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TUF GAMING

+ TUF GAMING | LAPTOP +

SERVICE MANUAL

The ASUS logo is rendered in a bold, black, sans-serif font. The letter 'A' is stylized with a diagonal slash through it.

More info:



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Chapter 1: ***Introduction***

Disclaimer

ASUS is not responsible for direct, indirect, intentional or unintentional damages resulting from improper installation and operation.

Safety precautions

- Before handling components, use a grounded wrist strap or touch a safely grounded object to avoid damaging them due to static electricity.
- Keep liquids or moisture away from your device to avoid short circuits.
- Remove rings, watches, and any other metal objects from your hands.
- Hold components by the edges to avoid touching the ICs.
- Properly install all components before connecting the AC power.
- Do not use power adapters or batteries from other devices to reduce the risk of injury to persons due to fire or explosion. Use only certified power adapters or batteries supplied by the manufacturer or authorized retailers.
- Detach all clips or flaps before removing cables to prevent damage.

- Disconnect cables, connectors, and power plugs by pulling the plug evenly to avoid damage.
- Use the correct screw models on your device to prevent damage.
- Confirm that the cable orientation is correct before connecting any cables.
- Fully remove all adhesive residue after removing and before installing any components.
- Photograph the appearance of cables, cable routing, connectors, and screws for later reference before proceeding with each step.

Pre-repair checklist

- Read the entire manual before starting any service procedures and follow all instructions.
 - Back up the data on your device.
 - Place your device on a clean and stable surface.
 - Turn off your device.
 - Disconnect all connected peripherals and cables.
 - Disconnect all power cables and remove the battery pack (if applicable).
-

IMPORTANT!

- If you are uncertain about performing the described service procedures, stop and contact an authorized service center for assistance.
 - Purchase replacement components from authorized retailers of this device to ensure maximum compatibility and reliability.
-

NOTE:

- The illustrations are for reference only.
 - The service procedures described in this manual depend on the model configuration and may not reflect the entire servicing process. To service components that are not covered in this manual, please visit an authorized service center for further assistance.
 - Keep all adhesive tape, insulating materials, screws, and other removable items in a safe place until the service procedure is completed, as they may be needed during installation.
-

Repair tools



Screwdriver



Plastic blade



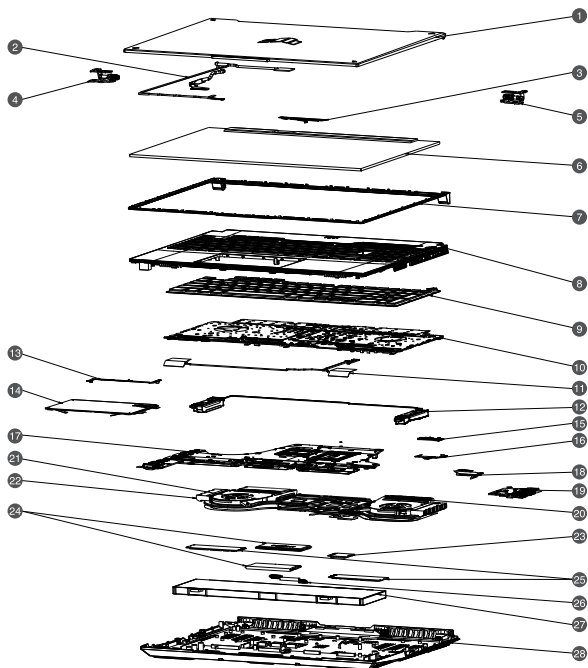
Tweezers

Diagnostic tools

Use ASUS System Diagnostics after completing any service procedures to ensure that all components are working properly.

For more information, visit www.asus.com/support/FAQ/1048490/.

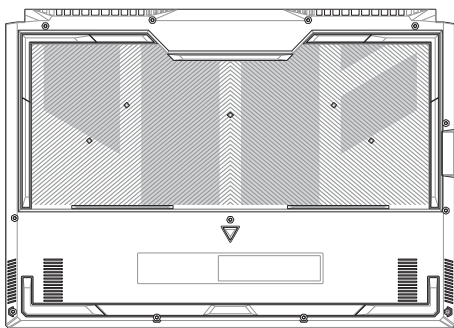
Major components



1. Top cover
2. eDP cable
3. Camera module
4. Display hinge (left)
5. Display hinge (right)
6. Display panel
7. Display bezel
8. Keyboard frame
9. Keyboard module
10. Keyboard shielding
11. Auxiliary antenna cable
12. Speakers
13. Touchpad cable
14. Touchpad
15. LED board
16. LED board cable
17. Motherboard
18. I/O board cable
19. I/O board
20. GPU fan module
21. APU fan module
22. Heat sink
23. WLAN module
24. RAM module
25. M.2 SSD module
26. Battery cable
27. Battery
28. Bottom cover

Chapter 2: ***Service Procedures***

Bottom cover



Before you begin

Read the **Safety Precautions** and complete the **Pre-repair Checklist**.

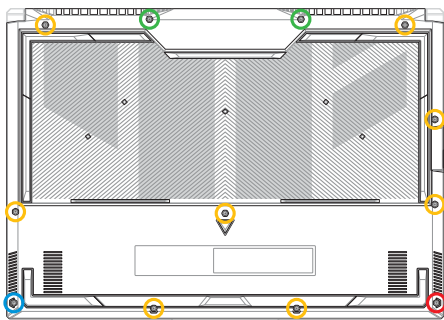
Screw list

- ⊕ M2.5 X 12.0L (2pcs)
- ⊕ M2.5 X 9.5L (8pcs)
- ⊕ M2.5 X 8.0L (1pc)
- ⊕ M2.5 X 8.0L (1pc Pop-open Screw)

Removal

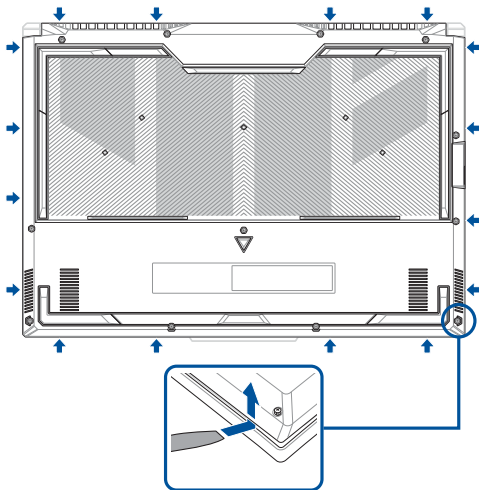
IMPORTANT! System power will be cut off automatically upon removal of the bottom cover. To restore power, reattach the bottom cover securely and connect the AC power adapter to your Notebook PC after the servicing is complete.

1. Remove the screw(s) from the bottom cover.
2. Loosen the Pop-open Screw without removing the screw from the cover.



3. Use the plastic blade to pry open the indicated area of the bottom cover as shown in the illustration below.
4. Remove the bottom cover.

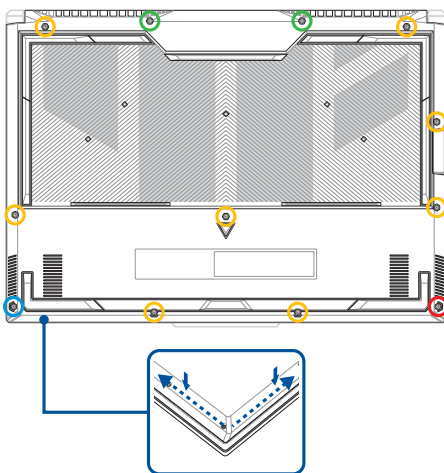
IMPORTANT! Avoid sliding the plastic blade along the side of your device or air vents to prevent damage.



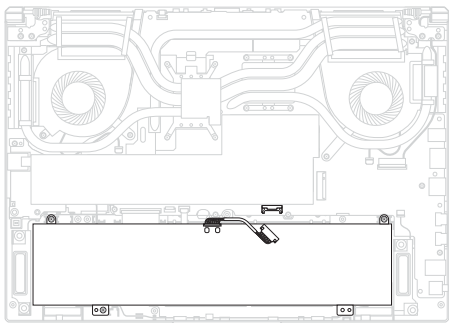
Installation

IMPORTANT! System power will be cut off automatically upon removal of the bottom cover. To restore power, reattach the bottom cover securely and connect the AC power adapter to your Notebook PC after the servicing is complete.

1. Install the bottom cover.
2. Gently press down on the bottom cover until it clicks into place.
3. Secure the bottom cover using the screw(s) you removed earlier.
4. Tighten the Pop-open Screw.



Battery



Before you begin

1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the bottom cover.

Screw list

56W battery model

- ⊕ M2.0 X 4.0L (3pcs)

90W battery model

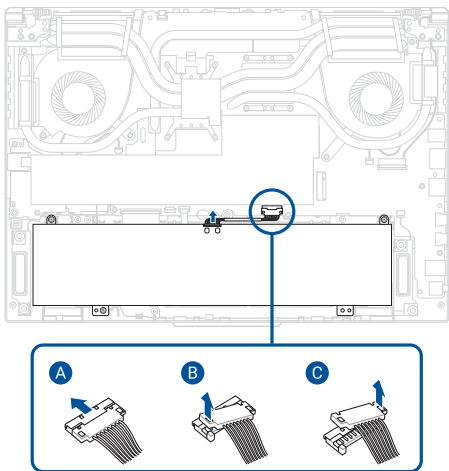
- ⊕ M2.0 X 4.0L (3pcs)

Removal

1. Disconnect the battery power cable from the battery and the motherboard, then remove the cable.

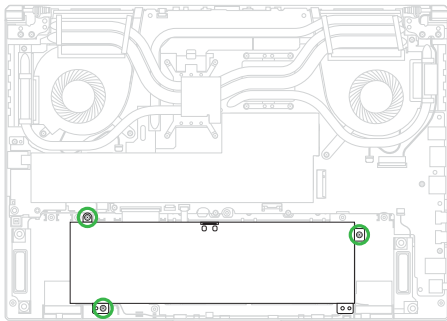
IMPORTANT!

