

***lenovo***

# *Ideapad Z560/Z565*

*Hardware  
Maintenance  
Manual*

**Note:**

Before using this information and the product it supports, be sure to read the general information under "Notices" on page 85

**First Edition (Apr. 2010)**

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# Contents

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<b>About this manual .....</b>	<b>iv</b>	1060 DIMM .....	40
<b>Safety information .....</b>	<b>1</b>	1070 Fan assembly and Heat Sink assembly ...	41
General safety .....	2	1080 CPU .....	44
Electrical safety .....	3	1090 PCI Express Mini Card for wireless	
Safety inspection guide .....	5	LAN/WAN .....	45
Handling devices that are sensitive to		1100 Keyboard .....	47
electrostatic discharge .....	6	1110 Keyboard bezel .....	49
Grounding requirements .....	6	1120 Speakers, power board and touch	
Safety notices: multilingual translations .....	7	inductive panel .....	52
Laser compliance statement .....	14	1130 System board and ExpressCard slot	
<b>Important service information .....</b>	<b>16</b>	assembly .....	54
Strategy for replacing FRUs .....	16	1140 LCD unit .....	58
Strategy for replacing a hard disk drive .....	17	1150 Bluetooth daughter card and base cover ...	61
Important notice for replacing a system board ...	17	1160 LCD front bezel .....	64
Important information about replacing RoHS		1170 LCD panel and hinges .....	65
compliant FRUs .....	18	1180 Integrated camera .....	67
1190 Antenna assembly and LCD cover .....	68	<b>Locations .....</b>	<b>69</b>
<b>General checkout .....</b>	<b>19</b>	Front view .....	69
What to do first .....	20	Right-side view .....	70
Power system checkout .....	21	Bottom and Left-side view .....	70
Checking the AC adapter .....	21	<b>Parts list .....</b>	<b>71</b>
Checking operational charging .....	21	Overall .....	72
Checking the battery pack .....	22	LCD FRUs .....	77
<b>Related service information .....</b>	<b>23</b>	Keyboard .....	79
Restoring the factory contents by using		Miscellaneous parts .....	81
OneKey Recovery .....	23	AC adapters .....	82
Restore of factory default .....	23	Power cords .....	83
Using recovery discs .....	23	<b>Notices .....</b>	<b>85</b>
Passwords .....	24	Trademarks .....	86
Power-on password .....	24		
Supervisor password .....	24		
Power management .....	25		
Screen blank mode .....	25		
Sleep (standby) mode .....	25		
Hibernation mode .....	26		
<b>Lenovo IdeaPad Z560/Z565 .....</b>	<b>27</b>		
Specifications .....	27		
Status indicators .....	29		
Fn key combinations .....	31		
FRU replacement notices .....	32		
Screw notices .....	32		
Removing and replacing an FRU .....	33		
1010 Battery pack .....	34		
1020 Dummy cards .....	35		
1030 Hard disk drive (HDD)/Memory/CPU			
(Central processing unit)/Mini PCI ExpressCard			
slot compartment cover .....	36		
1040 Hard disk drive .....	37		
1050 Optical drive .....	39		

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## About this manual

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This manual contains service and reference information for the following Lenovo IdeaPad product:

**Lenovo IdeaPad Z560/Z565**

Use this manual to troubleshoot problems.

The manual is divided into the following sections:

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

**Important:**

This manual is intended only for trained servicers who are familiar with Lenovo IdeaPad products. Use this manual to troubleshoot problems effectively.

Before servicing a Lenovo IdeaPad product, make sure to read all the information under “Safety information” on page 1 and “Important service information” on page 16.



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## **Safety information**

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This chapter presents the following safety information that you need to get familiar with before you service a Ideapad Z560/Z565 computer:

- “General safety” on page 2
- “Electrical safety” on page 3
- “Safety inspection guide” on page 5
- “Handling devices that are sensitive to electrostatic discharge” on page 6
- “Grounding requirements” on page 6
- “Safety notices: multilingual translations” on page 7
- “Laser compliance statement” on page 14

## General safety

Follow these rules below to ensure general safety:

- Observe a good housekeeping in the area where the machines are put during and after the maintenance.
- When lifting any heavy object:
  1. Make sure that 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 it.
  4. Lift it by standing or pushing up with your leg muscles; this action could avoid the strain from the muscles in your back. Do not attempt to lift any object that weighs more than 16 kg (35 lb) or that you think is too heavy for you.
- Do not perform any action that causes hazards to the customer, or that makes the machine unsafe.
- Before you start the machine, make sure that other service representatives and the customer are not in a hazardous position.
- Place removed covers and other parts in a safe place, keeping them away from all personnel, while you are servicing the machine.
- Keep your toolcase away from walk areas so that other people will not trip it over.
- Do not wear loose clothing that can be trapped in the moving parts of the machine. Make sure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.
- Insert the ends of your necktie or scarf inside clothing or fasten it with the nonconductive clip, about 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 may 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.
- Fan louvers on the machine help to prevent the overheating of internal components. Do not obstruct fan louvers or cover them with labels or stickers.

## Electrical safety

Observe the following rules when working on electrical equipments.

### Important:

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

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

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

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

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

Observe the special safety precautions when you work with very high voltages; instructions for these precautions are in the safety sections of maintenance information. Be extremely careful when you measure the 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 it to make sure that it has been powered off.

- Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, nongrounded power extension cables, power surges, and missing safety grounds.
- Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and machine damage.
- Do not service the following parts with the power on when they are removed from their normal operating places in a machine:
  - Power supply units
  - Pumps
  - Blowers and fans
  - Motor generatorsand similar units. (This practice ensures correct grounding of the units.)
- If an electrical accident occurs:
  - Caution: do not become a victim yourself.
  - Switch off the power.
  - Send the victim to get medical aid.

## Safety inspection guide

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

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

Consider these conditions and the safety hazards they present:

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

To determine whether there are any potential unsafe conditions, use the following checklist at the beginning of every service task. Begin the checks with the power off, and the power cord disconnected.

Checklist:

1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Turn 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 the frame ground.
  - b. The power cord should be the type specified in the parts list.
  - c. Insulation must not be frayed or worn.
4. Check for cracked or bulging batteries.
5. Remove the cover.
6. Check for any obvious non-Lenovo IdeaPad alterations. Use good judgment as to the safety of any non-Lenovo IdeaPad alterations.
7. 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.
8. Check for worn, frayed, or pinched cables.
9. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

## Handling devices that are sensitive to electrostatic discharge

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

### Notes:

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

When handling ESD-sensitive parts:

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

### Note:

The use of a grounding system to guard against ESD damage is desirable but not necessary.

- Attach the ESD ground clip to any frame ground, ground braid, or green-wire ground.
- When working on a double-insulated or battery-operated system, use an ESD common ground or reference point. 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.

## Safety notices: multilingual translations

The safety notices in this section are provided in English, French, German, Hebrew, Italian, Japanese, and Spanish.

### Safety notice 1

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

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

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

לפני הפעלת המחשב לאחר החלפת FRU יש לוודא שכל הברגים, הקפיצים, החלקים קטנים אחרים נמצאים במקומם ואינם חופשיים לזוז בתוך המחשב. כדי לוודא זאת, יש לטלטל את המחשב ולהקשיב לגילוי קולות שקשוק. חלקי או שבבי מתכת עלולים לגרום לקצרים חשמליים.

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

FRUの交換後、コンピュータの電源を入れる前に、ねじ、バネ、その他の小さな部品がすべて正しい位置にあり、またコンピュータの内部で緩んでいないことを確認してください。これを確認するには、コンピュータを振って、カチャカチャと音がしないか確かめます。金属部品や金属破片はショートの原因になることがあります。

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

**Safety notice 2**

**⚠ DANGER**

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

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

Die Bereitschaftsbatterie, die sich unter dem Diskettenlaufwerk befindet, kann geringe Mengen Nickel und Cadmium enthalten. Sie darf nicht zerlegt, wiederaufgeladen, kurzgeschlossen, oder Feuer oder Wasser ausgesetzt werden. 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.

סוללות המתנה מסוימות מכילות כמות קטנה של ניקל וקדמיום. אין לפרק סוללת המתנה, לטעון אותה מחדש, להשליך אותה לנאש או למים או לקצר אותה. יש לשלוק את הסוללה בנדרש על ידי התקנות והחוקים המקומיים. יש להשתמש רק בסוללה המופיעה ברשימת החלקים המתאימה. שימוש בסוללה לא מתאימה עלול לגרום להצתה או התפוצצות של הסוללה.

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.

予備バッテリーの中には少量のニッケルとカドミウムが含まれているものがあります。したがって、予備バッテリーの分解、再充電、火または水の中への投棄、またはショートさせることは決して行わないでください。バッテリーを廃棄する場合は地方自治体の条例に従ってください。適切なパーツ・リストにあるバッテリーだけを使用してください。誤ったバッテリーを使用すると、バッテリーが発火したり、爆発したりすることがあります。

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



**Safety notice 3****⚠ DANGER**

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

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

Akkumulační články obsahují malé množství niklu. Nemějte je rozmontovat, nepokládejte je do ohně ani do vody, ani nevykrátkíte. Odstraňujte je podle místních předpisů nebo předpisů. Používejte pouze baterie uvedené v seznamu dílů, které jsou určeny k nahrazení akumulátoru. Použití nesprávné baterie může způsobit vznícení nebo explozi akumulátoru.

מארו הסוללה מכיל כמויות קטנות של ניקל וקדמיום. אין לפרק את מארו הסוללה, להשליך אותו לאש או למים או לנקר אותו. יש לטפל את מארו הסוללה כנדרש על ידי התקנות והחוקים המקומיים. יש להשתמש רק בסוללה המופיעה ברשימת החלקים המתאימה בזמן החלפת מארו הסוללה. שימוש בסוללה לא מתאימה עלול לגרום להצתה או התפוצצות של הסוללה.

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.

バッテリー・パックには少量のニッケルが含まれています。バッテリー・パックを分解したり、火または水の中に投げ込んだり、ショートさせないでください。バッテリー・パックの廃棄にあたっては、地方自治体の条例または規則に従ってください。バッテリー・パックを交換するときは、適切なパーツ・リストにあるバッテリーだけを使用してください。誤ったバッテリーを使用すると、バッテリーが発火したり、爆発したりすることがあります。

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

**Safety notice 4**

**⚠ DANGER**

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

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

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.

סוללת הליתיום עלולה לגרום לשריפה, להתפוצצות או לכוויות קשות. אין לטעון אותה מחדש, לטלוק את המחבר המקוטב שלה, לפרק אותה או לחמם אותה לטמפרטורה העולה על 100 מעלות צלזיוס. אין לשרוף את הסוללה ואין לחשוף את תוכן התא למים. יש לטלוק את הסוללה כנדרש בתקנות ובחוקים המקומיים. יש להשתמש רק בסוללה המומינית ברשימת החלקים המתאימים. שימוש בסוללה אחרת עלול לגרום לשכנת שריפה או התפוצצות.

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

リチウム・バッテリーは、火災、爆発、または重症のやけどを引き起こすことがあります。バックアップ・バッテリーの充電、その極性コネクタの取り外し、バッテリー本体の分解、100°C (212°F) 以上への加熱、焼却、電池の中身を水に浸すことはしないでください。バッテリーを廃棄する場合は地方自治体の条例に従ってください。適切なパーツ・リストにあるバッテリーだけを使用してください。誤ったバッテリーを使用すると、バッテリーが発火したり、爆発したりすることがあります。

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 at least for 15 minutes. Seek medical care if any symptoms caused by 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.

אם מסך הנביש הנוזלי (LCD) נשבר והנוזל מתוך המסך בא במגע עם עיניים או ידיים, שטפו את האזורים הנוגעים מיד במים במשך 15 דקות לפחות. פנו לקבלת עזרה רפואית אם תסמינים הנובעים מהמגע עם הנוזל נמשכים לאחר השטיפה.

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.

LCD が破損し、LCD 中の液体が目に入ったり、手に触れたりした場合は、液体が触れた部分を少なくとも 15 分間洗い流してください。洗い流した後に、液体によって何らかの症状が現れた場合は、医師の治療を受けてください。

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

**Safety notice 6**

**⚠ DANGER**

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

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

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

כדי למנוע התחשמלות, אין להסיר את מכסה הפלסטיק המגן על חלקו התחתון של הכרטיס ההפוך.

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

感電を防ぐため、インバーター・カードの下部を保護しているプラスチック・カバーを外さないでください。

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

**Safety notice 7**

**⚠ DANGER**

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

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

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

אף שהסוללות הראשיות הן בעלות מתח נמוך, סוללה מקוצרת או מוארזת עלולה להפיק זרם מספיק לגרימת כוויות או להצתת חומרים דליקים.

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.

メイン・バッテリーの電圧は低くても、ショートしたり、接地したバッテリーが、作業者にやけどを負わせたり、可燃物を燃やすだけの電流を発生させる場合があります。

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

**Safety notice 8****⚠ DANGER**

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

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

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

לפני סילוק FRU כלשהו, יש לכבות את המחשב, לנתק את כל כבלי החשמל משקעי החשמל, להוציא את מטריז הסוללה, ואז לנתק כבלי חיבור אחרים אם יש כאלה.

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.

**FRU** を取り外す前に、**ThinkPad** の電源を切って、すべての電源コードをコンセントから外してください。次に、バッテリー・パックを外し、相互接続ケーブルを外してください。

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.

## Laser compliance statement

Some models of Lenovo IdeaPad computer are equipped from the factory with an optical storage device such as a CD-ROM drive or a DVD-ROM drive. Such devices are also sold separately as options. If one of these drives is installed, it 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.

If a CD-ROM drive, a DVD-ROM drive, or another laser device 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 kontrol, úprav alebo iných vykonaní od iných výrobcov, ako je v tomto špecifikované, mohlo by mať za následok nebezpečenstvo vystavenia sa vyžiarovaniu.

本書で指定された内容以外の、お客様による整備、調整、または手順を行った場合、レーザー光の放射の危険があります。

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, the DVD-ROM drive, or any other optical storage device could result in exposure to hazardous laser radiation. There are no serviceable parts inside those drives. **Do not open.**

A CD-ROM drive, a DVD-ROM drive, or any other storage device installed may contain an embedded Class 3A or Class 3B laser diode. Note the following:

**⚠ DANGER**

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

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

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

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

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

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

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

Открывая, берегитесь лазерного излучения.

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

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

開けるとレーザー光が放射されます。光線を見つめたり、光学機械を使って直接見たりしないでください。

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

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## Important service information

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This chapter presents the following important service information:

- “Strategy for replacing FRUs” on page 16
  - “Strategy for replacing a hard disk drive” on page 17
  - “Important notice for replacing a system board ” on page 17
- “Important information about replacing RoHS compliant FRUs” on page 18

### **Important:**

BIOS and device driver fixes are customer-installable. The BIOS and device drivers are posted on the customer support site:

<http://consumersupport.lenovo.com/>.

