

Hardware Maintenance Manual



Lenovo

Lenovo Googlebook (15", 12)

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About this manual

This manual contains hardware maintenance instructions for the products listed in the following table. In this manual, you will read safety requirements for hardware maintenance, diagnostics and troubleshooting, hardware replacement instructions, and other reference information. Use the manual along with the diagnostics applications and service tools to troubleshoot problems effectively.

Product name	Machine type (MT)
Lenovo GB 15IPH12	83W6

Important:

- Hardware configurations and software programs vary by machine type. Some statements or illustrations in this manual might be slightly different from your computer.
- It is recommended that the computer be repaired by trained service technicians.
- For customers electing to service the computer on their own, it is still recommended to speak to our Customer Support Center so that you can be directed to the correct documentation and repair information. See [Call Lenovo](#) on page 16. Depending on the complexity of the repair, it may be recommended to have a Lenovo-authorized service provider repair your computer.
- Before servicing a computer, please follow all instructions carefully and be sure to read all the information under [Safety requirements for hardware maintenance](#) on page 1 and [General guidelines](#) on page 26.

Chapter 1 Safety requirements for hardware maintenance

This chapter presents the following safety information that you need to be familiar with before you service a Lenovo notebook computer.

General safety requirements

Meet the following requirements on environment, personnel and outfit, and operation to ensure general safety:

Environment requirements

Observe good housekeeping in the area of the machines during and after maintenance.

Personnel and outfit requirements

- Do not wear loose clothing that can be trapped in the moving parts of a machine. Make sure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.
- Insert the ends of your necktie or scarf inside clothing or fasten it with a non-conductive 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 might be hazardous to your eyes.

Operation requirements

- Before you start the machine, make sure that no one is in a hazardous position.
- Do not perform any action that causes personal injury, or that makes the equipment unsafe.
- Keep your tool case away from walk areas so that other people will not trip over it.
- 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.
 4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back. Do not attempt to lift any object that weighs more than 16 kg (35 lb) or that you think is too heavy for you.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the machine.
- After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective. Reinstall all covers correctly.
- Fan louvers on the machine help to prevent overheating of internal components. Do not obstruct fan louvers or cover them with labels or stickers.

Electrical safety requirements

To ensure electrical safety, meet the following requirements on environment, outfit, and operation when working on the computer:

Environment requirements

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, non-grounded power extension cables, power surges, and missing safety grounds.

Outfit requirements

- Do not use worn or broken tools and testers.
- Regularly inspect and maintain your electrical hand tools for safe operational condition.

Important:

- Use only approved tools and test equipment. Some hand tools have handles covered with a soft material that does not insulate you when working with live electrical currents.
- Many customers have, near their equipment, rubber floor mats that contain small conductive fibers to decrease electrostatic discharges. Do not use this type of mat to protect yourself from electrical shock.

Operation requirements

- Disconnect all power before:
 - Performing a mechanical inspection
 - Working near power supplies
 - Removing or installing main units
- Do not service the following parts with the power on when they are removed from their normal operating places in a machine:
 - Power supply units
 - Pumps
 - Blowers and fans
 - Motor generators
 - Similar units as listed above

This practice ensures correct grounding of the units.

- 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.
- Observe the special safety precautions when you work with very high voltages; Instructions for these precautions are in the safety sections of maintenance information. Use extreme care when measuring high voltages.
- 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.
- Never assume that power has been disconnected from a circuit. First, check that it has been powered off.

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

Safety inspection guide

The purpose of this inspection guide is to assist you in identifying potentially unsafe conditions. As each machine was designed and built, required safety items were installed to protect users and service technicians from injury. This guide addresses only those items. You should use good judgment to identify potential safety hazards due to attachment of non-Lenovo 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 cathode ray tube (CRT) face or a bulging capacitor
- Mechanical hazards, such as loose or missing hardware

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

Checklist:

1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Power off the computer. Disconnect the power cord.
3. Check the power cord for:
 - a. A third-wire ground connector is 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 authorized type specified for your computer. Go to: <http://www.lenovo.com/serviceparts-lookup>
- 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 alterations. Use good judgment as to the safety of any non-Lenovo 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.

Note:

1. Use product-specific ESD procedures when they exceed the requirements noted here.
2. Ensure 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 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.

Important danger warning in multiple languages

The safety notices in this section are provided in the following languages:

- English

- Arabic
- Brazilian Portuguese
- French
- German
- Hebrew
- Japanese
- Korean
- Spanish
- Traditional Chinese

English



DANGER

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



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.



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.



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.



DANGER

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



DANGER

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



DANGER

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



DANGER

Unless hot swap is allowed for the FRU being replaced, do as follows before removing it: power off the computer, unplug all power cords from electrical outlets, remove the battery pack, and disconnect any interconnecting cables.

Arabic



خطر

قبل اعادة تشغيل الحاسب بعد الانتهاء من استبدال FRU، تأكد من أنه قد تم اعادة كل من المسامير و السوست وكل الأجزاء الصغيرة الأخرى في أماكنهم ولم يتم فقدانهم داخل الحاسب. ويمكن التحقق من ذلك عن طريق هز الحاسب والاستماع لأي صوت صاخب يصدر منه. قد تؤدي الأجزاء أو الرقائق المعدنية الى حدوث دائرة قصر.



خطر

تحتوي بعض البطاريات الاحتياطية على كمية صغيرة من مادتي النيكل والكاديوم. لا تقم بفك أو اعادة شحن البطارية الاحتياطية ولا تقم أيضا بالقائها في النار أو الماء ولا تتسبب في احدثات دائرة قصر بها. قم بالتخلص من البطارية كما هو موضح في القوانين المحلية. استخدم نوع البطارية المحدد والذي يوصى باستخدامه. حيث أنه قد يؤدي استخدام نوع بطارية غير صحيح الى اشتعالها أو انفجارها.



خطر

تحتوي حزمة البطارية على كمية صغيرة من مادة النيكل. لا تقم بفكها أو القاءها في النار أو الماء ولا تتسبب في احدثات دائرة قصر بها. تخلص من حزمة البطارية وفقا لما هو موضح في القوانين المحلية. قم، عند استبدال حزمة البطارية، باستخدام الأنواع المحددة فقط والتي يوصى باستخدامها. حيث أنه قد يؤدي استخدام نوع بطارية غير صحيح الى اشتعالها أو انفجارها.



خطر

قد تتسبب بطارية الليثيوم في حدوث حريق أو انفجار أو حدوث حروق شديدة. لا تقم باعادة شحن البطارية أو ازالة موصل الاستقطاب الخاص بها ولا تحاول أيضا فكها أو تسخينها لأكثر من ١٠٠ درجة مئوية (٢١٢ فهرنهايت) أو حرقها أو تعريض محتويات الخانة الخاصة بها للماء. قم بالتخلص من البطارية وفقا لما هو موضح في القوانين المحلية. استخدم نوع البطارية المحدد والذي يوصى باستخدامه. حيث أنه قد يؤدي استخدام نوع بطارية غير صحيح الى اشتعالها أو انفجارها.



خطر

إذا ما انكسرت شاشة LCD ولامس السائل الداخلي عينيك أو يديك، قم في الحال بغسلهما بالماء لمدة لا تقل عن ١٥ دقيقة. إذا ما وجدت أي أعراض بعد الغسل اطلب عندئذ المساعدة الطبية.



خطر

لتجنب التعرض لأي صدمات، لا تقم بإزالة الغطاء البلاستيكي الذي يحمي الجزء الأسفل من بطاقة العاكس.



خطر

على الرغم من أن البطاريات الرئيسية يكون لها جهد منخفض، إلا أنه قد تقوم البطاريات التي حدث قصور بها أو التي تم توصيلها أرضيا بإصدار تيار يكفي لحدوث حروق للأفراد أو تعرض المواد القابلة للاشتعال للحريق.



خطر

ما لم يتم السماح بالتبديل الفوري لأي FRU الجاري استبداله بدون ضرورة إغلاق النظام، قم بتنفيذ ما يلي قبل إزالته. قم بإيقاف تشغيل الحاسب ونزع كل أسلاك الطاقة من المخارج الكهربائية وقم أيضا بإزالة حزمة البطارية ثم قم بفصل أي كابلات متصلة.

Brazilian Portuguese



PERIGO

Antes de ligar o computador após a substituição da FRU, certifique-se de que todos os parafusos, molas e outras peças pequenas estejam no lugar e não estejam soltos dentro do computador. Verifique isso sacudindo o computador e procurando ouvir sons de peças soltas. Peças metálicas ou lascas de metal podem causar curto-circuito.



PERIGO

Algumas baterias reserva contêm uma pequena quantidade de níquel e cádmio. Não desmonte uma bateria reserva, recarregue-a, jogue-a no fogo ou na água, ou deixe-a entrar em curto-circuito. Descarte a bateria conforme requerido pelas leis ou regulamentos locais. Use somente a bateria nas partes listadas apropriadas. O uso de uma bateria incorreta pode resultar em combustão ou explosão da bateria.



PERIGO

O pacote da bateria contém uma pequena quantidade de níquel. Não o desmonte, jogue-o no fogo ou na água, ou deixe-o entrar em curto-circuito. Descarte o pacote da bateria conforme requerido pelas leis ou regulamentos locais. Use somente a bateria nas partes listadas apropriadas ao substituir o pacote da bateria. O uso de uma bateria incorreta pode resultar em combustão ou explosão da bateria.



PERIGO

A bateria de lítio pode causar incêndio, explosão ou graves queimaduras. Não a recarregue, remova seu conector polarizado, desmonte-a, aqueça-a acima de 100°C (212°F), incinere-a, ou exponha o conteúdo de sua célula à água. Descarte a bateria conforme requerido pelas leis ou regulamentos locais. Use somente a bateria nas partes listadas apropriadas. O uso de uma bateria incorreta pode resultar em combustão ou explosão da bateria.



PERIGO

Se o LCD quebrar e o fluido de dentro dele entrar em contato com seus olhos ou com suas mãos, lave as áreas afetadas imediatamente com água durante pelo menos 15 minutos. Procure cuidados médicos se algum sintoma causado pelo fluido surgir após a lavagem.