- Disconnect the battery power cable by lifting the side with the red wires first.
 - Serious risk of fire or explosion may occur if the battery is punctured. If you are uncertain about proceeding, stop and contact an authorized service center for assistance.
-

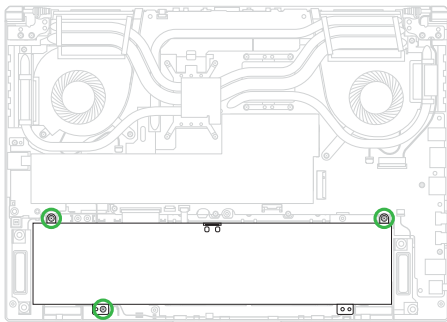


2. Remove the screw(s) from the battery.
3. Remove the battery.

56W battery model



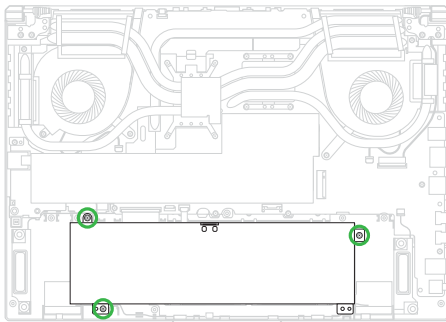
90W battery model



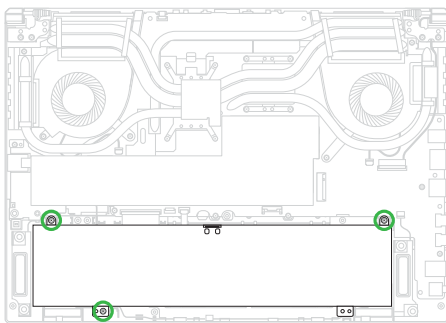
Installation

1. Install the battery.
2. Secure the battery using the screw(s) you removed earlier.

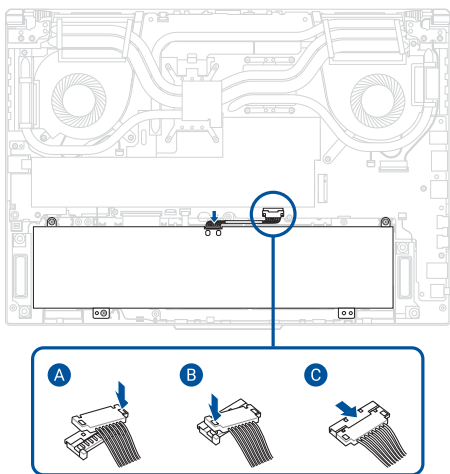
56W battery model



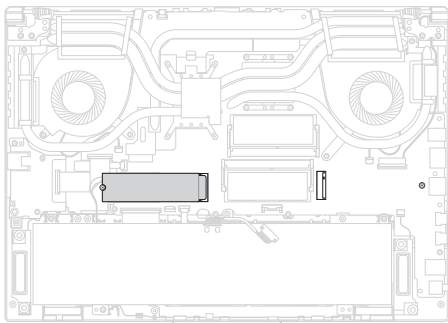
90W battery model



3. Reconnect the battery power cable to the battery and the motherboard .
4. Install the components you removed in the *Before you begin* section.



M.2 SSD module



Before you begin

IMPORTANT! Thermal paste, thermal pads, liquid metal, or other thermal interface materials must be thoroughly removed and replaced if this component is removed. Ensure that replacement materials are available before proceeding, or contact an authorized service center for assistance.

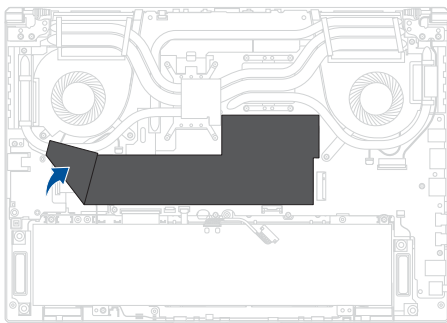
1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the bottom cover and disconnect the battery power cable.

Screw list

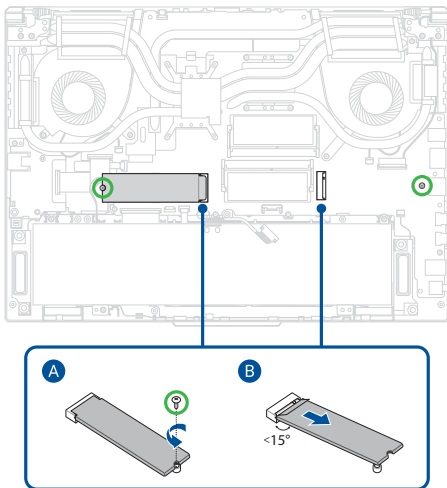
- ⊕ M2.0 X 3.0L (2pcs)

Removal

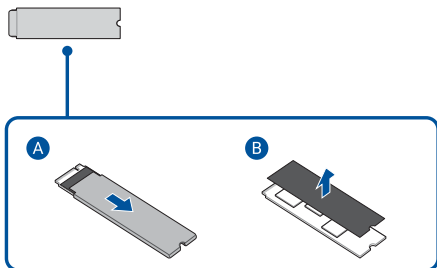
1. Remove the polyester film from the left side.



2. Remove the screw(s), then remove the M.2 SSD module(s) from the motherboard.

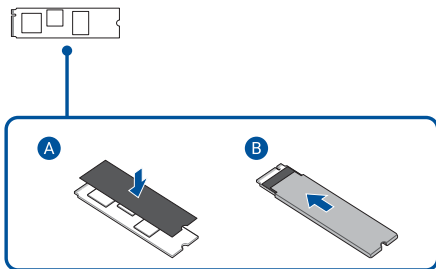


3. Remove the aluminum foil sleeve(s), then remove the absorber sheet(s) from the M.2 SSD module(s).

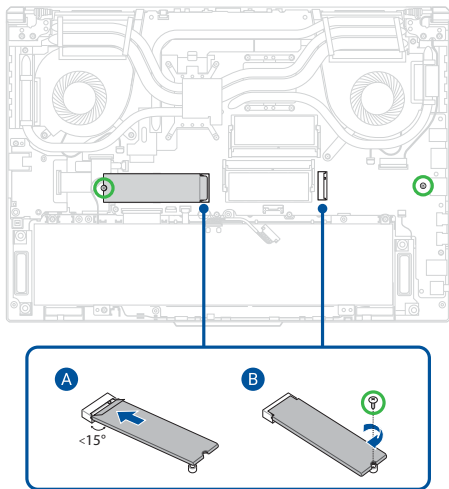


Installation

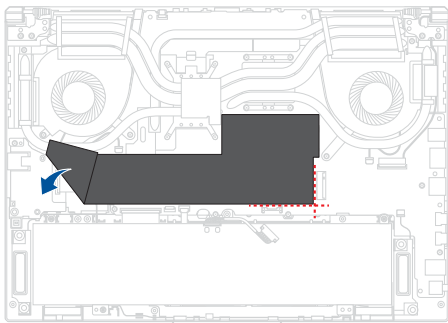
1. Reattach the absorber sheet(s) to the M.2 SSD module(s), then insert the M.2 SSD module(s) into the aluminum foil sleeve(s) as shown in the illustration below.



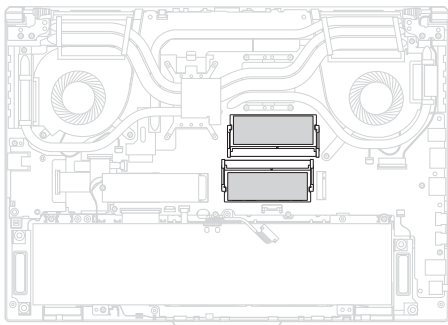
- Align and insert the M.2 SSD module(s) into the M.2 connector(s), and secure the M.2 SSD module(s) to the motherboard using the screw(s) you removed earlier.



3. Align and reattach the polyester film as shown in the illustration below.
4. Install the components you removed in the *Before you begin* section.



RAM module

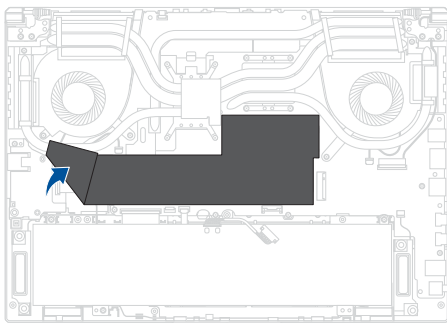


Before you begin

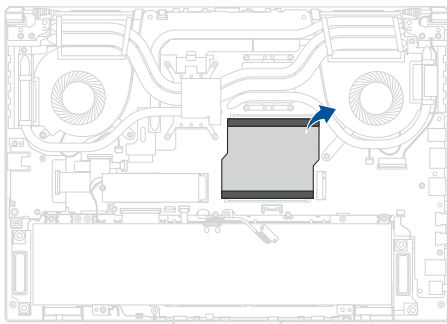
1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the bottom cover and disconnect the battery power cable.

Removal

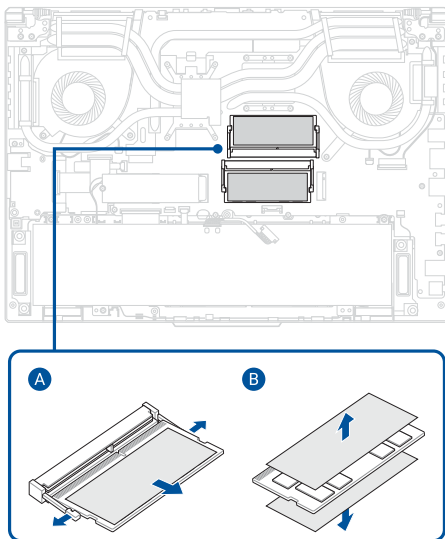
1. Remove the polyester film from the left side.