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## Strategy for replacing FRUs

### **Before replacing parts:**

Make sure that all software fixes, drivers, and BIOS downloads are installed before replacing any FRUs listed in this manual.

After a system board is replaced, ensure that the latest BIOS is loaded to the system board before completing the service action.

To download software fixes, drivers, and BIOS, follow the steps below:

1. Go to <http://consumersupport.lenovo.com/>.
2. Enter a serial number or select a product or use Lenovo smart downloading.
3. Select the BIOS/Driver/Applications and download.
4. Follow the directions on the screen and install the necessary software.



Use the following strategy to prevent unnecessary expense for replacing and servicing FRUs:

- If you are instructed to replace an FRU, but the replacement does not solve 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 of them, and replacing one of them does not solve the problem, reinstall that board, and then replace the other one.
- If an adapter or a device consists of more than one FRU, any of the FRUs may be the cause of the error. Before replacing the adapter or device, remove the FRUs one by one to see if the symptoms change. Replace only the FRU that changed the symptoms.

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

## **Strategy for replacing a hard disk drive**

Always try to run a low-level format before replacing a hard disk drive. This will cause all customer data on the hard disk to be lost. Make sure that the customer has a current backup of the data before performing this action.

**Attention:** The drive startup sequence in the computer you are servicing may have been changed. Be extremely careful during write operations such as copying, saving, or formatting. If you select an incorrect drive, data or programs can be overwritten.

## **Important notice for replacing a system board**

Some components mounted on a system board are very sensitive. Improper handling can cause damage to those components, and may cause a system malfunction.

**Attention:** When handling a system board:

- Do not drop the system board or apply any excessive force to it.
- Avoid rough handling of any kind.
- Avoid bending the system board and hard pushing to prevent cracking at each BGA (Ball Grid Array) chipset.

**Important information about replacing RoHS compliant FRUs**

RoHS, The Restriction of Hazardous Substances in Electrical and Electronic Equipment Directive (2002/95/EC) is a European Union legal requirement affecting the global electronics industry. RoHS requirements must be implemented on Lenovo products placed on the market after June 2006. Products on the market before June 2006 are not required to have RoHS compliant parts. If the original FRU parts are non-compliant, replacement parts can also be non-compliant. In all cases if the original FRU parts are RoHS compliant, the replacement part must also be RoHS compliant.

**Note:** RoHS and non-RoHS FRU part numbers with the same fit and function are identified with unique FRU part numbers.

Lenovo plans to transit to RoHS compliance well before the implementation date and expects its suppliers to be ready to support Lenovo's requirements and schedule in the EU. Products sold in 2005 and 2006 will contain some RoHS compliant FRUs. The following statement pertains to these products and any product Lenovo produces containing RoHS compliant FRUs.

RoHS compliant FRUs have unique FRU part numbers. Before or after the RoHS implementation date, failed RoHS compliant parts must always be replaced with RoHS compliant ones, so only the FRUs identified as compliant in the system HMM or direct substitutions for those FRUs may be used.

Products marketed before June 2006		Products marketed after June 2006	
Current or original part	Replacement FRU	Current or original part	Replacement FRU
Non-RoHS	Can be Non-RoHS	Must be RoHS	Must be RoHS
Non-RoHS	Can be RoHS		
Non-RoHS	Can sub to RoHS		
RoHS	Must be RoHS		

**Note:** A direct substitution is a part with a different FRU part number that is automatically shipped by the distribution center at the time of the order.

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## General checkout

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This chapter presents the following information:

- “What to do first” on page 20
- “Power system checkout” on page 21

Before you go to the checkout, make sure to read the following important notes:

**Important notes:**

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

## What to do first

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

1. Name and phone number of servicer
2. Date of service
3. Date on which the machine failed
4. Date of purchase
5. Procedure index and page number in which the failing FRU was detected
6. Failing FRU name and part number
7. Machine type, model number, and serial number
8. Customer's name and address

**Note for warranty:** During the warranty period, the customer may be responsible for repair costs if the computer damage was caused by misuse, accident, modification, unsuitable physical or operating environment, or improper maintenance by the customer.

The following is a list of some common items that are not covered under warranty and some symptoms that might indicate that the system was subjected to stress beyond normal use.

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

### **The following are not covered under warranty:**

- LCD panel cracked from the application of excessive force or from being dropped
- Scratched (cosmetic) parts
- Distortion, deformation, or discoloration of the cosmetic parts
- Plastic parts, latches, pins, or connectors that have been cracked or broken 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
- Improper disc insertion or use of an optical drive
- Diskette drive damage caused by pressure on the diskette drive cover, foreign material in the drive, or the insertion of a diskette with multiple labels
- Damaged or bent diskette eject button
- Fuses blown by attachment of a nonsupported device
- Forgotten computer password (making the computer unusable)
- Sticky keys caused by spilling a liquid onto the keyboard
- Use of an incorrect AC adapter on laptop products

### **The following symptoms might indicate damage caused by nonwarranted activities:**

- Missing parts might be a symptom of unauthorized service or modification.
- If the spindle of a hard disk drive becomes noisy, it may have been subjected to excessive force, or dropped.

## Power system checkout

To verify a symptom, follow the steps below:

1. Turn off the computer.
2. Remove the battery pack.
3. Connect the AC adapter.
4. Make sure that power is supplied when you turn on the computer.
5. Turn off the computer.
6. Disconnect the AC adapter and install the charged battery pack.
7. Make sure that the battery pack supplies power when you turn on the computer.

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

- “Checking the AC adapter ” on page 21
- “Checking operational charging” on page 21
- “Checking the battery pack ” on page 22

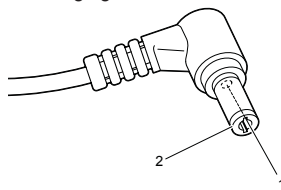
### Checking the AC adapter

You are here because the computer fails only when the AC adapter is used.

- If the power-on indicator does not turn on, check the power cord of the AC adapter for correct continuity and installation.
- If the computer does not charge during operation, go to “Checking operational charging”.

To check the AC adapter, follow the steps below:

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



Pin	Voltage (V DC)
1	+20
2	0

**Note:** Output voltage for the AC adapter pin No. 2 may differ from the one you are servicing.

3. If the voltage is not correct, replace the AC adapter.
4. If the voltage is acceptable, do the following:
  - Replace the system board.
  - If the problem continues, go to “Lenovo IdeaPad Z560/Z565” on page 27.

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

### Checking operational charging

To check whether the battery charges properly during operation, use a discharged battery pack or a battery pack that has less than 50% of the total power remaining when installed in the computer.

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

If the charge indicator still does not light on, replace the system board. Then reinstall the battery pack. If it is still not charged, go to the next section.

## Checking the battery pack

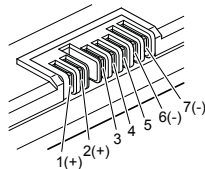
Battery charging does not start until the Power Meter shows that less than 95% of the total power remains; under this condition the battery pack can charge to 100% of its capacity. This protects the battery pack from being overcharged or from having a shortened life.

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

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

To check the battery pack, follow the steps below:

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



Terminal	Voltage (V DC)
1	+0 to +14
7	Ground (-)

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

**Note:** Recharging will be continued for at least 3 hours, even though the indicator does not light 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 5 and 7. The resistance must be 4 to 30 KΩ.

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

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## Related service information

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This chapter presents the following information:

- “Restoring the factory contents by using OneKey Recovery” on page 23
- “Passwords” on page 24
- “Power management” on page 25

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## Restoring the factory contents by using OneKey Recovery

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### Restore of factory default

The Ideapad Z560/Z565 computers come with pre-installed OneKey Rescue System. In order to save application files and the initial backed up files of the system, the hard disk in a Lenovo computer includes a hidden partition when it is shipped. If you need to restore the system to the point of your first boot up, just enter Lenovo OneKey Rescue System and run **Restore to factory default**. For details of OneKey Rescue System, see *the User Guide for OneKey Rescue System*.

**Note:** This will delete all the new data on the system partition (C drive), which is not recoverable. Make sure to back up your critical data before you perform this action.

### Using recovery discs

When you replace a hard disk drive in your computer, you are unable to use the pre-installed Lenovo OneKey Recovery and OneKey Rescue. However, you can use the recovery discs that store your backed up data to restore your new hard drive to a previous backup status.

**Note:** You can create recovery discs by burning the backup image to a CD/DVD as recovery discs. For details of **Create recovery discs**, see *the User Guide for OneKey Rescue System*.

When you use the recovery discs to boot your computer, the system will enter the user interface for system recovery automatically. Please follow the prompt to insert the backup discs to complete the whole recovery process.

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

## Passwords

As many as two passwords may be needed for any Lenovo IdeaPad computer: the power-on password (POP) and the supervisor password (SVP).

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

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

### Power-on password

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

### Supervisor password

A supervisor password (SVP) protects the system information stored in the BIOS Setup Utility. The user must enter the SVP in order to get access to the BIOS Setup Utility and change the system configuration.

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



## Power management

**Note:** Power management modes are not supported for APM operating system.

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

### Screen blank mode

If the time set on the "Turn off monitor" timer in the operating system expires, the LCD backlight turns off. You can also turn off the LCD backlight by pressing Fn+F2.

To end screen blank mode and resume normal operation, press any key.

### Sleep (standby) mode

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

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

To enter sleep (standby) mode, press Fn+F1.

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

- If a "suspend time" has been set on the timer, and the user does not do any operation with the keyboard, the hard disk, the parallel connector, or the diskette drive within that time.
- If the battery indicator is amber, indicating that the battery power is low. (Alternatively, if **Hibernate when battery becomes low** has been selected in the "Power Management Properties" window, the computer goes into hibernation mode.)

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

- Press the Fn key.
- Open the lid.
- Turn on the power switch.

Also, in the following event, the computer automatically returns from sleep (standby) mode and resumes the operation:

- The time set on the resume timer elapses.

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

## **Hibernation mode**

In hibernation mode, the following occurs:

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

To cause the computer to enter hibernation mode, follow the steps below:

- If you are using the ACPI operating system and have defined one of the following actions as the event that causes the system to go into hibernation mode, perform that action:
  - Closing the lid.
  - Pressing the power button.

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

- If a “hibernation time” has been set on the timer, and if the user does not do any operation with the keyboard, the hard disk drive, the parallel connector, or the diskette drive within that time.
- If the timer conditions are satisfied in suspend mode.

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

## Lenovo IdeaPad Z560/Z565

This chapter presents the following product-specific service references and product-specific parts information:

- “Specifications” on page 27
- “Status indicators” on page 29
- “Fn key combinations” on page 31
- “FRU replacement notices” on page 32
- “Removing and replacing an FRU” on page 33
- “Locations” on page 69
- “Parts list” on page 71

### Specifications

The following table lists the specifications of the Lenovo IdeaPad Z560/Z565:

*Table 1. Specifications*

Feature	Description
Processor	• Intel Calpella Arrandale
Core Chipset	• Intel HM55
Bus architecture	• Hyper Transport Link 16 x 16 • A link Express 2 • DDRIII 800~1333MHz • PCI-Express x 16
Graphic memory chip	• Intel HM55 Integrated • NVIDIA N11M-GE1 & N11M-GE2
Display	• 15.6" 1366*768 220nits typ. 190nits min. (5P)
Standard memory	• DDR III 800/1066M DIMM socket x 2 (max 4GB per slot)
CMOS RAM	• 16 M Bytes
Hard disk drive	• 2.5" SATA 250/320/500G 5400rpm & 7200rpm
Optical drive	• 12.7mm Fixed Bay - DVD Rambo - Blue Ray
I/O port	• External monitor connector • Stereo headphone jack • Microphone jack • RJ45 x 1 (on planar) • HDMI port • USB2.0 x 2 (on planar) • E-SATA + USB combo × 1 (on planar) • Express Card slot (selected models only) • 5-in-1 media card reader (selected models only)
MODEM slot	• N/A
Audio	• 1/8" Stereo Headphone Output Jack/ SPIDIF • 1/8" Microphone Input Jack • Built-in stereo speakers

Table 1. Specifications (continued)

Feature	Description
Video	<ul style="list-style-type: none"> <li>• CRT port x 1 (on planar), HDMI port x 1 (on planar)</li> </ul>
Ethernet (on the system board)	<ul style="list-style-type: none"> <li>• 10/100 Fast Ethernet Controller RTL8103EL</li> </ul>
PCI Express Mini Card slot	<ul style="list-style-type: none"> <li>• one half size for WLAN card</li> <li>• reserve for WWAN card</li> </ul>
ExpressCard slot	<ul style="list-style-type: none"> <li>• 34mm width x 1 (selected models only)</li> </ul>
Bluetooth wireless	<ul style="list-style-type: none"> <li>• Built-in antenna (selected models only)</li> </ul>
Keyboard	<ul style="list-style-type: none"> <li>• 6 row Lenovo Chocolate Keyboard with numeric key</li> </ul>
Touch pad	<ul style="list-style-type: none"> <li>• Yes</li> </ul>
Integrated camera	<ul style="list-style-type: none"> <li>• 0.3M/1.3M mega with LED indicator (selected models only)</li> </ul>
Battery	<ul style="list-style-type: none"> <li>• 2.2Ah, 6 cell Li-ion Battery</li> </ul>
AC adapter	<ul style="list-style-type: none"> <li>• 65 W/20 V</li> </ul>
Pre-installed operating system	<ul style="list-style-type: none"> <li>• Windows 7</li> </ul>

## Status indicators

The system status indicators below show the computer status:

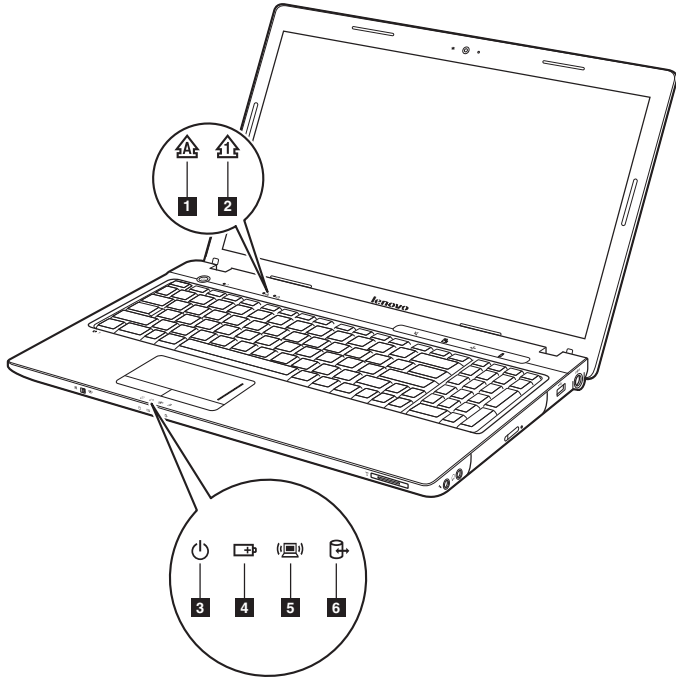


Table 2. Status indicators







Indicator	Meaning
<b>1</b> Caps lock 	<b>White:</b> Caps Lock mode is enabled. You can enter all alphabetic characters (A-Z) in uppercase without pressing the Shift key. To enable or disable Caps Lock mode, press the CapsLk key.
<b>2</b> Num lock 	<b>White:</b> The separate numeric keypad on the keyboard is enabled. To enable or disable the numeric keypad, press the Num Lock key.
<b>3</b> Power on 	<b>White:</b> System is enabled. <b>Blinking white:</b> System is in sleep mode. <b>Off:</b> System is in hibernate mode or shut down.

