDs” on page 169

The Product Recovery program is in the service partition, a section of the hard-disk drive that is not displayed by Windows Explorer.

Attention: All of the files on the primary hard-disk partition (usually drive C) will be lost in the recovery process. Be sure to back up copies of the files you have saved on your drive C before you begin.

Creating a Recovery Repair diskette

If the operating system cannot boot normally, or if you cannot get access to the Product Recovery program, you can use the Recovery Repair diskette to boot the computer. Make a Recovery Repair diskette and save it for future use. To make a Recovery Repair diskette, do the following:

1. Shut down and restart the computer.

Related service information

2. 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 opens.

Note: If you are prompted to select the operating system, select one you want to recover. Then the Product Recovery program main menu opens.

3. Select **System Utilities** from the main menu. Press Enter.
4. Select **Create a Recovery Repair diskette**. Press Enter.
5. Follow the on-screen instructions.
6. When the process is completed, label the diskette "Recovery Repair diskette" and save it for future use.

Product Recovery program

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. If you are using Windows XP, three messages (F1, F11, and F12) appear on the screen for a few seconds. One of them is "**Press F11 to invoke the IBM Product Recovery program**". While the message is displayed, quickly press F11. If you are using Windows 2000 or another operating system, the startup screen is displayed first, and then the message "**To start the Product Recovery program, press F11**" at the top of the screen. Here again it appears very briefly; watch for it, and press F11 before it disappears.

Note: If this message is not displayed, you can use a Recovery Repair diskette to get access to the Product Recovery program. (For using a Recovery Repair diskette, see "To use the Recovery Repair diskette:" on page 26.)

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.
6. When the Product Recovery program finishes running, the computer will restart with the pre-installed operating system, drivers, and software.

Note: Network drivers are not automatically restored with Windows NT 4.0; you will need to reinstall them.

Note: If you use Windows 2000 or Windows 98, restart the system by pressing Ctrl+Alt+Del or by turning the computer off and then on again. The computer will restart with the pre-installed operating system, drivers, and software.

Using the recovery CD

To create the service partition and install the preloaded system from the recovery CD, do the following:

To create the service partition:

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 is displayed: **"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. Press Y key. 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 is displayed: **"Your computer originally included a Product Recovery program ... Reinstall the Product Recovery program? (Y/N) []"**.
 - To install the service partition, go to step 4.

Related service information

- To preload the hard-disk drive without installing the service partition, press N key.

8. If you get a message asking which operating system to install, select the proper operating system and press Enter.
9. A message is displayed: “**Full Recovery:**”. Press Enter to select.
10. On each of the next three windows, press the Y key.
11. Follow the prompts to complete the recovery.

To use the Recovery Repair diskette:

1. Shut down and turn off the computer.
2. Insert the Recovery Repair diskette into the drive, and then turn on the computer.
3. Follow the on-screen instructions.

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 has 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 61.

3. Remove the backup battery.

For how to remove the backup battery, see "1040 Backup battery" on page 72.

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.

Related service information

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 NT.
- Standby mode is called *suspend mode* in 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.)

Related service information

- 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 NTFS format, 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.
- 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 41.

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 device, install it in the Ultrabay 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 35, and check the power sources.

If an error code appears, go to "Symptom-to-FRU index" on page 49.

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.)

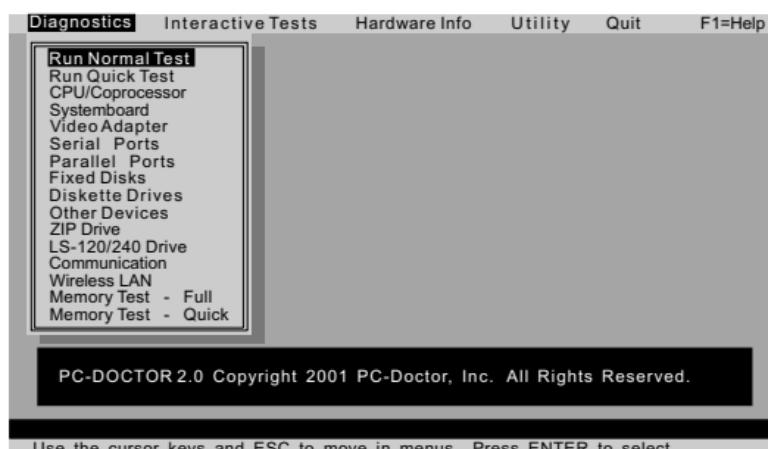
The options on the test menu are as follows:

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 • Diskette • System Load • CD-ROM/DVD Test • Actiontec Wireless Radio

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.
- **Video Adapter** test supports only the LCD display on the ThinkPad computer. 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.
- When Legacy Floppy Drives is enabled in the IBM BIOS Setup Utility, **Diskette Drives** test is activated even if no legacy diskette drive is attached to the ThinkPad computer.

Checkout guide



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 36
- “Checking the battery pack” on page 36
- “Checking the backup battery” on page 37

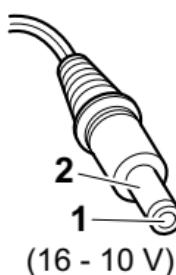
Checking the ac adapter

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 41.

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

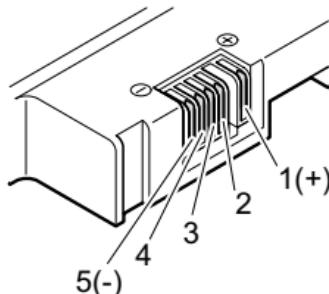
Battery charging does not start until the Power Meter shows that less than 95 % of the total power remains; under this condition the battery pack can charge to 100 % of its capacity. This protects the battery pack from being overcharged or from having a shortened life.

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.

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.

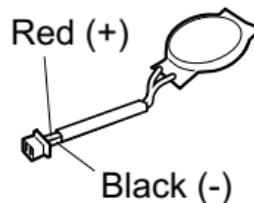
4. If the voltage is more than +11.0 V dc, measure the resistance between battery terminals 4 and 5. The resistance must be 4 to 30 K Ω .

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 61).
4. Remove the backup battery (see “Checking the battery pack” on page 36).
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 44
- “FRU Tests” on page 46
- “Fn key combinations” on page 47

Specifications

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

Feature	Description
Processor	<p>A30, A30p</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 Mobile Intel® Pentium® III processor 1.2 GHz - M Mobile Intel® Celeron® processor 1.06 GHz Mobile Intel® Celeron® processor 1.2 GHz <p>A31, A31p</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 Mobile Intel® Pentium® 4 processor 1.7 GHz Mobile Intel® Pentium® 4 processor 1.8 GHz Mobile Intel® Pentium® 4 processor 1.9 GHz Mobile Intel® Pentium® 4 processor 2.0 GHz
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

(continued)

Product overview

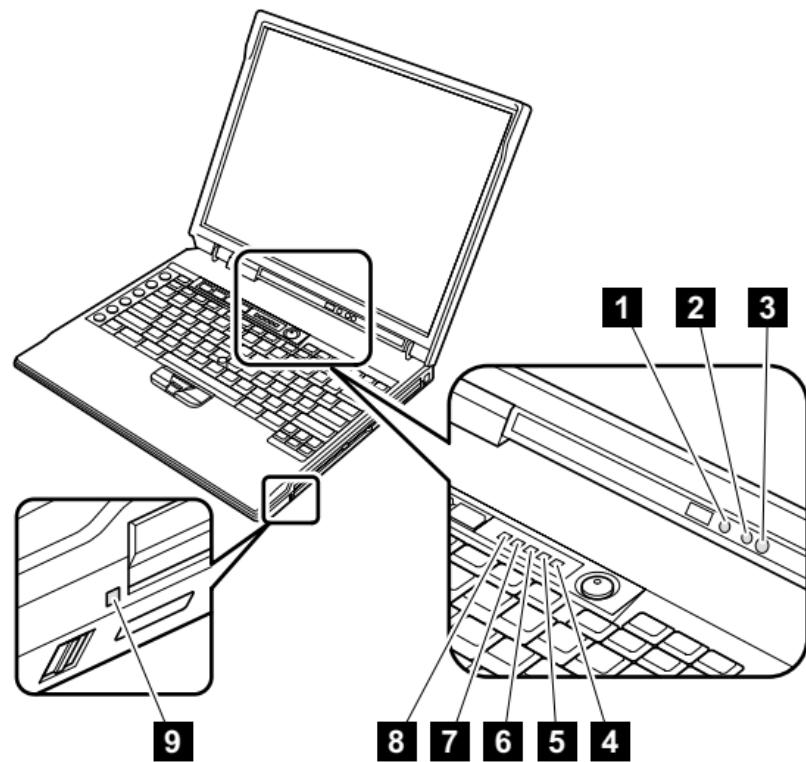
Feature	Description
Audio	<ul style="list-style-type: none"> Internal stereo speakers Software control volume
Memory (standard)	<p>A30, A30p</p> <ul style="list-style-type: none"> 128 MB DIMM card x 1 <p>A31, A31p</p> <ul style="list-style-type: none"> 128 MB DIMM card x 1 256 MB DIMM card x 1 512 MB DIMM card x 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, xGx, xKx, xTx, xXx: Windows XP Professional</p> <p>Models x4x, x6x, xHx, xSx, xWx: Windows 2000</p> <p>Models xAx, xBx, xCx: Windows 98</p> <p>Models xEx, xFx, xPx, xRx, xVx: 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	Green: The battery is in use and has enough power. The ac adapter has charged the battery completely. Blinking green: The battery is being charged, but still has enough power to operate. (At regular intervals, the indicator light turns off briefly.) Orange: The battery is being charged, but the battery power is still low. Blinking orange: The battery needs to be charged. When the indicator starts blinking orange, the computer beeps three times.

(continued)

Indicator	Meaning
3 Standby status	<p>Green: The computer is in standby mode.</p> <p>Blinking green: The computer is entering standby mode or hibernation mode, or is resuming normal operation.</p>
4 Power on	<p>Green: The computer is on and ready to use. This indicator stays lit whenever the computer is on and is not in standby mode.</p>
5 Scroll lock	<p>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.</p>
6 Caps lock	<p>Green: Caps Lock mode is enabled. To enable or disable Caps Lock mode, press the Caps Lock key.</p>
7 Num lock	<p>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.</p>
8 Drive in use	<p>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.</p> <p>Note: Do not move the system while the Green drive in use light is on. Sudden physical shock could cause drive errors.</p>
9 Ultrabay status	<p>Green: An Ultrabay device is installed and in use.</p> <p>Blinking green: An Ultrabay device is in the process of being detached.</p> <p>Turn off: An Ultrabay device is ready to be attached or detached.</p> <p>Note: If you are using Windows 2000, the Ultrabay status indicator does not blink while an Ultrabay device is being detached. Instead, a message box pops up when the process is completed; then the indicator turns off.</p>

FRU Tests

The following table shows the test for each FRU.

FRU	Applicable test
System board	1. Diagnostics --> CPU/Coprocessor 2. Diagnostics --> Systemboard
Power	Diagnostics --> Other Devices --> IBM AC Adapter, IBM Battery 1 (IBM Battery 2)
LCD unit	1. Diagnostics --> Video Adapter 2. Interactive Tests --> Video
Modem	1. Make sure the modem is set up correctly. 2. Replace the modem jack and the modem card in turn, and run the following test in Diagnostics --> Communication : a. Lucent Modem (M2) Loopback b. Lucent Modem (M2) Dialtone/DTMF 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	1. Interactive Tests --> Internal Speaker 2. Diagnostics --> Other Devices --> Crystal SoundFusion™ Test (A30/A30p only) 3. Diagnostics --> Other Devices --> Analog Devices AC97 CODEC Test (A31/A31p only)
Speaker	Interactive Tests --> Internal Speaker
PC Card slots	Diagnostics --> Systemboard --> PCMCIA, PCMCIA External Loop
Keyboard	1. Diagnostics --> Systemboard --> Keyboard 2. Interactive Tests --> Keyboard
Memory	1. If two DIMMs are installed, remove one of them and run Diagnostics --> Memory Test - Quick . 2. If the problem does not recur, return the DIMM to its place, remove the other one, and run the test again. 3. If the test does not detect the error, run Diagnostics --> Memory Test - Full .
Diskette drive	1. Diagnostics --> Diskette Drives 2. Interactive Tests --> Diskette
Hard-disk drive	Diagnostics --> Fixed Disks

(continued)

FRU	Applicable test
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
CD-ROM or DVD drive	<ol style="list-style-type: none"> 1. Diagnostics --> Other Devices --> CD-ROM/DVD 2. Interactive Tests --> CD-ROM/DVD Test
Fan	<ol style="list-style-type: none"> 1. Turn on the computer and check the air turbulence at the louver near the power switch. 2. 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	Turn standby mode on. To return to normal operation, press the Fn key independently, without pressing a function key.
<p>Notes:</p> <ol style="list-style-type: none"> 1. This mode is called <i>suspend mode</i> in Windows 95 and Windows NT. 2. 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)

Product overview

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 56.

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.
0176 System Security—The system has been tampered with.	1. Run IBM BIOS Setup Utility, and then save current setting by pressing F10. 2. System board.
0187 EAIA data access error—The access to EEPROM is failed.	System board.
0188 Invalid RFID serialization information area or bad CRC2—The EEPROM checksum is not correct.	System board.

Symptom-to-FRU index

Symptom or error	FRU or action, in sequence
0189 Invalid RFID configuration information area—The EEPROM checksum is not correct.	System board.
0190 Critical low-battery error	1. Charge the battery pack. 2. Battery pack.
0191 System Security—Invalid Remote Change requested.	1. Run IBM BIOS Setup Utility, and then save current setting by pressing F10. 2. System board.
0192 System Security—IBM Embedded Security hardware tamper detected.	System board.
0195 Security hardware tamper detected	1. Enter IBM BIOS Setup Utility by entering supervisor password, and select “Config” --> “IBM Security Chip” --> “Clear IBM Security Chip” to clear this error. 2. Security chip. 3. System board.
0196 Security hardware removed	1. Enter IBM BIOS Setup Utility by entering supervisor password, and select “Config” --> “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.
0199 System Security—IBM Security password retry count exceeded.	1. Run IBM BIOS Setup Utility, and then save current setting by pressing F10. 2. System board.
01C8 More than one modem devices are found. Remove one of them. Press <Esc> to continue.	1. Remove either a Mini PCI modem card or an modem daughter card; or press Esc to ignore the warning message. 2. System board.

Symptom or error	FRU or action, in sequence
01C9 More than one Ethernet devices are found. Remove one of them. Press <Esc> to continue.	1. Remove either a Mini PCI Ethernet card or an Ethernet daughter card; or press Esc to ignore the warning message. 2. System board.
0200 Hard disk error—The hard disk is not working.	1. Reseat the hard-disk drive. 2. Load Setup Defaults in IBM BIOS Setup Utility. 3. Hard-disk drive. 4. System board.
021x 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—Shadow RAM fails at offset nnnn.	System board.
0231 System RAM error—System RAM fails at offset nnnn.	1. DIMM. 2. System board.
0232 Extended RAM error—Extended RAM fails 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.

Symptom-to-FRU index

Symptom or error	FRU or action, in sequence
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 DMA test failed	1. DIMM. 2. System board.
02F6 Software NMI failed	1. DIMM. 2. System board.
02F7 Fail-safe timer NMI failed	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.	1. Reseat the LCD connector. 2. LCD assembly. 3. External CRT. 4. System board.
One long and two short beeps, and a blank or unreadable LCD.	1. System board. 2. LCD assembly. 3. DIMM.
Two short beeps with error codes.	POST error. See “Numeric error codes” on page 49.
Two short beeps and a blank screen.	1. System board. 2. DIMM.
Three short beeps, pause, three more short beeps, and one short beep.	1. DIMM. 2. System board
One short beep, pause, three short beeps, pause, three more short beeps, and one short beep.	
Only cursor appears.	Reinstall operating system.
Four cycles of four short beeps and a blank screen.	System board (IBM security chip)
Five short beeps and a blank screen.	System board

No-beep symptoms

Symptom or error	FRU or action, in sequence
No beep, power-on indicator on, LCD blank, and no POST.	1. Make sure that every connector is connected tightly and correctly. 2. DIMM. 3. System board.
No beep, power-on indicator on, and LCD blank during POST.	1. Reseat DIMM. 2. System board.
The power-on password prompt appears.	A power-on password or a supervisor password is set. Type the password and press Enter .
The hard-disk password prompt appears.	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: A bright dot means a pixel is always on (white or color.) A dark dot means a 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 35.)

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 Ultrabay
 - 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.

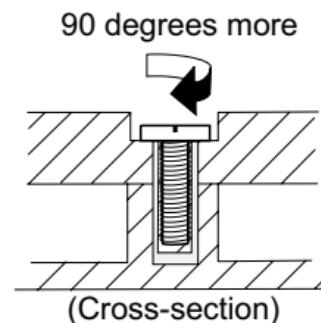
Do the following when you service this machine:

- Keep the screw kit (for the P/N, see "Miscellaneous parts" on page 175) in your tool bag.
- Always use new screws.
- Use a torque screwdriver if you have one.

Tighten screws as follows:

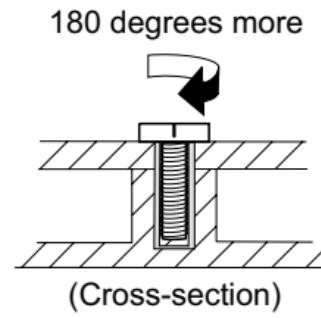
- **Plastic to plastic**

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.

FRU replacement notices

- 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 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 57.
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 142.
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.

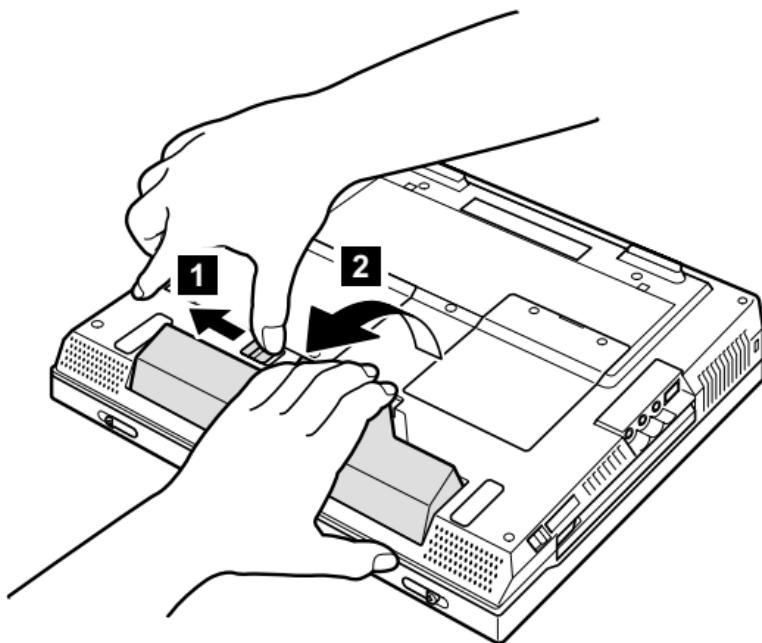
Attention: Before the computer is powered on after FRU replacement, make sure that all screws, springs, and other small parts are in place and are not loose inside the computer. Verify this by shaking the computer gently and listening for rattling sounds. Metallic parts or metal flakes can cause electrical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

The 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.



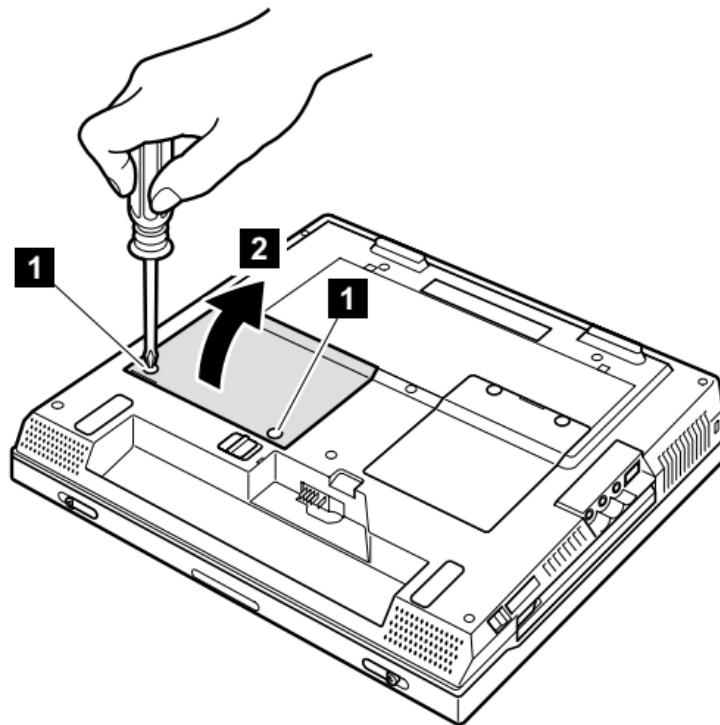
Removing and replacing a FRU

1020 Mini PCI adapter

For access, remove this FRU:

- “1010 Battery pack” on page 61

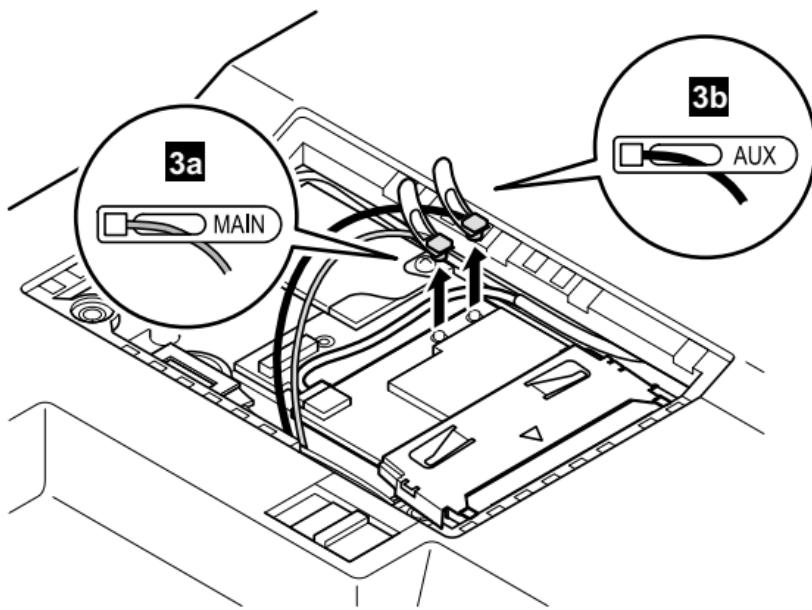
Note: Loosen the screws **1**, but do not remove them.



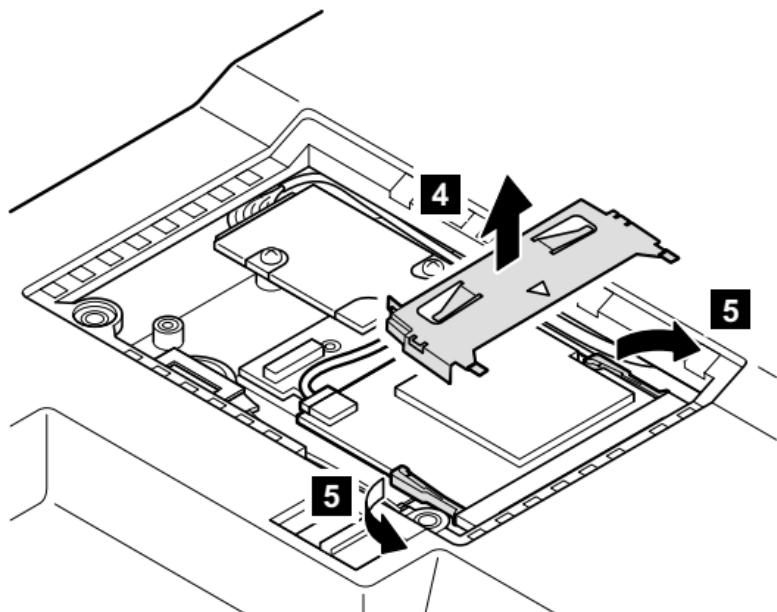
(continued)

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.

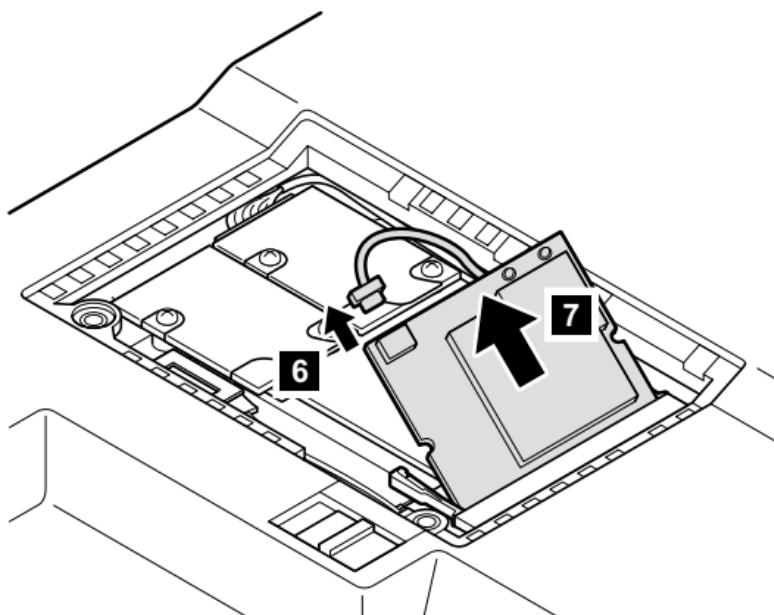


When installing: Plug the gray antenna cable with the tab marked "MAIN" (**3a**) into jack **J1**, and the black antenna cable with the tab marked "AUX" (**3b**) into jack **J2**.



(continued)

Removing and replacing a FRU



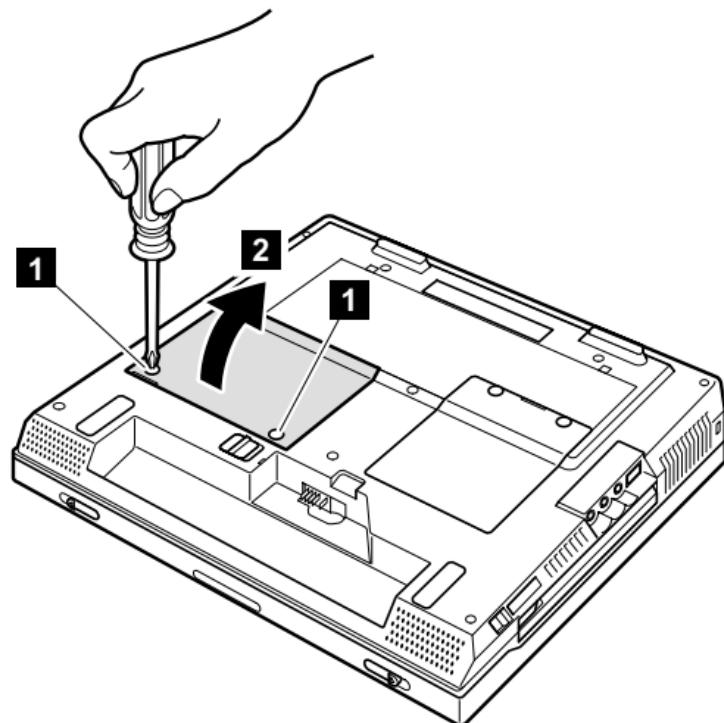
When installing: With the notched end of the card toward the socket, insert the card into the socket, and then press it firmly. Pivot the card until it snaps into place. Make sure that the card is firmly fixed in the slot and does not move easily.

1030 Communication daughter card (CDC)

For access, remove this FRU:

- “1010 Battery pack” on page 61

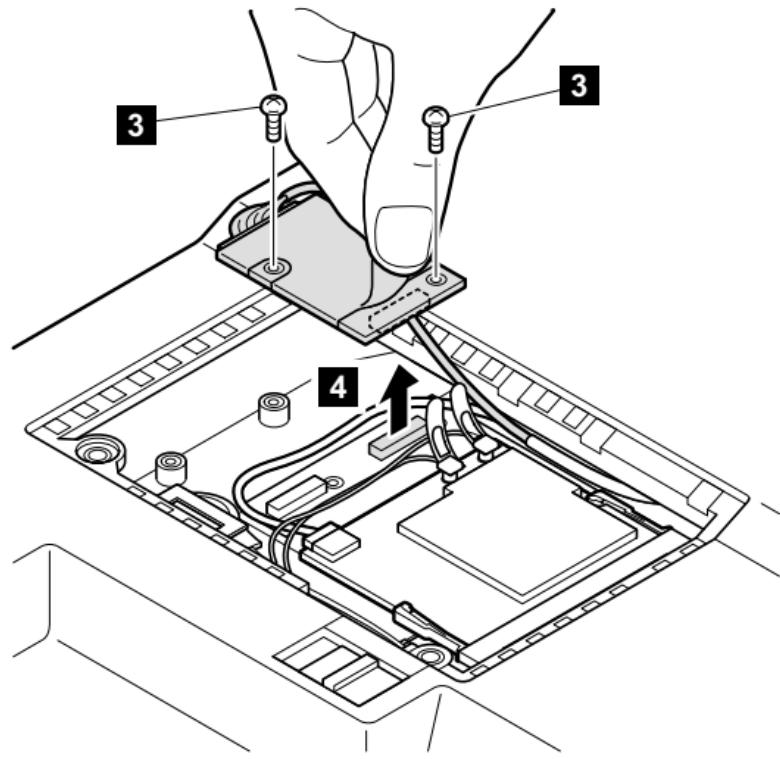
Note: Loosen the screws **1**, but do not remove them.



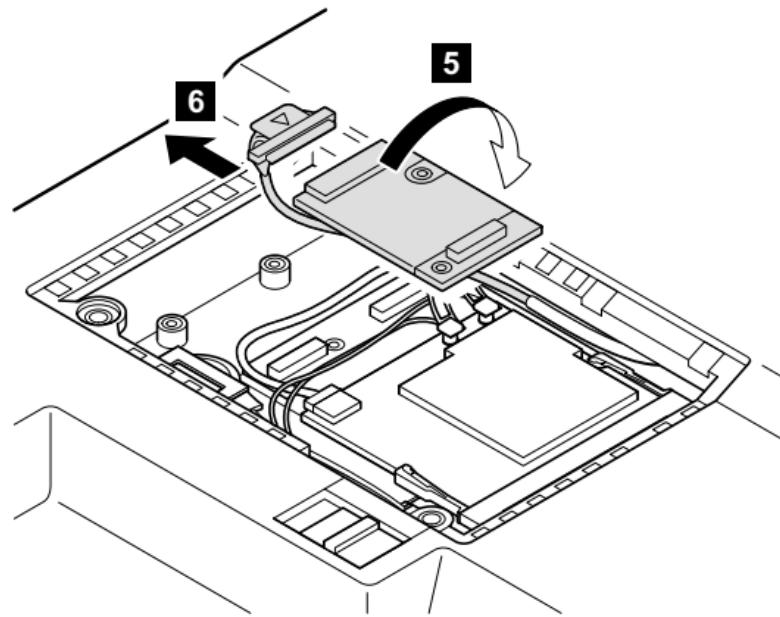
(continued)

Ethernet daughter card

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

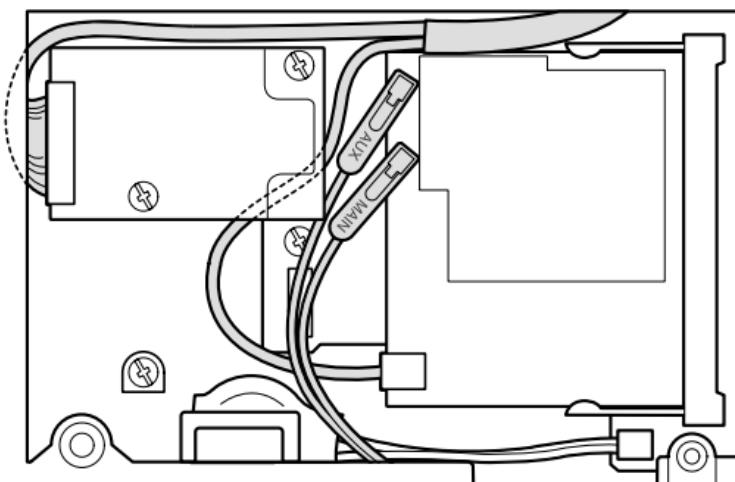


Step	Screw (quantity)	Torque
3	CDC screw (2)	0.392 Nm (4 kgfcm)



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

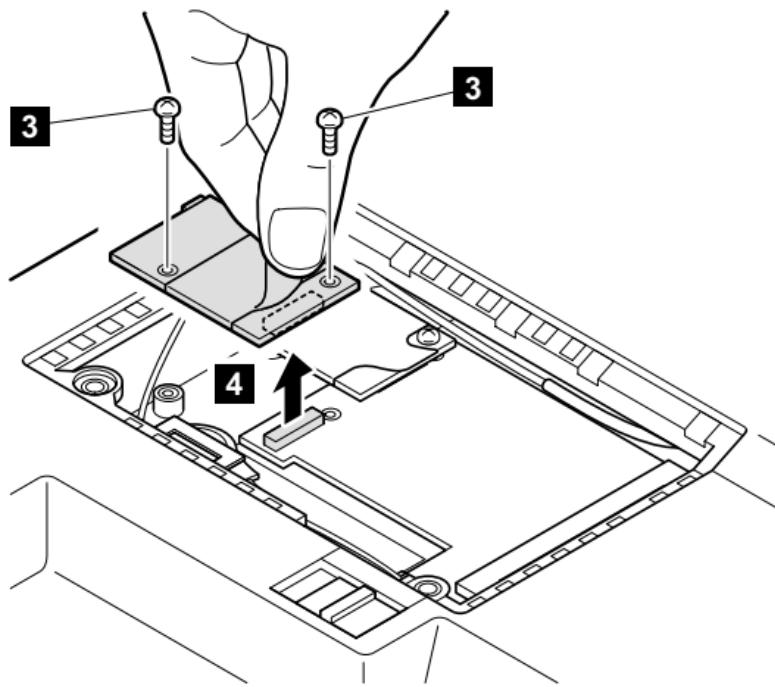
Cable routing: When attaching the Ethernet daughter card, route the cable as this figure.



