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IBM Mobile Systems

S05L-1768-00

**ThinkPad 560X (2640-60x, 70x)
Hardware Maintenance Manual**

October 1997

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Note

Before using this information and the product it supports, be sure to read the general information under "Notices" on page 99.

First Edition (October 1997)

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About This Manual

This manual contains service and reference information for the IBM ThinkPad 560X (2640-60x, 70x) products. Use this manual along with the advanced diagnostic tests to troubleshoot problems effectively.

The manual is divided into sections as follows:

- The Introduction section provides general information, guidelines, and safety information required to service computers.
- The product-specific section includes service, reference, and product-specific parts information.

Important

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

Before servicing an IBM ThinkPad product, be sure to review the safety information under "Safety Notices (Multi-lingual Translations)" on page 4 and "Safety Information" on page 11.

Related Publications

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

Publication	Part, Form Number
Mobile Systems HMM Volume 1: Laptop, Notebook, Portable, and ThinkPad Computers (Models L40, CL57, N45, N51, P70/P75, ThinkPad 300, 350, 500, 510, 710T, Expansion Unit, Dock I, Dock II)	30H2356, S82G-1501-01
Mobile Systems HMM Volume 2: ThinkPad Computers (Models 340, 355, 360, 370, 700, 701, 720, 750, 755)	30H2357, S82G-1502-03
Mobile Systems HMM Volume 3: ThinkPad Computers (Models 365, 380, 385, 560, 760, SelectaDock)	84H8099, S82G-1503-05
Mobile Systems HMM Volume 4: ThinkPad Computers (Models 380, 385, 560, 760, 765, 770, SelectaDock III)	05L1271, S05L-1270-01
ThinkPad 730T (2524) HMM	82G5497, S82G-5497
ThinkPad Exp. Crtg. (3550) HMS	42G2338, S42G-2338
ThinkPad Exp. Crtg. (3550) HMR	42G2339, S42G-2339
PS/2 FaxConcentrator HMS	15F2262, S15F-2262
PS/2 FaxConcentrator HMR	84F8541, S84F-8541
PS/2 Comm. Cartridge I HMS	10G5993, S10G-5993
PS/2 Comm. Cartridge I HMR	10G5992, S10G-5992
IBM High Speed Internal, PCMCIA Data/Fax Modems	61G1556, S61G-1556

Related Diskettes

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

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

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Introduction

Important Service Information

Important

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

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

Customers in Canada should call IBM HelpPC at 800-565-3344 for assistance or down-load information. The Canadian BBS phone numbers are:

Montreal	514-938-3022
Toronto	905-316-4255
Vancouver	604-664-6464
Winnipeg	204-934-2735

FRU Replacement Strategy

Before Replacing Parts

Ensure that all diskette fixes are installed prior to replacing any FRUs listed in this manual.

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

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

Attention

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

Hard Disk Drive Replacement Strategy:

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

Attention

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

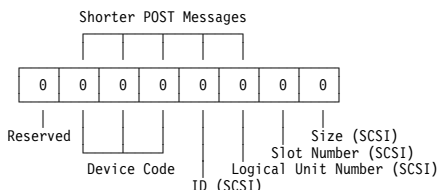
How to Use Error Messages

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

How to Read POST Error Messages

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

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



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

Drive and Diskette Compatibility Matrix

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

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

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

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

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

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

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

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

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

Safety Notices (Multi-lingual Translations)

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

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

Safety Notice 1

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

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

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

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

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

Safety Notice 2

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

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

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

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

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

Safety Notice 3

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

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

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

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

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

Safety Notice 4

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

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

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

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

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

Safety Notice 5

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

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

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

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

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

Safety Notice 6

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

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

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

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

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

Safety Notice 7

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

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

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

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

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

Safety Notice 8

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

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

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

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

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

Safety Information

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

General Safety

Follow these rules to ensure general safety:

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

Attention: Metal objects are good electrical conductors.

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

Electrical Safety

Observe the following rules when working on electrical equipment.

Important

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

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

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

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

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

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

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

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

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

Safety Inspection Guide

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

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

Consider these conditions and the safety hazards they present:

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

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

Checklist:

1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Power-off the computer. Disconnect the power cord.
3. Check the power cord for:
 - a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and frame ground.
 - b. The power cord should be the appropriate type as specified in the parts listings.
 - c. Insulation must not be frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the unit for any obvious unsafe conditions, such as metal filings, contamination, water or other liquids, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Handling Electrostatic Discharge-Sensitive Devices

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

Notes

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

When handling ESD-sensitive parts:

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

Note

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

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

Grounding Requirements

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

Laser Compliance Statement

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

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

CAUTION:

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

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

凡未在这里指明的任何控制用法、调整、行为，
都会导致严重后果。

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

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

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

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

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

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

El uso de controles o ajustes o la ejecución de procedimientos distintos de los aquí especificados

puede provocar la exposición a radiaciones peligrosas.

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

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

DANGER:

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

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

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

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

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

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

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

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

Ked' je laserová jednotka otvorená. Vyhňte sa priamemu pohľadu a nehladte priamo s optickými nástrojmi do lúča a vyhňte sa priamemu vystaveniu lúčov.

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

ThinkPad 560X (2640-60x, 70x)

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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 write operations such as copying, saving, or formatting.** Drives in the computer that you are servicing might have been rearranged, or the drive startup sequence might have been altered. If you select an incorrect drive, data or programs might be overwritten.
- **Replace FRUs only for the correct model.** When you replace a FRU, make sure the model of the machine and FRU part number are correct by referring to the FRU parts list.
- **A FRU should not be replaced because of a single, unreproducible failure.** Single failures can occur from a variety of reasons 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 recurring problem exists. If this is suspected, clear the error log and run the test again. Do not replace any FRUs if log errors do not reappear.
- **Do not replace a nondefective FRU.**

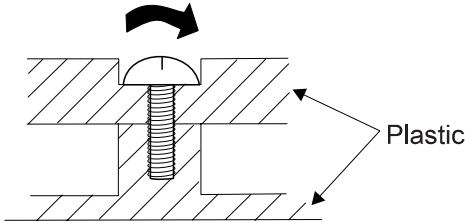
Screw Tightening Information

Loose screws can cause reliability problems. The IBM ThinkPad 560X computer addresses this problem with nylon-coated screws. Tighten screws as follows:

Plastic to Plastic

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

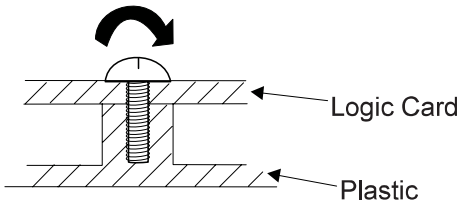
90 degrees more



Logic card to Plastic

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

180 degrees more



Torque Driver

If you have a torque driver, refer to the "Torque" instruction with each step.

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 caused the first error code can result in false error codes being displayed. If no error code is displayed, see if the error symptom is listed in the “Symptom-to-FRU Index” on page 36.

Port Replicator Problems: If you suspect a problem with the port replicator, see “Port Replicator Checkout” on page 29.

How to Diagnose Multiple FRUs: When the adapter or device has more than one FRU, the error code could be caused by any of them. Before replacing multiple FRUs, try removing or exchanging each FRU, one by one in the designated sequence, to see if the symptoms change.

What to Do First: The servicer must include the following in the parts exchange form or parts return form that is attached to the returned FRU.

- ___ 1. Name and phone number of servicer.
- ___ 2. Date of service.
- ___ 3. Date that the machine failed.
- ___ 4. Date of purchase.
- ___ 5. Failure symptoms, error codes appearing on the display, and beep symptoms.
- ___ 6. Procedure index and page number in which the failing FRU was detected.
- ___ 7. Failing FRU name and part number.
- ___ 8. Machine type, model number, and serial number.
- ___ 9. Customer's name and address.

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

Warranty Note

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

The following is not covered under warranty:

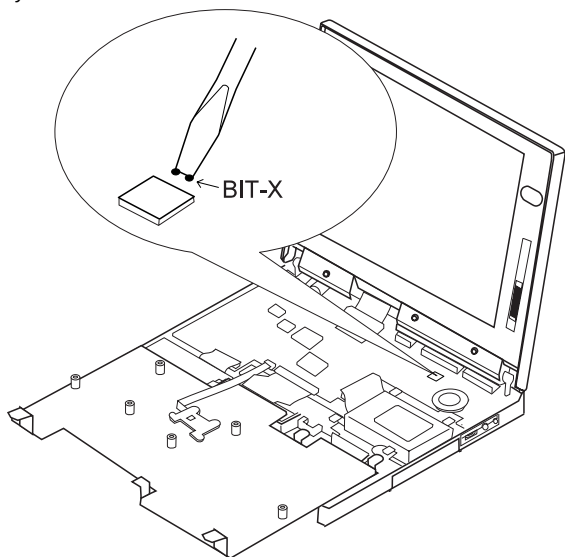
- LCD panel cracked from the application of excessive force or from being dropped.
- Scratched (cosmetic) parts.
- Cracked or broken plastic parts, broken latches, broken pins, or broken connectors caused by excessive force.
- Damage caused by liquid spilled into the system.
- Damage caused by the improper insertion of a PC Card or the installation of an incompatible card.
- Damage caused by foreign material in the FDD.
- Diskette drive damage caused by the diskette drive cover being pressed 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).

The following symptoms might indicate damage caused by nonwarranted activities:

- Missing parts might be a symptom of unauthorized service or modification.
- HDD spindles can become noisy from being subjected to excessive force or from being dropped.
- 19990303 errors can be caused by exposure to strong magnetic fields.

How to Disable the Power-On Password:

1. Power off the computer.
2. Remove the frame (see “1040 Frame” on page 63).
3. Position the keyboard as shown in the following figure.
4. Jumper the two password jumper pads (BIT-X) on the system board.



5. Power on the computer to clear the password.
6. Replace the keyboard and the frame.
Note: When replacing the frame, make sure that it fits correctly. If it is not in place, the click buttons of the TrackPoint III will not work. (See the note in “1050 Keyboard Unit” on page 66.)
7. Replace the screws.
8. Power on the computer and wait until the POST ends.
9. Verify that the password prompt does not appear.

To reactivate the password, set the password again.

Power Shutdown Switch

The power shutdown switch resets the system (regardless of the microcode status) and forces the power off. Use this push button to power off when power is not completely off or the microcode is in a hung state.

See “Bottom View” on page 86 for the power shutdown switch.

Checkout Guide

Use the following procedure as a guide for computer problems. The diagnostic tests are intended to test only IBM products.

1. Obtain the failing symptoms in as much detail as possible.
2. Verify the symptoms by attempting to re-create the failure by running the diagnostic test or by repeating the same operation. (To run the diagnostics, refer to "Running the Diagnostics" on page 47.
3. Use the following table with the verified symptom to determine which page to go to. Search the symptoms column, and find the description that best matches your symptom; then go to the page shown in the "Go To" column.

Symptoms (Verified)	Go To
Power failure. (The power indicator does not go on or stay on.)	"Power Systems Checkout" on page 30.
POST does not complete. No beep or error codes are indicated.	"Symptom-to-FRU Index" on page 36, and then use the No Beep Symptoms table.
POST beeps, but no error codes are displayed.	"Symptom-to-FRU Index" on page 36, and then use the Beep Symptoms table.
POST detected an error and displayed numeric error codes.	"Symptom-to-FRU Index" on page 36, and then use the Numeric Error Codes table.
The diagnostic test detected an error and displayed a FRU code.	"Running the Diagnostics" on page 47.
The configuration is not the same as the installed devices.	"Checking the Installed Devices List" on page 49.
Other symptoms (such as LCD display problems).	"Symptom-to-FRU Index" on page 36, and then use the Other Symptoms table.
Symptoms cannot be re-created. (Intermittent problems.)	Use the customer reported symptoms and go to "Symptom-to-FRU Index" on page 36.

Diskette Drive Checkout

Do the following to isolate the problem to a controller, drive, or diskette. A scratch, write-enabled, nondefective 2HD diskette is required.

FDD-1 represents an external diskette drive attached through the external diskette drive connector. *FDD-2* represents the external diskette drive attached to the port replicator.

Attention

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

Do the following to select the test device. See "Running the Diagnostics" on page 47 for details.