PERIGO

Para evitar choque elétrico, não remova a capa plástica que protege a parte inferior da placa inversora.



PERIGO

Embora as principais baterias possuam baixa voltagem, uma bateria em curto-circuito ou aterrada pode produzir corrente o bastante para queimar materiais de pessoal ou inflamáveis.



PERIGO

A menos que uma hot swap seja permitida para a FRU que está sendo substituída, faça o seguinte antes de removê-la: desligue o computador, desconecte todos os cabos de energia das tomadas, remova o pacote de baterias e desconecte quaisquer cabos de interconexão.

French



DANGER

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.



DANGER

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.



DANGER

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.



DANGER

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.



DANGER

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.



DANGER

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



DANGER

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.



DANGER

Si le remplacement à chaud n'est pas autorisé pour l'unité remplaçable sur site que vous remplacez, procédez comme suit avant de retirer l'unité : mettez l'ordinateur hors tension, débranchez tous les cordons d'alimentation des prises de courant, retirez le bloc de batterie et déconnectez tous les câbles d'interconnexion.

German



VORSICHT

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.



VORSICHT

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



VORSICHT

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



VORSICHT

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



VORSICHT

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.



VORSICHT

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



VORSICHT

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.



VORSICHT

Wenn ein Austausch der FRU bei laufendem Betrieb nicht erlaubt ist, gehen Sie beim Austausch der FRU wie folgt vor: Schalten Sie den Computer aus, ziehen Sie alle Netzkabel von den Netzsteckdosen ab, entfernen Sie den Akku und ziehen Sie alle miteinander verbundenen Kabel ab.

Hebrew



סכנה

לפני הפעלת המחשב לאחר החלפת FRU יש לוודא שכל תברגים, חקפזים, וחלקים קטנים אחרים נמצאים במקומם ואינם חופשיים לזוז בתוך המחשב. כדי לוודא זאת, יש לטלטל את המחשב ולחקש על גילוי קולות שקשוק. חלקי או שבבי מתכת עלולים לגרום לקצרים חשמליים.



סכנה

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



סכנה

מארז הסוללה מכיל כמות קטנה של ניקל וקדמיום. אין לפרק את מארז הסוללה, להשליך אותו לאש או למים או לקצר אותו. יש לסלק את מארז הסוללה הסוללה כנדרש על ידי התקנות והחוקים המקומיים. יש להשתמש רק בסוללה המופיעה ברשימת החלקים המתאימה בזמן החלפת מארז הסוללה. שימוש בסוללה לא מתאימה עלול לגרום להצתה או התפוצצות של הסוללה.



סכנה

סוללת הליתיום עלולה לגרום לשריפה, להתפוצצות או לכוויות קשות. אין לטעון אותה מחדש, לסלק 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 לסלק את הסוללה כנדרש בתקנות ובחוקים המקומיים. יש להשתמש רק בסוללה המופיעה ברשימת החלקים המתאימים. שימוש בסוללה אחרת עלול לגרום לסכנת שריפה או התפוצצות.



סכנה

אם מסך חגביש חנוזלי (LCD) נשבר וחנוזל מתוך חמסך בא במגע עם עיניכם או ידיכם, שטפו את האזורים הנגועים מיד במים במשך 15 דקות לפחות. פנו לקבלת עזרה רפואית אם תסמינים הנובעים מחמגע עם חנוזל נמשכים לאחר חטיפה.



סכנה

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



סכנה

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



סכנה

אלא אם כן מותרת 'החלפה חמה' של ה-FRU המוחלף, פעלו כדלהלן לפני חסרתו: כבו את המחשב, נתקו את כל כבלי החשמל מחשקעים, הוציאו את מארז הסוללות ונתקו את כל הכבלים מחוברים.

Japanese



危険

FRUの交換後、ThinkPadの電源を入れる前に、ねじ、パネ、その他の小さな部品がすべて正しい位置にあり、またThinkPad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、ThinkPad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。



危険

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。



危険

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。



危険

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、その極性コネクターの取り外し、バッテリー本体の分解、100℃ (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。



危険

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。



危険

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。



危険

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。



危険

交換しようとしている FRU がホット・スワップに対応していない場合、それを取り外す前に、コンピューターの電源をオフにし、すべての電源コードをコンセントから抜き、バッテリー・パックを取り外して、相互接続しているケーブルをすべて切り離してください。

Korean



위험

FRU를 교체하고 나서 컴퓨터 전원을 켜기 전에 모든 나사, 스프링 및 기타 작은 부품들이 올바른 위치에 있는지, 컴퓨터 내부에 단단하게 연결되어 있는지 확인하십시오. 컴퓨터를 흔들어 달각거리는 소리가 나지 않는지 확인하십시오. 금속 부품 또는 금속 조각은 누전을 일으킬 수 있습니다.



위험

일부 보조 배터리에는 소량의 니켈 및 카트륨이 포함되어 있습니다. 보조 배터리를 분해하거나, 다시 충전하거나, 불 또는 물에 던지거나, 단락시키지 마십시오. 배터리 팩을 폐기할 때에는 해당 지역의 법률 규정을 따르십시오. 배터리 팩을 교체할 때에는 올바른 배터리만 사용하십시오. 올바르게 사용하지 않는 배터리를 사용하면 배터리가 발화되거나 폭발할 수 있습니다.



위험

배터리 팩에는 소량의 니켈이 포함되어 있습니다. 배터리 팩을 분해하거나, 불 또는 물에 던지거나, 단락시키지 마십시오. 배터리 팩을 폐기할 때에는 해당 지역의 법률 규정을 따르십시오. 배터리 팩을 교체할 때에는 올바른 배터리만 사용하십시오. 올바르게 않은 배터리를 사용하면 배터리가 발화되거나 폭발할 수 있습니다.



위험

리튬 배터리는 화재, 폭발 또는 심각한 화상을 일으킬 수 있습니다. 리튬 배터리를 다시 충전하거나, 극성 커넥터를 제거하거나, 분해하거나, 100C(212F) 이상으로 가열하거나, 소각하거나, 전지 내용물을 물에 노출시키지 마십시오. 배터리를 폐기할 때에는 해당 지역의 법률 규정을 따르십시오. 올바른 배터리만 사용하십시오. 올바르게 않은 배터리를 사용하면 배터리가 발화되거나 폭발할 수 있습니다.



위험

LCD가 파손되어 LCD 내부의 액체가 눈에 들어가거나 손에 묻으면 즉시 깨끗한 물로 15분 이상 닦아 내십시오. 씻은 후에 조금이라도 이상을 느끼면 즉시 병원에 가서 의사의 진찰을 받아야 합니다.



위험

전기적 위험을 방지하려면 인버터 카드의 아래 부분을 보호하는 플라스틱 덮개를 제거하지 마십시오.



위험

기본 배터리의 전압은 낮지만, 단락되거나 접지된 배터리는 화상을 입히기에 충분한 전류와 가연성 물질을 발생시킬 수 있습니다.



위험

FRU 교체 시 Hot Swap이 지원되지 않는 경우, FRU를 제거하기 전에 컴퓨터의 전원을 끄고, 전기 콘센트에서 전원 코드를 분리하고, 배터리를 제거한 후, 연결된 모든 케이블을 분리하십시오.

Spanish



PELIGRO

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.



PELIGRO

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.



PELIGRO

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.



PELIGRO

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.



PELIGRO

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



PELIGRO

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



PELIGRO

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.



PELIGRO

Salvo que se permita el intercambio en caliente para la unidad sustituible localmente, realice lo siguiente antes de extraerla: apague el sistema, desconecte todos los cables de alimentación de las tomas de alimentación eléctrica, extraiga la batería y desconecte los cables de interconexión.

Traditional Chinese



危險

完成 FRU 更換之後，在開啟電腦的電源之前，請確定所有螺絲、彈簧及其他小零件都已歸位，沒有遺留在電腦內部。
若要確認這一點，請搖晃電腦，聽聽看是否有卡嗒的聲響。
金屬零件或儀錶的火花會造成電線短路。



危險

部分備用電池含有微量的鎳和鎘。請勿拆開備用電池、再充電、丟入火或水中，或使其形成短路。請按照當地法令或規定來棄置電池。

僅限使用零件清單中的電池。使用不適當的電池會導致電池起火或爆炸。



危險

電池套件含有微量的鎳。請勿拆開電池套件、丟入火或水中，或使其形成短路。請按照當地法令或規定來棄置電池套件。

更換電池套件時，僅限使用零件清單中的電池。使用不適當的電池會導致電池起火或爆炸。



危險

鋰電池會導致起火、爆炸或嚴重燒傷。請勿再充電、拔除其電極接頭、拆開、加熱超過 **100°C (212°F)**、焚燒，或讓電池組成物浸到水。請按照當地法令或規定來棄置電池。
僅限使用零件清單中的電池。使用不適當的電池會導致電池起火或爆炸。



危險

如果 LCD 破裂導致 LCD 流出的液體沾到您的眼睛或手，請立即以清水沖洗沾染部位至少 15 分鐘。如果在清洗後出現該液體所造成的任何症狀，請就醫治療。



危險

為避免電擊，請勿拆下轉換卡下面的塑膠護蓋。



危險

雖然主電池的電壓很低，但短路或接地電池所產生的電流，仍足以使人燒傷或使可燃物質起火。



危險

除非 FRU 允許以熱抽換來替換，否則請依下列方式將其移除：將電腦關機，拔除插座上所有電源線，移除電池包，並拔開任何交互連接的線材。

Chapter 2 Diagnostics and system recovery

This chapter introduces how to use the USB repair shim and get help from Lenovo Customer Support Center or Google.

Call Lenovo

If you have tried to correct the problem yourself and still need help, you can call Lenovo Customer Support Center.

Before you contact Lenovo

Record product information and problem details before you contact Lenovo.

Product information	Problem symptoms and details
• Product name • Machine type and serial number	• What is the problem? Is it continuous or intermittent? • Any error message or error code? • What operating system are you using? Which version? • Which software applications were running at the time of the problem? • Can the problem be reproduced? If so, how?

