



TUF GAMING

+ TUF GAMING | LAPTOP +

SERVICE MANUAL

The ASUS logo is rendered in a bold, black, sans-serif font. The '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.
-

Installation tools



Screwdriver



Plastic blade



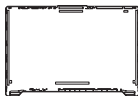
Tweezers

Diagnostic tools

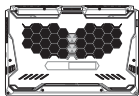
Use ASUS System Diagnostics after completing any service procedures to ensure that all components are working properly.

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

Major components



Top cover



Bottom cover



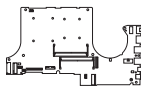
Display bezel



Display panel



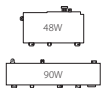
Keyboard module



Motherboard



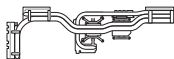
Power adapter



Battery



Camera module



Heat sink



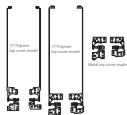
CPU fan



GPU fan



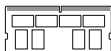
Speakers



Display hinges



WLAN module



RAM module



M.2 SSD module



LED board



I/O board



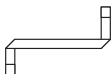
Power supply cable



Antenna cables



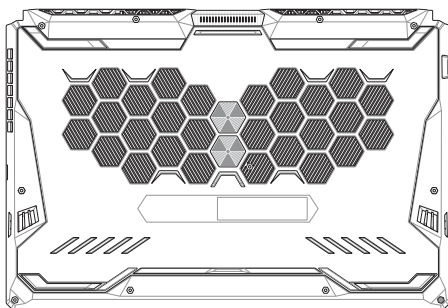
eDP cable



FFC and FPC cables

Chapter 2: ***Service Procedures***

Bottom cover



Before you begin

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

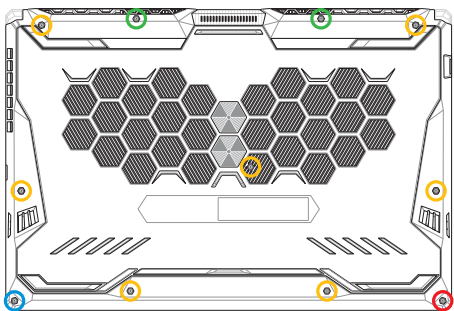
Screw list

- ⊕ M2.5 X 14L (2pcs)
- ⊕ M2.5 X 11L (7pcs)
- ⊕ M2.5 X 5.5L (1pc)
- ⊕ M2.5 X 6.0L (1pc Pop-open Screw)

Removal

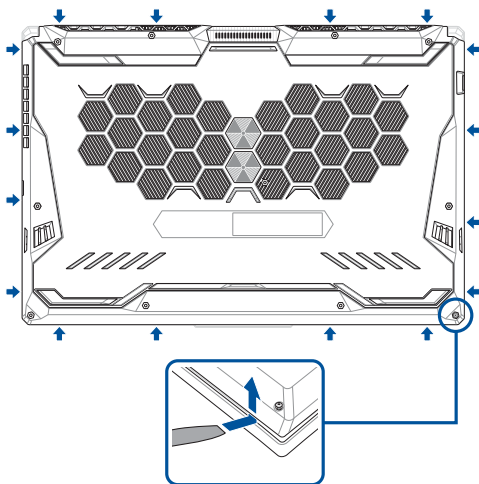
IMPORTANT! System power will be cut off automatically upon removal of the bottom cover. To restore power, reattach the bottom cover securely and connect the AC power adapter to your Notebook PC after the servicing is complete.

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.

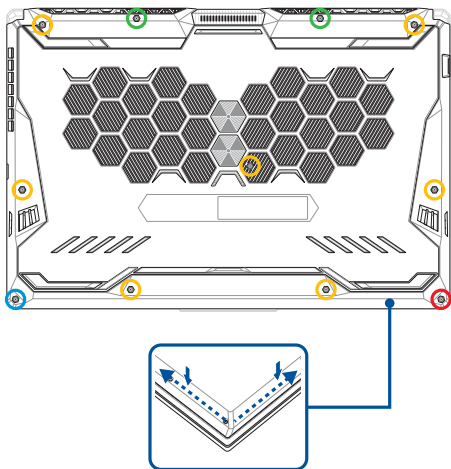
IMPORTANT! Avoid sliding the plastic blade along the side of your device or air vents to prevent damage.



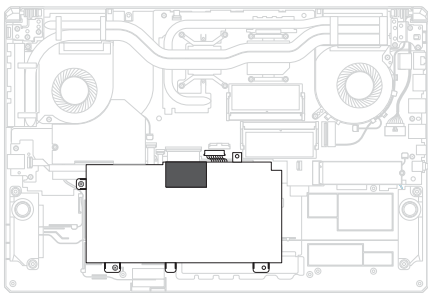
Installation

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 (48W battery model)



Before you begin

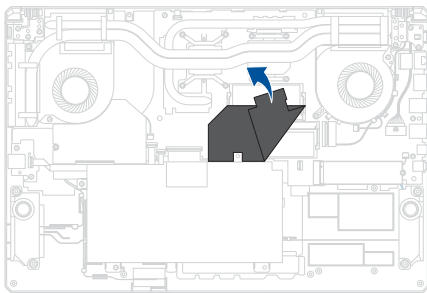
1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the following components:
 - Bottom cover

Screw list

- ⊕ M2.5 X 5.5L (2pcs)

Removal

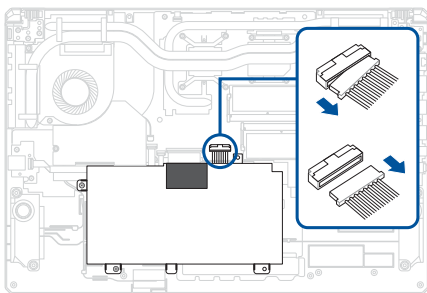
1. Remove the polyester film.



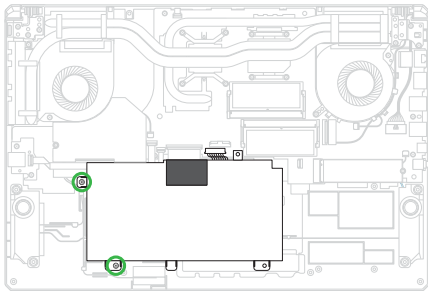
2. Disconnect the battery power cable.

IMPORTANT!

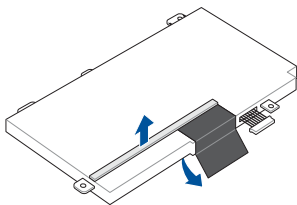
- Disconnect the battery power cable by lifting the side with the red wires first.
 - Serious risk of fire or explosion may occur if the battery is punctured. If you are uncertain about proceeding, stop and contact an authorized service center for assistance.
-



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

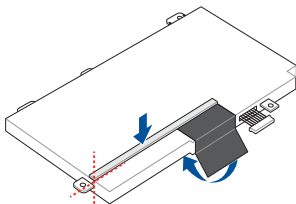


5. Remove the gasket and the polyester film from the battery.

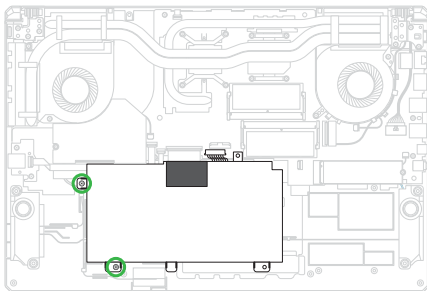


Installation

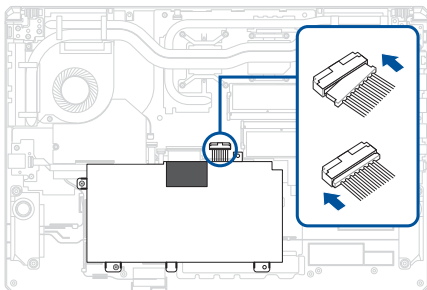
1. Align and attach the gasket and the polyester film to the battery as shown in the illustration below..



