



# Hardware Maintenance Manual

Lenovo N20 Chromebook





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## Chapter 1. Safety information

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

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### General safety

Follow these rules to ensure general safety:

- Observe good housekeeping in the area of the machines during and after maintenance.
- When lifting any heavy object:
  1. 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.*
- Do not perform any action that causes hazards to the customer, or that makes the equipment unsafe.
- Before you start the machine, make sure that other service technicians and the customer's personnel are not in a hazardous position.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the machine.
- Keep your tool case away from walk areas so that other people will not trip over it.
- Do not wear loose clothing that can be trapped in the moving parts of a machine. 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.
- 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 overheating of internal components. Do not obstruct fan louvers or cover them with labels or stickers.

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### Electrical safety

Observe the following rules when working on electrical equipment.

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

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Disconnect all power before:
  - Performing a mechanical inspection
  - Working near power supplies

- Removing or installing main units
- Before you start to work on the machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine, and to lock the wall box in the off position.
- If you need to work on a machine that has *exposed* electrical circuits, observe the following precautions:
  - Ensure that another person, familiar with the power-off controls, is near you.

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

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

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

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

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

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

This practice ensures correct grounding of the units.

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

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## 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 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.

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## 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 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.

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## 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.

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## Safety notices (multilingual translations)

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

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



### 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.



قبل إعادة تشغيل الحاسب بعد الانتهاء من استبدال FRU، تأكد من أنه قد تم إعادة كل من المسامير و السويت 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 إلى حدوث دائرة قصر.



تحتوي بعض البطاريات الاحتياطية على كمية صغيرة من مادتي النيكل والكادميوم. لا تقم بفك أو إعادة شحن البطارية الاحتياطية ولا تقم أيضا ببقاءها في النار أو الماء ولا تتسبب في أحداث 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 إلى اشتعالها أو انفجارها.



تحتوي حزمة البطارية على كمية صغيرة من مادة النيكل. لا تقم بفكها أو القاءها في النار أو الماء ولا تتسبب في أحداث 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 إلى اشتعالها أو انفجارها.



قد تتسبب بطارية الليثيوم في حدوث حريق أو انفجار أو حدوث حروق شديدة. لا تقم بإعادة شحن البطارية أو إزالة موصل الاستقطاب الخاص بها ولا تحاول أيضا فكها أو تسخينها لأكثر من ١٠٠ درجة مئوية (٢١٢١ 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 إلى اشتعالها أو انفجارها.



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.



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



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.



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



#### 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.



## 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.



## 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 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.



#### 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.



סכנה

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



סכנה

סוללות המתנה מסוימות מכילות כמויות קטנות של ניקל וקדמיום. אין לפרק סוללות המתנה, לטעון אותה מחדש, להשליך אותה לאש או למים או לקצר אותה. יש לסלק את הסוללה כנדרש על ידי התקנות והחוקים המקומיים. יש להשתמש רק בסוללה המופיעה ברשימת החלקים המותאמת. שימוש בסוללה לא מותאמת עלול לגרום להצתה או התפוצצות של הסוללה.



סכנה

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



סכנה

סוללות חליטיות עלולות 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 המותאמים. שימוש בסוללה אחרת עלול לגרום לסכנת שריפה או התפוצצות.



סכנה

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



סכנה

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



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 מארו הסוללות ונתקו את כל הכבלים מחמוברים.



## 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。



## 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・バックを取り外して、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。



## 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 카드뮴이 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. 올바르지 않은 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. 올바르지 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, 100°C(212°F) 이상으로 가열하거나, 소각하거나, 전지 내용물을 물에 노출시키지 마십시오. 배터리를 폐기할 때에는 해당 지역의 법률 규정을 따르십시오. 올바른 배터리만 사용하십시오. 올바르지 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.



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.



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。  
金屬零件或鑄鐵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。



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## Chapter 2. General checkout

This chapter contains the following topics:

Before you go to the checkout instructions, ensure that you read the following important notes.

### Important notes:

- **Only certified trained personnel should service the computer.**
- **Before replacing any FRU, read the entire page on removing and replacing FRUs.**
- **When you replace FRUs, it is recommended to 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 a FRU only with another FRU of the correct model.** When you replace a FRU, make sure that the model of the machine and the FRU part number are correct by referring to the FRU parts list.
- **A FRU should not be replaced because of a single, unreproducible failure.** Single failures can occur for a variety of reasons that have nothing to do with a hardware defect, such as cosmic radiation, electrostatic discharge, or software errors. Consider replacing a FRU only when a problem recurs. If you suspect that a FRU is defective, clear the error log and run the test again. If the error does not recur, do not replace the FRU.
- **Be careful not to replace a nondefective FRU.**

---

## What to do first

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

1. Name and phone number of 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 FRU was detected
7. Failing FRU name and part number
8. Machine type, model number, and serial number
9. Customer's name and address

**Note:** 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.

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 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

**The following symptoms might indicate damage caused by non-warranted activities:**

- Missing parts might be a symptom of unauthorized 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.

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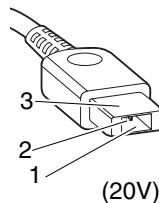
## Checking the ac power adapter

If the computer fails only when the ac power adapter is used, refer to the information in this topic to check the ac power adapter.

If the power-on indicator does not turn on, check the power cord of the ac power adapter for correct continuity and installation.

To check the ac power adapter, do the following:

1. Unplug the ac power adapter cable from the computer.
2. Measure the output voltage across the plug of the ac power adapter cable. The correct voltages are shown in the following table.



| Pin | Voltage (V dc) |
|-----|----------------|
| 1   | +20            |
| 2   | 0              |
| 3   | Ground         |

**Note:** The output voltage across pin 2 might differ from the voltage that you measure.

3. Depending on the voltage that you measure, do one of the following:

- If the voltage is not correct, replace the ac power adapter.
- If the voltage is acceptable, do the following:
  - a. Replace the system board.
  - b. If the problem persists, call the Customer Support Center.

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

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## **Chapter 3. Identifying FRUs (CRUs)**

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### **All FRUs (CRUs) for Lenovo N20 Chromebook**

The exploded illustrations help Lenovo service technicians identify FRUs or CRUs that they may need to replace when servicing a customer's computer.

Refer to “Lenovo part numbers of replacement FRUs or CRUs” on page 24 if you need to look up Lenovo part numbers for a particular FRU or CRU.