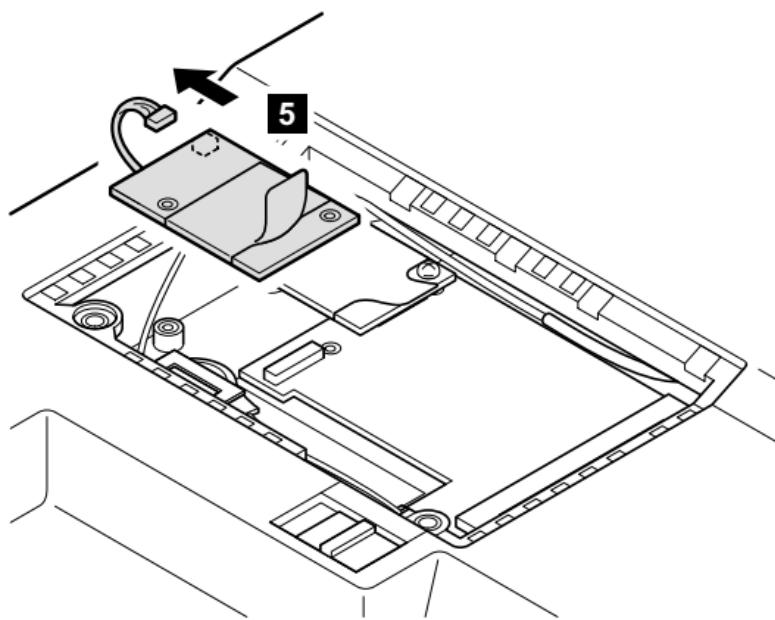
Removing and replacing a FRU

Modem daughter card

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

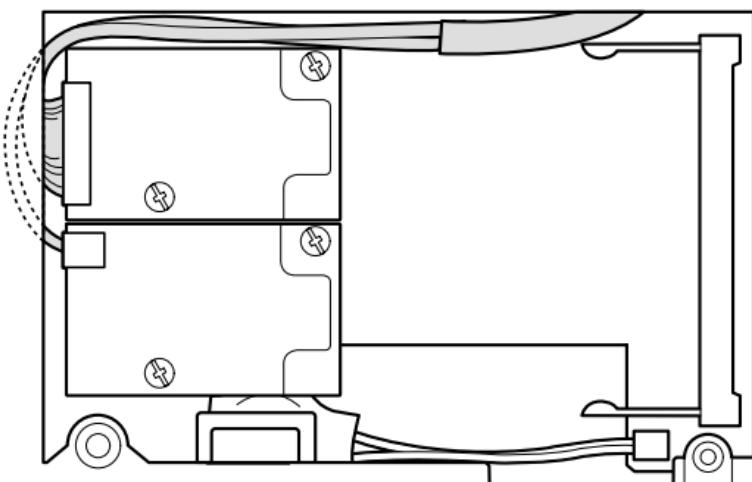


Step	Screw (quantity)	Torque
3	CDC screw (2)	0.392 Nm (4 kgfcm)



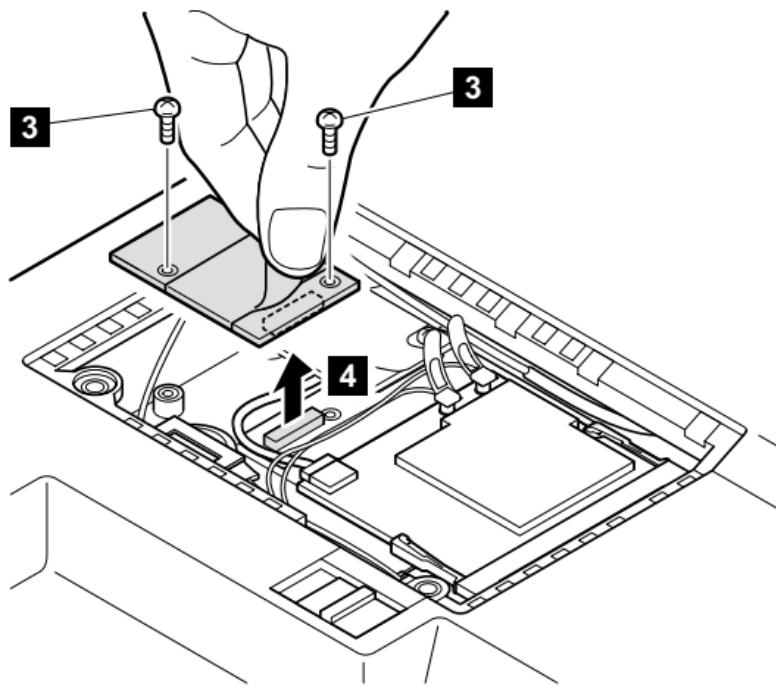
When installing: Make sure that connectors **4** and **6** are firmly attached.

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

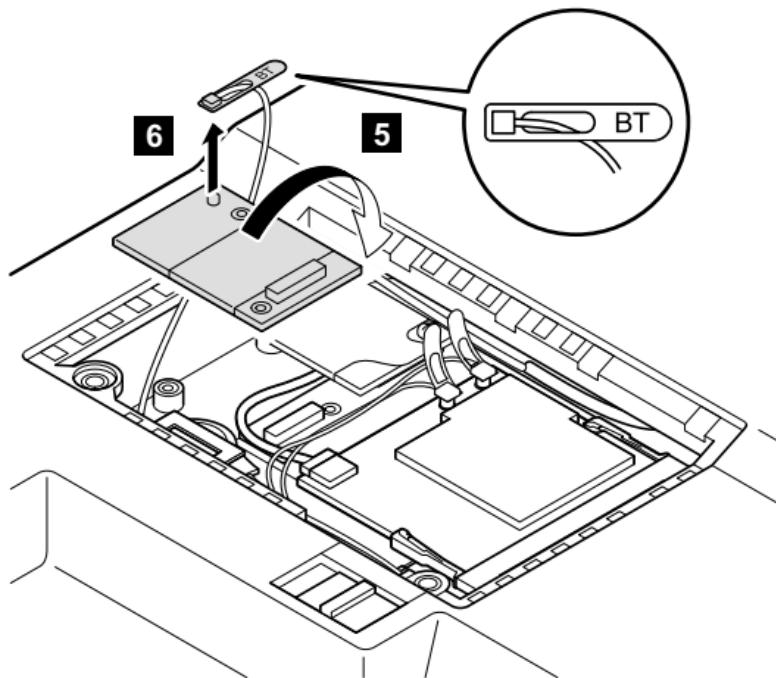


Bluetooth daughter card

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



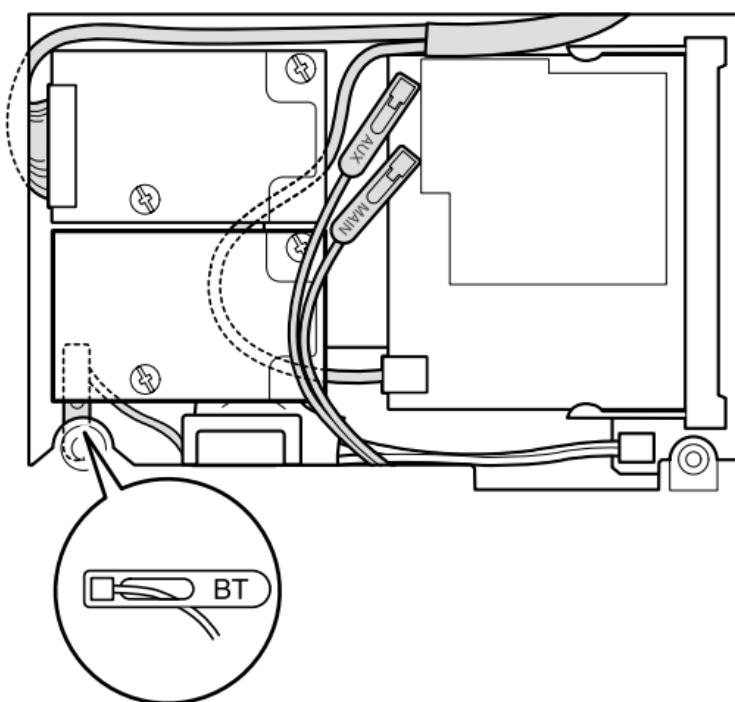
Step	Screw (quantity)	Torque
3	CDC screw (2)	0.392 Nm (4 kgfcm)



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.

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



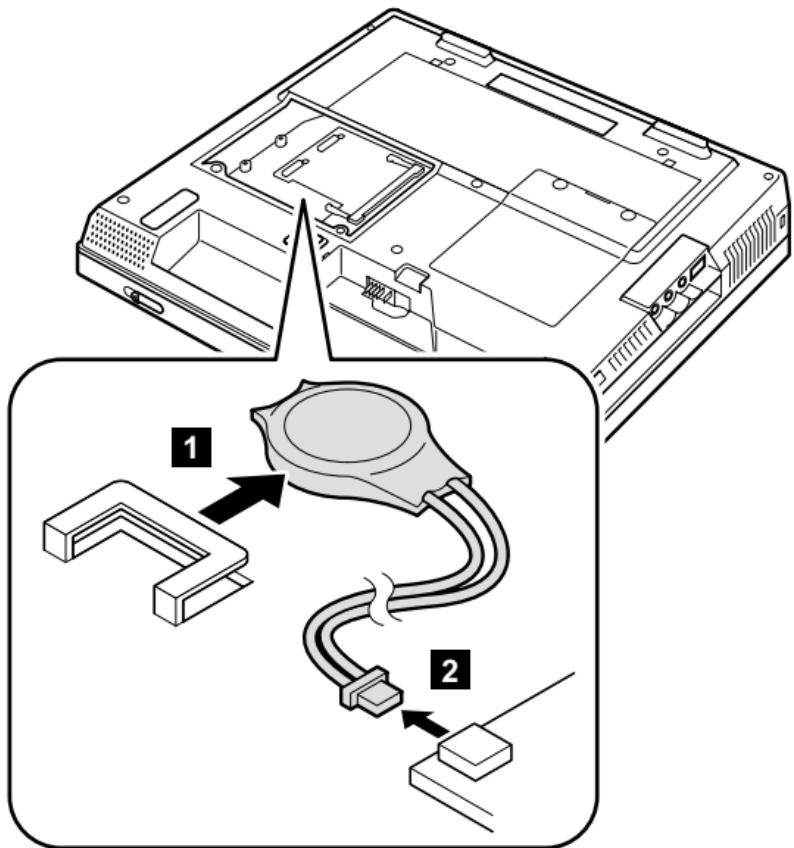
1040 Backup battery

DANGER

The 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 61
- “1030 Communication daughter card (CDC)” on page 65

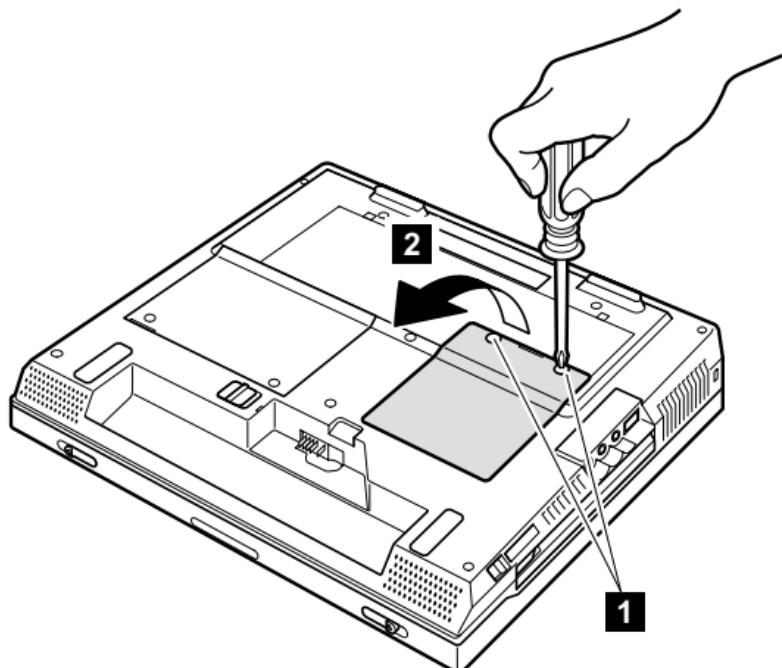


1050 DIMM

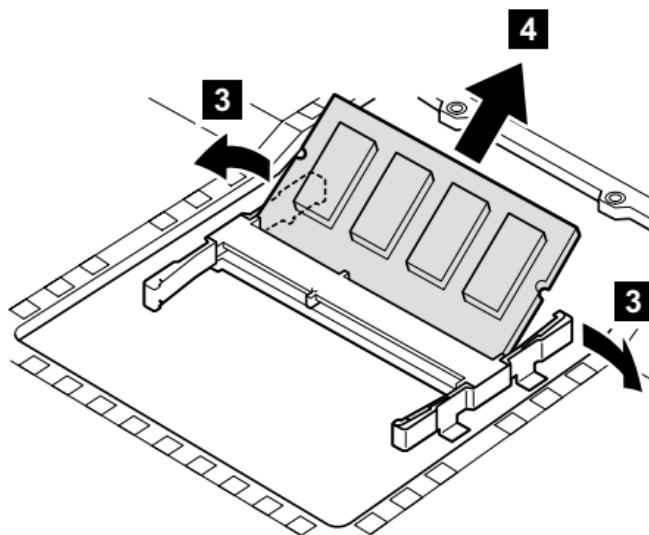
For access, remove this FRU:

- “1010 Battery pack” on page 61

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

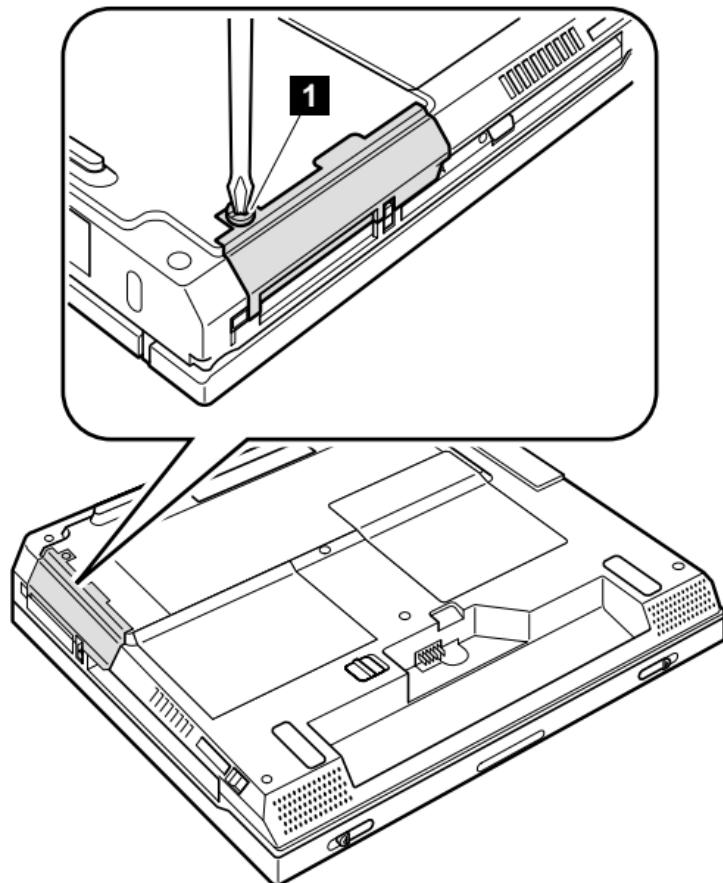
Do not drop or apply any shock to the hard-disk drive. The hard-disk drive is sensitive to physical shock. Incorrect handling can cause damage and permanent loss of data.

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 61

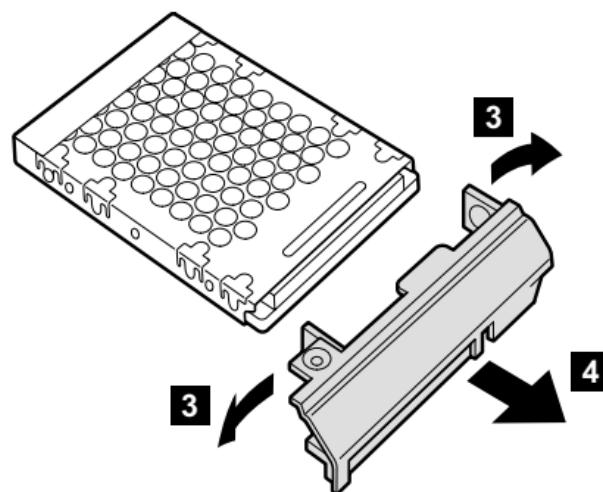
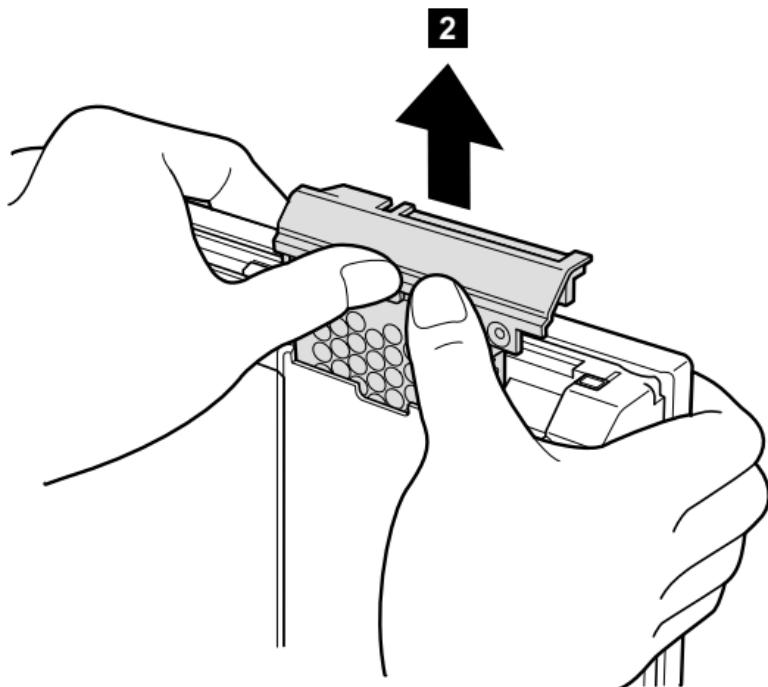


Note: The hard disk is attached to the cover.

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)



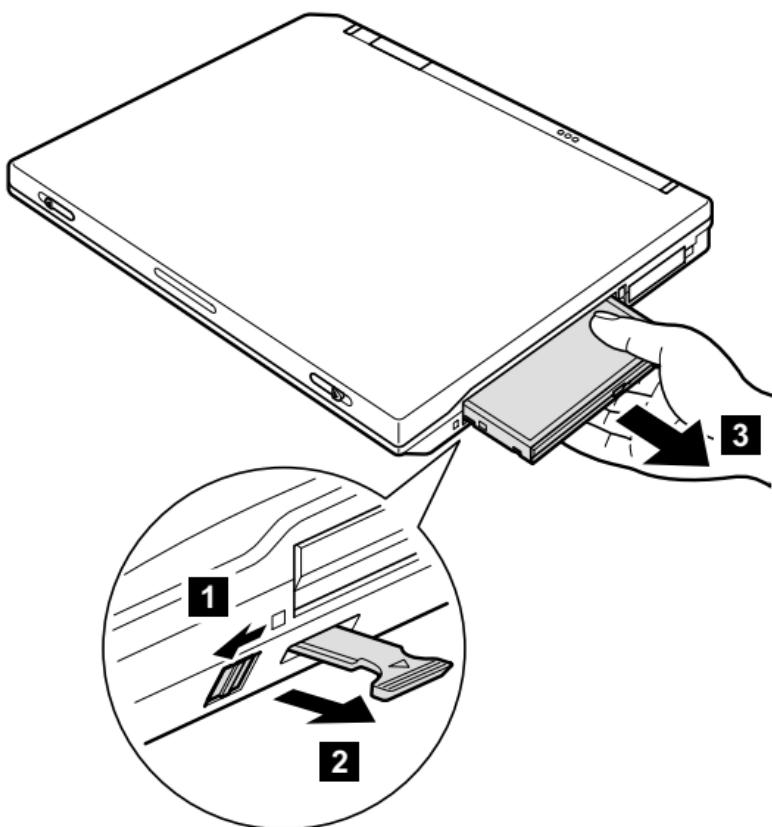
When installing: Make sure that the hard-disk connector is firmly connected.

1070 Ultrabay Plus device

Note

Ultrabay Plus does not support Ultrabay 2000 battery. For supported devices, see “Optional FRUs” on page 179. 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.

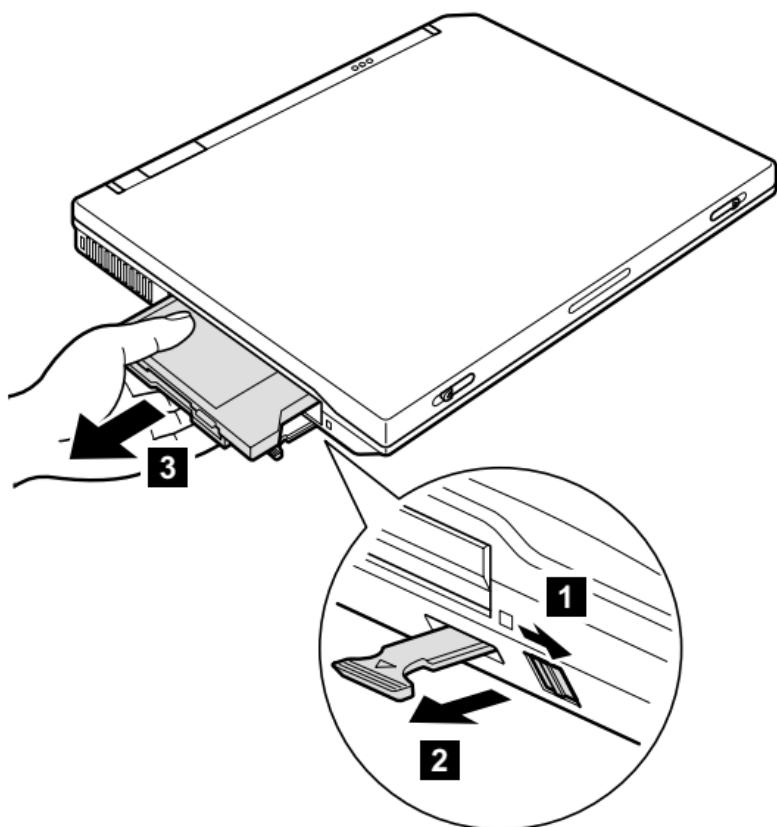


1080 Ultrabay 2000 device

Note

Ultrabay 2000 does not support Ultrabay Plus devices. For supported devices, see “Optional FRUs” on page 179. 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.

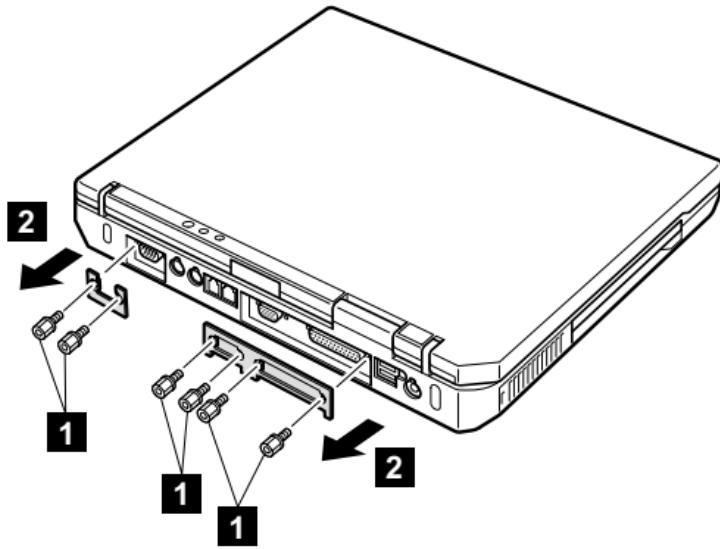


Removing and replacing a FRU

1090 I/O plate

For access, remove this FRU:

- “1010 Battery pack” on page 61

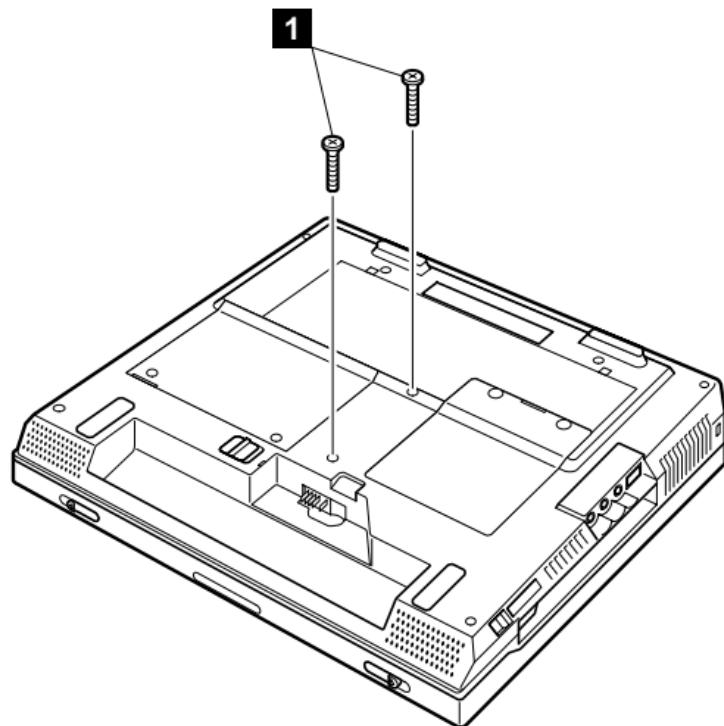


Step	Screw (quantity)	Torque
1	Hex stud (6)	0.392 Nm (4 kgfcm)

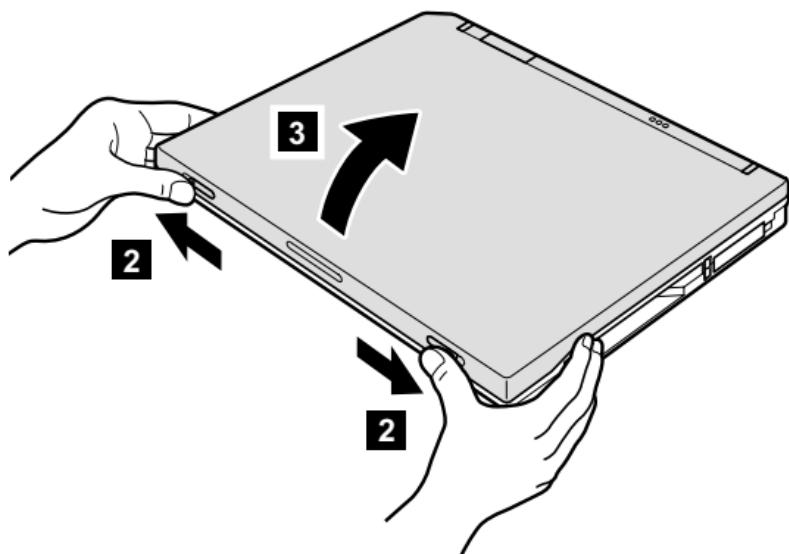
1100 Keyboard

For access, remove these FRUs, in order:

- “1010 Battery pack” on page 61
- “1070 Ultrabay Plus device” on page 76
- “1080 Ultrabay 2000 device” on page 77



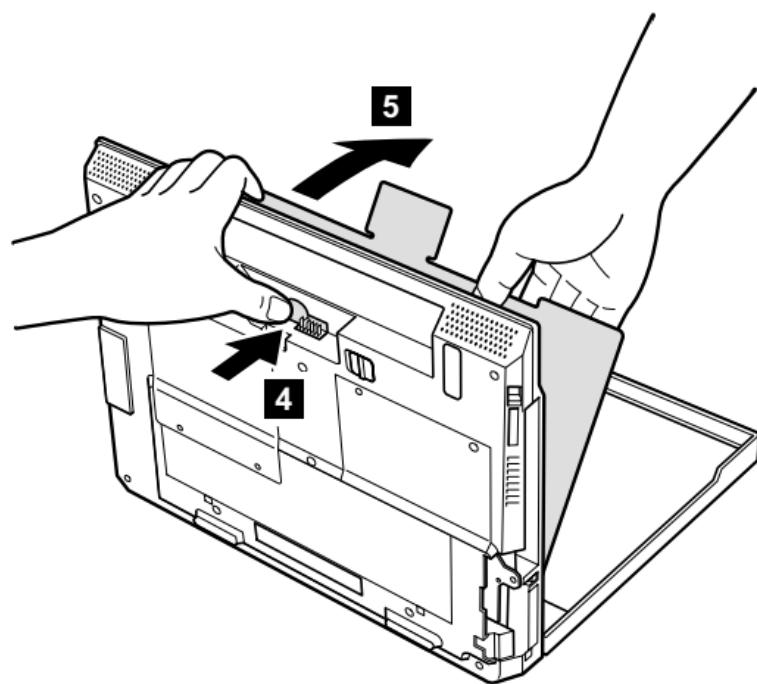
Step	Screw (quantity)	Torque
1	M2.5 × 16 mm, nylon-coated (2)	0.392 Nm (4 kgfcm)



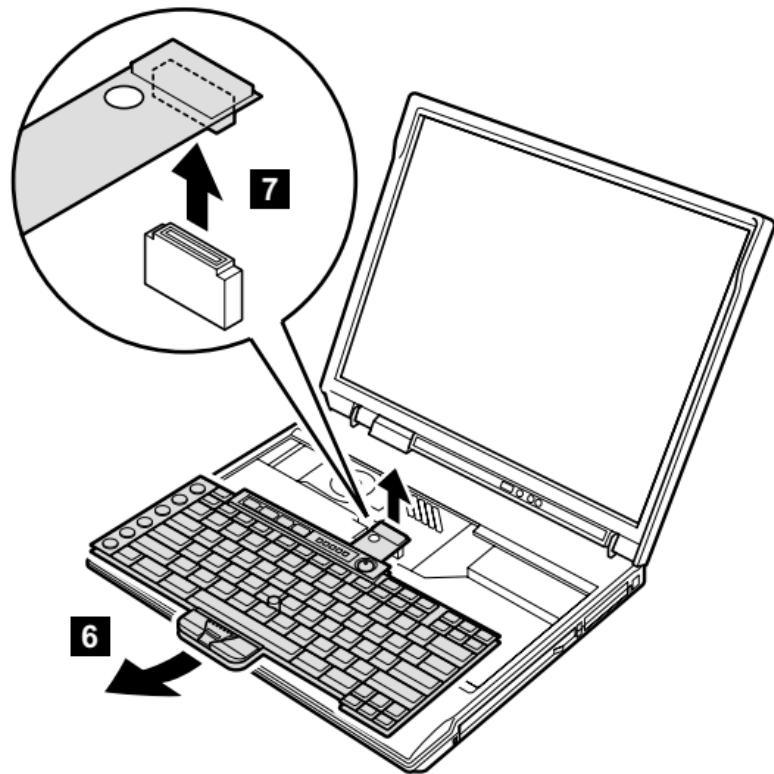
(continued)

Removing and replacing a FRU

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

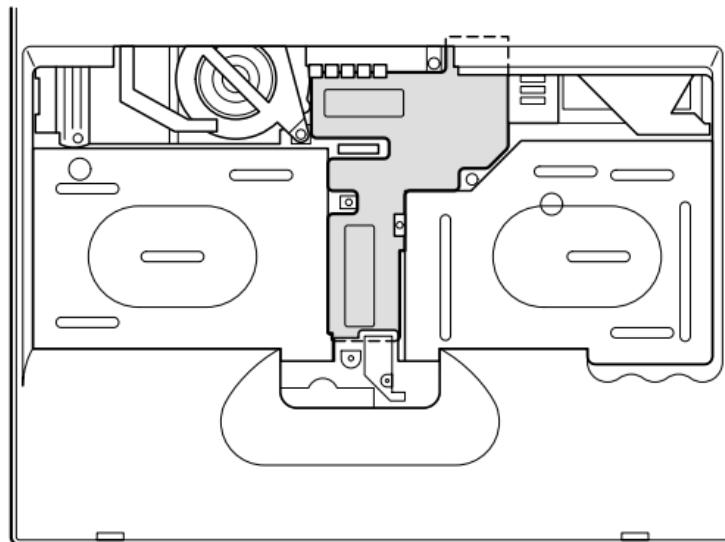


In step **6** , draw the keyboard a little in the direction of the arrow, and then detach the connector **7** .



Before installing the keyboard

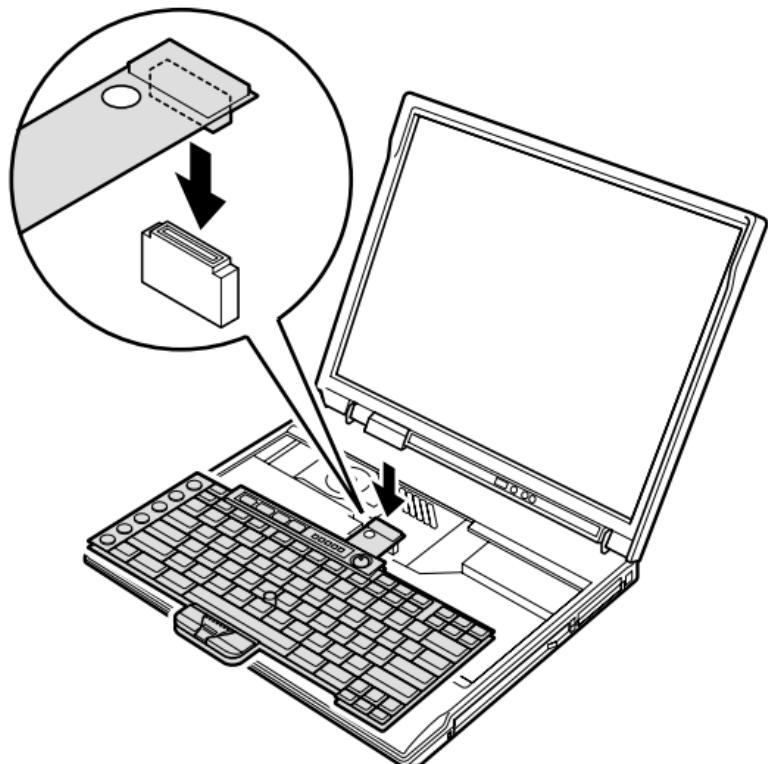
Some keyboard CRU insulators are not fixed with an adhesive tape and are easily moved. For those insulators, make sure that the keyboard CRU insulator is placed as in following figure. If the keyboard CRU insulator is not placed firmly, the keyboard cannot be installed properly.