Table 2. Status indicators (continued)

Indicator	Meaning
<p>4 Battery status</p> 	<p><b>Blinking amber (500ms off/1s on):</b> The remaining power of the battery is less than 5% of its capacity.</p> <p><b>Blinking amber (100ms off/3.2s on):</b> The battery is being charged with the remaining power between 5% and 20% of its capacity.</p> <p><b>Amber:</b> The computer is operating on battery power with the remaining power between 5% and 20% of its capacity.</p> <p><b>Blinking white:</b> The battery is being charged with the remaining power between 20% and 80% of its capacity.</p> <p><b>White:</b> The remaining power of the battery is more than 80% of its capacity, or the computer is operating on battery power with the remaining power between 20% and 80% of its capacity.</p>
<p>5 Wireless status</p> 	<p><b>White:</b> Any one of the wireless devices (WLAN/Bluetooth/WWAN) is enabled.</p> <p><b>Off:</b> All the wireless devices (WLAN/Bluetooth/WWAN) are disabled.</p>
<p>6 Drive in use</p> 	<p><b>White:</b> Data is being read from or written to the hard disk drive or the optical disk drive. When this indicator is on, do not put the computer into standby mode or turn off the computer.</p> <p><b>Note:</b> Do not move the system while the white drive-in-use light is on. Sudden physical shock could cause drive errors.</p>

## Fn key combinations

The following table shows the function of each combination of Fn with a function key.

Table 4. Fn key combinations

Key combination	Description
Fn + Esc:	Turn on/off the integrated camera.
Fn + F1:	Enter sleep mode.
Fn + F2:	Turn on/off the backlight of the LCD screen.
Fn + F3:	Open the interface for the display device switch to select this notebook or an external display.
Fn + F4:	Open the interface for display resolution settings.
Fn + F5:	Open the interface for integrated wireless devices settings (on/off).
Fn + F6:	Enable/Disable the touchpad.
Fn + F9:	Start/Pause playback of Windows Media Player.
Fn + F10:	Stop playback of Windows Media Player.
Fn + F11:	Skip to the previous track.
Fn + F12:	Skip to the next track.
Fn + Insert:	Enable/Disable the scroll lock.
Fn + PrtSc:	Activate the system request.
Fn + Home:	Activate the pause function.
Fn + End:	Activate the break function.
Fn + ↑/ ↓:	Increase/Decrease display brightness.
Fn + →/ ←:	Increase/Decrease sound volume.

## FRU replacement notices

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

### Screw notices

Loose screws can cause a reliability problem. In the Lenovo IdeaPad computer, this problem is addressed with special nylon-coated screws that have the following characteristics:

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

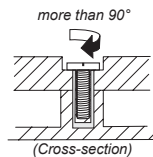
Do the following when you service this machine:

- Keep the screw kit in your tool bag.
- Always use new screws.
- Use a torque screwdriver if you have one.

Tighten screws as follows:

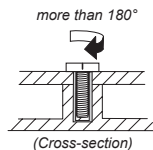
- **Plastic to plastic**

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



- **Logic card to plastic**

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



- **Torque driver**

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

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



## Removing and replacing an FRU

This section presents exploded figures with the instructions to indicate how to remove and replace the FRU. Make sure to observe the following general rules:

1. Do not attempt to service any computer unless you have been trained and certified. An untrained person runs the risk of damaging parts.
2. Before replacing any FRU, review "FRU replacement notices" on page 32.
3. Begin by removing any FRUs that have to be removed before the failing FRU. Any of such FRUs are listed at the top of the page. Remove them in the order in which they are listed.
4. Follow the correct sequence in the steps to remove the FRU, as given in the figures by the numbers in square callouts.
5. When turning a screw to replace an FRU, turn it in the direction as given by the arrow in the figure.
6. When removing the FRU, move it in the direction as given by the arrow in the figure.
7. To put the new FRU in place, reverse the removal procedures and follow any of the notes that pertain to replacement. For information about connecting and arranging internal cables, see "Locations" on page 69.
8. When replacing an FRU, use the correct screw as shown in the procedures.

### DANGER

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

**Attention:** After replacing an FRU, do not turn on the computer until you have made sure that all screws, springs, and other small parts are in place and none are loose inside the computer. Verify this by shaking the computer gently and listening for rattling sounds. Metallic parts or metal flakes can cause electrical short circuits.

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

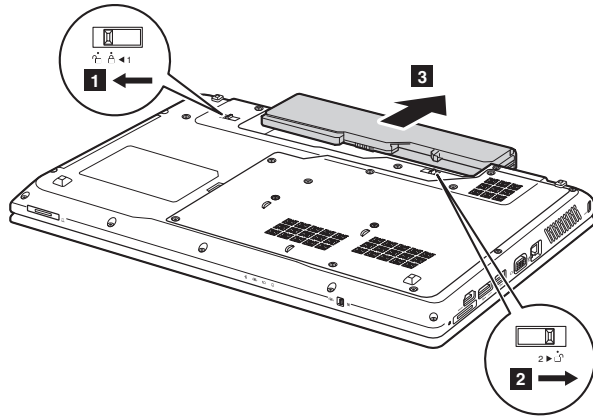
## 1010 Battery pack

**⚠ DANGER**

Only use the battery specified in the parts list for your computer. Any other battery could ignite or explode.

*Figure 1. Removal steps of battery pack*

Unlock the battery release lever **1**. Holding the battery release lever in the unlocked position **2**, remove the battery pack in the direction shown by arrow **3**.



**When installing:** Install the battery pack along the slide rails of the slot. Then make sure that the battery release lever is in the locked position.

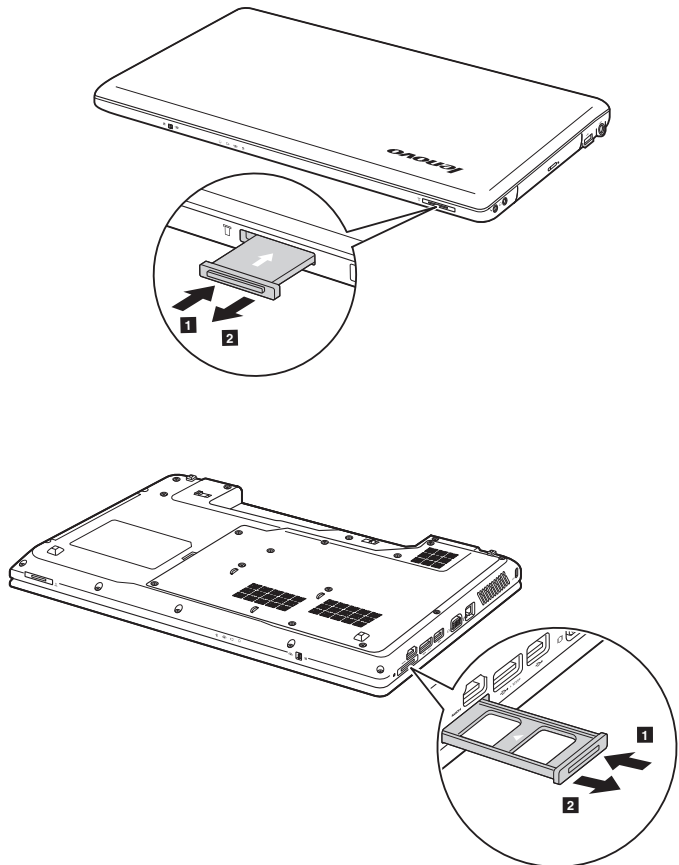
## 1020 Dummy cards

For access, remove this FRU:

- “1010 Battery pack” on page 34

*Figure 2. Removal steps of dummy cards*

Remove two dummy cards in the direction shown by arrows **1** **2**.



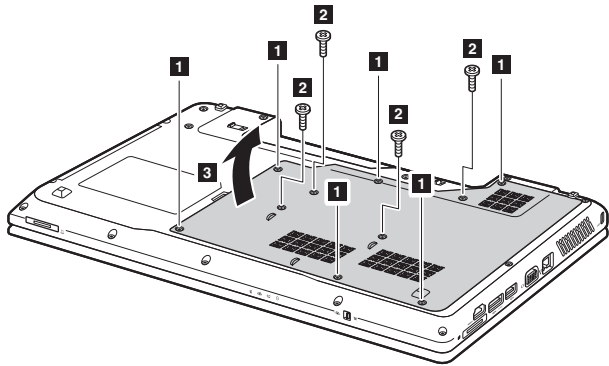
## 1030 Hard disk drive (HDD)/Memory/CPU (Central processing unit)/Mini PCI ExpressCard slot compartment cover

For access, remove this FRU:

- “1010 Battery pack” on page 34

*Figure 3. Removal steps of HDD/Memory/CPU/Mini PCI ExpressCard slot compartment cover*

**Note:** Loosen the screws **1**, but do not remove them. Remove four screws **2**. Remove the HDD/Memory/CPU/Mini PCI ExpressCard slot compartment cover in the direction shown by arrow **3**.



Step	Screw (quantity)	Color	Torque
<b>2</b>	M2.5 × 8 mm, flat-head, nylon-coated (4)	Black	0.6 Nm (6 kgfcm)

## 1040 Hard disk drive

For access, remove these FRUs in order:

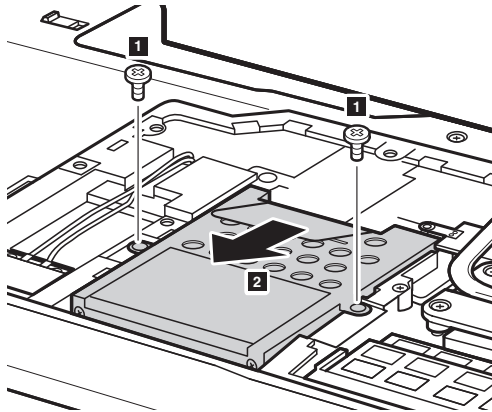
- “1010 Battery pack” on page 34
- “1030 Hard disk drive (HDD)/Memory/CPU (Central processing unit)/Mini PCI ExpressCard slot compartment cover ” on page 36

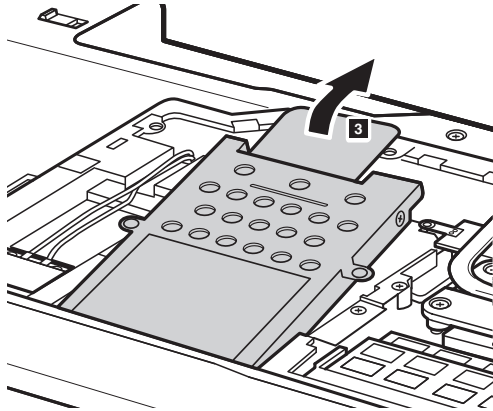
### Attention:

- **Do not drop the hard disk drive or apply any physical shock to it.** The hard disk drive is sensitive to physical shock. Improper handling can cause damages and permanent loss of data.
- Before removing the drive, suggest the customer to backup all the information on it if possible.
- Never remove the drive while the system is operating or is in suspend mode.

Figure 4. Removal steps of Hard disk drive

Remove two screws **1**. Pull the tab up in the direction shown by arrows **2** **3** to remove the hard disk drive from the slot.





Step	Screw (quantity)	Color	Torque
■	M2.0 × 6 mm, flat-head, nylon-coated (2)	Black	0.6 Nm (6 kgfcm)

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

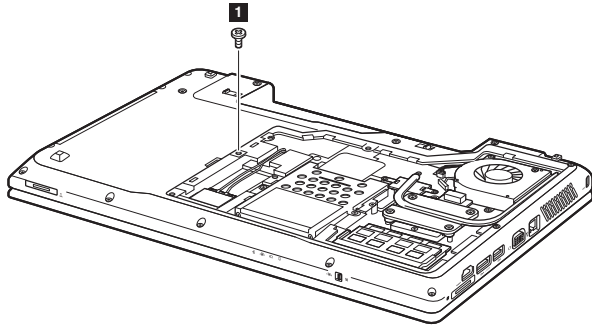
## 1050 Optical drive

For access, remove these FRUs in order:

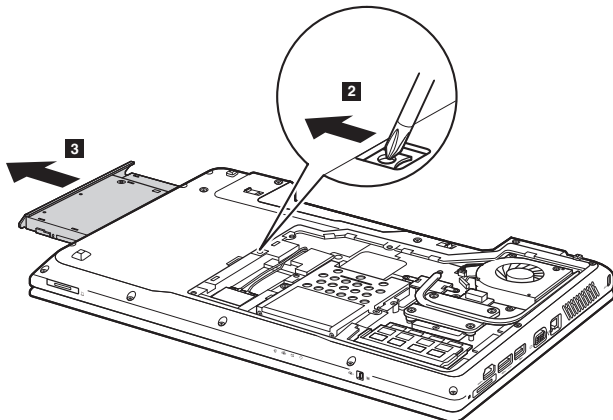
- “1010 Battery pack” on page 34
- “1030 Hard disk drive (HDD)/Memory/CPU (Central processing unit)/Mini PCI ExpressCard slot compartment cover ” on page 36

*Figure 5. Removal steps of optical drive*

Remove the screw **■**, insert a screwdriver into the screw hole and push the optical drive in the direction shown by arrow **2**, and then pull the optical drive out in the direction shown by arrow **3**.



Step	Screw (quantity)	Color	Torque
■	M2.5 × 4 mm, flat-head, nylon-coated (1)	Black	0.6 Nm (6 kgfcm)



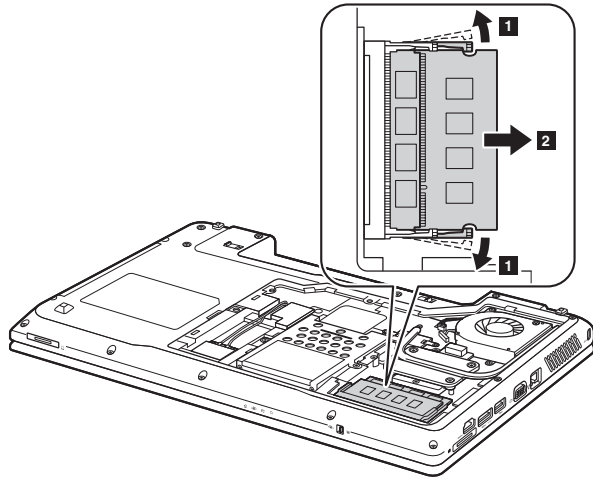
## 1060 DIMM

For access, remove these FRUs in order:

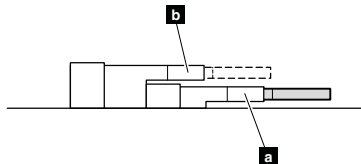
- “1010 Battery pack” on page 34
- “1030 Hard disk drive (HDD)/Memory/CPU (Central processing unit)/Mini PCI ExpressCard slot compartment cover ” on page 36

*Figure 6. Removal steps of DIMM*

Release the two latches on both edges of the socket at the same time in the direction shown by arrows **1**, and then unplug the DIMM in the direction shown by arrow **2**.