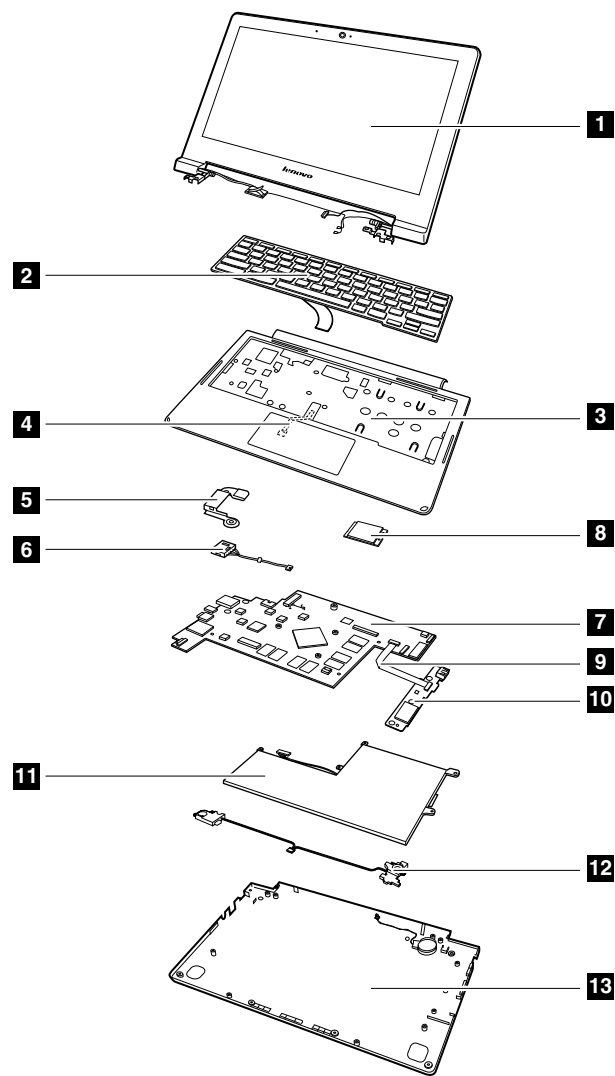


Figure 1. N20 exploded view

Table 1. FRU (CRU) categories

| No.       | FRU (CRU) category            | CRU ID |
|-----------|-------------------------------|--------|
| <b>1</b>  | LCD module                    | N      |
| <b>2</b>  | Keyboard                      | **     |
| <b>3</b>  | Upper case                    | N      |
| <b>4</b>  | Touch pad cable               | N      |
| <b>5</b>  | dc-in connector bracket       | N      |
| <b>6</b>  | dc-in connector               | N      |
| <b>7</b>  | System board                  | N      |
| <b>8</b>  | WLAN & Bluetooth combo module | N      |
| <b>9</b>  | I/O board cable               | N      |
| <b>10</b> | I/O board                     | N      |
| <b>11</b> | Battery pack                  | N      |
| <b>12</b> | Speakers                      | N      |
| <b>13</b> | Base cover                    | N      |
|           | ac power adapter              | *      |
|           | Power cord                    | *      |

**Note:** A customer replaceable unit (CRU) is identified by a single asterisk (\*) or two asterisks (\*\*) in the CRU ID column. A single asterisk (\*) means that the part is a Self-service CRU; two asterisks (\*\*) means that the part is an Optional-service CRU. A Letter “N” in the CRU ID column means that the part is not a CRU.

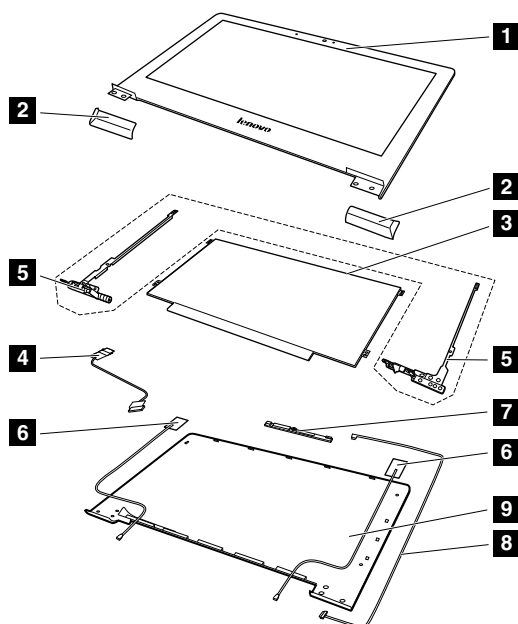


Figure 2. LCD module — exploded view

Table 2. FRU categories for the LCD module

| No.      | FRU (CRU) category | CRU ID |
|----------|--------------------|--------|
| <b>1</b> | LCD bezel          | N      |

Table 2. FRU categories for the LCD module (continued)

|          |                |   |
|----------|----------------|---|
| <b>2</b> | Hinge covers   | N |
| <b>3</b> | LCD panel      | N |
| <b>4</b> | LCD cable      | N |
| <b>5</b> | Hinges         | N |
| <b>6</b> | WLAN antennas  | N |
| <b>7</b> | Camera board   | N |
| <b>8</b> | Camera cable   | N |
| <b>9</b> | LCD base cover | N |

## Lenovo part numbers of replacement FRUs or CRUs

When servicing a customer's computer, Lenovo service technicians may use part numbers listed in the following tables to order replacement parts through Lenovo CRM (customer relationship management) system.

Table 3. Part numbers for FRUs (CRUs)

| No.      | FRU (CRU) category | Parts description                        | Lenovo part number |
|----------|--------------------|------------------------------------------|--------------------|
| <b>2</b> | Keyboard           |                                          |                    |
|          |                    | US74KeyST1CCCYBlackKeySilverFrame        | 25216074           |
|          |                    | UK75KeyST1CCCYBlackKeySilverFrame        | 25216075           |
|          |                    | Italian75KeyST1CCCYBlackKeySilverFrame   | 25216076           |
|          |                    | Spanish75KeyST1CCCYBlackKeySilverFrame   | 25216077           |
|          |                    | Turkish75KeyST1CCCYBlackKeySilverFrame   | 25216078           |
|          |                    | Thailand74KeyST1CCCYBlackKeySilverFrame  | 25216079           |
|          |                    | Portugue75KeyST1CCCYBlackKeySilverFrame  | 25216080           |
|          |                    | LatinSpa75KeyST1CCCYBlackKeySilverFrame  | 25216081           |
|          |                    | CanadFrEn75KeyST1CCCYBlackKeySilverFrame | 25216082           |
|          |                    | Korean74KeyST1CCCYBlackKeySilverFrame    | 25216083           |
|          |                    | TradChine74KeyST1CCCYBlackKeySilverFrame | 25216084           |
|          |                    | Russian74KeyST1CCCYBlackKeySilverFrame   | 25216085           |
|          |                    | French75KeyST1CCCYBlackKeySilverFrame    | 25216086           |
|          |                    | German75KeyST1CCCYBlackKeySilverFrame    | 25216087           |
|          |                    | Arabic74KeyST1CCCYBlackKeySilverFrame    | 25216088           |
|          |                    | Brazilian75KeyST1CCCYBlackKeySilverFrame | 25216089           |
|          |                    | Dutch75KeyST1CCCYBlackKeySilverFrame     | 25216090           |
|          |                    | Greek74KeyST1CCCYBlackKeySilverFrame     | 25216091           |
|          |                    | Hebrew74KeyST1CCCYBlackKeySilverFrame    | 25216092           |
|          |                    | Hungarian75KeyST1CCCYBlackKeySilverFrame | 25216093           |
|          |                    | Nordic75KeyST1CCCYBlackKeySilverFrame    | 25216094           |
|          |                    | Belgian75KeyST1CCCYBlackKeySilverFrame   | 25216095           |

Table 3. Part numbers for FRUs (CRUs) (continued)

