

ThinkSmart One
Hardware Maintenance Manual

ThinkSmart



Lenovo

Read this first

Before using this documentation and the product it supports, ensure that you read and understand the following:

- *Safety and Warranty Guide*
- *Generic Safety and Compliance Notices*

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About this manual

- This guide applies to Lenovo product model(s) listed below. Illustrations in this guide may look slightly different from your product model.
- This manual contains service and reference information for the following Lenovo products.

Model name	Machine type
ThinkSmart One	12BS,12BT, 12BU, 12BW, 12BV, 12BX, 12BY, 12C0, 12CG, 12CH,

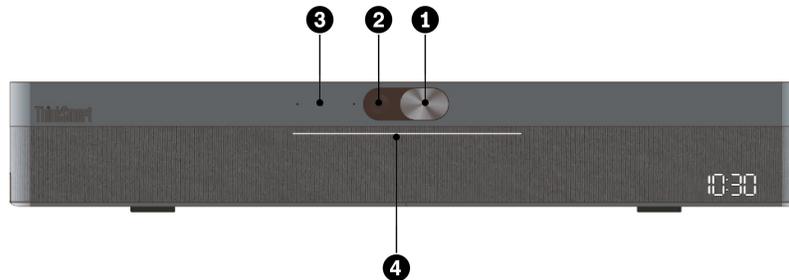
- Use this manual along with the advanced diagnostic tests to troubleshoot problems.

Important: This manual is intended only for trained service technicians who are familiar with these products. Use this manual along with the advanced diagnostic tests to troubleshoot problems effectively. Before servicing one of these products, be sure to read and understand the important safety information in *Generic Safety and Compliance Notices*.

Chapter 1. Product Overview

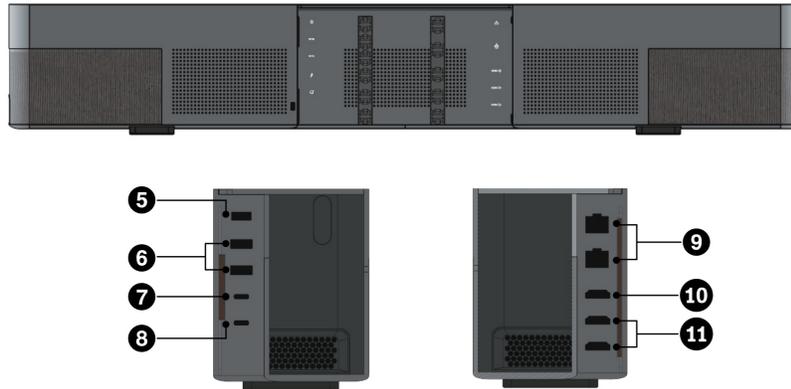
This chapter provides introductions to the connectors of ThinkSmart One. For detailed technical specifications, go to Product Specifications Reference at: psref.lenovo.com.

Front



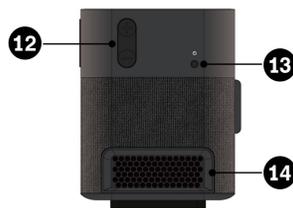
1. Camera cover slider	Move the slider to cover or uncover the camera lens.
2. Camera	Use for video conference.
3. Camera status indicator	Show the camera status of your device. <ul style="list-style-type: none">• On: The camera is working for a video conference.• Off: The camera is off.
4. Power indicator	Show the system status of your device. <ul style="list-style-type: none">• Solid white: The device is powered on and not in meeting.• Solid green: The device is in a meeting or call when it is not muted.• Solid red: The device is muted.• Blinking green: A call is on hold.• Green dot flowing from both sides to center: There is an incoming call.

Rear



5. Power connector	Connect to a power supply.
6. USB 3.2 connector Gen 1	Connect a USB-compatible device, such as a USB keyboard or USB mouse.
7. USB-C® connector (USB 3.2 Gen 1)	Connect USB-C compatible devices.
8. USB-C connector (USB 2.0)	Connect to ThinkSmart Controller only.
9. Ethernet connector	Connect to a local area network (LAN).
10. HDMI-in connector	Connect to your computer only. Do not connect an external HDMI™ display to this connector. External HDMI display must be connected to HDMI-out connection.
11. HDMI-out connector	Connect to an external HDMI display. This HDMI 1.4 connector supports display resolutions up to 3840 x 2160 pixels, 30 Hz.

Right



12. Volume button	Adjust volume.
13. Power button	<ul style="list-style-type: none">• Press to power on the device.• Press for 4 seconds to power off the device.
14. Ventilation holes (out)	Maintain the outgoing airflow to dissipate internal heat.

Statement on USB transfer rate

Depending on many factors such as the processing capability of the host and peripheral devices, file attributes, and other factors related to system configuration and operating environments, the actual transfer rate using the various USB connectors on this device will vary and will be slower than the data rate listed below for each corresponding device.

USB device	Data rate (Gbit/s)
3.2 Gen 2 / 3.1 Gen 2	10
Thunderbolt 3	40

Chapter 2. General checkout

Before you go to the checkout guide, be sure to read the following important notes.

Important notes:

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

What to do first

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

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

Note: During the warranty period, the customer may be responsible for repair costs if the product damage was caused by misuse, accident, modification, unsuitable physical or operating environment, or improper maintenance by the customer. Following is a list of some common items that are not covered under warranty and some symptoms that might indicate that the system was subject to stress beyond normal use.

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

The following are not covered under warranty:

- Display cracked from the application of excessive force or from being dropped
- Scratched (cosmetic) component
- Distortion, deformation, or discoloration of the cosmetic component
- Plastic parts, latches, pins, or connectors that have been cracked or broken by excessive force
- Damage caused by liquid spilled into the system
- Damage caused by the improper insertion of a PC Card or the installation of an incompatible card
- Forgotten product password (making the product unusable)
- Use of an incorrect ac power adapter on laptop products

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

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

Chapter 3. Hardware removal and installation

This chapter provides instructions on how to remove and install hardware for your product. Video tutorials on hardware removal and installation are available at <https://support.lenovo.com/solutions/ht505031>.

Service tool kit

Ensure that the following common service tool kit is prepared before you service the product.

No.	Tool name	Tool type
1	Phillips-head screwdriver	Common tool
2	Torx-head screwdriver (for new Intel Xeon CPUs)	Common tool
3	Pry tools	Common tool
4	Conductive tweezers	Common tool
5	Isolated tweezers	Common tool
6	Hexagonal socket	Common tool
7	Silicone grease	Consumable tool
8	Polyamide tape	Consumable tool
9	Mylar tape	Consumable tool
10	Eraser	Consumable tool
11	Electrical tape	Consumable tool
12	Double-sided tape	Consumable tool
13	Conductive tape	Consumable tool