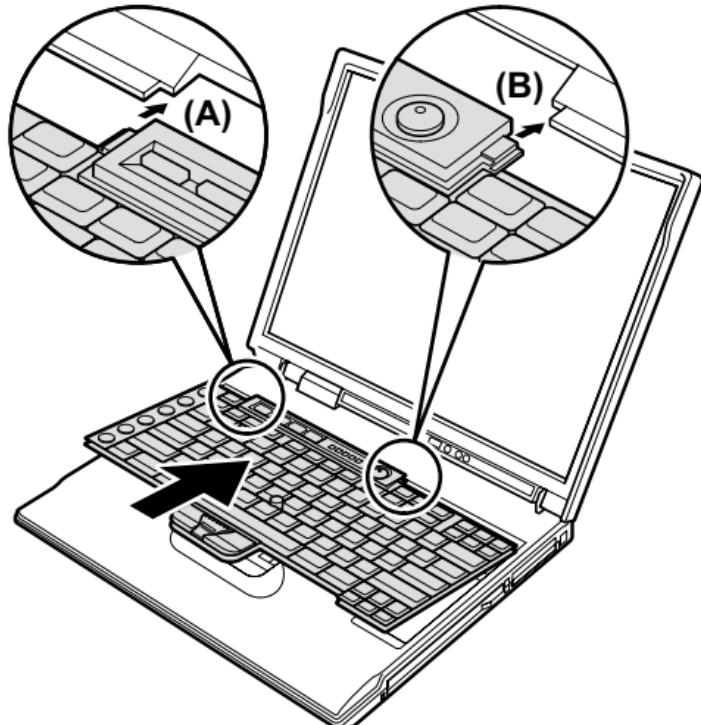
Removing and replacing a FRU

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

1. Attach the connector.

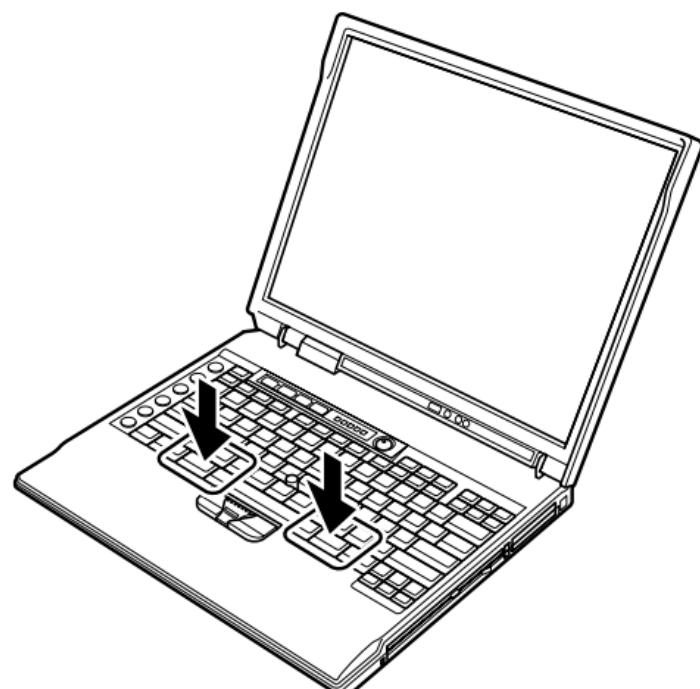


2. Make sure that the keyboard edges, shown in the figure as **(A)** and **(B)**, are under the frame.

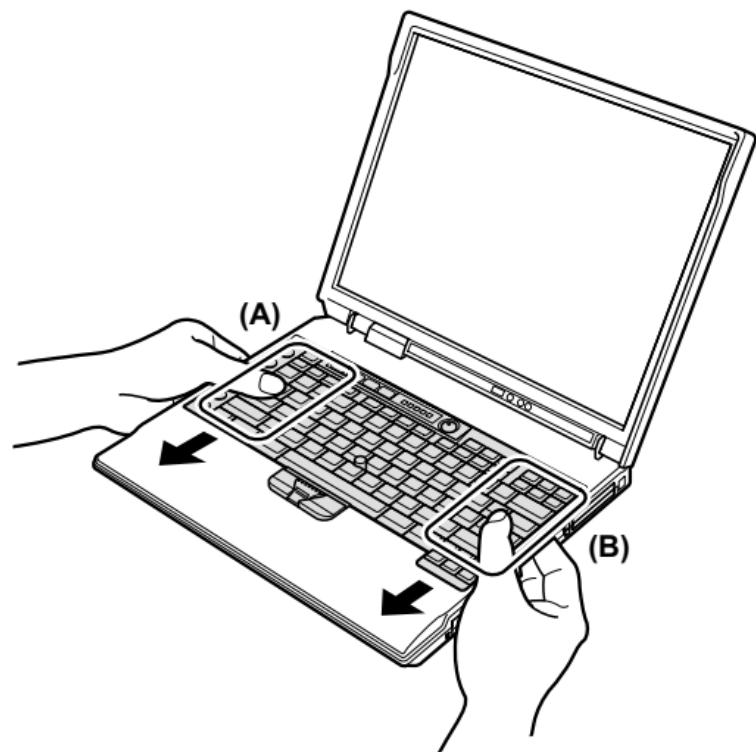


(continued)

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.



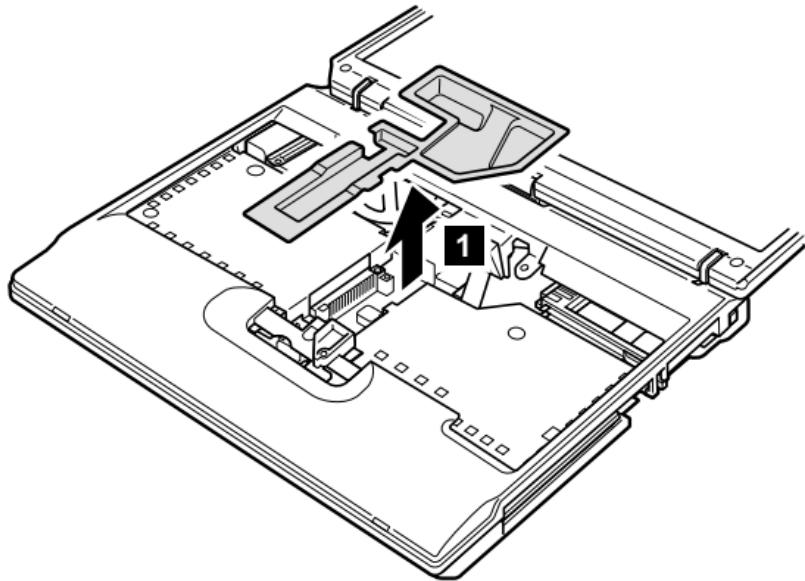
5. Replace the screws, using the new screws provided with the keyboard.

1110 Keyboard CRU insulator

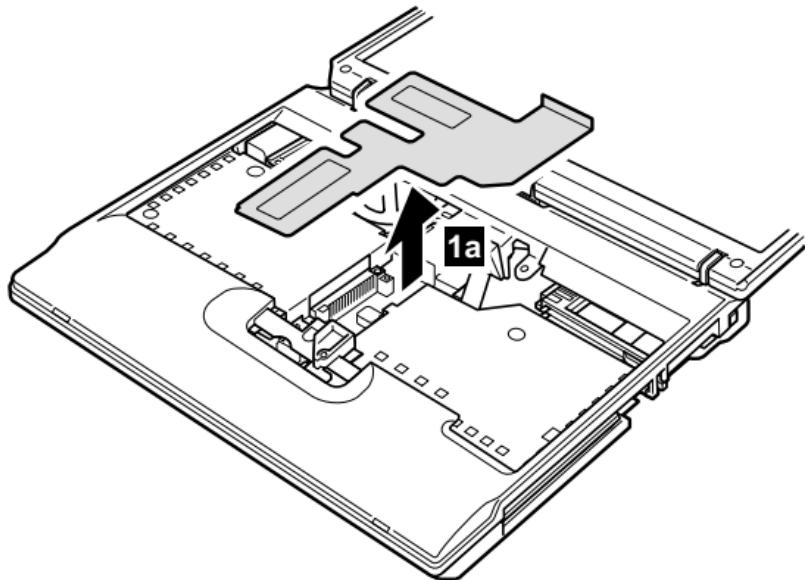
For access, remove these FRUs, in order:

- “1010 Battery pack” on page 61
- “1070 Ultrabay Plus device” on page 76
- “1080 Ultrabay 2000 device” on page 77
- “1100 Keyboard” on page 79

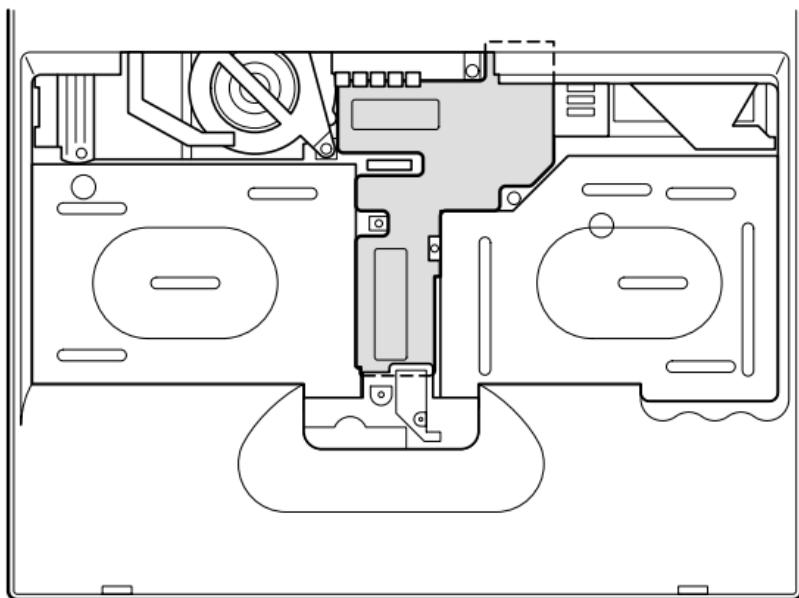
Keyboard CRU insulator **1** is fixed with an adhesive tape.



Keyboard CRU insulator **1a** is not fixed with an adhesive tape.



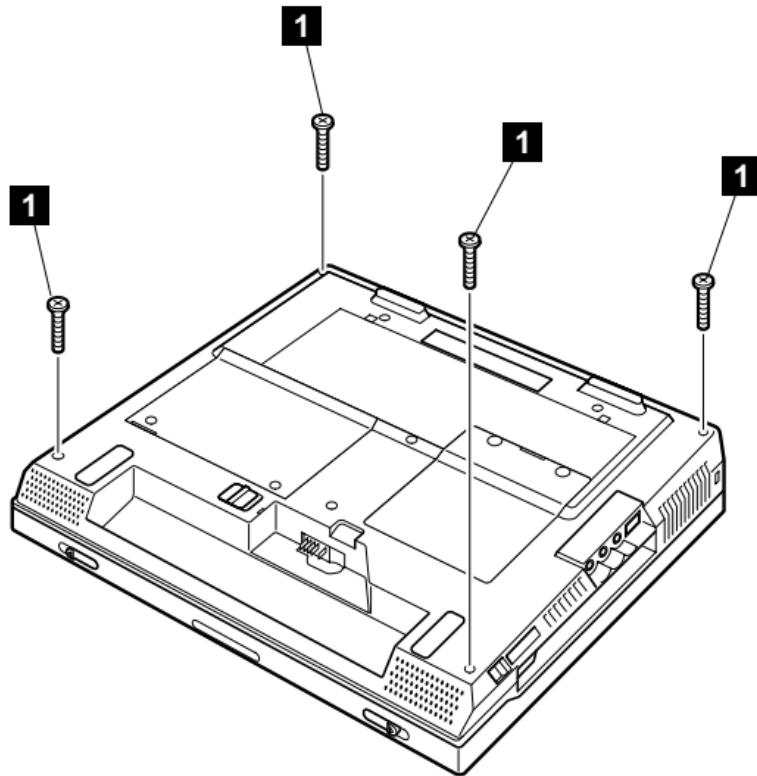
When installing: Some keyboard CRU insulators are not fixed with an adhesive tape and are easily moved. For those insulators, make sure that the keyboard CRU insulator is placed as in following figure. If the keyboard CRU insulator is not placed firmly, the keyboard cannot be installed properly.



1120 Keyboard bezel

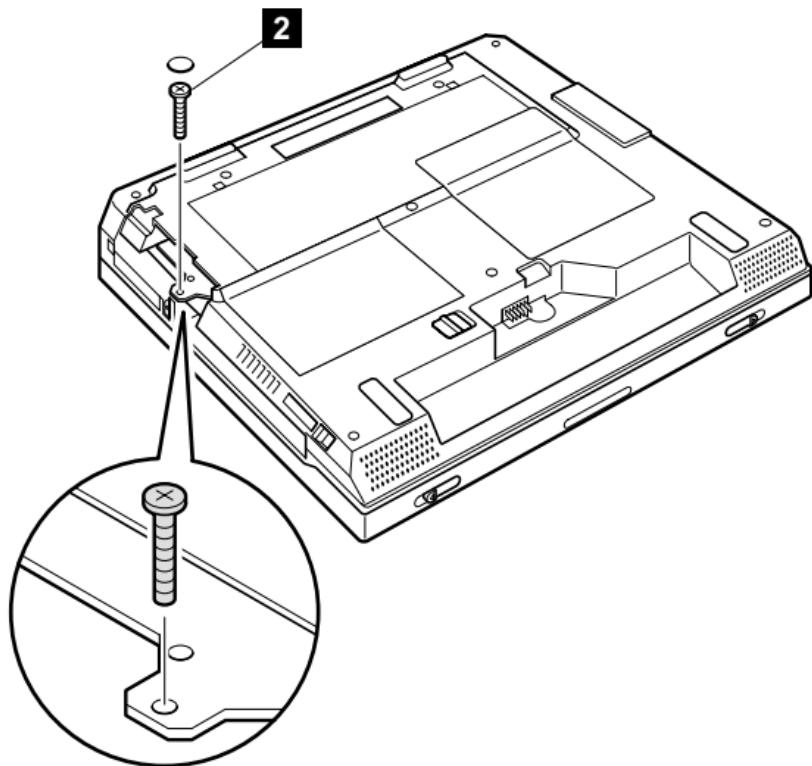
For access, remove these FRUs, in order:

- “1010 Battery pack” on page 61
- “1070 Ultrabay Plus device” on page 76
- “1080 Ultrabay 2000 device” on page 77
- “1100 Keyboard” on page 79
- “1110 Keyboard CRU insulator” on page 84



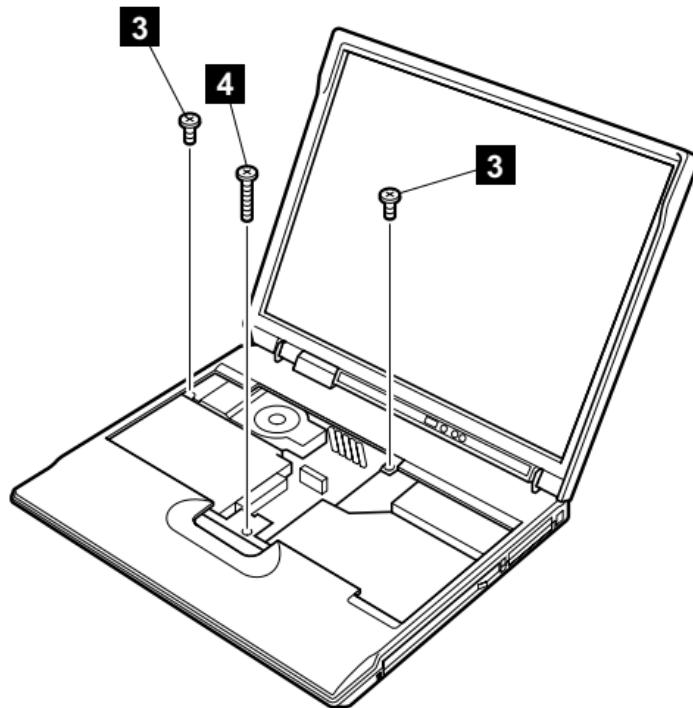
Step	Screw (quantity)	Torque
1	M2.5 x 16 mm, nylon-coated (4)	0.392 Nm (4 kgfcm)

(continued)



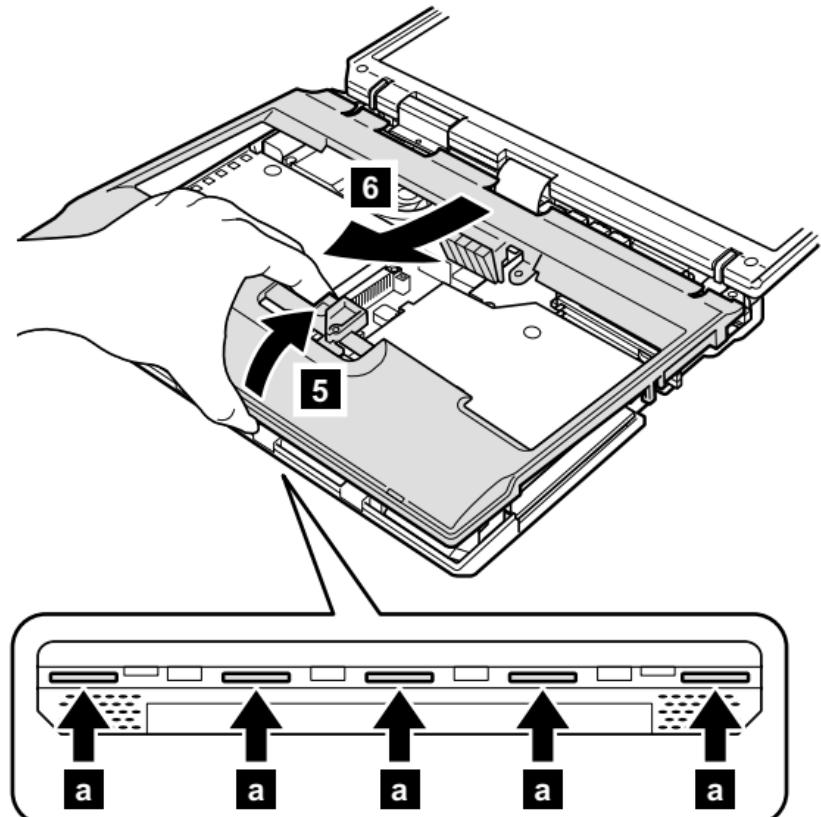
Step	Screw (quantity)	Torque
2	M2 x 15 mm, nylon-coated (1)	0.245 Nm (2.5 kgfcm)

(continued)



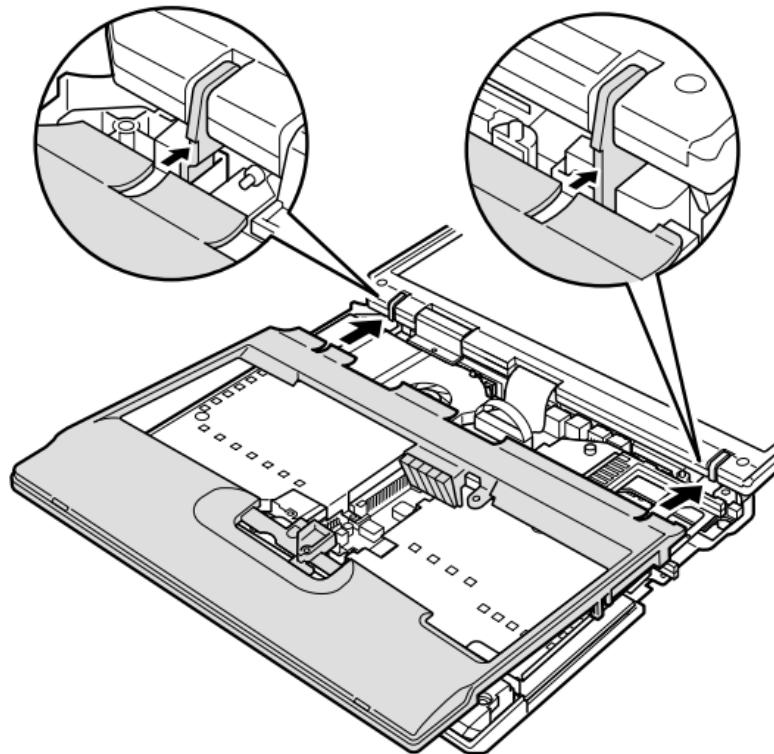
Step	Screw (quantity)	Torque
3	M2.5 × 4.8 mm, nylon-coated (2)	0.392 Nm (4 kgfcm)
4	M2.5 × 19.5 mm, nylon-coated (1)	0.392 Nm (4 kgfcm)

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.

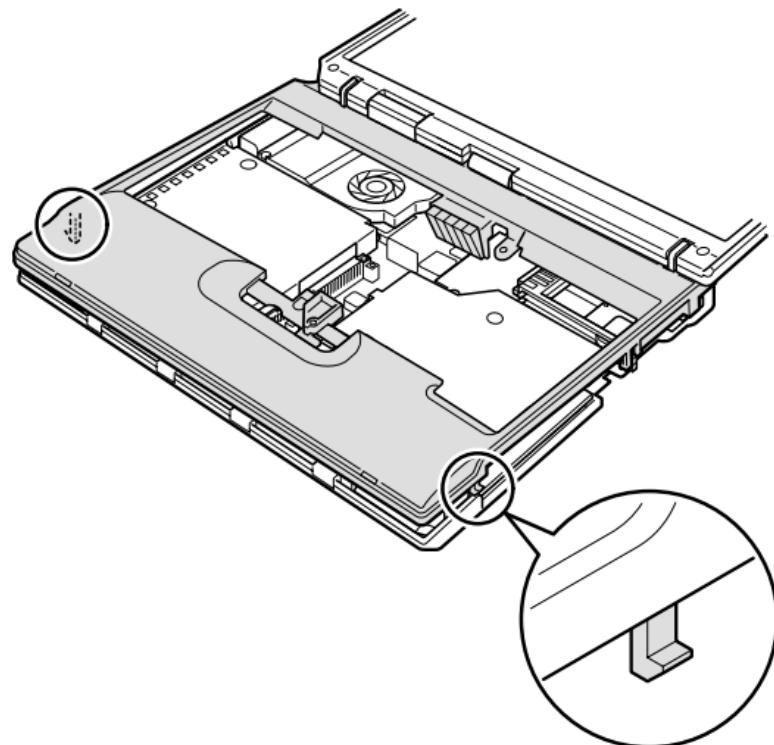


When installing the keyboard bezel, do the following:

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



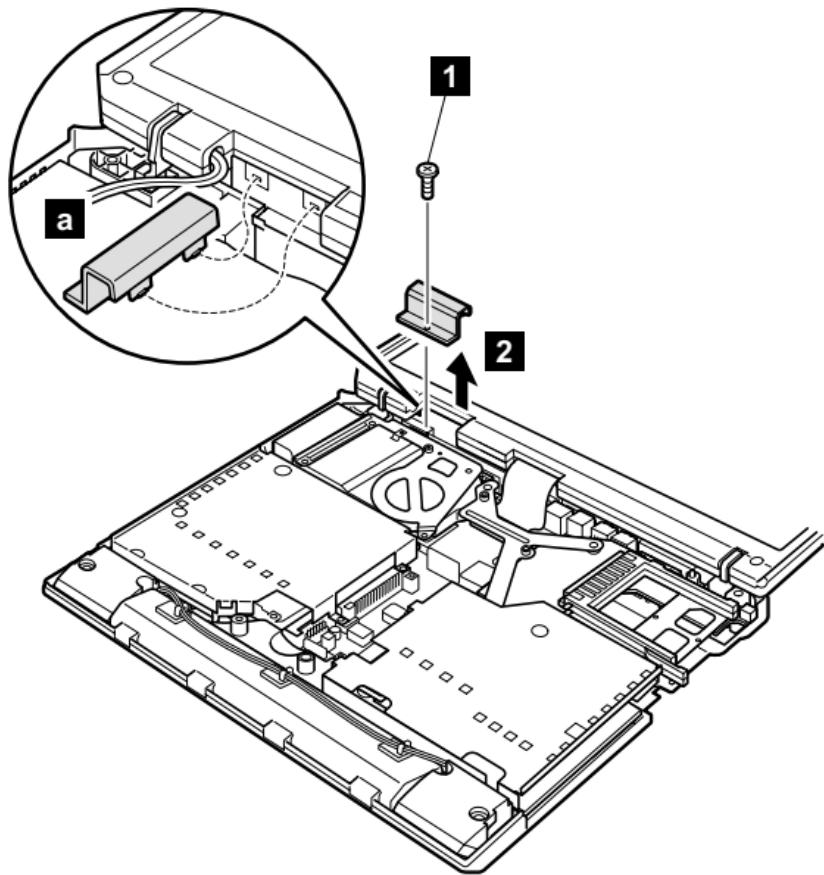
2. Make sure that all of the latches on the front side of the computer (**a** in removal step **5**) are firmly attached.
3. Make sure that both the left and right latches on the bottom side of the bezel are firmly attached.



1130 Hinge cover

For access, remove these FRUs, in order:

- “1010 Battery pack” on page 61
- “1070 Ultrabay Plus device” on page 76
- “1080 Ultrabay 2000 device” on page 77
- “1100 Keyboard” on page 79
- “1110 Keyboard CRU insulator” on page 84
- “1120 Keyboard bezel” on page 86



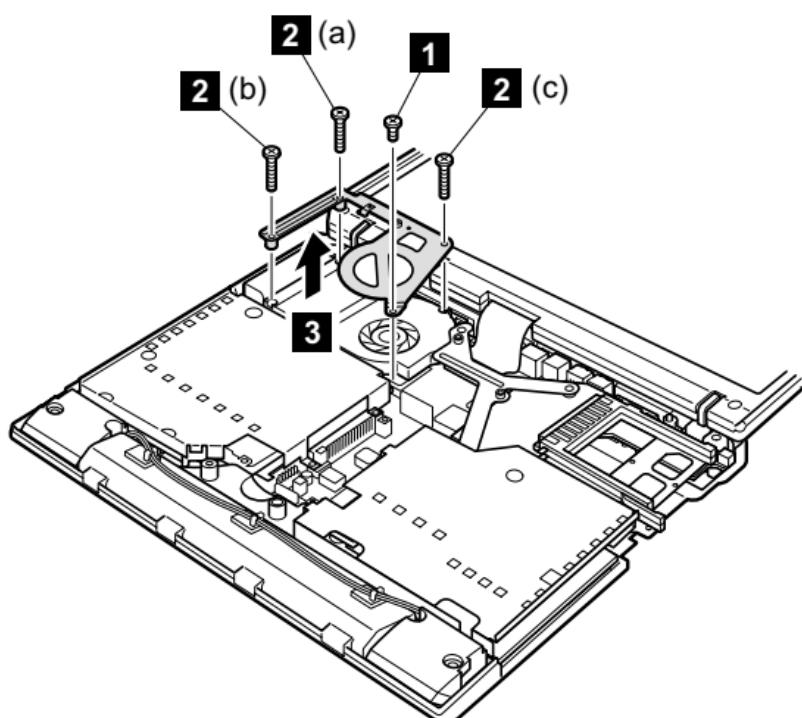
Step	Screw (quantity)	Torque
1	M2.5 x 4.8 mm, nylon-coated (2)	0.392 Nm (4 kgfcm)

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**)

1140 Fan assembly

For access, remove these FRUs, in order:

- “1010 Battery pack” on page 61
- “1030 Communication daughter card (CDC)” on page 65
- “1040 Backup battery” on page 72
- “1060 Hard-disk drive” on page 74
- “1070 Ultrabay Plus device” on page 76
- “1080 Ultrabay 2000 device” on page 77
- “1100 Keyboard” on page 79
- “1110 Keyboard CRU insulator” on page 84
- “1120 Keyboard bezel” on page 86
- “1130 Hinge cover” on page 90

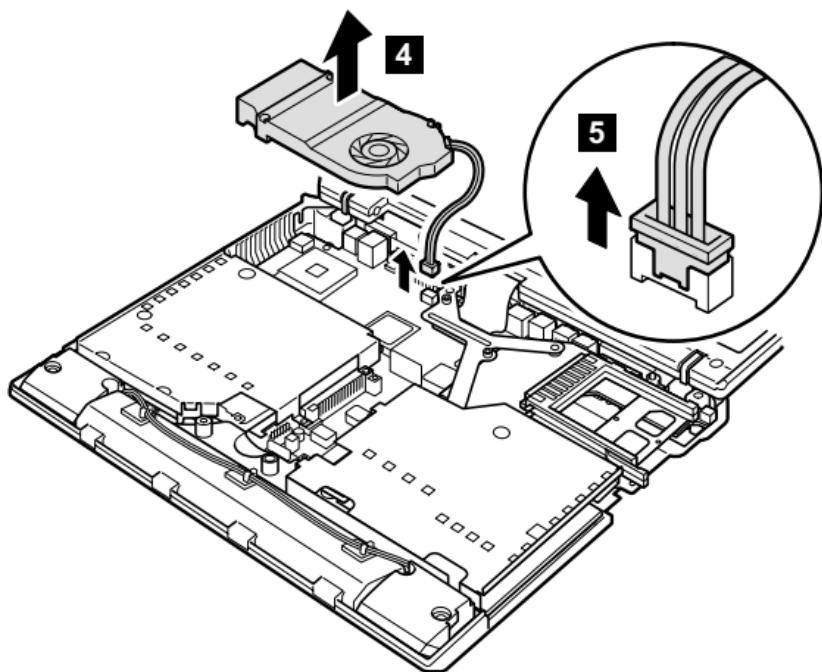


Step	Screw (quantity)	Torque
1	M2.5 × 4.8 mm, nylon-coated (1)	0.392 Nm (4 kgfcm)
2	M2 × 15 mm, nylon-coated (3)	0.245 Nm (2.5 kgfcm)

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.

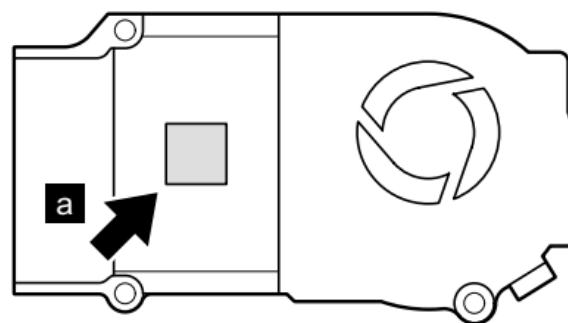
(continued)



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.



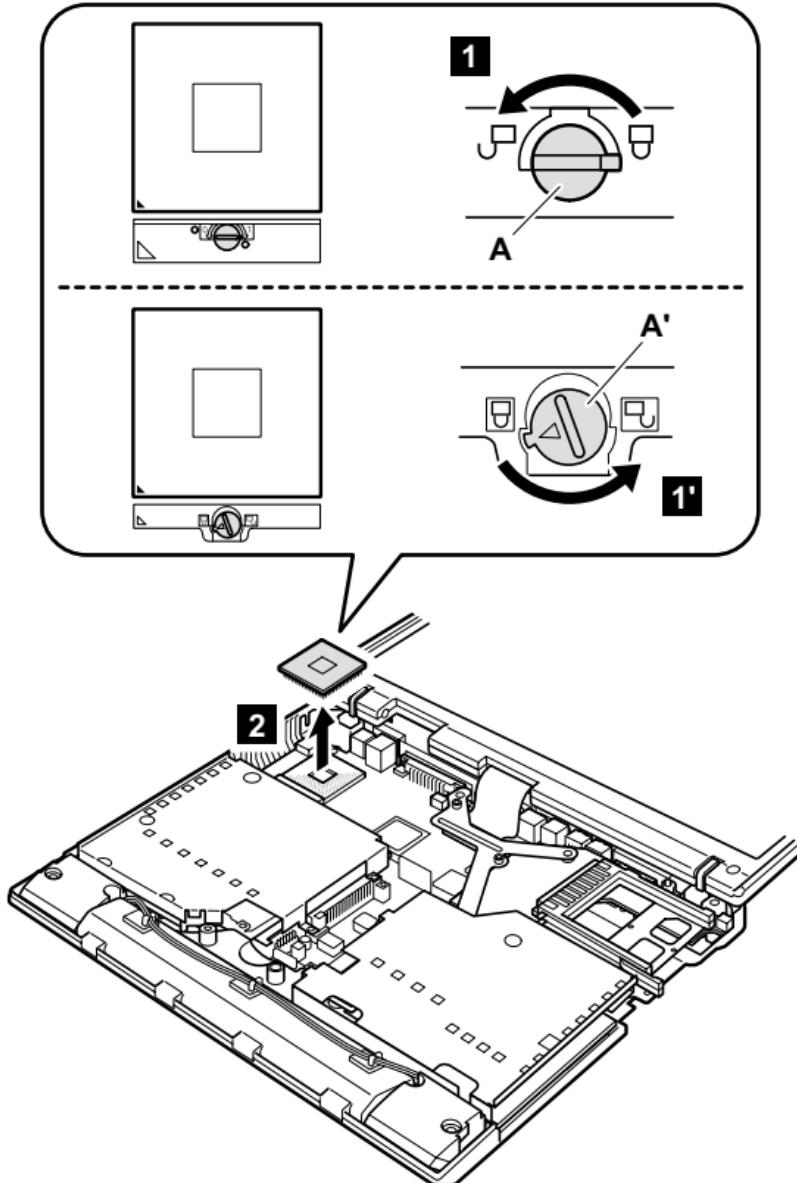
1150 CPU

For access, remove these FRUs, in order:

- “1010 Battery pack” on page 61
- “1030 Communication daughter card (CDC)” on page 65
- “1040 Backup battery” on page 72
- “1060 Hard-disk drive” on page 74
- “1070 Ultrabay Plus device” on page 76
- “1080 Ultrabay 2000 device” on page 77
- “1100 Keyboard” on page 79
- “1110 Keyboard CRU insulator” on page 84
- “1120 Keyboard bezel” on page 86
- “1130 Hinge cover” on page 90
- “1140 Fan assembly” on page 91

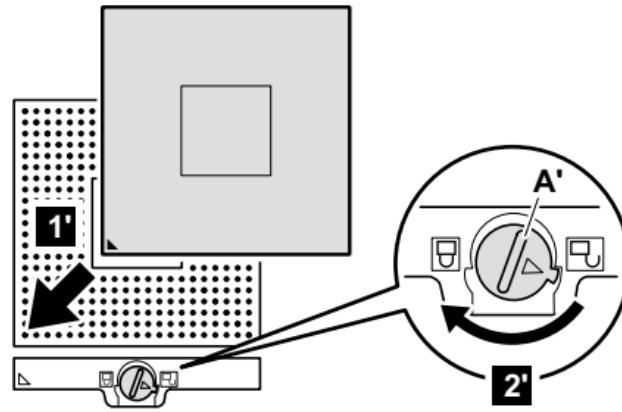
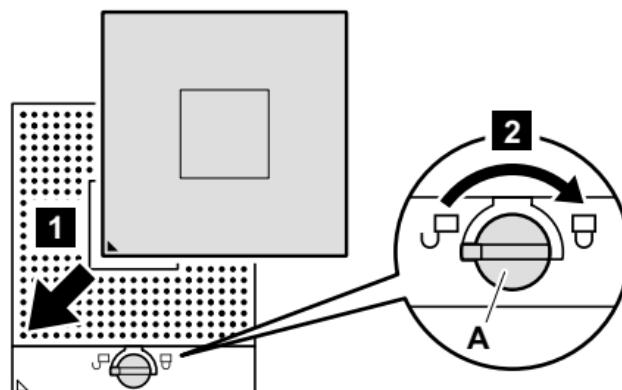
Note: There are two types of CPU socket. Confirm the socket type of the computer first.