Note:

The product name and serial number can usually be found on the bottom of the computer, either printed on a label or etched on the cover.

Lenovo Customer Support Center

Telephone numbers

For a list of the Lenovo Support phone numbers for your country or region, go to <https://pcsupport.lenovo.com/supportphonelist>.

Note:

Phone numbers are subject to change without notice. If the number for your country or region is not provided, contact your Lenovo reseller or Lenovo marketing representative.

Services available during the warranty period

- Problem determination - Trained personnel are available to assist you with determining if you have a hardware problem and deciding what action is necessary to fix the problem.
- Lenovo hardware repair - If the problem is determined to be caused by Lenovo hardware under warranty, trained service personnel are available to provide the applicable level of service.

- Engineering change management - Occasionally, there might be changes that are required after a product has been sold. Lenovo or your reseller, if authorized by Lenovo, will make selected Engineering Changes (ECs) that apply to your hardware available.

Services not covered

- Replacement or use of parts not manufactured for or by Lenovo or non-warranted parts
- Identification of software problem sources
- Configuration of UEFI/BIOS as part of an installation or upgrade
- Changes, modifications, or upgrades to device drivers
- Installation and maintenance of network operating systems (NOS)
- Installation and maintenance of programs

For the terms and conditions of the Lenovo Limited Warranty that apply to your Lenovo hardware product, go to:

- https://www.lenovo.com/warranty/llw_02
- <https://pcsupport.lenovo.com/warrantylookup>

Get help from Google

After signing in to your Chromebook, start Get Help from the app Launcher. The Get Help app provides comprehensive instructions on using your Chromebook.

In addition, if you are interested in visiting the Chromebook Help Center and Community, go to <http://support.google.com/chromebook>.

Nonwarranted items and activities

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. 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.

Items not covered by 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 personal-computer card (PC card) or the installation of an incompatible card
- Improper disc insertion or use of an external optical drive
- Fuses blown by attachment of a non-supported device
- Forgotten computer password (making the computer unusable)
- Sticky keys caused by spilling a liquid onto the keyboard
- Use of an incorrect ac power adapter on laptop products

Symptoms that might indicate damage caused by non-warranted activities

- Missing parts might be a symptom of improper service or modification.
- Check for obvious damage to a hard disk drive. If the spindle of a hard disk drive becomes noisy, the hard disk drive might have been dropped or subject to excessive force.

Chapter 3 Parts, screws, and tools

Parts

The smallest serviceable parts for your computer are classified by Lenovo as either CRUs (Customer Replaceable Units) or FRUs (Field Replaceable Units). The exploded diagram in this section provides an illustrated view of all serviceable parts and their relative locations. Using the "Find Parts" tool on the Lenovo Support website, users can look up part numbers, check stock availability, and place orders for the parts they need to replace.

Part type definition

Your computer contains the following types of "Customer Replaceable Unit" (CRU)s and "Field Replaceable Unit" (FRU)s:

- **Self-service CRUs:** Refer to parts that can be replaced easily by customer themselves or by trained service technicians at an additional cost.
- **Optional-service CRUs:** Refer to parts that can be replaced by customers with a greater skill level. Trained service technicians can also provide service to replace the parts under the type of warranty designated for the customer's product.
- **FRUs:** Refer to parts that are more complicated to replace and it is recommended that these parts should be replaced by trained service technicians. If customers elect to replace the FRU by themselves, we recommend that you ensure the correct instructions are carefully followed.

Important notes:

- **CRU statement for customers:**
 - You can resolve some problems with your product by replacing a CRU. For self-service CRUs, installation is your responsibility. For optional-service CRUs, you can either install the CRU yourself or you can request that a Service Provider install the CRU according to the warranty service for your product.
 - If you intend on installing the CRU, Lenovo will ship the CRU to you. CRU information and replacement instructions are shipped with your product and are available from Lenovo at any time upon request.
 - You can find a list of CRUs for your product in this *Hardware Maintenance Manual*.
- **CRU/FRU statement:**
 - **Replace a CRU/FRU only with another CRU/FRU of the correct model.** When you replace a CRU/FRU, make sure that the model of the machine and the CRU/FRU part number are correct.
 - **A CRU/FRU should not be replaced because of a single unreproducible failure.** Single failures can occur for a variety of reasons that have nothing to do with a hardware defect, such as cosmic radiation, electrostatic discharge, or software errors. Consider replacing a CRU/FRU only when a problem recurs. If you suspect that a CRU/FRU is defective, clear the error log and run the test again. If the error does not recur, do not replace the CRU/FRU.
 - **Be careful not to replace a nondefective CRU/FRU.**
 - When you return a CRU/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 service technician
 2. Date of service
 3. Date on which the machine failed
 4. Date of purchase

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

Look up a part

1. For more detailed CRU/FRU information, including part numbers, descriptions, and substitution part numbers, go to <https://support.lenovo.com/partslookup>.
2. Type the product name, the machine type or the serial number in the corresponding field to get a general CRU/FRU list.

Exploded view and part list

The exploded view below illustrates all the components that make up the computer, categorized as either CRUs or FRUs, along with their relative positions and relationships. Each CRU or FRU is labeled with a numerical or alphabetical identifier. A corresponding parts list is provided on the right side of the exploded view, including the name of each component and a hyperlink to its disassembly procedure.

Exploded view	Part list
	Self-service CRUs: b Mouse c ac power adapter* Optional-service CRU: 8 Battery on page 28 9 Base cover assembly on page 26 10 Battery cable on page 28 11 Speaker on page 33 FRUs: 1 LCD module on page 43 2 Upper case (with keyboard) on page 45 3 USB board on page 37 4 46-pin USB board cable on page 35 5 30-pin USB board cable on page 35 6 Wi-Fi card mylar on page 34 7 M.2 solid-state drive on page 32 12 Fan on page 31 13 Heat sink on page 29 14 System board on page 40 15 Touchpad sponge on page 38 16, 17 Touchpad cables on page 39 a Screw pack

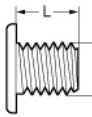
* for selected models

Screws

This section provides a comprehensive list of screws used in this computer, detailing their type, length, torque, and color. It also includes guidelines for properly handling screws, which should be read before proceeding with any part replacement.

Screw list

The following table includes screw specifications, torque information, and screw colors of this product.



The number after the letter L refers to the length of the screw shank measured from under the head to the tip of the screw. The number after the letter M refers to the width of the screw shank measured across the outermost points in a metric screw.

Table 1: Screw list of this product

Thread (mm)	Length (mm)	Torque (kgf.cm)	Color
M2	L2	1.85 ± 0.15	Black
M2	L3	1.85 ± 0.15	Silver
M2.5	L5	3.0 ± 0.3	Black

You can refer to the following table to choose a properly matched screwdriver.



Note:



The Phillips head screw has a cross-shaped slot in the screw head.

Table 2: Choose a properly matched screwdriver

Screw head type	Thread (mm)	Screwdriver type
Phillips head	M1.6 — M2	PH0 or PH1
Phillips head	> M2	PH1

Screw notices

Do the following when you service the computer:

- Carefully retain and reuse all screws.
- Keep the screw kit in your tool bag. For the part number of the screw kit, go to: <https://support.lenovo.com/partslookup>.
- Use the correct screw as shown in the CRU/FRU replacement procedures.
- Turn the screws in the direction as given by the arrow in the CRU/FRU replacement illustration.
- If you have a torque screwdriver, tighten all screws firmly to the torque specified in the screw information table for each step.
- Ensure torque screwdrivers are calibrated correctly following country specifications.

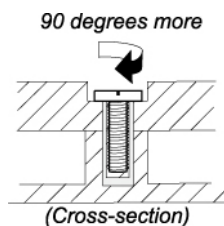
Loose screws can cause a reliability problem. In your computer, this problem is addressed with special nylon-coated screws that have the following characteristics:

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

Tighten screws as follows:

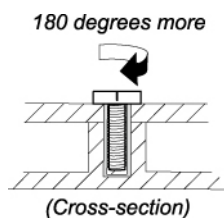
- **Plastic to plastic**

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



- **Logic card to plastic**

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



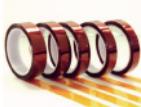
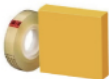
Service tools

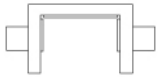
The following table lists all tools for servicing Lenovo products. Tools required to service a part are listed in the specific part disassembly topic. Prepare them before you service the product.

Table 3: Service tools

No.	Reference image	Tool name	Specification	Tool type
1		Screwdriver set	• PH0, PH00, PH1, PH2 • T5, T15, T20, T30 <i>Note:</i> Use a screwdriver with the shank length greater than 6 inches for	Common tool

No.	Reference image	Tool name	Specification	Tool type
			Desktop, Workstation, and Smart device product.	
2		Pry tool	N/A	Common tool
3		Tweezers	• Conductive • Isolated	Common tool
4		Suction cup	N/A	Common tool
5		Hexagonal socket	• For VGA: H5 mm or H4.8 mm • For Tiny antenna: H8 mm	Common tool
6		Adjustable torque screwdriver	0.2 Nm to 4.0 Nm, Threadripper CPU, CAMM, etc	Common tool
7		ESD mat	N/A	Common tool
8		USB flash drive	For Golden Key, Chrome Reloads, AutoPilot, etc	Common tool

No.	Reference image	Tool name	Specification	Tool type
9		USB-C to USB-A converter	N/A	Common tool
10		Thermal pad	Variety of thickness, most common 0.5mm thickness pad under the component	Consumable tool
11		Thermal interface materials	N/A	Consumable tool
12		Acetate tape	N/A	Consumable tool
13		Polyimide tape	N/A	Consumable tool
14		Mylar tape	N/A	Consumable tool
15		Electrical tape	N/A	Consumable tool
16		Double-sided tape	N/A	Consumable tool

No.	Reference image	Tool name	Specification	Tool type
17		Conductive tape	N/A	Consumable tool
18		Eraser	N/A	Consumable tool
19		Cleaning wipes	N/A	Consumable tool
20		Touchpad jig (this might come with touchpad)	N/A	Consumable tool
21		Heat gun	N/A	Special tool
22		Brown brush	25 mm to 35 mm wide	Special tool
23		Contact cleaner spray	WD-40 Contact cleaner for battery connector	Special tool
24		Hexagonal socket	H17 mm	Special tool

Chapter 4 Hardware replacement

This chapter provides instructions on how to remove and install the hardware components of your computer.