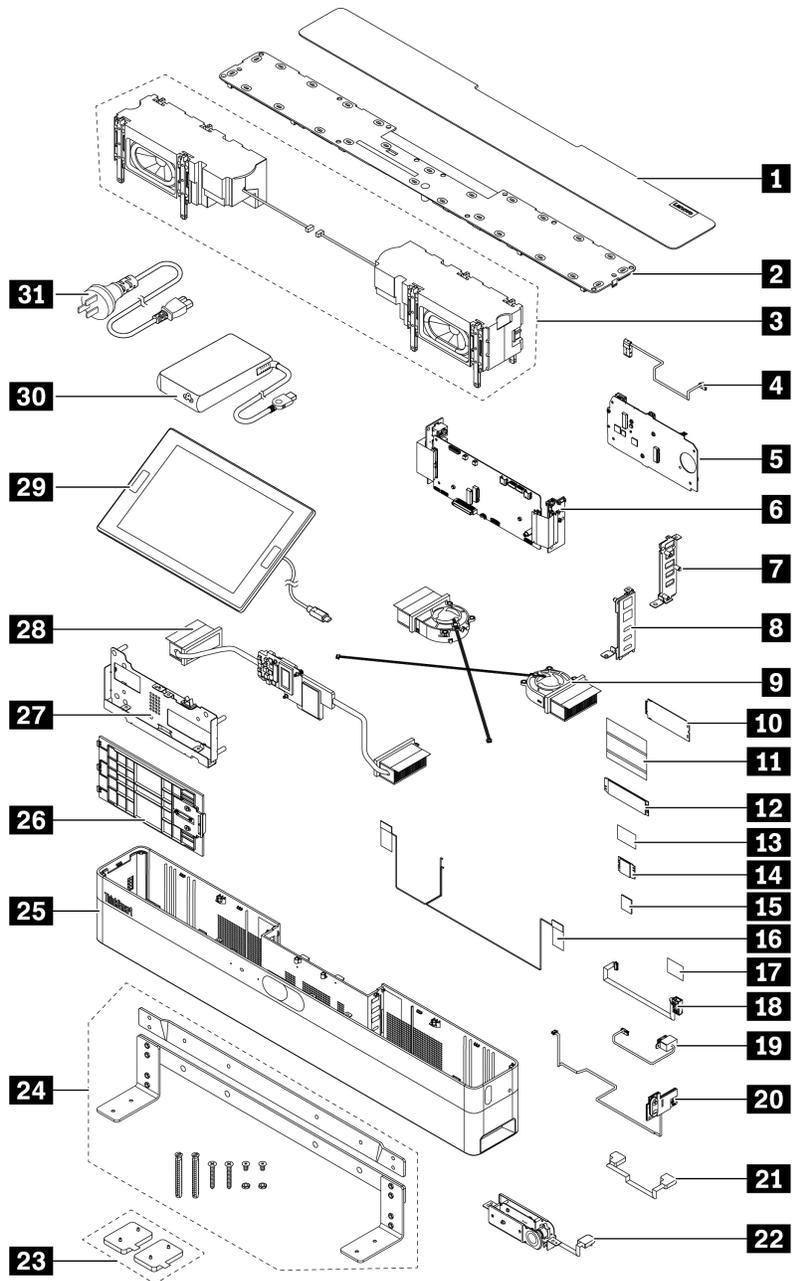
Note: The silicone grease can be applied to the surfaces of the microprocessor and heat sink to eliminate air gaps. The hexagonal socket is used to pick up the antenna connectors.

Major FRUs and CRUs

Your product contains the following types of CRUs and FRUs:

- **Self-service CRUs:** Refer to parts that can be installed or replaced easily by customer themselves or by trained service technicians at an additional cost.
- **Optional-service CRUs:** Refer to parts that can be installed or replaced by customers with a greater skill level. Trained service technicians can also provide service to install or replace the parts under the type of warranty designated for the customer's machine.
- **FRUs:** Refer to parts that must be installed or replaced only by trained service technicians. If customers choose to replace the FRUs by themselves, the product warranty might be affected.

For detailed FRU and CRU information, such as the FRU part numbers and supported models, go to: <http://www.lenovo.com/serviceparts-lookup>



Number	Description	Self-service CRU	Optional-service CRU
1	Top cover	No	No
2	Top frame	No	No
3	Speakers	No	No
4	Skype board power cable	No	No
5	System board	No	No
6	Skype board and I/O board assembly (with I/O board cables)	No	No

Number	Description	Self-service CRU	Optional-service CRU
7	Right I/O board bracket	No	No
8	Left I/O board bracket	No	No
9	Fans	No	No
10	Video capture card	No	No
11	Video capture card AL foil	No	No
12	M.2 solid-state drive	No	No
13	M.2 solid-state drive thermal pad	No	No
14	Wi-Fi® card	No	No
15	Wi-Fi card thermal pad	No	No
16	Wi-Fi antennas	No	No
17	RJ45 thermal pad	No	No
18	RJ45 cable	No	No
19	Power cable	No	No
20	Button board with cable	No	No
21	USB Type-C cable	No	No
22	Camera module	No	No
23	Rubber feet	Yes	No
24	Wall mount bracket & screws	Yes	No
25	Chassis module	No	No
26	Cable door	Yes	No
27	System board bracket	No	No
28	Thermal module	No	No
29	ThinkSmart Controller	Yes	No
30	AC power adapter	Yes	No
31	Power cord	Yes	No

Board connectors

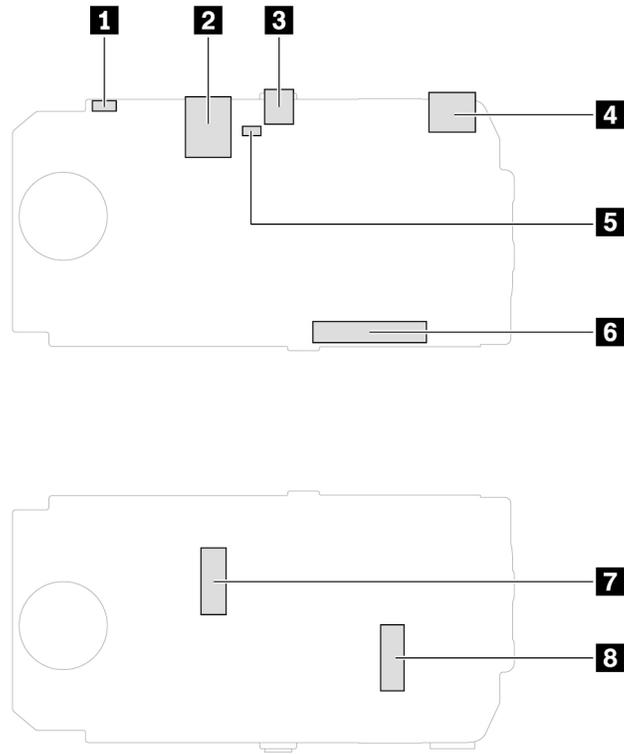


Figure 1. System board

1 Clear CMOS (Complementary Metal Oxide Semiconductor)	2 RJ45 cable connector
3 USB-C connector	4 USB-A connector
5 CMOS battery connector	6 Board-to-board connector
7 M.2 solid-state drive slot	8 Wi-Fi card slot

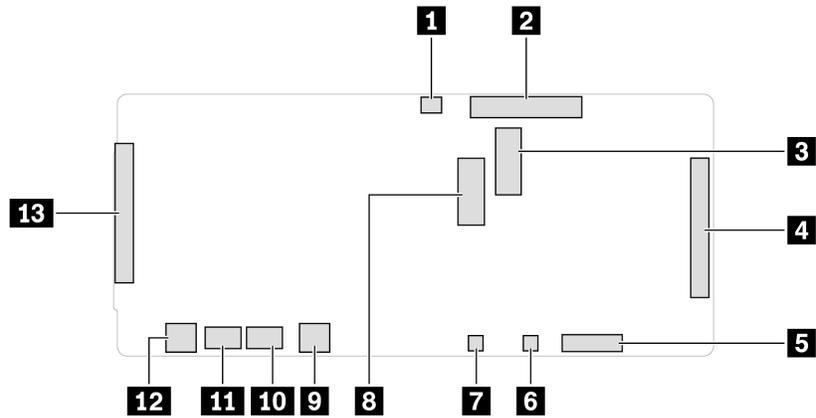


Figure 2. Skype board

1 Thermal sensor connector	2 Board-to-board connector
3 Video capture card slot	4 Left I/O board connector
5 Microphone connector	6 Left speaker connector
7 Right speaker connector	8 DSP card slot
9 USB-C connector	10 DC-out connector
11 DC-in connector	12 USB-C connector
13 Right I/O board connector	

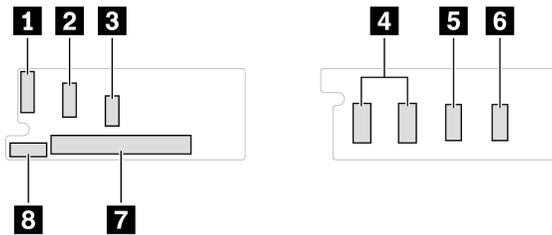


Figure 3. Right I/O board

1 LED cable connector	2 Power board cable connector
3 System fan cable connector	4 USB-A connector
5 USB-C connector	6 USB-C connector (Controller connector)
7 I/O board cable connector	8 Clock cable connector