**Note:** If only one DIMM is used on the computer you are servicing, the card must be installed in SLOT-0 ( **a** : lower slot), but not in SLOT-1 ( **b** : upper slot).



**When installing:** Insert the notched end of the DIMM into the socket. Push the DIMM firmly, and then pivot it until it snaps into the place. Make sure that it is firmly fixed in the slot and difficult to be moved.



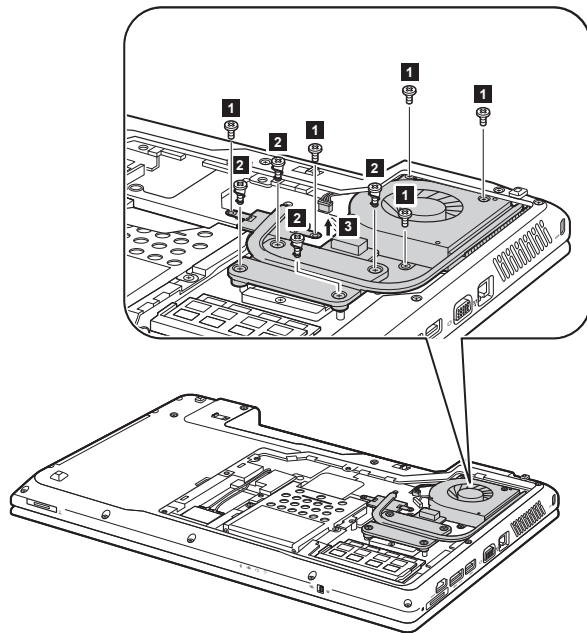
## 1070 Fan assembly and Heat Sink assembly

For access, remove these FRUs in order:

- “1010 Battery pack” on page 34
- “1030 Hard disk drive (HDD)/Memory/CPU (Central processing unit)/Mini PCI ExpressCard slot compartment cover ” on page 36

Figure 7. Removal steps of fan assembly and heat sink assembly

**Note:** Remove five screws **1** and four spring screws **2**.  
Unplug the connector in the direction shown by arrow **3**.

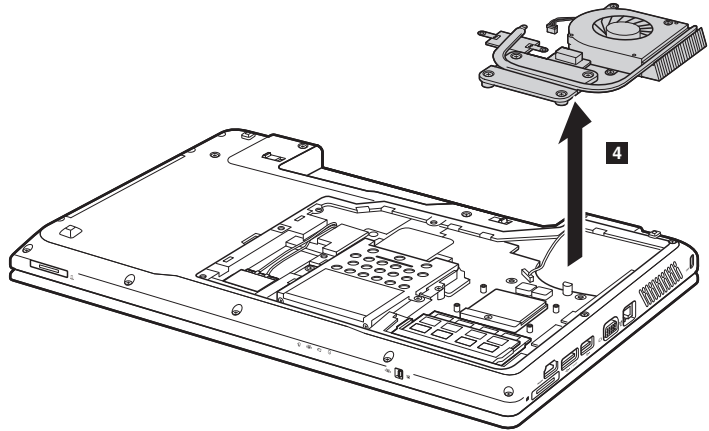


**When installing:** Make sure that the fan connector is attached firmly to the system board.

Step	Screw (quantity)	Color	Torque
<b>1</b>	M2.5 × 4 mm, flat-head, nylon-coated (5)	Black	0.6 Nm (6 kgfcm)
<b>2</b>	M2.0 × 3.2 mm, with spring, nylon-coated (4)	Silver	2.0~2.5 Nm (2.0~2.5 kgfcm)

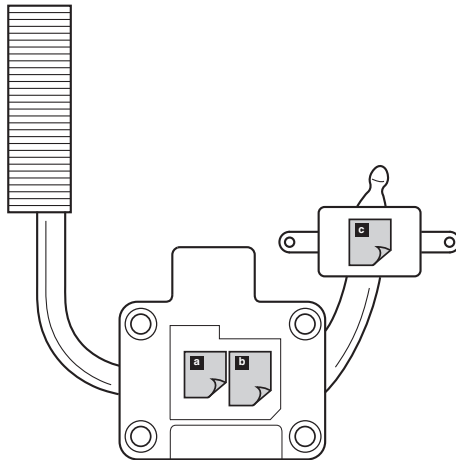
*Figure 7. Removal steps of fan assembly and heat sink assembly (continued)*

Lift the fan assembly and heat sink assembly in the direction shown by arrow **4**. Be careful not to damage the connector.



**Attention:** Do not handle the heat sink assembly roughly. Improper handling can cause distortion or deformation and imperfect contact with components.

Figure 7. Removal steps of fan assembly and heat sink assembly (continued)



**When installing:**

- Before you attach the fan assembly to the computer, apply thermal grease, at an amount of 0.2 grams, to the **a b** part shown in the figure above. Either too much or too less grease application can cause a thermal problem due to imperfect contact with a component.
- In models with the discrete graphics chip, there is an additional thermal rubber **c** whose film to be peeled off.

## 1080 CPU

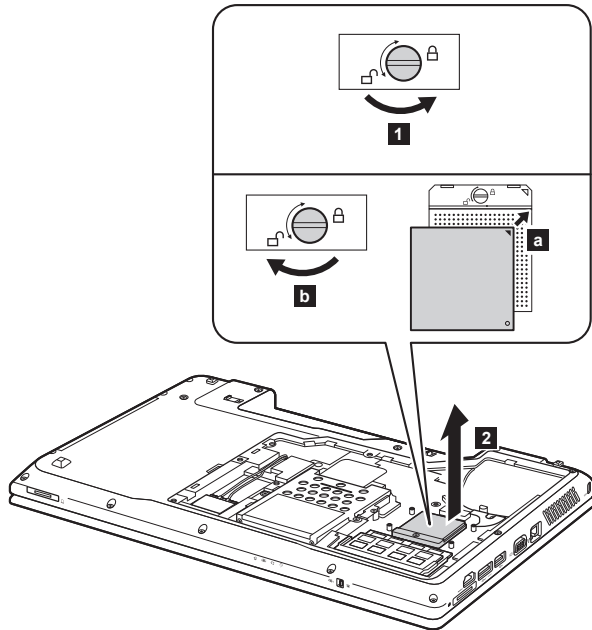
For access, remove these FRUs in order:

- “1010 Battery pack” on page 34
- “1030 Hard disk drive (HDD)/Memory/CPU (Central processing unit)/Mini PCI ExpressCard slot compartment cover” on page 36
- “1070 Fan assembly and Heat Sink assembly” on page 41

**Attention:** CPU is extremely sensitive. When you service the CPU, avoid any kind of rough handling.

*Figure 8. Removal steps of CPU*

Rotate the head of the screw in the direction shown by arrow **1** to release the lock, and then remove the CPU in the direction shown by arrow **2**.



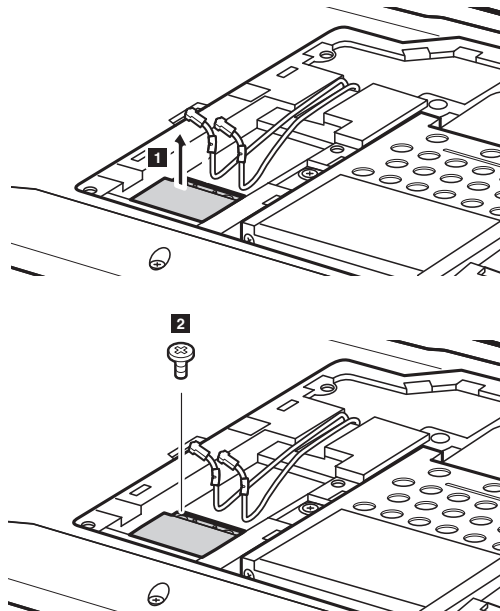
**When installing:** Place the CPU on the CPU socket in the direction shown by arrow **a**, and then rotate the head of the screw in the direction shown by arrow **b** to secure the CPU.

## 1090 PCI Express Mini Card for wireless LAN/WAN

For access, remove these FRUs in order:

- “1010 Battery pack” on page 34
- “1030 Hard disk drive (HDD)/Memory/CPU (Central processing unit)/Mini PCI ExpressCard slot compartment cover ” on page 36

Figure 9. Removal steps of PCI Express Mini Card for wireless LAN/WAN



Disconnect the two wireless LAN cables (black, white) in the direction shown by arrow **1**, and then remove the screw **2**.

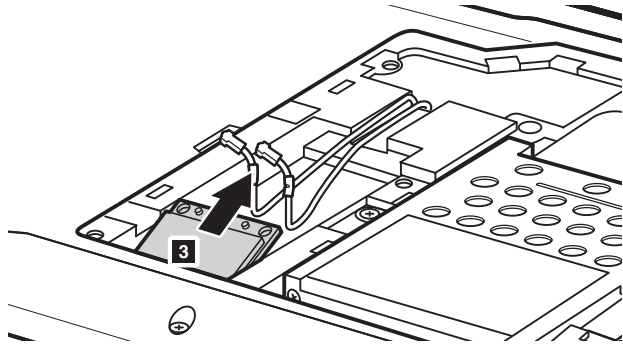
Step	Screw (quantity)	Color	Torque
<b>2</b>	M2.0 × 3 mm, flat-head, nylon-coated (1)	Black	0.4 Nm (4 kgfcm)

In step **1**, unplug the jacks by using the removal tool antenna RF connector (P/N: 08K7159), or pick up the connectors with your fingers and gently unplug them in the direction shown by the arrow.

- Notes:** wireless LAN card has 2 cables in step ■.  
wireless LAN card in some models may have 3 cables in step ■.

*Figure 9. Removal steps of PCI Express Mini Card for wireless LAN/WAN (continued)*

Remove the card in the direction shown by arrow 3.



**When installing:**

- In models with a wireless LAN card that has two antenna connectors, plug the black cable into the jack labeled 1, and the white cable into the jack labeled 2 on the card.

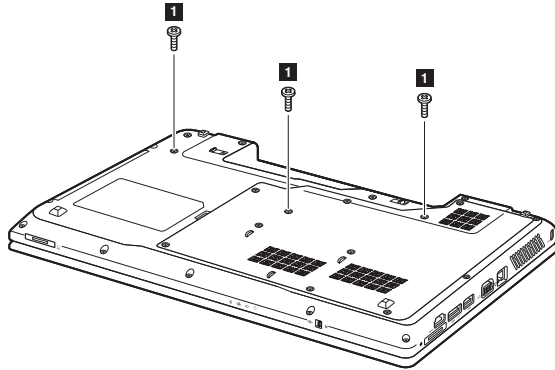
## 1100 Keyboard

For access, remove this FRU:

- “1010 Battery pack” on page 34

*Figure 10. Removal steps of keyboard*

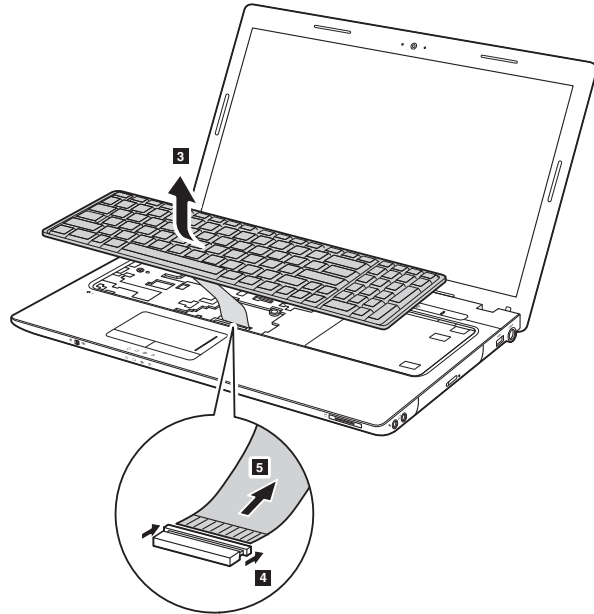
Remove three screws  on the bottom.



Step	Screw (quantity)	Color	Torque
	M2.5 × 8 mm, flat-head, nylon-coated (3)	Black	0.6 Nm (6 kgfcm)

Figure 10. Removal steps of keyboard (continued)

Lift the keyboard a little **3**, unlock the FPC connector and then detach the connector in the direction shown by arrows **4** **5**.



**When installing:** Make sure that the FPC connector is attached firmly and then lock the FPC connector.



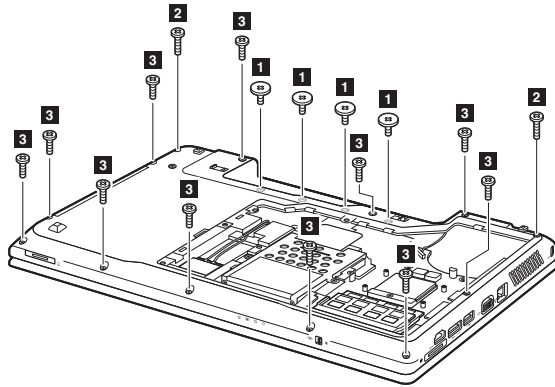
## 1110 Keyboard bezel

For access, remove these FRUs in order:

- “1010 Battery pack” on page 34
- “1030 Hard disk drive (HDD)/Memory/CPU (Central processing unit)/Mini PCI ExpressCard slot compartment cover” on page 36
- “1050 Optical drive” on page 39
- “1070 Fan assembly and Heat Sink assembly” on page 41
- “1100 Keyboard” on page 47

Figure 11. Removal steps of keyboard bezel

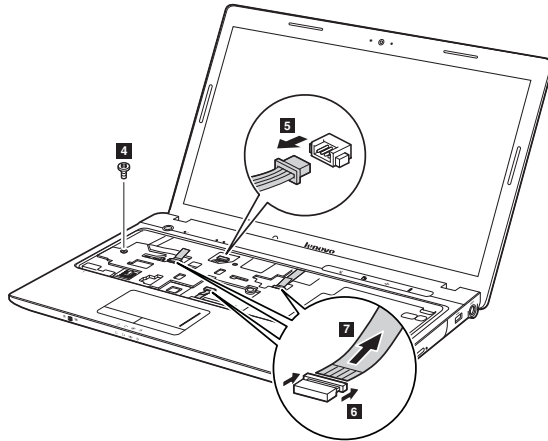
Remove four screws **1**, two screws **2** and eleven screws **3** on the bottom.