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

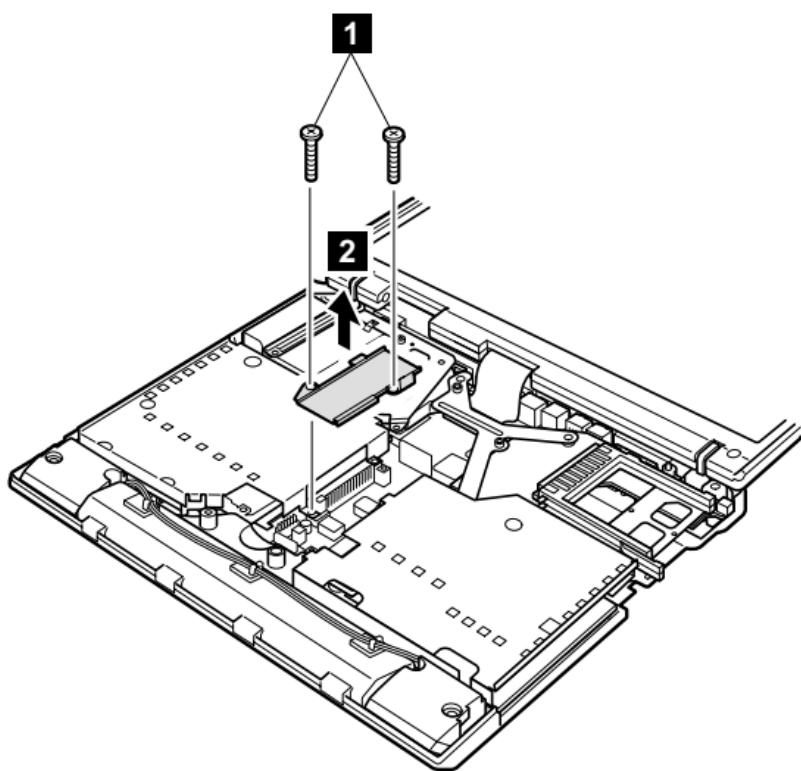
When installing: Place the CPU on the CPU socket (1), and then rotate the head of the screw (A) in the direction of arrow 2 to lock the CPU.



1160 Ultrabay Plus slot

For access, remove these FRUs, in order:

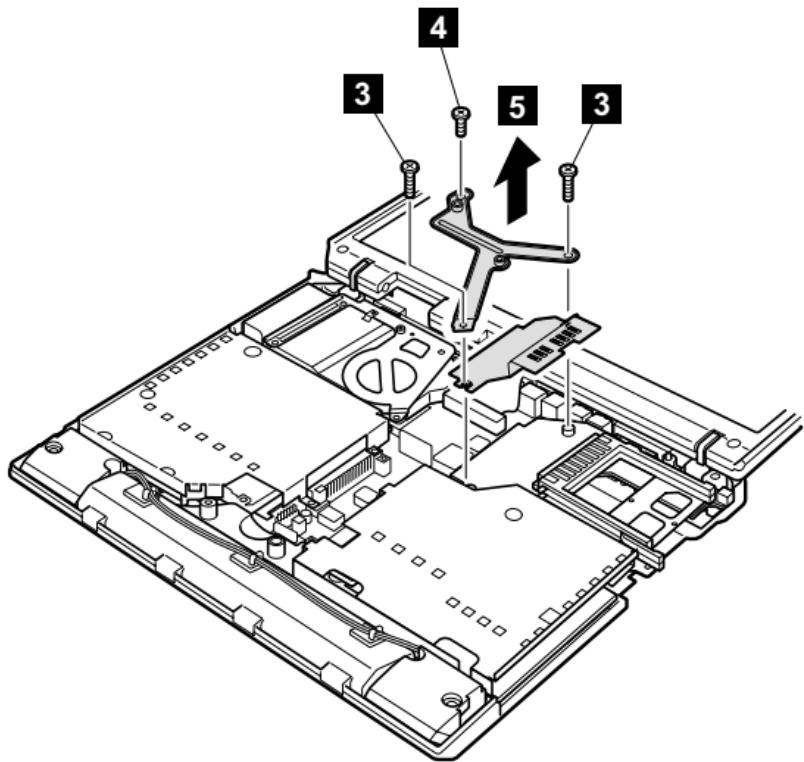
- “1010 Battery pack” on page 61
- “1030 Communication daughter card (CDC)” on page 65
- “1040 Backup battery” on page 72
- “1060 Hard-disk drive” on page 74
- “1070 Ultrabay Plus device” on page 76
- “1080 Ultrabay 2000 device” on page 77
- “1100 Keyboard” on page 79
- “1110 Keyboard CRU insulator” on page 84
- “1120 Keyboard bezel” on page 86



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

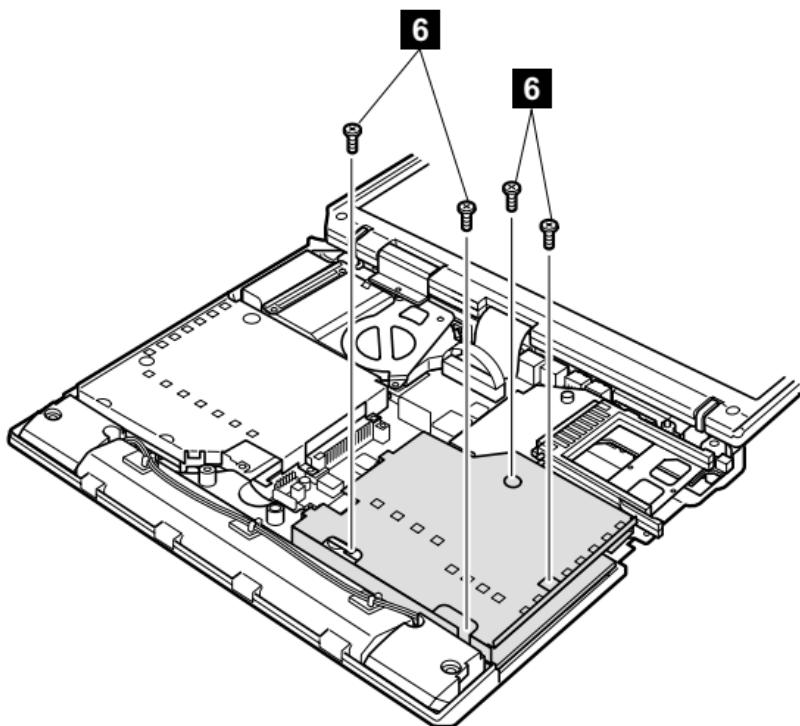
(continued)

Removing and replacing a FRU



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

(continued)

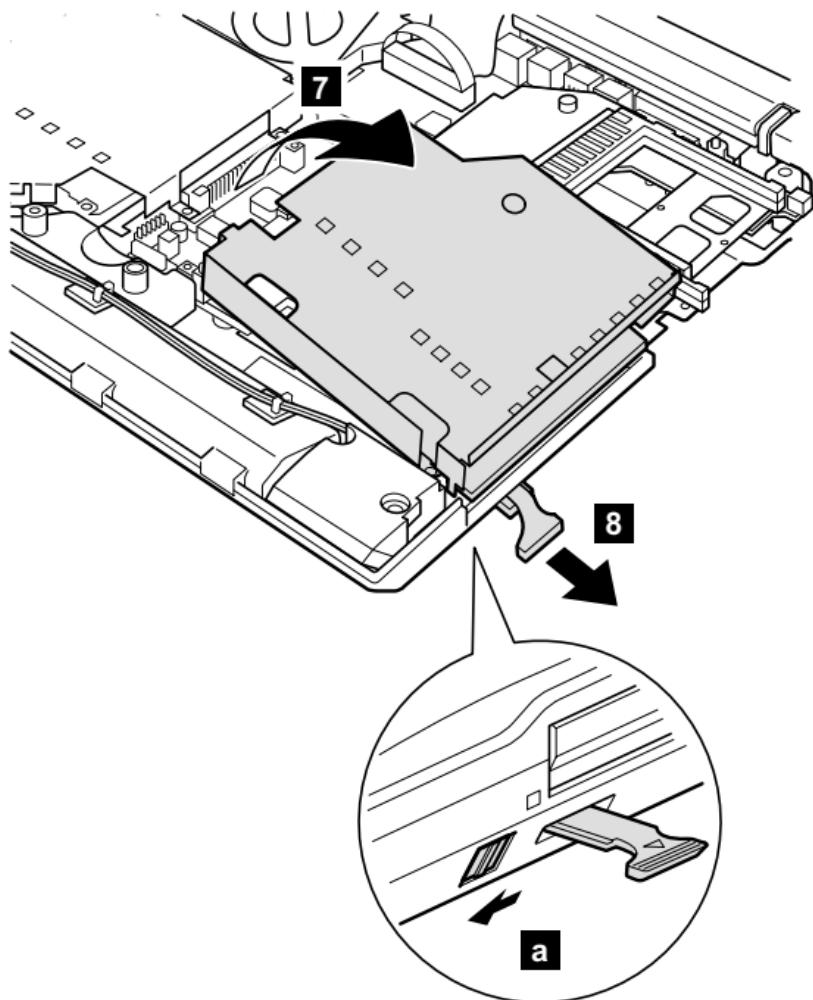


Step	Screw (quantity)	Torque
6	M2.5 × 4.8 mm, nylon-coated (4)	0.392 Nm (4 kgfcm)

(continued)

Removing and replacing a FRU

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

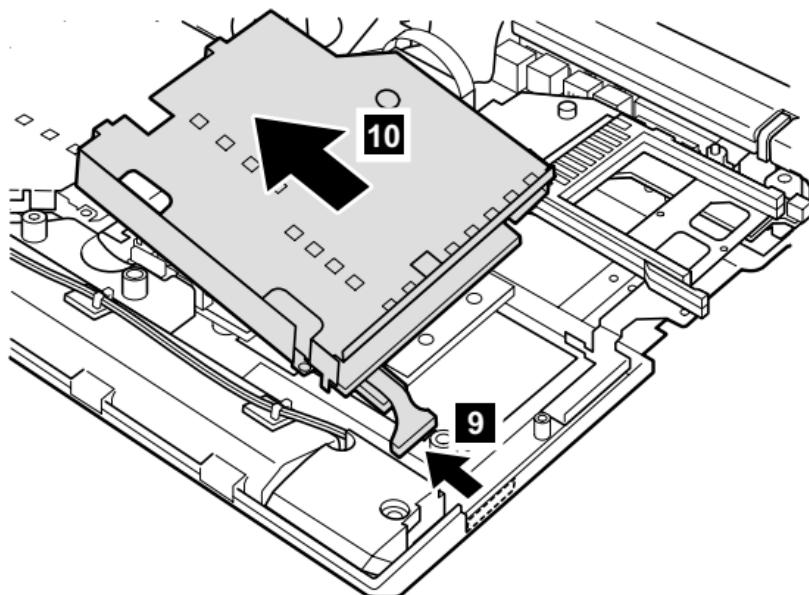


When installing: After inserting the Ultrabay release lever into the rectangular hole of base cover, slide the Ultrabay latch knob toward you until it snaps (**a**). Then attach the bay to the computer.

(continued)

Removing and replacing a FRU

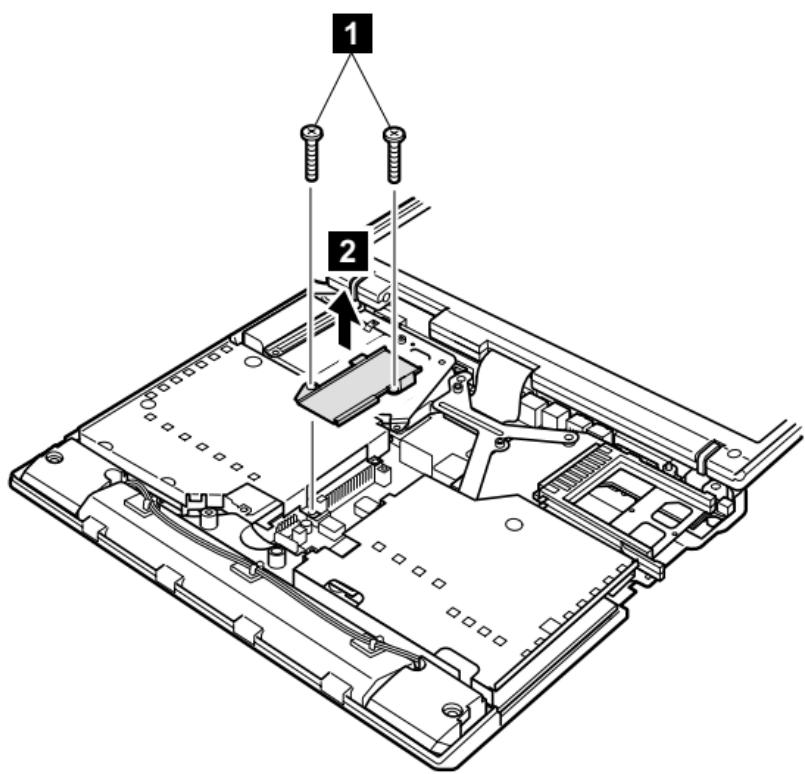
Detach the bay slot in the direction of arrow **10** , avoid damaging the Ultrabay release lever **9** .



1170 Ultrabay 2000 slot

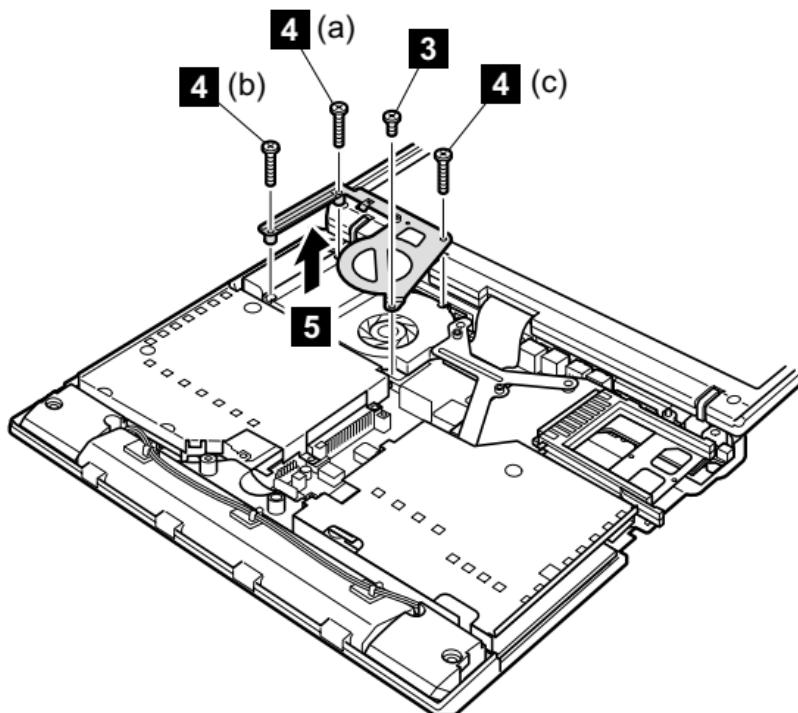
For access, remove these FRUs, in order:

- “1010 Battery pack” on page 61
- “1030 Communication daughter card (CDC)” on page 65
- “1040 Backup battery” on page 72
- “1060 Hard-disk drive” on page 74
- “1070 Ultrabay Plus device” on page 76
- “1080 Ultrabay 2000 device” on page 77
- “1100 Keyboard” on page 79
- “1110 Keyboard CRU insulator” on page 84
- “1120 Keyboard bezel” on page 86



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

(continued)



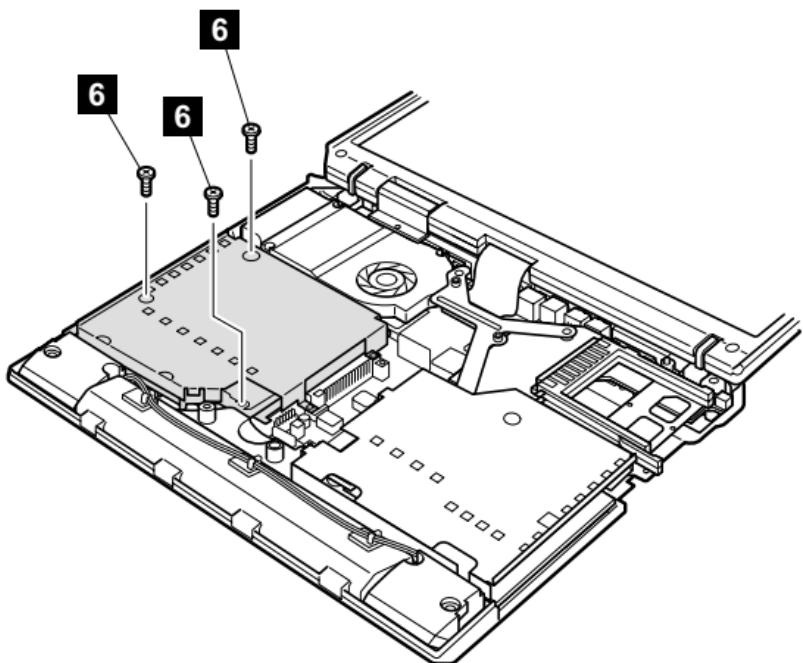
Step	Screw (quantity)	Torque
3	M2.5 × 4.8 mm, nylon-coated (1)	0.392 Nm (4 kgfcm)
4	M2 × 15 mm, nylon-coated (3)	0.245 Nm (2.5 kgfcm)

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)

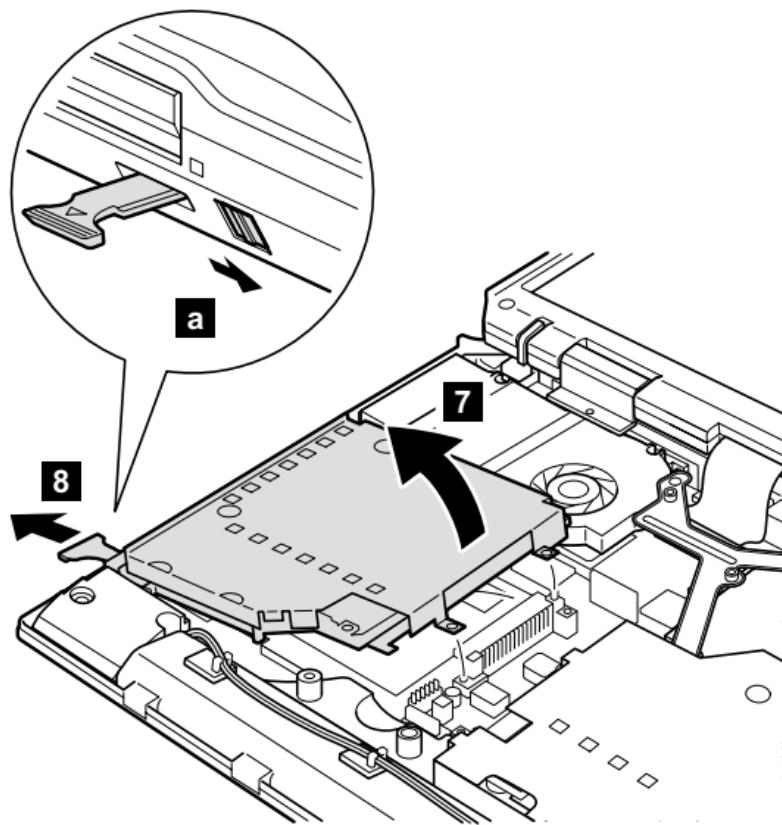
Removing and replacing a FRU



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

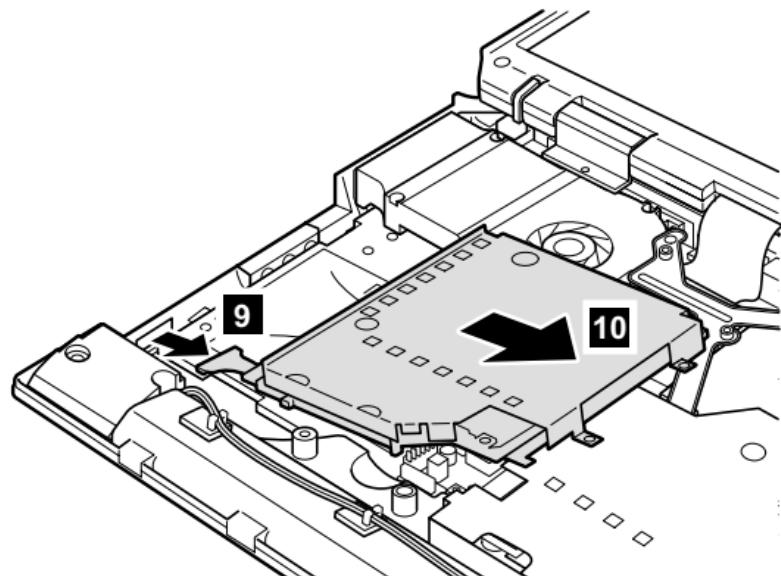
(continued)

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.

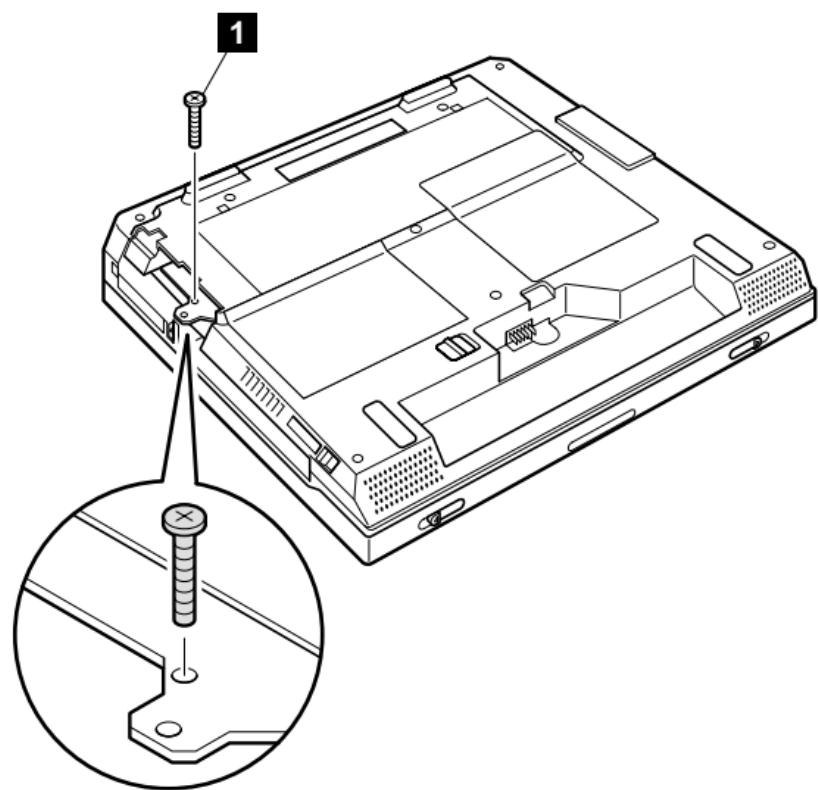
Detach the bay slot to the direction of arrow **10** , to avoid damaging the Ultrabay release lever **9** .



1180 Sub card for PC Card slot

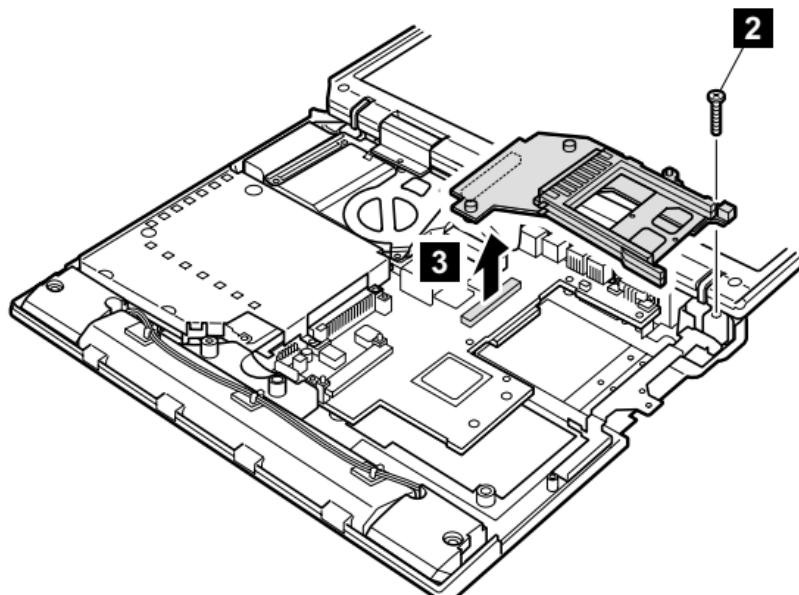
For access, remove these FRUs, in order:

- “1010 Battery pack” on page 61
- “1030 Communication daughter card (CDC)” on page 65
- “1040 Backup battery” on page 72
- “1060 Hard-disk drive” on page 74
- “1070 Ultrabay Plus device” on page 76
- “1080 Ultrabay 2000 device” on page 77
- “1100 Keyboard” on page 79
- “1110 Keyboard CRU insulator” on page 84
- “1120 Keyboard bezel” on page 86
- “1160 Ultrabay Plus slot” on page 95



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

(continued)



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

1190 Security chip

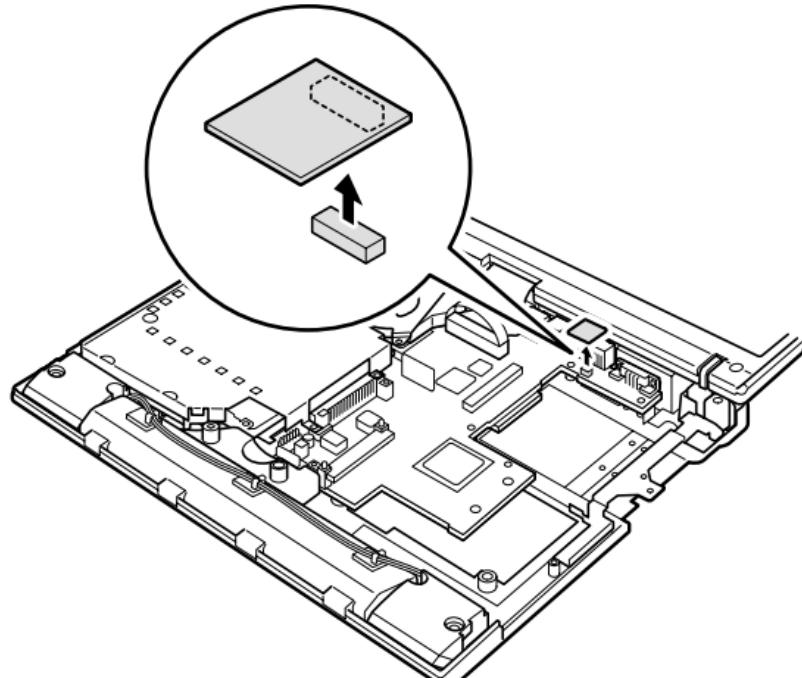
Note

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 of FRU number 26P8084 and 26P8234, remove or reinstall it as follows:

Begin by checking the FRU number of the security chip, and be sure to use the correct security chip FRU for the computer. For the FRU numbers, see "Parts list" on page 146.

For access, remove these FRUs, in order:

- "1010 Battery pack" on page 61
- "1020 Mini PCI adapter" on page 62
- "1030 Communication daughter card (CDC)" on page 65
- "1040 Backup battery" on page 72
- "1050 DIMM" on page 73
- "1060 Hard-disk drive" on page 74
- "1070 Ultrabay Plus device" on page 76
- "1080 Ultrabay 2000 device" on page 77
- "1100 Keyboard" on page 79
- "1110 Keyboard CRU insulator" on page 84
- "1120 Keyboard bezel" on page 86
- "1130 Hinge cover" on page 90
- "1160 Ultrabay Plus slot" on page 95
- "1180 Sub card for PC Card slot" on page 104

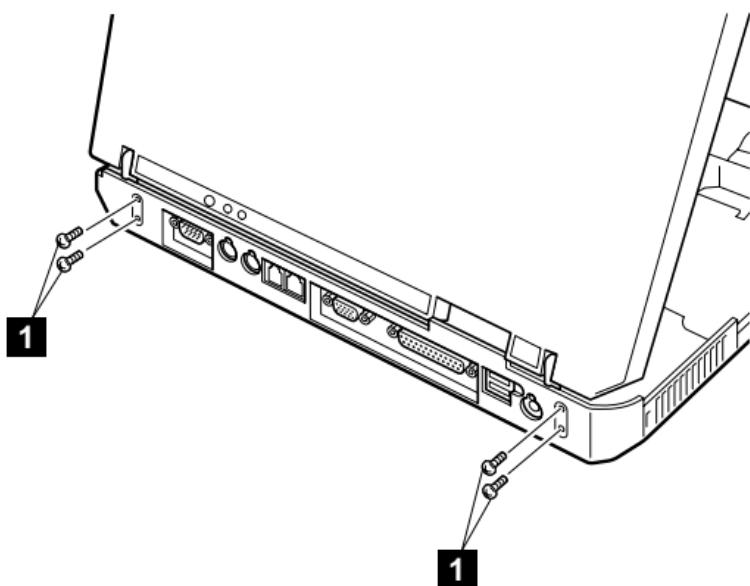


When installing: Make sure that the connector is firmly attached.