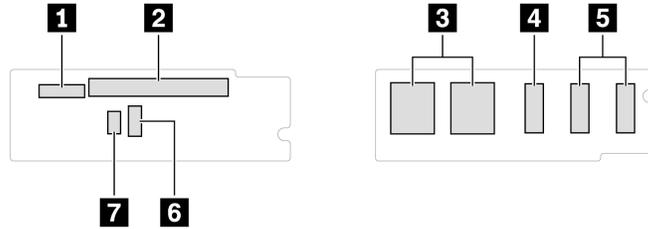


Figure 4. Left I/O board

1 RJ45 cable connector	2 I/O board cable connector
3 Ethernet connector	4 HDMI-in connector
5 HDMI-out connector	6 System fan cable connector
7	

General Guidelines

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

1. Do not try to service any device unless you have been trained and certified. An untrained person runs the risk of damaging parts.
2. Begin by removing any FRUs that have to be removed before replacing the failing FRU. Any such FRUs are listed at the beginning of each FRU replacement procedure. Remove them in the order in which they are listed.
3. Follow the correct sequence in the steps for removing an FRU, as shown in the illustrations by the numbers in square callouts.
4. When removing an FRU, move it in the direction as shown by the arrow in the illustration.
5. To install a new FRU in place, perform the removal procedure in reverse and follow any notes that pertain to replacement.
6. When replacing an FRU, carefully retain and reuse all screws.
7. When replacing the base cover, reapply all labels that come with the replacement base cover. If some original labels are not included with the replacement base cover, peel them off from the original base cover and paste them on the replacement base cover.

Attention: The system board is sensitive to and can be damaged by ESD. Before touching it, establish personal grounding by touching a ground point with one hand or by using an ESD strap.

Remove the wall mount bracket

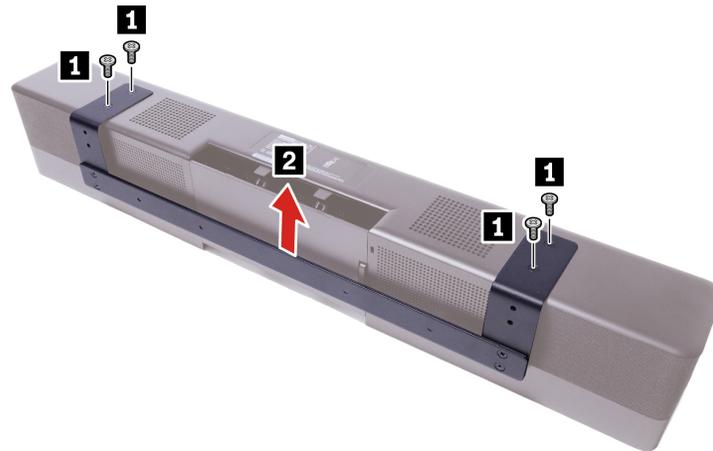
Prerequisite

Before you open the top cover, turn off ThinkSmart One and wait several minutes until it is cool.

For access, do the following:

1. Disconnect the power cord from electrical outlet and disconnect all the cables from the device.
2. Place a clean soft cloth, and then lay down the device with the top cover facing up.

Removal step



Remove the cable door

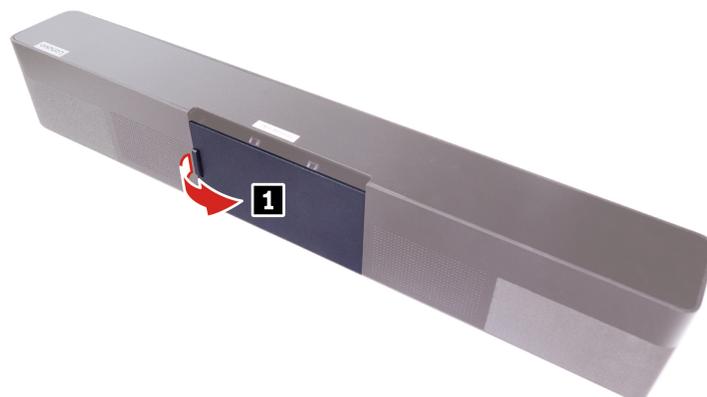
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For access, do the following:

1. Disconnect the power cord from electrical outlet and disconnect all the cables from the device.
2. Place a clean soft cloth, and then lay down the device with the top cover facing up.
3. Remove the wall mount bracket. See “Remove the wall mount bracket” on page 12.

Removal step



Remove the top cover

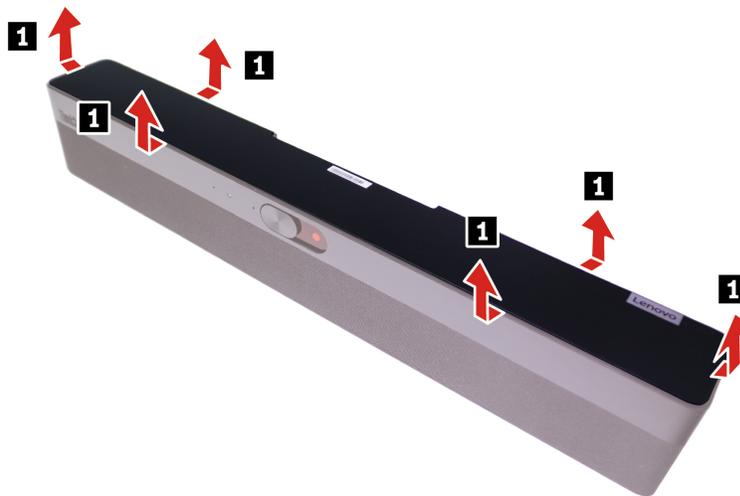
Prerequisite

Before you open the top cover, turn off ThinkSmart One and wait several minutes until it is cool.

For access, do the following:

1. Disconnect the power cord from electrical outlet and disconnect all the cables from the device.
2. Place a clean soft cloth, and then lay down the device with the top cover facing up.
3. Remove the wall mount bracket. See “Remove the wall mount bracket” on page 12
4. Remove the cable door. See “Remove the cable door” on page 13.

Removal step



Remove the top frame

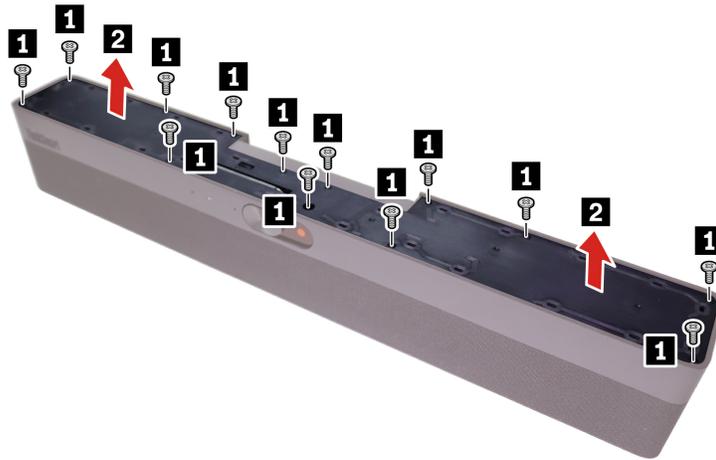
Prerequisite

Before you open the top cover, turn off ThinkSmart One and wait several minutes until it is cool.