General guidelines



DANGER:

Before removing any FRU or CRU, shut down the computer, unplug all power cords from electrical outlets, and wait about ten minutes to let the computer cool down.

When removing or replacing a CRU/FRU, ensure that you observe the following general guidelines:

1. Before replacing any CRU/FRU, ensure that you have read [Generic Safety and Compliance Notices](#).
2. Begin by removing any CRUs/FRUs that have to be removed before replacing the failing CRU/FRU. Any such CRUs/FRUs are listed at the beginning of each CRU/FRU replacement procedure. Remove them in the order in which they are listed.
3. Follow the correct sequence in the steps for removing a CRU/FRU, as shown in the illustrations by the numbers in square callouts.
4. When removing a CRU/FRU, move it in the direction as shown by the arrow in the illustration.



Attention:

- After replacing a CRU/FRU, do not turn on the computer until you have ensured 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.
- The system board is sensitive to and can be damaged by ESD. Before touching it, establish personal grounding by touching a ground point with one hand or by using an ESD strap (P/N 6405959).

Base cover assembly

- Before you start, ensure that you have read [Safety requirements for hardware maintenance](#) on page 1 and [General guidelines](#) on page 26.
 - Tools needed: Screw driver, pry tool
1. Place the computer upside down on a flat surface.
 2. Loosen six screws. Then, pry up the latches and remove the base cover assembly.

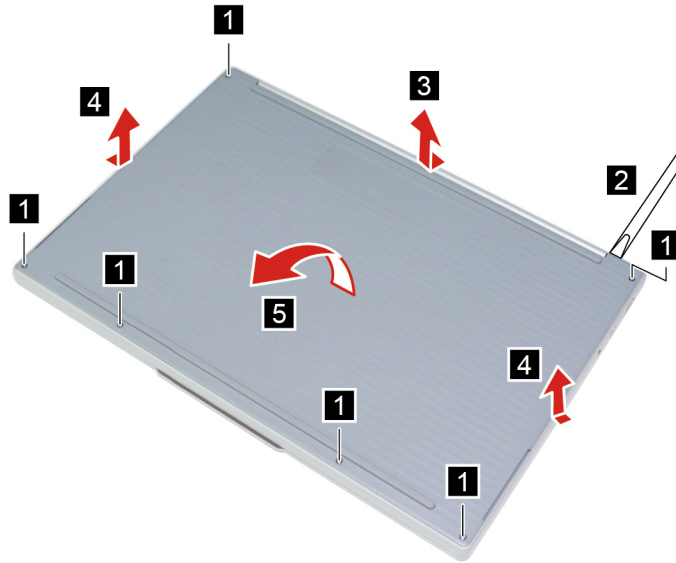


Figure 1: Loosen six screws and the base cover assembly

3. Install the base cover assembly and the six screws.

Note:

When you tighten the screw **a**, the gap will be closed. Do not push down the screw **a**, otherwise it might be damaged.

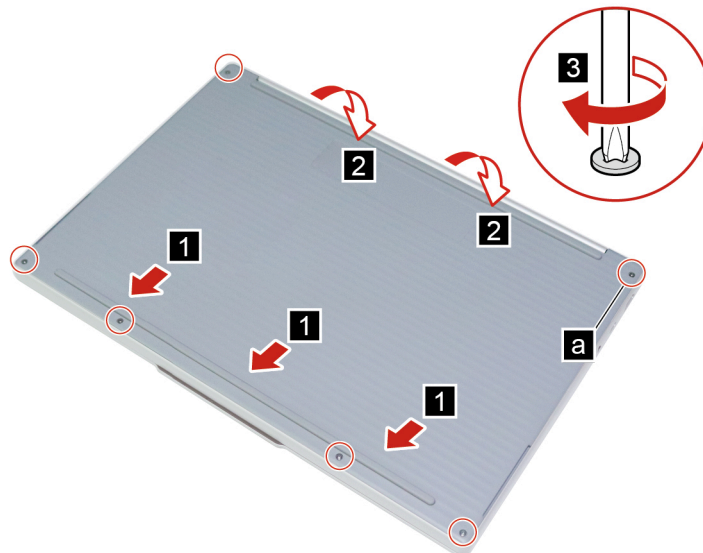


Figure 2: Remove six screws and the base cover assembly

Label locations

When replacing the base cover, reapply all labels that come with the replacement base cover. If some original labels are not included with the replacement base cover, peel them off from the original base cover and paste them on the replacement base cover.

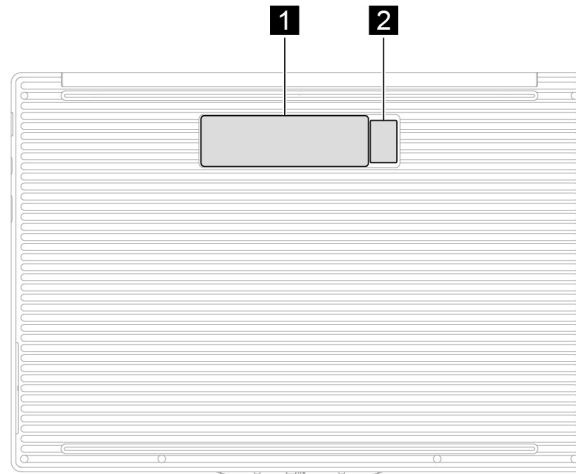


Figure 3: Label layout on the back side of the base cover

Labels attached to the base cover are country/region specific. Make sure to apply the appropriate labels to the replacement base cover.

Table 4: All base cover labels

Label	Label description	Applied country/region	Label dimensions
1	Rating label	Worldwide	99 mm x 30 mm
2	QR label	Non-EAA country	26.1 mm x 17 mm
		EAA country	15.7 mm x 15.2 mm

Battery and battery cable

- Before you start, ensure that you have read [Safety requirements for hardware maintenance](#) on page 1 and [General guidelines](#) on page 26.
- Make sure the following FRUs (or CRUs) have been removed.

[Base cover assembly](#) on page 26

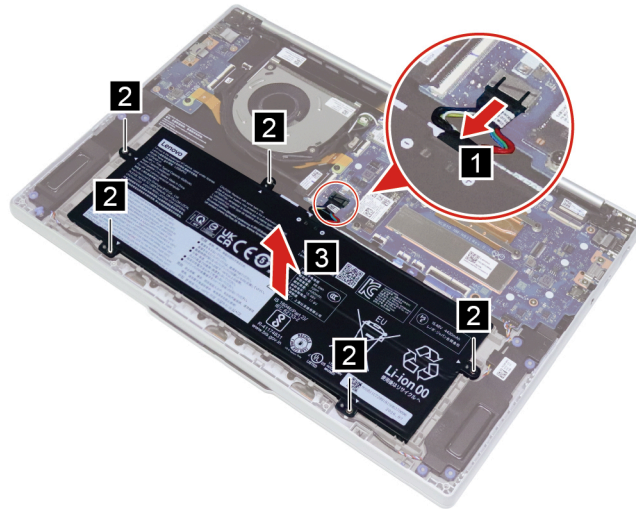
- Tools needed: Screw driver

1. Disconnect the battery cable from the system board, loosen five screws and remove the battery.



Attention:

Use your fingernail to pull the connector to unplug it. Do not pull the cable.



2. Remove the battery cable.



Attention:

Use your fingernail to pull the connector to unplug it. Do not pull the cable.

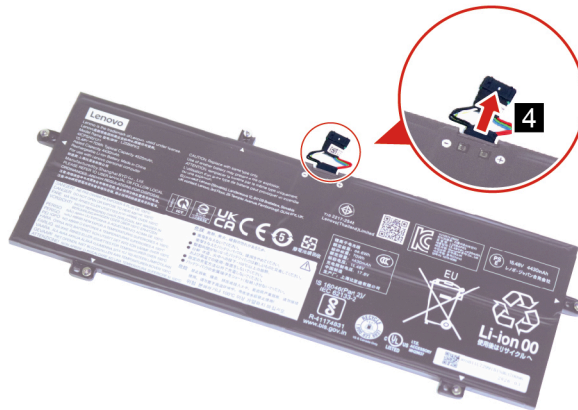


Figure 4: Remove the battery cable.

3. Install the battery and the battery cable in reverse order.

Heat sink

- Before you start, ensure that you have read [Safety requirements for hardware maintenance](#) on page 1 and [General guidelines](#) on page 26.
 - Make sure the following FRUs (or CRUs) have been removed.
 - [Base cover assembly](#) on page 26
 - Tools needed: Screw driver
1. Disconnect the battery pack cable from the system board. Then, loosen four screws and remove the heat sink.

**Attention:**

Use your fingernail to pull the connector to unplug it. Do not pull the cable.

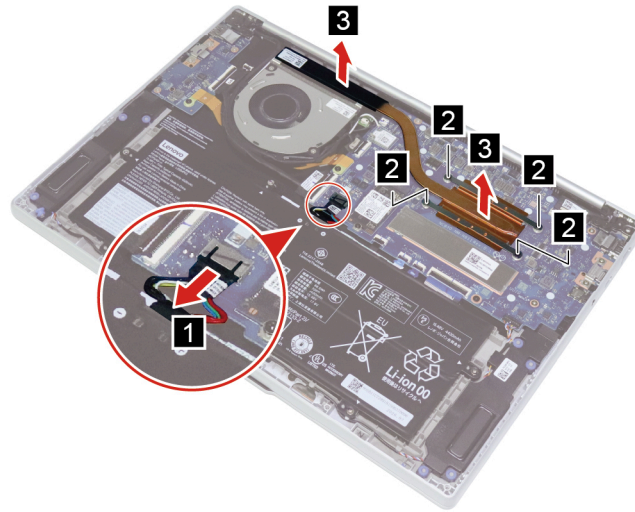


Figure 5: Disconnect the battery pack cable and remove the heat sink

2. Install the heat sink in reverse order.

Handling thermal interface materials

Thermal interface materials are typically applied between a heat sink and a CPU (and/or GPU) die to enhance the heat transfer capability of the heat sink. If thermal interface materials are exposed during computer servicing, such as when replacing the heat sink or system board, it is important to handle the thermal interface materials properly.