1200 LCD assembly

For access, remove these FRUs, in order:

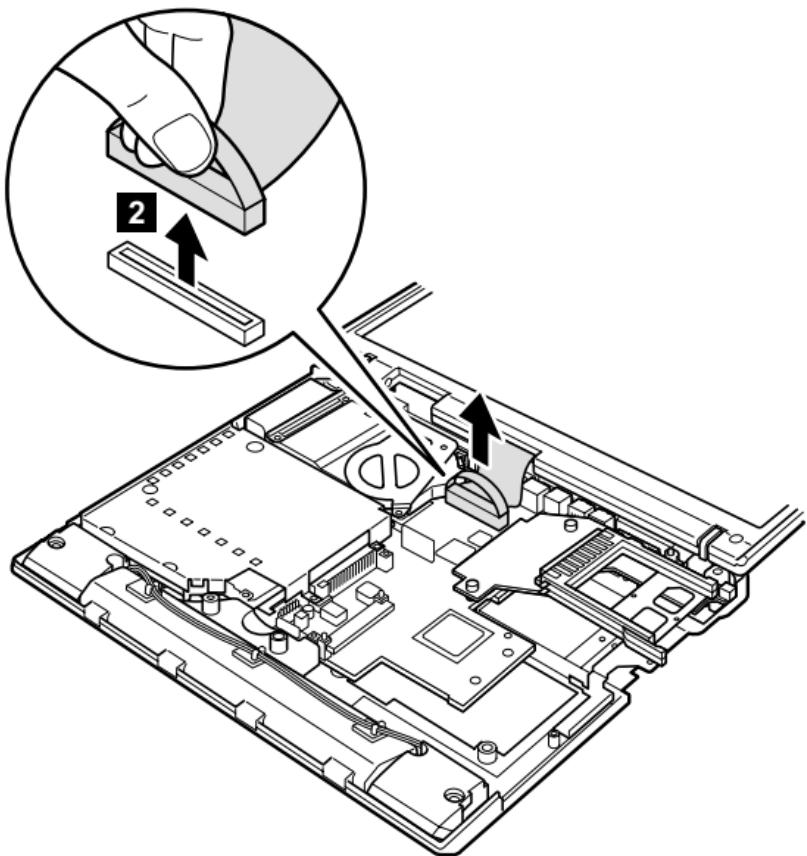
- “1010 Battery pack” on page 61
- “1020 Mini PCI adapter” on page 62
- “1030 Communication daughter card (CDC)” on page 65
- “1040 Backup battery” on page 72
- “1060 Hard-disk drive” on page 74
- “1070 Ultrabay Plus device” on page 76
- “1080 Ultrabay 2000 device” on page 77
- “1100 Keyboard” on page 79
- “1110 Keyboard CRU insulator” on page 84
- “1120 Keyboard bezel” on page 86
- “1130 Hinge cover” on page 90
- “1160 Ultrabay Plus slot” on page 95



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

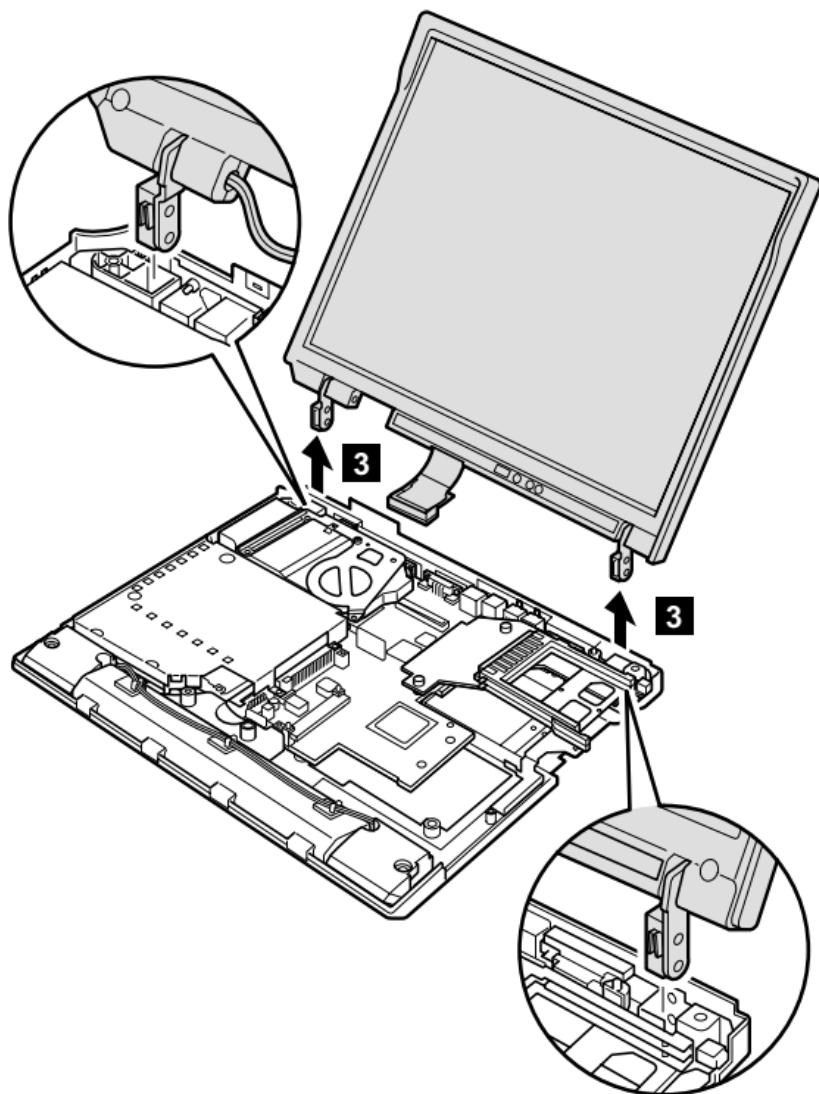
(continued)

Removing and replacing a FRU



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

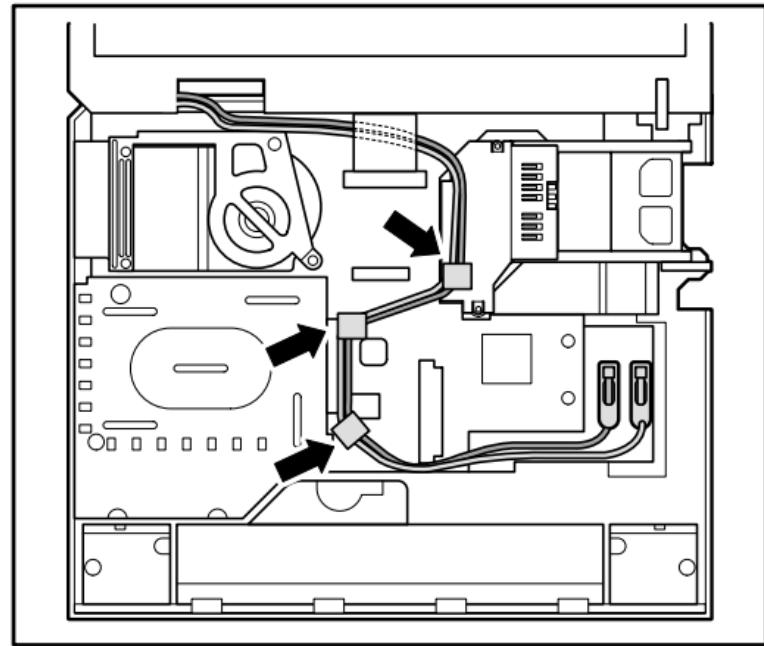
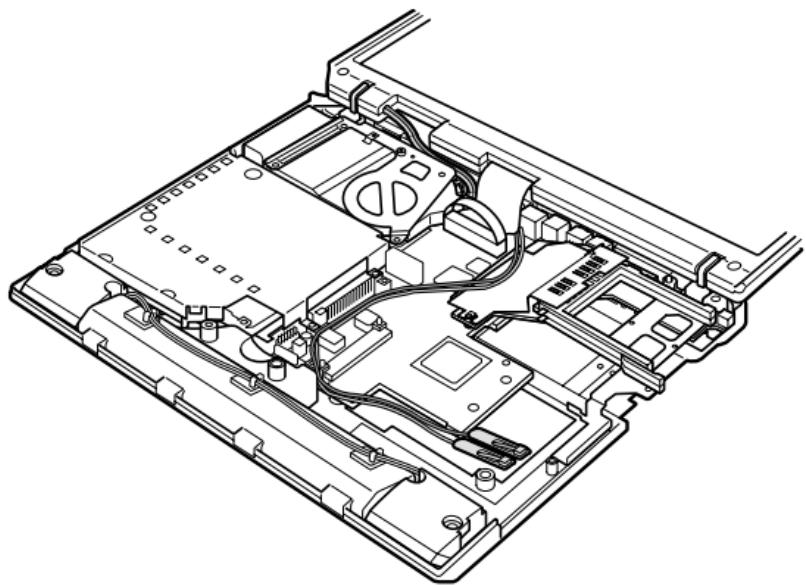
(continued)



Removing and replacing a FRU

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.



1210 System board

For access, remove these FRUs, in order:

- “1010 Battery pack” on page 61
- “1020 Mini PCI adapter” on page 62
- “1030 Communication daughter card (CDC)” on page 65
- “1040 Backup battery” on page 72
- “1050 DIMM” on page 73
- “1060 Hard-disk drive” on page 74
- “1070 Ultrabay Plus device” on page 76
- “1080 Ultrabay 2000 device” on page 77
- “1090 I/O plate” on page 78
- “1100 Keyboard” on page 79
- “1110 Keyboard CRU insulator” on page 84
- “1120 Keyboard bezel” on page 86
- “1130 Hinge cover” on page 90
- “1140 Fan assembly” on page 91
- “1150 CPU” on page 93
- “1190 Security chip” on page 106
- “1160 Ultrabay Plus slot” on page 95
- “1160 Ultrabay Plus slot” on page 95
- “1180 Sub card for PC Card slot” on page 104
- “1200 LCD assembly” on page 107

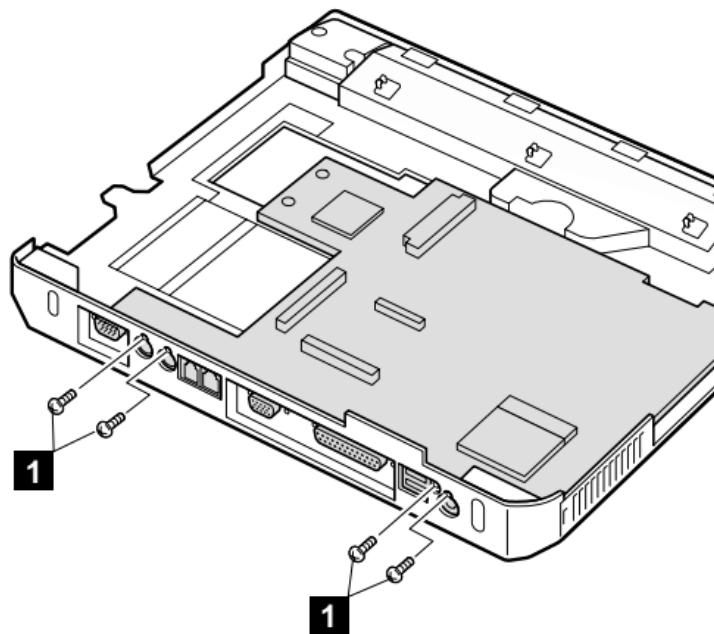
There are several types of system board FRU. Begin by checking the FRU number of the system board, and be sure to use the correct system board FRU for the computer. For the FRU numbers, see “Parts list” on page 146.

Important

If the ThinkPad computer you are servicing has the system board with the security chip of FRU number 26P8428 and 26P8430, mind the following:

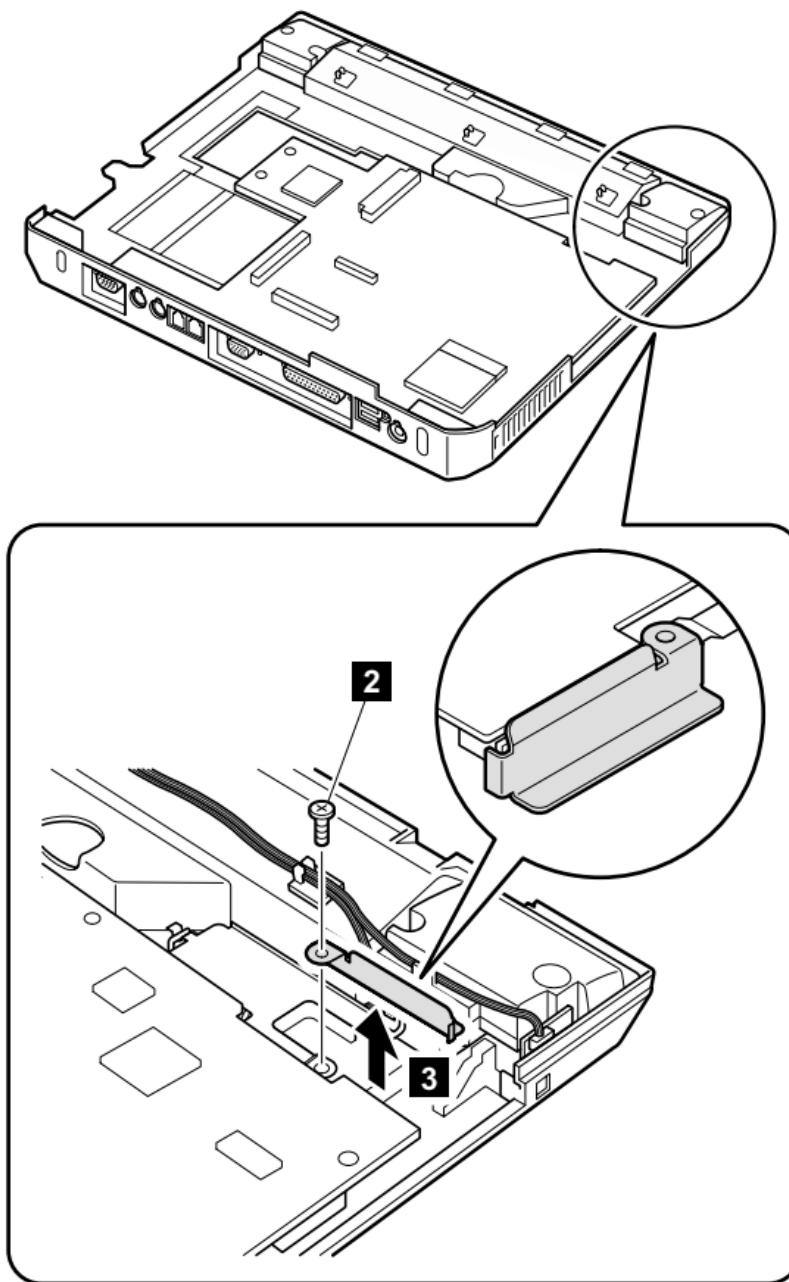
- **Do not remove the security chip from the system board.** If the security chip is removed by accident, reinstall it on the system board immediately. Then make sure that it is firmly fixed on the system board and does not move easily.
- The security chip **cannot** be used with any other system board.
- The system board **cannot** be used with other security chip.
- The system board **cannot** be used without the security chip.
- When you return the defective system board FRU, you must check whether the security chip is firmly attached to the system board. If it is not embedded, it may not be covered under warranty.

Removing and replacing a FRU



Step	Screw (quantity)	Torque
1	M2.5 x 4.8 mm Small head, nylon-coated (4)	0.254 Nm (2.5 kgfcm)

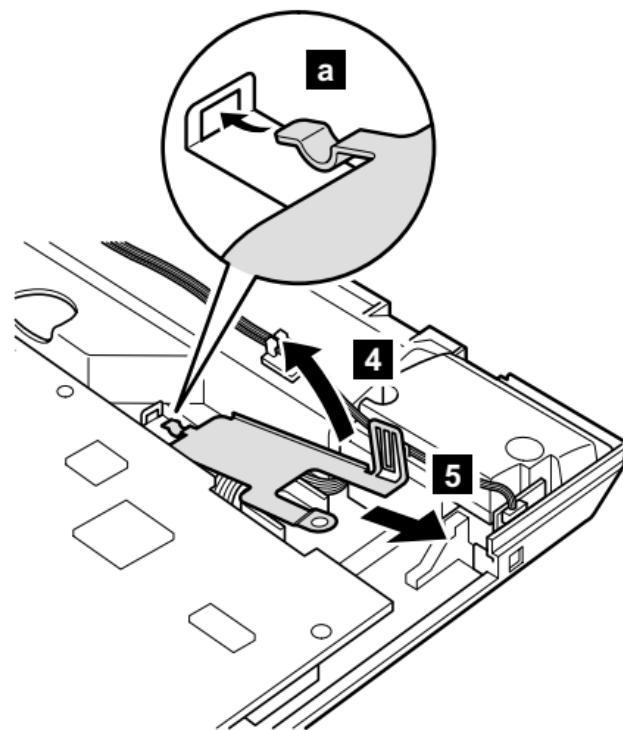
(continued)



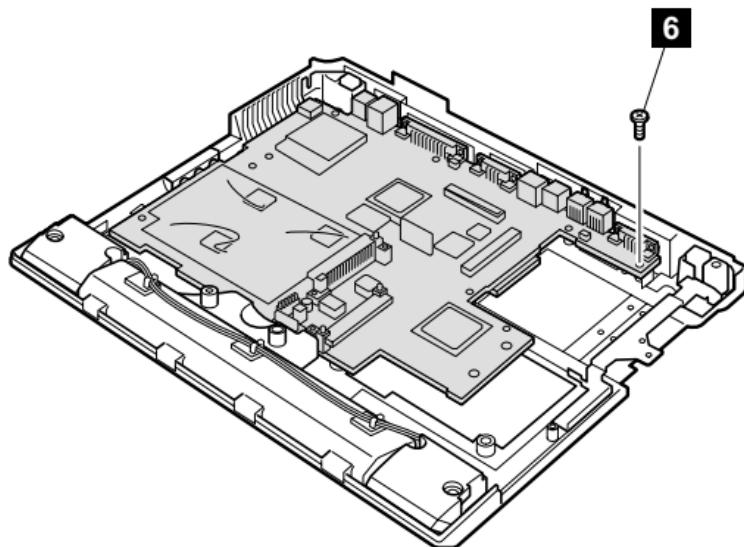
Step	Screw (quantity)	Torque
2	M2.5 × 4.8 mm, nylon-coated (1)	0.392 Nm (4 kgfcm)

(continued)

Removing and replacing a FRU

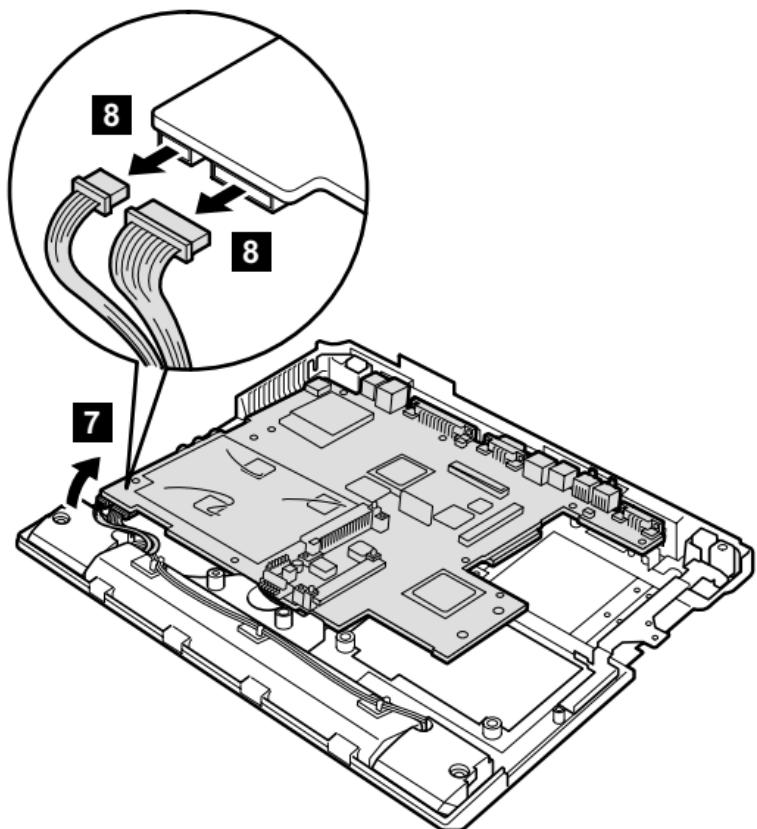


When installing: Do as shown in figure **a** .

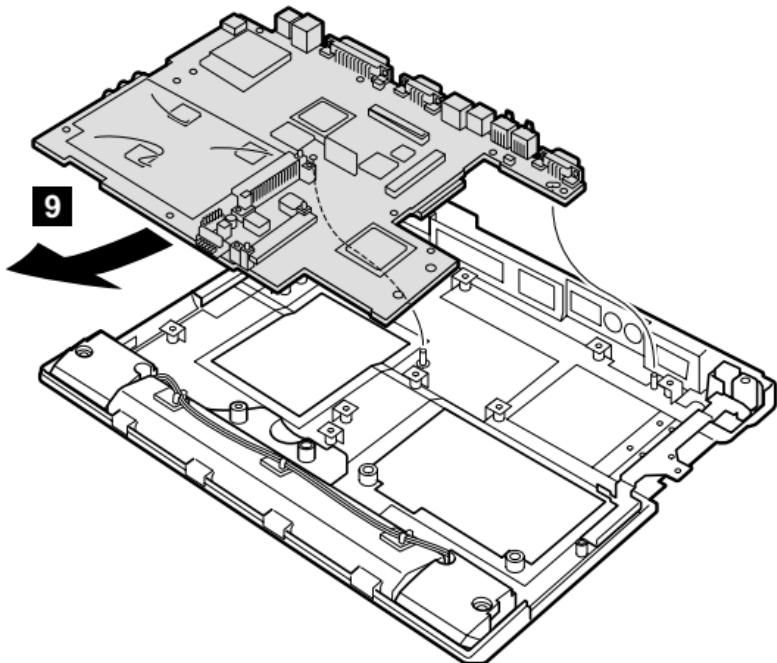


Step	Screw (quantity)	Torque
6	M2.5 × 4.8 mm, nylon-coated (1)	0.392 Nm (4 kgfcm)

(continued)



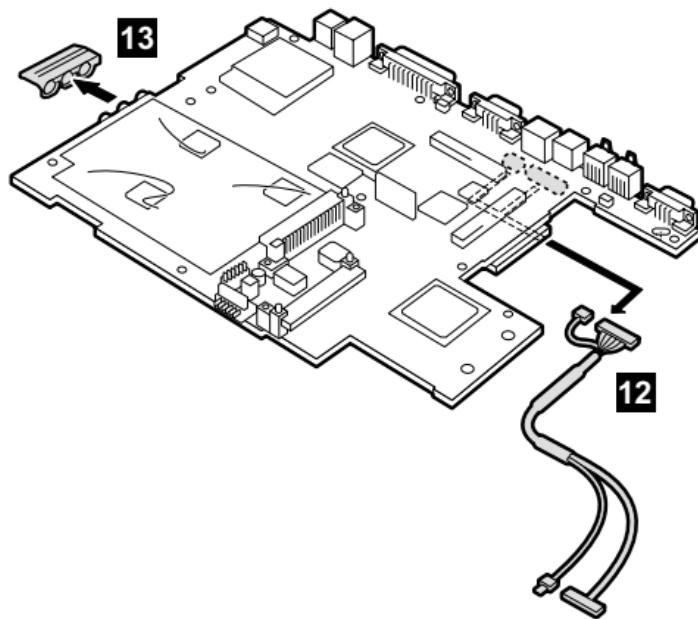
When installing: Make sure that both of the connectors are firmly attached.



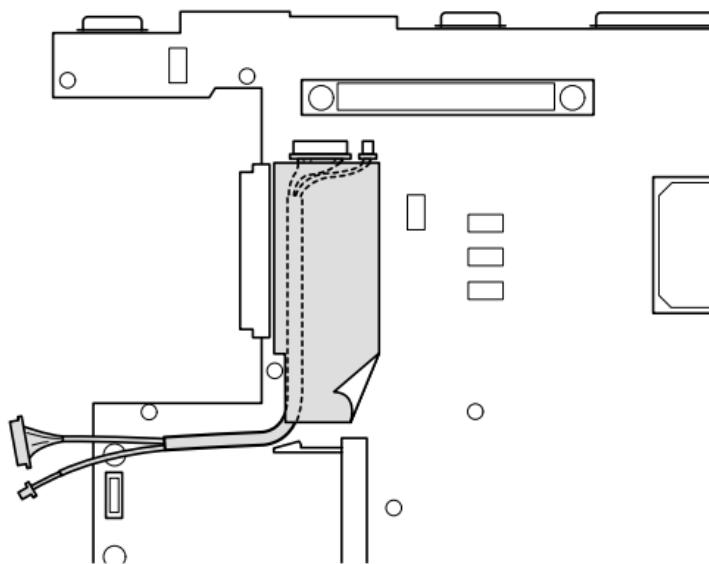
When installing: Attach the system board so that the two small projections on the base cover fit into the holes provided.

(continued)

Removing and replacing a FRU



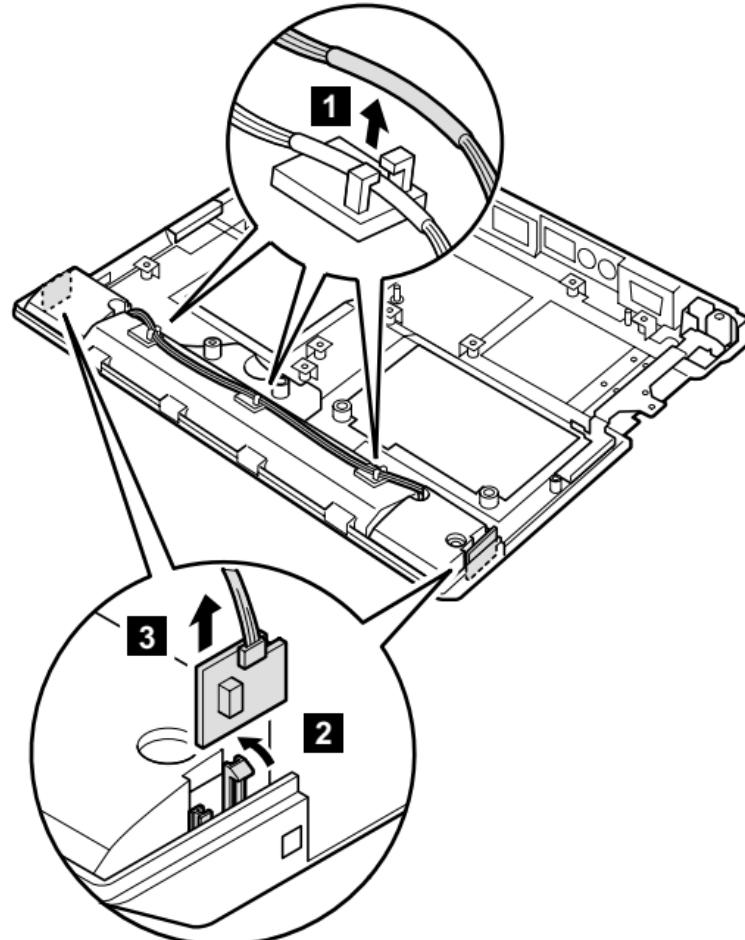
When installing: Make sure that the Ethernet/modem cable is firmly attached to two connectors on the bottom of the system board. And then, stick the EMI tape to secure the cable on the system board.



1220 Ultrabay LED card

For access, remove these FRUs, in order:

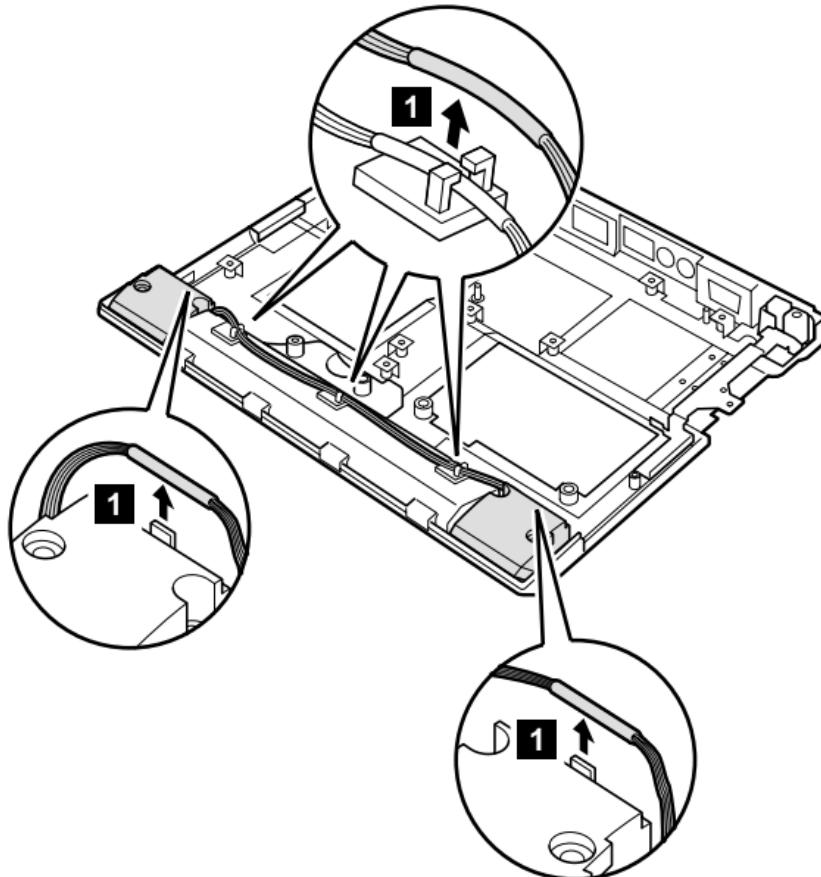
- “1010 Battery pack” on page 61
- “1020 Mini PCI adapter” on page 62
- “1030 Communication daughter card (CDC)” on page 65
- “1040 Backup battery” on page 72
- “1050 DIMM” on page 73
- “1060 Hard-disk drive” on page 74
- “1070 Ultrabay Plus device” on page 76
- “1080 Ultrabay 2000 device” on page 77
- “1090 I/O plate” on page 78
- “1100 Keyboard” on page 79
- “1110 Keyboard CRU insulator” on page 84
- “1120 Keyboard bezel” on page 86
- “1130 Hinge cover” on page 90
- “1140 Fan assembly” on page 91
- “1150 CPU” on page 93
- “1160 Ultrabay Plus slot” on page 95
- “1160 Ultrabay Plus slot” on page 95
- “1180 Sub card for PC Card slot” on page 104
- “1200 LCD assembly” on page 107
- “1210 System board” on page 111



1230 Speaker assembly

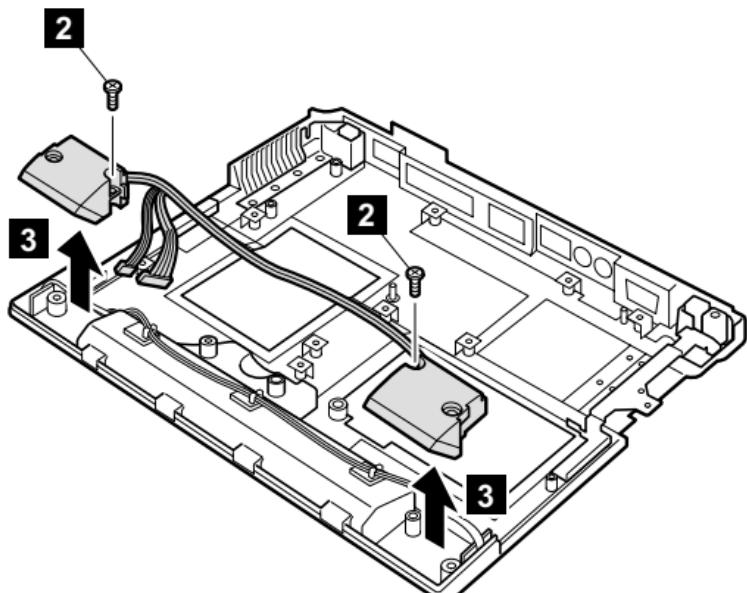
For access, remove these FRUs, in order:

- “1010 Battery pack” on page 61
- “1020 Mini PCI adapter” on page 62
- “1030 Communication daughter card (CDC)” on page 65
- “1040 Backup battery” on page 72
- “1050 DIMM” on page 73
- “1060 Hard-disk drive” on page 74
- “1070 Ultrabay Plus device” on page 76
- “1080 Ultrabay 2000 device” on page 77
- “1090 I/O plate” on page 78
- “1100 Keyboard” on page 79
- “1110 Keyboard CRU insulator” on page 84
- “1120 Keyboard bezel” on page 86
- “1130 Hinge cover” on page 90
- “1140 Fan assembly” on page 91
- “1150 CPU” on page 93
- “1160 Ultrabay Plus slot” on page 95
- “1160 Ultrabay Plus slot” on page 95
- “1180 Sub card for PC Card slot” on page 104
- “1200 LCD assembly” on page 107
- “1210 System board” on page 111



(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)

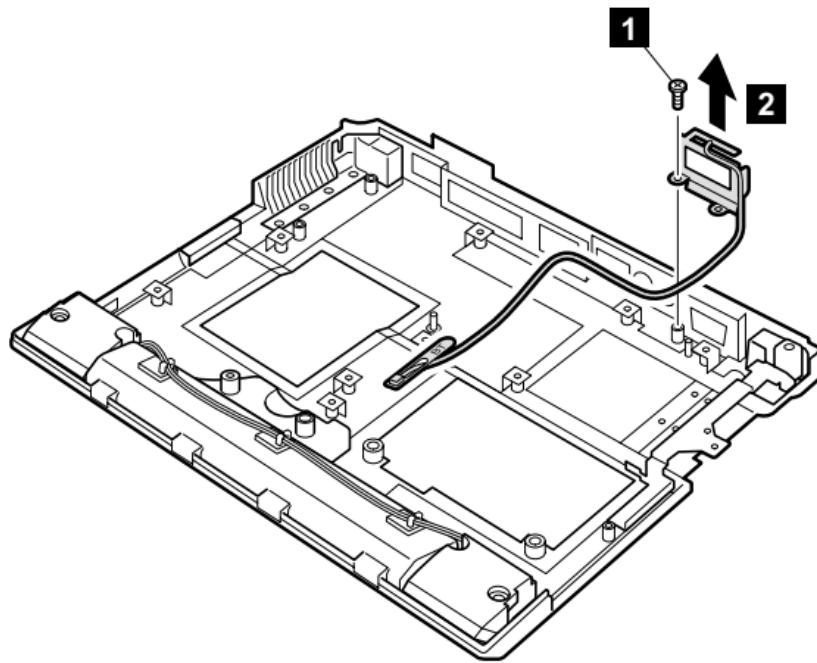
1240 Antenna for Bluetooth

Note

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

For access, remove these FRUs, in order:

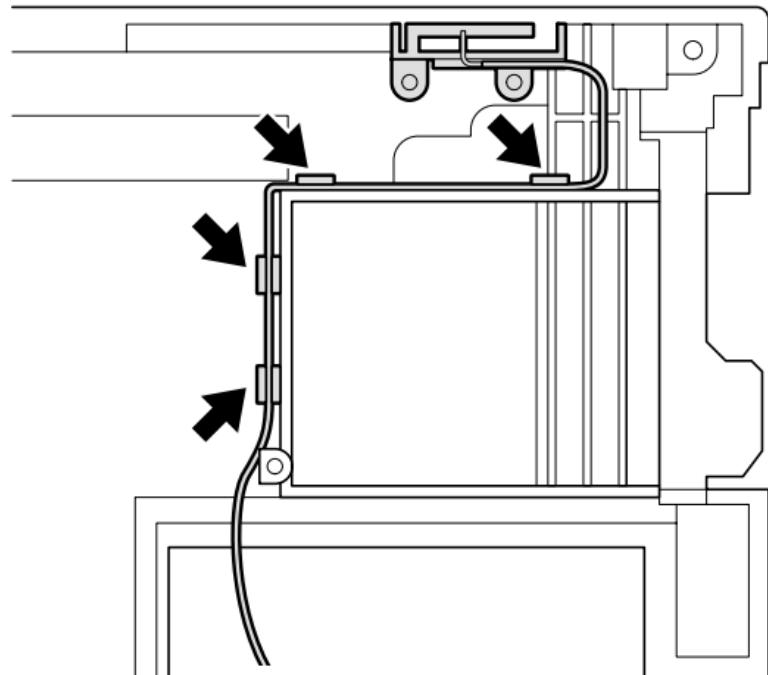
- “1010 Battery pack” on page 61
- “1020 Mini PCI adapter” on page 62
- “1030 Communication daughter card (CDC)” on page 65
- “1040 Backup battery” on page 72
- “1050 DIMM” on page 73
- “1060 Hard-disk drive” on page 74
- “1070 Ultrabay Plus device” on page 76
- “1080 Ultrabay 2000 device” on page 77
- “1090 I/O plate” on page 78
- “1100 Keyboard” on page 79
- “1110 Keyboard CRU insulator” on page 84
- “1120 Keyboard bezel” on page 86
- “1130 Hinge cover” on page 90
- “1140 Fan assembly” on page 91
- “1150 CPU” on page 93
- “1160 Ultrabay Plus slot” on page 95
- “1170 Ultrabay 2000 slot” on page 100
- “1180 Sub card for PC Card slot” on page 104
- “1210 System board” on page 111



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

Removing and replacing a FRU

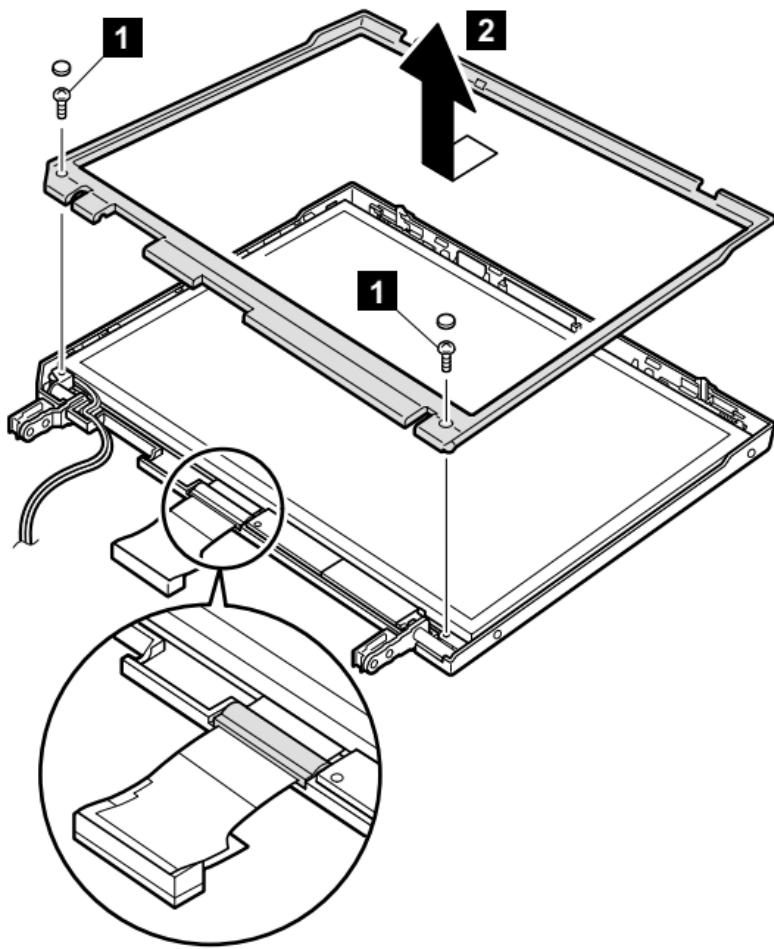
Cable routing: When attaching the antenna for Bluetooth, route the cable to fit into the cable guides on the base cover.