For access, remove the following:

- “Remove the wall mount bracket” on page 12
- “Remove the cable door” on page 13
- “Remove the top cover” on page 14

Removal step



Remove the left speaker

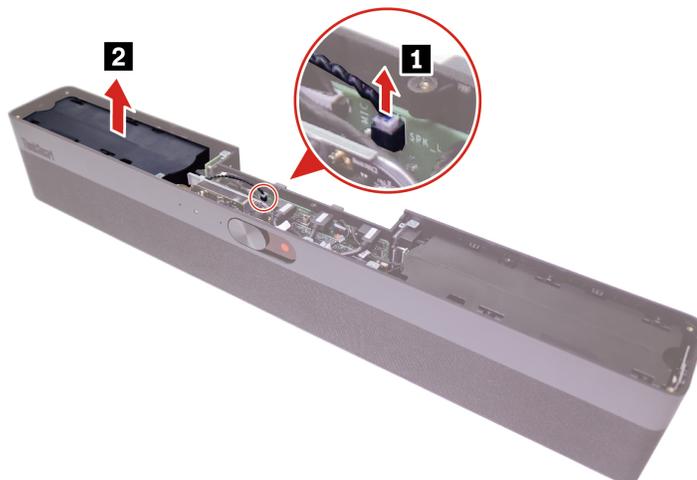
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- “Remove the top cover” on page 14
- “Remove the top frame” on page 14

Removal step



Remove the right speaker

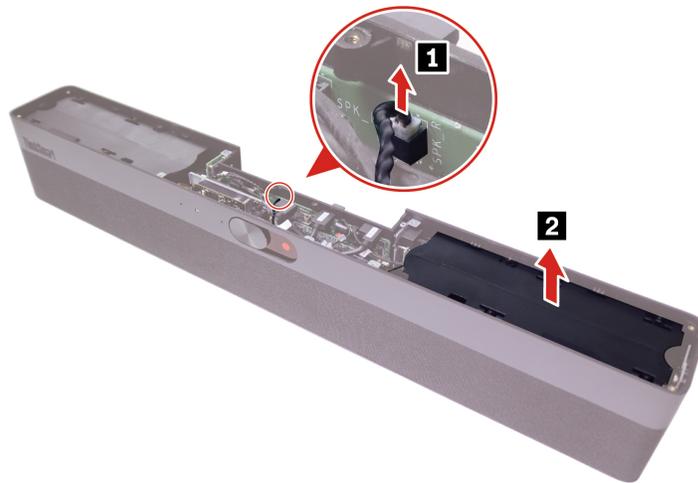
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- “Remove the top frame” on page 14

Removal step



Remove the USB Type-C cable

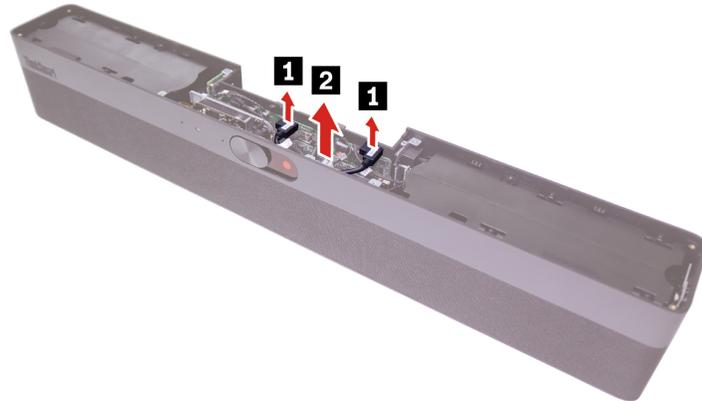
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- “Remove the top frame” on page 14

Removal step



Remove the Skype board power cable

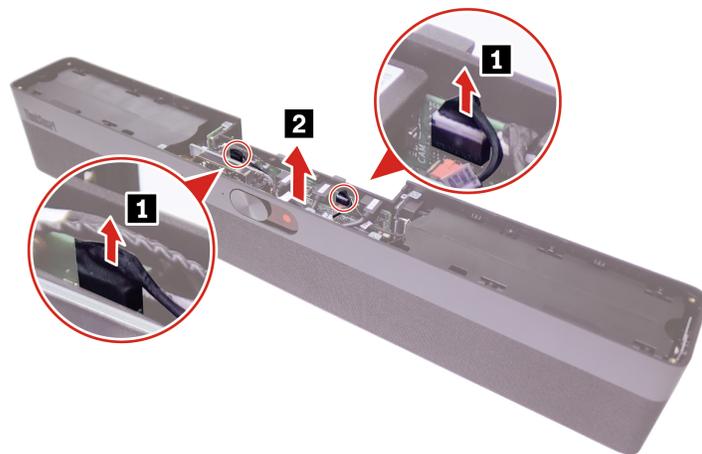
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- “Remove the top cover” on page 14
- “Remove the top frame” on page 14

Removal step



Remove the RJ45 cable

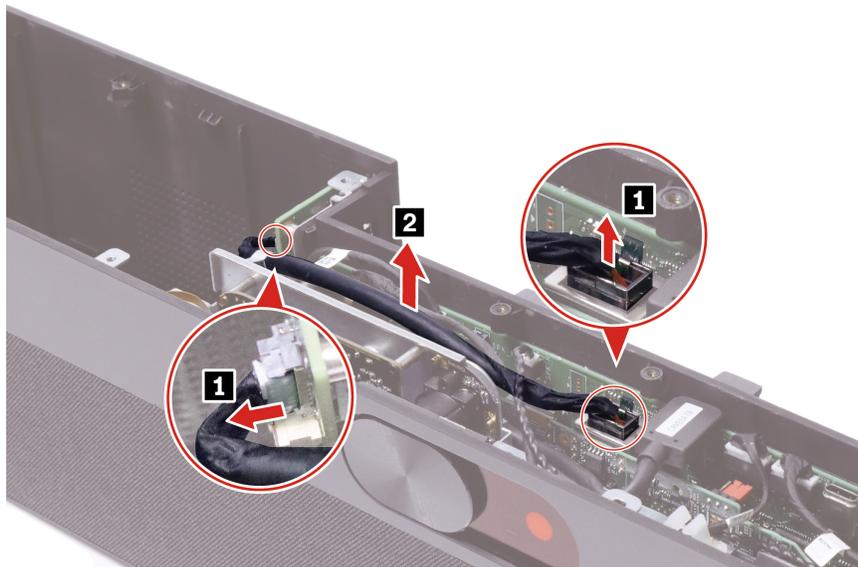
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- “Remove the top cover” on page 14
- “Remove the top frame” on page 14
- “Remove the left speaker” on page 15
- “Remove the USB Type-C cable” on page 16

Removal step



Remove the button board with cable

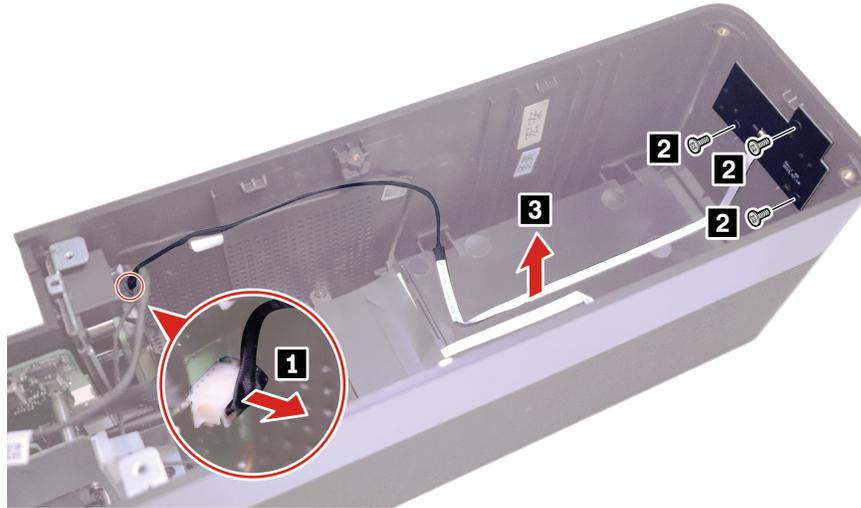
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For access, remove the following:

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- “Remove the top cover” on page 14
- “Remove the top frame” on page 14
- “Remove the right speaker” on page 16