2. Remove the absorber sheet.

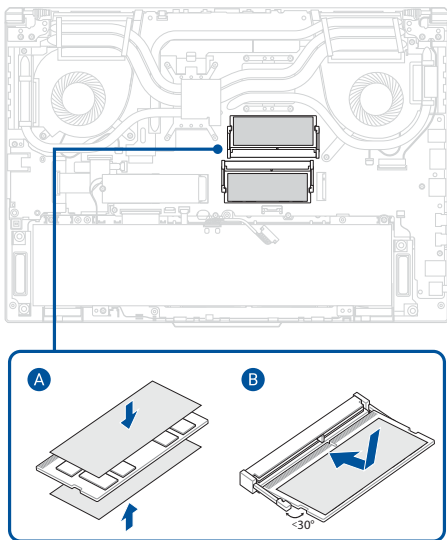


3. Push the clips outwards to remove the RAM module(s).
4. Remove the absorber sheet(s) from both sides of the RAM module(s).

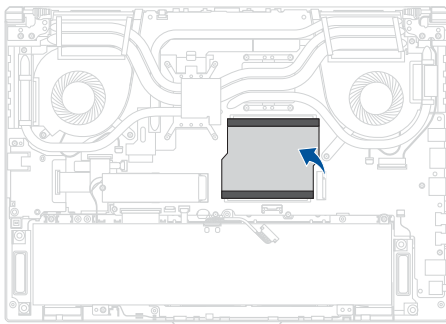


Installation

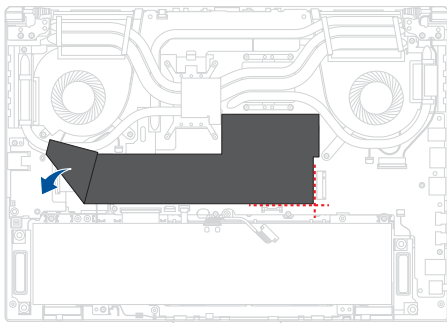
1. Reattach the absorber sheet(s) to both sides of the RAM module(s).
2. Align and insert the RAM module(s) into the RAM module slot(s).



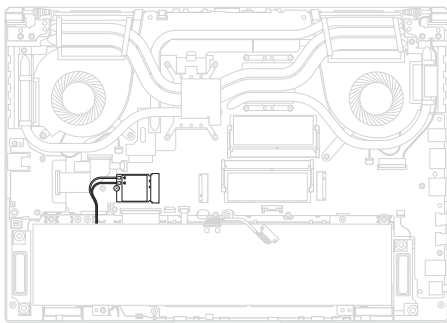
3. Reattach the absorber sheet.



4. Align and reattach the polyester film as shown in the illustration below.
5. Install the components you removed in the *Before you begin* section.



WLAN module



Before you begin

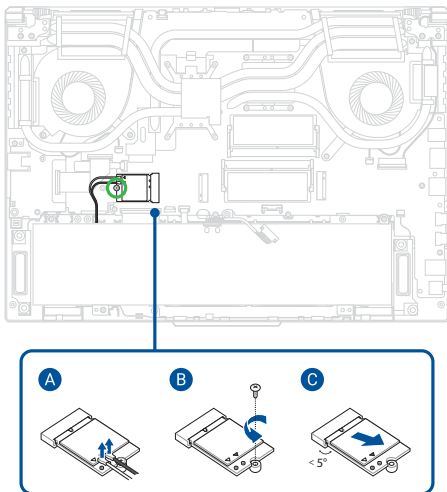
1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the bottom cover and disconnect the battery power cable.
3. Remove the following components:
 - M.2 SSD module

Screw list

- ⊕ M2.0 X 3.0L (1pc)

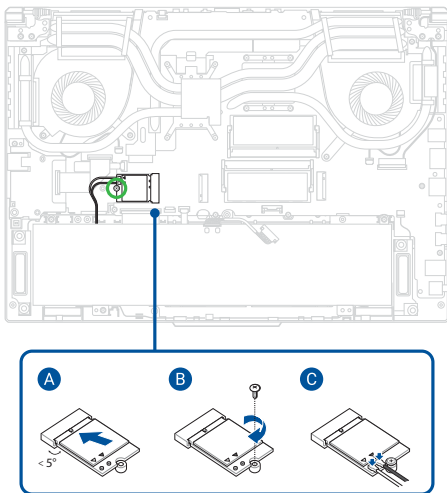
Removal

Disconnect the antenna cable(s), then remove the screw and remove the WLAN module.

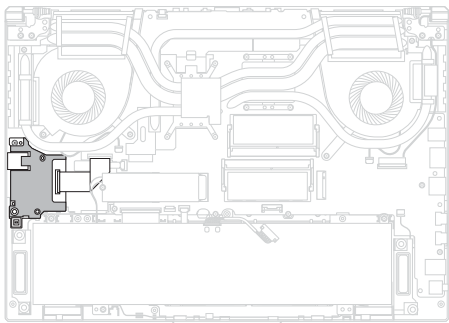


Installation

1. Install the WLAN module, then secure the WLAN module using the screw you removed earlier and reconnect the antenna cable(s).
2. Install the components you removed in the *Before you begin* section.



I/O board



Before you begin

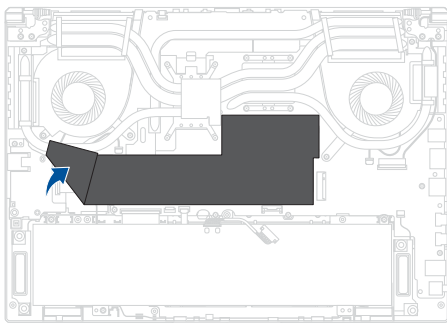
1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the bottom cover and disconnect the battery power cable.

Screw list

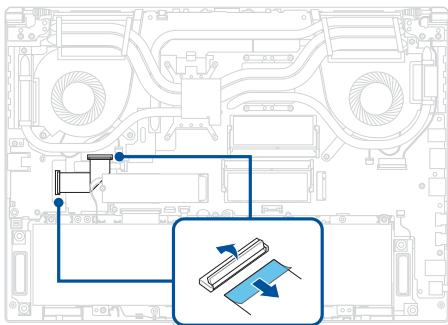
- ⊕ M2.0 X 3.0L (1pc)

Removal

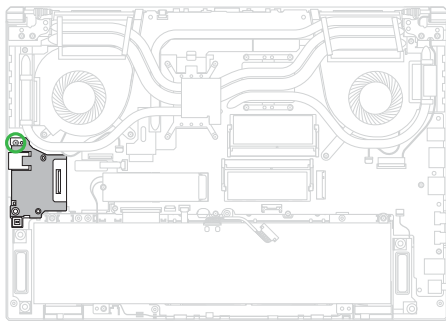
1. Remove the polyester film from the left side.



2. Disconnect the I/O board cable from the motherboard and the I/O board, then remove the cable.

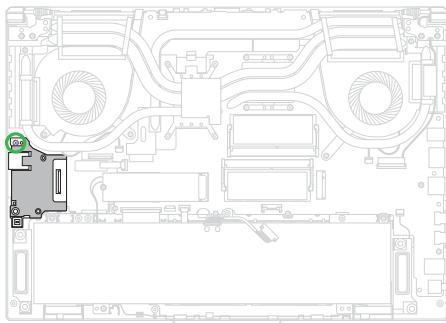


3. Remove the screw(s), then remove the I/O board.

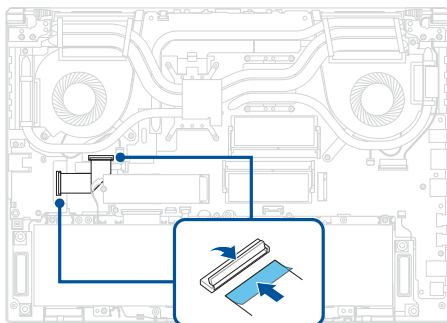


Installation

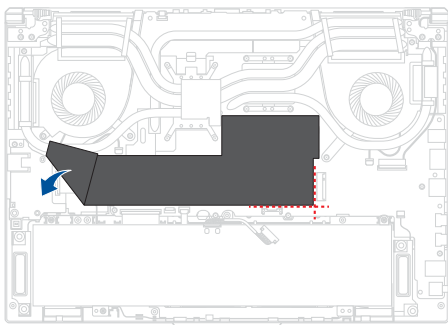
1. Install the I/O board, then secure the I/O board using the screw(s) you removed earlier.



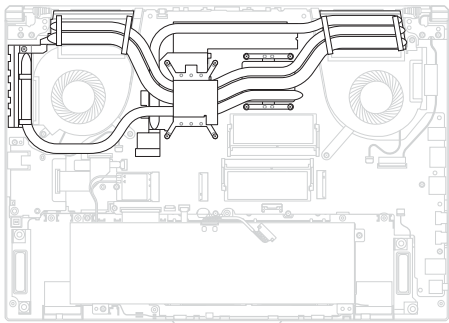
2. Reconnect the I/O board cable to the motherboard and the I/O board.



3. Align and reattach the polyester film as shown in the illustration below.
4. Install the components you removed in the *Before you begin* section.



Heat sink (56W battery model)



Before you begin

IMPORTANT! Thermal paste, thermal pads, liquid metal, or other thermal interface materials must be thoroughly removed and replaced if this component is removed. Ensure that replacement materials are available before proceeding, or contact an authorized service center for assistance.

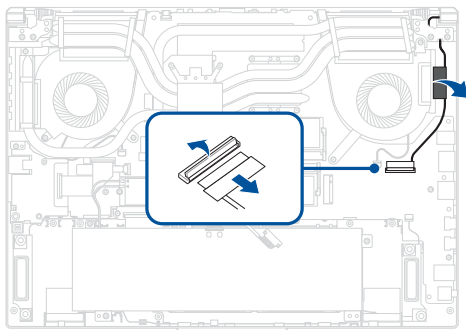
1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the bottom cover and disconnect the battery power cable.