|          |                |                                          |            |
|----------|----------------|------------------------------------------|------------|
|          |                | Iceland75KeyST1CCCYBlackKeySilverFrame   | 25216096   |
|          |                | Slovenian75KeyST1CCCYBlackKeySilverFrame | 25216097   |
|          |                | Swiss75KeyST1CCCYBlackKeySilverFrame     | 25216098   |
|          |                | USInter74KeyST1CCCYBlackKeySilverFrame   | 25216099   |
|          |                | Czh-Slk75KeyST1CCCYBlackKeySilverFrame   | 25216100   |
|          |                | Bulgarian75KeyST1CCCYBlackKeySilverFrame | 25216101   |
|          |                | India74KeyST1CCCYBlackKeySilverFrame     | 25216102   |
|          |                | US74KeyST1CJMEBlackKeySilverFrame        | 25216045   |
|          |                | UK75KeyST1CJMEBlackKeySilverFrame        | 25216046   |
|          |                | Italian75KeyST1CJMEBlackKeySilverFrame   | 25216047   |
|          |                | Spanish75KeyST1CJMEBlackKeySilverFrame   | 25216048   |
|          |                | Turkish75KeyST1CJMEBlackKeySilverFrame   | 25216049   |
|          |                | Thailand74KeyST1CJMEBlackKeySilverFrame  | 25216050   |
|          |                | Portugue75KeyST1CJMEBlackKeySilverFrame  | 25216051   |
|          |                | LatinSpa75KeyST1CJMEBlackKeySilverFrame  | 25216052   |
|          |                | CanadFrEn75KeyST1CJMEBlackKeySilverFrame | 25216053   |
|          |                | Korean74KeyST1CJMEBlackKeySilverFrame    | 25216054   |
|          |                | TradChine74KeyST1CJMEBlackKeySilverFrame | 25216055   |
|          |                | Russian74KeyST1CJMEBlackKeySilverFrame   | 25216056   |
|          |                | French75KeyST1CJMEBlackKeySilverFrame    | 25216057   |
|          |                | German75KeyST1CJMEBlackKeySilverFrame    | 25216058   |
|          |                | Arabic74KeyST1CJMEBlackKeySilverFrame    | 25216059   |
|          |                | Brazilian75KeyST1CJMEBlackKeySilverFrame | 25216060   |
|          |                | Dutch75KeyST1CJMEBlackKeySilverFrame     | 25216061   |
|          |                | Greek74KeyST1CJMEBlackKeySilverFrame     | 25216062   |
|          |                | Hebrew74KeyST1CJMEBlackKeySilverFrame    | 25216063   |
|          |                | Hungarian75KeyST1CJMEBlackKeySilverFrame | 25216064   |
|          |                | Nordic75KeyST1CJMEBlackKeySilverFrame    | 25216065   |
|          |                | Belgian75KeyST1CJMEBlackKeySilverFrame   | 25216066   |
|          |                | Iceland75KeyST1CJMEBlackKeySilverFrame   | 25216067   |
|          |                | Slovenian75KeyST1CJMEBlackKeySilverFrame | 25216068   |
|          |                | Swiss75KeyST1CJMEBlackKeySilverFrame     | 25216069   |
|          |                | USInter74KeyST1CJMEBlackKeySilverFrame   | 25216070   |
|          |                | Czh-Slk75KeyST1CJMEBlackKeySilverFrame   | 25216071   |
|          |                | Bulgarian75KeyST1CJMEBlackKeySilverFrame | 25216072   |
|          |                | India74KeyST1CJMEBlackKeySilverFrame     | 25216073   |
| <b>3</b> | Upper case     |                                          |            |
|          |                | Upper Case C N20 W/TP N-3G               | 5CB0G15038 |
| <b>4</b> | Touchpad cable |                                          |            |

Table 3. Part numbers for FRUs (CRUs) (continued)

|           |                               |                                          |            |
|-----------|-------------------------------|------------------------------------------|------------|
|           |                               | TouchPad Cable C N20                     | 5C10G15006 |
| <b>5</b>  | dc-in connector bracket       |                                          |            |
|           |                               | DC-IN Bracket C N20                      | 5B40G15032 |
| <b>6</b>  | dc-in connector               |                                          |            |
|           |                               | DC-IN Cable C N20                        | 5C10G15004 |
| <b>7</b>  | System board                  |                                          |            |
|           |                               | MB C N20 N2830 2G                        | 5B20G15025 |
|           |                               | MB C N20 N2930 4G                        | 5B20G15044 |
|           |                               | MB C N20 N2830 4G                        | 5B20G15037 |
|           |                               | MB C N20 N2930 2G                        | 5B20G15021 |
| <b>8</b>  | WLAN & Bluetooth combo module |                                          |            |
|           |                               | USI 88W8897 2x2AC+BT4.0 PCIE M.2 WLAN    | 20200606   |
|           |                               | Cbt 88W8897 2x2AC+BT4.0 PCIE M.2 WLAN    | 20200632   |
|           |                               | Intel 7260 2x2AC+BT PCIE M.2 WLAN V2     | 20200552   |
| <b>9</b>  | I/O board cable               |                                          |            |
|           |                               | IO Board cable C N20                     | 5C10G15041 |
| <b>10</b> | I/O board                     |                                          |            |
|           |                               | IO Board C N20                           | 5C50G15020 |
| <b>11</b> | Battery pack                  |                                          |            |
|           |                               | Felx11 SP/A L13M6P61 11.1V34.8Wh6cellbty | 121500254  |
|           |                               | Felx11 LG L13L3P61 11.1V34.8Wh 3cell bty | 121500255  |
| <b>12</b> | Speakers                      |                                          |            |
|           |                               | Speaker C N20                            | 5C20G15029 |
| <b>13</b> | Base cover                    |                                          |            |

**Note:** Refer to Appendix C “Lenovo part numbers of ac adapters and power cords” on page 49 to look up the Lenovo part numbers of ac power adapters and power cords.

Table 4. Part numbers for LCD FRUs

| No.      | FRU (CRU) category | Spare parts description                | Lenovo part number |
|----------|--------------------|----------------------------------------|--------------------|
| <b>1</b> | LCD bezel          |                                        |                    |
|          |                    | LCD Bezel C N20                        | 5B30G15010         |
| <b>2</b> | Hinge covers       |                                        |                    |
|          |                    | Hinge Cover C N20                      | 5CB0G15026         |
| <b>3</b> | LCD panel          |                                        |                    |
|          |                    | IVO M116NWR1 HW1.1 HD AG F LED1 NB LCD | 18201681           |
|          |                    | CMI N116BGE EA2 HD AG S LED1 NB LCD    | 18201680           |
|          |                    | AUO B116XTN01.0 1A HD AG F LED1 NB LCD | 18201679           |
| <b>4</b> | LCD cable          |                                        |                    |



Table 4. Part numbers for LCD FRUs (continued)

|          |                |                    |            |
|----------|----------------|--------------------|------------|
|          |                | LCD Cable C N20    | 5C10G15008 |
| <b>5</b> | Hinges         |                    |            |
|          |                | Hinge L+R C N20    | 5H50G15024 |
| <b>6</b> | WLAN antennas  |                    |            |
|          |                | Antenna C N20 WIFI | 5A30G15046 |
| <b>7</b> | Camera board   |                    |            |
|          |                | Camera C N20       | 5C20G15029 |
| <b>8</b> | Camera cable   |                    |            |
|          |                | Camera Cable C N20 | 5C10G15031 |
| <b>9</b> | LCD base cover |                    |            |
|          |                | LCD Cover C N20    | 5CB0G15042 |



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## Chapter 4. Removing a FRU or CRU

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### General guidelines

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

1. Do not try to service any computer unless you have been trained and certified. An untrained person runs the risk of damaging parts.
2. Begin by removing any FRUs that have to be removed before replacing the failing FRU. Any such FRUs are listed at the beginning of each FRU replacement procedure. Remove them in the order in which they are listed.
3. Follow the correct sequence in the steps for removing a FRU, as shown in the illustrations by the numbers in square callouts.
4. When removing a FRU, move it in the direction as shown by the arrow in the illustration.
5. To install a new FRU in place, perform the removal procedure in reverse and follow any notes that pertain to replacement.
6. When replacing a FRU, carefully retain and reuse all screws. If screws are missing, look up the Lenovo parts numbers in Appendix B “Lenovo part numbers of screws used on N20 Chromebook” on page 47 for replacement screws and order them through the Lenovo CRM system.
7. 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. Refer to Appendix D “Label locations” on page 51 for the layout of labels on the back side of the base cover.



**Before removing any FRU or CRU, shut down the computer and unplug all power cords from electrical outlets.**

**Attention:** After replacing a 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.

**Attention:** 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).

---

### Remove the keyboard

Step 1. Shut down the Chromebook.

Step 2. Turn over the Chromebook and remove the two screws **1**.

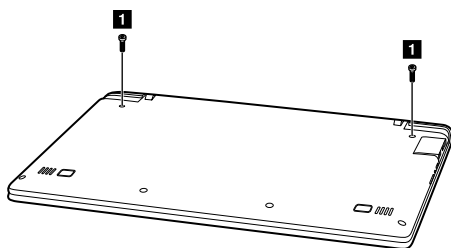


Figure 3. Remove 2 screws

- Step 3. Turn over the Chromebook again and then open the LCD cover.
- Step 4. Lift the keyboard by its upper edge **2** and then slowly lift it up **3** until the keyboard socket appears.