2010 Front bezel

For access, remove these FRUs, in order:

- “1010 Battery pack” on page 61
- “1020 Mini PCI adapter” on page 62
- “1030 Communication daughter card (CDC)” on page 65
- “1040 Backup battery” on page 72
- “1060 Hard-disk drive” on page 74
- “1070 Ultrabay Plus device” on page 76
- “1080 Ultrabay 2000 device” on page 77
- “1100 Keyboard” on page 79
- “1110 Keyboard CRU insulator” on page 84
- “1120 Keyboard bezel” on page 86
- “1130 Hinge cover” on page 90
- “1160 Ultrabay Plus slot” on page 95
- “1200 LCD assembly” on page 107



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



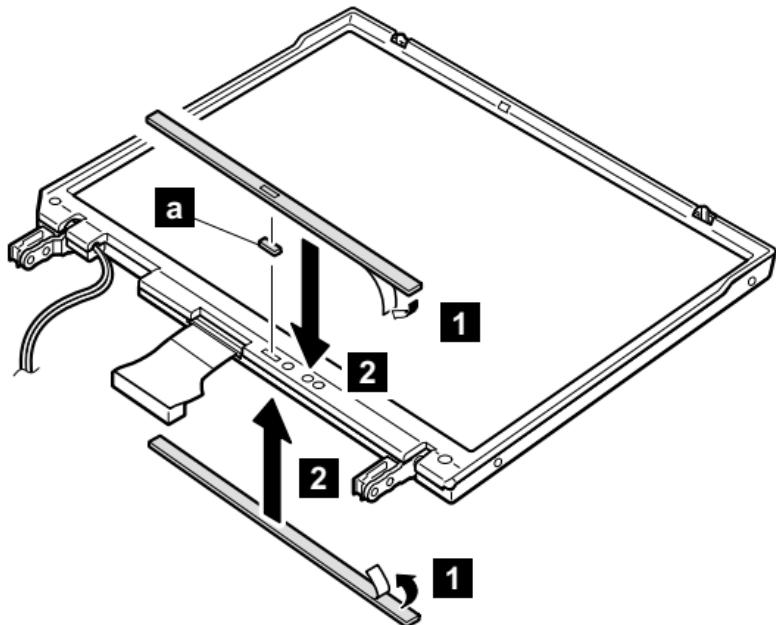
- Clear plate, rear cover, without Bluetooth feature
- Clear plate, rear cover, with Bluetooth feature



- Clear plate, rear cover, with Bluetooth feature



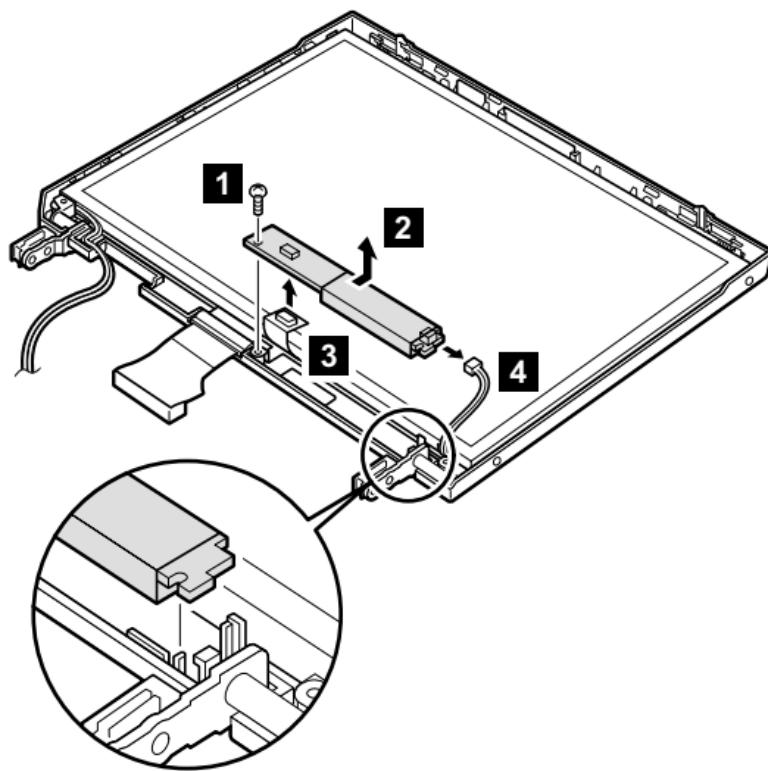
2. If the computer has the Bluetooth feature, you also need to install Bluetooth button **a**, which is contained in the FRU. It is attached to the front bezel side only.
3. Strip off the protection sheet of the insulation tape **1** of the clear plate, and then stick the plate on the front bezel and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



2020 Inverter card

For access, remove these FRUs, in order:

- “1010 Battery pack” on page 61
- “1020 Mini PCI adapter” on page 62
- “1030 Communication daughter card (CDC)” on page 65
- “1040 Backup battery” on page 72
- “1060 Hard-disk drive” on page 74
- “1070 Ultrabay Plus device” on page 76
- “1080 Ultrabay 2000 device” on page 77
- “1100 Keyboard” on page 79
- “1110 Keyboard CRU insulator” on page 84
- “1120 Keyboard bezel” on page 86
- “1130 Hinge cover” on page 90
- “1160 Ultrabay Plus slot” on page 95
- “1200 LCD assembly” on page 107
- “2010 Front bezel” on page 123

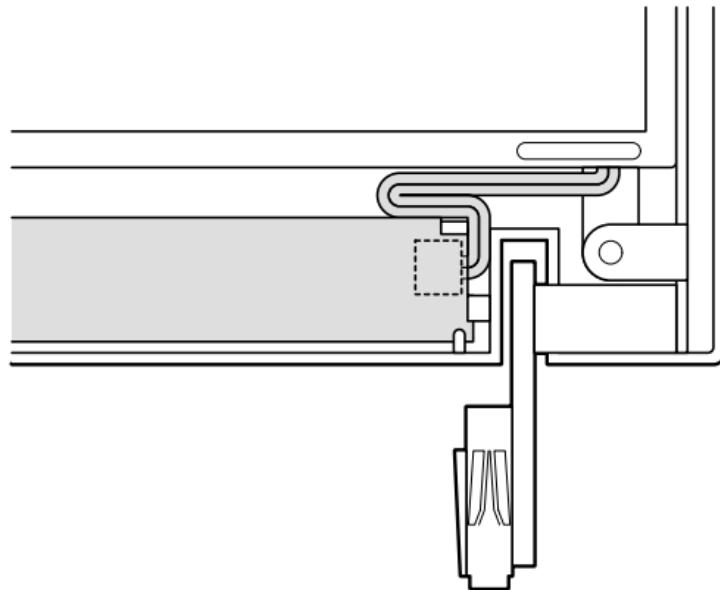


Step	Screw (quantity)	Torque
1	M2.5 × 4.8 mm, nylon-coated (4)	0.392 Nm (4 kgfcm)

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:

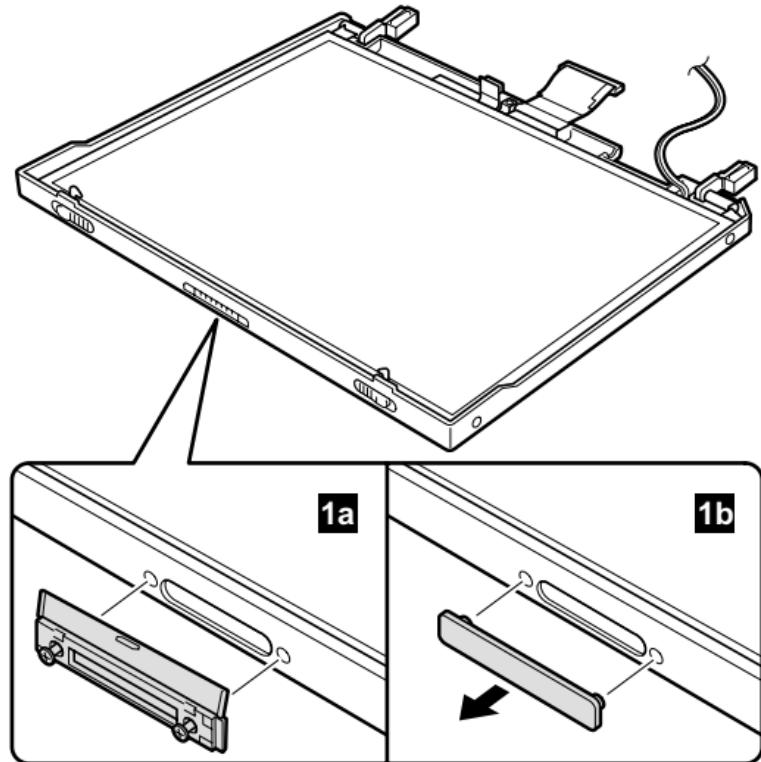


2030 LCD panel

For access, remove these FRUs, in order:

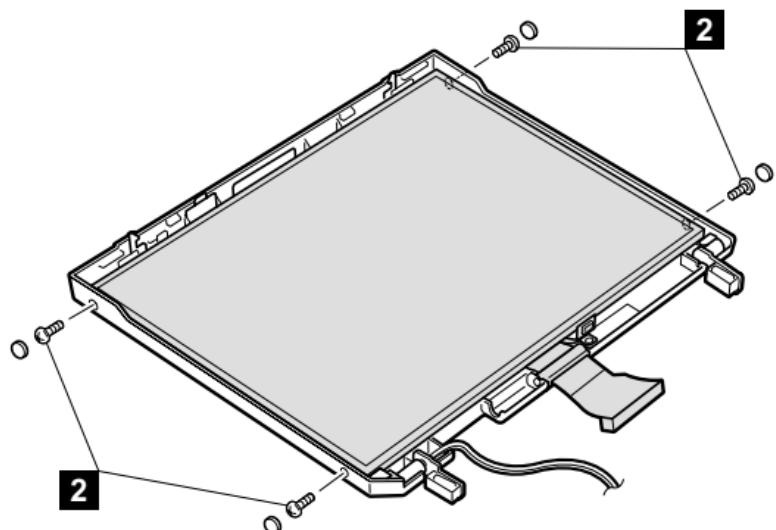
- “1010 Battery pack” on page 61
- “1020 Mini PCI adapter” on page 62
- “1030 Communication daughter card (CDC)” on page 65
- “1040 Backup battery” on page 72
- “1060 Hard-disk drive” on page 74
- “1070 Ultrabay Plus device” on page 76
- “1080 Ultrabay 2000 device” on page 77
- “1100 Keyboard” on page 79
- “1110 Keyboard CRU insulator” on page 84
- “1120 Keyboard bezel” on page 86
- “1130 Hinge cover” on page 90
- “1160 Ultrabay Plus slot” on page 95
- “1200 LCD assembly” on page 107
- “2010 Front bezel” on page 123
- “2020 Inverter card” on page 125

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**.

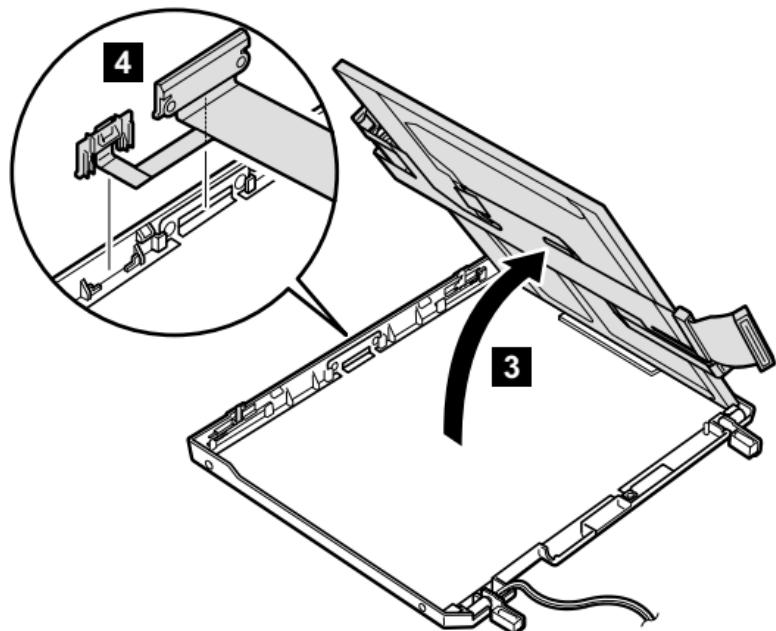


(continued)

Removing and replacing a FRU

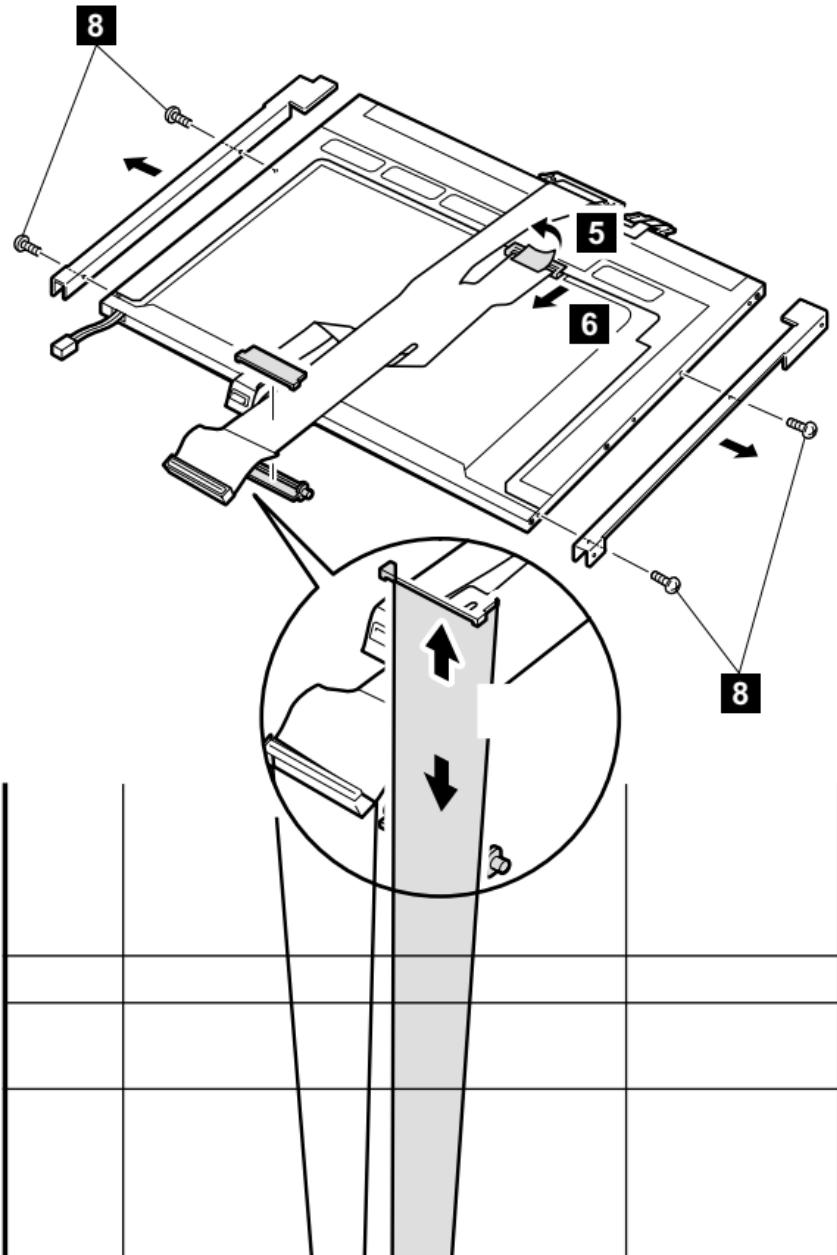


Step	Screw (quantity)	Torque
2	M2 × 5.7 mm, nylon-coated (4)	0.245 Nm (2.5 kgfcm)



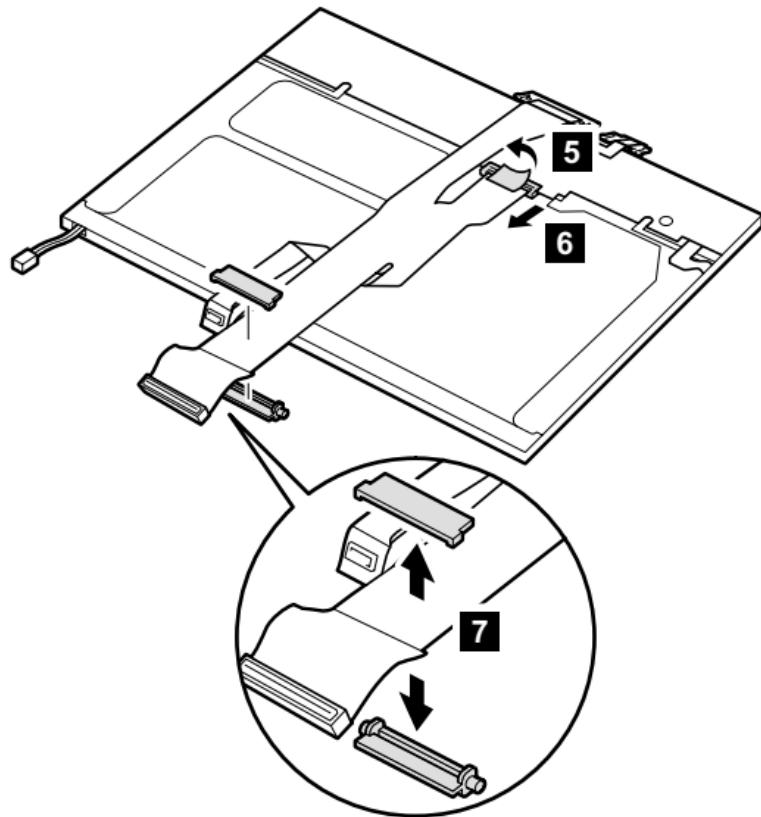
(continued)

For 14.1-in. LCD panel

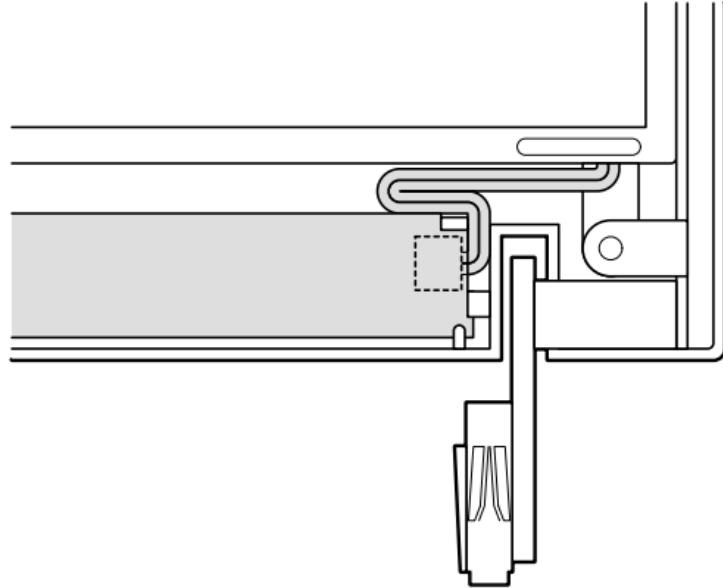


Removing and replacing a FRU

For 15.0-in. LCD panel



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



2040 Antenna assembly

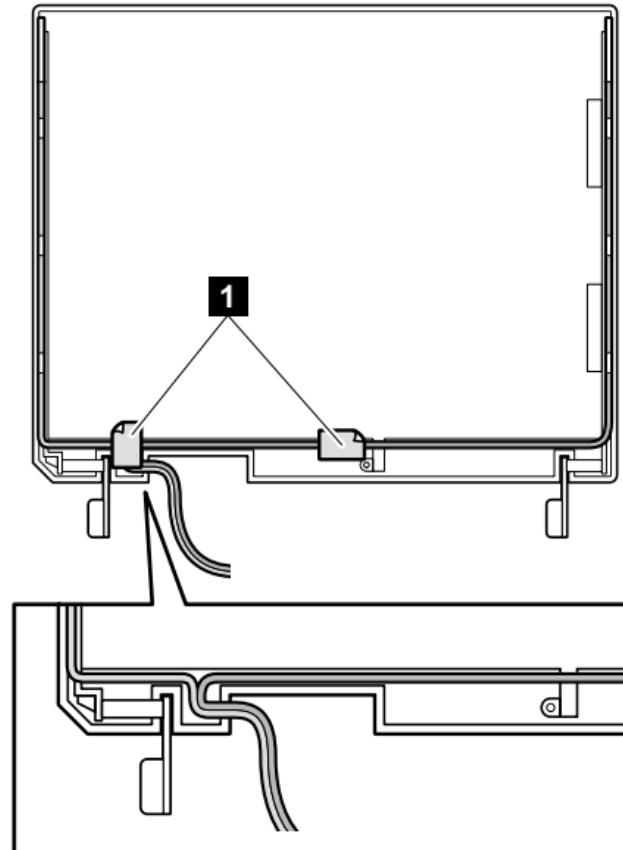
Note

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

For access, remove these FRUs, in order:

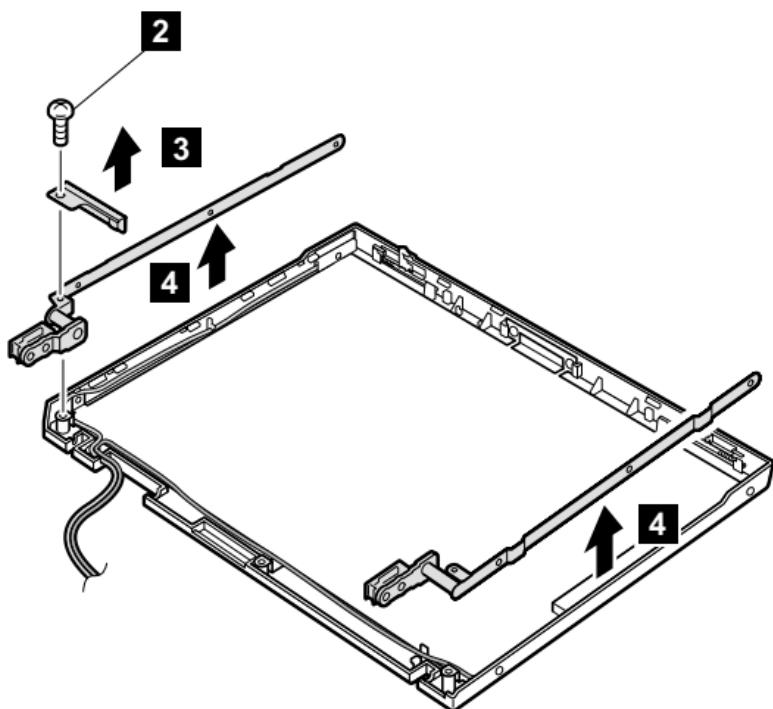
- “1010 Battery pack” on page 61
- “1020 Mini PCI adapter” on page 62
- “1030 Communication daughter card (CDC)” on page 65
- “1040 Backup battery” on page 72
- “1060 Hard-disk drive” on page 74
- “1070 Ultrabay Plus device” on page 76
- “1080 Ultrabay 2000 device” on page 77
- “1100 Keyboard” on page 79
- “1110 Keyboard CRU insulator” on page 84
- “1120 Keyboard bezel” on page 86
- “1130 Hinge cover” on page 90
- “1160 Ultrabay Plus slot” on page 95
- “1200 LCD assembly” on page 107
- “2010 Front bezel” on page 123
- “2020 Inverter card” on page 125
- “2030 LCD panel” on page 127

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

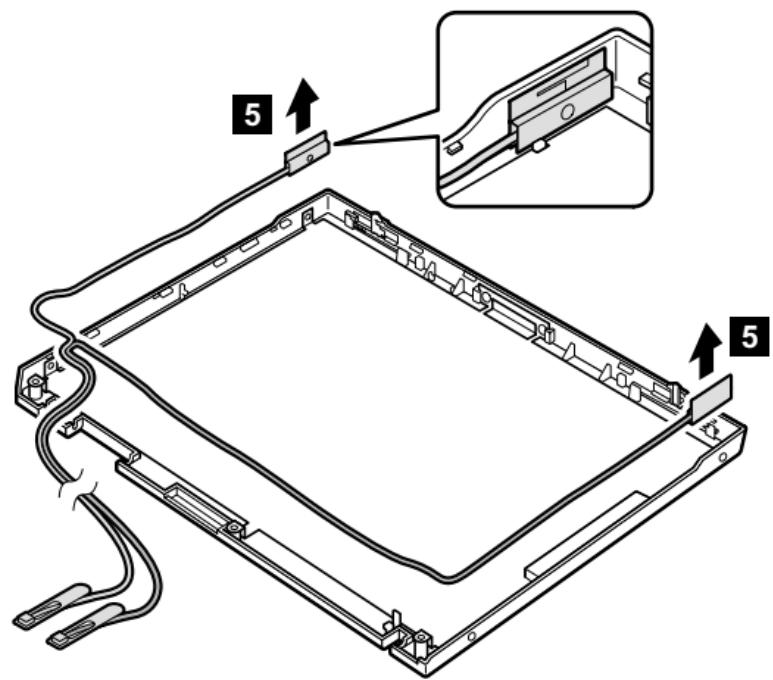


(continued)

Removing and replacing a FRU



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

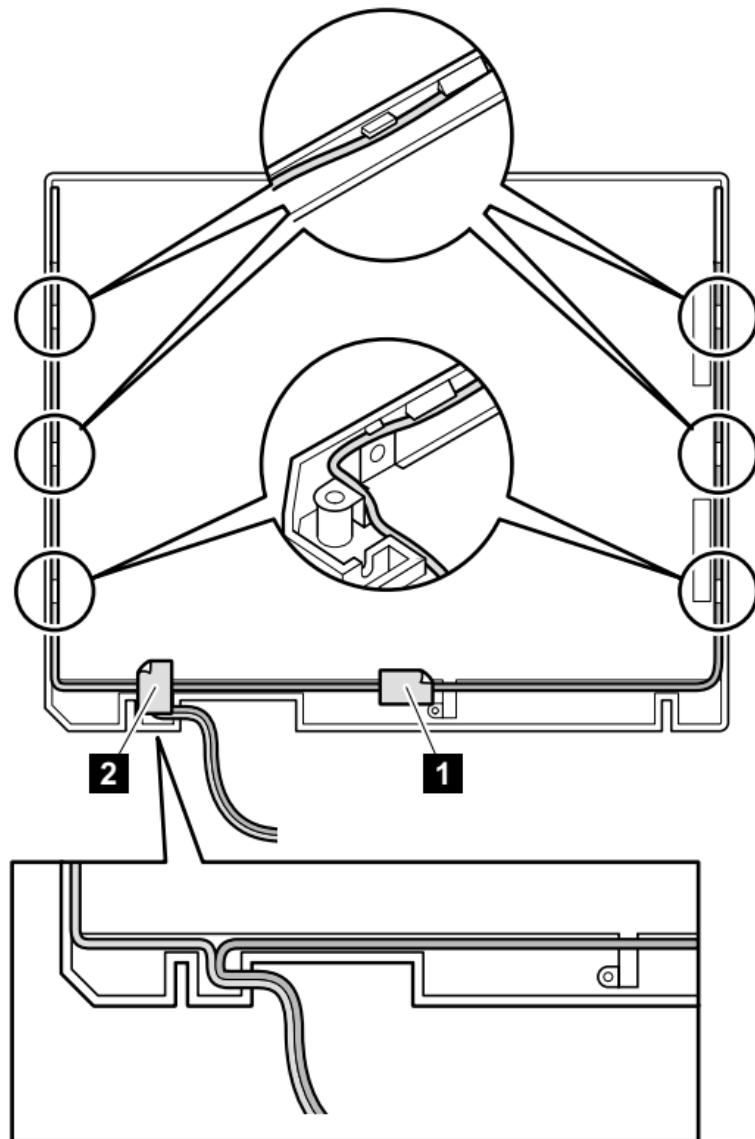


When installing the antenna assembly, do as follows:

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.

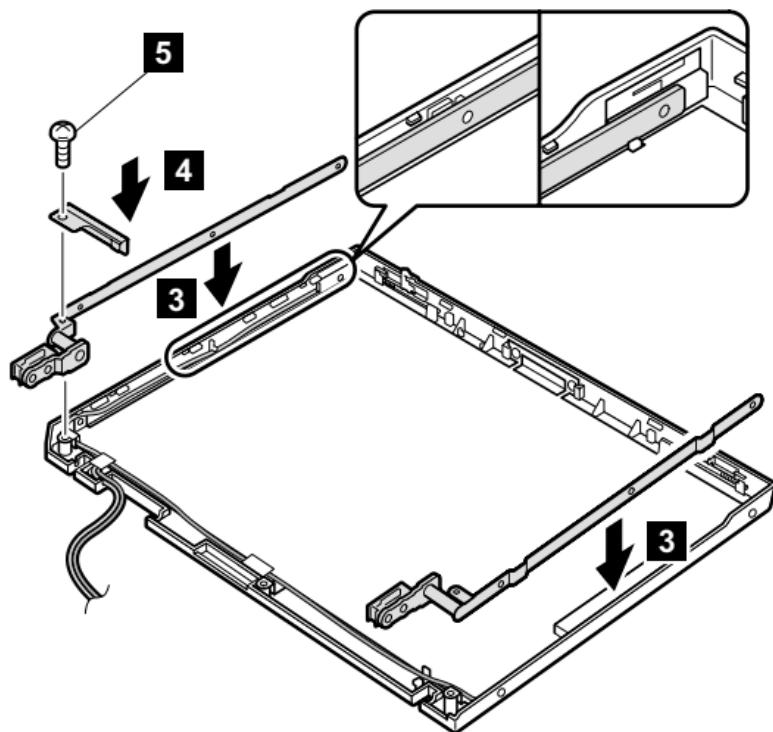
2. Secure the cables with insulation tape in the order shown **1** and **2**.