Screw list

- ⊕ M2.0 X 4.0L (9pcs)

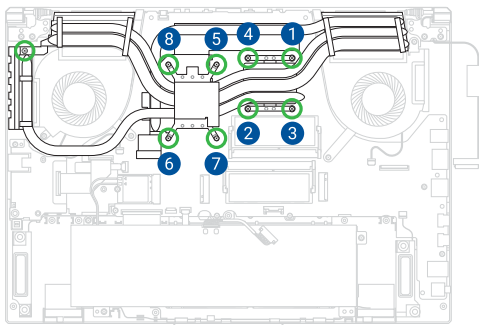
Removal

1. Disconnect the cable.
2. Remove the tape and release the cable.



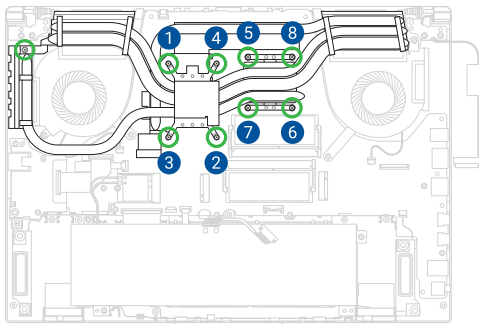
3. Remove the screw from the left end of the heat sink.
4. Remove the heat sink screw(s) one by one in the sequence shown in the illustration below, then remove the heat sink.

IMPORTANT! Vertically lift the heat sink using the middle part of the heat sink to prevent damage.

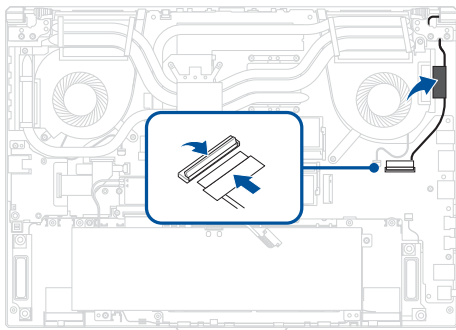


Installation

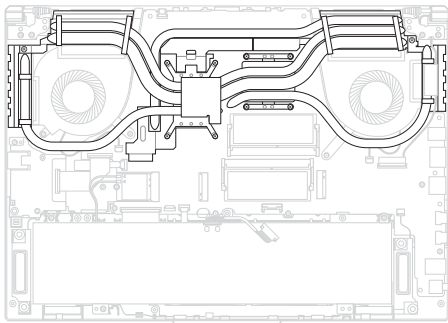
1. Align and install the heat sink, then secure the heat sink screw(s) one by one in the sequence shown in the illustration below.
2. Secure the screw to the left end of the heat sink.



3. Reconnect the cable.
4. Route the cable, then reattach the tape.
5. Install the components you removed in the *Before you begin* section.



Heat sink (90W battery model)



Before you begin

IMPORTANT! Thermal paste, thermal pads, liquid metal, or other thermal interface materials must be thoroughly removed and replaced if this component is removed. Ensure that replacement materials are available before proceeding, or contact an authorized service center for assistance.

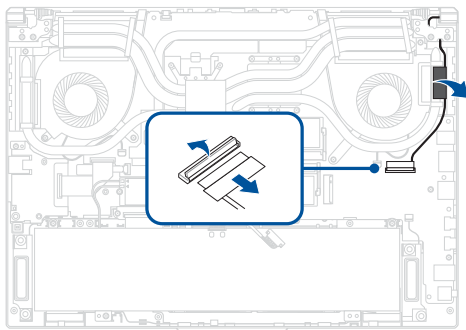
1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the bottom cover and disconnect the battery power cable.

Screw list

- ⊕ M2.0 X 4.0L (10pcs)

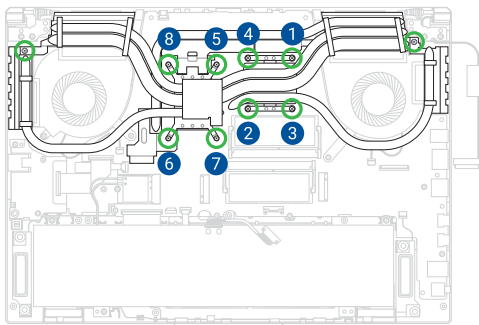
Removal

1. Disconnect the cable.
2. Remove the tape and release the cable.



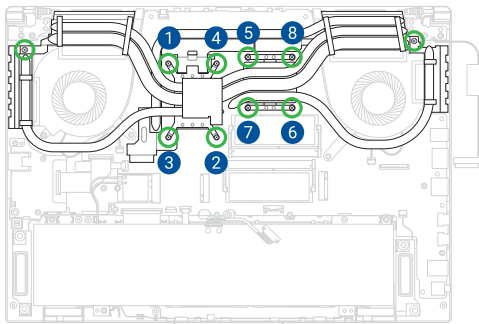
3. Remove the screw(s) from both ends of the heat sink.
4. Remove the heat sink screw(s) one by one in the sequence shown in the illustration below, then remove the heat sink.

IMPORTANT! Vertically lift the heat sink using the middle part of the heat sink to prevent damage.

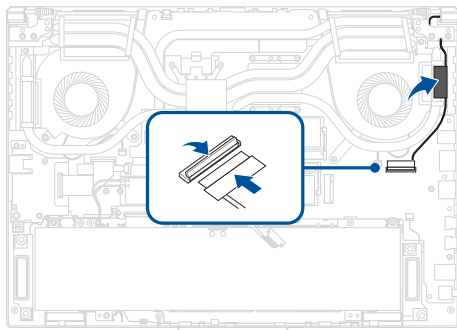


Installation

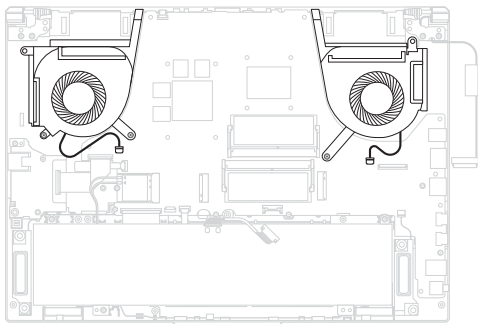
1. Align and install the heat sink, then secure the heat sink screw(s) one by one in the sequence shown in the illustration below.
2. Secure the screw(s) to both ends of the heat sink.



3. Reconnect the cable.
4. Route the cable, then reattach the tape.
5. Install the components you removed in the *Before you begin* section.



Fan module (APU fan and GPU fan)



Before you begin

1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the bottom cover and disconnect the battery power cable.
3. Remove the following components:
 - Heat sink

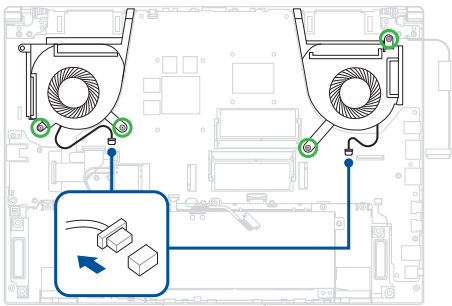
Screw list

- ⊕ M2.0 X 4.0L (3 or 4pcs)

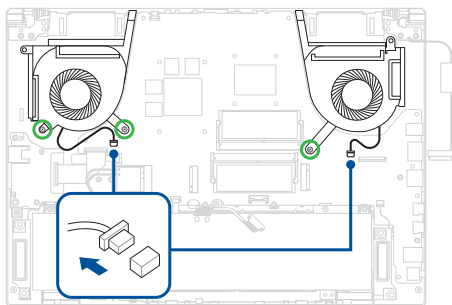
Removal

1. Disconnect the fan connector(s).
2. Remove the screw(s).
3. Remove the fan(s).

56W battery model



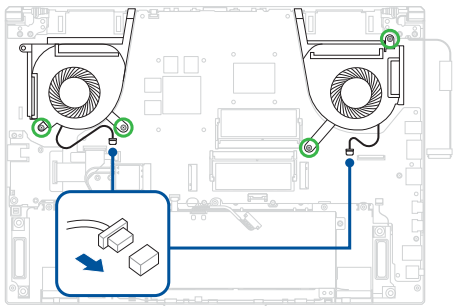
90W battery model



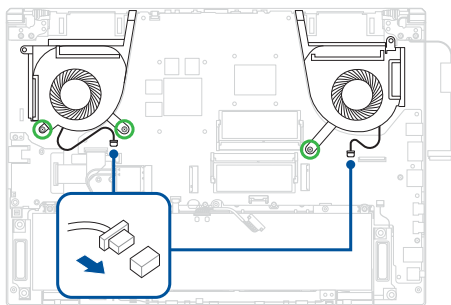
Installation

1. Reinstall the fan(s).
2. Secure the fan(s) using the screw(s) you removed earlier.
3. Reconnect the fan connector(s).
4. Install the components you removed in the *Before you begin* section.