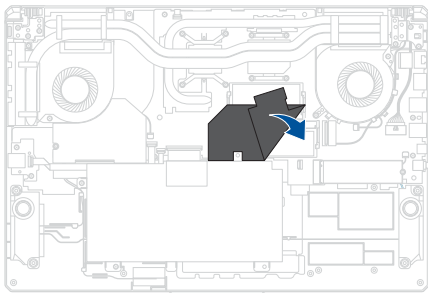
2. Install the battery.
3. Secure the battery using the screw(s) you removed earlier.



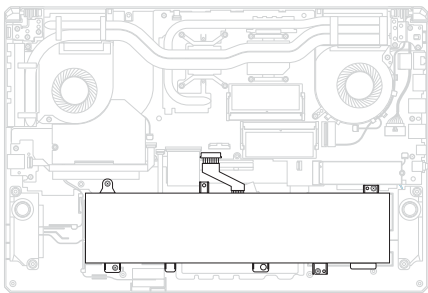
4. Reconnect the battery power cable.



5. Align and attach the polyester film.
6. Install the components you removed in the *Before you begin* section.



Battery (90W battery model)



Before you begin

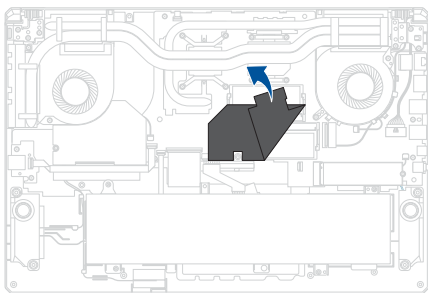
1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the following components:
 - Bottom cover

Screw list

- ⊕ M2.5 X 5.5L (4pcs)

Removal

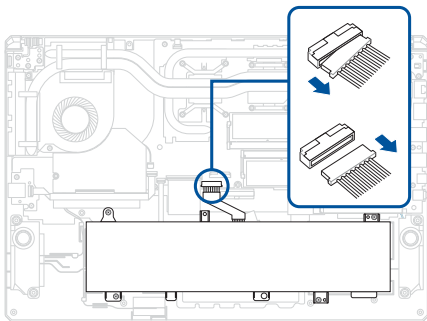
1. Remove the polyester film.



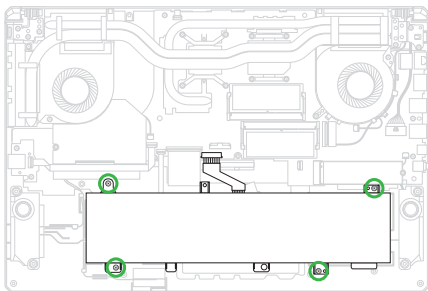
2. Disconnect the battery power cable.

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.
-

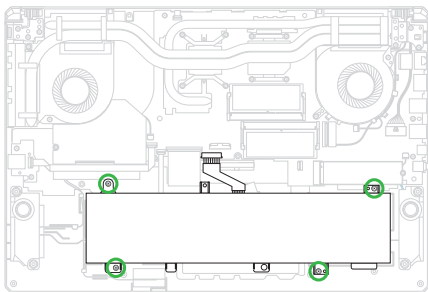


3. Remove the screw(s) from the battery.
4. Remove the battery.

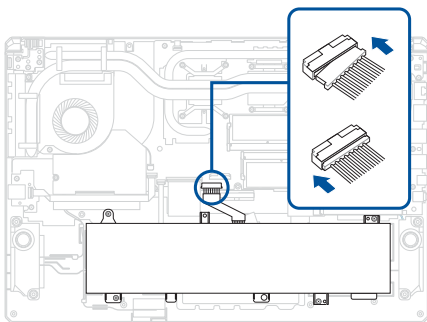


Installation

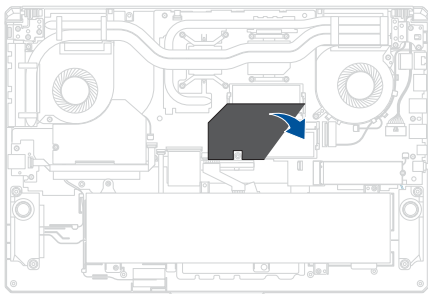
1. Install the battery.
2. Secure the battery using the screw(s) you removed earlier.



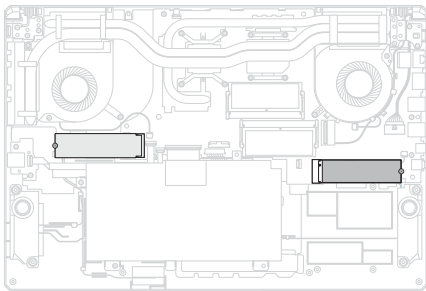
3. Reconnect the battery power cable.



4. Align and attach the polyester film.
5. Install the components you removed in the *Before you begin* section.



M.2 SSD module



Before you begin

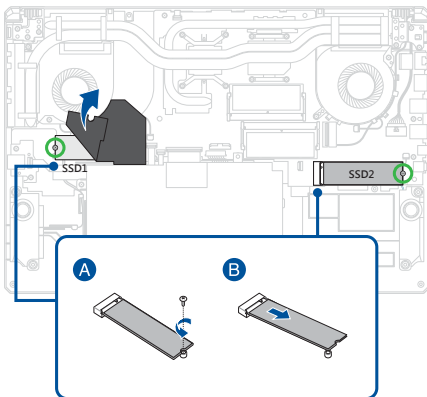
1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the following components:
 - Bottom cover
 - Battery

Screw list

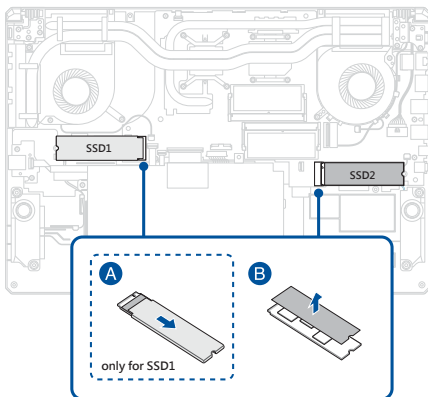
- ⊕ M2.0 X 3.0L (2pcs)

Removal

1. Remove the polyester film (if available), then remove the screw(s) and remove the M.2 SSD module(s) from the motherboard.