Removal step



Remove the camera module

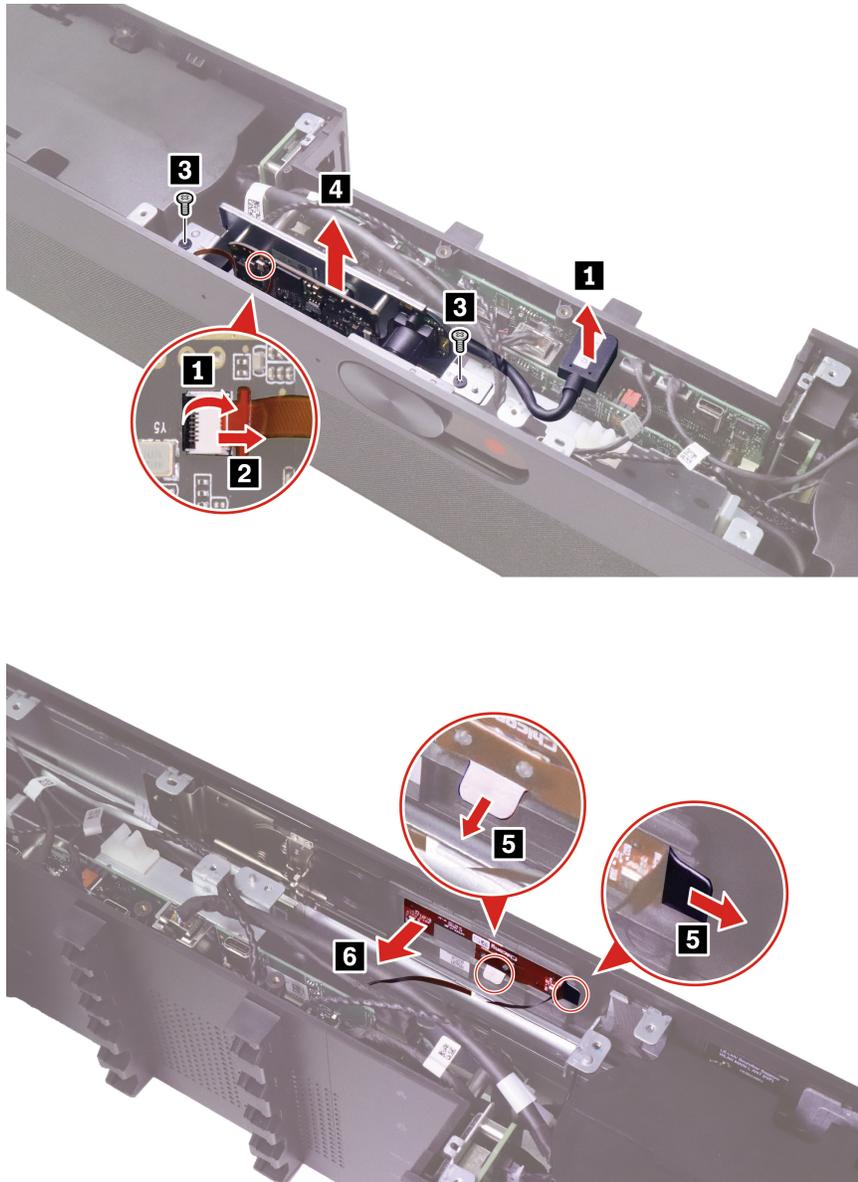
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- “Remove the top cover” on page 14
- “Remove the top frame” on page 14
- “Remove the USB Type-C cable” on page 16

Removal step



Remove the Skype board and I/O board cables

Prerequisite

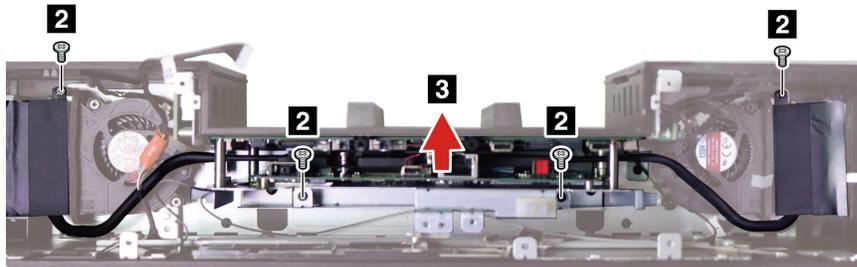
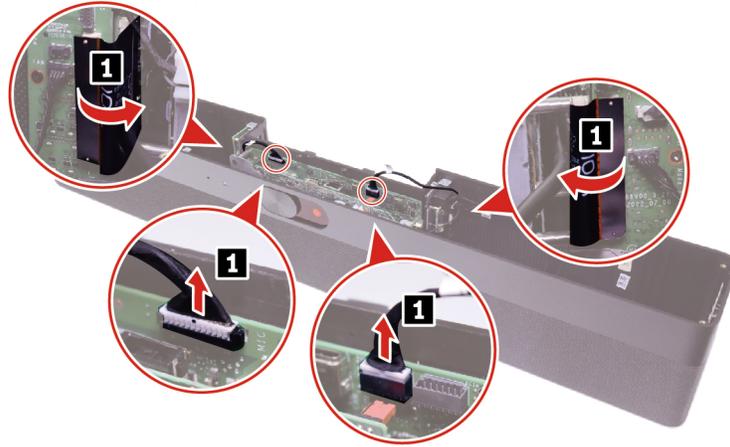
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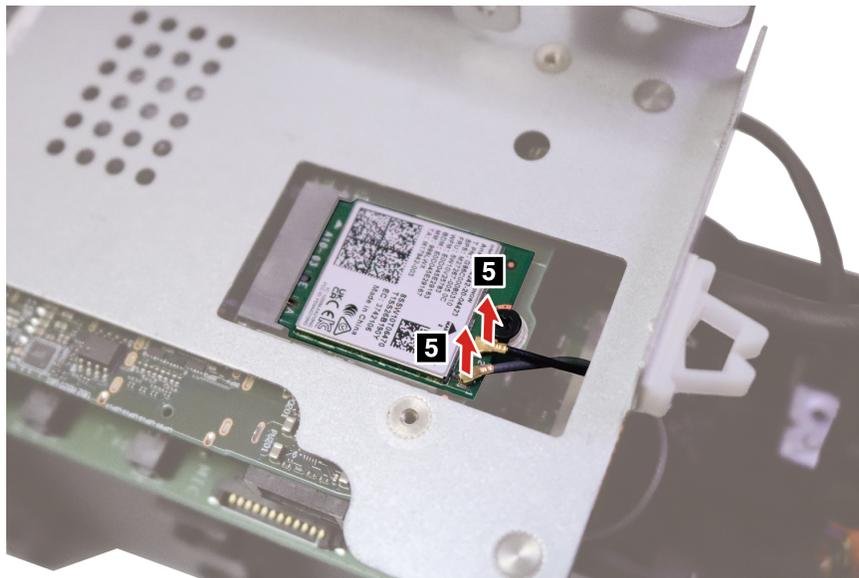
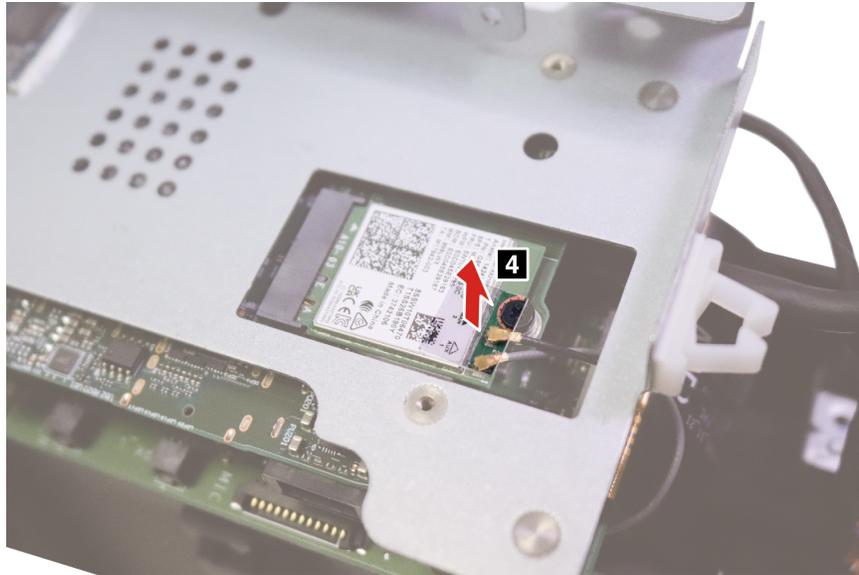
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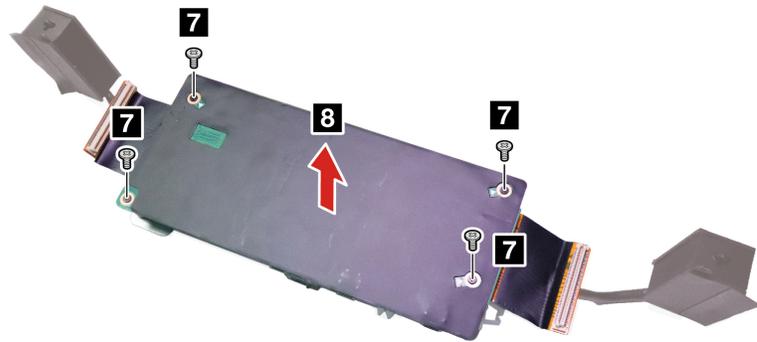
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- “Remove the top frame” on page 14
- “Remove the left speaker” on page 15