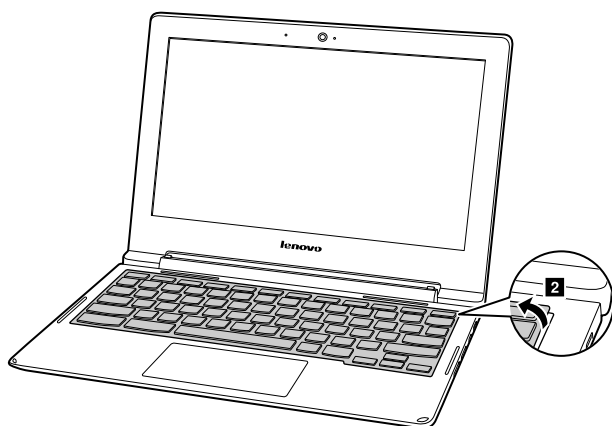


Figure 4. Lift up the keyboard by its upper edge

- Step 5. Unplug the battery pack connector **4**.
- Step 6. Open the keyboard socket **5**, pull out the keyboard cable **6**, and then remove the keyboard.

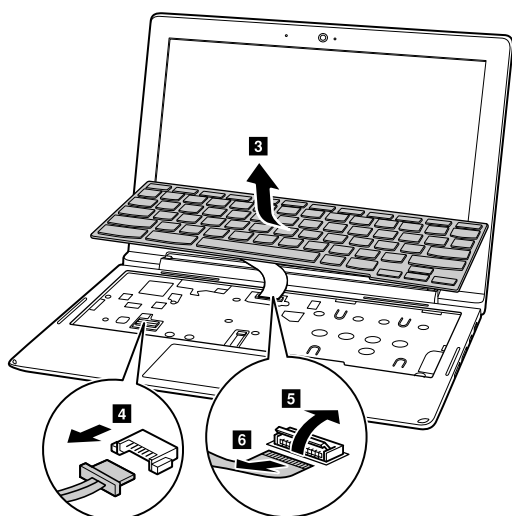


Figure 5. Lift up the keyboard until the keyboard socket appears

Table 5. Screw specifications — removing the keyboard

| Screw label | Specifications                       | Color | Torque             |
|-------------|--------------------------------------|-------|--------------------|
| <b>1</b>    | M2 × 3.5 mm, flat-head, nylon-coated | Black | 3.7 – 4.0 kgf * cm |

Refer to Table 3 “Part numbers for FRUs (CRUs)” on page 24 to look up the Lenovo part numbers of replacement keyboards.

**Note:** Replacement keyboards are available in different languages and colors. Check the color and language type of the keyboard to be replaced and order an equivalent one.

---

## Remove the upper case

Make sure the following FRUs (CRUs) have been removed:

“Remove the keyboard” on page 29

Step 1. Pry the two rubbers out of their recesses.

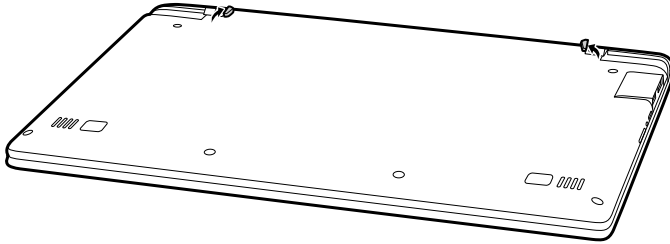


Figure 6. Pry rubbers out of recesses

**Note:** The rubbers are connected to the Chromebook through rubber pins and cannot be completely detached.

Step 2. Remove the two screws **1** under the rubbers.

Step 3. Remove the four screws **2**.

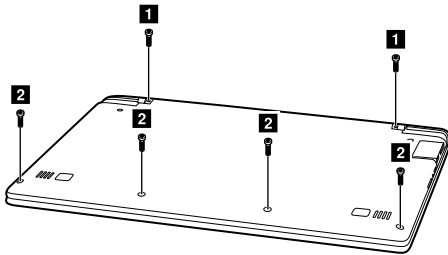


Figure 7. Remove 6 screws

Step 4. Turn over the Chromebook and open the LCD cover.

Step 5. Open the touch pad socket **3** and pull out the cable **4**.

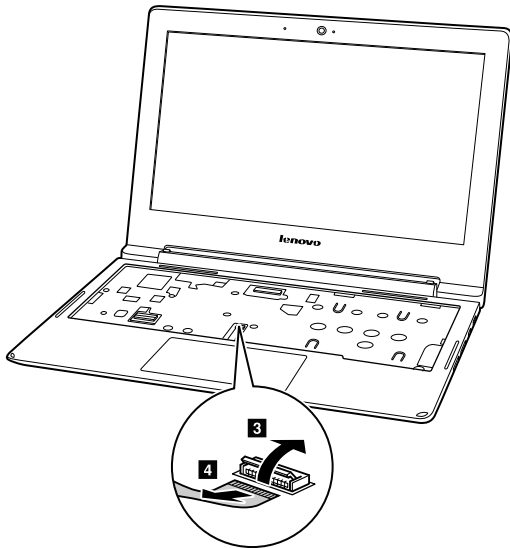


Figure 8. Unplug touch pad cable

- Step 6. Remove the 9 screws **5**; use a scrap credit card or a similar plastic card to slide through the grooves between the upper case and the base cover to detach the upper case and then remove it.

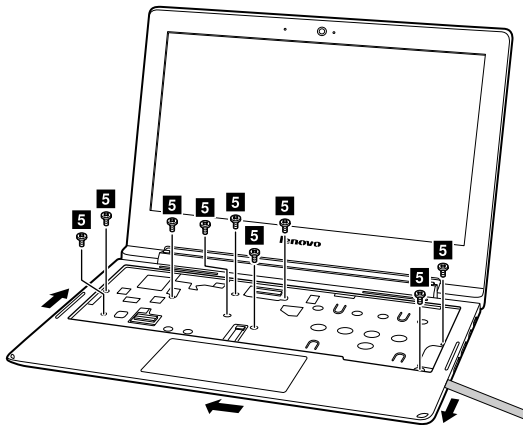


Figure 9. Remove 9 screws

Table 6. Screw specifications — removing the upper case

| Screw label | Specifications                       | Color | Torque             |
|-------------|--------------------------------------|-------|--------------------|
| <b>1</b>    | M2.5 × 5 mm, flat-head, nylon-coated | Black | 3.7 — 4.0 kgf * cm |
| <b>2</b>    | M2 × 3.5 mm, flat-head, nylon-coated | Black | 3.7 — 4.0 kgf * cm |
| <b>5</b>    | M2 × 3.5 mm, flat-head, nylon-coated | Black | 1.7 — 2.0 kgf * cm |

Refer to Table 3 “Part numbers for FRUs (CRUs)” on page 24 to look up the Lenovo part numbers of the following replacement parts:

Upper case

Touch pad cable

## Remove the WLAN & Bluetooth combo module

Make sure the following FRUs (CRUs) have been removed:

“Remove the keyboard” on page 29

“Remove the upper case” on page 31

Step 1. Disconnect the white and black cables from the WLAN & Bluetooth combo module **1**.

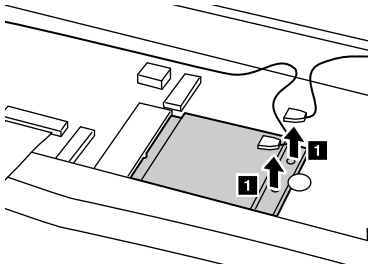


Figure 10. Disconnect antenna cables

Step 2. Remove the screw **2**.

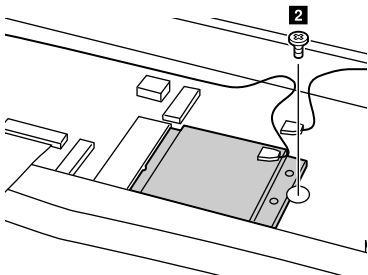


Figure 11. Remove 1 screw

Step 3. Pull out the WLAN & Bluetooth combo module in the direction shown by the arrow **3**.