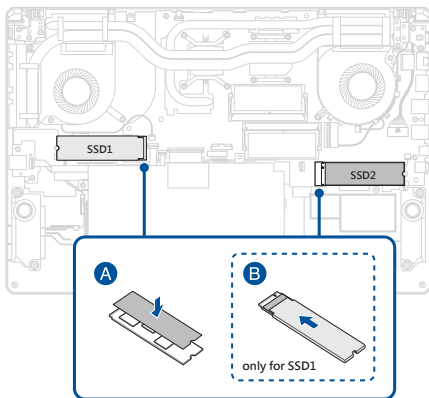


2. Remove the aluminum foil sleeve (if available), then remove the absorber sheet(s) from the M.2 SSD module(s).

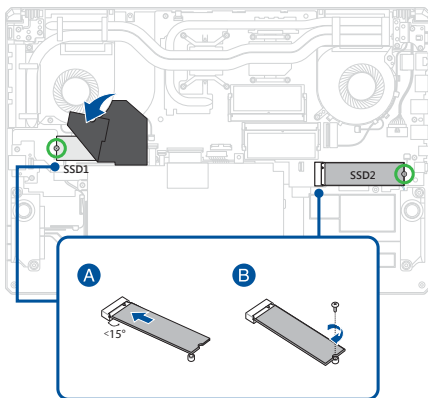


Installation

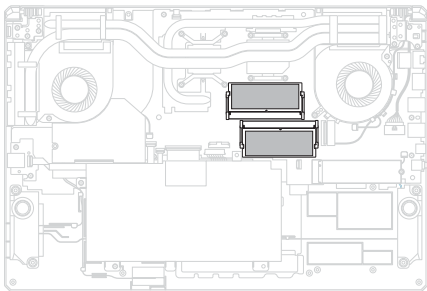
1. Reattach the absorber sheet(s) to the M.2 SSD module(s), then insert the M.2 SSD module(s) into the aluminum foil sleeve (if available).



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



RAM module

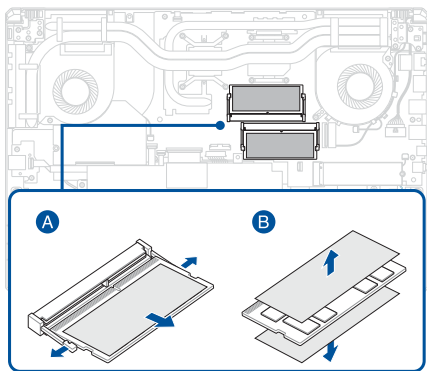


Before you begin

1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the following components:
 - Bottom cover
 - Battery

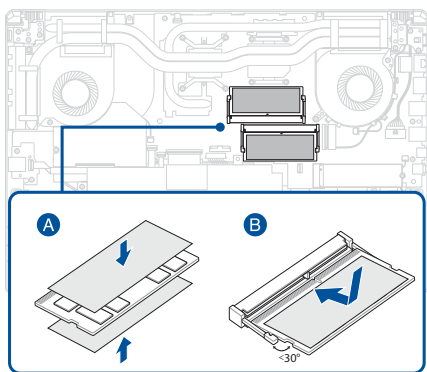
Removal

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

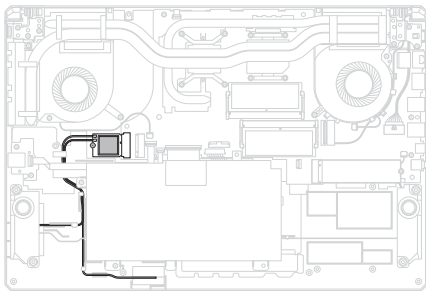


Installation

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



WLAN 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.

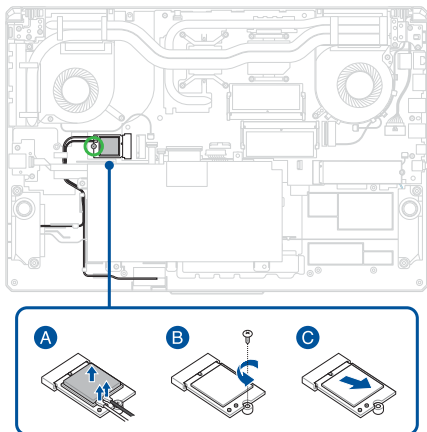
1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the following components:
 - Bottom cover
 - Battery
 - M.2 SSD module

Screw list

- ⊕ M2.0 X 3.0L (1pc)

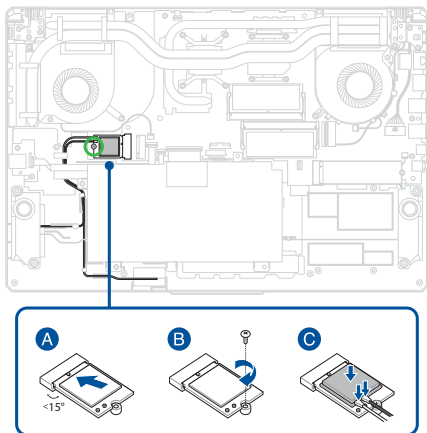
Removal

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

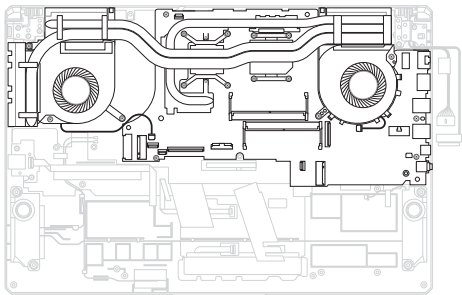


Installation

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.



Fan module and motherboard



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 following components:

- Bottom cover
- Battery
- M.2 SSD module
- RAM module
- WLAN module

Screw list

15" models

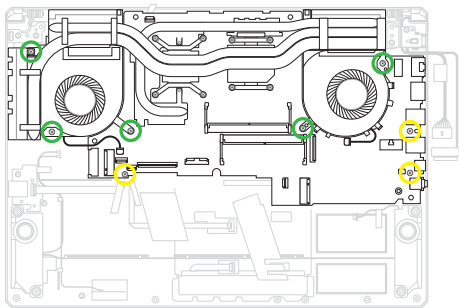
- ⊕ M2.0 X 4.0L (5pcs)
- ⊕ M2.0 X 3.0L (3pcs)

17" models

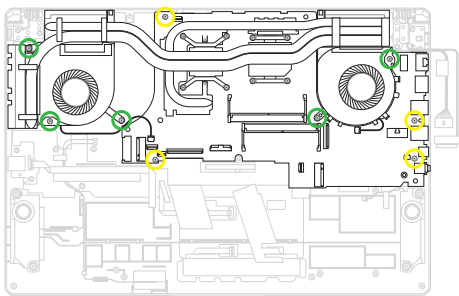
- ⊕ M2.0 X 4.0L (5pcs)
- ⊕ M2.0 X 3.0L (4pcs)

2. Remove the screw(s) from the motherboard.
3. Remove the motherboard with the heat sink and the fan module(s) attached.