Step	Screw (quantity)	Color	Torque
<b>1</b>	M2.0 × 2 mm, flat-head, nylon-coated (4)	Black	0.25 Nm (2.5 kgfcm)
<b>2</b>	M2.5 × 10 mm, flat-head, nylon-coated (2)	Black	0.6 Nm (6 kgfcm)
<b>3</b>	M2.5 × 8 mm, flat-head, nylon-coated (11)	Black	0.6 Nm (6 kgfcm)

Figure 11. Removal steps of keyboard bezel (continued)

Remove one screw **4**, unplug the speaker connector in the direction shown by arrow **5**, and then detach three FPC connectors in the direction shown by arrows **6** **7**.

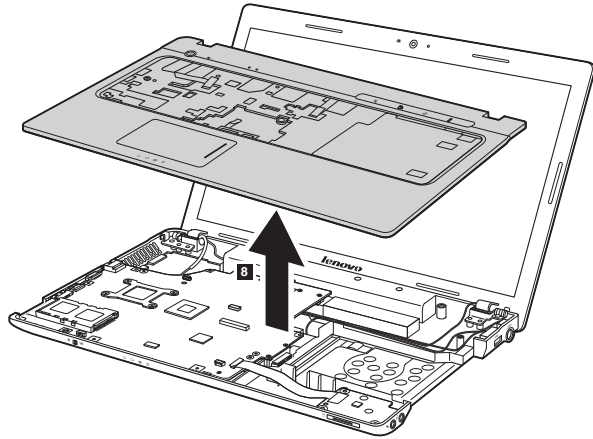


Step	Screw (quantity)	Color	Torque
<b>4</b>	M2.5 × 4 mm, flat-head, nylon-coated (1)	Black	0.6 Nm (6 kgfcm)

**When installing:** Make sure that the speaker connector and all the FPC connectors are attached firmly.

Figure 11. Removal steps of keyboard bezel (continued)

Remove the keyboard bezel in the direction shown by arrow **8**.




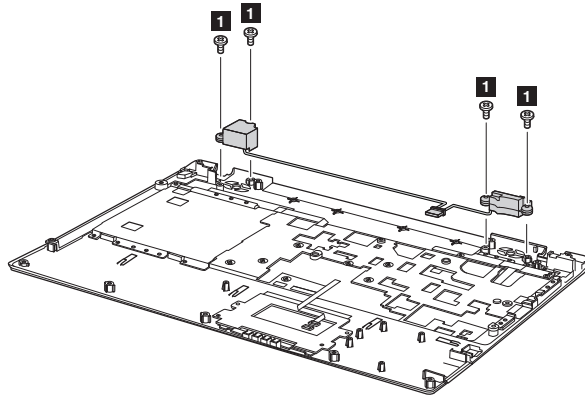
## 1120 Speakers, power board and touch inductive panel

For access, remove these FRUs in order:

- “1010 Battery pack” on page 34
- “1030 Hard disk drive (HDD)/Memory/CPU (Central processing unit)/Mini PCI ExpressCard slot compartment cover” on page 36
- “1050 Optical drive” on page 39
- “1070 Fan assembly and Heat Sink assembly” on page 41
- “1100 Keyboard” on page 47
- “1110 Keyboard bezel” on page 49

*Figure 12. Removal steps of speakers, power board and touch inductive panel*

Turn over the keyboard bezel, remove four screws , release the speaker cables from the cable guides, and then remove the speakers.




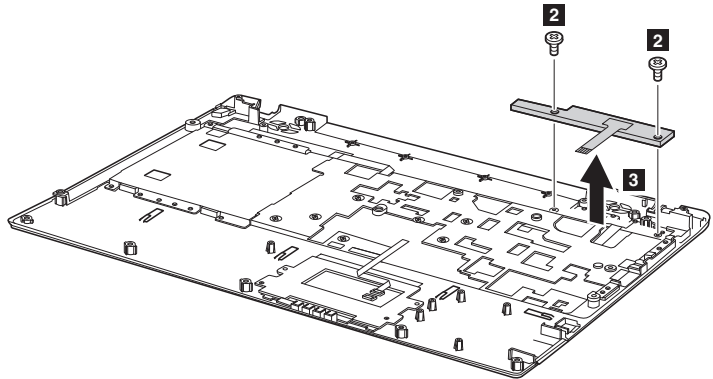
Step	Screw (quantity)	Color	Torque
	M2.5 × 5.7 mm, flat-head, nylon-coated (4)	Black	0.6 Nm (6 kgfcm)

Figure 12. Removal steps of speakers, power board and touch inductive panel (continued)

Remove two screws **2** and then remove the power board in the direction shown by arrow **3**.



**Notes:** The touch inductive panel is fixed on the keyboard bezel.

Step	Screw (quantity)	Color	Torque
<b>2</b>	M2.0 × 3 mm, flat-head, nylon-coated (2)	Black	0.25 Nm (2.5 kgfcm)

## 1130 System board and ExpressCard slot assembly

### Important notices for handling the system board:

When handling the system board, bear the following in mind.

- Be careful not to drop the system board on a bench top that has a hard surface, such as metal, wood, or composite.
- Avoid rough handling of any kind.
- In the whole process, make sure not to drop or stack the system board.
- If you put a system board down, make sure to put it only on a padded surface such as an ESD mat or conductive corrugated material.

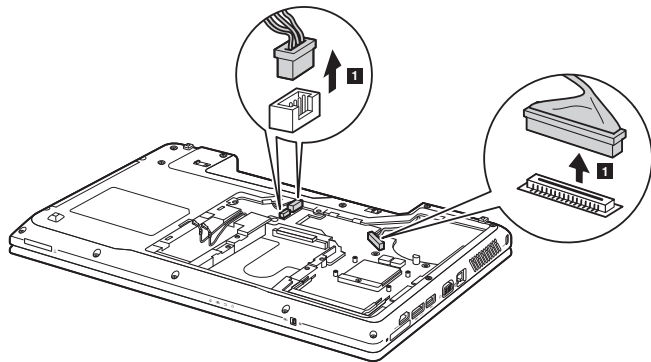
For access, remove these FRUs in order:

- “1010 Battery pack” on page 34
- “1020 Dummy cards” on page 35
- “1030 Hard disk drive (HDD)/Memory/CPU (Central processing unit)/Mini PCI ExpressCard slot compartment cover ” on page 36
- “1040 Hard disk drive ” on page 37
- “1050 Optical drive” on page 39
- “1060 DIMM” on page 40
- “1070 Fan assembly and Heat Sink assembly” on page 41
- “1090 PCI Express Mini Card for wireless LAN/WAN” on page 45
- “1100 Keyboard” on page 47
- “1110 Keyboard bezel” on page 49

**Note:** ExpressCard slot assembly is attached to the system board.

*Figure 13. Removal steps of system board and ExpressCard slot assembly*

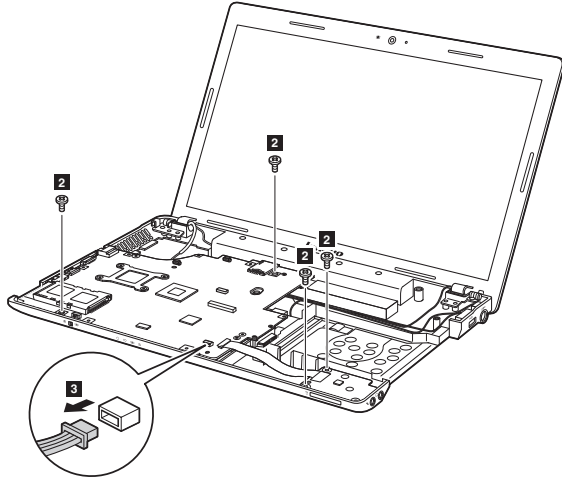
Unplug the LCD connector and detach two connectors in the direction shown by arrows ■.



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

Figure 13. Removal steps of system board and ExpressCard slot assembly (continued)

Remove four screws **2** and detach a connector in the direction shown by arrow **3**.

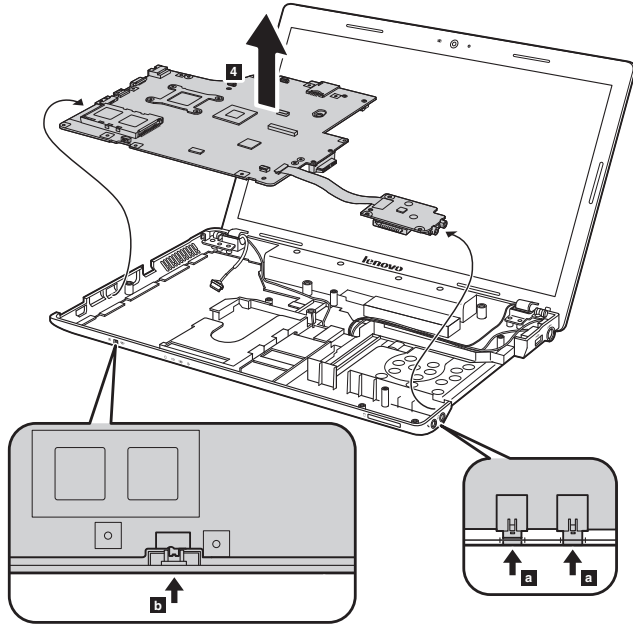


**When installing:** Make sure that the connector is attached firmly.

Step	Screw (quantity)	Color	Torque
<b>2</b>	M2.5 × 4 mm, flat-head, nylon-coated (4)	Black	0.6 Nm (6 kgfcm)

*Figure 13. Removal steps of system board and ExpressCard slot assembly (continued)*

Remove the system board in the direction shown by arrow **4**.

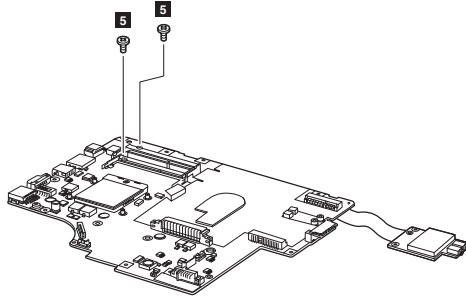


**When installing:** When attaching the system board to the base cover, adjust the placement of the wireless radio switch as shown in **b**, and make sure that both of the audio jack and the microphone jack are attached to the holes on the base cover as shown in **a**. Improper placement of the switch or those jacks might cause a damage.



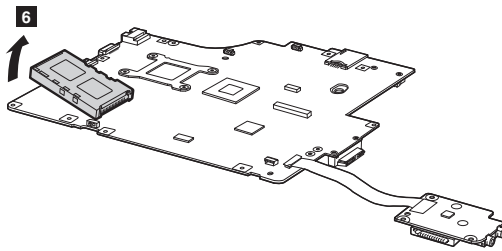
Figure 13. Removal steps of system board and ExpressCard slot assembly (continued)

Turn the system board over and remove two screws **5**.



Step	Screw (quantity)	Color	Torque
<b>5</b>	M2.0 × 3 mm, flat-head, nylon-coated (2)	Black	0.25 Nm (2.5 kgfcm)

Remove the ExpressCard slot assembly in the direction shown by arrow **6**.



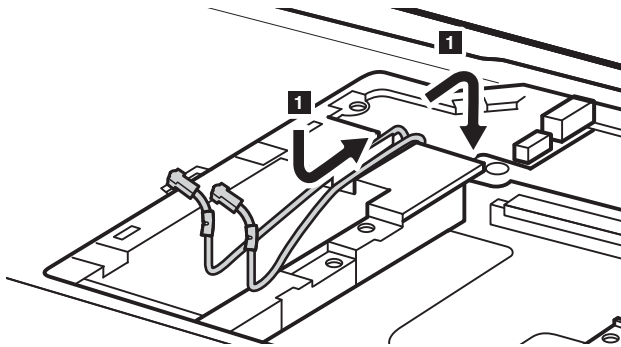
## 1140 LCD unit

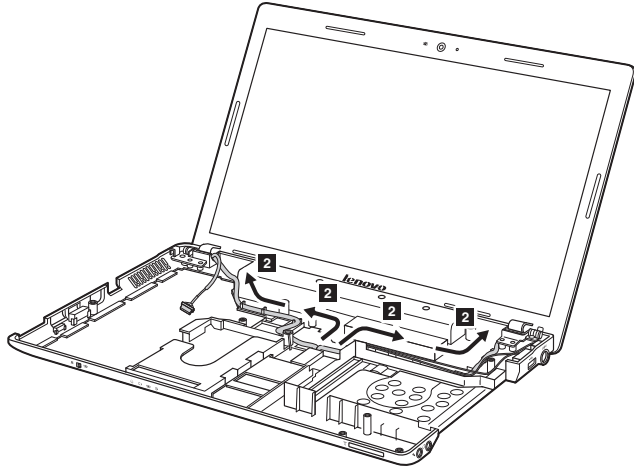
For access, remove these FRUs in order:

- “1010 Battery pack” on page 34
- “1020 Dummy cards” on page 35
- “1030 Hard disk drive (HDD)/Memory/CPU (Central processing unit)/Mini PCI ExpressCard slot compartment cover” on page 36
- “1040 Hard disk drive ” on page 37
- “1050 Optical drive” on page 39
- “1060 DIMM” on page 40
- “1070 Fan assembly and Heat Sink assembly” on page 41
- “1090 PCI Express Mini Card for wireless LAN/WAN” on page 45
- “1100 Keyboard” on page 47
- “1110 Keyboard bezel” on page 49
- “1130 System board and ExpressCard slot assembly” on page 54

*Figure 14. Removal steps of LCD unit*

Pull out the four antenna cables from the guide hole in the direction shown by arrows **1** and release them from the cable guides in the direction shown by arrows **2**.



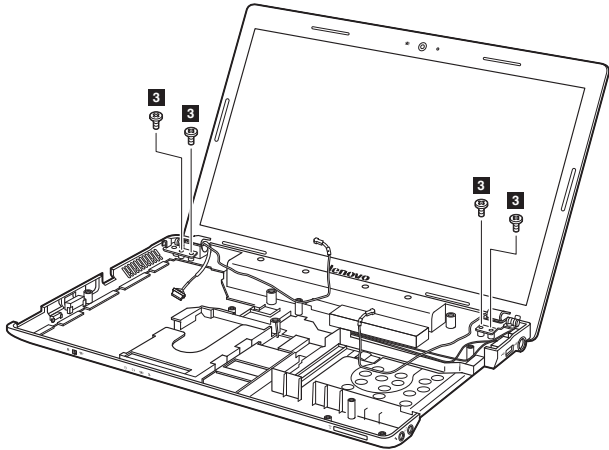


**When installing:**

- Route the antenna cables along the cable guides. As you route the cables, make sure that they are not subjected to any tension. Tension could cause the cables to be damaged by the cable guides, or a wire to be broken.