1. Go to the advanced diagnostic mode by pressing **Ctrl+A** from the test menu of the Easy-Setup.
2. Click on **Exit** twice.
3. Click on **FDD-1** or **FDD-2** to start the test.
4. Insert the **blank** diskette when instructed and follow the instructions on the screen.
5. If the controller test detects an error, FRU code 10 appears. Replace the system board.
6. If the controller test runs without errors, the drive read/write tests start automatically. If a drive test detects an error, FRU code 50 for FDD-1 or 51 for FDD-2 appears. If the diskette itself is known to be good, replace the drive.
7. If the FDD-2 test detects an error, move the drive to the computer's diskette drive connector directly, if possible, and test it again as FDD-1.

If no errors occur in the FDD-1 position, the drive is not defective. Go to "Port Replicator Checkout" on page 29 to isolate the port replicator problem.

Keyboard or Auxiliary Input Device Checkout

Remove the external keyboard if the internal keyboard is to be tested.

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

If the keyboard cable connection is correct, run the Keyboard Test. See "Running the Diagnostics" on page 47 for details.

Note: When the **Fn** key is pressed, a black square briefly appears.

If the tests detect a keyboard problem, do the following one at a time to correct the problem. Do not replace a nondefective FRU:

- Reseat the keyboard cable.
- Replace the keyboard.
- Replace the system board.

The following auxiliary input devices are supported for this computer:

- Numeric keypad
- Mouse (PS/2 compatible)
- External keyboard (with keyboard/mouse cable)

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

If the problem does not recur, recheck the connector.

If the problem is not corrected, replace the device and then the system board.

Memory Checkout

DIMM cards are available for increasing memory capacity.

DIMM	Displayed Value
No DIMM installed	32192 KB
8 MB	40384 KB
16 MB	48576 KB
32 MB	64960 KB
64 MB	97728 KB

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

Use the following procedure to isolate memory problems.

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

See “Running the Diagnostics” on page 47 for details.

If memory problems occur intermittently, use the loop option to repeat the test. When the test detects an error, an error log is printed on the printer connected to the parallel port. See “Displaying the Error Log” on page 48 for more information.

System Programs in Flash Memory: System setup programs and diagnostic tests are stored in the flash memory.

Flash Memory Update: The flash memory update is required for the following conditions:

- New versions of system programs
- New features or options

To update the flash memory, do the following:

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

Port Replicator Checkout

Use the following procedure to isolate a port replicator problem. The port replicator attaches to the system expansion connector at the bottom of the computer.

1. Power off the computer.
2. Remove the failing devices from the port replicator.
3. Unplug the AC adapter from the port replicator, if attached.
4. Remove the port replicator from the computer.
5. Reconnect the failing device directly to the computer. (If another device is already connected to the computer, remove it first.)
6. Go to the "Running the Diagnostics" on page 47 and run the diagnostics.
7. If the advanced diagnostic device test did not find an error, suspect a problem with the port replicator of the system expansion bus.
8. Power off the computer and reconnect the port replicator.
9. Power on the computer and run the following advanced diagnostic tests:
 - Serial port test with the wrap plug (P/N 72X8546) installed on the port replicator
 - Universal serial bus test with the test cable (P/N 05K2580) [see "Universal Serial Bus (USB) Test" on page 48]
 - Parallel port test with the wrap plug (P/N 72X8546) installed on the port replicator
 - PC Card (PCMCIA) test with the PC test card (P/N 35G4703) installed
 - FDD-2 device test on the failing device with a scratch diskette
10. If diagnostic errors appear, replace the port replicator or the diskette drive. If the problem remains after the replacement, replace the system board.
11. If power problem appears only when the port replicator is used, replace the port replicator.

If power shutdown occurs intermittently when using PC Card devices via a port replicator, suspect an over-current problem. Some PC Card devices use more power; if the maximum usage of each device occurs simultaneously, the total current will exceed the limit, thereby causing a

power shutdown. Isolate this problem by removing one of the devices, and use the computer under the same condition, and see whether a power shutdown occurs. Do this procedure for all devices to determine the cause.

Power Systems Checkout

To verify the symptom of the problem, power on the computer using each of the following power sources.

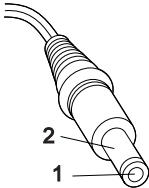
1. Remove the battery pack and diskette drive.
2. Connect the AC Adapter and check that power is supplied.
3. Disconnect the AC Adapter and install the charged battery pack; then check that power is supplied by the battery pack.

If you suspect a power problem, see the appropriate power supply checkout in the following list:

- “Checking the AC Adapter”
- “Checking Operational Charging” on page 31
- “Checking the Battery Pack” on page 31
- “Checking the Backup Battery” on page 32

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 operational charge does not work, go to “Checking Operational Charging” on page 31.
- Unplug the AC Adapter cable from the computer and measure the output voltage at the plug of the AC Adapter cable. See the following figure:



(16 - 10 V)

Pin	Voltage (V dc)
1	+14.5 to +17.0
2	Ground

If the voltage is not within range, replace the AC Adapter.

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

- Replace the DC/DC card.

- Replace the system board.
- If the problem is not corrected, go to “Undetermined Problems” on page 46.
- If the voltage is not correct, go to the next step.

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

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

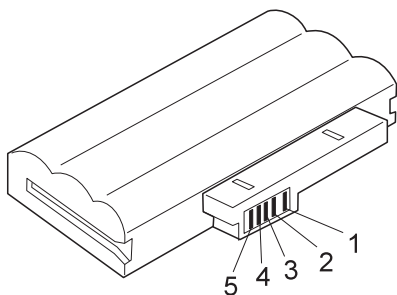
Perform operational charging. If the battery status indicator does not turn on, remove the battery pack and let it return to room temperature. Reinstall the battery pack. If the charge indicator still does not turn on, replace the battery pack.

If the charge indicator still does not turn on, replace the DC/DC card. Then reinstall the battery pack. If the reinstalled battery pack is not charged, go to the next section.

Checking the Battery Pack: Battery charging will not start until the Fuel-Gauge shows that less than 95% of the total power remains; with this condition the battery pack will charge to 100% of its capacity. This protects the battery pack from being overcharged or having a shortened life.

Do the following:

1. Power off the computer.
2. Remove the battery pack and measure the voltage between battery terminals 1 (+) and 4 (–). See the following figure:



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

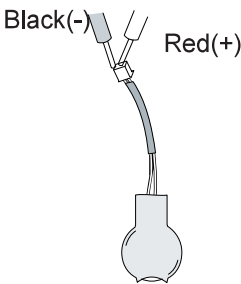
In this case, the battery pack is over-discharged. It takes at least 2 hours to recharge the battery pack even if the indicator does not turn on.

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 3 and 4. The resistance must be 4 to 30 K ohm.
- If the resistance is not correct, replace the battery pack. If the resistance is correct, replace the DC/DC card. If the problem persists, replace the system board.

Checking the Backup Battery

1. Power off the computer and unplug the AC Adapter from the computer.
2. Turn the computer upside down.
3. Remove the DIMM cover and backup battery (see "1010 Backup Battery" on page 60).
4. Measure the voltage of the backup battery. See the following figure.



Wire	Voltage (V dc)
Red	+2.5 to +3.7
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.

Status Indicator Checkout

If an LED problem occurs, do the following:

1. Power off the computer.
2. Power on the computer.
3. All the LEDs in the indicator panel should turn on for a moment after the computer is powered on. Make sure they turn on.

If the problems persists, replace the system board.

System Board Checkout

The processing functions are performed by the system board. When a numeric code calls the system board as a FRU, use the following procedure to isolate the problem:

See "Running the Diagnostics" on page 47 for details.

1. Run the system board test to verify the symptom.
This test verifies the system board. If no error is detected, return to "Checkout Guide" on page 26.
2. If FRU code 10 appears, replace the system board.
3. Rerun the test to verify the fix.

If this procedure does not correct the problem, go to "Undetermined Problems" on page 46.

TrackPoint III Checkout

If the TrackPoint III does not work, check the configuration in the ThinkPad Configurations program. If the configuration of the TrackPoint III is disabled, select **Enable** to enable it.

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

The TrackPoint III adjusts the pointer sensor automatically. During this process, the pointer moves on the screen automatically for a short time. This self-acting pointer movement can occur when a slight, steady pressure is applied to the TrackPoint III pointer. You must readjust it if the temperature has exceeded its normal temperature range. This symptom does not indicate a hardware problem. No service actions are necessary if the pointer movement stops in a short period of time.

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

1. Go to the Easy-Setup screen.
2. Select an item with the pointing stick.
3. Press either the left or right click button.
4. Verify that both buttons work correctly.

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

- Reseat the keyboard cables.
- Replace the keyboard.
- Replace the system board.

Power Management Features

Three power management modes are provided by the computer to reduce power consumption and prolong battery power.

Standby Mode: In standby mode the following occurs:

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

Events that cause the computer to enter standby mode:

- Standby is requested by the **Fn** key (**Fn+F3**).

- There has been activity under **auto-standby** in the ThinkPad Configurations program.

The computer exits standby and resumes operation when any key is pressed.

Suspend Mode: In suspend mode, the following occurs, in addition to what occurs in standby mode:

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

Events that cause the computer to enter suspend mode:

- Suspend mode is requested by the **Fn** key (**Fn+F4**).
- The LCD is closed.
- The specified time has elapsed from the last operation with the keyboard, the TrackPoint III, the hard disk drive, the parallel connector, or the diskette drive; or the AC Adapter is plugged in. The time is specified by **Suspend Timer** in the ThinkPad Configurations program.
- The battery condition is low. The battery power indicator blinks orange.
- Either the PS2 OFF or PS2 SUSpend command is set in the ThinkPad Configurations program.

Notes

1. In the ThinkPad Configurations program, the computer can be set to "Will not suspend even if LCD is closed."
2. If the computer is powered on with ac power and it is used with one of the communication PC Cards, the computer enters *standby mode*; the PC Card and application program remain active.
3. The computer cannot enter suspend mode while a communication link is connecting.

The following events cause the computer to resume operation from suspend mode:

- The LCD is opened.
- The real time clock alarm is signaled.
- The ring indicator (RI) is signaled by a serial device or PC Card device.
- The **Fn** key is pressed.
- An external keyboard key is pressed while the computer is operating with ac power.

The computer also exits suspend mode when timer conditions are satisfied for entering hibernation mode.

Hibernation Mode: In hibernation mode, the following occurs:

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

Note

The computer cannot enter hibernation mode if it has been powered on with ac power and a communication PC Card is used.

The following events cause the computer to enter hibernation mode:

- Hibernation mode is requested by the **Fn** key (**Fn+F12**).
- Timer conditions are satisfied in suspend mode.
- A critically low battery condition occurs.
- The PS2 HIBernation command is set in the ThinkPad Configurations program.

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

Port Replicator Power Overload: If a power shutdown occurs intermittently when PC Card devices are used with a port replicator, suspect an over-current problem. Some PC Card devices use much power; if the maximum usage of each device occurs simultaneously, the total current exceeds the limit, thereby causing a power shutdown. Isolate this problem by removing one of the devices, and use the computer under the same condition to see if a power shutdown occurs. Do this procedure for all devices to help determine the cause.

Symptom-to-FRU Index

The symptom-to-FRU Index lists the symptoms and errors and the possible causes. The most likely cause is listed first.

Note

Perform the FRU replacement or actions in the sequence shown in the "FRU/Action" columns. If a FRU replacement did not solve the problem, put the original FRU back in the computer. Do not replace a nondefective FRU.

This index can also help you determine the next possible FRUs to be replaced when servicing a computer.

Numeric error codes show the errors detected in POST or system operation. In the following error codes, X can be any number.

If no codes are available, use narrative symptoms.

If the symptom is not listed, go to "Undetermined Problems" on page 46.

Note

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

Numeric Error Codes

Symptom / Error	FRU / Action in Sequence
10X 101: Interrupt failure. 102: Timer failure. 103: Timer interrupt failure. 104: Protected mode failure. 105: Last 8042 command not accepted. 107: NMI test failure. 108: Timer bus test failure. 109: Low meg-chip select test.	1. System board.

Symptom / Error	FRU / Action in Sequence
110 (Planar parity.)	1. Go to "Memory Checkout" on page 28. 2. DIMM card. 3. Detach the expansion unit if attached to the computer. 4. System board.
111 (I/O parity.)	1. Go to "Memory Checkout" on page 28. 2. Expansion unit or port replicator. 3. System board.
158 (Hard disk password was not set even though the supervisor password is set.)	1. Set the password for hard disk drive.
159 (Hard disk password is not set the same as the supervisor password.)	1. Set the correct password for hard disk drive.
161 (Dead battery.)	1. Go to "Checking the Backup Battery" on page 32. 2. Backup battery. 3. System board.
163 (Time and date were not set.)	1. Set time and date. 2. System board.
173 (Configuration data was lost.)	1. Select OK in the error screen; then set the time and date. 2. Backup battery. 3. System board.
174 (Configuration error: Perform "Checking the Installed Devices List" on page 49 before changing any FRUs.)	1. Check device configuration. 2. Hard disk drive assembly. 3. System board.
175, 177, 178 175: EEPROM CRC #1 error. 177: Supervisor password check sum error. 178: EEPROM is not functional.	1. System board.
183 (Incorrect password entered at the supervisor password prompt.)	1. Have the user examine the password.