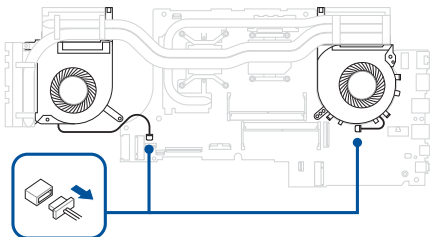
15" models



17" models

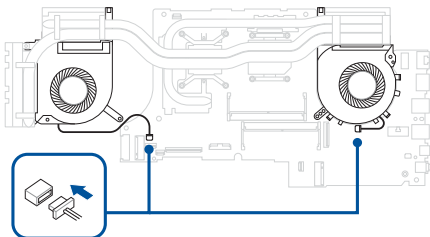


4. Disconnect the fan connector(s).
5. Tilt the fan(s) and remove the fan(s) sideways.



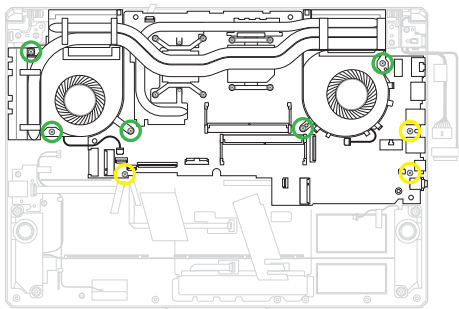
Installation

1. Tilt the fan(s) and install the fan(s) sideways.
2. Reconnect the fan connector(s).

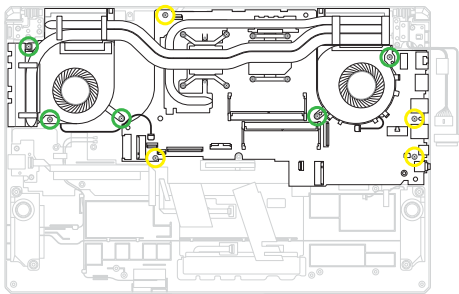


3. Align and install the motherboard with the heat sink and the fan module(s) attached.
4. Secure the fan(s) and the motherboard using the screw(s) you removed earlier.

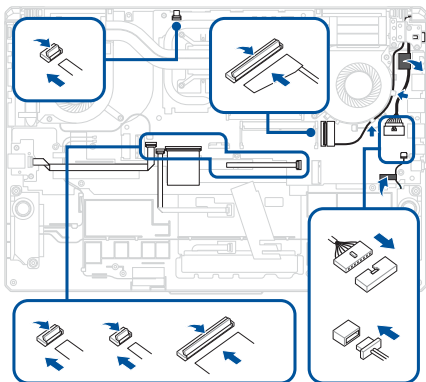
15" models



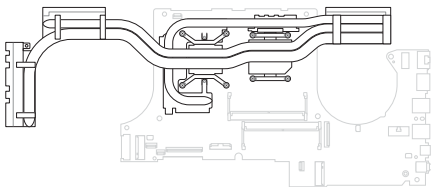
17" models



5. Remove the tape, then locate and disconnect the cable(s) as shown in the illustration below.
6. Install the components you removed in the *Before you begin* section.



Heat sink



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 following components:
 - Bottom cover
 - Battery
 - M.2 SSD module
 - RAM module
 - WLAN module
 - Fan module and motherboard

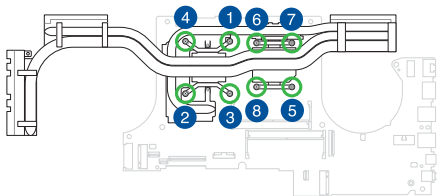
Screw list

- ⊕ M2.0 X 4.0L (8pcs)

Removal

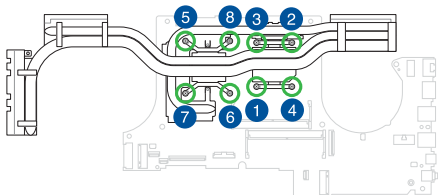
1. Remove the heat sink screw(s) one by one in the sequence shown in the illustration below, then remove the heat sink.

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

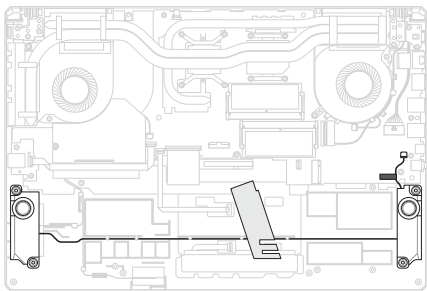


Installation

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



Speakers

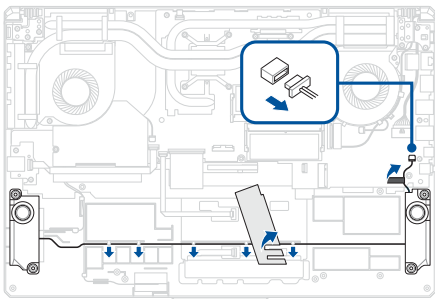


Before you begin

1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the following components:
 - Bottom cover
 - Battery

Removal

1. Remove the tape and disconnect the cable.
2. Remove the speaker cable from the cable guides, then remove the speakers.

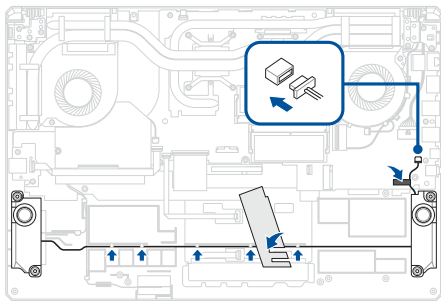


Installation

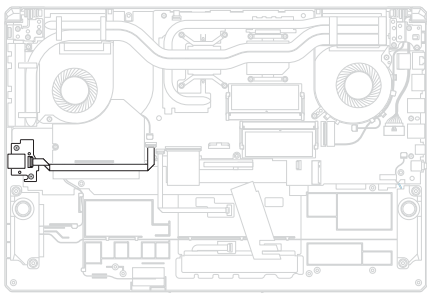
1. Install the speakers.
2. Route the speaker cable through the cable guides.

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. Connect the cable and reattach the tape.
4. Install the components you removed in the *Before you begin* section.



USB board



Before you begin

1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the following components:
 - Bottom cover
 - Battery
 - M.2 SSD module

15" model

- ⊕ M.2 X 3.0L (1pc)

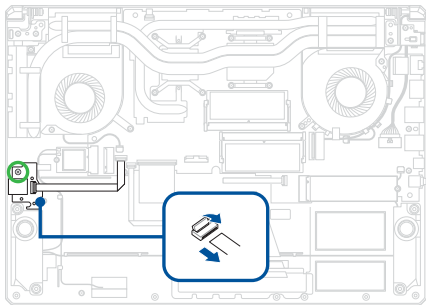
17" model

- ⊕ M.2 X 3.0L (2pcs)

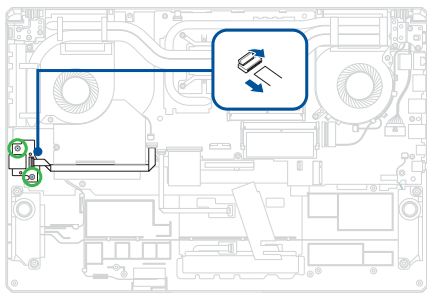
Removal

1. Disconnect the FFC cable.
2. Remove the screw(s), then remove the USB board.

15" model



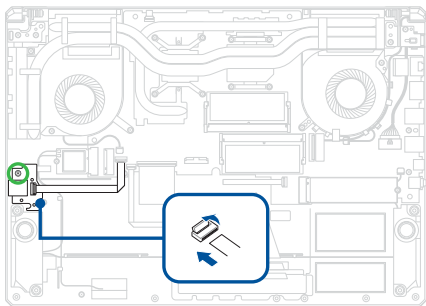
17" model



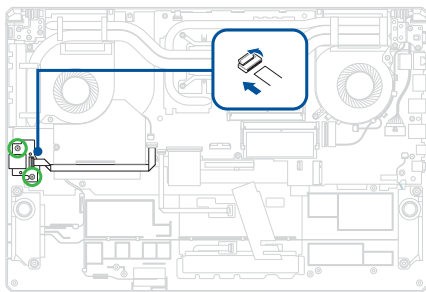
Installation

1. Align and install the USB board, then secure the USB board using the screw(s) you removed earlier.
2. Connect the FFC cable.
3. Install the components you removed in the *Before you begin* section.