- You need to completely remove the old thermal interface materials from the CPU and/or GPU die.
- You need to apply new thermal interface materials onto the heat sink according to the type, quantity, and application areas specified in this publication.

Related information

[Heat sink](#) on page 29

[System board](#) on page 40

Type, quantity, and areas of thermal interface materials application on the heat sink

The table and figure below provide information on the type and quantity of thermal interface materials, as well as the specific areas on the heat sink where these materials should be applied.

Area	Type	Quantity
a	PTM795L-SP	17 mm × 13 mm × 0.2 mm



Figure 6: Area(s) on the heat sink where thermal interface materials should be applied

Area(s) on the system board where thermal interface materials are applied

The following figure shows the areas on the system board where thermal interface materials are applied.

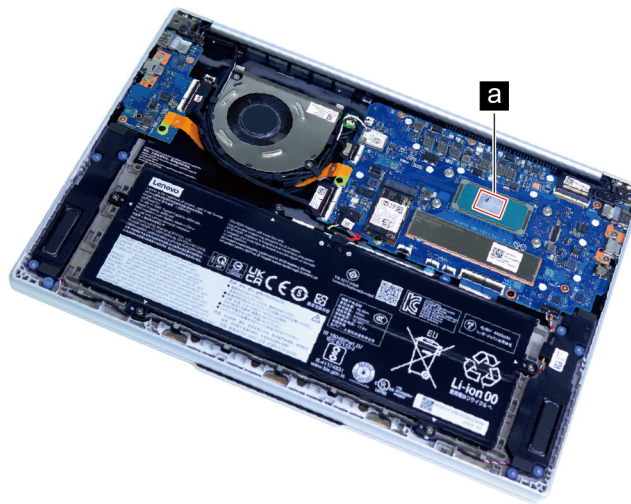


Figure 7: Area(s) on the system board where thermal interface materials are applied

Fan

- Before you start, ensure that you have read [Safety requirements for hardware maintenance](#) on page 1 and [General guidelines](#) on page 26.
 - Make sure the following FRUs (or CRUs) have been removed.
 - [Base cover assembly](#) on page 26
 - [Heat sink](#) on page 29
 - Tools needed: Screw driver
1. Disconnect the battery pack cable, USB board cable and the LCD cable from the system board, and disconnect the Wi-Fi antennas from the Wi-Fi card. Pull the LCD cable out of the guide.



Attention:

Use your fingernail to pull the connector to unplug it. Do not pull the cable.

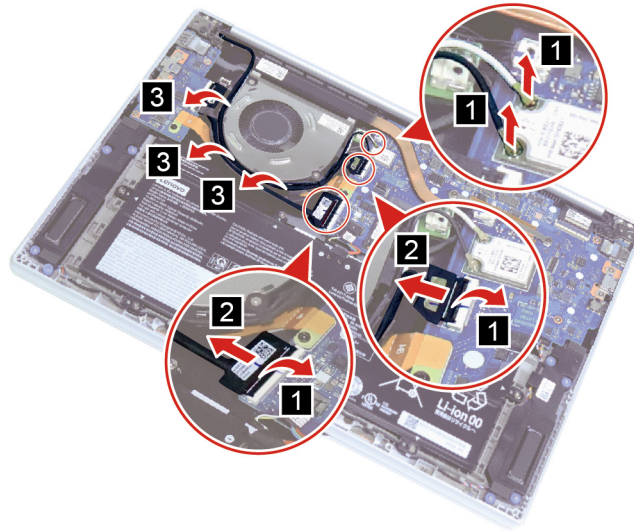


Figure 8: Disconnect cables and antennas

2. Remove the two screws and disconnect the fan cable. Then, remove the fan.

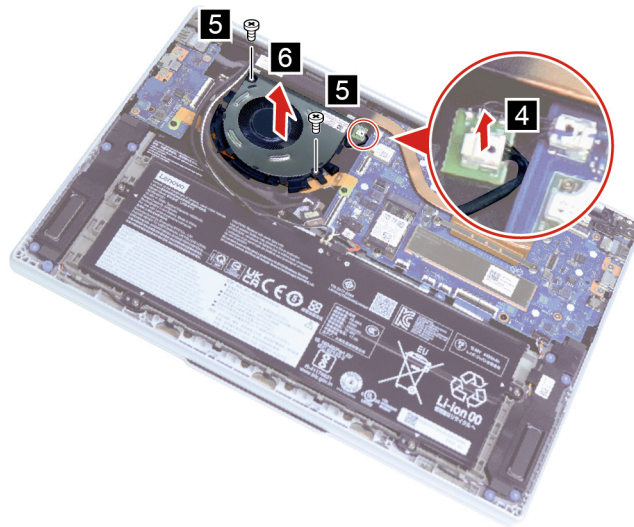


Figure 9: Remove screws and the fan

Table 5: Screws used to secure the fan

Thread	Length (mm)	Torque (kgf.cm)	Quantity
M2	3	1.85 ± 0.15	2

3. Install the fan in reverse order.

M.2 solid-state drive

- Before you start, ensure that you have read [Safety requirements for hardware maintenance](#) on page 1 and [General guidelines](#) on page 26.
- Make sure the following FRUs (or CRUs) have been removed.

[Base cover assembly](#) on page 26

- Tools needed: Screw driver

1. Disconnect the battery pack cable from the system board. Then, remove one screw and remove the M.2 solid-state drives by pulling it away from the slot.

⚠ Attention:

Use your fingernail to pull the connector to unplug it. Do not pull the cable.

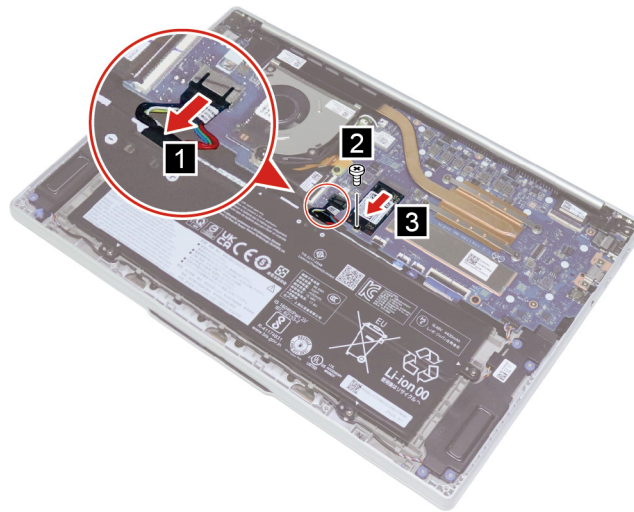


Figure 10: Remove the M.2 solid-state drive

Table 6: Screws used to secure the M.2 solid-state drive

Thread	Length (mm)	Torque (kgf.cm)	Quantity
M2	2	1.85 ± 0.15	1

2. Install the M.2 solid-state drive in reverse order.

Speaker

- Before you start, ensure that you have read [Safety requirements for hardware maintenance](#) on page 1 and [General guidelines](#) on page 26.
- Make sure the following FRUs (or CRUs) have been removed.

[Base cover assembly](#) on page 26

1. Disconnect the battery pack cable and the speaker cable from the system board. Then, remove the speakers and pull out the speaker cable.

⚠ Attention:

Use your fingernail to pull the connector to unplug it. Do not pull the cable.

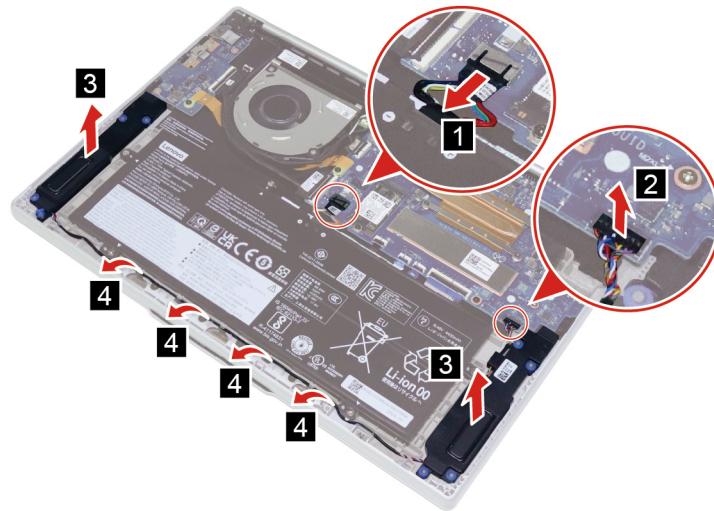


Figure 11: Remove the speakers

2. Install the speakers in reverse order.

Wi-Fi card mylar

- Before you start, ensure that you have read [Safety requirements for hardware maintenance](#) on page 1 and [General guidelines](#) on page 26.
- Make sure the following FRUs (or CRUs) have been removed.

[Base cover assembly](#) on page 26

1. Disconnect the battery pack cable from the system board. Then, remove the Wi-Fi card mylar.

Attention:

Use your fingernail to pull the connector to unplug it. Do not pull the cable.