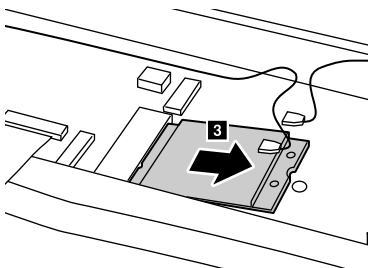


Figure 12. Pull out the WLAN & Bluetooth combo module

Table 7. Screw specifications — removing the WLAN & Bluetooth combo module

| Screw label | Specifications                     | Color | Torque             |
|-------------|------------------------------------|-------|--------------------|
| <b>2</b>    | M2 × 2 mm, flat-head, nylon-coated | Black | 1.7 – 2.0 kgf * cm |

Refer to Table 3 “Part numbers for FRUs (CRUs)” on page 24 to look up the Lenovo part numbers of replacement WLAN & Bluetooth combo modules.

---

## Remove the LCD module

Make sure the following FRUs (CRUs) have been removed:

“Remove the keyboard” on page 29

“Remove the upper case” on page 31

“Remove the WLAN & Bluetooth combo module” on page 33

Step 1. Unplug the LCD cable **1** and the camera cable **2**.

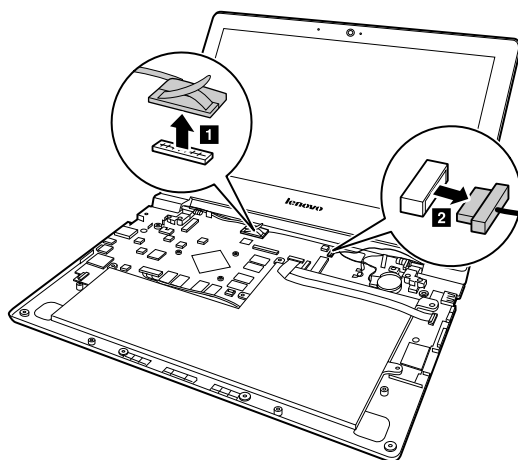


Figure 13. Unplug the LCD and camera cables

Step 2. Release the antenna, LCD, and camera cables out of cable guides.

Step 3. Remove the five screws **3** that fix the LCD module to the base cover.

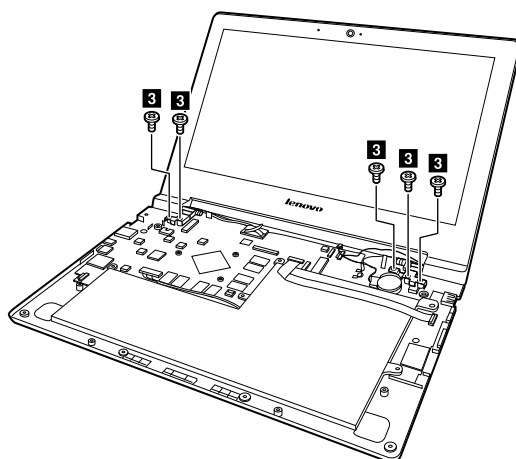


Figure 14. Remove 5 screws

Step 4. Lift up the LCD module to detach it from the base cover **4**.



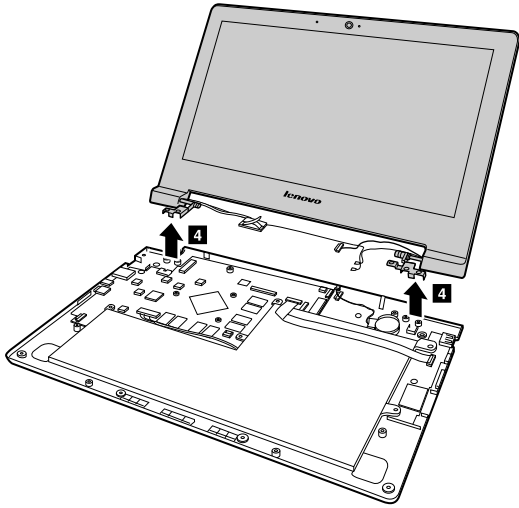


Figure 15. Lift up the LCD module

Table 8. Screw specifications — removing the LCD module

| Screw label | Specifications                       | Color | Torque             |
|-------------|--------------------------------------|-------|--------------------|
| <b>3</b>    | M2.5 × 4 mm, flat-head, nylon-coated | Black | 3.7 – 4.0 kgf * cm |

The LCD module is not a FRU. It contains FRUs as its components. Refer to “Disassemble the LCD module” on page 40 if you need to replace a FRU contained in the LCD module.

## Remove the dc-in connector

Make sure the following FRUs (CRUs) have been removed:

“Remove the keyboard” on page 29

“Remove the upper case” on page 31

Step 1. Pull out the plug of the dc-in cable out of the socket **1**.

### CAUTION:

Hold the plug to pull it out of the socket. Do *not* pull the cable.

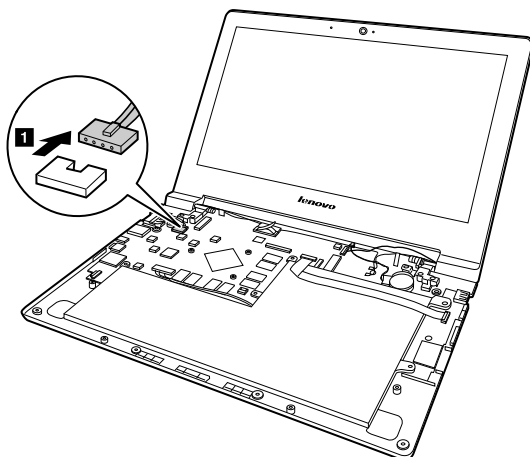


Figure 16. Unplug the dc-in cable

Step 2. Remove the two screws **2** and then remove the metal bracket **3** that fastens the dc-in connector.

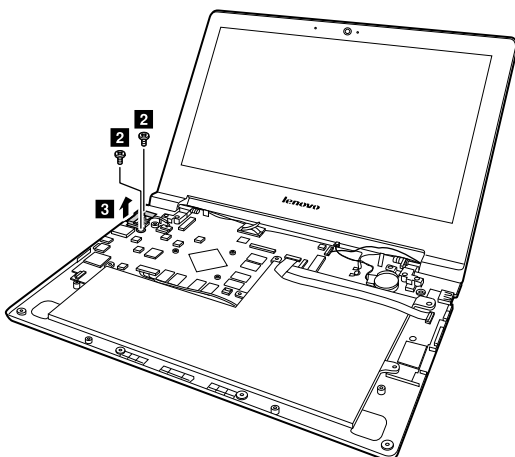


Figure 17. Remove 2 screws

Step 3. Remove the dc-in connector **4**.

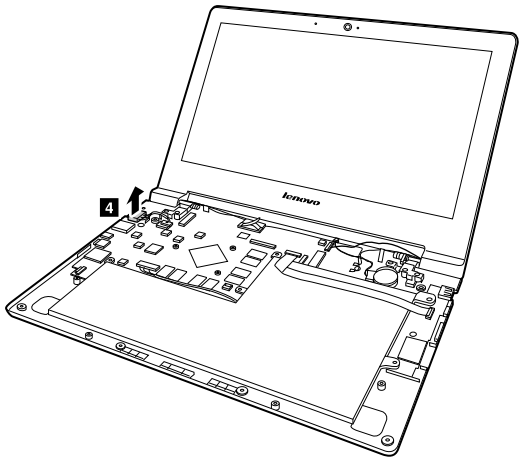


Figure 18. Remove the dc-in connector

Table 9. Screw specifications — removing the dc-in connector

| Screw label | Specifications                     | Color   | Torque             |
|-------------|------------------------------------|---------|--------------------|
| <b>2</b>    | M2 × 3 mm, flat-head, nylon-coated | Silvery | 1.7 — 2.0 kgf * cm |

Refer to Table 3 “Part numbers for FRUs (CRUs)” on page 24 to look up the Lenovo part numbers of the following replacement parts:

- dc-in bracket
- dc-in connector

## Remove the battery pack

- “Remove the keyboard” on page 29
- “Remove the upper case” on page 31

Step 1. Open the two sockets **1** and then remove the cable **2** that connects the I/O board to the system board.