Symptom / Error	FRU / Action in Sequence
184 (Power-on password check sum error.)	1. Reset the power-on password in Easy-Setup.
185 (The startup sequence is not valid. Suspect that power was off when the startup sequence was being updated.)	1. Reset the startup sequence in Easy-Setup.
186	1. System Board.
190 (A depleted battery pack was installed when the power was on.)	1. Go to "Checking the Battery Pack" on page 31.
191XX (PM initialization error.)	1. System board.
195 (The configuration read from the hibernation area does not match the actual configuration.)	1. Check if the configuration was changed. For example, check if a DIMM card was added.
196 (A read error occurred in the hibernation area of the hard disk drive.)	1. Run the hard disk drive test. 2. Hard disk drive.
199XX (Resume error.)	1. System board.
1XX	1. System board.
2XX 201: Memory data error. 202: Memory line error 00–15. 203: Memory line error 16–23. 205: Memory test failure on on-board memory. 221: ROM to RAM remap error.	1. Go to "Memory Checkout" on page 28. 2. DIMM card. 3. System board.
301, 303, 304, 305, 3XX (301: Keyboard error.)	1. Go to "Keyboard or Auxiliary Input Device Checkout" on page 27. 2. Keyboard. 3. External numeric keypad. 4. External keyboard. 5. Keyboard/mouse cable. 6. System board.

Symptom / Error	FRU / Action in Sequence
601, 6XX (601: Diskette drive or controller error.)	1. Go to “Diskette Drive Checkout” on page 27. 2. Diskette drive assembly. 3. Diskette. 4. System board.
602 (Diskette read error.)	1. Go to “Diskette Drive Checkout” on page 27. 2. Diskette. 3. Diskette drive assembly.
604 (Unacceptable ID was read from the diskette drive.)	1. Go to “Diskette Drive Checkout” on page 27. 2. Diskette drive assembly. 3. System board.
11XX 1101: Serial_A test failure.	1. Serial device. 2. Communication cable. 3. System board.
12XX 1201: Serial_B test failure.	1. System board (infrared).
17XX 1701: Hard disk controller failure. 1780, 1790: Hard disk 0 error. 1781, 1791: Hard disk 1 error.	1. Hard disk drive. 2. System board.
24XX (2401: System board video error.)	1. System board.
808X 8081: PCMCIA presence test failure. (PCMCIA revision number also checked.) 8082: PCMCIA register test failure.	1. PC Card slot assembly. 2. PCMCIA device. 3. System board.
860X (Pointing device error when TrackPoint III is disabled.) 8601: System bus error—8042 mouse interface. 8602: External mouse error. 8603: System bus error or mouse error.	1. External mouse. 2. External keyboard. 3. System board.

Symptom / Error	FRU / Action in Sequence
861X (Pointing device error when TrackPoint III is enabled.) 8611: System bus error—I/F between 8042 and IPDC. 8612: TrackPoint error. 8613: System board or TrackPoint error.	1. Reseat the keyboard cable on the system board. 2. Keyboard. 3. External mouse. 4. System board.
I9990301 I9990302 I9990305 I9990301: Hard disk error. I9990302: Invalid hard disk boot record. I9990305: No bootable device.	1. Verify the operating system is installed on the hard disk drive. If not, install the operating system. 2. Reseat the boot device. 3. Verify the startup sequence for the correct boot device. 4. Verify the operating system is installed and operating correctly.
I9990303 (Bank–2 flash ROM check sum error.)	1. System board.
Other codes not listed above.	1. Go to “Undetermined Problems” on page 46.

Beep Symptoms

Symptom / Error	FRU / Action in Sequence
Continuous beeps.	System board.
One beep and a blank, unreadable, or flashing LCD.	1. Reseat the LCD connector. 2. LCD assembly. 3. System board.
One beep, and the message "Unable to access boot source."	1. Boot device. 2. System board.
One long and two short beeps, and a blank or unreadable LCD.	1. System board. 2. LCD assembly.
One long beep followed by four short beeps each time the power switch is operated. (System cannot power on due to low battery voltage.)	Connect the AC Adapter or install a fully charged battery.
One beep every second. (System is shutting down due to low battery voltage.)	Connect the AC Adapter or install a fully charged battery. (Allow the system to completely shut down before changing the battery.)
Two short beeps with error codes.	POST error. See "Numeric Error Codes" on page 36.
Two short beeps with blank screen.	System board.

No Beep Symptoms

Symptom / Error	FRU / Action in Sequence
No beep, power-on indicator not on, and a blank LCD during POST.	1. Go to "Power Systems Checkout" on page 30. 2. DC/DC card. 3. System board. 4. Check the power outlet.
No beep, power-on indicator on, and a blank LCD during POST.	• DC/DC card. • System board.
No beep, power-on indicator on, and a blinking cursor only during POST.	• DC/DC card. • System board.
No beep during POST but system runs correctly.	1. Turn the volume up and check the speaker. 2. Speaker. 3. System board.

Function-Related Symptoms

Symptom / Error	FRU / Action in Sequence
The system does not suspend or resume when the LCD is closed or opened.	1. Go to “Suspend Mode” on page 34, and check that the computer can enter suspend mode. 2. Boot an operating system and press Fn+F4. If the computer enters suspend mode, suspect that the application program is not working properly. 3. LCD assembly. 4. System board.
The battery Fuel-Gauge does not go higher than 90%.	Go to “Checking the Battery Pack” on page 31 and see the note.
The memory count (size) appears different from actual size.	Go to “Memory Checkout” on page 28.
The system configuration does not match the installed devices.	Go to “Checking the Installed Devices List” on page 49.
The system hangs intermittently.	Go to “Intermittent Problems” on page 45.

Indicator-Related Symptoms

Symptom / Error	FRU / Action in Sequence
The indicator incorrectly remains off or on, but system runs correctly.	• System board. • DC/DC card.
The battery power status indicator blinks from green, yellow, to orange.	1. Check that a correct battery is installed. 2. Battery pack. 3. DC/DC card. 4. System board.
The battery indicator does not turn on when the battery is installed.	• DC/DC card. • Battery pack. • System board.

Infrared-Related Symptoms

Symptom / Error	FRU / Action in Sequence
Unable to communicate using the Infrared (IR) Port.	1. Make sure the setup for the IR is correct. Use the ThinkPad Configurations utility. 2. Make sure there are no fluorescent lights near the computer. The computer may receive optical noise from the fluorescent light. 3. Run the advanced diagnostic test. If an error occurs and a FRU code is displayed, replace the parts shown by the FRU code.

Keyboard or TrackPoint III Related Symptoms

Symptom / Error	FRU / Action in Sequence
The keyboard (one or more keys) does not work.	1. Reseat the keyboard cable on the system board. 2. Keyboard. 3. System board.
The TrackPoint III does not work.	1. Reseat the keyboard cable on the system board. 2. Go to "TrackPoint III Checkout" on page 33. 3. Keyboard. 4. System board.
The pointer moves automatically or does not work correctly.	See "TrackPoint III Checkout" on page 33.

LCD-Related Symptoms

Important

The TFT LCD for the notebook computer contains over 921,000 thin-film transistors (TFTs). A small number of missing, discolored, or lighted dots (on all the time) is characteristic of TFT LCD technology, but excessive pixel problems can cause viewing concerns. The LCD should be replaced if the number of missing, discolored, or lighted dots in any background is **21 or more**.

Symptom / Error	FRU / Action in Sequence
No beep, power-on indicator on, and a blank LCD during POST.	1. DC/DC card. 2. System board.
• LCD backlight not working. • LCD too dark. • LCD brightness cannot be adjusted. • LCD contrast cannot be adjusted.	1. Reseat the LCD connectors. 2. LCD assembly. 3. System board.
• LCD screen unreadable. • Characters missing pels. • Screen abnormal. • Wrong color displayed.	1. See important note for “LCD-Related Symptoms.” 2. Reseat all LCD connectors. 3. LCD assembly. 4. System board.
LCD has extra horizontal or vertical lines displayed.	LCD assembly.

Peripheral-Device-Related Symptoms

Symptom / Error	FRU / Action in Sequence
The external monitor does not work correctly.	Connect the external monitor to another PC. If the monitor works fine, replace the system board. If not, replace the external monitor.
Printer problems.	1. Run printer self-test. 2. Parallel port wrap test. 3. System board. 4. Printer cable.
Serial or parallel port device problems.	1. Serial/parallel port wrap test. 2. Device. 3. System board. 4. Device cable.

Power-Related Symptoms

Symptom / Error	FRU / Action in Sequence
Power shuts down during operation.	1. Go to “Power Systems Checkout” on page 30. 2. Battery pack. 3. Remove the battery pack and let it cool for 2 hours. 4. DC/DC card. 5. System bard. 6. Check the power outlet.
The system does not power off. (See “Power Shutdown Switch” on page 25.)	1. Press the power shutdown switch. 2. DC/DC card. 3. System board.

Other Symptoms

Symptom / Error	FRU / Action in Sequence
Errors occur only when the port replicator is used.	See “Port Replicator Checkout” on page 29.
PC Card slot pin is damaged.	PC Card slot assembly.

Note: If you cannot find a symptom or an error in this list and the problem remains, see “Undetermined Problems” on page 46.

Intermittent Problems

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

When analyzing the intermittent problem, do the following:

1. Run the advanced 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, installed devices are incorrect, a short circuit is suspected, or the system is inoperative. Follow these procedures to isolate the failing FRU (do not isolate nondefective FRUs).

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 Systems Checkout" on page 30):

1. Power off the computer.
2. Visually check the attached devices and power supply for damage. If any problems are found, replace the 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. PC Cards.
4. Power on the computer.
5. Determine if the problem has changed.
6. If the problem does not remain, 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.

Running the Diagnostics

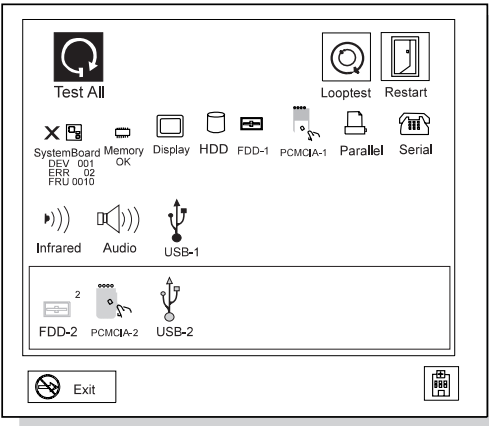
Use either the TrackPoint III or the cursor move keys to interact with the tests.

The following are the special tools used with the diagnostics.

Tool Name	Part Number
PC Test Card	35G4703
Tri-Connector wrap plug	72X8546
USB parallel test cable	05K2580

Use either the TrackPoint III or the cursor move keys to interact with the tests. The **Enter** key works the same as selecting the **OK** icon to reply OK.

1. Press and hold **F1**; then power on the computer. Hold **F1** down until the Easy-Setup window appears.
2. Click on **Test**. The basic diagnostic menu window appears.
3. Click on a device to run the test. The test progress screen appears; then **OK** appears under the tested device icon when the test ends without any errors.
4. Start the **Advanced Diagnostic test** by pressing **Ctrl+A** on the basic diagnostic menu screen. The ThinkPad FRU connections window appears.
5. Click on **Exit** or press the **Esc** key. The keyboard test window appears.
6. When you press a key, a mark appears or disappears on the corresponding key position on the screen. Repeat this step for any keys that need to be tested. You can run the keyboard test if you press **Ctrl+K** key at the advanced diagnostic test mode.
7. To exit the keyboard test, click on **Exit** or press **Ctrl+Break**. The Advanced Diagnostics window appears:



- Click on a device to test it, or click on **Test All** to test all devices.

Click on **Looptest** to run the tests in a repeated loop. The loop option menu window appears. Click on a device; the ✓ mark appears beside the selected device. Repeat this step to select multiple devices. Click on **OK** to start the diagnostic loop. If no device is selected, all devices tests are looped.