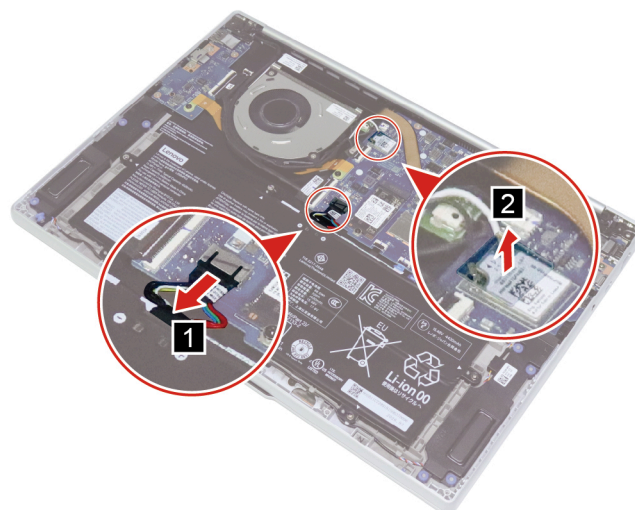


Figure 12: Remove the Wi-Fi card mylar

2. Install the Wi-Fi card mylar in reverse order.

46-pin USB board cable

- Before you start, ensure that you have read [Safety requirements for hardware maintenance](#) on page 1 and [General guidelines](#) on page 26.
- Make sure the following FRUs (or CRUs) have been removed.

[Base cover assembly](#) on page 26

1. Disconnect the battery pack cable. Disconnect the USB board cable from the USB board and the system board. Then, pull the USB board cable out of the guide and remove the cable.



Attention:

Use your fingernail to pull the connector to unplug it. Do not pull the cable.

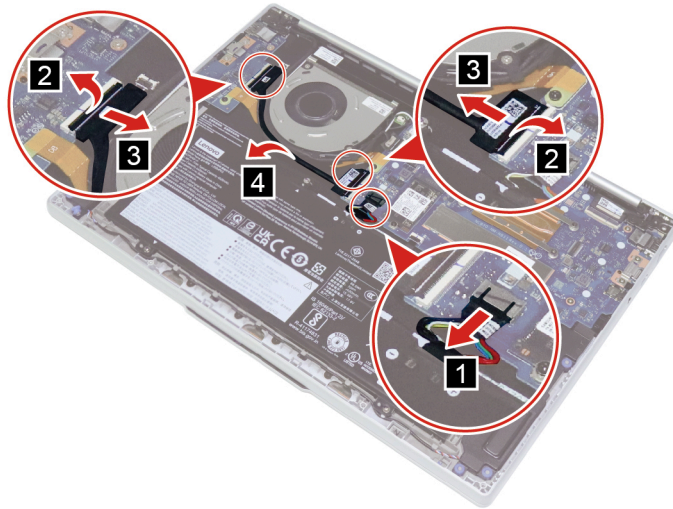


Figure 13: Disconnect and remove cables

2. Install the 46-pin USB board cable in reverse order.

30-pin USB board cable

- Before you start, ensure that you have read [Safety requirements for hardware maintenance](#) on page 1 and [General guidelines](#) on page 26.
- Make sure the following FRUs (or CRUs) have been removed.

[Base cover assembly](#) on page 26

[Fan](#) on page 31

1. Remove two screws.

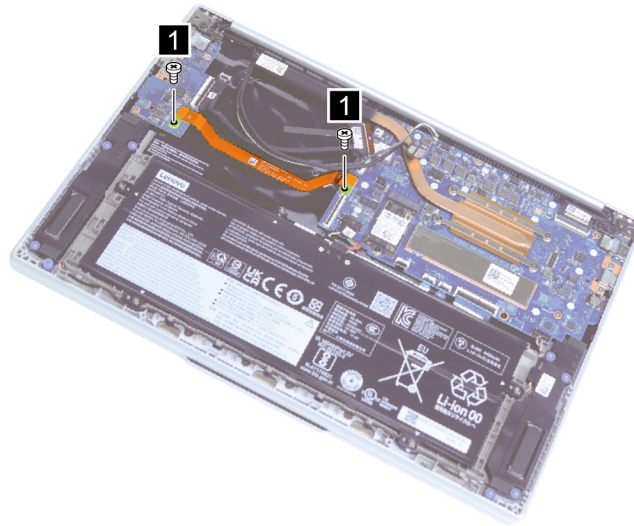


Figure 14: Remove two screws.

Table 7: Screws used to secure the 30-pin USB board cable

Thread	Length (mm)	Torque (kgf.cm)	Quantity
M2	2	1.85 ± 0.15	2

2. Disconnect and remove the 30-pin USB board cable.



Attention:

Use your fingernail to pull the connector to unplug it. Do not pull the cable.

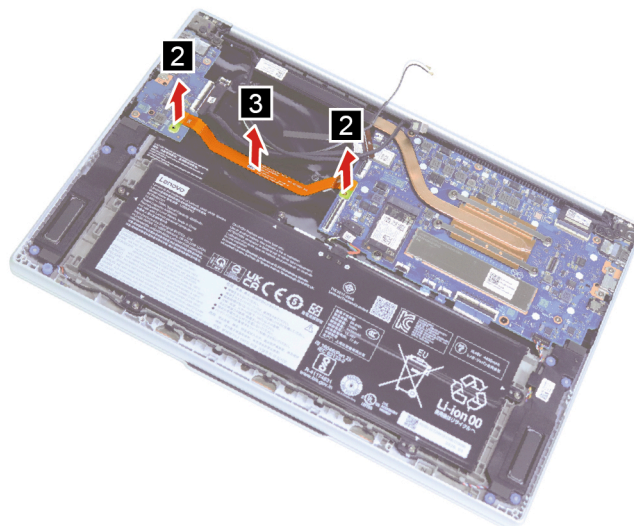


Figure 15: Disconnect and remove the 30-pin USB board cable.

3. Install the 30-pin USB board cable in reverse order.

USB board

- Before you start, ensure that you have read [Safety requirements for hardware maintenance](#) on page 1 and [General guidelines](#) on page 26.
 - Make sure the following FRUs (or CRUs) have been removed.
 - [Base cover assembly](#) on page 26
 - Tools needed: Screw driver
1. Disconnect the battery pack cable from the system board. Then, remove two screws and the USB board bracket, and remove one screw.

**Attention:**

Use your fingernail to pull the connector to unplug it. Do not pull the cable.

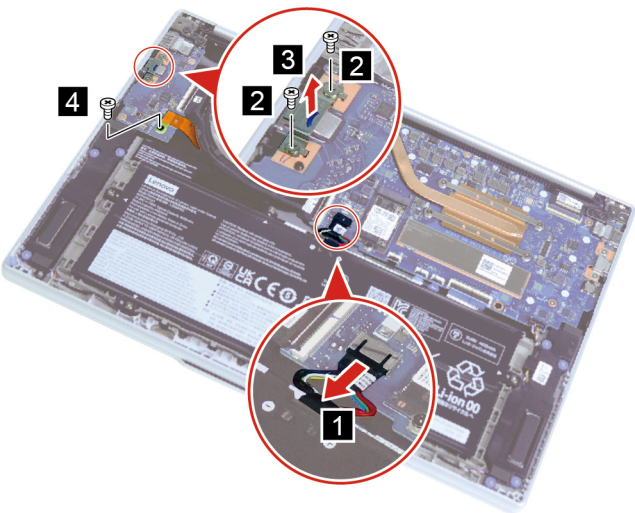


Figure 16: Remove the screws and the USB board bracket

Table 8: Screws used to secure the USB board bracket and the USB board

Label	Thread	Length (mm)	Torque (kgf.cm)	Quantity
2	M2	3	1.85 ± 0.15	2
4	M2	2	1.85 ± 0.15	1

2. Disconnect the USB board cables from the USB board.

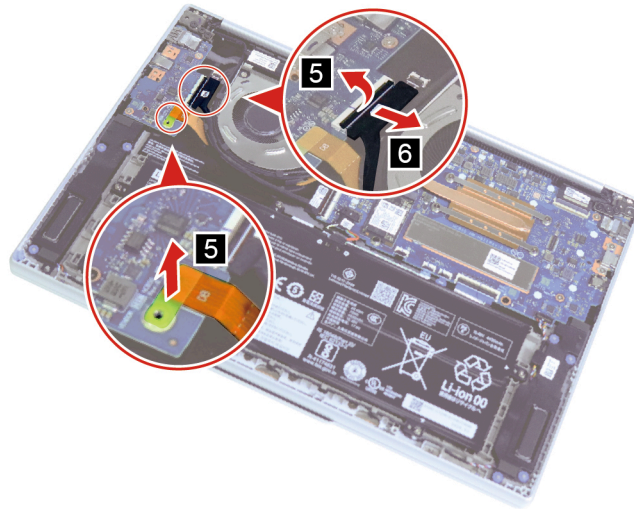


Figure 17: Disconnect the cables

3. Remove two screws and remove the USB board.

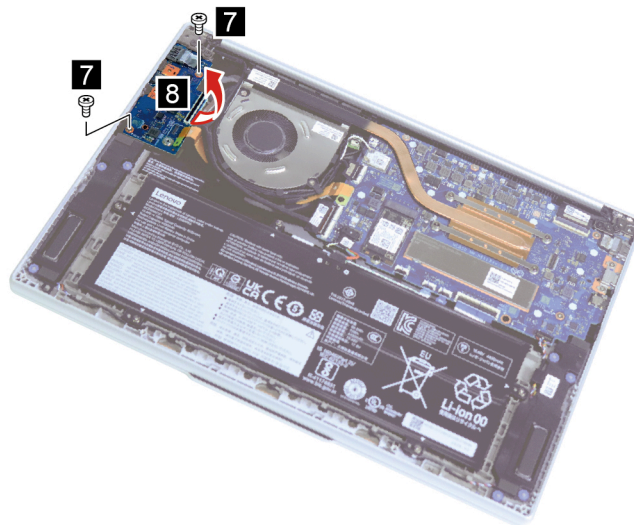


Figure 18: Remove two screws and remove the USB board

Table 9: Screws used to secure the USB board

Label	Thread	Length (mm)	Torque (kgf.cm)	Quantity
7	M2	3	1.85 ± 0.15	2

4. Install the USB board in reverse order.

Touchpad sponge

- Before you start, ensure that you have read [Safety requirements for hardware maintenance](#) on page 1 and [General guidelines](#) on page 26.
- Make sure the following FRUs (or CRUs) have been removed.