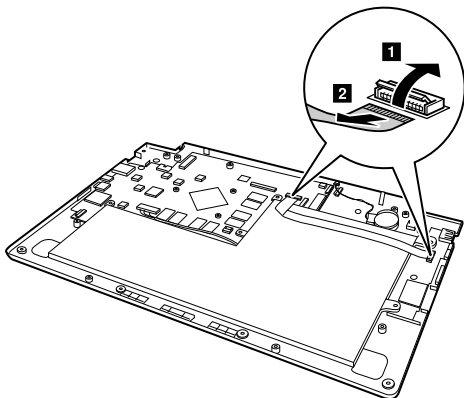


Figure 19. Remove the I/O board cable

Step 2. If the plug of the battery pack has not been disconnected, disconnect it **3**.

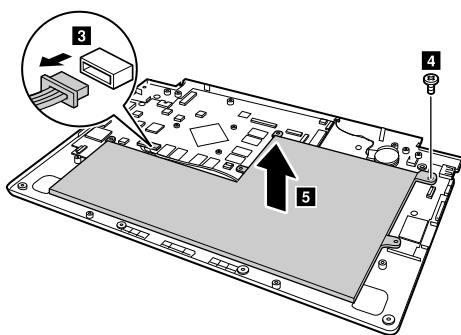


Figure 20. Remove the battery pack

Step 3. Remove the screw **4** and then remove the battery pack **5**.

Table 10. Screw specifications — removing the battery pack

| Screw label | Specifications                     | Color   | Torque             |
|-------------|------------------------------------|---------|--------------------|
| <b>4</b>    | M2 × 3 mm, flat-head, nylon-coated | silvery | 1.7 — 2.0 kgf * cm |

Refer to Table 3 “Part numbers for FRUs (CRUs)” on page 24 to look up the Lenovo part numbers of the following replacement parts:

Battery pack

I/O board cable

## Remove the speakers

Make sure the following FRUs (CRUs) have been removed:

“Remove the keyboard” on page 29

“Remove the upper case” on page 31

“Remove the battery pack” on page 37

Step 1. Unplug the speakers’ cable from system board **1**.

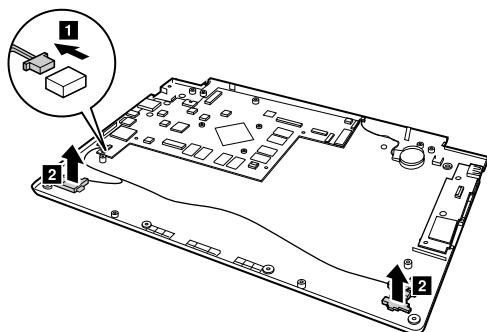


Figure 21. Remove the speakers

Step 2. Hold the speakers with two hands to remove them **2**.

Refer to Table 3 “Part numbers for FRUs (CRUs)” on page 24 to look up the Lenovo part numbers of replacement speakers.

---

## Remove the system board and the I/O board

Make sure the following FRUs (CRUs) have been removed:

- “Remove the keyboard” on page 29
- “Remove the upper case” on page 31
- “Remove the WLAN & Bluetooth combo module” on page 33
- “Remove the LCD module” on page 34
- “Remove the dc-in connector” on page 35
- “Remove the battery pack” on page 37
- “Remove the speakers” on page 38

Step 1. Unplug the coin-cell battery from the system board **1**.

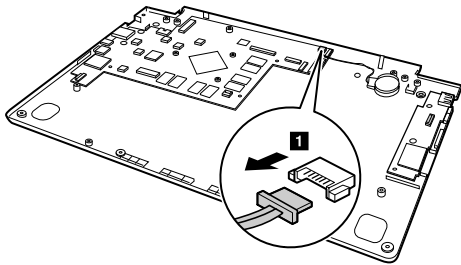


Figure 22. Unplug the coin-cell battery

Step 2. Remove the system board **2** and the I/O board **3**.

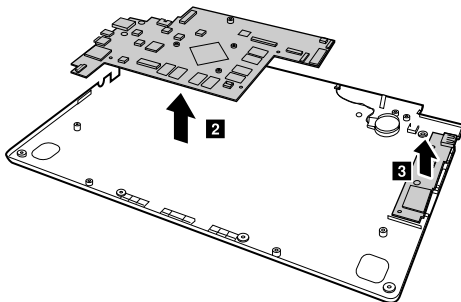


Figure 23. Remove the system board and the I/O board

Refer to Table 3 “Part numbers for FRUs (CRUs)” on page 24 to look up the Lenovo part numbers of the following replacement parts:

- System board
- I/O board
- Base cover (with coin-cell battery)

---

## Disassemble the LCD module

The LCD module as a whole is not a FRU. It contains FRUs as its components. Before disassembling the LCD module, make sure it has been detached from the base cover. Refer to “Remove the LCD module” on page 34 for instructions.

### Remove the LCD bezel

Step 1. Pry and then remove the two hinge covers **1**.

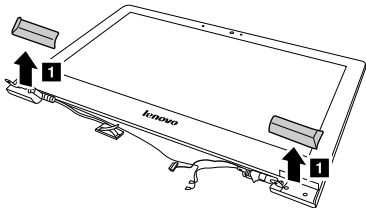


Figure 24. Pry and remove two hinge covers

Step 2. Remove the four screws **2**.

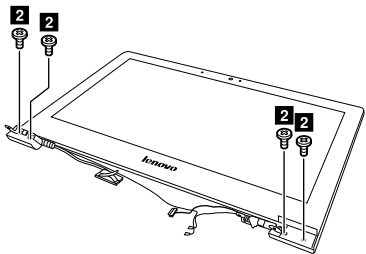


Figure 25. Remove 4 screws

Step 3. Insert the tips of your finger nails between one inner side of the LCD bezel and the LCD panel and then carefully pull the LCD bezel outwards. Repeat this action along the inner edges of the LCD bezel until all hooks that secure the LCD bezel are detached.

Step 4. Remove the LCD bezel **3**.

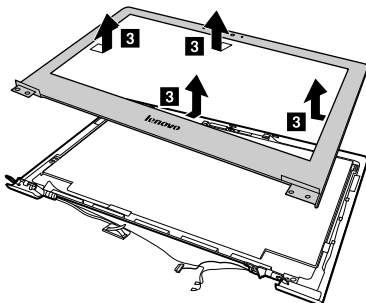


Figure 26. Remove the LCD bezel

Table 11. Screw specifications — removing the LCD bezel

| Screw label | Specifications                       | Color   | Torque             |
|-------------|--------------------------------------|---------|--------------------|
| <b>2</b>    | M2.5 × 5 mm, flat-head, nylon-coated | Silvery | 3.7 — 4.0 kgf * cm |

Refer to Table 4 “Part numbers for LCD FRUs” on page 26 to look up the Lenovo part numbers of the following replacement parts:

Hinge covers

LCD bezel

## Remove the LCD panel

Make sure the following FRUs (CRUs) have been removed:

“Remove the LCD bezel” on page 40

Step 1. Remove the four screws **1**; with the bottom edge as an axis, lift up the top edge of the LCD panel **2**.

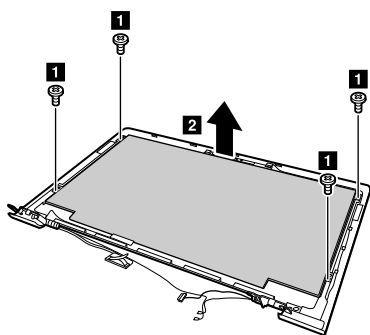


Figure 27. Remove 4 screws and lift up the LCD panel

Step 2. Check the back side of the LCD panel for the LCD connector and then unplug the LCD cable **3**.

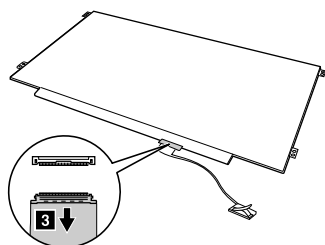


Figure 28. Disconnect the LCD cable from the back of the LCD panel

Step 3. Remove the LCD panel.