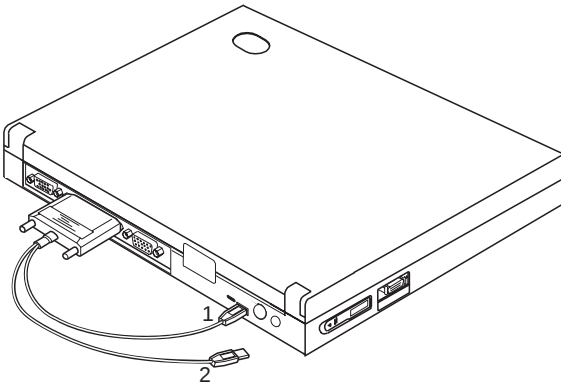
- To exit the loop, keep pressing **Ctrl+Pause** until the test exits. A beep sounds to notify that the exit interrupt is sensed by the test program. Press **Esc** to exit from the loop test.

PC Card (PCMCIA) Slots Test

The green LED on the PC test card (P/N 35G4703) turns on when the PC Card (PCMCIA) slot test is running. If the LED does not turn on, check that the card is installed correctly by reseating it. If the LED still does not turn on after the card is reseated, try using another slot for the test. If the LED still does not turn on and the test fails, replace the FRU shown by the diagnostic error code.

Universal Serial Bus (USB) Test

At the advanced diagnostic window, connect the USB parallel test cable (P/N 05K2580) to the computer as shown.



Click on  to run the test. Follow the instructions on the screen. **OK** appears if the test passed, but three lines of error codes appear if the test failed. The defective FRU is the system board.

Use cable number 2 for an external USB port, such as a port replicator or a docking station.

Displaying the Error Log

Diagnostic errors are printed on a printer that is attached to the parallel port when the error is detected. The error is also logged in the system memory.

Use the following procedure to display the errors:

1. Enter the advanced diagnostic test.
2. Press **Ctrl+E**.
3. The error log appears.
4. To exit the screen, click on **Exit** or press **Esc** key.

The error log is not saved when system power is turned off.

Checking the Installed Devices List

If a device is installed but the icon appears in a gray shade rather than a dark shade on the basic diagnostics screen, the device is defective. Reseat the device connectors. If the symptom remains, replace the device or the system board. If needed, adjust the contrast control to clearly distinguish the shades of the icon.

If a device that is not installed appears in a dark shade (for example, FDD-2 appears in a dark shade when *no* second FDD is installed), do the following:

1. Replace the **first** device in the configuration, such as an FDD-1.
2. If the problem remains, replace the system board.

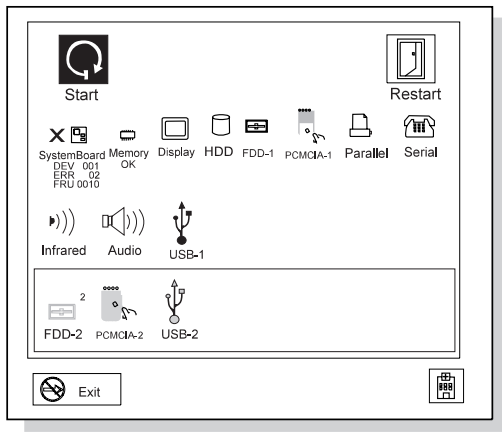
The Parallel and Serial icons are always displayed in a dark shade, because the icons represent subsystems of the system board and not the attachment of the devices.

The FDD-1 icon represents the **first** drive in the system configuration for each type of device. For Model 560X, FDD-1 represents an external diskette drive attached through the external diskette drive connector. Similarly, the FDD-2 icon represents the **second** drive, usually attached through a port replicator.

Diagnostic Error Codes

If an error is detected, the following appears:

- Large X on the left side of the device icon.
- Device ID (three digits).
- Error code (two digits).
- FRU code (four digits).



The device ID and error code indicate the detailed portion of the FRU that caused the error. If replacing a FRU does not correct the problem, see the device ID or error code from the previous failure. If they have changed, the cause might be that the new FRU is defective or that the FRU was incorrectly installed.

Device ID: If an error is detected by the diagnostic tests, a three-digit device ID is displayed, indicating the suspected device.

Icon	Device ID	Suspected Device
 SystemBoard	001	System board
	003	Keyboard
	007	Math coprocessor
	086	Pointing device
 Memory	002	Memory
 Display	050	Display
 HDD	017	Hard disk drive

Icon	Device ID	Suspected Device
 FDD-1	006	External diskette drive or FDD connector of the computer
 FDD-1	066	External diskette drive or FDD Connector of the port replicator
 PCMCIA-1	080	PCMCIA
 PCMCIA-2	088	External PC Card (PCMCIA)
 Parallel	009	Parallel port
 Serial	011, 012	Serial port
 USB-1	154	Universal serial bus (USB)
 USB-2	155	External universal serial bus (USB)
 Infrared	103	IR
 Audio	150	Audio (ESS)

FRU Codes: If an error is detected by the diagnostic tests, a four-digit FRU code is displayed. The FRU code indicates two suspected FRUs. Replace the FRU that is indicated by the **two leftmost digits** first; then replace the FRU that indicated by the **two rightmost digits**. No FRU is assigned to code 00. If only one FRU is suspected, the other FRU code is filled with zeros. See the reference page before replacing the FRU.

FRU Code	FRU
10	System board
30	Reserved
32	External keyboard
33	External mouse
40	LCD assembly
45	External monitor
50	1. Reseat the diskette drive (FDD-1) 2. Diskette drive (FDD-1)
51	1. Reseat the diskette drive (FDD-2) 2. Diskette drive (FDD-2)
60	1. Reseat the hard disk drive 2. Hard disk drive
72	PC Card slot assembly
74	Universal serial bus

If the problem persists after replacement of the FRUs, go to "Undetermined Problems" on page 46.

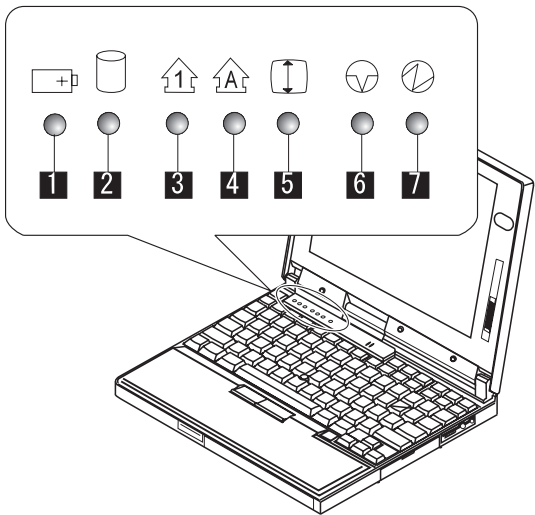
Related Service Procedures

This section provides information about the following:

- “Status Indicators”
- “Password Combinations” on page 54
- “Running a Low-Level Format” on page 55
- “Maintenance Diskette Download” on page 55
- “Fn Key Combinations” on page 55

Status Indicators

The system status indicators show the current computer status in different colors (green and orange):



Symbol	Color	Meaning
1 Battery 	Green	The battery is fully charged.
	Orange	The battery is charging.
	Blinking orange	The battery needs charging.
2 Hard Disk In Use 	Orange	Data is read from or written to the hard disk drive.
3 Numeric Lock 	Green	The numeric keypad on the keyboard is enabled.
4 Caps Lock 	Green	Caps lock mode is enabled.
5 Scroll Lock 	Green	Arrow keys can be used as screen-scroll function keys.
6 Suspend Mode 	Green	Suspend mode
	Blinking Green	Entering suspend mode
7 Power On 	Green	Power on

Password Combinations

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

Note: The Model 560X supports three passwords.

- When POP is the same as HDP-1 or HDP-2**
 The POP prompt appears, but one of the HDP prompts does not appear.
- When POP is not the same as HDP-1 and HDP-2**
 The POP, HDP-1 and HDP-2 prompts all appear.
- PAP and HDP-1 or HDP-2**
 When PAP is used, HDP-1 or HDP-2 are enabled automatically, but no HDP prompt appears. HDP-1 and HDP-2 are set the same as PAP.

Running a Low-Level Format

Do the following to format the hard disk.

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

1. Power off the computer.
2. Insert the **ThinkPad hardware maintenance diskette Ver 1.40** or later into diskette drive **A** and power on the computer.
3. Select **Format the hard disk** from the main menu.
4. Select the drive from the menu.
5. Follow the instructions on the screen.

Maintenance Diskette Download

The maintenance diskette is not available from the parts center, but you can download it from the IBM Internet web site. The web site address is as follows:

<http://pccbbs.raleigh.ibm.com>

Fn Key Combinations

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

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

Fn +	Description
F1	Reserved
F2	Fuel-Gauge display on or off
F3	Standby mode invocation
F4	Suspend mode invocation
F5	Reserved
F6	Reserved
F7	Switching between the LCD and an external monitor
F8	Reserved
F9	Reserved
F10	Reserved
F11	Switching the power management mode (High Performance, Automatic, and Customized)
F12	Hibernation invocation

Product Overview (560X)

The following table provides an overview of the IBM ThinkPad 560 series system features.

Feature	Description
Processor	560 - Intel® Pentium® 100 MHz - Intel Pentium 120 MHz - Intel Pentium 133 MHz 560E - Intel Pentium MMX™ 150 MHz, L2 cache - Intel Pentium MMX 166 MHz, L2 cache 560X - Intel Pentium MMX 200 MHz, L2 cache - Intel Pentium MMX 233 MHz, L2 cache
Bus Architecture	PCI Bus
Memory (Standard)	560 8 MB (on the system board) 560E 16 MB (on the system board) 560X 32 MB (on the system board)
Memory (Option)	560 8 MB, 16 MB, 32 MB DIMM card (Max. 40 MB) 560E 8 MB, 16 MB, 32 MB, 64 MB DIMM card (Max. 80 MB) 560X 8 MB, 16 MB, 32 MB, 64 MB DIMM card (Max. 96 MB)
CMOS RAM	114 bytes

Feature	Description
VGA Video	560 11.3-inch, 256 colors, 800×600 pixel DSTN color LCD 12.1-inch, 64K colors, 800×600 pixel TFT color LCD 560E 11.3-inch, 64K colors 800×600 pixel DSTN color LCD 12.1-inch, 256K colors, 800×600 pixel TFT color LCD 560X 12.1-inch, 64K colors 800×600 pixel DSTN color LCD 12.1-inch, 256K colors, 800×600 pixel TFT color LCD
Diskette Drive (External)	1.44 MB (2-mode), 3.5-inch 1.44 MB (3-mode), 3.5-inch, for Japan
Hard Disk Drive	560 810 MB, 2.5-inch, IDE interface 1.08 GB, 2.5-inch, IDE interface 2.1 GB, 2.5-inch, IDE interface 560E 2.1 GB, 2.5-inch, IDE interface 560X 2.1 GB, 2.5-inch, IDE interface 4.0 GB, 2.5-inch, IDE interface
I/O Port	- Headphone - Microphone - Port replicator
Audio	16-bit audio - Internal speaker - Internal microphone - Mechanical volume
Infrared Transfer	560 - IrDA 1.0 560E /560X - IrDA 1.1
PCMCIA	One Type-III or two Type-II

FRU Removals and Replacements

This section contains information about removals and replacements.

- Do not damage any parts. Only certified and trained personnel should service the computer.
- The arrows in the "Removals and Replacements" section show the direction of movement to remove a FRU, or to turn a screw to release the FRU. The arrows are marked in numeric order, in square callouts, to show the correct sequence of removal.
- When other FRUs must be removed before the failing FRU is removed, they are listed at the top of the page.
- To replace a FRU, reverse the removal procedure and follow any notes that pertain to replacement. See "Locations" for internal cable connections and arrangement information.
- When replacing a FRU, use the correct screw size as shown in the procedures.

Safety Notice 1: Translation on page 4

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

Safety Notice 3: Translation on page 6

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.

Safety Notice 8: Translation on page 10

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.

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

Important Notice

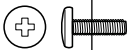
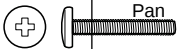
This computer uses special nylon-coated screws with the following characteristics:

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

Do the following when you service this machine:

- Keep the screw kit (P/N 12J0808) in your tool bag.
- Always use new screws.
- Use a torque screwdriver if available.

Screw Information: The following types of screws are used in this machine. Use the correct screw in the **Screw Kit (P/N 12J0808)** when you replacing any FRUs.