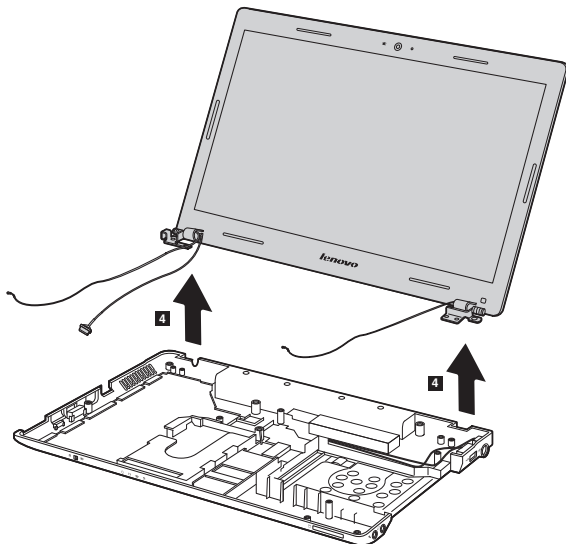
Figure 14. Removal steps of LCD unit (continued)

Remove four screws **3**.



Step	Screw (quantity)	Color	Torque
<b>3</b>	M2.5 × 4 mm, flat-head, nylon-coated (4)	silver	0.6 Nm (6 kgfcm)

Remove the LCD unit in the direction shown by arrows **4**.



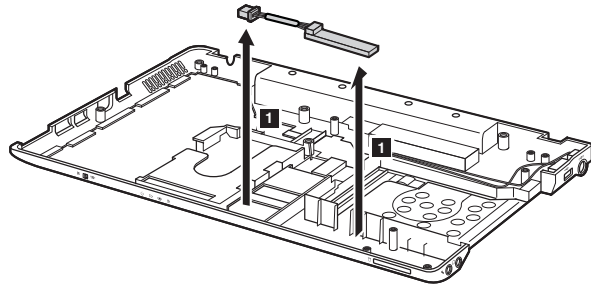
## 1150 Bluetooth daughter card and base cover

For access, remove these FRUs in order:

- “1010 Battery pack” on page 34
- “1020 Dummy cards” on page 35
- “1030 Hard disk drive (HDD)/Memory/CPU (Central processing unit)/Mini PCI ExpressCard slot compartment cover ” on page 36
- “1040 Hard disk drive ” on page 37
- “1050 Optical drive” on page 39
- “1060 DIMM” on page 40
- “1070 Fan assembly and Heat Sink assembly” on page 41
- “1090 PCI Express Mini Card for wireless LAN/WAN” on page 45
- “1100 Keyboard” on page 47
- “1110 Keyboard bezel” on page 49
- “1130 System board and ExpressCard slot assembly” on page 54
- “1140 LCD unit” on page 58

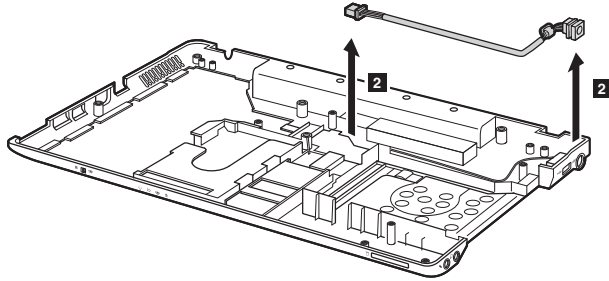
*Figure 15. Removal steps of bluetooth daughter card and base cover*

The Bluetooth daughter card is attached to the base cover. Remove the Bluetooth daughter card in the direction shown by arrows ■.



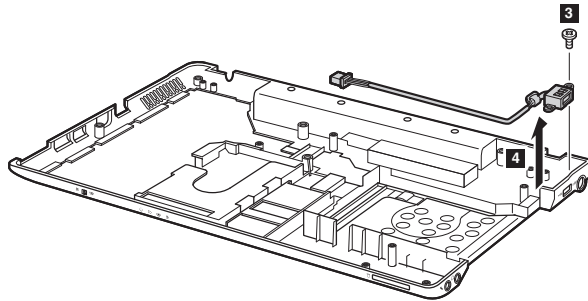
**When installing:** Make sure that the connector is attached firmly.

Figure 15. Removal steps of bluetooth daughter card and base cover (continued)  
 Remove the power assembly in the direction shown by arrows 2.



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

Remove one screw 3 and then remove the USB assembly in the direction shown by arrow 4.



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

Step	Screw (quantity)	Color	Torque
3	M2.0 × 3 mm, flat-head, nylon-coated (1)	Black	0.25 Nm (2.5 kgfcm)

**Note: Applying labels to the base cover**

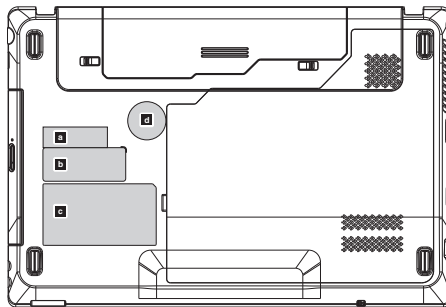
The new base cover FRU is shipped with a kit containing labels of several kinds. When you replace the base cover, you need to apply the following label:

The following labels need to be peeled off from the old base cover, and need to be put on the new base cover.

- a** PRC CODE label
- b** COA label
- c** Rating label
- d** ENERGY label

For some models, you also need to apply one or two FCC labels. Check the old base cover; if it has one or two FCC labels, find duplicates of them in the label kit and apply them to the new base cover.

For the location of each label, refer to the following figure:



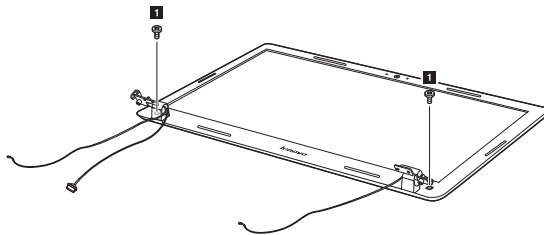
## 1160 LCD front bezel

For access, remove these FRUs in order:

- “1010 Battery pack” on page 34
- “1020 Dummy cards” on page 35
- “1030 Hard disk drive (HDD)/Memory/CPU (Central processing unit)/Mini PCI ExpressCard slot compartment cover ” on page 36
- “1040 Hard disk drive ” on page 37
- “1050 Optical drive” on page 39
- “1060 DIMM” on page 40
- “1070 Fan assembly and Heat Sink assembly” on page 41
- “1090 PCI Express Mini Card for wireless LAN/WAN” on page 45
- “1100 Keyboard” on page 47
- “1110 Keyboard bezel” on page 49
- “1130 System board and ExpressCard slot assembly” on page 54
- “1140 LCD unit” on page 58

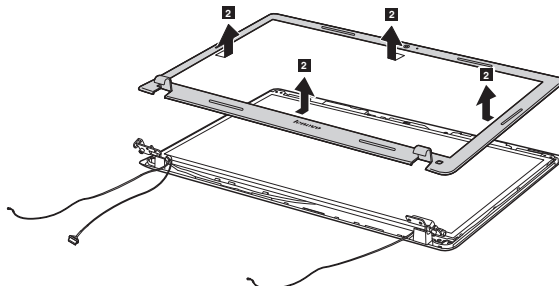
*Figure 16. Removal steps of LCD front bezel*

Remove two screws **■**.



Step	Screw (quantity)	Color	Torque
■	M2.5 × 5 mm, flat-head, nylon-coated (2)	Silver	0.6 Nm (6 kgfcm)

Remove the LCD front bezel in the direction shown by arrows **2**.






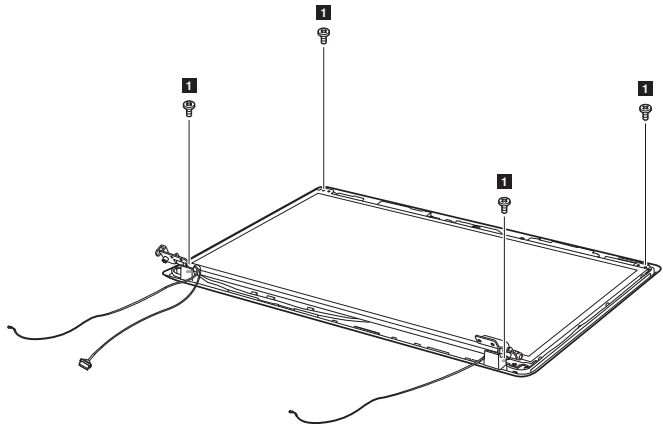
## 1170 LCD panel and hinges

For access, remove these FRUs in order:

- “1010 Battery pack” on page 34
- “1020 Dummy cards” on page 35
- “1030 Hard disk drive (HDD)/Memory/CPU (Central processing unit)/Mini PCI ExpressCard slot compartment cover ” on page 36
- “1040 Hard disk drive ” on page 37
- “1050 Optical drive” on page 39
- “1060 DIMM” on page 40
- “1070 Fan assembly and Heat Sink assembly” on page 41
- “1090 PCI Express Mini Card for wireless LAN/WAN” on page 45
- “1100 Keyboard” on page 47
- “1110 Keyboard bezel” on page 49
- “1130 System board and ExpressCard slot assembly” on page 54
- “1140 LCD unit” on page 58
- “1160 LCD front bezel” on page 64

*Figure 17. Removal steps of LCD panel and hinges*

Remove four screws , and then release the LCD panel.




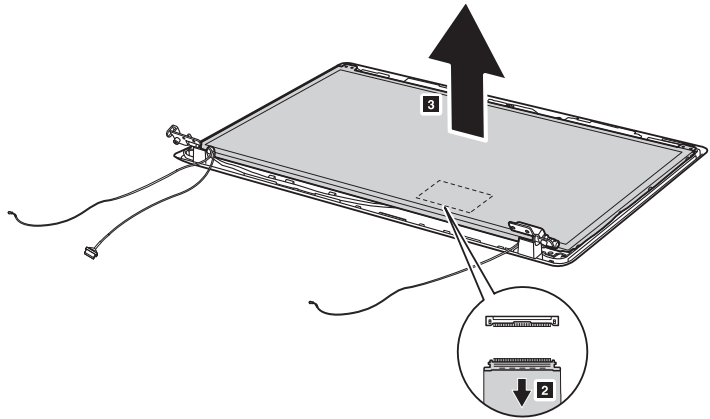
Step	Screw (quantity)	Color	Torque
	M2.5 × 5 mm, flat-head, nylon-coated (4)	Black	0.6 Nm (6 kgfcm)

Figure 17. Removal steps of LCD panel and hinges (continued)

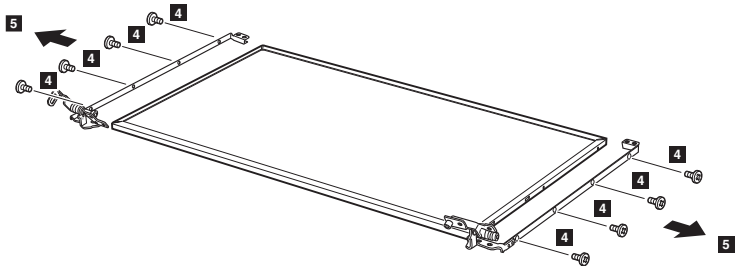
Lift the LCD panel a little and detach the connector on the back of the LCD panel in the direction shown by arrow **2**. Remove the LCD panel **3**.



**Note:** The LCD circuit is attached to the LCD panel, and connected with the LCD cable by an FPC connector.

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

Remove eight screws **4**, and release the hinges from the LCD panel in the direction shown by arrows **5**.



Step	Screw (quantity)	Color	Torque
<b>4</b>	M2.0 × 3 mm, flat-head, nylon-coated (8)	Black	0.25 Nm (2.5 kgfcm)

## 1180 Integrated camera

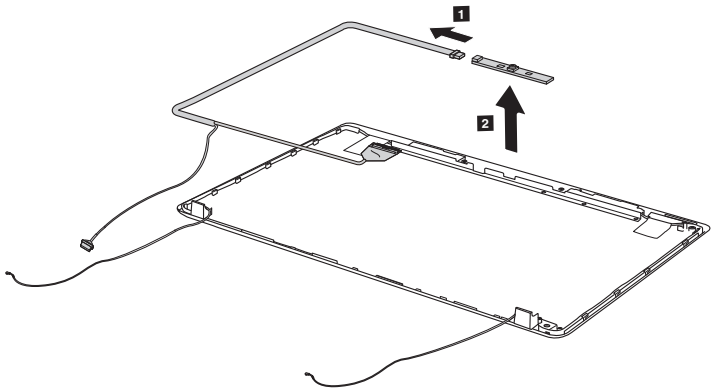
For access, remove these FRUs in order:

- “1010 Battery pack” on page 34
- “1020 Dummy cards” on page 35
- “1030 Hard disk drive (HDD)/Memory/CPU (Central processing unit)/Mini PCI ExpressCard slot compartment cover ” on page 36
- “1040 Hard disk drive ” on page 37
- “1050 Optical drive” on page 39
- “1060 DIMM” on page 40
- “1070 Fan assembly and Heat Sink assembly” on page 41
- “1090 PCI Express Mini Card for wireless LAN/WAN” on page 45
- “1100 Keyboard” on page 47
- “1110 Keyboard bezel” on page 49
- “1130 System board and ExpressCard slot assembly” on page 54
- “1140 LCD unit” on page 58
- “1160 LCD front bezel” on page 64
- “1170 LCD panel and hinges” on page 65

*Figure 18. Removal steps of integrated camera*

**Note:** The integrated camera is stuck on the top center of the LCD cover.

Detach the connector in the direction shown by arrow **1** and then remove the integrated camera from the LCD cover **2**.



**When installing:** Stick the integrated camera to the top center of the LCD cover and adjust the placement of it to make sure the connector is attached firmly. When replacing the integrated camera, route the connector cable as shown in the figure above.

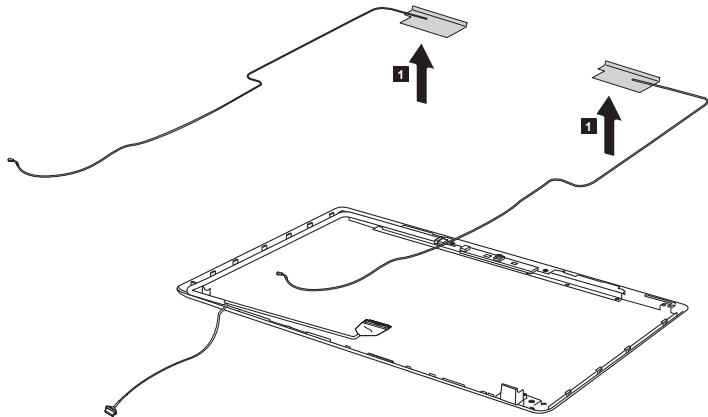
## **1190 Antenna assembly and LCD cover**

For access, remove these FRUs in order:

- “1010 Battery pack” on page 34
- “1020 Dummy cards” on page 35
- “1030 Hard disk drive (HDD)/Memory/CPU (Central processing unit)/Mini PCI ExpressCard slot compartment cover ” on page 36
- “1040 Hard disk drive ” on page 37
- “1050 Optical drive” on page 39
- “1060 DIMM” on page 40
- “1070 Fan assembly and Heat Sink assembly” on page 41
- “1090 PCI Express Mini Card for wireless LAN/WAN” on page 45
- “1100 Keyboard” on page 47
- “1110 Keyboard bezel” on page 49
- “1130 System board and ExpressCard slot assembly” on page 54
- “1140 LCD unit” on page 58
- “1160 LCD front bezel” on page 64
- “1170 LCD panel and hinges” on page 65

*Figure 19. Removal steps of antenna assembly and LCD cover*

Peel off the adhesive tapes securing the antenna boards, release the cables from the cable guide, and then remove the antenna assembly in the direction shown by arrows **1**.