(continued)

Removing and replacing a FRU

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

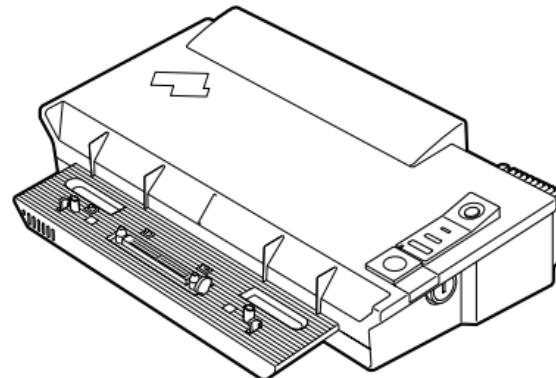


3010 ThinkPad Dock PCI cover

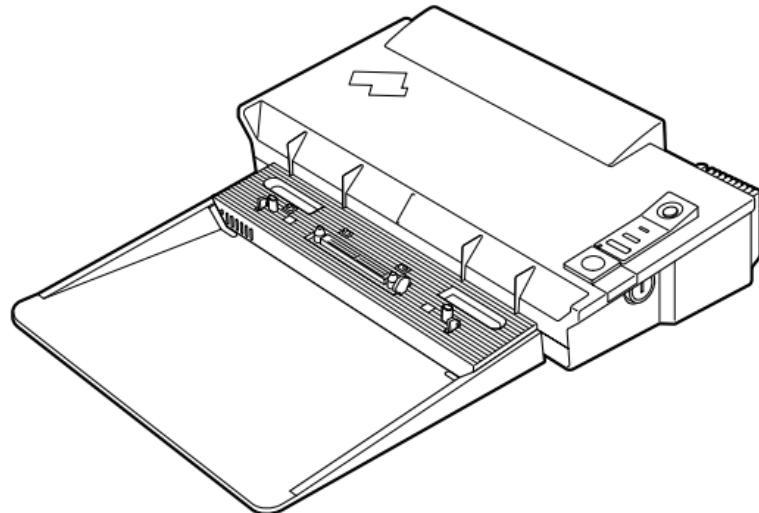
Before replacing the PCI cover:

There are two types of ThinkPad Dock, as follows:

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



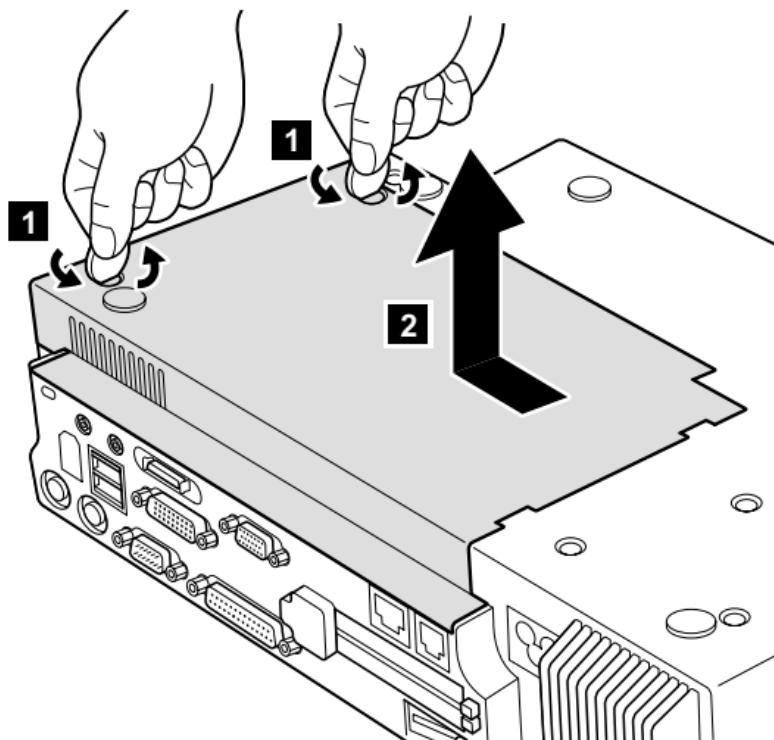
- ThinkPad Dock with extension plate: FRU no. 08N1537 (PCI cover: FRU no. 08N7317)



Confirm the FRU no. of the ThinkPad Dock first and choose the proper PCI cover FRU for the ThinkPad Dock you are servicing.

Removing and replacing a FRU

Note: The following illustration shows how to remove the PCI cover of ThinkPad Dock (FRU no. 08N1546). Do the same to remove the PCI cover of ThinkPad Dock with extension plate (FRU no. 08N1537).

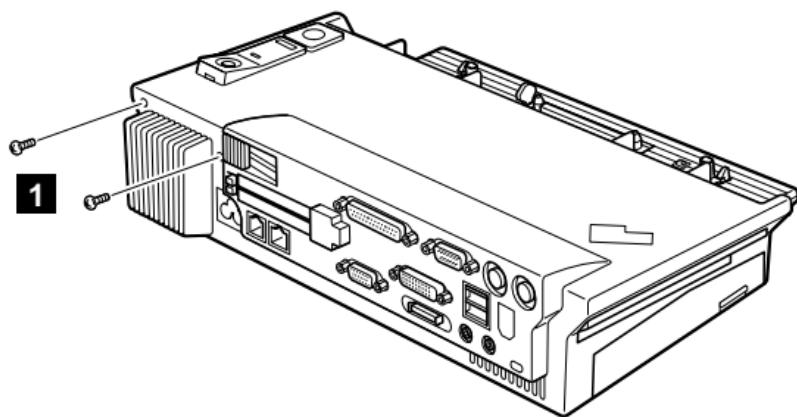


(Bottom view)

3020 ThinkPad Dock top cover

Note

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

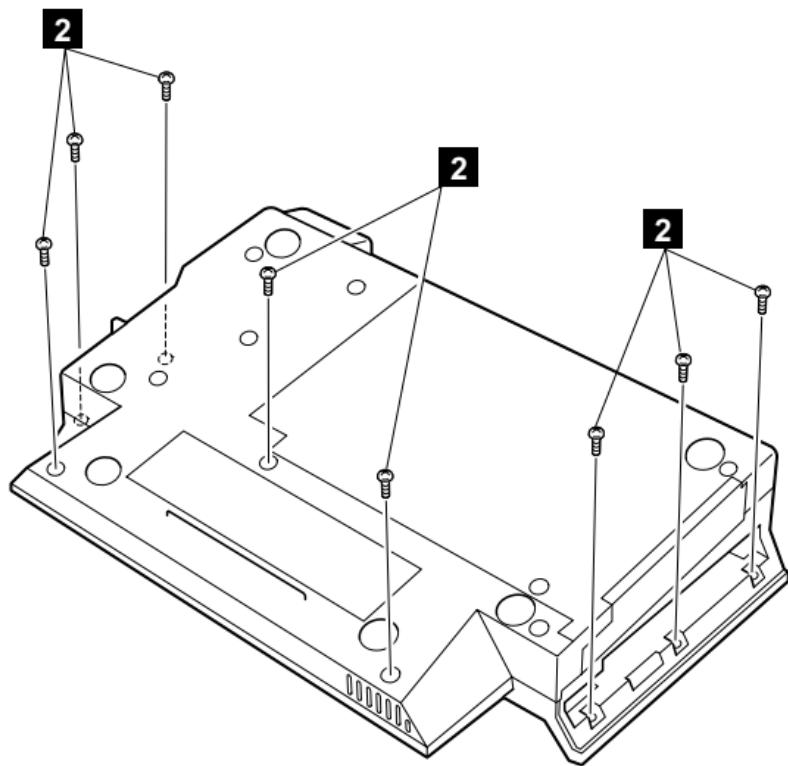


(Rear view)

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

(continued)

Removing and replacing a FRU

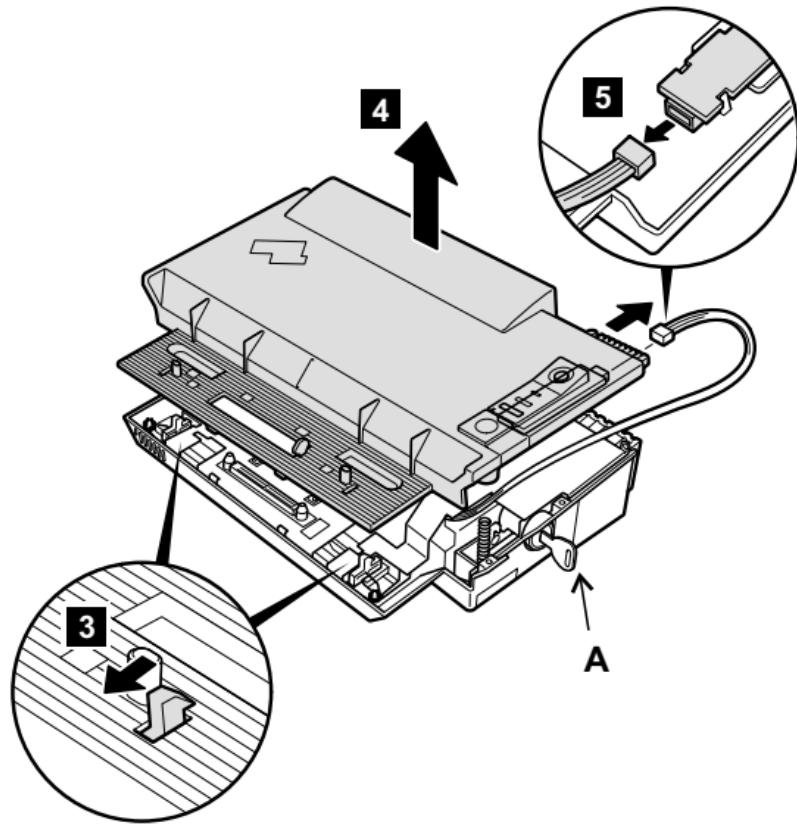


(Bottom view)

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

(continued)

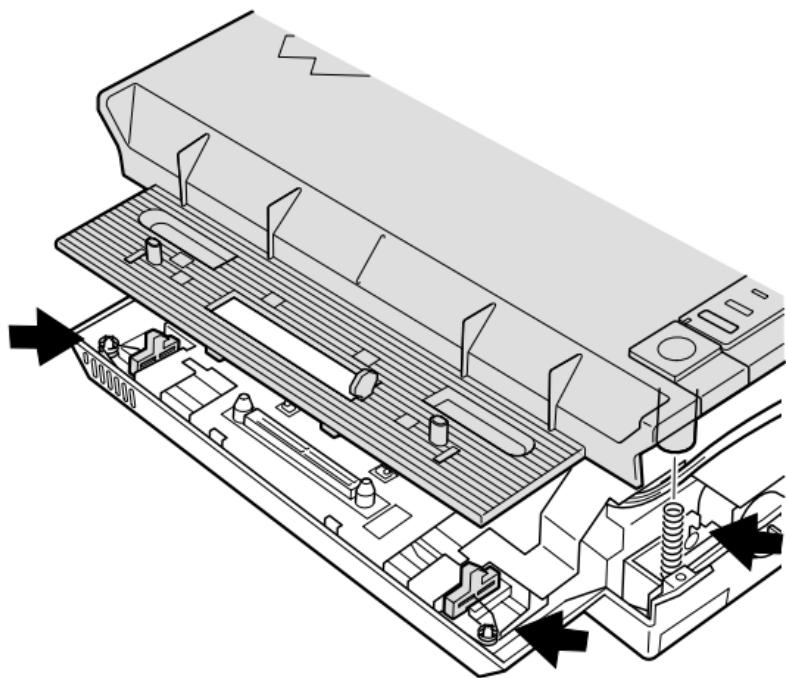
Make sure that the system lock key **A** is set to the Unlock position. Release the front latches in step **3**, and then remove the top cover **4**. For step **5**, see the inside view, shown in the circle.



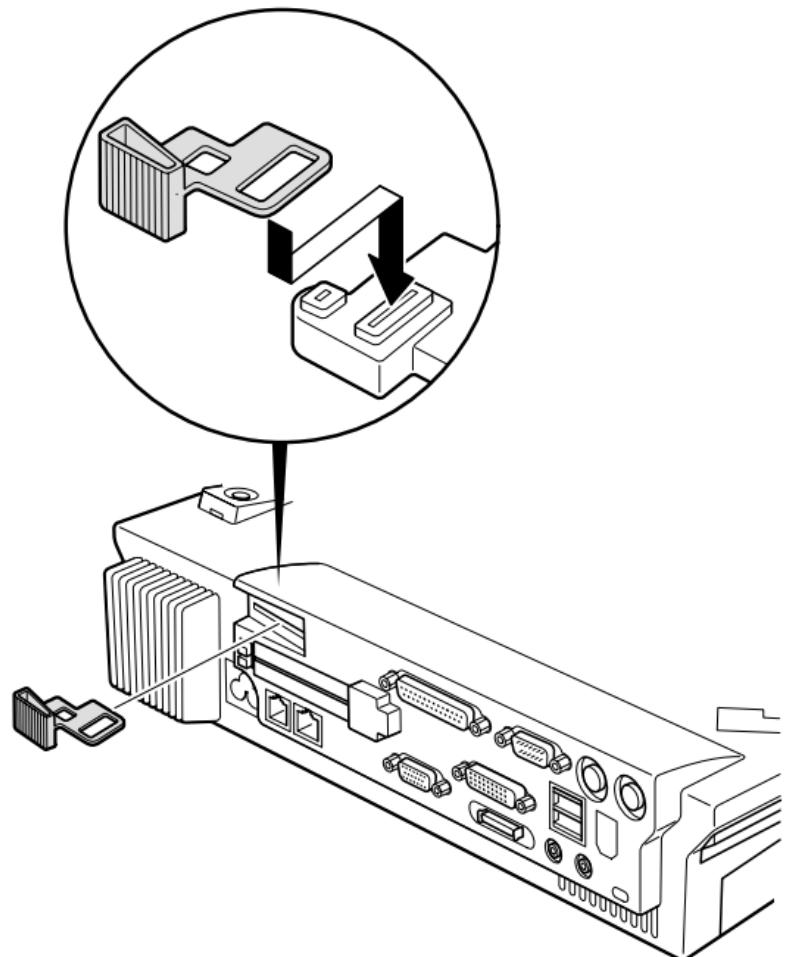
Removing and replacing a FRU

When replacing the top cover, do the following:

- Make sure that the springs are placed correctly.



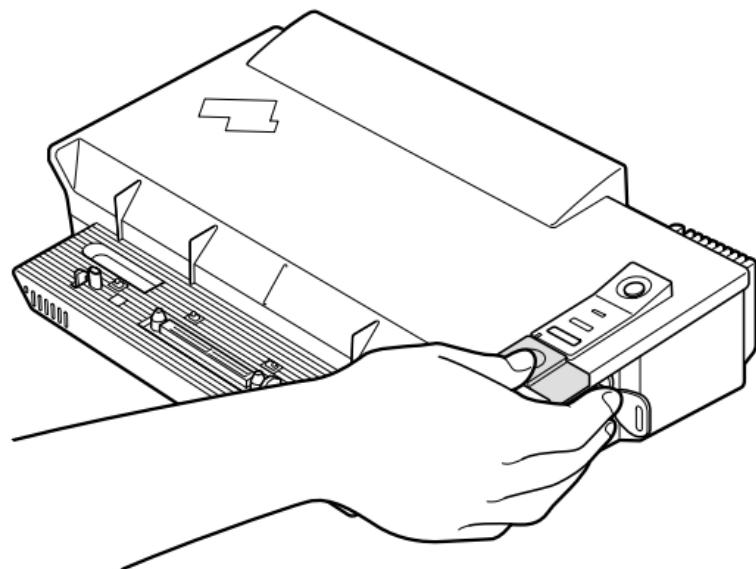
- Make sure that the device release lever is seated correctly.



(continued)

Removing and replacing a FRU

- Make sure that the release button works correctly.



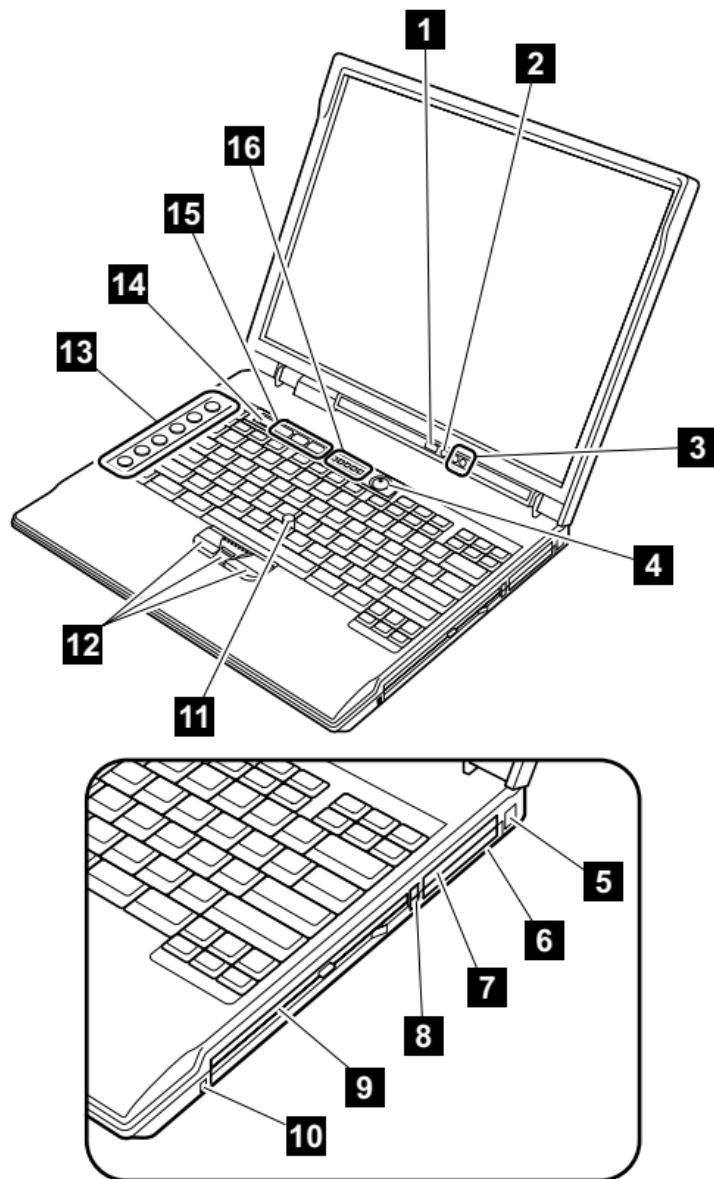
Locations

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

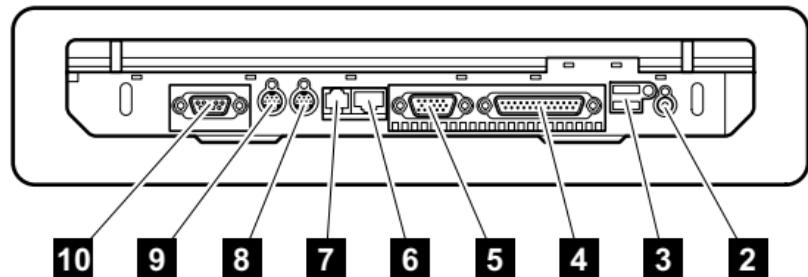
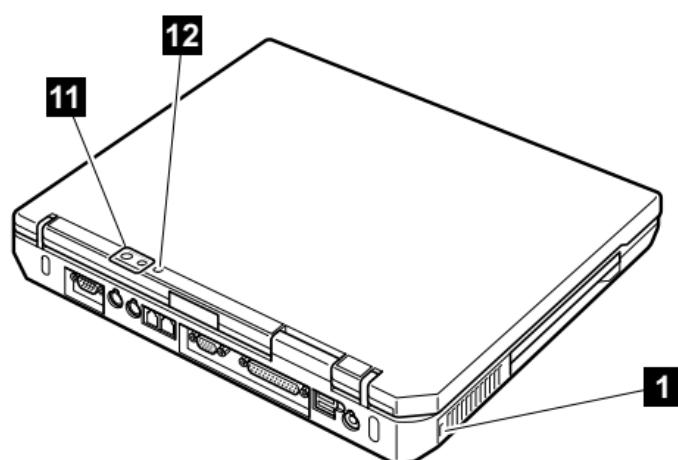
Note: The Ultrabay Plus accepts several storage devices, such as a DVD drive or a CD-ROM drive, and also accepts an Ultrabay Plus carrier. (Ultrabay Plus does not support the Ultrabay 2000 battery.)

- 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)

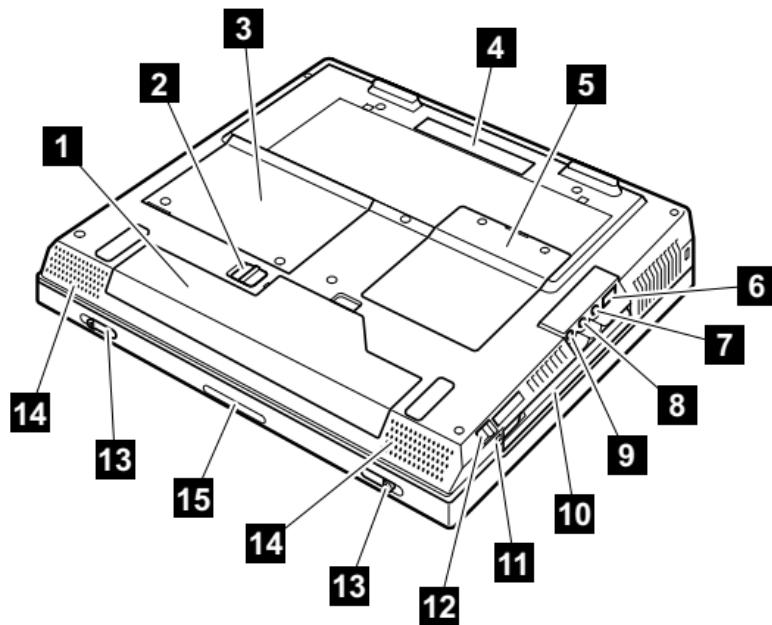


Bottom view

- 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				
2652-83J			14.1-in. XGA		Cel 1.06 G
2652-93J					Cel 1.2 G
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	Ethernet/ Modem	—	15.0-in. XGA		Tual 1.13 G
2654-43x, 44x, 4Bx					
2652-45x, 46x,4Cx	Ethernet/ —	802.11b/ Modem	15.0-in. XGA wireless		
2654-45x, 46x,4Cx					

(continued)

Model	CDC-slot1/ slot2	Mini PCI adapter	LCD	Right bay device	CPU
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				
<ul style="list-style-type: none"> • Tual xxx M(G): Mobile Intel® Pentium® III processor xxx MHz (GHz) - M • Cel xxx G: Mobile Intel® Celeron® processor xxx GHz 					

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, ATU	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, BxG	Ethernet/ Modem	—	15.0-in. XGA		
2652-BKC	Ethernet/ —	802.11b/ Modem	15.0-in. XGA wireless		
2652-J3x, J4x, JEx, JTU	Ethernet/ Modem	—	14.1-in. XGA	CD- ROM (24x)	N1.6 G
2652-J5x, J6x, JFx, JUx	Ethernet/ —	802.11b/ Modem	14.1-in. XGA wireless		
2652-JxT, JxC except JKC	Ethernet/ Modem	—	14.1-in. XGA	DVD- ROM (8x)	
2652-JKC	Ethernet/ —	802.11b/ Modem	14.1-in. XGA wireless		
2652-K3x, K4x	Ethernet/ Modem	—	15.0-in. XGA	CD- ROM (24x)	
2652-K5x, K6x	Ethernet/ —	802.11b/ Modem	15.0-in. XGA wireless		
2652-KGx, KHx, KPx except KxK, KxH, KxB, 2652-KxG	Ethernet/ Modem	—	15.0-in. XGA	DVD- ROM (8x)	
2652-KKC	Ethernet/ —	802.11b/ Modem	15.0-in. XGA wireless		

(continued)

Model	CDC-slot1/ slot2	Mini PCI adapter	LCD	Right bay device	CPU
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		
2652-JGx, JHx, JPx except xxC			14.1-in. XGA		N1.6 G
2652-KGx, KHx, KPx except xxC, xxK			15.0-in. XGA	CD- ROM (24x)	
2652-KKK	Ethernet/ —	802.11b/ Modem	15.0-in. XGA wireless		
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)	N1.6 G
2652-CKx	Ethernet/ —	802.11b/ Modem	15.0-in. XGA wireless		
2652-CXG, CWG	Ethernet/ Modem	—	15.0-in. XGA		
2652-CZG, CYG	Ethernet/ —	802.11b/ Modem	15.0-in. XGA wireless		
2652-AUU, 2653-AUU			14.1-in. XGA wireless	CD- RW	
2652-C3x, C4x, CGx, CTU	Ethernet/ Modem	—	15.0-in. XGA		
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		

(continued)

Parts list

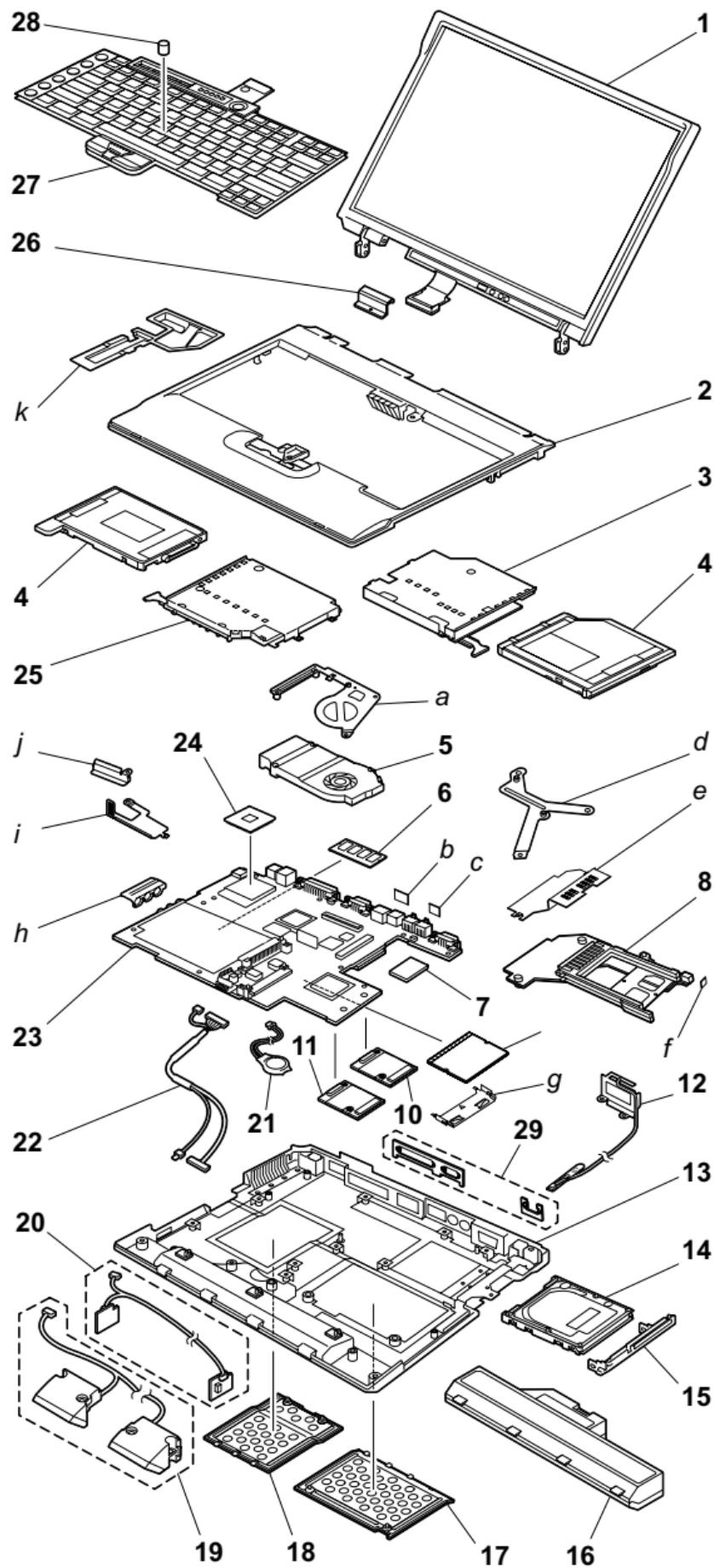
Model	CDC-Slot1/ slot2	Mini PCI adapter	LCD	Right bay device	CPU
A31 (memory, 256 MB; video memory, 16 MB; HDD, 30 GB)					
2652-P3x, P4x	Ethernet/ Modem	—	15.0-in. XGA	DVD- ROM (8x)	N1.9 G
2652-P5x, P6x	Ethernet/ —	802.11b/ Modem	15.0-in. XGA wireless		
2652-PXx, PWx, PTU	Ethernet/ Modem	—	15.0-in. XGA		
2652-PZx, PYx	Ethernet/ —	802.11b/ Modem	15.0-in. XGA wireless		
2654-P3x	Ethernet/ Modem	—	15.0-in. XGA		
2654-P5x	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	N1.6 G
2652-L5x, L6x					
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+		
2652-D5x, D6x, DFx, DKx	Ethernet/ —	802.11b/ Modem	15.0-in. SXGA+ wireless		
2652-M3x, M4x, MXx, MWx	Ethernet/ Modem	—	15.0-in. SXGA+ IPS		N1.8 G
2652-M5x, M6x	Ethernet/ —	802.11b/ Modem	15.0-in. SXGA+ IPS wireless		
2652-MGx	Ethernet/ Modem	—	15.0-in. SXGA+ IPS	DVD- ROM (8x)	
2652-MKx	Ethernet/ —	802.11b/ Modem	15.0-in. SXGA+ IPS wireless		

(continued)

Model	CDC-slot1/ slot2	Mini PCI adapter	LCD	Right bay device	CPU	
A31p (memory, 256 MB; video memory, 64 MB; HDD, 60 GB)						
2653-H3x, H4x	Ethernet/ Modem	—	15.0-in. UXGA IPS	DVD/ CD-RW combo	N1.7 G	
2653-H5x, H6x, HTU	Ethernet/ Bluetooth	802.11b/ Modem	15.0-in. UXGA IPS wireless			
2653-N3x, N4x	Ethernet/ Modem	—	15.0-in. UXGA IPS			
2653-N5x, N6x, NTU	Ethernet/ Bluetooth	802.11b/ Modem	15.0-in. UXGA IPS wireless			
2653-R3x, R4x	Ethernet/ Modem	—	15.0-in. UXGA IPS	N2.0 G	N2.0 G	
2653-R5x, R6x, RTU	Ethernet/ Bluetooth	802.11b/ Modem	15.0-in. UXGA IPS wireless			
A31p (memory, 512 MB; video memory, 64 MB; HDD, 60 GB)						
2653-HNG	Ethernet/ Bluetooth	802.11b/ Modem	15.0-in. UXGA IPS wireless	DVD/ CD-RW combo	N1.7 G	
2653-L3x, L4x	Ethernet/ Modem	—	15.0-in. UXGA IPS		N1.8 G	
2653-RNx, RPx						
A31p (memory, 1 GB; video memory, 64 MB; HDD, 60 GB)						
2653-HXU	Ethernet/ Modem	—	15.0-in. UXGA IPS	DVD/ CD-RW combo	N1.7 G	
<ul style="list-style-type: none"> • N xxx G: Mobile Intel® Pentium® 4 processor xxxGHz • Cel xxx G: Mobile Intel® Celeron® processor xxx GHz 						

Parts list

Overall



- 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 175.	
1	LCD unit (see "LCD FRUs" on page 164).	
2	Keyboard bezel assembly	
	all models except xxK	46L6401
	models xxK	46L6402
3	Ultrabay Plus guide rail assembly	26P9631
4	Diskette drive (TEAC) OP	08K9606*
	• 2652-xxA, xxJ, xxE, xxC, xxK, xxH, xxT	
	Diskette drive (SONY) OP	08K9607*
	• 2652-xxA, xxJ, xxE, xxC, xxK, xxH, xxT	
	CD-ROM drive 24x (LG) (low power) OP	08K9545*
	• 2652-1xx, 2xx, 83J, 93J, A3x, A4x, A5x, A6x, AEx, AFx, B3x, B4x, B5x, B6x, BEx, BFx, BHx, BKK, J3x, J4x, J5x, J6x, JEx, JFx, JSx, JTU, JUU, K3x, K4x, K5x, K6x, KEx, KFx, KxK	
	• 2653-JUU	
	CD-ROM drive 24x (TEAC) OP	27L3436*
	• 2652-1xx, 2xx, 83J, 93J, A3x, A4x, A5x, A6x, AEx, AFx, B3x, B4x, B5x, B6x, BEx, BFx, BHx, BKK, J3x, J4x, J5x, J6x, JEx, JFx, JSx, JTU, JUU, K3x, K4x, K5x, K6x, KEx, KFx, KxK	
	• 2653-JUU	
	DVD drive 8x (MKE) OP	08K9648*
	• 2652-3xx, 4xx, AGx, AHx, APx, AKC, BGx, BxG, BHH, BHT, BPx, BKC, CxC, CxG, JxB, JxC, JxH, JxT, KxH, KPB, KxC, KxG, KxT, MxC	
	• 2654-4xx	
	• 2653-DGC, DKC	
	DVD drive 8x (HITACHI) OP	08K9646*
	• 2652-3xx, 4xx, AGx, AHx, APx, AKC, BGx, BxG, BHH, BHT, BPx, BKC, CxC, CxG, JxB, JxC, JxH, JxT, KxH, KPB, KxC, KxG, KxT, MxC	
	• 2654-4xx	
	• 2653-DGC, DKC	
	DVD drive 8x (MKE LW) OP	27L4351*
	• 2652-P3x, P4x, P5x, P6x, PxC, PxG, PTU	
	• 2654-P3x, P5x	

(continued)

Parts list

No.	FRU	P/N
4	DVD drive 8x (H-L LW) OP • 2652-P3x, P4x, P5x, P6x, PxG, PTU • 2654-P3x, P5x	27L4355*
	CD-RW drive (TEAC) OP • 2652-AUU, C3x, C4x, C5x, C6x, CTU, E5J, E6J • 2653-AUU • 2654-C3x, C4x, C5x, C6x	27L4297*
	CD-RW drive (SONY) OP • 2652-AUU, C3x, C4x, C5x, C6x, CTU, E5J, E6J • 2653-AUU • 2654-C3x, C4x, C5x, C6x	27L4231*
	DVD/CD-RW combo drive (TOSHIBA) • 2652-6xx • 2653-6xx	27L4249*
	DVD/CD-RW combo drive (KME) • 2652-Dxx, M3x, M4x, M5x, M6x, MxG • 2653-Hxx, N3x, N4x, N5x, N6x, L3x, L4x, NTU	27L4359*
	DVD/CD-RW combo drive (HLDS) • 2653-R3x, R4x, R5x, R6x, RNx, RPx	08K9820
	DVD/CD-RW combo drive (TOSHIBA) • 2653-R3x, R4x, R5x, R6x, RNx, RPx	08K9832
	Travel cover OP	26P9860*
For optional Ultrabay 2000 devices and Ultrabay Plus devices, see "Optional FRUs" on page 179.		
5	Fan assembly for A30/A30p	26P9630
	Fan assembly • 2652-Axx, Dxx, Mxx • 2653-Axx, Hxx, Lxx, Nxx	46L4697
	Fan assembly • 2652-Pxx • 2653-Rxx • 2654-Pxx	62P4092
6	DIMM for A30/A30p	
	128-MB SDRAM SO DIMM (PC133)	19K4653*
	256-MB SDRAM SO DIMM (PC133)	19K4655*
	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*
	For optional DIMM, see "Optional FRUs" on page 179.	