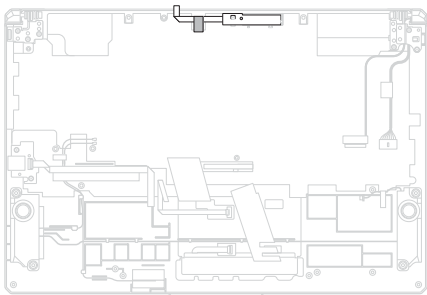
15" model



17" model



LED board

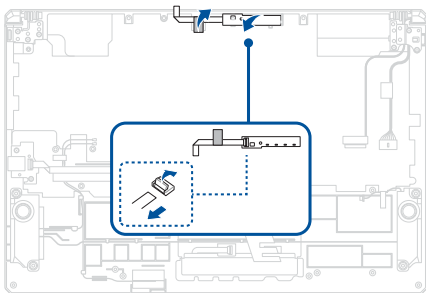


Before you begin

1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the following components:
 - Bottom cover
 - Battery
 - M.2 SSD module
 - RAM module
 - WLAN module
 - Fan module and motherboard
 - Heat sink

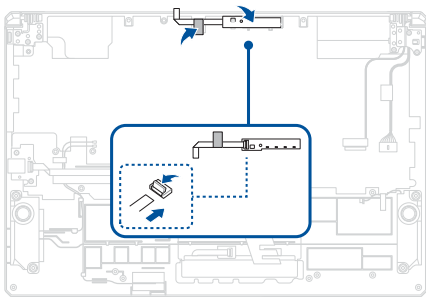
Removal

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

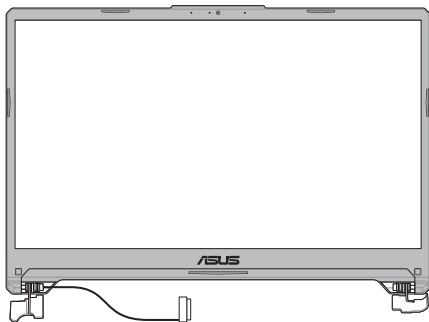


Installation

1. Connect the LED FFC cable to the bottom of the LED board.
2. Flip over the LED board and install the LED board.
3. Attach the tape.
4. 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 following components:
 - Bottom cover
 - Battery

Screw list

15" model

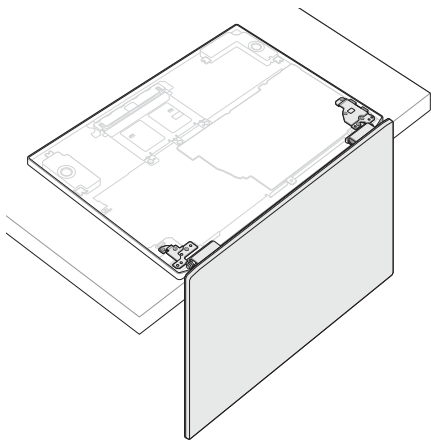
- ⊕ M2.5 X 5.5L (4pcs)

17" model

- ⊕ M2.5 X 5.5L (6pcs)

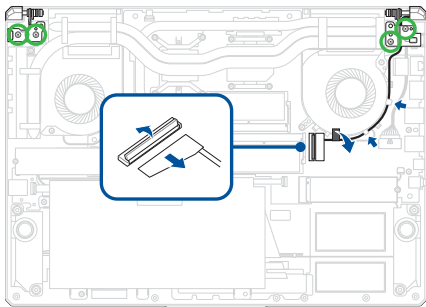
Removal

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

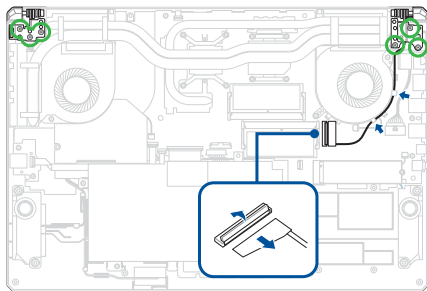


2. Remove the screw(s), then remove the tape and disconnect the cable.

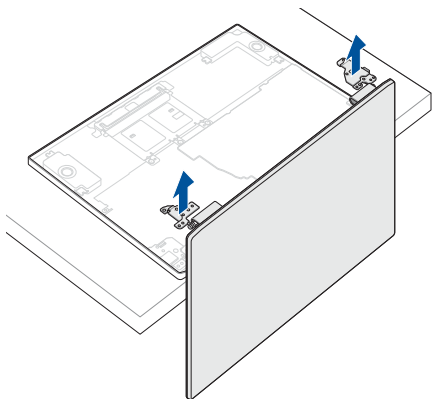
15" model



17" model

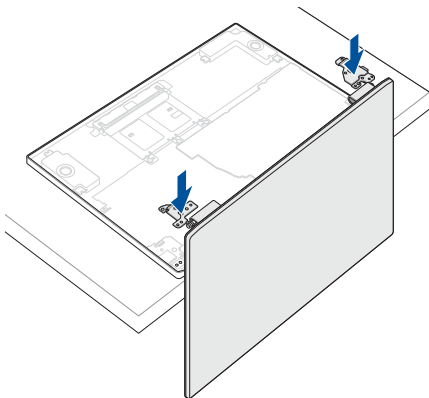


3. Remove the display panel module.



Installation

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

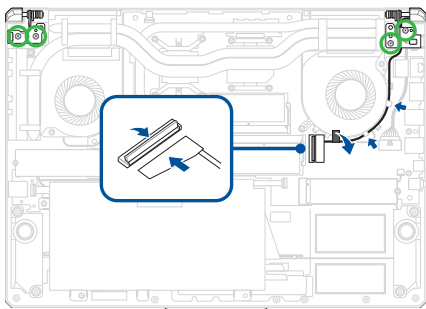


2. Secure the hinges using the screw(s) you removed earlier.
3. Route the cable through the cable guides, then connect the cable.

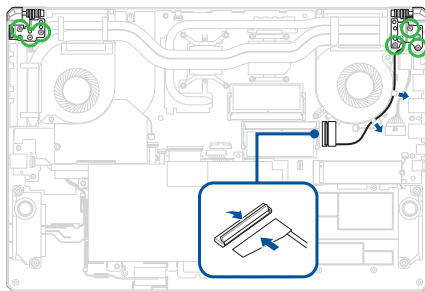
IMPORTANT! Damage may occur if cables are not properly routed through the cable guides. Confirm that all cables are routed through each of the indicated cable guides before proceeding.

4. Reattach the tape.
5. Install the components you removed in the *Before you begin* section.

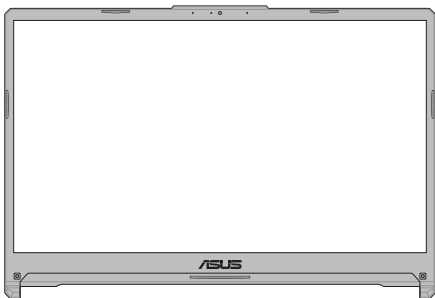
15" model



17" model



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.