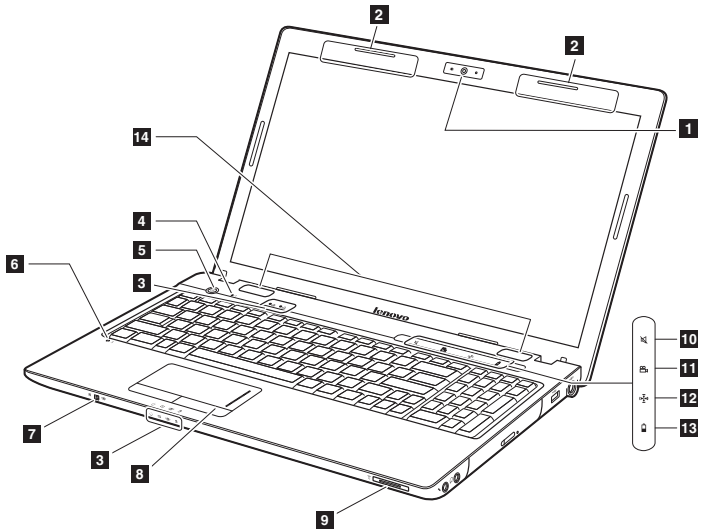


**When installing:** Route the antenna cables along the cable guides and secure the antenna boards with adhesive tapes. As you route the cables, make sure that they are not subjected to any tension. Tension could cause the cables to be damaged by the cable guides, or a wire to be broken.

## Locations

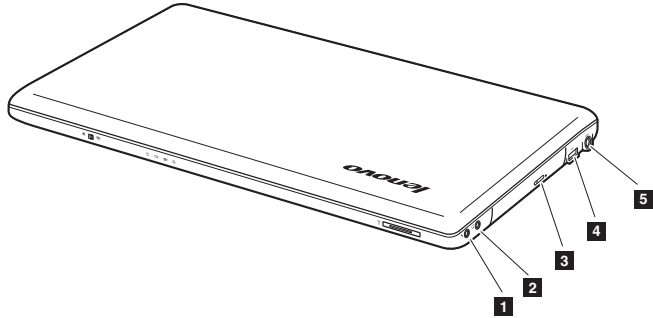
### Front view

- 1 Integrated camera
  - 2 Wireless LAN antennas (selected models only)
  - 3 System status indicators
- Note:** For the description of each indicator, see “Status indicators” on page 29.
- 4 OneKey Rescue System button
  - 5 Power button
  - 6 Built-in microphone
  - 7 Integrated wireless device switch (selected models only)
  - 8 Touch pad
  - 9 Memory card slot
  - 10 Mute/Unmute button
  - 11 OneKey theater button
  - 12 Smart noise control button
  - 13 Energy management button
  - 14 Speakers



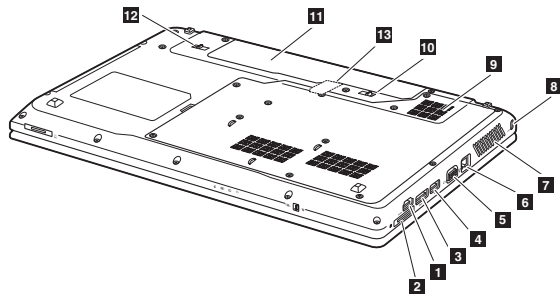
### Right-side view

- 1 Microphone jack
- 2 Headphone jack
- 3 Optical drive
- 4 USB port
- 5 AC power adapter jack



### Bottom and Left-side view

- 1 HDMI port
- 2 ExpressCard® slot (selected models only)
- 3 eSATA/USB combo port
- 4 USB port
- 5 VGA port
- 6 RJ-45 port
- 7 Fan louvers
- 8 Kensington slot
- 9 HDD/Memory/CPU/Mini PCI ExpressCard slot compartment
- 10 Battery latch - spring loaded
- 11 Battery pack
- 12 Battery latch - manual
- 13 SIM card slot (selected models only)



## Parts list

This section presents the following service parts:

- “Overall” on page 72
- “LCD FRUs” on page 77
- “Keyboard” on page 79
- “Miscellaneous parts” on page 81
- “AC adapters” on page 82
- “Power cords” on page 83

**Notes:**

- Each FRU is available for all types or models, unless specific types or models are specified.

**Overall**

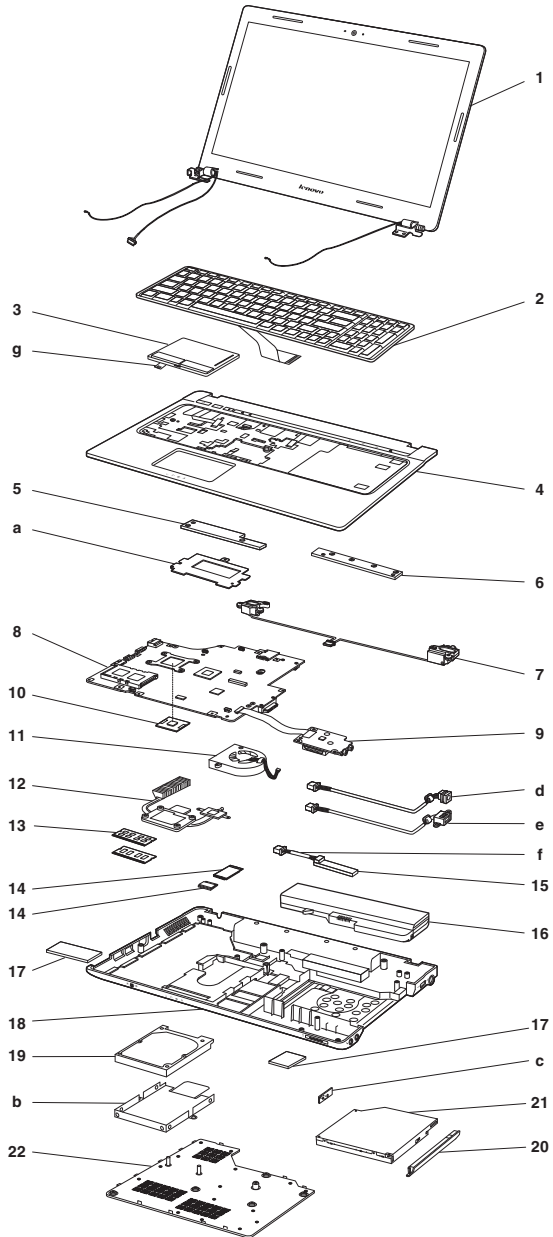




Table 5. Parts list—Overall

No.	FRU	FRU no.
1	LCD unit (see "LCD FRUs" on page 77.)	
2	Keyboard (see "Keyboard" on page 79.)	
3	NIWE3_TP_BTN_BOARD_ASSY	31044227
4	NIWE4 LOGIC UPPER ASSY 15.6-AL	31044216
5	NIWE4 POWER BOARD-15.6	31044213
6	NIWE4 SENSOR BOARD-15.6	31044827
7	NIWE4 SPEAKER-15.6	31044230
8	NIWE4 MB ASSY UMA-15.6 W/O 3G F (for z560)	11012244
8	NIWE4 MB ASSY N11M-GE1 DIS 15.6 W/O 3G F (for z560)	11012245
8	NIWE4 MB ASSY N11M-GE2 DIS 15.6 W/O 3G F (for Z560)	11012256
8	NAWE6 MB ASSY UMA/GLAN 15.6 (for Z565)	11012290
8	NAWE6 MB ASSY DIS/GLAN 15.6 (for Z565)	11012291
8	NAWE6 MB ASSY UMA/GLAN/BT 15.6 W/O 3G (for Z565)	11012292
8	NAWE6 MB ASSY GLAN DIS 15.6 W/O 3G (for Z565)	11012293
8	NAWE6 MB ASSY DIS/100/BT 15.6 W/O 3G (for Z565)	11012294
8	NAWE6 MB ASSY 10/100 UMA 15.6 W/O 3G (for Z565)	11012295
9	NIWE2 CARD READER-15.6	11011875
10	CPU assembly, Intel ARD 2.66G 4M I7-620M rPGA processor	102000791
10	CPU assembly, Intel ARD 2.53G 3M I5-540M rPGA processor	102000790
10	CPU assembly, Intel ARD 2.13G 3M C2 I3-330M PGA processor	102000786
10	CPU assembly, Intel ARD 2.40G 3M I5-520M rPGA processor	102000789
10	CPU assembly, Intel ARD 2.26G 4M C2 I5-430M PGA processor	102000788
10	CPU assembly, Intel ARD 2.26G 3M C2 I3-350M PGA processor	102000787
10	CPU assembly, Intel ARD 2.40G 3M K0 I5-450M PGA processor	102000845
10	CPU assembly, Intel ARD 2.40G 3M K0 I3-370M PGA processor	102000846
10	CPU assembly, P6100 processor	TBD
10	CPU assembly, Intel P6000 1.86GHZ 3M C-2 PGA processor	102000844
10	CPU assembly, Intel P4500 1.86GHZ 2M C-2 PGA processor	102000811
11	NIWE1 FAN	31042378
12	NIWE1 THERMAL MODULE-UMA (for Z560)	31042382
12	NIWE1 THERMAL MODULE-DIS (for Z560)	31042383
12	NAWE5 THERMAL MODULE-UMA (for Z565)	31044388
12	NAWE5 THERMAL MODULE-DIS (for Z565)	31044389
13	DDRIII 1066 1GB, M471B2873FHS-CF8 (CS: Nov 5 new 30pcs)	11011550
13	DDRIII 1066 1GB, EBJ10UE8BDS0-AE-F (Rev D /1Gb/65nm)	11011281
13	DDRIII 1066 1GB, MT8JSF12864HZ-1G1F1(V58B/1Gb/68nm)	11010924
13	DDRIII 1066 1GB, HMT112S6TFR8C-G7N0 (CS: Nov 15 new 30pcs)	11011555
13	DDRIII 1066 2GB, M471B5673FH0-CF8 (CS: Nov 5 new 30pcs)	11011551
13	DDRIII 1066 2GB, EBJ21UE8BDS0-AE-F (Rev D /1Gb/65nm)	11011240
13	DDRIII 1066 2GB, MT16JSF25664HZ-1G1F1 (V58B/1Gb/68nm)	11010925
13	DDRIII 10662GB, HMT125S6TFR8C-G7N0 (CS: Nov 15 new 30pcs)	1011554
13	DDRIII 1066 4GB, M471B5273BH1-CF8(Rev B/2Gb/56nm)	11011092

**Table 5. Parts list—Overall (continued)**

No.	FRU	FRU no.
13	DDRIII 1066 4GB, HMT351S6AFR8C-G7N0 (Orion/2Gb/54nm)	11011215
13	DDRIII 1066 4GB, MT16JSS51264HY-1G1A1	11011091
13	DDRIII 1333 1GB, M471B2873FHS-CH9 (Rev F /1Gb/46nm)	11011936
13	DDRIII 1333 1GB, EBJ10UE8BDS0-DJ-F (Rev D /1Gb/65nm)	11011497
13	DDRIII 1333 1GB, MT8JSF12864HZ-1G4F1(V58B/1Gb/68nm)	11011494
13	DDRIII 1333 1GB, HMT112S6TFR8C-H9 N0 (OrionT /1Gb/54nm)	11011971
13	DDRIII 1333 2GB, M471B5673FH0-CH9 (Rev F /1Gb/46nm)	11011935
13	DDRIII 1333 2GB, EBJ21UE8BDS0-DJ-F (Rev D /1Gb/65nm)	11011496
13	DDRIII 1333 2GB, MT16JSF25664HZ-1G4F1(V58B/1Gb/68nm)	11011493
13	DDRIII 1333 2GB, HMT125S6TFR8C-H9 N0 (OrionT /1Gb/54nm)	11011970
13	DDRIII 1333 2GB, RMT1950MD58E8F-1333	11012213
13	DDRIII 1333 4GB, M471B5273CH0-CH9 (Rev C /2Gb/46nm)	11011934
13	DDRIII 1333 4GB, HMT351S6AFR8C-H9 N0 (Rev Orion /2Gb/54nm)	11011513
14	WLAN card, 802.11a/g/n && 802.16e, Intel 6250NX MOW M PCIE NB HMC	20002321
14	WLAN card, 802.11a/g/n && 802.16e, Intel 6250GX MOW M PCIE NB HMC	20002388
14	WLAN card, 802.11 a/g/n, Intel 6200N MOW M PCIE NB HMC	20002324
14	WLAN card, 802.11 b/g/n, Gtc BCM43225 BGN MOW NB	20002271
14	WLAN card, 802.11 b/g/n, Intel 1000N MOW M PCIE NB HMC	20002329
14	WLAN card, 802.11 b/g/n, Cbt AR9283 HB93 BGN MOW NB	20002276
14	WLAN card, 802.11 b/g/n, Gtc BCM4313 M 802.11N MOW NB	20002347
14	WLAN card, 802.11 b/g/n, Cbt AR9285 HB95 BGN MOW NB	20002346
14	WLAN card, 802.11 b/g/n, Liteon AR9285 HB95 BGN MOW NB	20002357
14	WWAN card, WCDMA/HSDPA 7.2M, Ericsson F3607gw WCDMA 850MHz	11011296
14	WWAN card, WCDMA/HSDPA 7.2M, Ericsson F3607gw WCDMA 900MHz	11011295
14	WWAN card, WCDMA/HSDPA 7.2M, Huawei EM770 HSDPA MiniPCIE	11010888
14	WWAN card, WCDMA/HSDPA 7.2M, Huawei EM770U WCDMA MOW	11011654
14	WWAN card, WCDMA/HSDPA 7.2M, Huawei EM770W WCDMA MOW	11011653
14	WWAN card, Gobi, Qualcomm GOBI WCDMA/EVDO	11011655
14	WWAN card, EVDO, Huawei EM660 EV-DO MiniPCIE	11010853
14	WWAN card, EVDO, ZTE MC2716 EVDO MiniPCIE	11011055
14	WWAN card, TD-SCDMA, TC LC5730D TD-SCDMA MiniPCIE	11011652
14	WWAN card, TD-SCDMA, TC LC5730C TD+CMMB MiniPCIE	11011598
14	WWAN card, TD-SCDMA, LM TD231 TD-SCDMA MiniPCIE	11011651
14	WWAN card, TD-SCDMA, LM TD232 TD+CMMB MiniPCIE	
14	WWAN card, TD-SCDMA, ZTE MU303 TD+CMMB MiniPCIE	11011599
14	WWAN card, TD-SCDMA, ZTE MU302 TD-SCDMA MiniPCIE	11011600