[Base cover assembly](#) on page 26

[Battery and battery cable](#) on page 28

1. Remove the touchpad screw sponge.

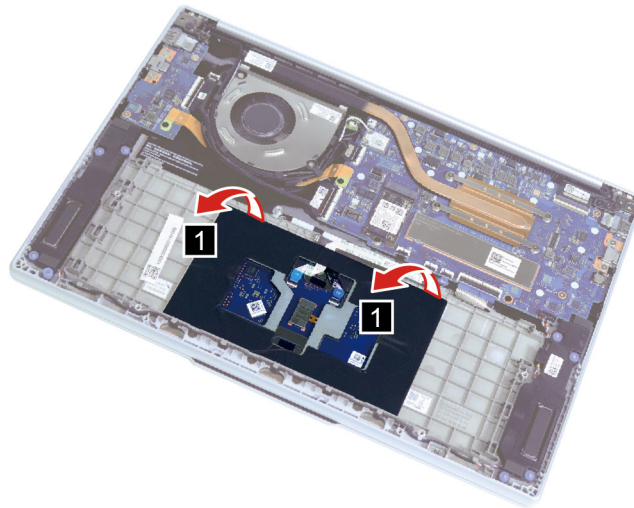


Figure 19: Remove the touchpad screw sponge.

2. Install the touchpad screw sponge in reverse order.

Touchpad cables

- Before you start, ensure that you have read [Safety requirements for hardware maintenance](#) on page 1 and [General guidelines](#) on page 26.
- Make sure the following FRUs (or CRUs) have been removed.

[Base cover assembly](#) on page 26

[Battery and battery cable](#) on page 28

[Touchpad sponge](#) on page 38

1. Disconnect the touchpad cables from the touchpad and the system board.

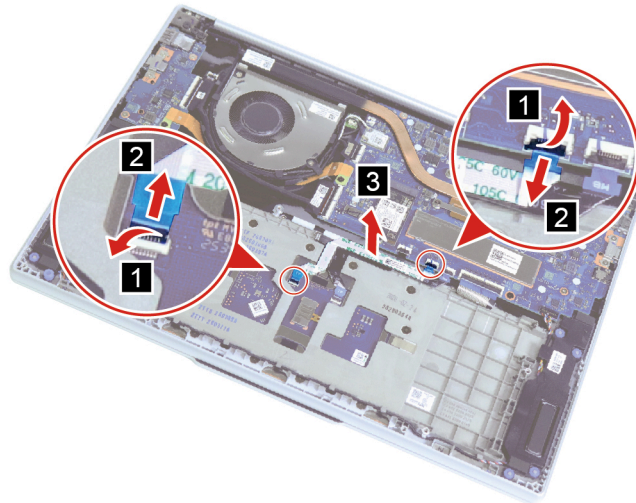


Figure 20: Disconnect cables

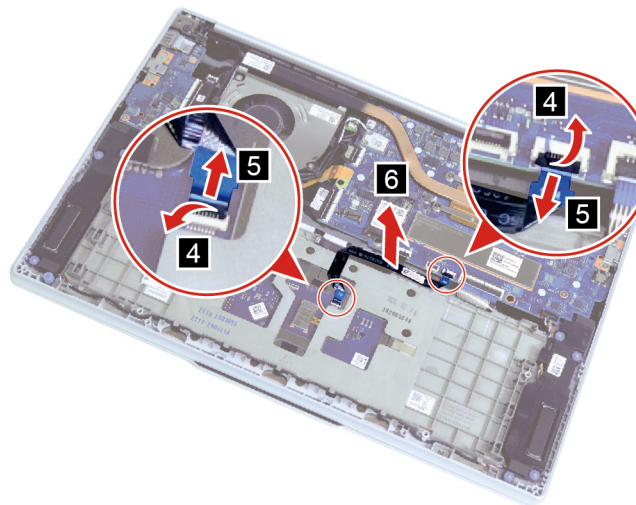


Figure 21: Disconnect cables

2. Install the touchpad cables in reverse order.

System board

- Before you start, ensure that you have read [Safety requirements for hardware maintenance](#) on page 1 and [General guidelines](#) on page 26.
- Make sure the following FRUs (or CRUs) have been removed.
 - [Base cover assembly](#) on page 26
 - [M.2 solid-state drive](#) on page 32
 - [Heat sink](#) on page 29
 - [Wi-Fi card mylar](#) on page 34
- Tools needed: Screw driver

1. Disconnect the Wi-Fi antennas. Disconnect cables connected to the system board. Remove two screws and the system board bracket. Remove one screw. Then, remove three screws and open the right hinge.

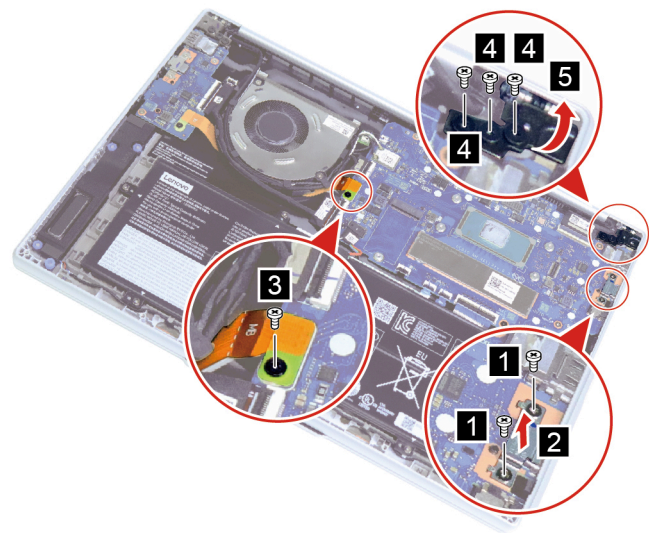


Figure 22: Remove screws

Table 10: Screws used to secure the hinge, USB board cable, and sensor board bracket

Label	Thread	Length (mm)	Torque (kgf.cm)	Quantity
1	M2	3	1.85 ± 0.15	2
3	M2	2	1.85 ± 0.15	1
4	M2.5	5	3.0 ± 0.3	3

2. Disconnect all cables.

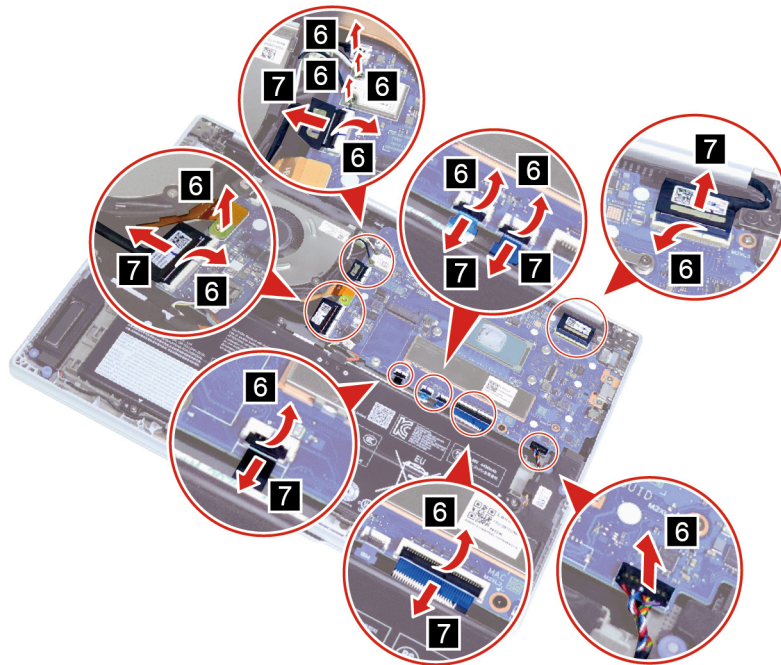


Figure 23: Disconnect all cables.

3. Remove five screws. Then, remove the system board.

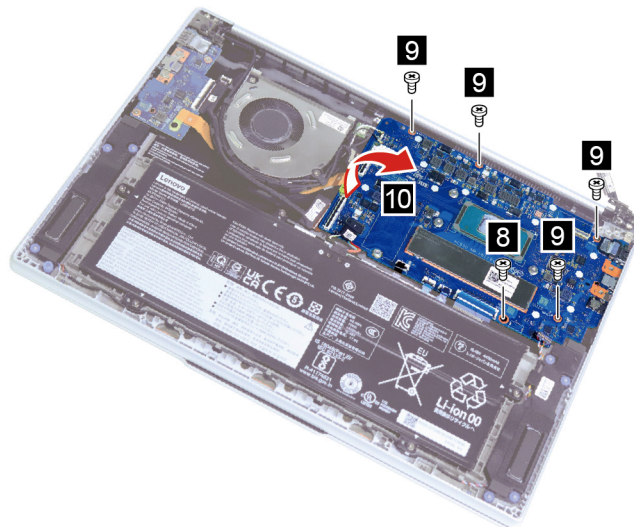


Figure 24: Remove screws and the system board

Table 11: Screws used to secure the system board

Label	Thread	Length (mm)	Torque (kgf.cm)	Quantity
8	M2	2	1.85 ± 0.15	1
9	M2	3	1.85 ± 0.15	4

4. Install the system board in reverse order.

LCD module

- Before you start, ensure that you have read [Safety requirements for hardware maintenance](#) on page 1 and [General guidelines](#) on page 26.
 - Make sure the following FRUs (or CRUs) have been removed.
 - [Base cover assembly](#) on page 26
 - Tools needed: Screw driver
1. Disconnect the battery pack cable the system board. Then, remove the Wi-Fi card mylar.



Attention:

Use your fingernail to pull the connector to unplug it. Do not pull the cable.