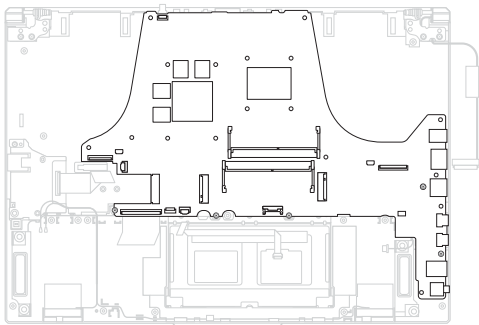
56W battery model



90W battery model



Motherboard



Before you begin

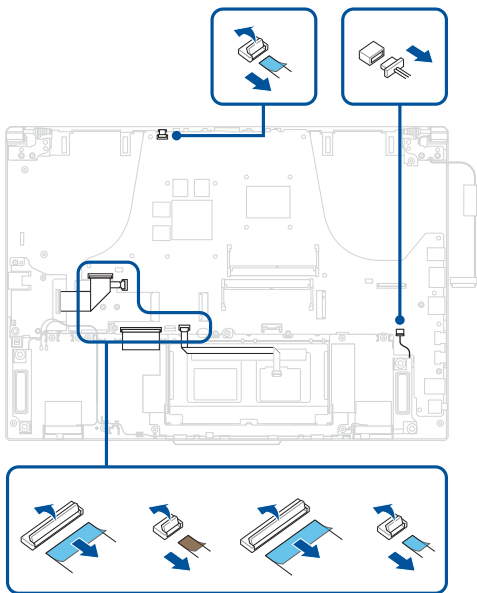
1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the bottom cover and disconnect the battery power cable.
3. Remove the following components:
 - Battery
 - M.2 SSD module
 - RAM module
 - WLAN module
 - Heat sink
 - Fan module (APU fan and GPU fan)

Screw list

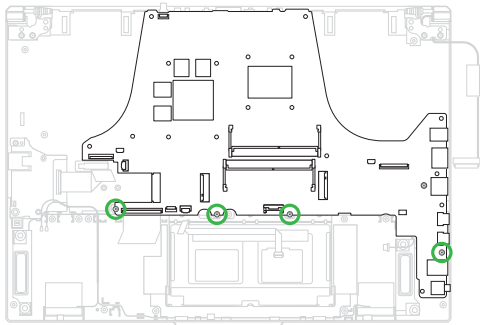
- ⊕ M2.0 X 4.0L (4pcs)

Removal

1. Disconnect the cable(s) from the motherboard.

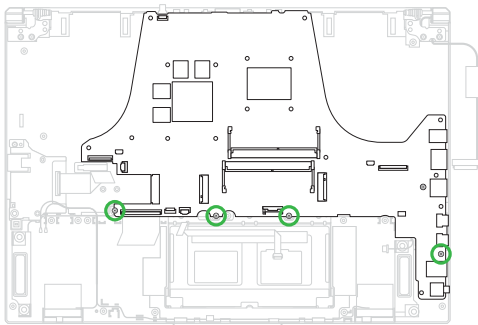


2. Remove the screw(s), then remove the motherboard from the chassis.

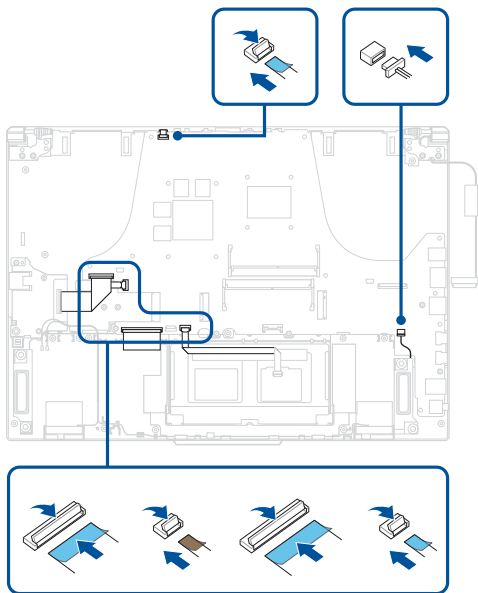


Installation

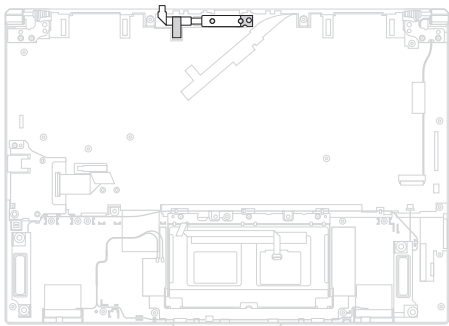
1. Align and install the motherboard, then secure the motherboard using the screw(s) you removed earlier.



2. Reconnect the cable(s) to the motherboard.
3. Install the components you removed in the *Before you begin* section.



LED board

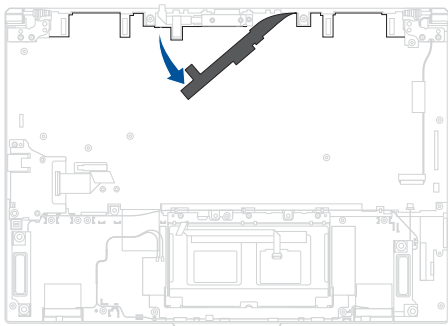


Before you begin

1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the bottom cover and disconnect the battery power cable.
3. Remove the following components:
 - Battery
 - M.2 SSD module
 - RAM module
 - WLAN module
 - Heat sink
 - Fan module (APU fan and GPU fan)
 - Motherboard

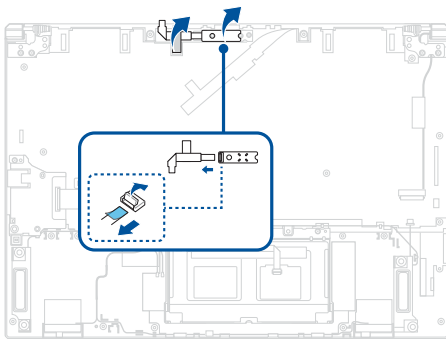
Removal

1. Remove the polyester film.



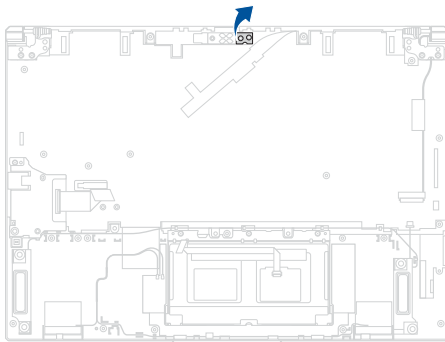
2. Remove the tape.
3. Flip over the LED board, then disconnect the LED cable.

NOTE: Remove all adhesive residue if any remains.



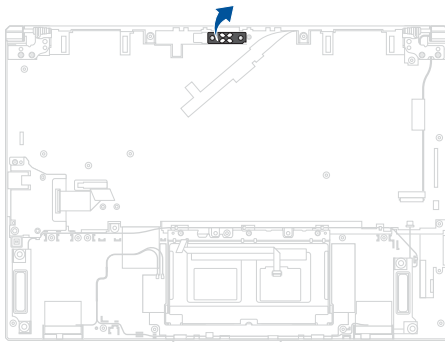
4. Remove the aluminum foil.

NOTE: This adhesive material cannot be reused. Remove any adhesive residue and use the new adhesive material when reinstalling components.



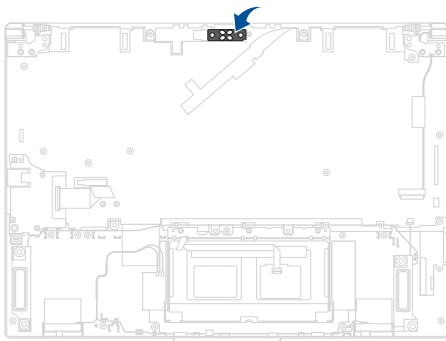
5. Remove the the adhesive LED sponge.

NOTE: This adhesive material cannot be reused. Remove any adhesive residue and use the new adhesive material when reinstalling components.

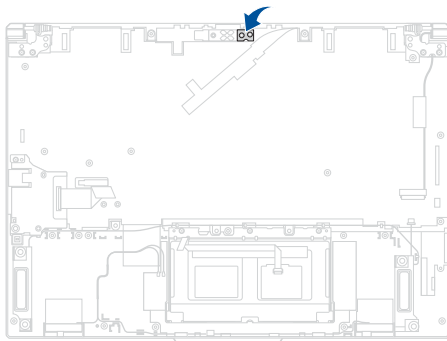


Installation

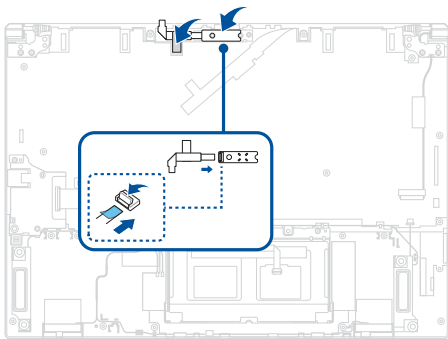
1. Align and attach the adhesive LED sponge.



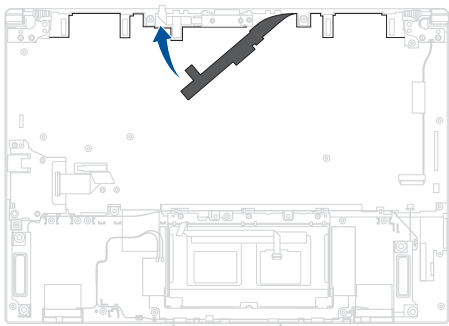
2. Align and attach the aluminum foil.



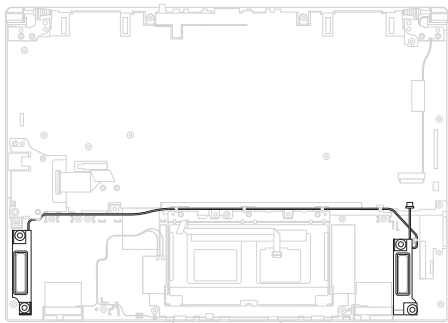
3. Connect the LED cable to the bottom of the LED board.
4. Flip and install the LED board, then attach the tape.