(continued)

No.	FRU	P/N
7	Secure chip <ul style="list-style-type: none"> • 2653-6xx 	26P8084
	Secure chip <ul style="list-style-type: none"> • 2653-Hxx 	26P8234
8	Sub card for PC Card slot <ul style="list-style-type: none"> • 2652-all • 2654-all • 2653-all except 6xx, Hxx, Nxx, Lxx, Rxx 	26P8079
	Sub card for PC Card slot <ul style="list-style-type: none"> • 2653-6xx, Hxx, Nxx, Lxx, Rxx 	26P8246
9	Mini PCI 56k/802.11b combo card for A30/A30p OP <ul style="list-style-type: none"> • 2652-x5x, xCx 	26P8092*
	Mini PCI 56k/802.11b combo card <ul style="list-style-type: none"> • 2652-x5x, x6x, xFx, xKx, xMx, xYx, xZx • 2653-x5x, x6x, NTU, NMU, xMx, xTx • 2654-x5x 	12P3863
	Mini PCI combo card, Intel OP	06P3809*
	Mini PCI 56k/3Com Ethernet combo card OP	22P6753*
10	Ethernet daughter card <ul style="list-style-type: none"> • all models except xAx 	26P8181*
11	Modem daughter card <ul style="list-style-type: none"> • 2652-x1x, x2x, x3x, x4x, xAx, xBx, xEx, xGx, xHx, xPx, xXx, xWx, xVx, xTx, xSx, xLx • 2653-x3x, x4x, xNx, xPx, xLx • 2654-x3x, x4x, xBx 	26P8256*
	Bluetooth daughter card OP <ul style="list-style-type: none"> • 2653-65x, 66x, H6x • 2653-R5x, R6x 	12P3872*
12	Antenna for Bluetooth <ul style="list-style-type: none"> • 2653-65x, 66x, H6x • 2653-R5x, R6x 	27L0685
13	Base cover for A30/A30 series	
	Base cover for 2652 WW <ul style="list-style-type: none"> • 2652-1Ax except 1AC • 2652-13x except 13C, 13T • 2652-14x except 14C, 14T • 2652-1Bx except 1BC, 1BT • 2652-23x except 23J, 23K • 2652-24x except 24J, 24K • 2652-2Bx except 2BJ • 2652-33x except 33C, 33K, 33T • 2652-34x except 34C, 34K, 34T • 2652-3Bx except 3BC, 3BT • 2652-43x except 43C, 43J, 43K, 43T • 2652-44x except 44C, 44J, 44K, 44T • 2652-4Bx except 4BC, 4BJ, 4BK, 4BT • 2652-1NG, 1TU, 4TU • 2652-xVG, xWG, xXG, xRG, xSG, xTG 	26P9620

(continued)

Parts list

No.	FRU	P/N
13	Base cover for A30/A30 series	
	Base cover for 2652 China • 2652-1AC, 13C, 14C, 1BC, 33C, 34C, 3BC, 43C, 44C, 4BC	26P9623
	Base cover for 2652 Korea • 2652-23K, 24K, 33K, 34K, 43K, 44K, 4BK	26P9626
	Base cover for 2652 Taiwan • 2652-13T, 14T, 1BT, 33T, 34T, 3BT, 43T, 44T, 4BT	27L6762
	Base cover for 2652 Japan • 2652-23J, 24J, 2BJ, 43J, 44J, 4BJ, 83J, 93J	46P3052
	Base cover for 2652 wireless WW • 2652-35x except 35K, 35T • 2652-36x except 36K, 36T • 2652-3Cx except 3CT • 2652-45x except 45C, 45K, 45T • 2652-46x except 46C, 46K, 46T • 2652-4Cx except 4CC, 4CK, 4CT	27L6753
	Base cover for 2652 wireless China • 2652-45C, 46C, 4CC	27L6756
	Base cover for 2652 wireless Korea • 2652-35K, 36K, 3CK, 45K, 46K, 4CK	27L6759
	Base cover for 2652 Taiwan • 2652-35T, 36T, 3CT, 45T, 46T, 4CT	27L6763
	Base cover for 2653 WW • 2653-63x except 63C, 63K, 63T • 2653-64x except 64C, 64K, 64T	26P9621
	Base cover for 2653 China • 2653-63C, 64C	26P9624
	Base cover for 2653 Korea • 2653-63K, 64K	26P9627
	Base cover for 2653 Taiwan • 2653-63T, 64T	27L6764
	Base cover for 2653 wireless WW • 2653-65x except 65C, 65K, 65T • 2653-66x • 2653-6TU	27L6754
	Base cover for 2653 wireless China • 2653-65C	27L6757
	Base cover for 2653 wireless Korea • 2653-65K	27L6760
	Base cover for 2653 wireless Taiwan • 2653-65T	27L6765
	Base cover for 2654 WW • 2654-44x except 44C, 44K, 44T • 2654-4Bx except 4BC, 4BK, 4BT	26P9622

(continued)

No.	FRU	P/N
13	Base cover for A30/A30 series	
	Base cover for 2654 China • 2654-44C, 4BC	26P9625
	Base cover for 2654 Korea • 2654-44K, 4BK	26P9628
	Base cover for 2654 Taiwan • 2654-44T, 4BT	27L6766
	Base cover for 2654 wireless WW • 2654-45x, except 45C, 45K, 45T • 2654-46x except 46C, 46K, 46T • 2654-4Cx except 4CC, 4CK, 4CT	27L6755
	Base cover for 2654 wireless China • 2654-45C, 46C, 4CC	27L6758
	Base cover for 2654 wireless Korea • 2654-45K, 46K, 4CK	27L6761
	Base cover for 2654 wireless Taiwan • 2654-45T, 46T, 4CT	27L6767
	Base cover for A31/A31p series	
	Base cover for 2652 WW • 2652-A3x except A3A • 2652-A4x except A4A • 2652-AEx • 2652-B3x except B3A • 2652-B4x • 2652-BxG • 2652-C3x except C3A, C3B, C3C, C3H, C3K, C3T • 2652-C4x except C4A, C4B, C4C, C4H, C4K, C4T • 2652-J3x except J3A, J3B, J3H, J3C, J3T • 2652-J4x except J4A, J4B, J4Hx, J4T • 2652-JLU, JTU, JSx • 2652-K3x except K3A, K3C, K3K, K3T • 2652-K4x except K4H, K4K, K4T • 2652-KxG, KLU	46L5006
	Base cover for 2652 WW • 2652-P3U, P4U, P3F, P4F, P3P, P4P, P3S, P4S, P3X, P4X, P3M, P4M, P3G, P4G, PXG, PWG	62P4062
	Base cover for 2652 China • 2652-AGC, APC, BGC, BPC, C3C, C4C, CGC, JGC, JPC, K3C, KEC, KGC, KPC	46L5008
	Base cover for 2652 China • 2652-P3C, P4C, PGC	62P4066
	Base cover for 2652 Korea • 2652-BGK, BHK, C3K, C4K, K3K, K4K, KGK, KHK	46L5010
	Base cover for 2652 Korea • 2652-P3K, P4K	62P4068

(continued)

Parts list

No.	FRU	P/N
13	Base cover for A31/A31p series	
	Base cover for 2652 Taiwan • 2652-AGT, AHT, APT, BGT, BHT, BPT, C3T, C4T, JxT, K3T, K4T, KET, KGT, KHT, KPT	46L5012
	Base cover for 2652 Taiwan • 2652-P3T, P4T	62P4070
	Base cover for 2652 WW IIPC H • 2652-AxA, AxB, AxH, BxA, BxB, BxH, C3A, C3H, C4A, C4H, JxH, JxB, K3A, K4H, KEB, KHH, KPH, KPB	46L6573
	Base cover for 2652 WW IIPC H • 2652-P3A, P4A, P3J, P4J, P3E, P4E, P3H, P4H	62P4064
	Base cover for 2652 wireless WW • 2652-A5x except A5A • 2652-A6x, AFx, AUU • 2652-B5x, B6x • 2652-E5J, E6J • 2652-C5x except C5A, C5H, C5C, C5K, C5T • 2652-C6x except C6A, C6H, C6C, C6K, C6T • 2652-K5U, K5F, K5M • 2652-KMU, MMU • 2652-M5x except M5A, M5H, M5C, M5K, M5T • 2652-M6x except M6A	46L5007
	Base cover for 2652 wireless WW • 2652-P5U, P6U, P5F, P6F, P5P, P6P, P5S, P6S, P5X, P6X, P5M, P6M, P5G, P6G, PZG, PYG	62P4063
	Base cover for 2652 wireless China • 2652-AKC, BKC, C5C, CKC, C6C, K5C, KKC, MKC	46L5009
	Base cover for 2652 wireless China • 2652-P5C, P6C, PKC	62P4067
	Base cover for 2652 wireless Korea • 2652-BKK, C5K, C6K, K5K, KKK	46L5011
	Base cover for 2652 wireless Korea • 2652-P5K, P6K	62P4069
	Base cover for 2652 wireless Taiwan • 2652-C5T, C6T	46L5013
	Base cover for 2652 wireless Taiwan • 2652-P5T, P6T	62P4071
	Base cover for 2652 wireless WW IIPC H • 2652-A5A, B5A, C5A, C5H, C6A, C6H, K5A	46L6574

(continued)

No.	FRU	P/N
13	Base cover for A31/A31p series	
	Base cover for 2652 wireless WW IIPC H • 2652-P5A, P6A, P5J, P6J, P5E, P6E, P5H, P6H	62P4065
	Base cover for 2653 WW • 2653-D3x except D3A, D3H, D3K, D3T • 2653-D4x except D4A, D4K • 2653-DxG, DLU • 2653-H3x except H3H, H3C, H3K, H3T • 2653-H4x except H4H, H4C, H4K, H4T • 2653-HLU • 2653-N3x except N3H, N3C, N3K, N3T • 2653-N4x except N4H, N4C, N4K, N4T • 2653-L3G, L4G • 2653-NLU	46L4689
	Base cover for 2653 WW • 2653-R3U, R4U, R3P, R3S, R3X, R3G, R4G, RNG, RPG	62P4072
	Base cover for 2653 China • 2653-DGC, H3C, H4C	46L4691
	Base cover for 2653 China • 2653-R3C, R4C	62P4076
	Base cover for 2653 Korea • 2653-D3K, D4K, H3K, H4K	46L4693
	Base cover for 2653 Korea • 2653-R3K, R4K	62P4078
	Base cover for 2653 Taiwan • 2653-D3T, H3T, H4T	46L4695
	Base cover for 2653 Taiwan • 2653-R3T, R4T	62P4080
	Base cover for 2653 WW IIPC H • 2653-D3A, D3H, D4A, H3H, H4H	46L6575
	Base cover for 2653 WW IIPC H • 2653-R3H, R4H	62P4074
	Base cover for 2653 wireless WW • 2653-D5x except D5A, D5H, D5K, D5T • 2653-D6x except D6A • 2653-DMU • 2653-H5x except H5A, H5H, H5C, H5K, H5T • 2653-H6x except H6A, H6H, H6C, H6T • 2653-N5x except N5A, N5H, N5C, N5K, N5T • 2653-N6x except N6A, N6H, N6C, N6T • 2653-NTU, NMU	46L4690
	Base cover for 2653 wireless WW • 2653-R5U, R6U, R5F, R6F, R5M, R6M, R5G, R6G	62P4073

(continued)

Parts list

No.	FRU	P/N
13	Base cover for A31/A31p series	
	Base cover for 2653 wireless China • 2653-DKC, H5C, H6C	46L4692
	Base cover for 2653 wireless China • 2653-R5C, R6C	62P4077
	Base cover for 2653 wireless Korea • 2653-D5K, H5K	46L4694
	Base cover for 2653 wireless Korea • 2653-R5K	62P4079
	Base cover for 2653 wireless Taiwan • 2653-D5T, H5T, H6T	46L4696
	Base cover for 2653 wireless Taiwan • 2653-R5T, R6T	62P4081
	Base cover for 2653 wireless WW IIPC H • 2653-D5A, D5H, D6A, H5A, H5H, H6A, H6H	46L6576
	Base cover for 2653 wireless WW IIPC H • 2653-R5A, R6A, R5J, R6J, R3H, R4H	62P4075
	Base cover for 2654 WW • 2654-C3x except C3A, C3H, C3C, C3K, C3T • 2654-C4x except C4A, C4H, C4C, C4K, C4T	46L5014
	Base cover for 2654 WW • 2654-P3U, P3F, P3P, P3S, P3X, P3M, P3G	62P4082
	Base cover for 2654 China • 2654-C3C, C4C	46L5016
	Base cover for 2654 China • 2654-P3C	62P4086
	Base cover for 2654 Korea • 2654-C3K, C4K	46L5018
	Base cover for 2654 Korea • 2654-P3K	62P4088
	Base cover for 2654 Taiwan • 2654-C3T, C4T	46L5020
	Base cover for 2654 Taiwan • 2654-P3T	62P4090
	Base cover for 2654 WW IIPC H • 2654-C3A, C3H, C4A, C4H	46L6577
	Base cover for 2654 WW IIPC H • 2654-P3A, P3J, P3E, P3H	62P4084
	Base cover for 2654 wireless WW • 2654-C5x except C5A, C5H, C5C, C5K, C5T • 2654-C6x except C6A, C6H, C6C, C6K, C6T	46L5015
	Base cover for 2654 wireless WW • 2654-P5U, P5F, P5P, P5S, P5X, P5M, P5G	62P4083

(continued)

No.	FRU	P/N
13	Base cover for A31/A31p series	
	Base cover for 2654 wireless China • 2654-C5C, C6C	46L5017
	Base cover for 2654 wireless China • 2654-P5C	62P4087
	Base cover for 2654 wireless Korea • 2654-C5K, C6K	46L5019
	Base cover for 2654 wireless Korea • 2654-P5K	62P4089
	Base cover for 2654 wireless Taiwan • 2654-C5T, C6T	46L5021
	Base cover for 2654 wireless Taiwan • 2654-P5T	62P4091
	Base cover for 2654 wireless WW IIPC H • 2654-C5A, C5H, C6A, C6H	46L6578
	Base cover for 2654 wireless WW IIPC H • 2654-P5A, P5J, P5E, P5H	62P4085
14	Hard-disk drive (20.0 GB), STD OP • 2652-1xx, 2xx except xxE • 2652-A3x, A4x, A5x, A6x, Bxx	27L4286*
	Hard-disk drive (20.0 GB), HITACHI OP • 2652-1xx, 2xx except xxE • 2652-A3x, A4x, A5x, A6x, Bxx	08K9533*
	Hard-disk drive (30 GB), HITACHI OP • 2652-3xx, 4xx • 2652-AGx, AHx, APx, AKx, Cxx, Exx • 2654-4xx	08K9592*
	Hard-disk drive (30 GB), STD OP • 2652-3xx, 4xx • 2652-AGx, AHx, APx, AKx, Cxx, Exx • 2654-4xx	27L4291*
	Hard-disk drive (40 GB), STD OP • 2652-Dxx	08K9683*
	Hard-disk drive (40 GB), HITACHI OP • 2652-Dxx	08K9767*
	Hard-disk drive (48 GB), STD OP • 2652-4xx • 2653-4xx	08K9599*
	Hard-disk drive (60 GB), STD OP • 2652-Hxx	08K9700*
15	Cover, hard-disk drive	27L6768*

(continued)

Parts list

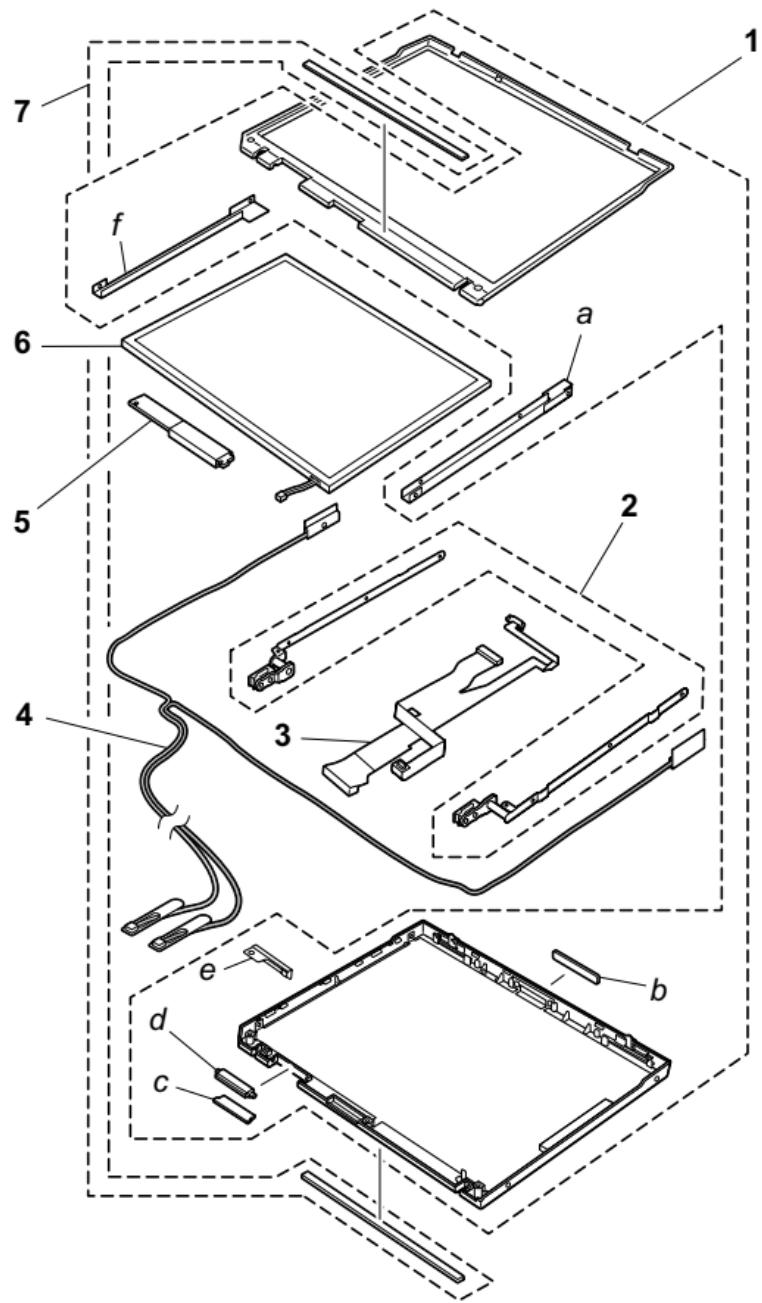
No.	FRU	P/N
16	Battery pack for A30/A30p	
	Battery pack, Li-Ion (6 cell) PANASONIC (all models except xxJ, xxE) OP	02K6793*
	models xxJ, xxE OP	02K6795*
	Battery pack, Li-Ion (6 cell) SANYO (all models except xxJ, xxE) OP	02K6794*
	models xxJ, xxE OP	02K6796*
	Battery pack for A31/A31p	
	Battery pack, 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	46L6361*
19	Speaker assembly	02K5988
20	Ultrabay LED card	26P8138
21	Backup battery	02K6572*
22	Modem/Ethernet cable	27L0726
23	System board for A30/A30p	
	• 2652-1xx, 2xx, 3xx, 4xx	12P3776
	• 2654-4xx	
	• 2653-6xx	12P3773
	System board for A31/A31p	
	System board assembly M7 16 MB	26P8254
	• 2652-Axx, Bxx, Cxx, Jxx, Kxx	26P8397
	System board assembly M7 32 MB	26P8231
	• 2652-Dxx, Exx, Mxx	26P8398
	System board assembly M7 64 MB	26P8232
	• 2653-Dxx, Hxx	26P8399
	System board assembly M7 16 MB CR with security chip	26P8428
	• 2652-P5x, P6x, PKx, PZx, PYx	
	• 2654-P5x	
	System board assembly M7 16 MB CR without security chip	26P8429
	• 2652-P3x, P4x, PGx, PXx, PWx	
	• 2654-P3x	
	System board assembly M7 64 MB with security chip	26P8430
	• 2653-R3x, R4x, R5x, R6x, RNx, RPx	

(continued)

No.	FRU	P/N
24	CPU assembly for A30/A30p	
	Pentium III 933 MHz • 2652-1xx, 2xx	26P8001
	Pentium III 1.0 GHz - M • 2652-3xx	26P8122
	CPU assembly for A30/A30p	
	Pentium III 1.13 GHz - M • 2652-4xx • 2654-4xx	26P8082
	Pentium III 1.2 GHz - M • 2653-6xx	26P8005
	Celeron 1.06 GHz • 2652-83J	26P8374
		26P8467
	Celeron 1.2 GHz • 2652-93J	26P8375
		26P8468
	CPU assembly for A31/A31p	
	Pentium 4, 1.4 GHz • 2652-Axx, Bxx	26P8250
	Pentium 4, 1.5 GHz • 2652-Cxx • 2654-Cxx	26P8251
	Pentium 4, 1.6 GHz • 2652-Dxx, Jxx, Kxx	26P8242
	Pentium 4, 1.7 GHz • 2653-Dxx, Hxx	26P8252
	Pentium 4, 1.8 GHz • 2652-Mxx • 2653-Lxx, Nxx	26P8327
	Pentium 4, 1.9 GHz • 2652-P3x, P4x, P5x, P6x, PGx, PKx, PXx, PWx, PZx, PYx • 2654-P3x, P5x	26P8431
	Pentium 4, 2.0 GHz • 2653-R3x, R4x, R5x, R6x, RNx, RPx	26P8432
25	Ultrabay 2000 guide rail assembly	26P9632
26	Hinge cap	26P9643
27	Keyboard* (see "Keyboard" on page 168.)	
28	Pointing stick cap	26P9212*
29	I/O plate for A31/A31p	46P2585
—	Telephone cable (SAN TAI)	27L0700*
—	Recovery CD (see "Recovery CDs" on page 169.)	
—	AC adapter (see "AC adapters" on page 178.)	

LCD FRUs

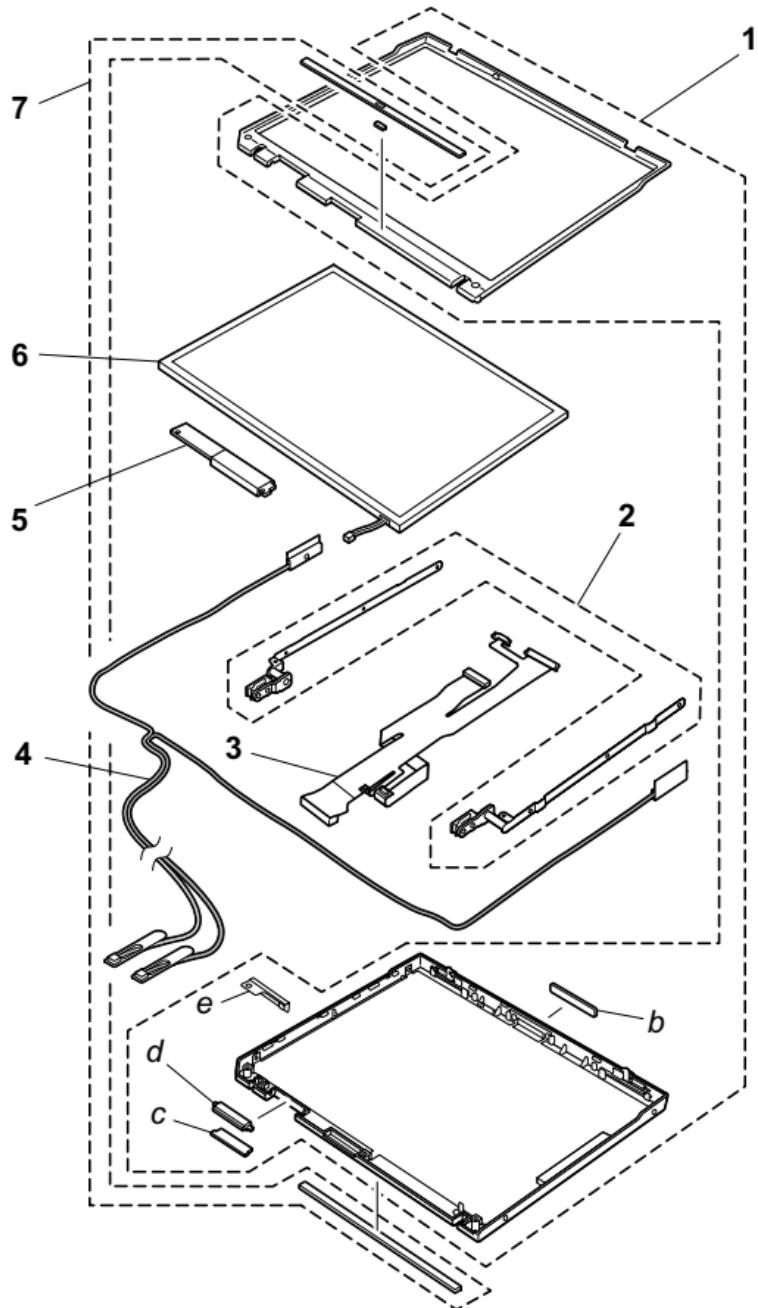
14.1-in. XGA TFT



No.	FRU	P/N
a - f	See "LCD miscellaneous parts" on page 176.	
1	LCD cover kit 14.1-in. (except models xxK)	11P8314
	models xxK	11P8315
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
	LCD panel, 14.1 SGA (HITACHI)	11P8309
7	Clear plate for A30/A30p	46L4904
	Clear plate for A31/A31p	46L5024

Parts list

15.0-in. XGA TFT



No.	FRU	P/N
<i>b - e</i>	See "LCD miscellaneous parts" on page 176.	
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) for A30	05K9965
	LCD panel, 15.0 SXGA+ (SAMSUNG) V2	11P8298
	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)

Windows 98 is preinstalled as the operating system in the following models:

- 2652-1Ax, 1Bx, 1RG, 1VG, 2Bx, 3Bx, 3Cx, 3RG, 3VG, 4Bx, 4Cx
- 2654-4Bx

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)

Windows 2000 is preinstalled as the operating system in the following models:

- 2652-14x, 1TU, 1SG, 1WG, 24x, 34x, 36x, 3SG, 3WG, 44x, 46x, 4TU
- 2653-64x, 66x
- 2654-44x

Language	P/N
Arabic	14P9104*
Arabic (modem 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 XP Home Edition (A30/A30p)

Windows XP Home Edition is preinstalled as the operating system in model 2652-1NG.

Language	P/N
Swedish	32P6259*

For Windows XP professional (A30/A30p)

Windows XP professional is preinstalled as the operating system in the following models:

- 2652-13x, 1TG, 1XG, 23x, 33x, 35x, 3TG, 3XG, 43x, 45x, 83J, 93J
- 2653-63x, 65x, 6TU

Language	P/N
Arabic	14P9005*
Arabic (modem enabled)	14P9004*
Chinese, Simplified	46P5588*
Chinese, Traditional	46P5582*
Czech	14P9006*
Danish	14P8995*
Dutch	14P9002*
English, U.K.	32P7134*
English, U.S.	32P7133*
Finnish	14P9001*
French, Canadian	32P7135*
French, European	32P7137*
German	32P7138*
Greek	14P9010*
Hebrew	14P9007*
Hungarian	14P9011*
Italian	32P7140*
Japanese	46P4450*
Japanese (for 2652-93J)	67P4800*
Norwegian	14P9003*
Polish	14P9008*
Portuguese	14P8994*
Russian	14P9012*
Slovak	14P9014*
Slovenian	14P9013*
Spanish, European	32P7139*
Spanish, Latin American	32P7136*
Swedish	14P8999*
Thai	14P9015*
Turkish	14P9009*

For Windows 2000 (A31/A31p)

Language	P/N by models	
	A4x, A6x, AHx, B4x, B6x, BHx, BSG, BWG, C4x, C6x, CTU, CWG, CYG, D4x, D6x, DWG, E6J, H4x, H6x, HNG, J4x, J6x, JHx, JTU, K4x, K6x, KHx, KWG, M4x, M6x, MWG, N4x, N6x, L4G	P4x, P6x, PTU, R4x, R6x, RPG
Arabic	32P6838*	01R5916*
Chinese, Simplified	62P8553*	67P4899*
Chinese, Traditional	62P8550*	67P4896*
Chinese, Traditional (Hong Kong S.A.R.)	62P8556*	67P4902*
Czech	32P6839*	01R5917*
Danish	32P6829*	01R5907*
Dutch	32P6836*	01R5914*
English, U.K.	32P6825*	01R5905*
English, U.S.	32P6824*	01R5904*
Finnish	32P6835*	01R5913*
French, Canadian	32P6826*	N/A
French, European	32P6830*	01R5908*
German	32P6831*	01R5909*
Greek	32P6843*	01R5921*
Hebrew	32P6840*	01R5918*
Hungarian	32P6844*	01R5922*
Italian	32P6834*	01R5912*
Japanese	46P6216*	67P4762*
Norwegian	32P6837*	01R5915*
Polish	32P6841*	01R5919*
Portuguese	32P6828*	01R5906*
Russian	32P6845*	01R5923*
Spanish, European	32P6832*	01R5910*
Spanish, Latin American	32P6827*	N/A
Swedish	32P6833*	01R5911*
Turkish	32P6842*	01R5920*

For Windows XP professional (A31/A31p)

Language	P/N by models	
	A3x, A5x, AKC, AGB, AGC, AGH, AGT, AUX, B3x, B5x, BGC, BGK, BGT, BKx, BQG, BTG, BXG, C3x, C5x, CGC, CKC, CXG, CZG, D3x, D5x, DGC, DKC, DXG, E5J, H3x, H5x, HTU, J3x, J5x, JGx, JKC, JSx, JUU, K3x, K5x, KGx, KKC, KGK, KKK, KXG, KQG, KTG, M3x, M5x, MGC, MKC, MxG, N3x, N5x, L3G, NTU	P3x, P5x, PGC, PKC, R3x, R5x, RTU, RNG, PZx
Arabic	32P7043*	01R6036*
Chinese, Simplified	62P8555*	67P4901*
Chinese, Traditional	62P8552*	67P4898*
Chinese, Traditional (Hong Kong S.A.R.)	62P8558*	67P4904*
Czech	32P7044*	01R6037*
Danish	32P7034*	01R6027*
Dutch	32P7041*	01R6034*
English, U.K.	32P7030*	01R6025*
English, U.S.	32P7029*	01R6024*
Finnish	32P7040*	01R6033*
French, Canadian	32P7031*	N/A
French, European	32P7035*	01R6028*
German	32P7036*	01R6029*
Greek	32P7048*	01R6041*
Hebrew	32P7045*	01R6038*
Hungarian	32P7049*	01R6042*
Italian	32P7039*	01R6032*
Japanese	46P6219*	67P4768*
Norwegian	32P7042*	01R6035*
Polish	32P7046*	01R6039*
Portuguese	32P7033*	01R6026*
Russian	32P7050*	01R6043*
Spanish, European	32P7037*	01R6030*
Spanish, Latin American	32P7032*	N/A
Swedish	32P7038*	01R6031*
Turkish	32P7047*	01R6040*

For Windows XP Home Edition (A31/A31p)

Language	P/N by models	
	AEx, AFx, APx, BEx, BFx, BPx, BVG, BRG, DEx, DFx, JEx, JFx, JPx, KEx, KFx, KPx, KVG	AEx, AFx, APx, BEx, BFx, BPx, BVG, BRG, DEx, DFx, JEx, JFx, JPx, KEx, KFx, KPx, KVG
Arabic	32P6941*	01R5976*
Chinese, Simplified	62P8554*	67P4900*
Chinese, Traditional	62P8551*	67P4897*
Chinese, Traditional (Hong Kong S.A.R.)	62P8557*	67P4903*
Czech	32P6942*	01R5977*
Danish	32P6932*	01R5967*
Dutch	32P6939*	01R5974*
English, U.K.	32P6928*	01R5965*
English, U.S.	32P6927*	01R5964*
Finnish	32P6938*	01R5973*
French, Canadian	32P6929*	N/A
French, European	32P6933*	01R5968*
German	32P6834*	01R5969*
Greek	32P6946*	01R5981*
Hebrew	32P6943*	01R5978*
Hungarian	32P6947*	01R5982*
Italian	32P6937*	01R5972*
Japanese	46P6222*	N/A
Norwegian	32P6940*	01R5975*
Polish	32P6944*	01R5979*
Portuguese	32P6931*	01R5966*
Russian	32P6948*	01R5983*
Spanish, European	32P6935*	01R5970*
Spanish, Latin American	32P6930*	N/A
Swedish	32P6936*	01R5971*
Turkish	32P6945*	01R5980*

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)

Parts list

FRU	P/N
<p>LCD miscellaneous parts:</p> <ul style="list-style-type: none"> • LCD latch, right • LCD latch, left • LCD latch spring • <i>(b)</i> Blank cap, not UltraPort • Blank cap, UltraPort • <i>(a)</i> Bracket, LCD holder (right) • <i>(f)</i> Bracket, LCD holder (left) • <i>(d)</i> FPC holder, upper • <i>(c)</i> FPC holder, lower • <i>(e)</i> 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 164 and 166.</p>	11P8316
<p>System miscellaneous parts for A30/A30p:</p> <ul style="list-style-type: none"> • <i>(b)</i> Blank cap (RJ45) • <i>(c)</i> Blank cap (Video-in) • <i>(f)</i> Blank cap (1394) • <i>(h)</i> 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 • <i>(k)</i> Insulator, keyboard CRU • Easy button cover • <i>(a)</i> Fan bracket • <i>(d)</i> LCD connector support • <i>(e)</i> EMI shield, sub card • <i>(g)</i> MiniPCI guide • <i>(i)</i> Cable guide, speaker and bay LED/SW • <i>(j)</i> 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 152.</p>	26P9633

(continued)

FRU	P/N
System board miscellaneous parts for A31, A31p: • 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: • (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 Note: Italicized letters in parentheses are references to the exploded view on page 152.	46L6387

(continued)

Parts list

FRU	P/N
System board miscellaneous parts 3: <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	62P4126

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*

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 or region are usually available only in that country or 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 or region are usually available only in that country or 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: 02R2906

(1P) P/N: 02R2906