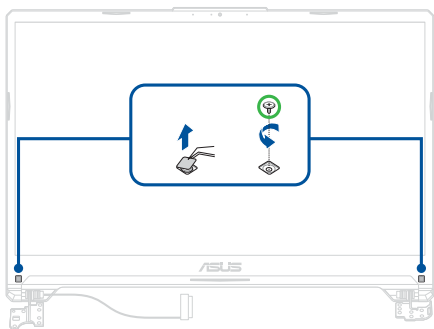
1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the following components:
 - Bottom cover
 - Battery
 - Display panel module

Screw list

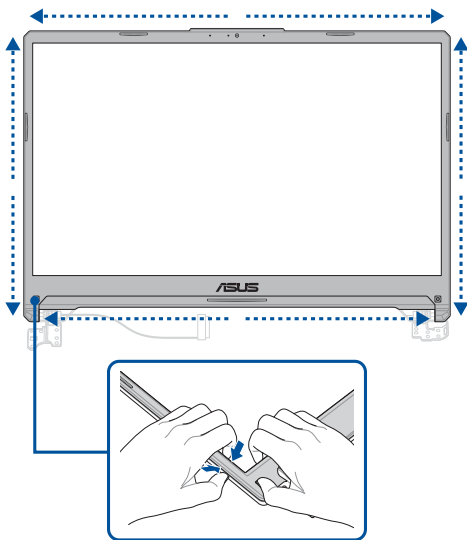
- ⊕ M2.5 X 3.5L (2pcs in total from two sides)

Removal

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



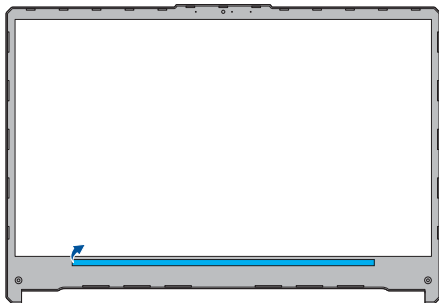
- Carefully pry the bezel loose from the bottom left corner, then remove the bezel completely.



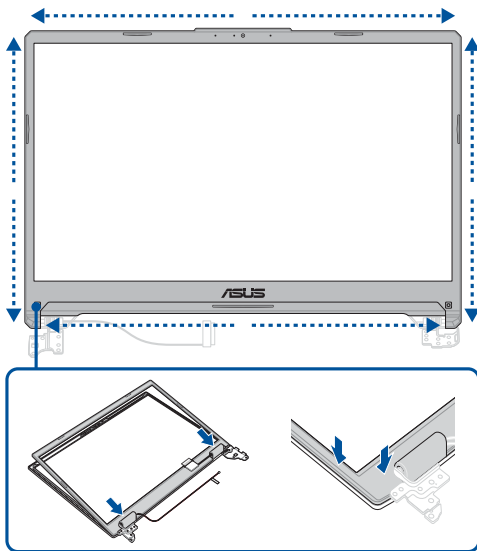
Installation

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

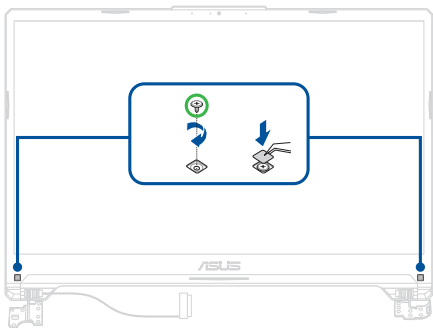
NOTE: The tape cannot be reused. Remove any adhesive residue and use new tape when reinstalling components.



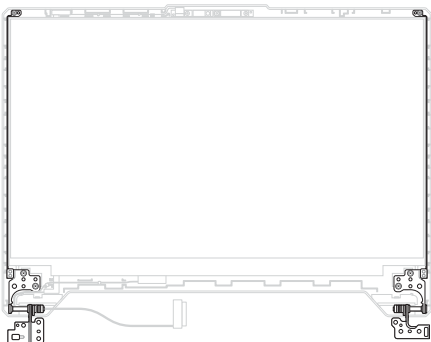
2. Align and install the bezel.



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 hinges (15" model)



Before you begin

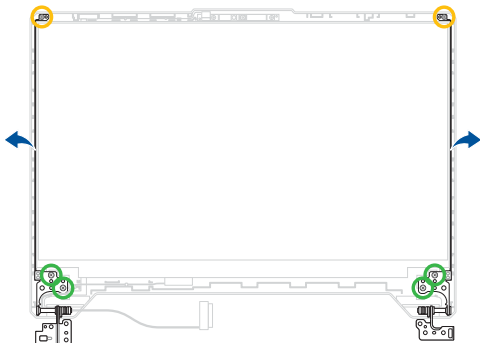
1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the following components:
 - Bottom cover
 - Battery
 - Display panel module
 - Display bezel

Screw list

- ⊕ M2.5 X 3.0L (4pcs)
- ⊕ M1.6 X 2.5L (2pcs)

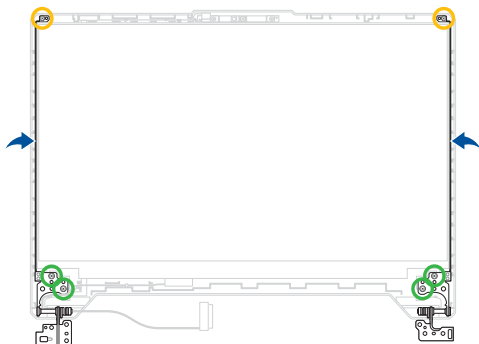
Removal

1. Remove the screw(s).
2. Remove the display hinge(s) with the display panel bracket(s) attached.

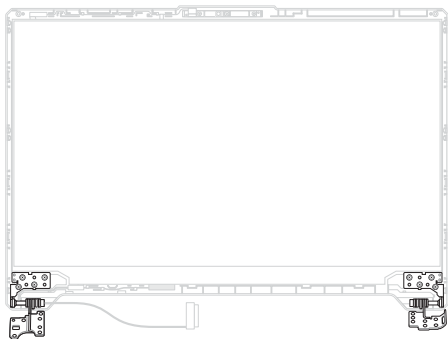


Installation

1. Align and place the display hinge(s) on the screw holes with the display panel bracket(s) attached.
2. Secure the hinge(s) using the screw(s) you removed earlier.
3. Install the components you removed in the *Before you begin* section.



Display hinges (17" model)



Before you begin

1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the following components:
 - Bottom cover
 - Battery
 - Display panel module
 - Display bezel

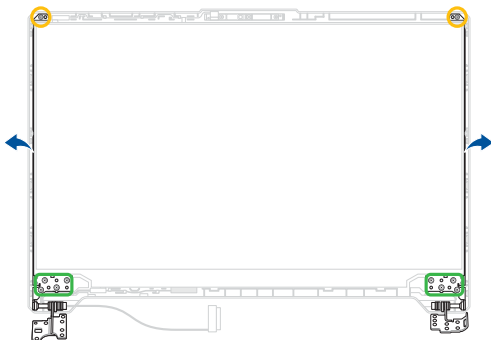
Screw list

- ⊕ M2.5 X 3.5L (6pcs)
- ⊕ M2.0 X 4.0L (2pcs)

Removal

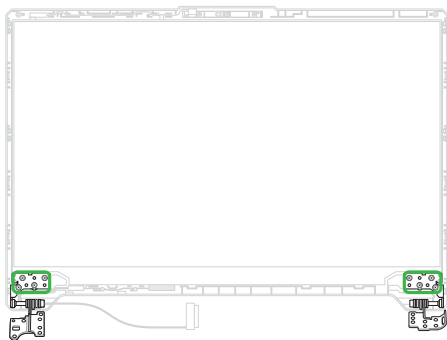
Polymer top cover model

1. Remove the screw(s).
2. Remove the display hinge(s) with the display panel bracket(s) attached.



Metal top cover model

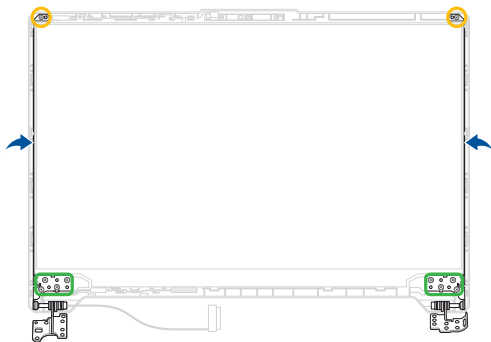
1. Remove the screw(s).
2. Remove the display hinge(s).