5. Reattach the polyester film.
6. Install the components you removed in the *Before you begin* section.



Speakers

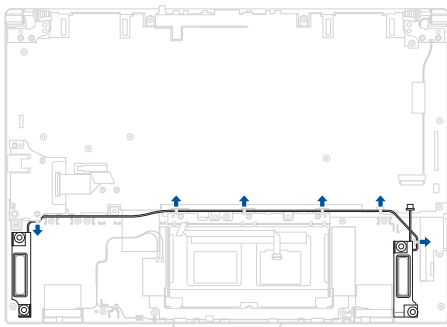


Before you begin

1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the bottom cover and disconnect the battery power cable.
3. Remove the following components:
 - Battery
 - M.2 SSD module
 - RAM module
 - WLAN module
 - Heat sink
 - Fan module (APU fan and GPU fan)
 - Motherboard

Removal

Remove the speaker cable from the cable guide(s), then remove the speakers.

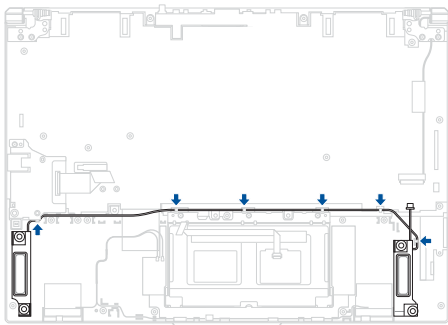


Installation

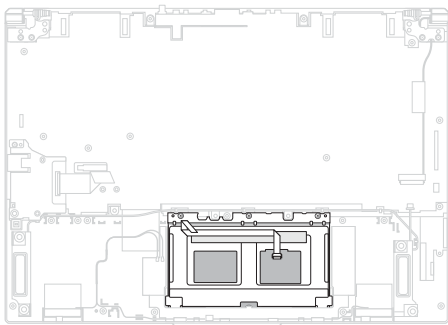
1. Install the speakers.
2. Route the speaker cable through the cable guide(s).

IMPORTANT! Damage may occur if cables are not properly routed through the cable guides. Confirm that all cables are routed through each of the indicated cable guides before proceeding.

3. Install the components you removed in the *Before you begin* section.



Touchpad



Before you begin

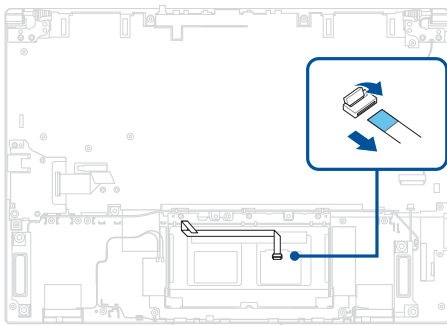
1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the bottom cover and disconnect the battery power cable.
3. Remove the following components:
 - Battery
 - M.2 SSD module
 - RAM module
 - WLAN module
 - Heat sink
 - Fan module (APU fan and GPU fan)
 - Motherboard

Screw list

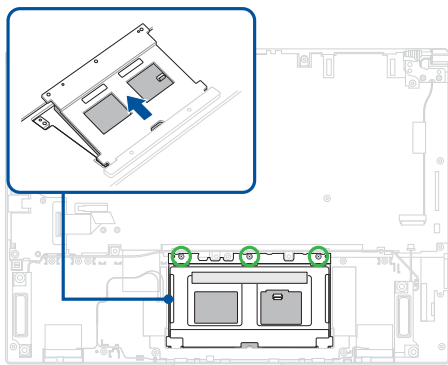
- ⊕ M2.0 X 2.0L (3pcs)

Removal

1. Disconnect and remove the touchpad FFC cable from the touchpad.

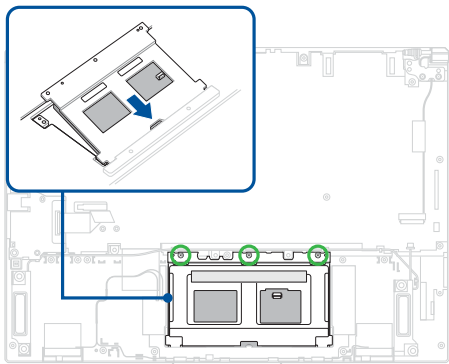


2. Remove the screw(s), then remove the touchpad module.

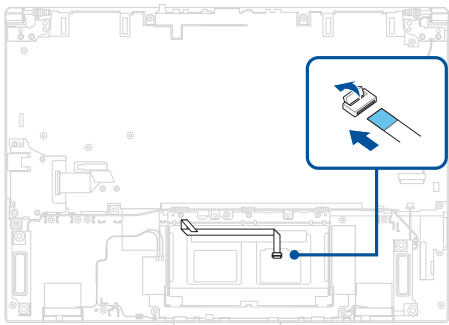


Installation

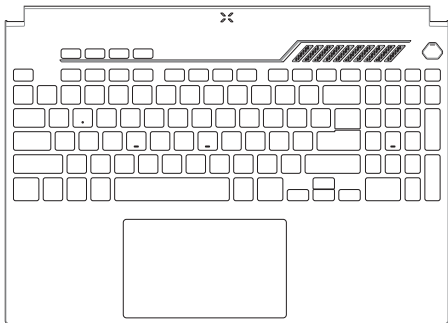
1. Align and install the touchpad as shown in the illustration below.
2. Secure the touchpad using the screw(s) you removed earlier.



3. Reconnect the touchpad FFC cable.
4. Install the components you removed in the *Before you begin* section.



Keyboard module



Before you begin

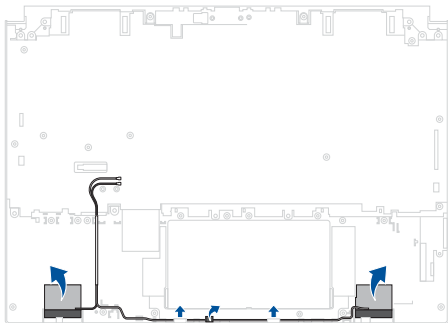
1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the bottom cover and disconnect the battery power cable.
3. Remove the following components:
 - Battery
 - M.2 SSD module
 - RAM module
 - WLAN module
 - Heat sink
 - Fan module (APU fan and GPU fan)
 - Motherboard

- LED board
- Touchpad
- Speakers

Removal

Remove the antenna cable(s) from the cable guide(s).

IMPORTANT! The antenna cable(s) cannot be reused once removed.

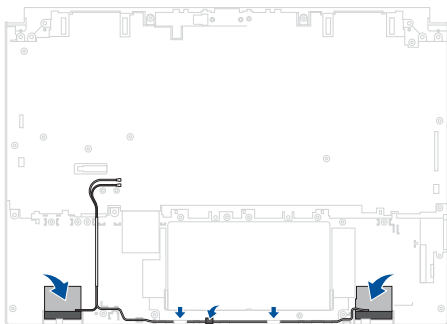


Installation

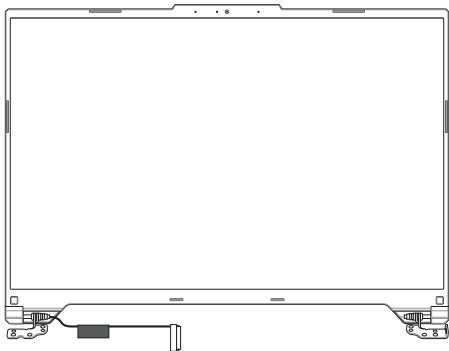
1. Install the antenna cable(s).
2. Route the cable(s) through the cable guide(s).

IMPORTANT! Damage may occur if cables are not properly routed through the cable guides. Confirm that all cables are routed through each of the indicated cable guides before proceeding.

3. Install the components you removed in the *Before you begin* section.



Display panel module



Before you begin

IMPORTANT! Do not bend the display panel in any way to avoid risk of display panel leakage.

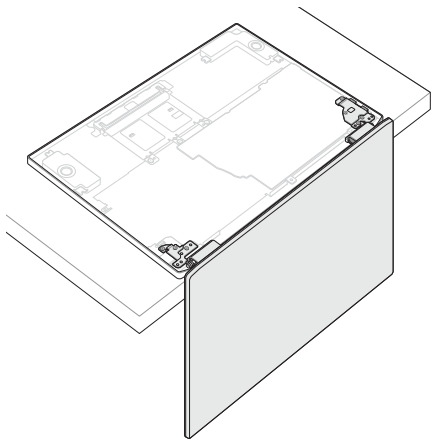
1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the bottom cover and disconnect the battery power cable.

Screw list

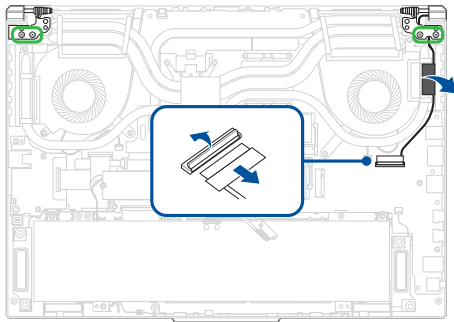
- ⊕ M2.5 X 5.0L (4pcs)

Removal

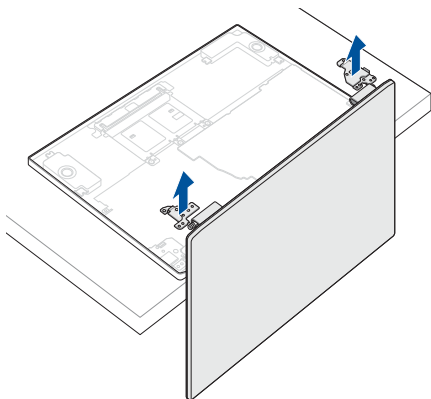
1. Place your device with the display panel hanging over the edge of the workspace as shown in the illustration below.