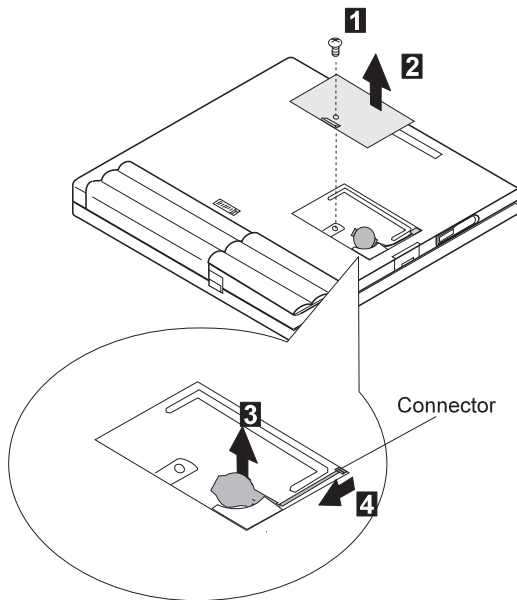
Screw No.	Screw	Type of Head	Color	Length (mm)
1		Pan	Black	6.5
2		Pan	Black	11.5
3		Flat	Black	3.5
4		Pan	Brass	2.5
5		Hex	Silver	7.0
6		Pan	Black	2.5
7		Flat	Brass	5.5
8		Flat	Brass	3.0
9		Pan	Black	3.5

1010 Backup Battery

Safety Notice 4: Translation on page 7

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

Turn the computer upside down.

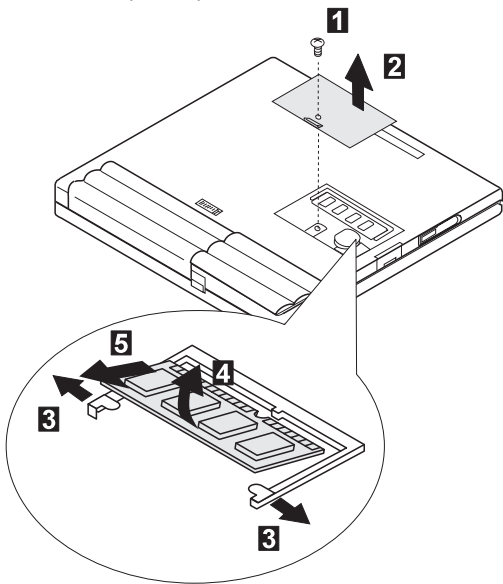


To replace the battery, connect the battery connector using a small screwdriver; then insert it into the computer.

Step	Screw No. (See page 59)	Qty	Torque
1	1 	1	4 kgcm
When replacing: Make sure you use the correct screw, and tighten it firmly to the torque shown in the table if you have a torque screwdriver. Never use a screw that you removed. Use a new one. Make sure the screw is tightened firmly (see "Screw Tightening Information" on page 22 if you do not have a torque screwdriver).			

1020 DIMM (If Installed)

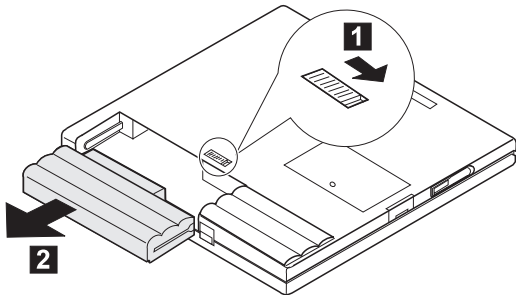
Turn the computer upside down.



Step	Screw No. (See page 59)	Qty	Torque
1	1 	1	4 kgcm
When replacing: Make sure you use the correct screw, and tighten it firmly to the torque shown in the table if you have a torque screwdriver. Never use a screw that you removed. Use a new one. Make sure the screw is tightened firmly (see "Screw Tightening Information" on page 22 if you do not have a torque screwdriver).			

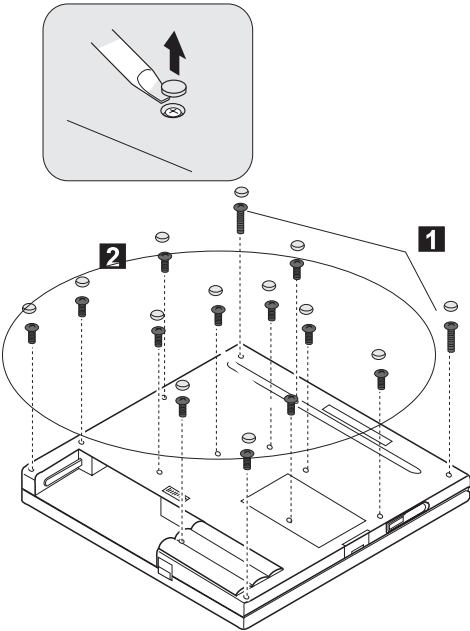
1030 Battery Pack

Turn the computer upside down.



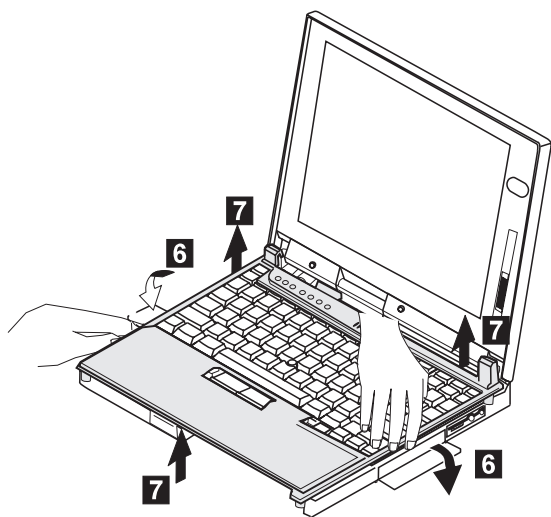
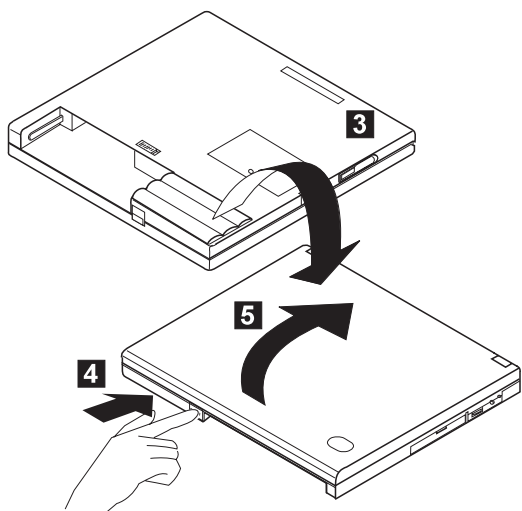
1040 Frame

- Battery Pack (1030)

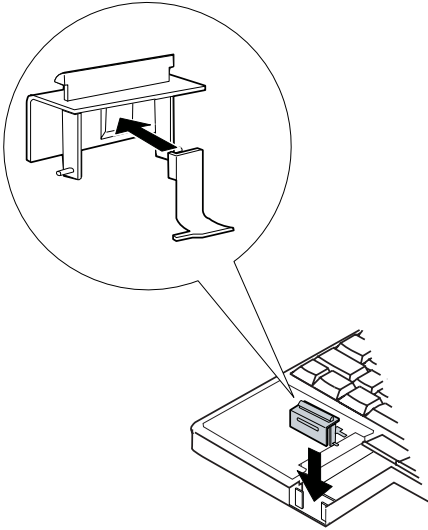


Step	Screw No. (See page 59)	Qty	Torque
1	2 	2	4 kgcm
2	1 	12	4 kgcm

When replacing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. **Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly** (see "Screw Tightening Information" on page 22 if you do not have a torque screwdriver).

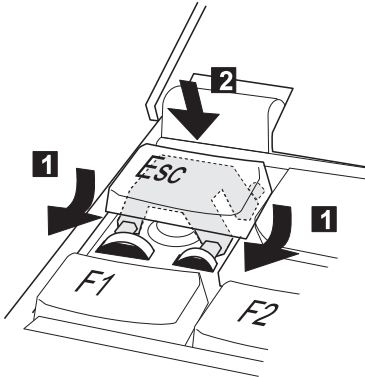


The LCD release latch is easily disassembled, see the following if you need to reassemble:



Notes

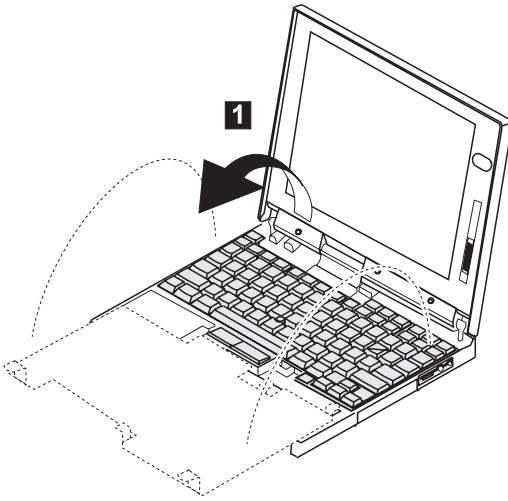
- Be careful not to remove the **Esc** key when you remove the frame. If the **Esc** key is removed, replace it as shown:



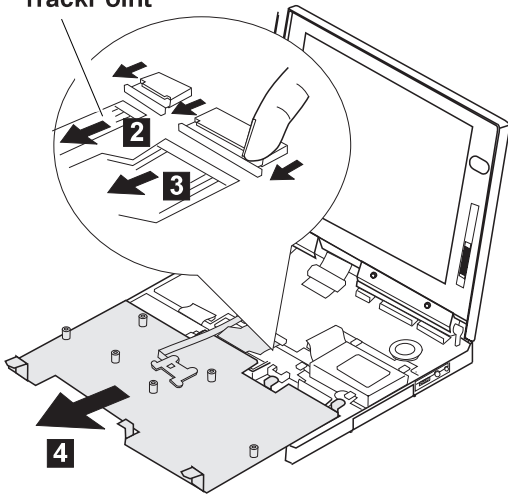
- When replacing the frame, verify the TrackPoint III click buttons function correctly.
(If the frame is not in place, the click buttons will not function.)

1050 Keyboard Unit

- Battery Pack (1030)
- Frame (1040)



Cable of the TrackPoint



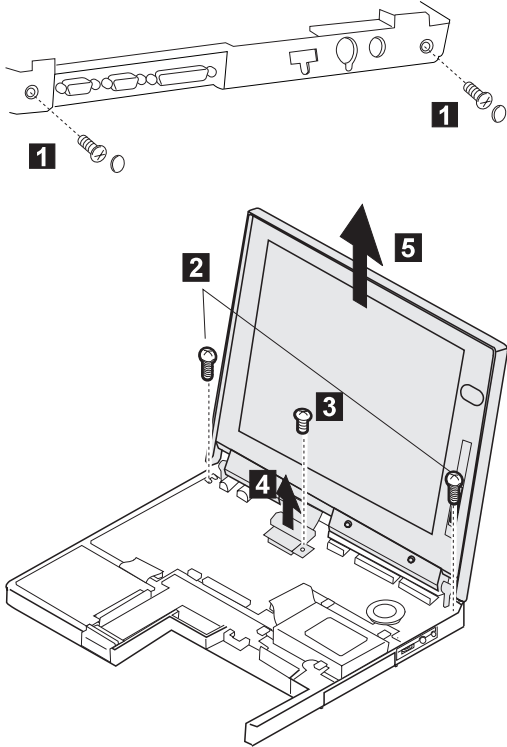
Note:

When replacing the frame, verify the TrackPoint III click buttons function. (If the frame is not in place, the click buttons will not function.)

1060 LCD Assembly

- Battery Pack (1030)
- Frame (1040)
- Keyboard Unit (1050)

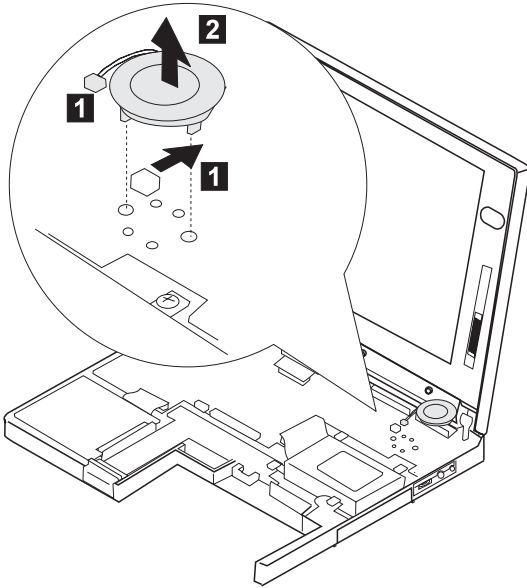
Note: For the LCD FRU removals and replacement, go to “2010 LCD Front Cover” on page 74.