- “Remove the right speaker” on page 16
- “Remove the USB Type-C cable” on page 16
- “Remove the Skype board power cable” on page 17
- “Remove the RJ45 cable” on page 18
- “Remove the button board with cable” on page 18
- “Remove the camera module” on page 19

Removal steps







Remove the Wi-Fi antennas

Prerequisite

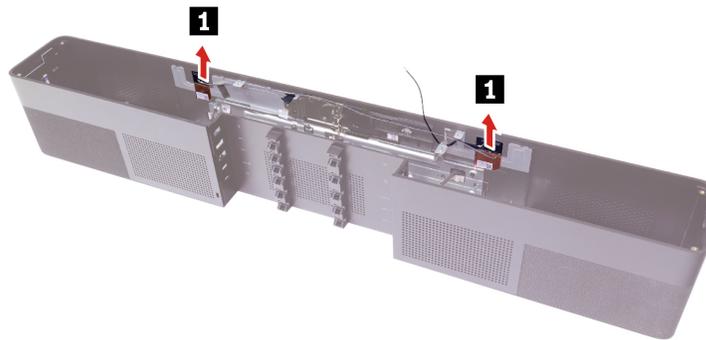
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- “Remove the right speaker” on page 16
- “Remove the USB Type-C cable” on page 16
- “Remove the Skype board power cable” on page 17
- “Remove the RJ45 cable” on page 18
- “Remove the button board with cable” on page 18
- “Remove the camera module” on page 19
- “Remove the Skype board and I/O board cables” on page 20

Removal step



Remove the video capture card and the AL foil

Prerequisite

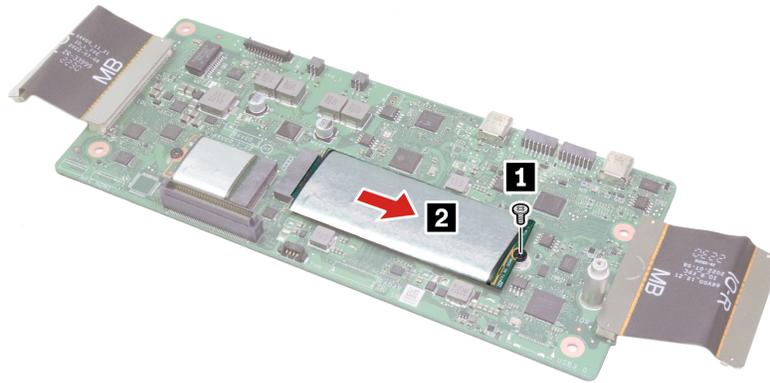
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- “Remove the USB Type-C cable” on page 16
- “Remove the Skype board power cable” on page 17
- “Remove the RJ45 cable” on page 18
- “Remove the button board with cable” on page 18

- “Remove the camera module” on page 19
- “Remove the Skype board and I/O board cables” on page 20

Removal step



Remove the thermal module with thermal pad

Prerequisite

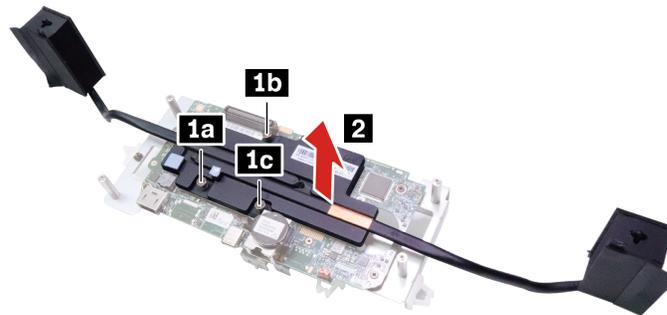
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- “Remove the Skype board power cable” on page 17
- “Remove the RJ45 cable” on page 18
- “Remove the button board with cable” on page 18
- “Remove the camera module” on page 19
- “Remove the Skype board and I/O board cables” on page 20

Removal step



Remove the system board and RJ45 thermal pad

Prerequisite

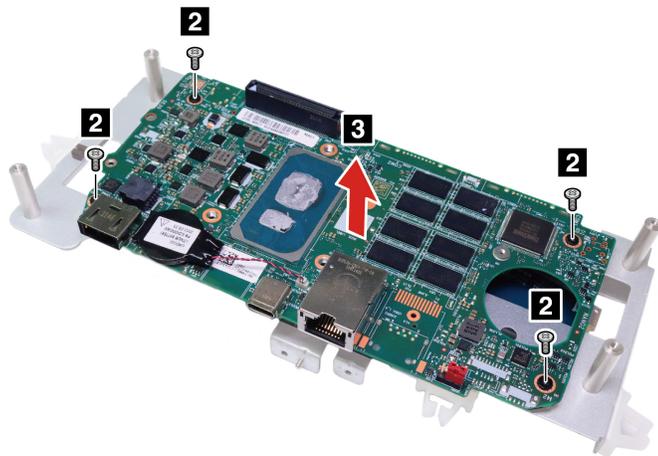
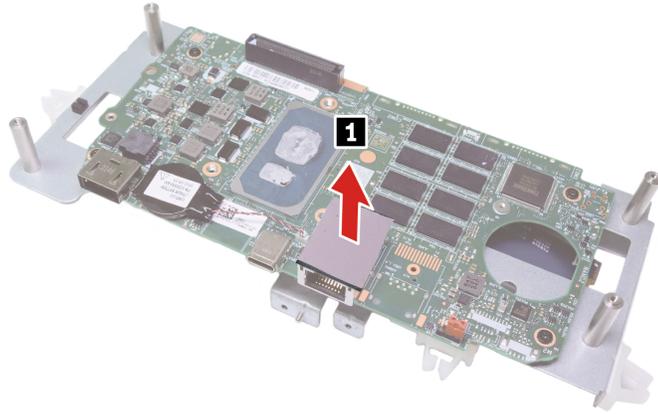
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- “Remove the USB Type-C cable” on page 16
- “Remove the Skype board power cable” on page 17
- “Remove the RJ45 cable” on page 18
- “Remove the button board with cable” on page 18
- “Remove the camera module” on page 19

- “Remove the Skype board and I/O board cables” on page 20
- “Remove the thermal module with thermal pad” on page 25

Removal step



Remove the system board bracket

Prerequisite

Before you open the top cover, turn off ThinkSmart One and wait several minutes until it is cool.

For access, remove the following:

- “Remove the wall mount bracket” on page 12

- “Remove the cable door” on page 13
- “Remove the top cover” on page 14
- “Remove the top frame” on page 14
- “Remove the left speaker” on page 15
- “Remove the right speaker” on page 16
- “Remove the USB Type-C cable” on page 16
- “Remove the Skype board power cable” on page 17
- “Remove the RJ45 cable” on page 18
- “Remove the button board with cable” on page 18
- “Remove the camera module” on page 19
- “Remove the Skype board and I/O board cables” on page 20
- “Remove the thermal module with thermal pad” on page 25
- “Remove the system board and RJ45 thermal pad” on page 26

Remove the M.2 solid-state drive and thermal pad

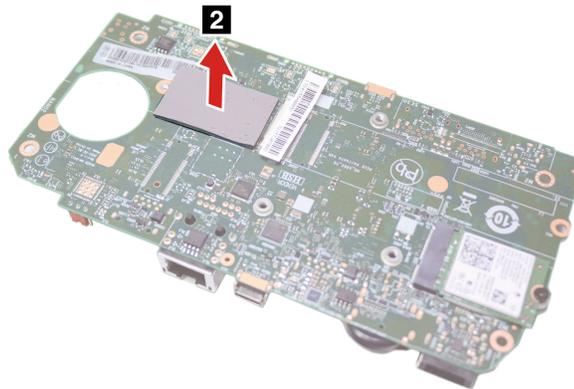
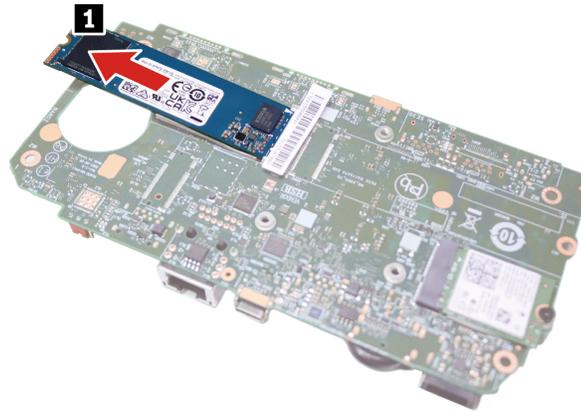
Prerequisite

Before you open the top cover, turn off ThinkSmart One and wait several minutes until it is cool.