2. Remove the screw(s).
3. Remove the tape, then disconnect the eDP cable.

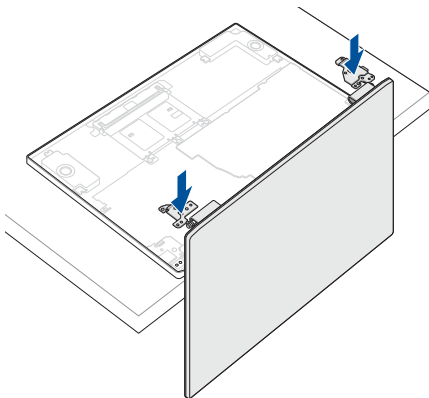


4. Remove the display panel module.

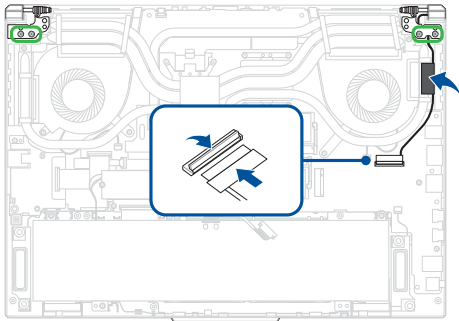


Installation

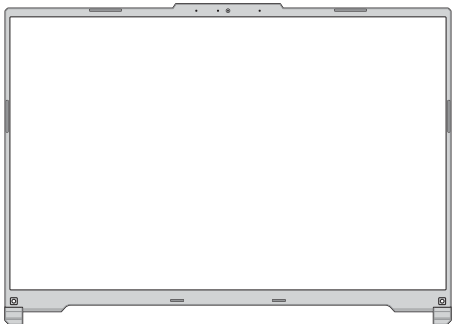
1. In the orientation shown, align and place the hinges of the display panel module on the screw holes.



2. Secure the hinges using the screw(s) you removed earlier.
3. Route the eDP cable, then reattach the tape.
4. Install the components you removed in the *Before you begin* section.



Display bezel



Before you begin

IMPORTANT! This component is fragile. Damage may occur if the service procedure is performed incorrectly. If you are uncertain about proceeding, stop and contact an authorized service center for assistance.

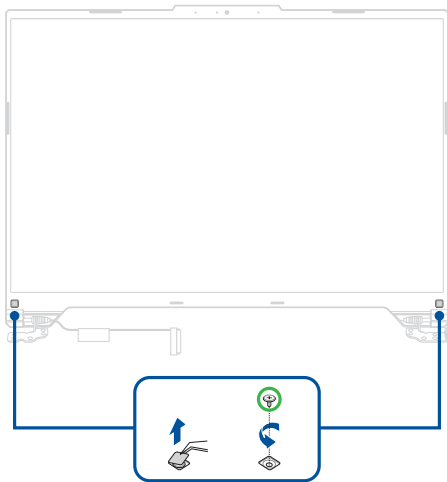
1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the bottom cover and disconnect the battery power cable.
3. Remove the following components:
 - Display panel module

Screw list

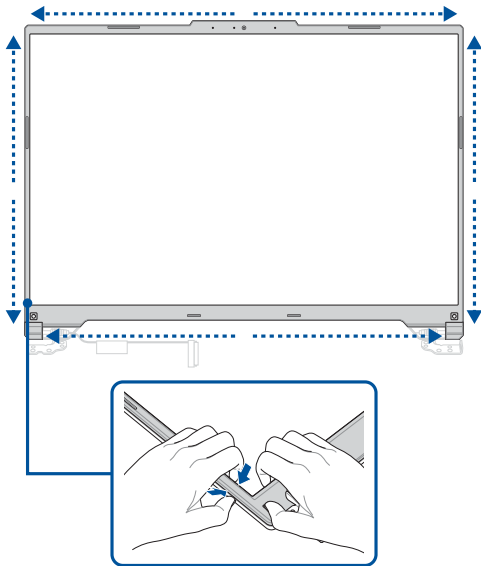
- ⊕ M2.5 X 3.5L (2pcs in total from two sides)

Removal

1. Remove the rubber cover(s) to expose the screw(s) underneath.
2. Remove the screw(s).



- Carefully pry the bezel loose from the bottom left corner, then remove the bezel completely.



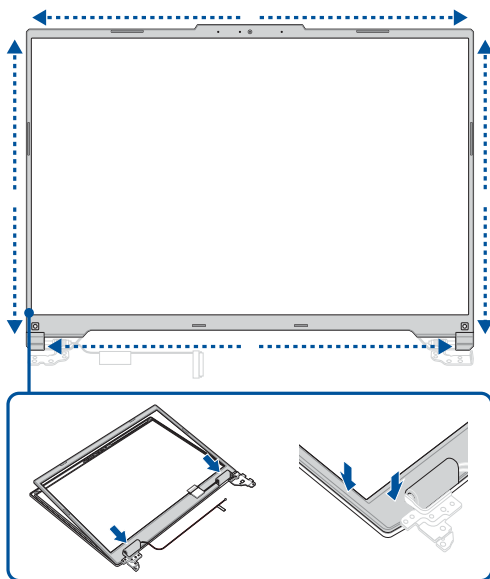
Installation

1. Remove the release liner(s) from the tape on the bezel.

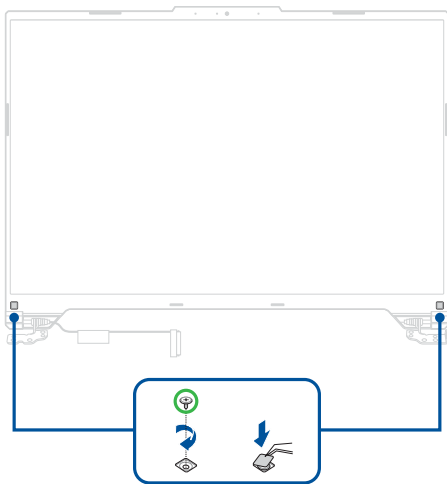
NOTE: The tape cannot be reused. Remove any adhesive residue and use new tape when reinstalling components.



2. Align and install the bezel.



3. Secure the bezel using the screw(s) you removed earlier.
4. Put the rubber cover(s) in place.
5. Install the components you removed in the *Before you begin* section.



Display panel



Before you begin

IMPORTANT!

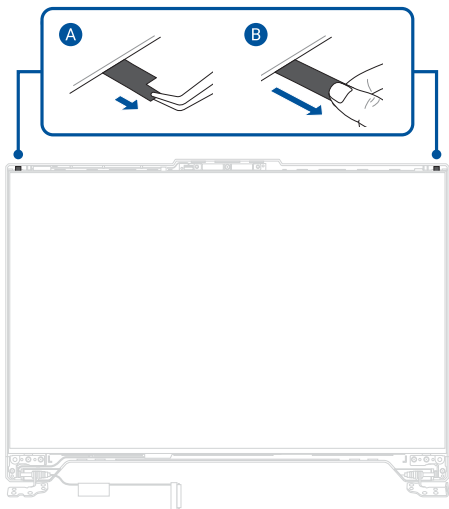
- This component is fragile. Damage may occur if the service procedure is performed incorrectly. If you are uncertain about proceeding, stop and contact an authorized service center for assistance.
 - Do not bend the display panel in any way to avoid risk of display panel leakage.
-

1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the bottom cover and disconnect the battery power cable.
3. Remove the following components:
 - Display panel module
 - Display bezel

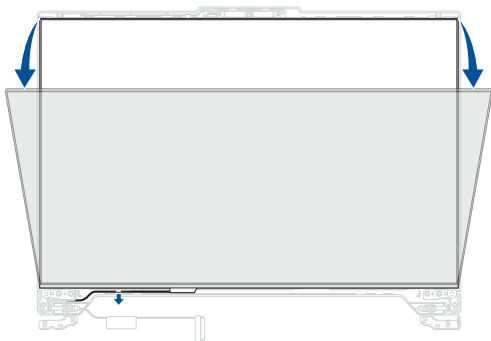
Removal

1. Locate the tip of the stretch release tape, then carefully pull out the stretch release tape as shown in the illustration below.

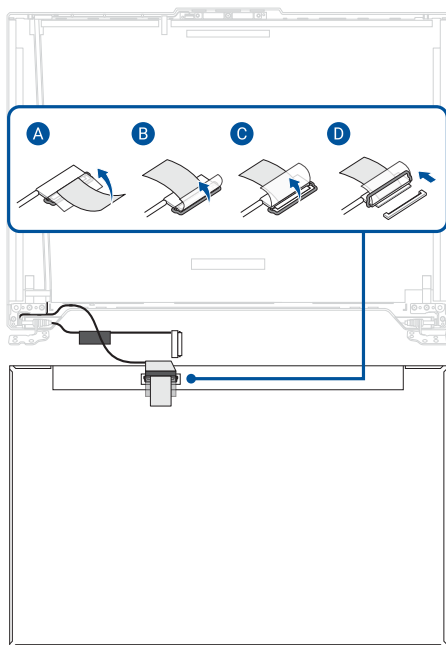
IMPORTANT! Maintain a flat angle and constant speed when pulling the stretch release tape. Excessive force may damage the stretch release tape and prevent removal of the display panel.



2. Lift the display panel as shown in the illustration below.
3. Release the cable from the cable guide.

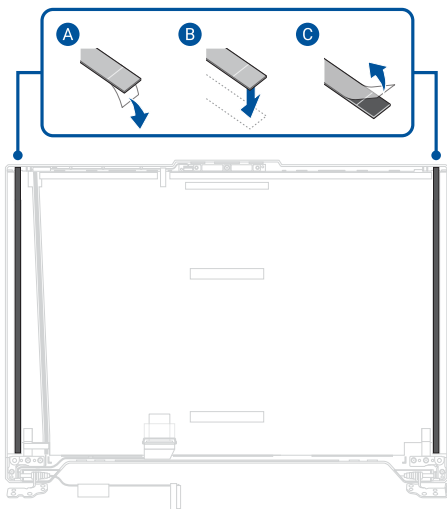


4. Disconnect the cable from the rear side of the display panel.

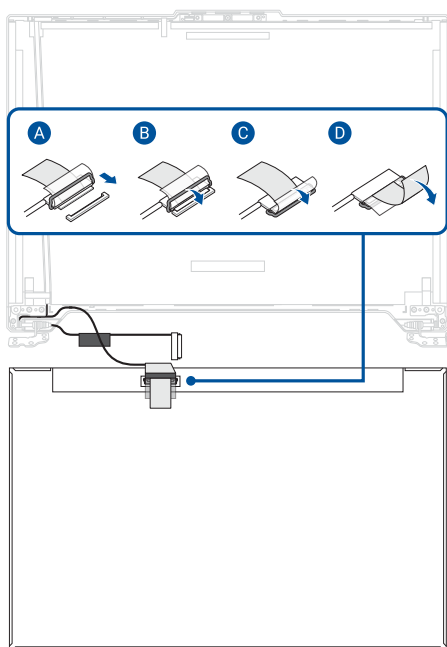


Installation

1. Remove the release liner(s) from the bottom side of the stretch release tape.
2. Align and attach the stretch release tape to the top cover.
3. Remove the release liner(s) from the top side of the stretch release tape.