Table 12. Screw specifications — removing the LCD panel

| Screw label | Specifications                     | Color   | Torque             |
|-------------|------------------------------------|---------|--------------------|
| <b>1</b>    | M2 × 3 mm, flat-head, nylon-coated | Silvery | 1.7 — 2.0 kgf * cm |

Refer to Table 4 “Part numbers for LCD FRUs” on page 26 to look up the Lenovo part numbers of the following replacement parts:

LCD panel

LCD cable

## Remove the hinges, the LCD cable, and the WLAN antennas

Make sure the following FRUs (CRUs) have been removed:

“Remove the LCD bezel” on page 40

“Remove the LCD panel” on page 41

Step 1. Remove the two screws **1** and then remove the left and right hinges **2**.

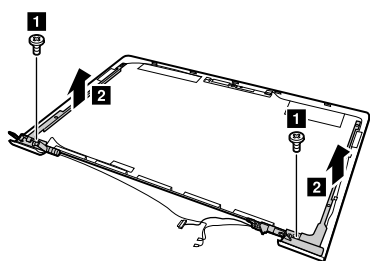


Figure 29. Remove the hinges

Step 2. Release the LCD cable out of cable guides.

Step 3. Release the antenna cables out of the cable guides; peel the left and right antennas off the LCD base cover and then remove the antennas **3**.

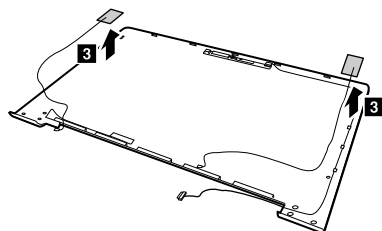


Figure 30. Remove WLAN antennas

Table 13. Screw specifications — removing the hinges and the WLAN antennas

| Screw label | Specifications                         | Color  | Torque             |
|-------------|----------------------------------------|--------|--------------------|
| <b>1</b>    | M2.5 × 3.5 mm, flat-head, nylon-coated | Silver | 3.7 — 4.0 kgf * cm |

Refer to Table 4 “Part numbers for LCD FRUs” on page 26 to look up the Lenovo part numbers of the following replacement parts:

Hinges (left and right)

LCD cable

Antennas (left and right)



## Remove the camera board and the camera cable

Make sure the following FRUs (CRUs) have been removed:

“Remove the LCD bezel” on page 40

“Remove the LCD panel” on page 41

“Remove the hinges, the LCD cable, and the WLAN antennas” on page 42

Step 1. Unplug the camera cable **1**.

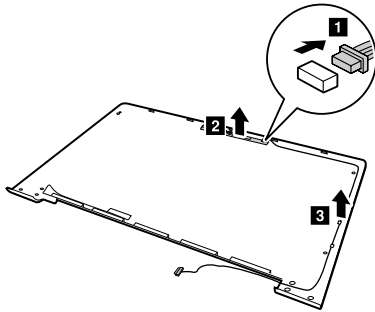


Figure 31. Remove the camera board and the camera cable

Step 2. Remove the camera board **2**.

Step 3. Release the camera cable out of cable guides and then remove it.

Refer to Table 4 “Part numbers for LCD FRUs” on page 26 to look up the Lenovo part numbers of the following replacement parts:

Camera board

Camera cable

LCD base cover



## Appendix A. Features, controls, and connectors

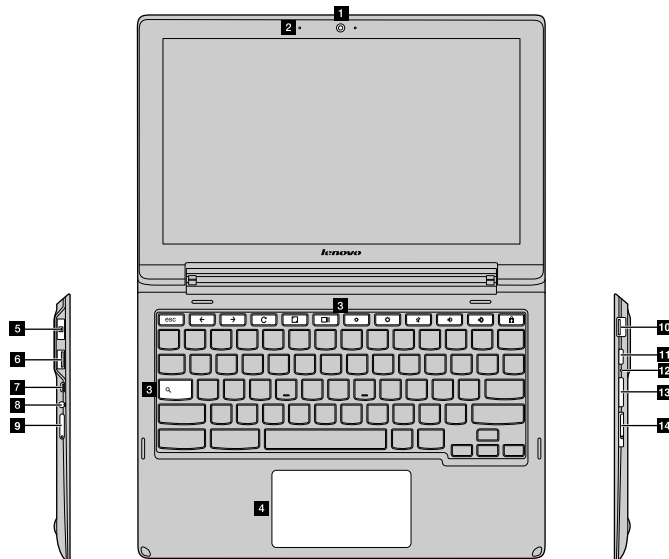


Figure 32. N20 Chromebook features and connectors

Table 14. N20 Chromebook features and connectors

| No. | Feature or connector             |
|-----|----------------------------------|
| 1   | Integrated camera                |
| 2   | Microphone hole                  |
| 3   | Shortcut keys                    |
| 4   | Touch pad                        |
| 5   | dc-in connector                  |
| 6   | USB 3.0 connector                |
| 7   | HDMI (Type D) connector          |
| 8   | Combo audio jack                 |
| 9   | SIM card slot (on select models) |
| 10  | USB 2.0 connector                |
| 11  | Power button                     |
| 12  | Battery status indicator         |
| 13  | Memory card (SD/MMC) slot        |



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## Appendix B. Lenovo part numbers of screws used on N20 Chromebook

Table 15. Part numbers of N20 screws

| Screw description               | Part number |
|---------------------------------|-------------|
| SCREW N20 M M2 2.0D 2L K 7D     | 5S10G15012  |
| SCREW N20 M M 1.98D 3.0L K 4.6D | 5S10G15015  |
| SCREW N20 M2D 3L K 4.5D ZK      | 5S10G15036  |
| SCREW N20 M2.5D 3.5L K 5.3D     | 5S10G15023  |
| SCREW N20 M M 2D 5L K 4.6D      | 5S10G15005  |
| SCREW N20 M2.5D 5.0L K 4.6D     | 5S10G15034  |
| SCREW N20 M M 3.0D 3.0L K 4.9D  | 5S10G15016  |



## Appendix C. Lenovo part numbers of ac adapters and power cords

Table 16. Part numbers for FRUs (CRUs)

| CRU category     | Parts description                      | Lenovo part number |
|------------------|----------------------------------------|--------------------|
| ac power adapter |                                        |                    |
|                  | Delta ADLX45NDC3A 20V2.25A adap(CMN)   | 36200602           |
|                  | Liteon ADLX45NLC3A 20V2.25A adap(CMN)  | 36200606           |
|                  | Chicony ADLX45NCC3A 20V2.25A adap(CMN) | 36200610           |
| Power cord       |                                        |                    |
|                  | LINETEK LP-61L+ H03VV-F+ LS15          | 145000593          |
|                  | Longwell LP-61L+H03VV-F+LS-18          | 145000561          |
|                  | VOLEX MP5004+H03VV-F+VAC5S             | 145000605          |
|                  | lux 0031+H03VV-F 0.75/3C+0011          | 145500000          |
|                  | LINETEK LP-34+H03VV-F + LS15           | 145000585          |
|                  | Longwell LP-34A+H03VV-F+LS-18          | 145000553          |
|                  | VOLEX M2511+H03VV-F+VAC5S              | 145000525          |
|                  | lux 0033+H03VV-F 0.75/3C+0011          | 145500001          |
|                  | LINETEK LP-30B + SPT-2 + LS15          | 145000594          |
|                  | Longwell LP-30B+SPT-2 18AWG+LS-18      | 145000562          |
|                  | Volex US15S3+SPT-2 + VAC5S             | 145000537          |
|                  | lux 0014+SPT-2 60°C 18/3C+0016         | 145500002          |
|                  | LINETEK PC323+RVV300/300+LS15          | 145000600          |
|                  | Longwell LSG-31+RVV300/300+LS-18       | 145000568          |
|                  | VOLEX GB10S3+RVV 300/500+VAC5S         | 145000538          |
|                  | lux 0036+RVV 300/300 0.75/3C+0002      | 145500003          |
|                  | LINETEK PE-361+ H05VV-F+ LS15          | 145000592          |
|                  | Longwell LP-67+BIS+LS-18               | 145000560          |
|                  | lux 0046+IS694 0.75/3C+0011            | 145500004          |
|                  | LINETEK LS15+VCTF+LP-54                | 145000587          |
|                  | Longwell LP-54+VCTF+LS-18              | 145000555          |
|                  | VOLEX VAC5S+VCTF+M755                  | 145000530          |
|                  | lux 0018(E)+VCTF 0.75/3C+0021          | 145500005          |
|                  | LINETEK LS15+H03VV-F+LP-23A            | 145000589          |
|                  | Longwell LP-23A+LFC-3R+LS-18           | 145000557          |
|                  | VOLEX AU10S3+H03VV-F+VAC5S             | 145000532          |
|                  | lux 0038+H03VV-F 0.75/3C+0011          | 145500006          |
|                  | LINETEK LS15+VCTF+LP-53                | 145000588          |