Table 5. Parts list—Overall (continued)

No.	FRU	FRU no.
15	Bluetooth card, BT2.1 + EDR, Fcn BCM92070 BT2.1 EDR Flash U NB	TBD
15	Bluetooth card, BT2.1 + EDR, USI BCM92070 BT2.1 EDR Flash U NB	
16	Battery pack, 2.2Ah,6 cell, Sanyo 11.1V 3S2P 4400mAh Li-ion NB battery	121000938
16	Battery pack, 2.2Ah,6 cell, SMP 11.1V 3S2P 4400mAh Li-ion NB battery	121000935
16	Battery pack, 2.2Ah,6 cell, Celxpert Z460 3S2P 48Wh LG Li-ion	121000994
16	Battery pack, 2.2Ah,6 cell, SMP Eiffel 48Wh 11.1V L09M6Y02 (LG)	121000992
16	Battery pack, 2.2Ah,6 cell, G460/G560 SMP 2.2Ah 3S2P Li-ion Battery(B)	121000939
17	NIWE3 EXPRESS DUMMY CARD	31044225
17	NIWE3 SD DUMMY CARD	31044226
18	NIWE4 LOGIC LOWER 15.6 W/O 3G F	31044218
19	HDD/SSD, 160G 5400rpm SATA, WD1600BEVT-24A23T0 5400RPM160G	16004523
19	HDD/SSD, 160G 5400rpm SATA, Seagate ST9160314AS 160G 9NB	16004187
19	HDD/SSD, 160G 5400rpm SATA, Hitachi HTS545016B9A300 160G 9NB	16004061
19	HDD/SSD, 160G 5400rpm SATA, Toshiba MK1665GSX 5400RPM 160G	16004640
19	HDD/SSD, 160G 5400rpm SATA, Samsung HM161GI 5400RPM 160G (Only for Made in Brazil)	16004762
19	HDD/SSD, 250G 5400rpm SATA, WD2500BEVT-24A23T0 5400RPM250G	16004524
18	HDD/SSD, 250G 5400rpm SATA, Hitachi HTS545025B9A300 250G 9NB	16004060
18	HDD/SSD, 250G 5400rpm SATA, Seagate ST9250315AS 250G 9NB	16004186
19	HDD/SSD, 250G 5400rpm SATA, Toshiba MK2565GSX 5400RPM 250G	16004641
19	HDD/SSD, 250G 5400rpm SATA, Samsung HM251HI 5400RPM 250G (Only for Made in Brazil)	16004763
19	HDD/SSD, 320G 5400rpm SATA, WD3200BEVT-24A23T0 5400RPM320G	16004525
19	HDD/SSD, 320G 5400rpm SATA, Hitachi HTS545032B9A300 320G 9NB	16004059
19	HDD/SSD, 320G 5400rpm SATA, Seagate ST9320325AS 320G 9NB	16004183
19	HDD/SSD, 320G 5400rpm SATA, Toshiba MK3265GSX 5400RPM 320G	16004642
19	HDD/SSD, 320G 5400rpm SATA, Samsung HM321HI 5400RPM 320G (Only for Made in Brazil)	16004764
19	HDD/SSD, 500G 5400rpm SATA, Seagate ST9500325AS 500G 9NB	16004189

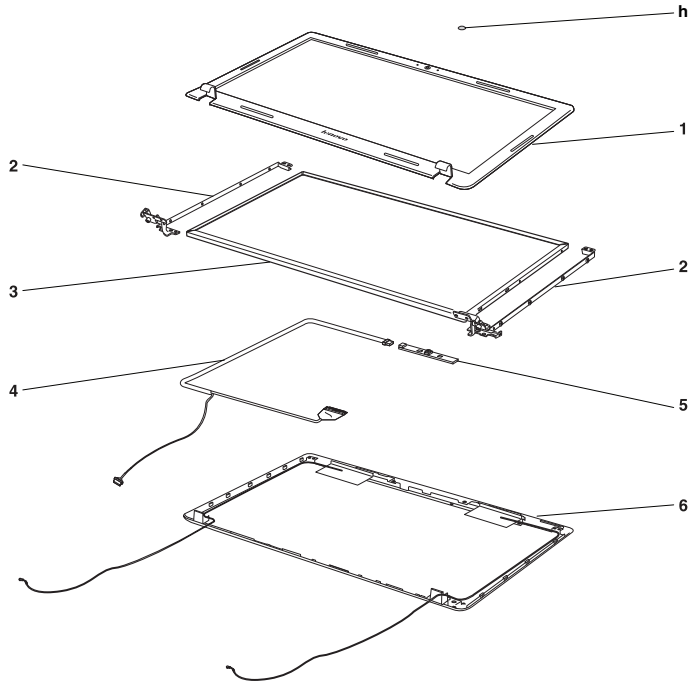
**Table 5. Parts list—Overall (continued)**

No.	FRU	FRU no.
19	HDD/SSD, 500G 5400rpm SATA, WD5000BEVT-24A0RT0 5400RPM500G	16004526
19	HDD/SSD, 500G 5400rpm SATA, Hitachi HTS545050B9A300 500G 9NB	16004058
19	HDD/SSD, 500G 5400rpm SATA, Toshiba MK5065GSX 5400RPM 500G	16004643
19	HDD/SSD, 500G 5400rpm SATA, Samsung HM501II 5400RPM 500G (Only for made in Brazil)	16004765
19	HDD/SSD, 640G 5400RPM SATA, WD6400BEVT-24A0RT0 5400RPM640G	16004527
19	HDD/SSD, 640G 5400RPM SATA, Hitachi HTS545050B9A300 640G 9NB	TBD
19	HDD/SSD, 640G 5400RPM SATA, Seagate ST9500325AS 640G 9NB	TBD
19	HDD/SSD, 640G 5400RPM SATA, Toshiba MK6465GSX 5400RPM 640G	16004644
19	HDD/SSD, 640G 5400RPM SATA, Samsung HM641JI 5400RPM 640G(Only for made in Brazil)	16004766
19	HDD/SSD, 320G 7200rpm SATA, HGST 320g 7200rpm	16004530
19	HDD/SSD, 320G 7200rpm SATA, Seagate 320g 7200rpm	16004533
19	HDD/SSD, 500G 7200rpm SATA, HGST 500g 7200rpm	16004531
19	HDD/SSD, 500G 7200rpm SATA, Seagate 500g 7200rpm	16004532
20	NIWE1 ODD BEZEL-BD	31042379
20	NIWE1 ODD BEZEL-SM	31042380
21	ODD, 12.7mm Tray Rambo, GT30N	25009116
21	ODD, 12.7mm Tray Rambo, AD-7585H(QSI)	25009461
21	ODD, 12.7mm Tray Rambo, DS-8A4S	25009439
21	ODD, 12.7mm Tray Rambo, UJ890A	TBD
21	ODD, 12.7mm Tray BD Combo, BC-5500H	25009785
21	ODD, 12.7mm Tray BD Combo, DS-4E1S	25009829
22	NIWE2 THERMAL DOOR-15.6	31042374
—	AC adapter (see “AC adapters” on page 82.)	

## LCD FRUs

In Lenovo IdeaPad Z560/Z565, there are following types of LCDs.

- "15.6-in. HD TFT"



**15.6-in. HD TFT**

*Table 6. Parts list—15.6-in. HD TFT*

No.	FRU	FRU no.
1	NIWE4 LCD BEZEL 15.6 W/CAMERA F (for Z560)	31044220
1	NAWE6 LCD BEZEL 15.6 W/CAMERA F (for Z565)	31044386
2	NIWE2 LCD BRACKET 15.6 R+L	31042434
3	LCD panel, 15.6HD, B156XW02 V2	18003797
3	LCD panel, 15.6HD, LP156WH2-TLAA	18003819
3	LCD panel, 15.6HD, LTN156AT05-J01	18003911
3	LCD panel, 15.6HD, HT156WXB-100	18003719
3	LCD panel, 15.6HD, CMO N156B6-L0B HD G LED1 NB	18003983
4	NIWE2 LVDS_COMS CABLE-15.6	31042430
5	NIWE1 CAMERA 0.3M	31042438
5	NIWE1 CAMERA 1.3M	31042439
6	NIWE4 LCD COVER 15.6 W/ANTENNA*2-IMR	31044223
6	NIWE4 LCD COVER 15.6 W/ANTENNA*4-IMR	31044224
6	NIWE3 LCD COVER 15.6 W/ANTENNA*2-BLK IMR	31044340
6	NIWE3 LCD COVER 15.6 W/ANTENNA*4-BLK IMR	31044341

## Keyboard

Table 7. Parts list—Keyboard

Language	P/N	
Sunrex	Bulgarian	25010767
	Nordic	25010768
	FrEn	25010769
	US Internation	25010770
	Swiss	25010771
	Slovenia	25010772
	Slovak	25010773
	Iceland	25010774
	Belgian	25010775
	Hungarian	25010776
	Hebrew	25010777
	Greek	25010778
	Dutch	25010779
	Czech	25010780
	Japanese	25010781
	French	25010782
	Russian	25010783
	Traditional Chinese	25010784
	Korea	25010785
	LSP	25010786
	Portuguese	25010787
	Thailand	25010788
	Turkey	25010789
	Spanish	25010790
	Italy	25010791
	U.K. English	25010792
US English	25010793	
Brazil	25010794	
Arabic	25010795	
German	25010796	
Czechoslovakia	25011098	

Table 7. Parts list—Keyboard (continued)

Language	P/N	
Chicony	Bulgarian	25010797
	Nordic	25010798
	FrEn	25010799
	US Internation	25010800
	Swiss	25010801
	Slovenia	25010802
	Slovak	25010803
	Iceland	25010804
	Belgian	25010805
	Hungarian	25010806
	Hebrew	25010807
	Greek	25010808
	Dutch	25010809
	Czech	25010810
	Japanese	25010811
	French	25010812
	Russian	25010813
	Traditional Chinese	25010814
	Korea	25010815
	Latin	25010816
	Portuguese	25010817
	Thailand	25010818
	Turkey	25010819
	Spanish	25010820
	Italy	25010821
	U.K. English	25010822
	US English	25010823
Brazil	25010824	
Arabic	25010825	
German	25010826	
Czechoslovakia	25011058	



## Miscellaneous parts

Table 8. Parts list—Miscellaneous parts

FRU	P/N
System miscellaneous parts:	
• (a) NIWE4 TP BRACKET-15.6	31044209
• (b) NIWE1 HDD BRACKET (for Z560)	31042377
• (b) NAWE5 HDD BRACKET (for Z565)	31044387
• (c) NIWE1 ODD BRACKET	31042381
• (h) NIWE4_LCD_RUBBER_PAD_POLISH	31044229
Cable miscellaneous parts:	
• (d) NIWE2 DC-IN CABLE-15.6	31042402
• (e) NIWE2 USB CABLE-15.6	31042399
• (f) NIWE1 BT CABLE	31042403
• (g) NIWE4 TP FFC-15.6	31044211
<b>Note:</b> Italicized letters in parentheses are references to the exploded view in "Overall" on page 72 and "LCD FRUs" on page 77 .	

## AC adapters

Table 9. Parts list—3-pin AC adapters

FRU	P/N
65W3PIN, Delta ADP-65KH B adapter	36001646
65W3PIN, Liteon PA-1650-56LC adapter	36001651
65W3PIN, Chicony CPA-A065 20V3.25A adapter	36001792
65W3PIN, Brazil PA-1650-52LB adapter	36001714
65W3PIN, Emerson AA26600L 20V 3.25A adapter	36001870

## Power cords

A Lenovo IdeaPad power cord for a specific country or region is usually available only in that country or region:

*Table 10. Parts list—3-pin power cords*

Region	P/N
CCC	145000602
• SSD YD-118-1+IEC53RVV+SSD-3-2B-1 1m	
CCC	145000600
• LINETEK PC323+RVV300/300+LS15 1m	
Argentina	145000599
• LINETEK LS15+H03VV-F+LP39 1m	
Danmark	145000598
• LINETEK LS15+H03VV-F+LP-38 1m	
Switzerland	145000597
• LINETEK LS15+H03VV-F+LP-37 1m	
Brazil	145000596
• LINETEK LS15 H03VV-F LP26A 1m	
Israel	145000595
• LINETEK LS15+H03VV-F+LP-41 1m	
UL	145000594
• LINETEK LP-30B + SPT-2 + LS15 1m	
UL	145000635
• LINETEK LP-30B + SPT-2 + LS15 1.5m	
UK	145000593
• LINETEK LP-61L+ H03VV-F+ LS15 1m	
Indian	145000592
• LINETEK PE-361+ H05VV-F+ LS15 1m	
Italy	145000591
• LINETEK LS15+H03VV-F+PE-336 1m	
Korea	145000590
• LINETEK LS15+H05VV-F+LP-E04A 1m	
Australia	145000589
• LINETEK LS15+H03VV-F+LP-23A 1m	
Taiwan	145000588
• LINETEK LS15+VCTF+LP-53 1m	
Japan	145000587
• LINETEK LS15+VCTF+LP-54 1m	
Africa	145000586
• LINETEK LS15+H03VV-F+PE-364 1m	
CE	145000585
• LINETEK LP-34+H03VV-F + LS15 1m	
CCC	145000568
• Longwell LSG-31+RVV300/300+LS-18 1m	
Argentina	145000567
• Longwell LP-24+H03VV-F+LS-18 1m	
Danmark	145000566
• Longwell LP-40+H03VV-F+LS-18 1m	

Table 10. Parts list—3-pin power cords(continued)

Region	P/N
Switzerland • Longwell LP-37+H03VV-F+LS-18 1m	145000565
Brazil • Longwell LP-46+H03VV-F+LS-18 1m	145000564
Israel • Longwell LP-41+H03VV-F+LS-18 1m	145000563
UL • Longwell LP-30B+SPT-2 18AWG+LS-18 1m	145000562
UL • Longwell LP-30B+SPT-2+LS-18 1.5m	145000633
UK • Longwell LP-61L+H03VV-F+LS-18 1m	145000561
Indian • Longwell LP-67+BIS+LS-18 1m	145000560
Italy • Longwell LP-22+H03VV-F+LS-18 1m	145000559
Korea • Longwell LP-486+KTLH03VV-F+LS-5 1m	145000558
Australia • Longwell LP-23A+LFC-3R+LS-18 1m	145000557
Taiwan • Longwell LP-71+VCTF+LS-33 1m	145000556
Japan • Longwell LP-54+VCTF+LS-18 1m	145000555
Africa • Longwell LP-39+H03VV-F+LS-18 1m	145000554
CE • Longwell LP-34A+H03VV-F+LS-18 1m	145000553

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