For access, remove the following:

- “Remove the wall mount bracket” on page 12
- “Remove the cable door” on page 13
- “Remove the top cover” on page 14
- “Remove the top frame” on page 14
- “Remove the left speaker” on page 15
- “Remove the right speaker” on page 16
- “Remove the USB Type-C cable” on page 16
- “Remove the Skype board power cable” on page 17
- “Remove the RJ45 cable” on page 18
- “Remove the button board with cable” on page 18
- “Remove the camera module” on page 19
- “Remove the Skype board and I/O board cables” on page 20
- “Remove the thermal module with thermal pad” on page 25
- “Remove the system board and RJ45 thermal pad” on page 26

Removal steps



Remove the Wi-Fi card and thermal pad

Prerequisite

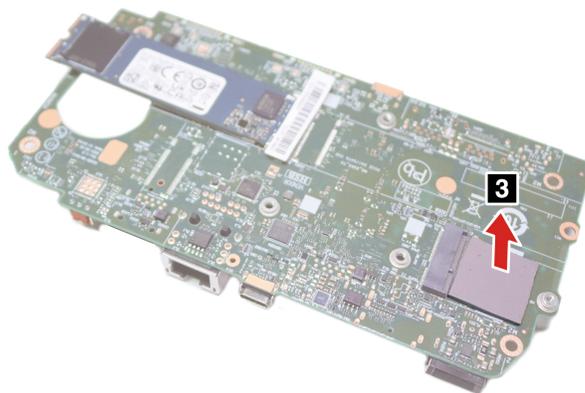
Before you open the top cover, turn off ThinkSmart One and wait several minutes until it is cool.

For access, remove the following:

- “Remove the wall mount bracket” on page 12
- “Remove the cable door” on page 13
- “Remove the top cover” on page 14
- “Remove the top frame” on page 14

- “Remove the left speaker” on page 15
- “Remove the right speaker” on page 16
- “Remove the USB Type-C cable” on page 16
- “Remove the Skype board power cable” on page 17
- “Remove the RJ45 cable” on page 18
- “Remove the button board with cable” on page 18
- “Remove the camera module” on page 19
- “Remove the Skype board and I/O board cables” on page 20
- “Remove the thermal module with thermal pad” on page 25
- “Remove the system board and RJ45 thermal pad” on page 26

Removal steps



Remove the left fan

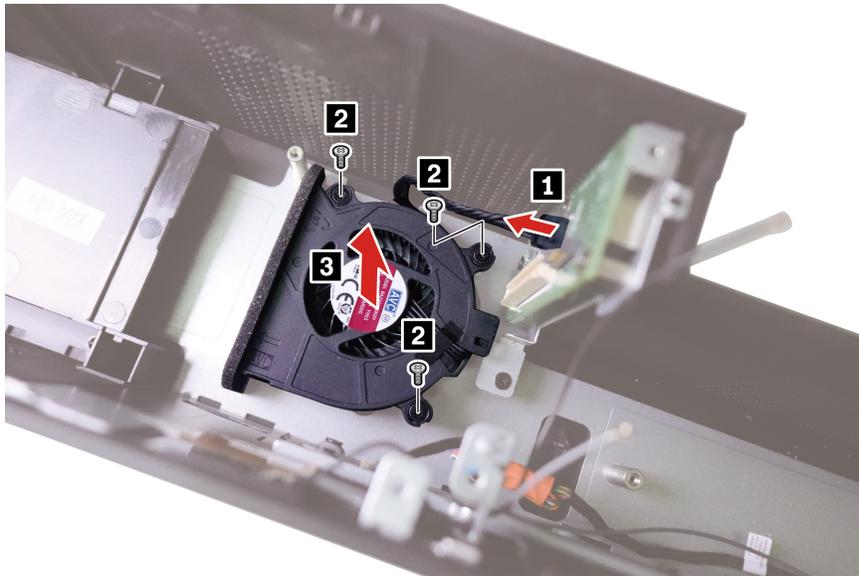
Prerequisite

Before you open the top cover, turn off ThinkSmart One and wait several minutes until it is cool.

For access, remove the following:

- “Remove the wall mount bracket” on page 12
- “Remove the cable door” on page 13
- “Remove the top cover” on page 14
- “Remove the top frame” on page 14
- “Remove the left speaker” on page 15
- “Remove the right speaker” on page 16
- “Remove the USB Type-C cable” on page 16
- “Remove the Skype board power cable” on page 17
- “Remove the RJ45 cable” on page 18
- “Remove the button board with cable” on page 18
- “Remove the camera module” on page 19
- “Remove the Skype board and I/O board cables” on page 20

Removal step



Remove the right fan

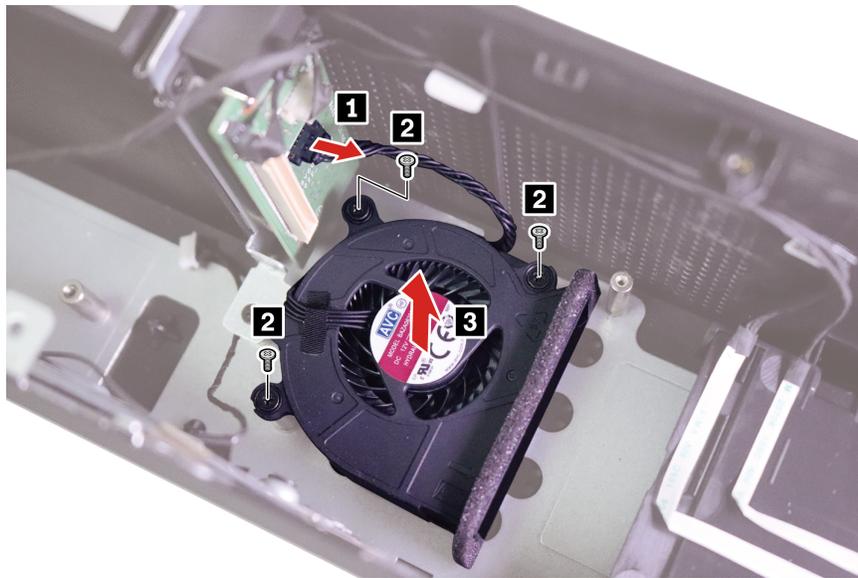
Prerequisite

Before you open the top cover, turn off ThinkSmart One and wait several minutes until it is cool.