Table 16. Part numbers for FRUs (CRUs) (continued)

|  |                                 |           |
|--|---------------------------------|-----------|
|  | Longwell LP-71+VCTF+LS-33       | 145000556 |
|  | VOLEX TW15CS3+VCTF+VAC5S        | 145000531 |
|  | lux 0019+VCTF 0.75/3C+0021      | 145500007 |
|  | LINETEK LS15+H05VV-F+LP-E04A    | 145000590 |
|  | Longwell LP-486+KTLH03VV-F+LS-5 | 145000558 |
|  | VOLEX M2511+KETI IEC+VAC5S      | 145000533 |
|  | lux 0033+H03VV-F 0.75/3C+0011   | 145500008 |
|  | LINETEK LS15+H03VV-F+PE-336     | 145000591 |
|  | Longwell LP-22+H03VV-F+LS-18    | 145000559 |
|  | VOLEX IT10S3+H03VV-F+VAC5S      | 145000535 |
|  | lux 0029+H03VV-F 0.75/3C+0011   | 145500009 |
|  | LINETEK LS15+H03VV-F+PE-364     | 145000586 |
|  | Longwell LP-39+H03VV-F+LS-18    | 145000554 |
|  | lux 0044+H03VV-F 0.75/3C+0011   | 145500010 |
|  | LINETEK LS15 H03VV-F LP26A      | 145000596 |
|  | Longwell LP-46+H03VV-F+LS-18    | 145000564 |
|  | VOLEX CH10S3+H03VV-F+VAC5S      | 145000527 |
|  | lux 0034+H03VV-F 0.75/3C+0011   | 145500011 |
|  | LINETEK LS15+H03VV-F+LP-41      | 145000595 |
|  | Longwell LP-41+H03VV-F+LS-18    | 145000563 |
|  | VOLEX SI16S3+H03VV-F+VAC5S      | 145000526 |
|  | lux 0041+H03VV-F 0.75/3C+0011   | 145500012 |
|  | LINETEK LS15+H03VV-F+LP-37      | 145000597 |
|  | Longwell LP-37+H03VV-F+LS-18    | 145000565 |
|  | VOLEX MP232+H03VV-F+VAC5S       | 145000524 |
|  | lux 0027+H03VV-F 0.75/3C+0011   | 145500013 |
|  | LINETEK LS15+H03VV-F+LP-38      | 145000598 |
|  | Longwell LP-40+H03VV-F+LS-18    | 145000566 |
|  | VOLEX MP233D+H03VV-F+VAC5S      | 145000534 |
|  | lux 0048+H03VV-F 0.75/3C+0011   | 145500014 |
|  | LINETEK LS15+H03VV-F+LP39       | 145000599 |
|  | Longwell LP-24+H03VV-F+LS-18    | 145000567 |
|  | VOLEX VA2073+H03VV-F+VAC5S      | 145000528 |
|  | lux 0040+H03VV-F 0.75/3C+0011   | 145500015 |



## Appendix D. Label locations

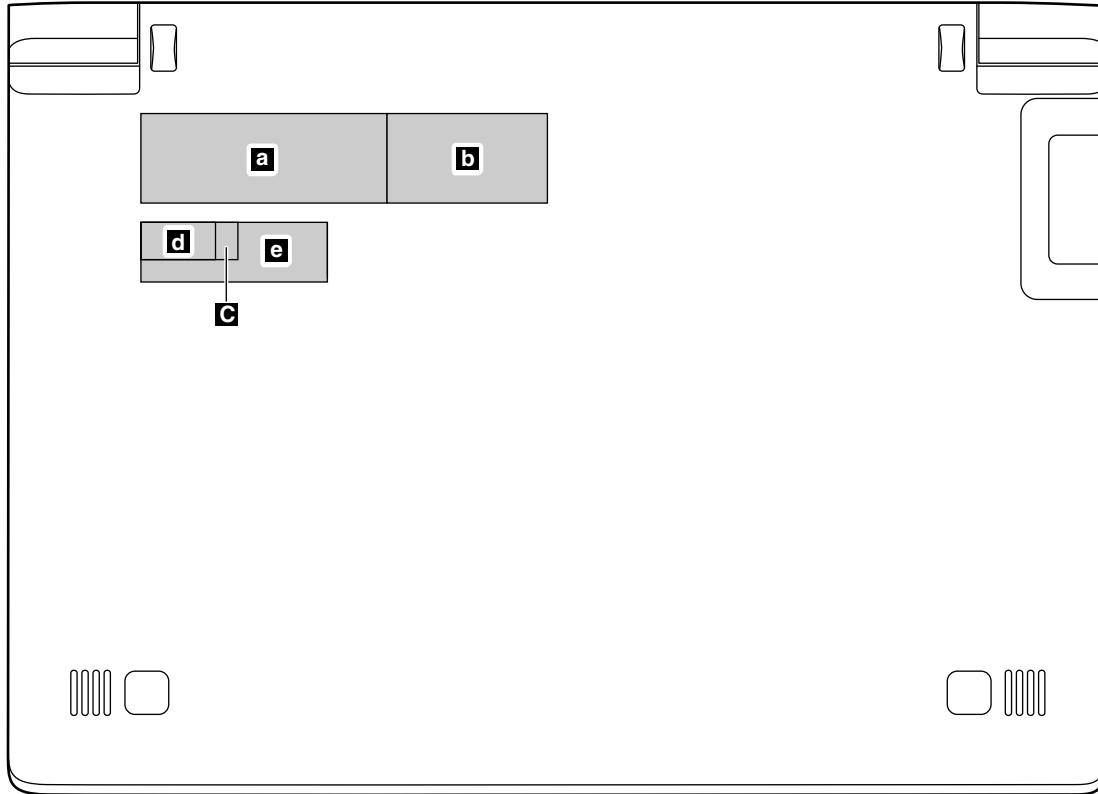


Figure 33. Label layout on the back side of the base cover

Table 17. All base cover labels

| Label    | Label description  | Country or region             | Dimensions | Part number |
|----------|--------------------|-------------------------------|------------|-------------|
| <b>a</b> | Rating label       | All                           | 66 x 24 mm | SL10F84398  |
| <b>b</b> | Print rating label | All                           | 43 x 24 mm | N/A         |
| <b>c</b> | WLAN label         |                               |            |             |
|          | US/CA/TW           | United States, Canada, Taiwan | 32 x 10 mm | 144502854   |
|          | Brazil             | Brazil                        | 35 x 15 mm | 144502856   |
|          | Israel             | Israel                        | 32 x 10 mm | 144502858   |
|          | Malaysia           | Malaysia                      | 15 x 15 mm | 144502860   |
|          | South Africa       | South Africa                  | 20 x 10 mm | 144502967   |
| <b>d</b> | Indonesia label    | Indonesia                     | 26 x 10 mm | 144503356   |
| <b>e</b> | KR KCC label       | Korea                         | 50 x 16 mm | N/A         |

**Note:** “N/A” means not applicable.



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