Installation

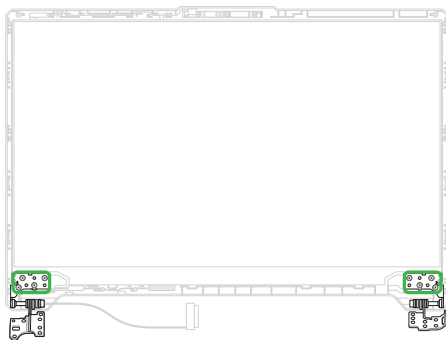
Polymer top cover model

1. Align and place the display hinge(s) on the screw holes with the display panel bracket(s) attached.
2. Secure the hinge(s) using the screw(s) you removed earlier.
3. Install the components you removed in the *Before you begin* section.

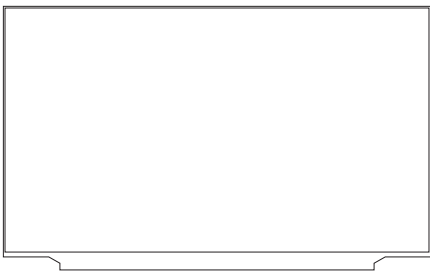


Metal top cover model

1. Align and place the display hinge(s) on the screw holes.
2. Secure the hinge(s) using the screw(s) you removed earlier.
3. Install the components you removed in the *Before you begin* section.



Display panel



Before you begin

IMPORTANT!

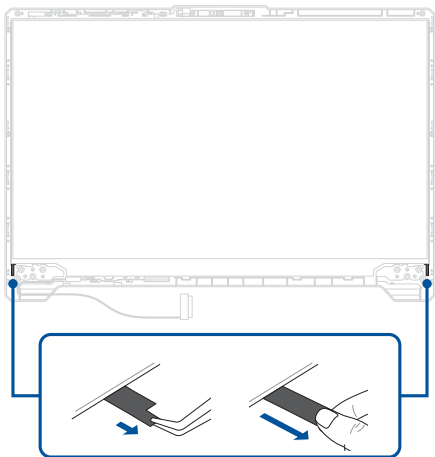
- This component is fragile. Damage may occur if the service procedure is performed incorrectly. If you are uncertain about proceeding, stop and contact an authorized service center for assistance.
 - Do not bend the display panel in any way to avoid risk of display panel leakage.
-

1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the following components:
 - Bottom cover
 - Battery
 - Display panel module
 - Display bezel
 - Display hinges

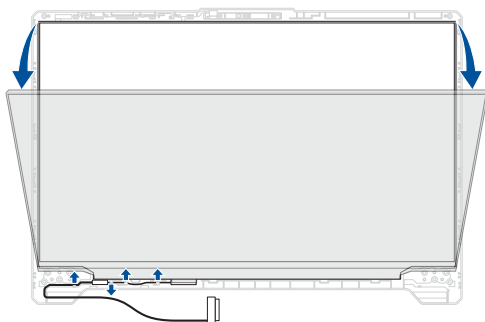
Removal

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

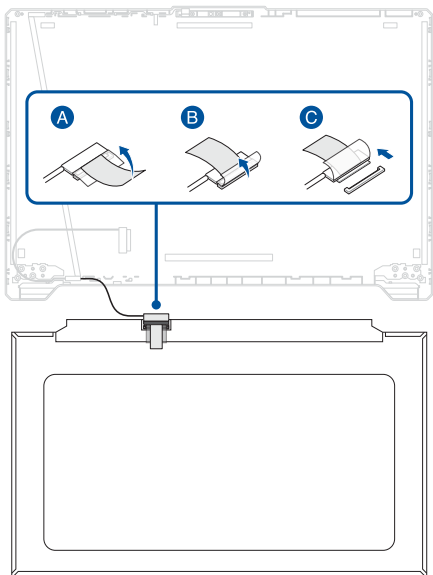
IMPORTANT! Maintain a flat angle and constant speed when pulling the stretch release tape. Excessive force may damage the stretch release tape and prevent removal of the display panel.



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

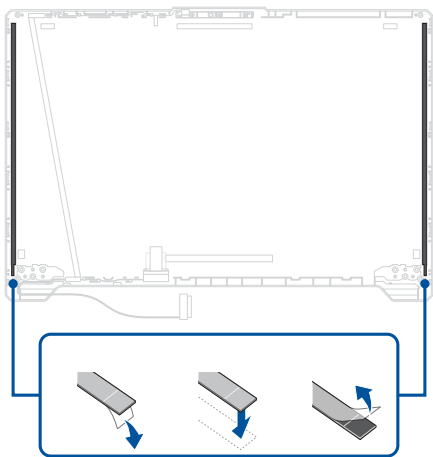


4. Disconnect the cable from the rear side of the display panel.

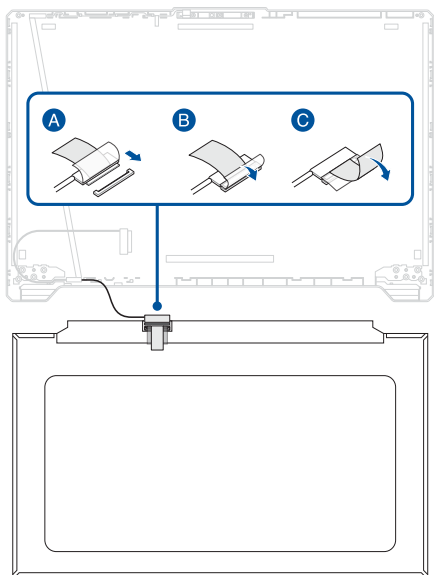


Installation

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.



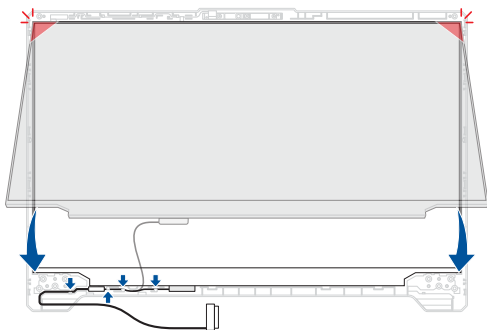
4. Reconnect the cable to the rear side of the display panel.



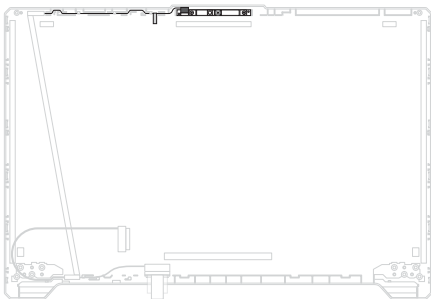
5. Align and install the display panel.
6. Route the cable through the cable guide.