Step	Screw No. (See page 59)	Qty	Torque
1	3 	2	4 kgcm
2	1 	2	4 kgcm
3	9 	1	3 kgcm
When replacing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly (see “Screw Tightening Information” on page 22 if you do not have a torque screwdriver).			

1070 Speaker

- Battery Pack (1030)
- Frame (1040)
- Keyboard Unit (1050)



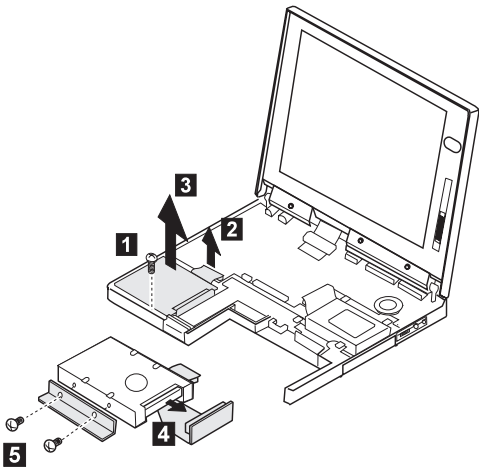
1080 Hard Disk Drive

Attention

Do not drop or apply any shock to the hard disk drive.

Before removing the drive, have the user make a backup copy of all the information on the drive. Never remove the drive while the system is operating or is in suspend mode. Remove the hard disk drive exactly as shown in the figure. Do not apply any extra force to the hard disk drive when removing it.

- Battery Pack (1030)
- Frame (1040)
- Keyboard Unit (1050)



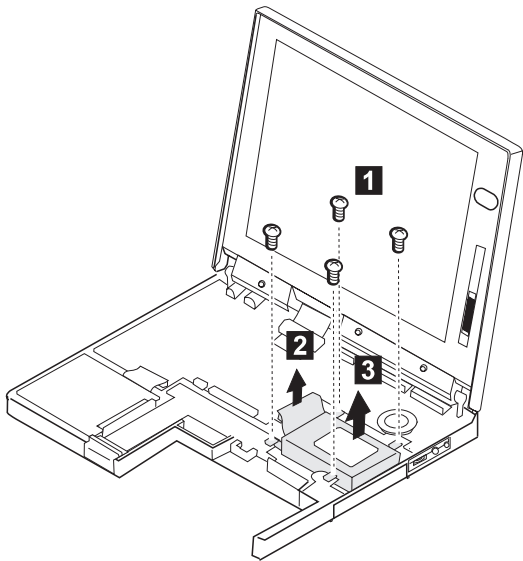
Step	Screw No. (See page 59)	Qty	Torque
1	1 	1	4 kgcm
5	4 	2	3 kgcm

When replacing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. **Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly** (see "Screw Tightening Information" on page 22 if you do not have a torque screwdriver).

1090 PC Card (PCMCIA) Slot Assembly

- Battery Pack (1030)
- Frame (1040)
- Keyboard Unit (1050)

Note: Before removing and replacing the PC Card slot assembly, make sure that the PC Cards are removed and the eject levers are not extended out.



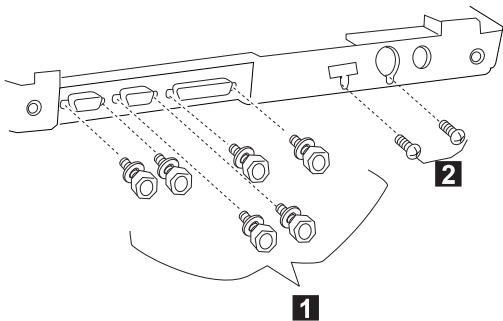
Step	Screw No. (See page 59)	Qty	
1	1 	4	4 kgcm
When replacing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly (see "Screw Tightening Information" on page 22 if you do not have a torque screwdriver).			

1100 System Board

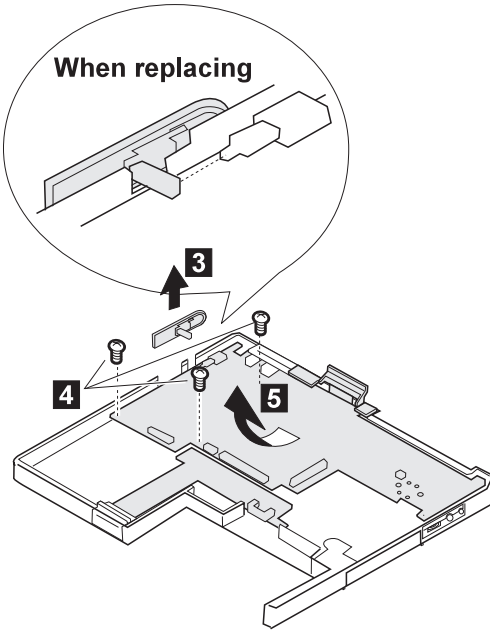
- DIMM (If Installed) (1020)
- Battery Pack (1030)
- Frame (1040)
- Keyboard Unit (1050)
- LCD Assembly (1060)
- Speaker (1070)
- Hard Disk Drive (1080)
- PC Card Slot Assembly (1090)

Notes:

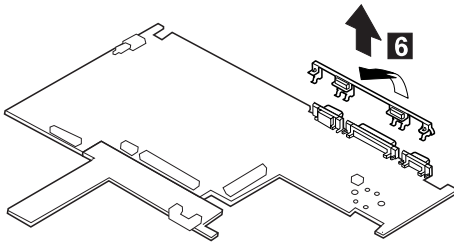
1. The system unit serial number must be restored when the system board is replaced. Select the option **Set system identification** on the maintenance diskette. The flash ROM on the system board contains the vital product data (VPD)—that is, the system unit serial number, system board system number, and other computer-unique data.
2. Do not power off the computer when restoring the VPD. The system unit serial number label is attached to the base cover.



Step	Screw No. (See page 59)	Qty	Torque
1	5  	6	3 kgcm
2	6  	2	2 kgcm
When replacing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly (see "Screw Tightening Information" on page 22 if you do not have a torque screwdriver).			



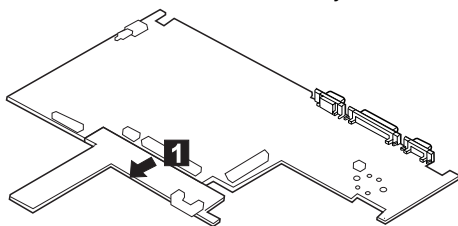
Step	Screw No. (See page 59)	Qty	Torque
4	3 	3	4 kgcm
When replacing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly (see "Screw Tightening Information" on page 22 if you do not have a torque screwdriver).			



1110 DC/DC Card

- DIMM (If Installed) (1020)
- Battery Pack (1030)
- Frame (1040)
- Keyboard Unit (1050)
- LCD Assembly (1060)
- Speaker (1070)
- Hard Disk Drive (1080)
- PC Card Slot Assembly (1090)
- System Board (1100)

Detach the DC/DC card from the system board.

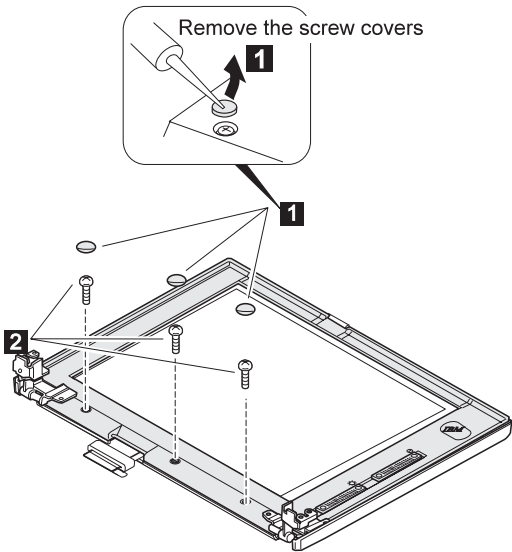


2010 LCD Front Cover

- Battery Pack (1030)
- Frame (1040)
- Keyboard Unit (1050)
- LCD Assembly (1060)

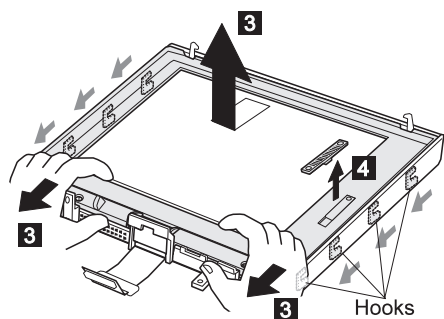
Important

The LCD for the notebook computer contains over 921,000 thin-film transistors (TFTs). A small number of missing, discolored, or constantly lighted dots 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 **21 or more**.



Step	Screw No. (See page 59)	Qty	Torque
2	7 	3	3 kgcm
When replacing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly (see "Screw Tightening Information" on page 22 if you do not have a torque screwdriver).			

- The LCD front cover has several latches. Release the latches as shown in step **3**.
- The DSTN LCD has two slide knobs in step **4**.



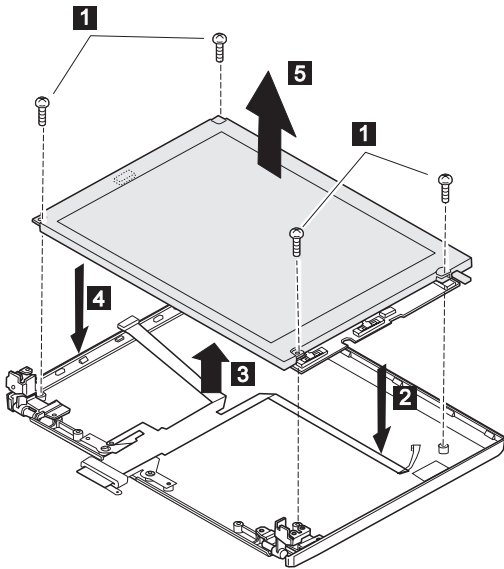
When replacing:

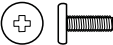
Make sure that all eight latches are engaged properly. Make sure that the slide knobs work correctly.

2020 LCD Panel

- Battery Pack (1030)
- Frame (1040)
- Keyboard Unit (1050)
- LCD Assembly (1060)
- LCD Front Cover (2010)

DSTN Panel



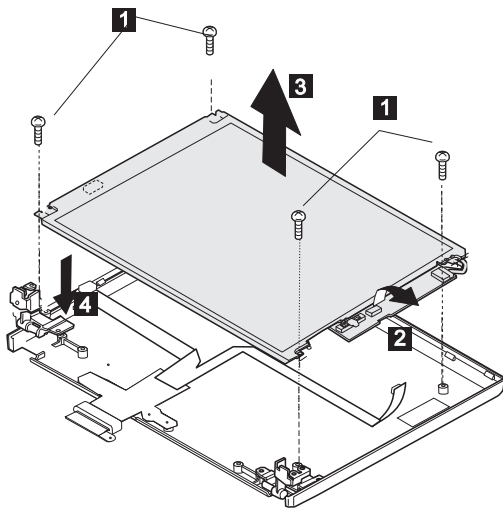
Step	Screw No. (See page 59)	Qty	Torque
1	7 	4	3 kgcm
When replacing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly (see "Screw Tightening Information" on page 22 if you do not have a torque screwdriver).			

TFT Panel

TFT LCD Note

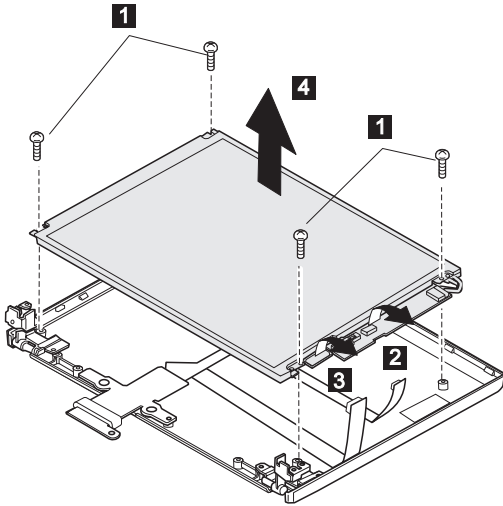
To distinguish the TFT 1 panel from the TFT 2 panel, disassemble the panel and note its characteristics.