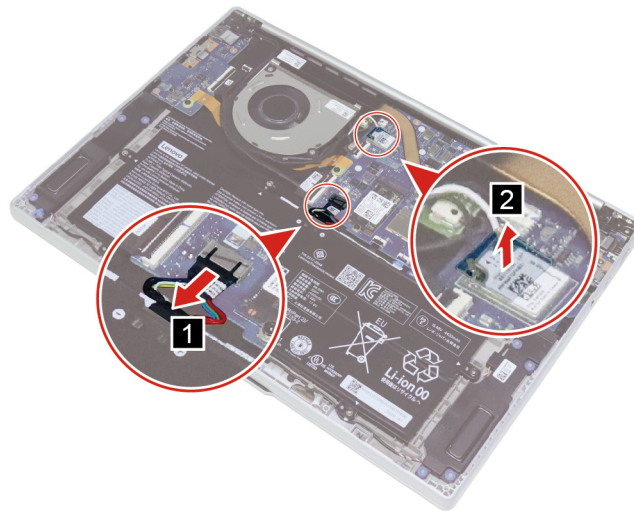


Figure 25: Disconnect cables and remove the Wi-Fi card mylar

2. Disconnect the LCD cable and EDP cable from the system board. Disconnect the antennas from the Wi-Fi card. Then, pull the LCD cable out of the guide.



Attention:

Use your fingernail to pull the connector to unplug it. Do not pull the cable.

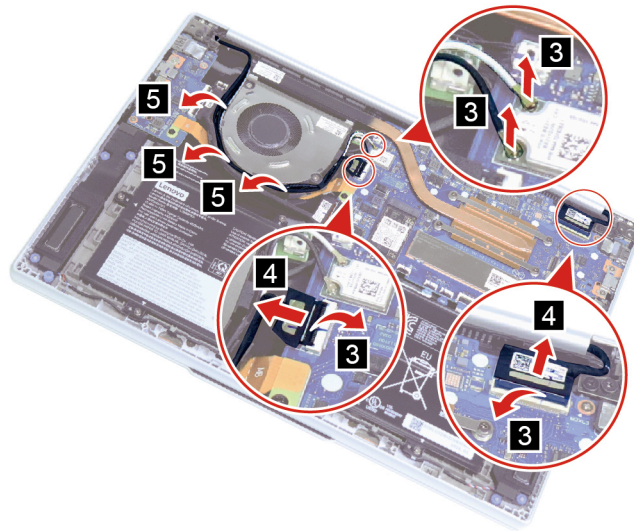


Figure 26: Disconnect cables and antennas

3. Remove six screws.

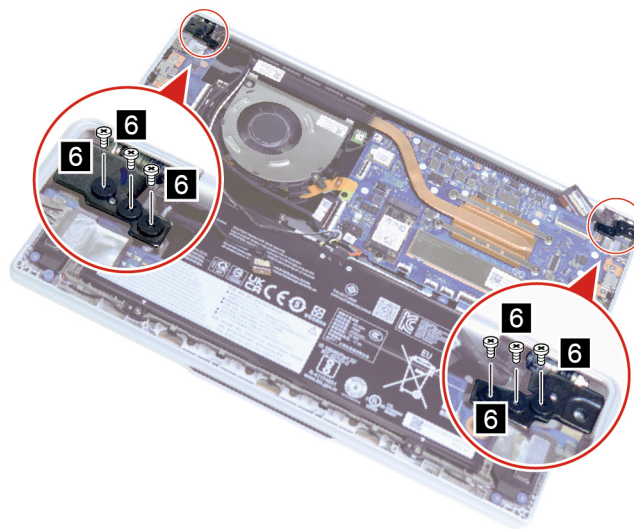


Figure 27: Remove six screws

Table 12: Screws used to secure the hinges

Thread	Length (mm)	Torque (kgf.cm)	Quantity
M2.5	5	3.0 ± 0.3	6

4. Rotate the LCD module to an angle of 135 degrees and remove the LCD module.

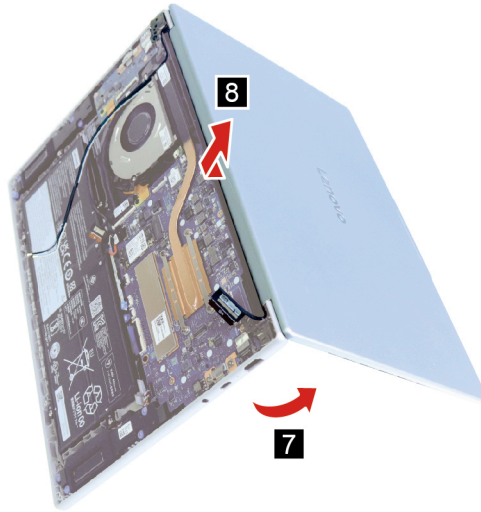


Figure 28: Remove the LCD module

5. Install the LCD module in reverse order.

Upper case (with keyboard)

- Before you start, ensure that you have read [Safety requirements for hardware maintenance](#) on page 1 and [General guidelines](#) on page 26.
- Make sure the following FRUs (or CRUs) have been removed.

[Base cover assembly](#) on page 26

[Battery and battery cable](#) on page 28

[Heat sink](#) on page 29

[Fan](#) on page 31

[M.2 solid-state drive](#) on page 32

[Speaker](#) on page 33

[Wi-Fi card mylar](#) on page 34

[46-pin USB board cable](#) on page 35

[30-pin USB board cable](#) on page 35

[USB board](#) on page 37

[Touchpad sponge](#) on page 38

[Touchpad cables](#) on page 39

[LCD module](#) on page 43

Chapter 5 Lenovo RMA app for Googlebook repair

The Lenovo RMA app is a service utility used during Googlebook repair activities. The tool allows technicians to:

- Provision device information
- Update replacement part (FRU) information
- Perform hardware functional tests
- Return the device to normal user mode after repair

Use this tool after completing hardware replacement and any required system recovery.

Before starting, ensure that following items are available.

Table 13: Required items

Items	Description
USB flash drive	Used to store and install the Lenovo RMA app.
Lenovo RMA app	LenovoRMA_MT_xxx.apk Download from E-support product landing page > Software & Drivers.
ac adapter	Required if battery is disconnected for write protection disablement.

1. Replace the faulty hardware.

Perform the required hardware replacement according to the hardware maintenance manual.

2. Perform system recovery (if required).

A system recovery must be completed when either of the following parts is replaced:

- System board
- Solid-state drive

3. Power on the device.

Boot the Googlebook normally.

4. Enter the repair mode.

- a. Press and hold the power button.
- b. While holding the power button, press F2 three times.
- c. The device will reboot automatically.

After reboot, the system enters the repair mode, then select **Get Started** to continue.

5. Disable write protection.

Write protection must be disabled before continuing. Choose one of the following methods:

- Manually turn off (Battery removal).

Note:

The ac adapter must remain connected after the battery removal.

- Perform RMA Server Unlock (RSU). Please refer to [Chromebook RSU Process \(CSWi20Y\)](#) to get RMA Server Unlock (RSU) authorization and procedures.

6. Install the Lenovo RMA app.

- a. Insert the USB drive containing the LenovoRMA_MT_xxx.apk.
- b. Install LenovoRMA_MT_xxx.apk.

7. Confirm device information.

Input and confirm all device information, such as Lenovo device serial number, Lenovo MTM, and region code.

8. Confirm hardware parts information.

Confirm the FRU PN for the replacement parts.

Note:

- Most components are automatically detected and selected.
- Sub boards and keyboards cannot be automatically detected. These components must be selected manually.
- If multiple keyboard entries use the same FRU part number, any matching option can be selected.

9. Calibrate the speaker.

Enter the temperature (20°~25°) on the calibration screen.

10. Run functional tests (optional).

Run any functional tests to verify proper operation of the repaired system.

Note:

Hardware testing is optional but strongly recommended after key parts replacement.

11. Complete the repair.

You can exit the repair mode and bring the system back to the user mode.

For the latest APK, procedures, screenshots, and step-by-step instructions, refer to the Lenovo RMA App SOP available from **Drivers & Software** on Lenovo Support site <https://support.lenovo.com>.

Appendix A Important notice for Quebec consumers

In regard to section 79.18 of Quebec's Regulation respecting the application of the Consumer Protection Act, Lenovo in no way guarantees the availability of (a) replacement parts; (b) repair services; and (c) information necessary to maintain or repair the goods. For up-to-date information on the technical support and parts available for your purchase, please consult <https://support.lenovo.com/ca/en>.

En ce qui concerne l'article 79.18 du Règlement d'application de la Loi sur la protection du consommateur du Québec, Lenovo ne garantit en aucune façon la disponibilité des éléments suivants: (a) les pièces de rechange; (b) les services de réparation; et (c) les renseignements nécessaires à l'entretien à la réparation du bien. Pour obtenir des renseignements à jour sur le soutien technique et les pièces disponibles pour votre achat, veuillez consulter <https://support.lenovo.com/ca/fr>.

Appendix B Self-help resources

Use the following self-help resources to learn more about the computer and troubleshoot problems.

Resources	How to access?
Troubleshooting and frequently asked questions	• https://www.lenovo.com/tips • https://forums.lenovo.com
Accessibility information	https://www.lenovo.com/accessibility
Reset or restore Windows	• Use Lenovo recovery options. 1. Go to https://support.lenovo.com/HowToCreateLenovoRecovery. 2. Follow the on-screen instructions. • Use Windows recovery options. 1. Go to https://pcsupport.lenovo.com. 2. Detect your computer or manually select your computer model. 3. Click Troubleshoot & Diagnose > Custom Troubleshooting > Operating System Diagnostics and then follow the on-screen instructions.
Use Lenovo Vantage or Lenovo Baiying to:	
• Download and install the latest drivers and firmware. • Configure hardware settings. • Diagnose computer hardware problems. • Check the computer warranty status.	Use Windows Search.
Product documentation:	
• Generic Safety and Compliance Notices • Safety and Warranty Guide • Setup Guide • User Guide • This Hardware Maintenance Manual • Regulatory Notice	Go to Lenovo Documentation Center and search by product.
Lenovo Support Web site with the latest support information on the following:	
• Drivers and software • Diagnostic solutions • Product and service warranty	Visit https://support.lenovo.com .

Resources	How to access?
• Product and parts details • Knowledge base and frequently asked questions	
Windows help information	• Use Get Help or Tips. • Use Windows Search. • Microsoft Support Web site: https://support.microsoft.com

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