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



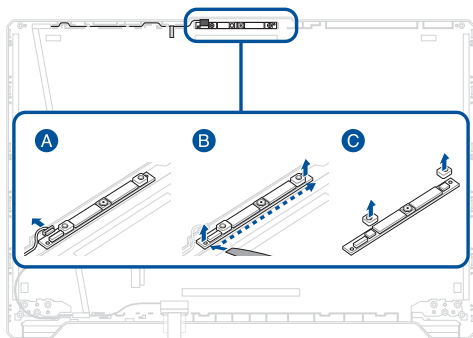
Before you begin

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 following components:
 - Bottom cover
 - Battery
 - Display panel module
 - Display bezel
 - Display hinges
 - Display panel

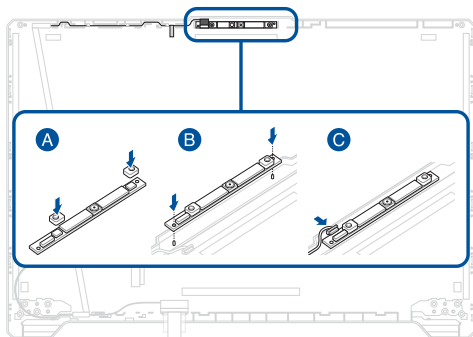
Removal

Carefully disconnect the cable from the camera and remove the camera module, then remove the rubber caps from the camera module.

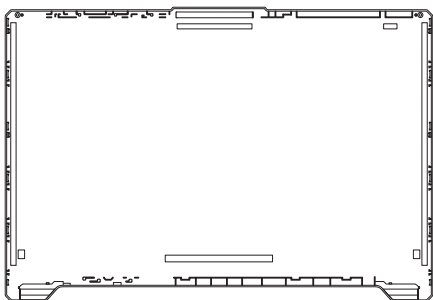


Installation

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



Top cover

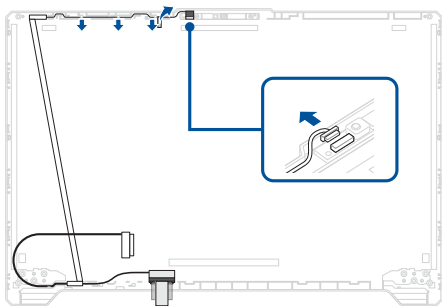


Before you begin

1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the following components:
 - Keyboard module
 - Battery
 - WLAN module
 - LTE module (on selected models)
 - Display panel module
 - Display panel
 - Camera module

Removal

1. Remove the tape.
2. Disconnect the cable and remove the cable completely.

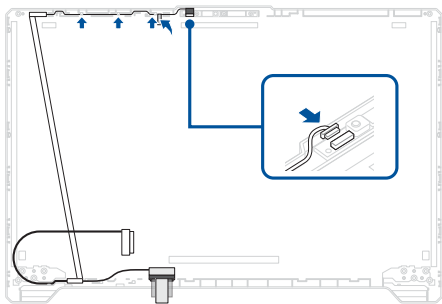


Installation

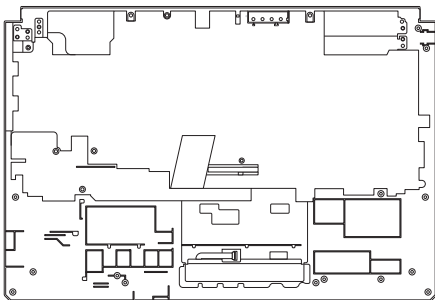
1. Route the cable through the cable guides.

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.

2. Connect the cable and reattach the tape.
3. Install the components you removed in the *Before you begin* section.



Keyboard module



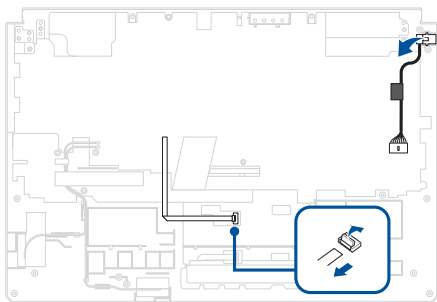
Before you begin

1. Read the **Safety Precautions** and **Pre-repair Checklist**.
2. Remove the following components:
 - Bottom cover
 - Battery
 - M.2 SSD module
 - RAM module
 - WLAN module
 - Fan module and motherboard

- Heat sink
- Display panel module
- Speakers
- LED board

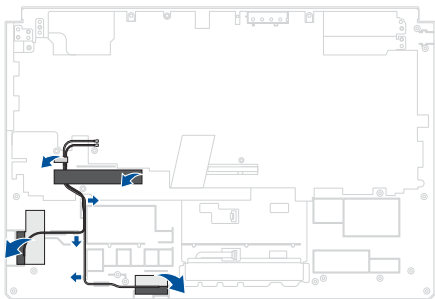
Removal

1. Disconnect and remove the FFC cable.
2. Remove the power supply cable.



3. Remove the tape, then remove the antenna cable(s) as shown in the illustration below.

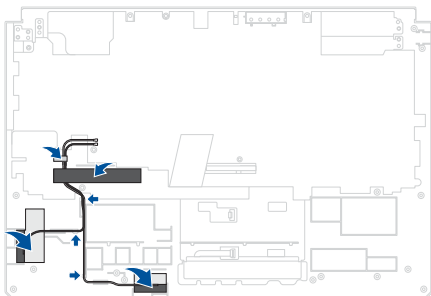
IMPORTANT! The antenna cable(s) cannot be reused once removed.



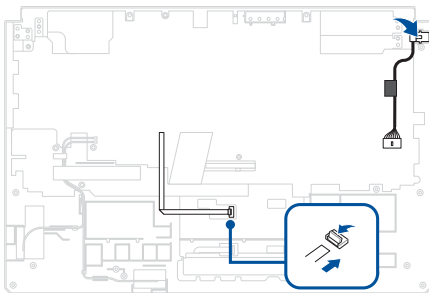
Installation

1. Install the antenna cable(s) and attach the tape.
2. Route the cable(s) through the cable guide(s) and reattach the tape.

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.



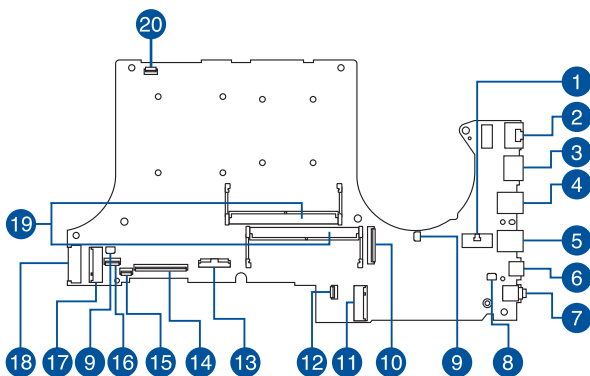
3. Align and install the power supply cable.
4. Reconnect the FFC cable.
5. Install the components you removed in the *Before you begin* section.



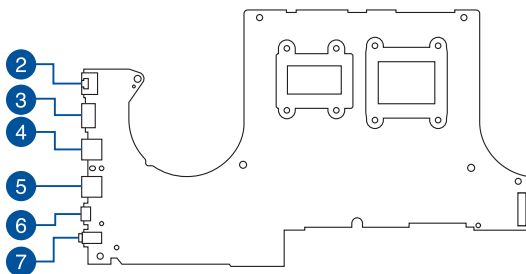
Appendices

Wiring and connection diagrams

Top View



Bottom View



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