TFT 1 (P/N 12J1704)



Step	Screw No. (See page 59)	Qty	Torque
1	7 	4	3 kgcm
When replacing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly (see “Screw Tightening Information” on page 22 if you do not have a torque screwdriver).			

TFT 2 (P/N 12J1706)

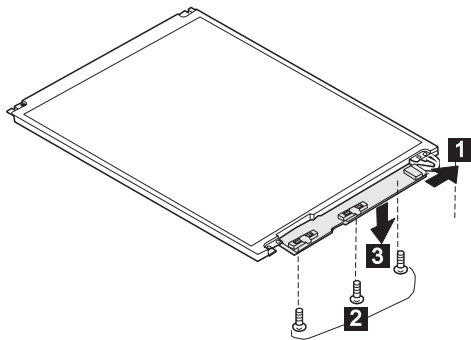


Step	Screw No. (See page 59)	Qty	Torque
1	7 	4	3 kgcm
When replacing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly (see "Screw Tightening Information" on page 22 if you do not have a torque screwdriver).			

2030 Inverter Card

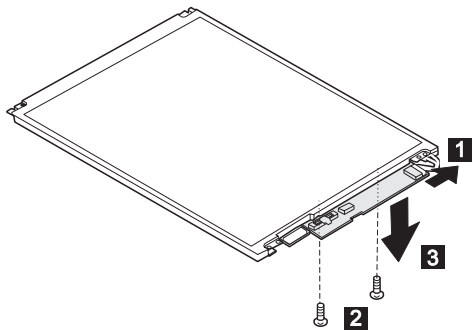
- Battery Pack (1030)
- Frame (1040)
- Keyboard Unit (1050)
- LCD Assembly (1060)
- LCD Front Cover (2010)
- LCD Panel (2020)

DSTN Panel



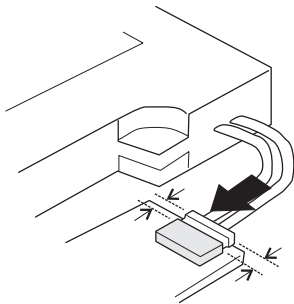
Step	Screw No. (See page 59)	Qty	Torque
2	8 	3	3 kgcm
When replacing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly (see "Screw Tightening Information" on page 22 if you do not have a torque screwdriver).			

TFT Panel



Step	Screw No. (See page 59)	Qty	Torque
2	8 	2	3 kgcm
When replacing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly (see "Screw Tightening Information" on page 22 if you do not have a torque screwdriver).			

When replacing: Align the LCD connector to the inverter card to ensure a good connection.

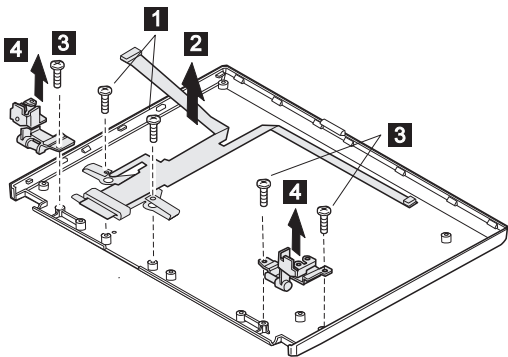


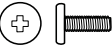
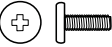
2040 LCD Cable and Hinges

- DIMM (If Installed) (1020)
- Battery Pack (1030)
- Frame (1040)
- Keyboard Unit (1050)
- LCD Assembly (1060)
- LCD Front Cover (2010)
- LCD Panel (2020)
- Inverter Card (DSTN only)(2030)

DSTN or TFT 1

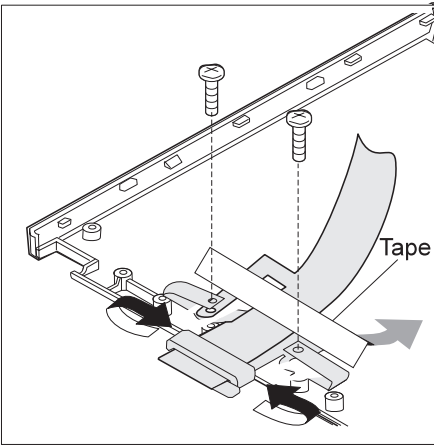
- 1 2 : LCD cable
- 3 4 : Hinges



Step	Screw No. (See page 59)	Qty	Torque
1	7 	2	3 kgcm
3	7 	3	3 kgcm

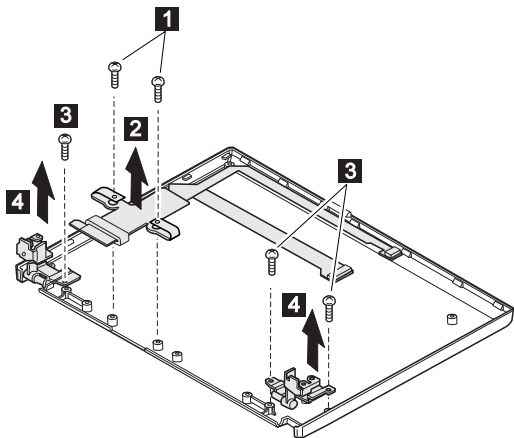
When replacing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. **Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly** (see "Screw Tightening Information" on page 22 if you do not have a torque screwdriver).

When replacing:
See the following figure:



TFT 2

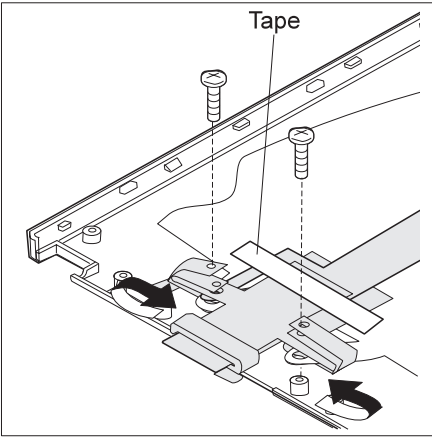
- **1 2** : LCD cable
- **3 4** : Hinges



Step	Screw No. (See page 59)	Qty	Torque
1	7  	2	3 kgcm
3	7  	3	3 kgcm

When replacing: Make sure you use the correct screw, and tighten all screws firmly to the torque shown in the table if you have a torque screwdriver. **Never use a screw that you removed. Use a new one. Make sure the screws are tightened firmly** (see “Screw Tightening Information” on page 22 if you do not have a torque screwdriver).

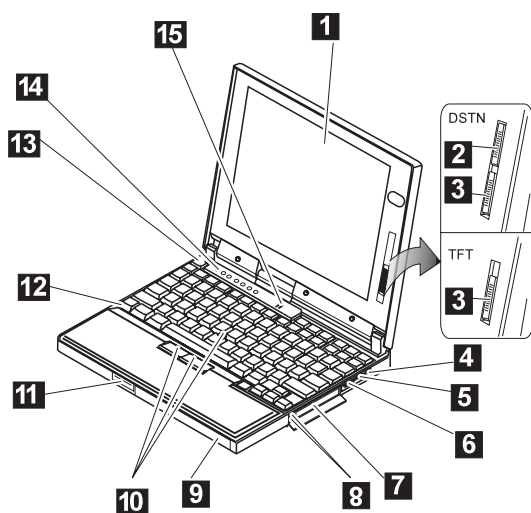
When replacing:
See the following figure:



Locations

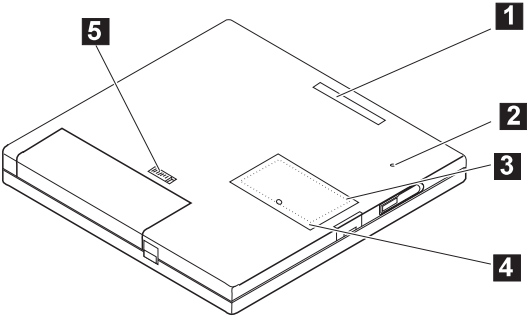
Front View

- 1** LCD
- 2** Contrast Control
- 3** Brightness Control
- 4** Headphone Jack
- 5** Microphone/Line-In Jack
- 6** Volume Control
- 7** PC Card Slots
- 8** PC Card Eject Buttons
- 9** Battery Pack
- 10** TrackPoint III
- 11** LCD Latch
- 12** Fn Key
- 13** Keyboard
- 14** Indicator Panel
- 15** Built-in Microphone



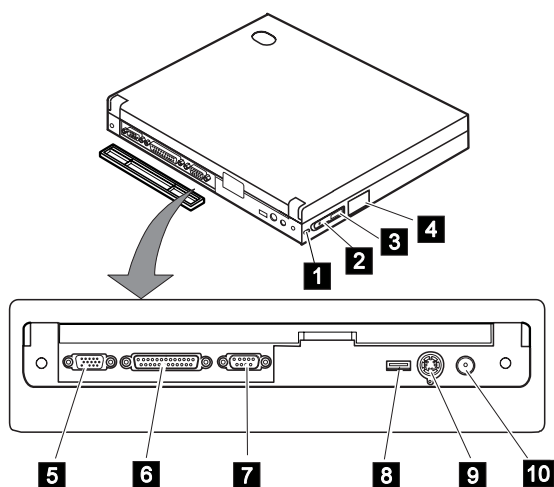
Bottom View

- 1** System-Expansion Connector
- 2** Power Shutdown Switch
- 3** Memory Slot
- 4** Memory-Slot Cover
- 5** Battery Pack Latch

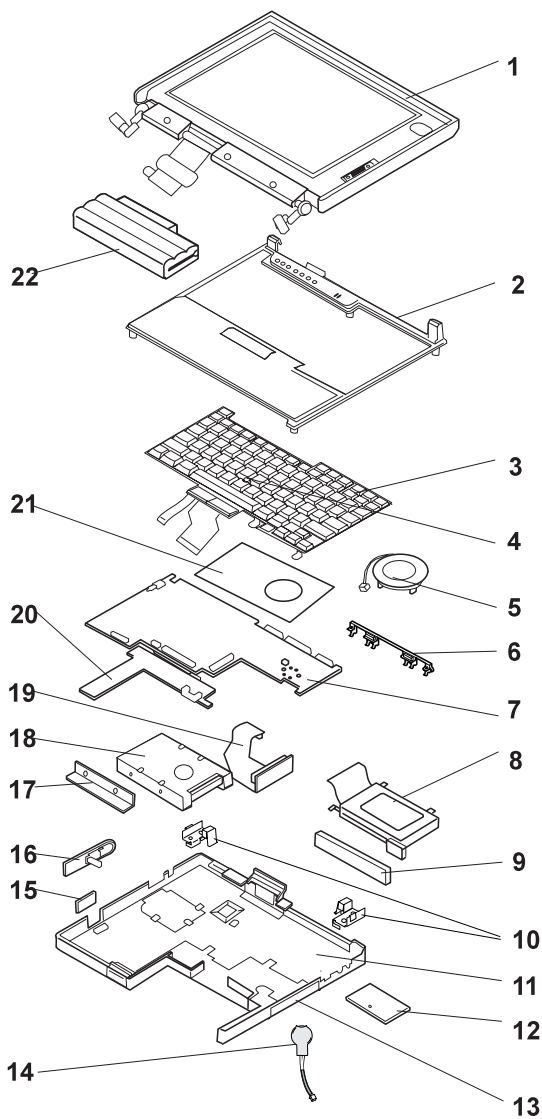


Rear View

- 1** Security Keyhole
- 2** Power Switch
- 3** IR Port
- 4** External Diskette Drive Connector
- 5** External Monitor Connector
- 6** Parallel Connector
- 7** Serial Connector
- 8** Universal Serial Port
- 9** External-Input-Device Connector
- 10** Power Jack



Parts Listing 560X (2640-60x, 70x)

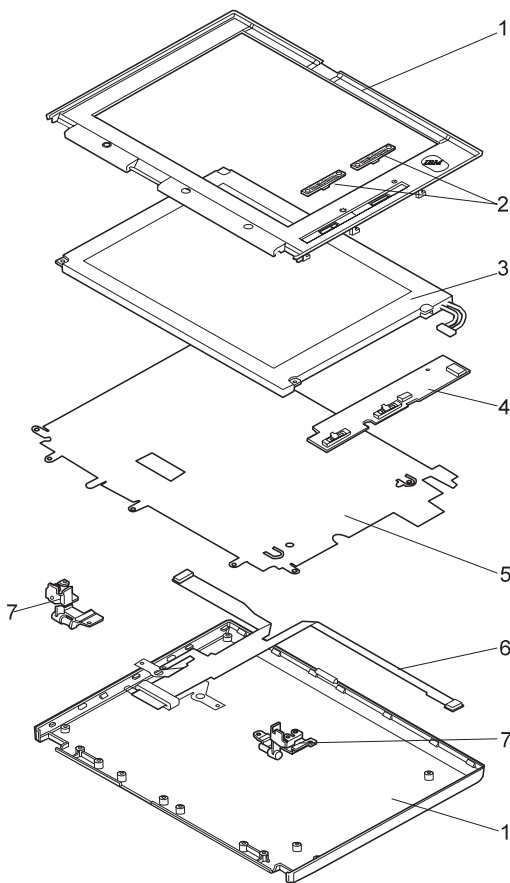


Note for the TFT LCD:

There are two TFT LCD panels: TFT 1 and TFT2. Both panels are interchangeable, so you can use either panel when replacing (see page 77 for more information).