For access, remove the following:

- “Remove the wall mount bracket” on page 12
- “Remove the cable door” on page 13
- “Remove the top cover” on page 14
- “Remove the top frame” on page 14
- “Remove the left speaker” on page 15
- “Remove the right speaker” on page 16
- “Remove the USB Type-C cable” on page 16
- “Remove the Skype board power cable” on page 17
- “Remove the RJ45 cable” on page 18
- “Remove the button board with cable” on page 18
- “Remove the camera module” on page 19
- “Remove the Skype board and I/O board cables” on page 20

Removal step



Remove the left I/O board and bracket

Prerequisite

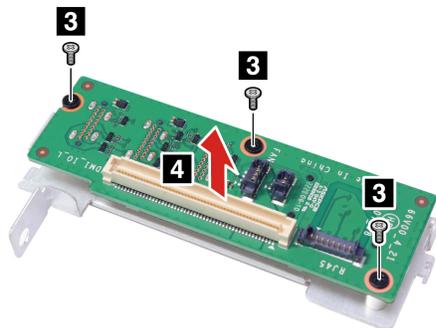
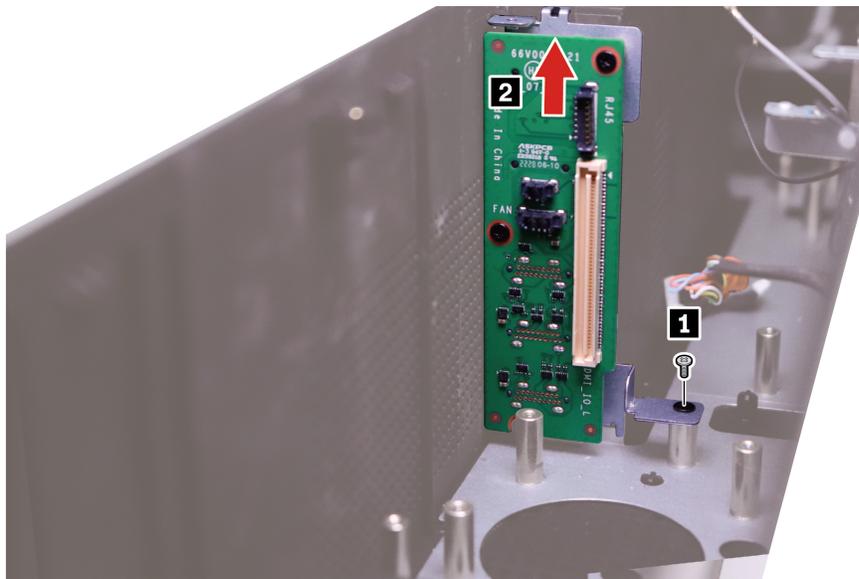
Before you open the top cover, turn off ThinkSmart One and wait several minutes until it is cool.

For access, remove the following:

- “Remove the wall mount bracket” on page 12
- “Remove the cable door” on page 13
- “Remove the top cover” on page 14
- “Remove the top frame” on page 14

- “Remove the left speaker” on page 15
- “Remove the right speaker” on page 16
- “Remove the USB Type-C cable” on page 16
- “Remove the Skype board power cable” on page 17
- “Remove the RJ45 cable” on page 18
- “Remove the button board with cable” on page 18
- “Remove the camera module” on page 19
- “Remove the Skype board and I/O board cables” on page 20
- “Remove the left fan” on page 31

Removal steps



Remove the right I/O board and bracket

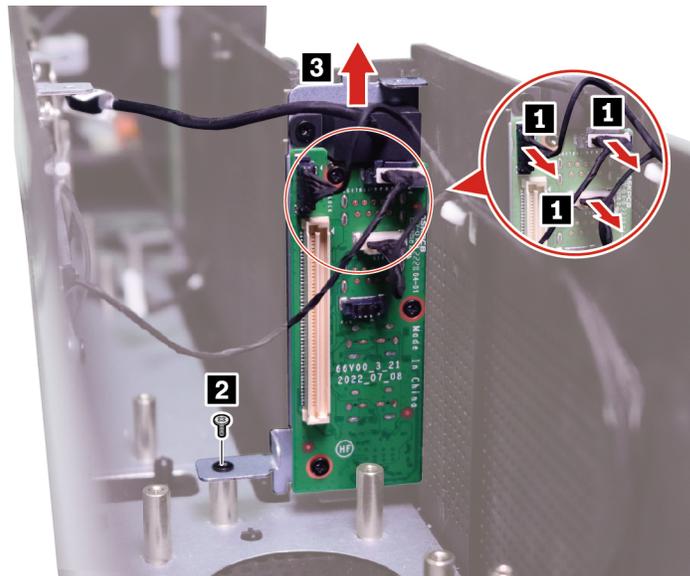
Prerequisite

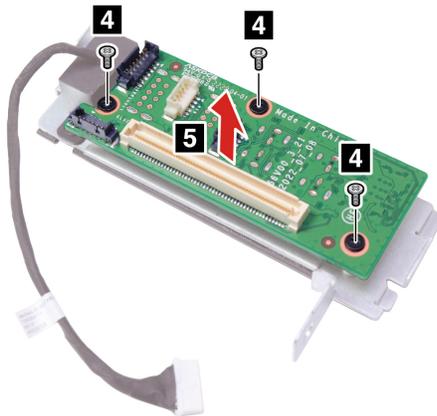
Before you open the top cover, turn off ThinkSmart One and wait several minutes until it is cool.

For access, remove the following:

- “Remove the wall mount bracket” on page 12
- “Remove the cable door” on page 13
- “Remove the top cover” on page 14
- “Remove the top frame” on page 14
- “Remove the left speaker” on page 15
- “Remove the right speaker” on page 16
- “Remove the USB Type-C cable” on page 16
- “Remove the Skype board power cable” on page 17
- “Remove the RJ45 cable” on page 18
- “Remove the button board with cable” on page 18
- “Remove the camera module” on page 19
- “Remove the Skype board and I/O board cables” on page 20
- “Remove the right fan” on page 31

Removal steps





Remove the power cable

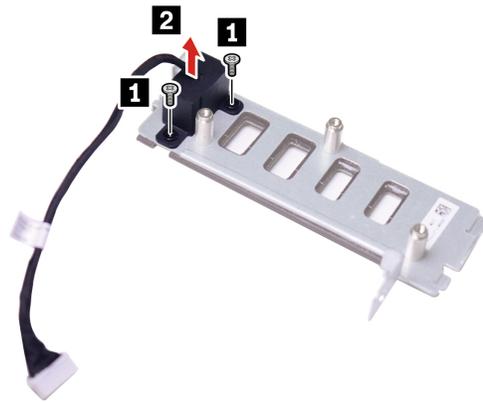
Prerequisite

Before you open the top cover, turn off ThinkSmart One and wait several minutes until it is cool.

For access, remove the following:

- “Remove the wall mount bracket” on page 12
- “Remove the cable door” on page 13
- “Remove the top cover” on page 14
- “Remove the top frame” on page 14
- “Remove the left speaker” on page 15
- “Remove the right speaker” on page 16
- “Remove the USB Type-C cable” on page 16
- “Remove the Skype board power cable” on page 17
- “Remove the RJ45 cable” on page 18
- “Remove the button board with cable” on page 18
- “Remove the camera module” on page 19
- “Remove the Skype board and I/O board cables” on page 20
- “Remove the right fan” on page 31
- “Remove the right I/O board and bracket” on page 34

Removal step



Chapter 4. Help and support

This chapter describes the various help and support resources.

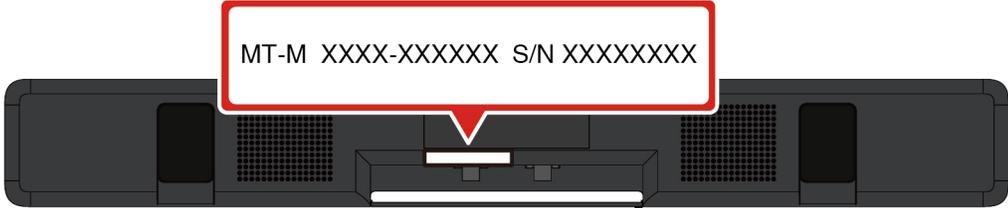
Help resources

Use the following resources to learn more about the product and support.

Resource	How to access?
Support and service: <ul style="list-style-type: none">• Frequently Asked Questions• Troubleshooting• Recovery• Drivers and Software	Go to https://smartsupport.lenovo.com/ , enter the product name, Machine Type or Serial Number and find the resources you want.
Microsoft Windows <ul style="list-style-type: none">• Windows help	<ul style="list-style-type: none">• Open the Start menu and click Get Help or Tips.• Use Windows Search or the Cortana® personal assistant.• Microsoft support Web site: https://support.microsoft.com
Microsoft Teams Rooms, Zoom Rooms	Go to: https://support.lenovo.com/us/en/solutions/ht514061
Lenovo ThinkSmart Manager Service	Go to: https://support.lenovo.com/solutions/tsm

Appendix A. Serial Number Location

Refer to the illustrations to find your product Serial Number.



Appendix B. Notices and trademarks

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