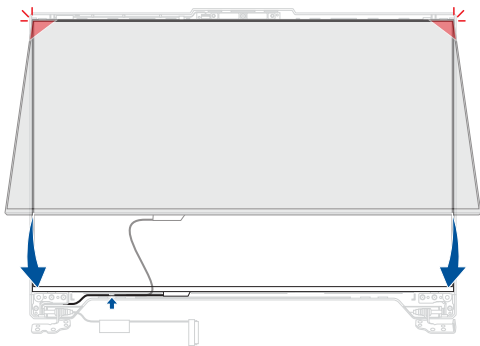
4. Reconnect the cable to the rear side of the display panel.



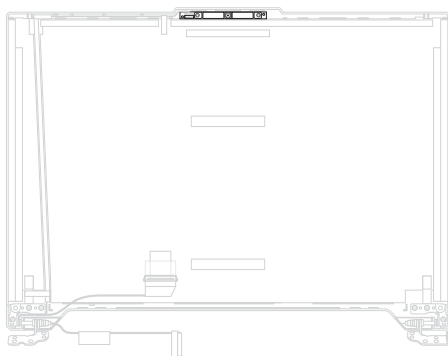
5. Align and install the display panel.
6. Route the cable through the cable guide.

IMPORTANT! Damage may occur if cables are not properly routed through the cable guides. Confirm that all cables are routed through each of the indicated cable guides before proceeding.

7. Install the components you removed in the *Before you begin* section.



Camera module



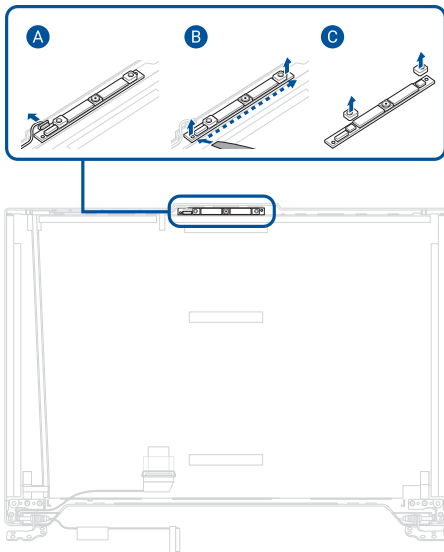
Before you begin

IMPORTANT! This component is fragile. Damage may occur if the service procedure is performed incorrectly. If you are uncertain about proceeding, stop and contact an authorized service center for assistance.

1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the bottom cover and disconnect the battery power cable.
3. Remove the following components:
 - Display panel module
 - Display bezel
 - Display panel

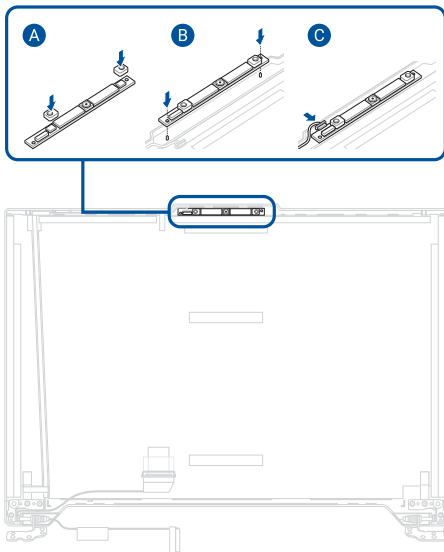
Removal

1. Disconnect the cable from the camera module.
2. Carefully remove the camera module, then remove the rubber caps from the camera module.

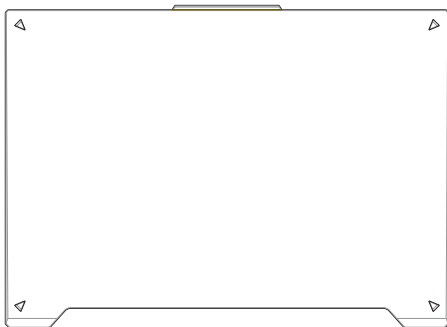


Installation

1. Attach the rubber caps to the camera module, then install the camera module.
2. Install the components you removed in the *Before you begin* section.



Top cover



Before you begin

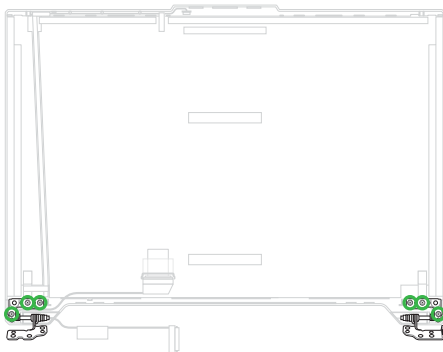
1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the bottom cover and disconnect the battery power cable.
3. Remove the following components:
 - Display panel module
 - Display bezel
 - Display panel
 - Camera module

Screw list

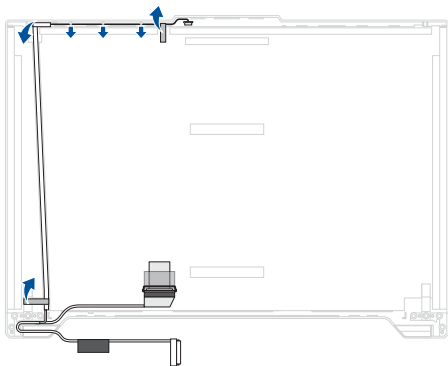
- ⊕ M2.5 X 3.0L (6pcs)

Removal

1. Remove the hinge screw(s), then remove the hinges.

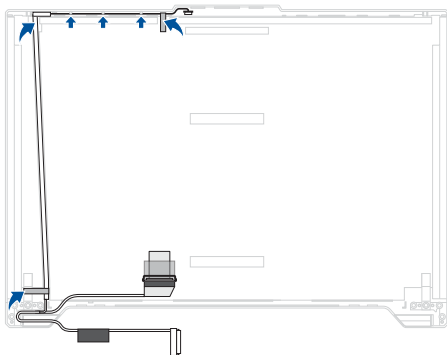


2. Remove the tape.
3. Disconnect the eDP cable and remove the cable completely.

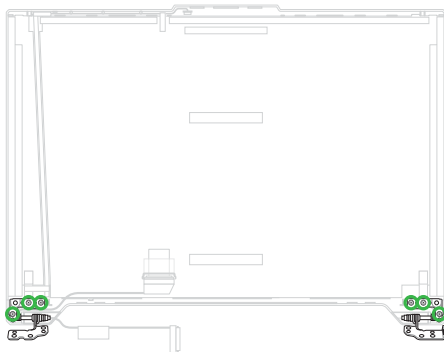


Installation

1. Align and connect the eDP cable.
2. Attach the tape.



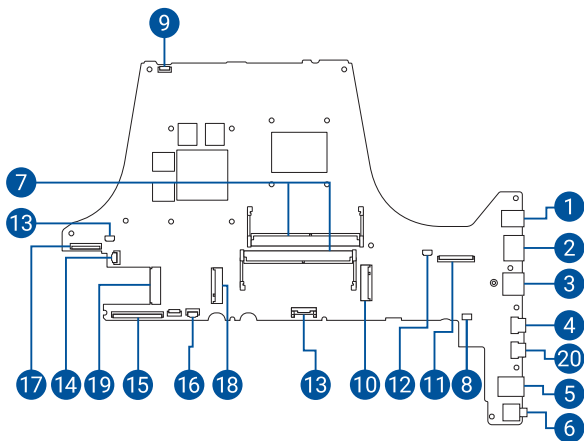
3. Secure the hinges using the screw(s) you removed earlier.
4. Install the components you removed in the *Before you begin* section.



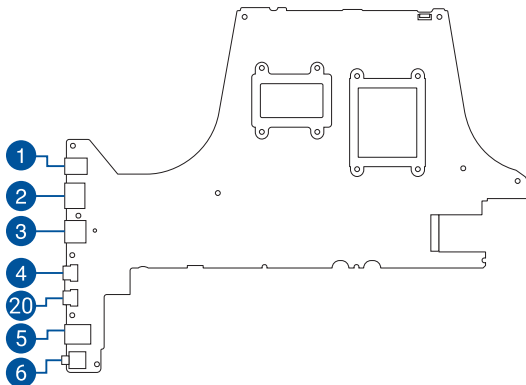
Appendices

Wiring and connection diagrams

Top View



Bottom View



- | | |
|---------------------------|----------------------------------|
| 1. Power supply connector | 11. LVDS connector |
| 2. LAN connector | 12. Fan connector |
| 3. HDMI connector | 13. Battery connector |
| 4. USB Type-C® connector* | 14. Keyboard backlight connector |
| 5. USB Type-A connector | 15. Keyboard membrane connector |
| 6. Audio connector | 16. Touchpad connector |
| 7. RAM module slot | 17. USB 3.0 connector |
| 8. Speaker connector | 18. SSD connector (SSD1) |
| 9. LED board connector | 19. WLAN connector |
| 10. SSD connector (SSD2) | 20. USB Type-C® connector |

* On selected models