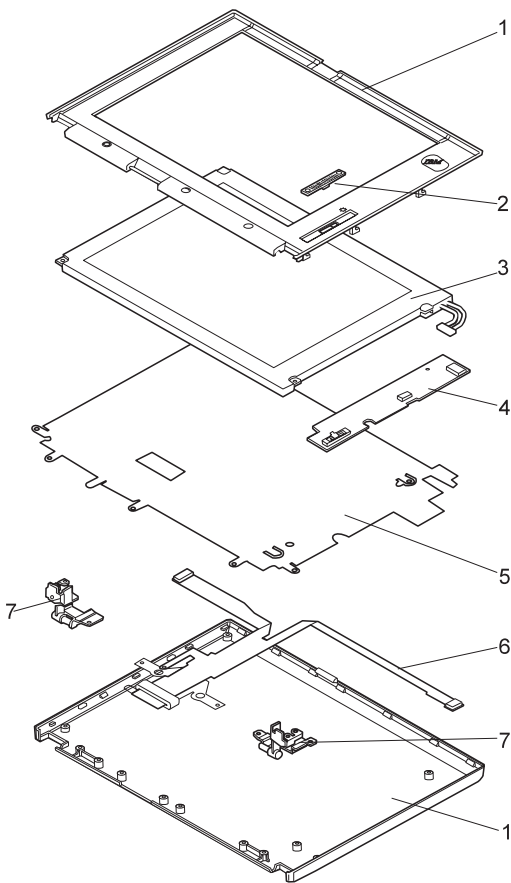
Index	System Unit	
1	LCD Assembly (12.1 DSTN)	12J1699
	See "LCD FRU (DSTN)" on page 90.	
	LCD Assembly (12.1 TFT 1)	12J1704
	See "TFT 1 (12J1704)" on page 91.	
	LCD Assembly (12.1 TFT 2)	12J1706
	See "TFT 2 (12J1706)" on page 92.	
2	Frame	12J1697
3	Keyboard (see keyboard section)	
4	TrackPoint III Cap	84G6536
5	Speaker	46H4133
6	EMI Bracket I/O	05K4643
7	System Board (200 MHz)	12J1693
	System Board (233 MHz)	12J1694
8	Card-Bus Slot	12J1696
9	Rubber Cap I/O	46H4151
10	EMI Spring	46H4145
11	Base Cover	12J1690
12	DIMM Cover	46H4131
13	PC Card Cover	12J1691
14	Backup Battery	12J1695
15	FDD Connector Cover	12J1692
16	Power Switch	46H4138
17	HDD Bracket	46H4137
18	Hard Disk Drive (2.1 GB)	83H7080
	Hard Disk Drive (4.0 GB)	83H7085
19	HDD Flexible Cable	05K2615
20	DC/DC Card	05K3112
21	Keyboard Sheet	46H4150
22	Battery Pack	46H4144
	External FDD (2-mode)	10H4056
	External FDD (3-mode)	39F2086
	External FDD Cable	39F2077
	AC Adapter (56W)	
	2-pin	11J8974
	3-pin	11J8956
	Screw Cap	66G5046
	Screw Cap, rear	11J8919

LCD FRU (DSTN)



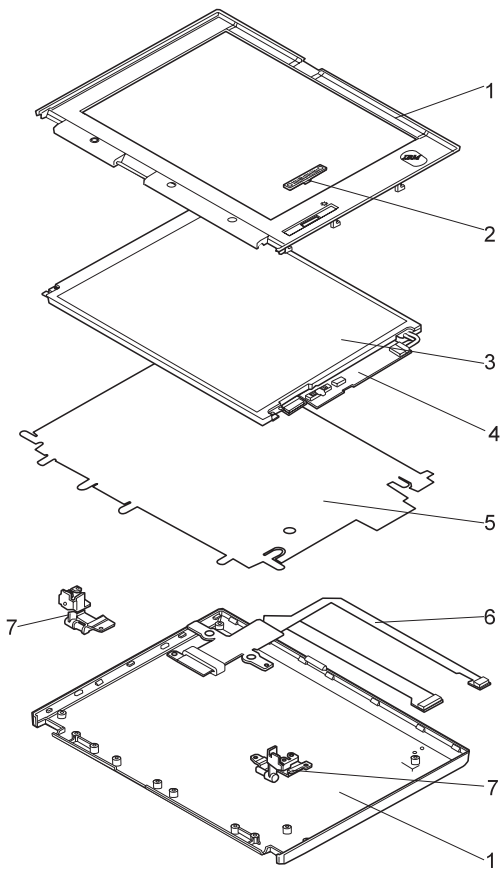
<i>Index</i>	<i>System Unit</i>	
1	LCD Cover Set	12J1700
2	Control Knob	12J1702
3	LCD Panel	—
4	Inverter Card	12J1703
5	Shield Sheet	46H4165
6	LCD Cable	12J1701
7	Hinges	46H4155

LCD FRU (TFT)
TFT 1 (12J1704)



<i>Index</i>	<i>System Unit</i>	
1	LCD Cover Set	05K4602
2	Control Knob	11J9664
3	LCD Panel	—
4	Inverter Card	11J9632
5	Shield Sheet	46H4165
6	LCD Cable	12J1705
7	Hinges	11J9663
	Hinge Spacer	05K4658

TFT 2 (12J1706)



<i>Index</i>	<i>System Unit</i>	
1	LCD Cover Set	05K4603
2	Control Knob	11J9664
3	LCD Panel	—
4	Inverter Card	82H5509
5	Shield Sheet	46H4165
6	LCD Cable	12J1707
7	Hinges	11J9663

Keyboard

Arabic	97H3886
Belgian	97H3884
Canadian French	97H3891
Danish	97H3879
Dutch	97H3878
French	97H3876
German	97H3875
Greek	97H3889
Hebrew	97H3887
Italian	97H3877
Japanese	97H3893
Korean	97H3894
Latin Spanish	97H3890
Norwegian	97H3881
Portuguese	97H3885
Russian	97H3892
Spanish	97H3880
Swedish or Finnish	97H3883
Swiss	97H3882
Turkish	97H3888
U.K. English	97H3874
U.S. English	97H3873

Common and Option Parts List

Miscellaneous Parts

Screw Kit (including nylon-coated screws)	12J0808
Screw Kit (M2.5 x 3.5 mm, nylon-coated)	97H3917
Screw Kit (M2.5 x 6.5 mm, nylon-coated)	97H3918
Screw Kit (M2.5 x 11.5 mm, nylon-coated)	97H3919
Screw Kit (LCD)	46H4160

Options

Notes

1. When you replace the AC Adapter, use the one for the country you are in even if the computer is from a different country.
2. The warranty for the system unit does not apply to all options.

Headset	85G1529
810 MB Hard Disk Drive Assembly	39H2220
1.08 GB Hard Disk Drive Assembly	39H2221
2.1 GB Hard Disk Drive Assembly	83H7080
4.0 GB Hard Disk Drive Assembly	83H7085
Microphone	66G7871
PS/2 Miniature Mouse	95F5723
ThinkPad 560 Port Replicator	12J1602
ThinkPad 380 Port Replicator	11J9000
DIMM 8 MB	42H2767
DIMM 16 MB	42H2768
DIMM 32 MB	42H2769
DIMM 64 MB	42H2817
Interface Cable to System for Keyboard	84G2531
Interface Cable to Keyboard for Keypad	84G2532
Mini-DIN to Mini-DIN Cable	84G6474

Numeric Keypad

Belgian	95F5741
Canadian French	95F5466
Danish	95F5467
Dutch	95F5467
French	95F6313
German	95F6314
Greek	95F5467
Hebrew	95F5741
Icelandic	95F5467
Italian	95F6316
Japanese	79F6401
Norwegian	95F5467
Spanish	95F6315
Swedish or Finnish	95F5468
Swiss French	95F5711
Swiss German	95F5715
Turkish	95F5467
U.K. English	95F5741
U.S. English	95F5741

Black Keypad

French	84G6286
German	84G6280
Italian	84G6292
Norwegian	84G6310
Swedish	84G6304
U.K. English	84G6298
U.S. English	84G2530

Black Keyboard

French	84G6285
German	84G6279
Italian	84G6291
Norwegian	84G6309
Swedish	84G6303
U.K. English	84G6297
U.S. English	84G2529

Accessories

Keyboard/Mouse Cable	54G0444
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Tools

Tri-Connector Wrap Plug	72X8546
PC Test Card	35G4703
Audio Wrap Cable	66G5180
USB Parallel Test Cable	05K2580
Screwdriver Kit	95F3598
Torque Screwdriver	05K4695
5mm Socket Wrench	05K4694
Screwdriver	05K4693

ThinkPad Hardware Maintenance

Diskette Version 1.40

(See "Maintenance Diskette Download" on page 55.)

Power Cords

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

For 2-pin power cords:

IBM Power Cord Part Number	Used in These Countries
13H5264	Bahamas, Barbados, Bermuda, Bolivia, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Korea (South), Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Thailand, Trinidad (West Indies), United States of America, Venezuela
13H5267	Abu Dhabi, Albania, Antigua, Bahrain, Brunei, Dubai, Fiji, India, Ireland, Kenya, Kuwait, Macao, Malaysia, Nigeria, Oman, People's Republic of China (including Hong Kong), Qatar, Singapore, United Kingdom
13H5270	Austria, Belgium, Bulgaria, Chile, Czech Republic, Denmark, Egypt, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Israel, Italy, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sweden, Switzerland, Turkey, former Yugoslavia
13H5273	Japan
13H5276	Argentina, Australia, New Guinea, New Zealand, Papua, Paraguay, Uruguay
13H5279	Bangladesh, Pakistan, South Africa, Sri Lanka

For 3-pin power cords:

Note:

The grounded adapter is required for full MPRII compliance.

IBM Power Cord Part Number	Used in These Countries
25H2205	Argentina, Australia, New Guinea, New Zealand, Papua, Paraguay, Uruguay
25H2207	Bahamas, Barbados, Bermuda, Bolivia, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Korea (South), Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), United States of America, Venezuela
25H2209	Austria, Belgium, Bulgaria, Czech Republic, Egypt, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sweden, Turkey, former Yugoslavia
25H2211	Denmark
25H2213	Bangladesh, Pakistan, South Africa, Sri Lanka
25H2215	Abu Dhabi, Albania, Antigua, Bahrain, Brunei, Dubai, Fiji, India, Ireland, Kenya, Kuwait, Macao, Malaysia, Nigeria, Oman, People's Republic of China (including Hong Kong), Qatar, Singapore, United Kingdom
25H2219	Thailand
25H2221	Switzerland
25H2223	Chile, Italy
25H2225	Israel

For 3-pin slim power cords:

IBM Power Cord P/N	Used in These Countries
76H3514	Argentina, Australia, Papua New Guinea, New Zealand, Paraguay, Uruguay
76H3516	Bahamas, Barbados, Bermuda, Bolivia, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), United States of America, Venezuela
76H3518	Austria, Belgium, Bulgaria, Czech Republic, Egypt, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sweden, Turkey, former Yugoslavia
76H3520	Denmark
76H3522	Bangladesh, Pakistan, South Africa, Sri Lanka
76H3524	Abu Dhabi, Albania, Antigua, Bahrain, Brunei, Dubai, Fiji, India, Ireland, Kenya, Kuwait, Macao, Malaysia, Nigeria, Oman, People's Republic of China (including Hong Kong), Qatar, Singapore, United Kingdom
76H3526	Japan
76H3528	Switzerland, Liechtenstein
76H3530	Chile, Ethiopia, Italy, Libya
76H3532	Israel
76H3535	Korea
76H4866	Thailand

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