ThinkSmart Tiny Kit
Hardware Maintenance Manual

Lenovo
ThinkSmart
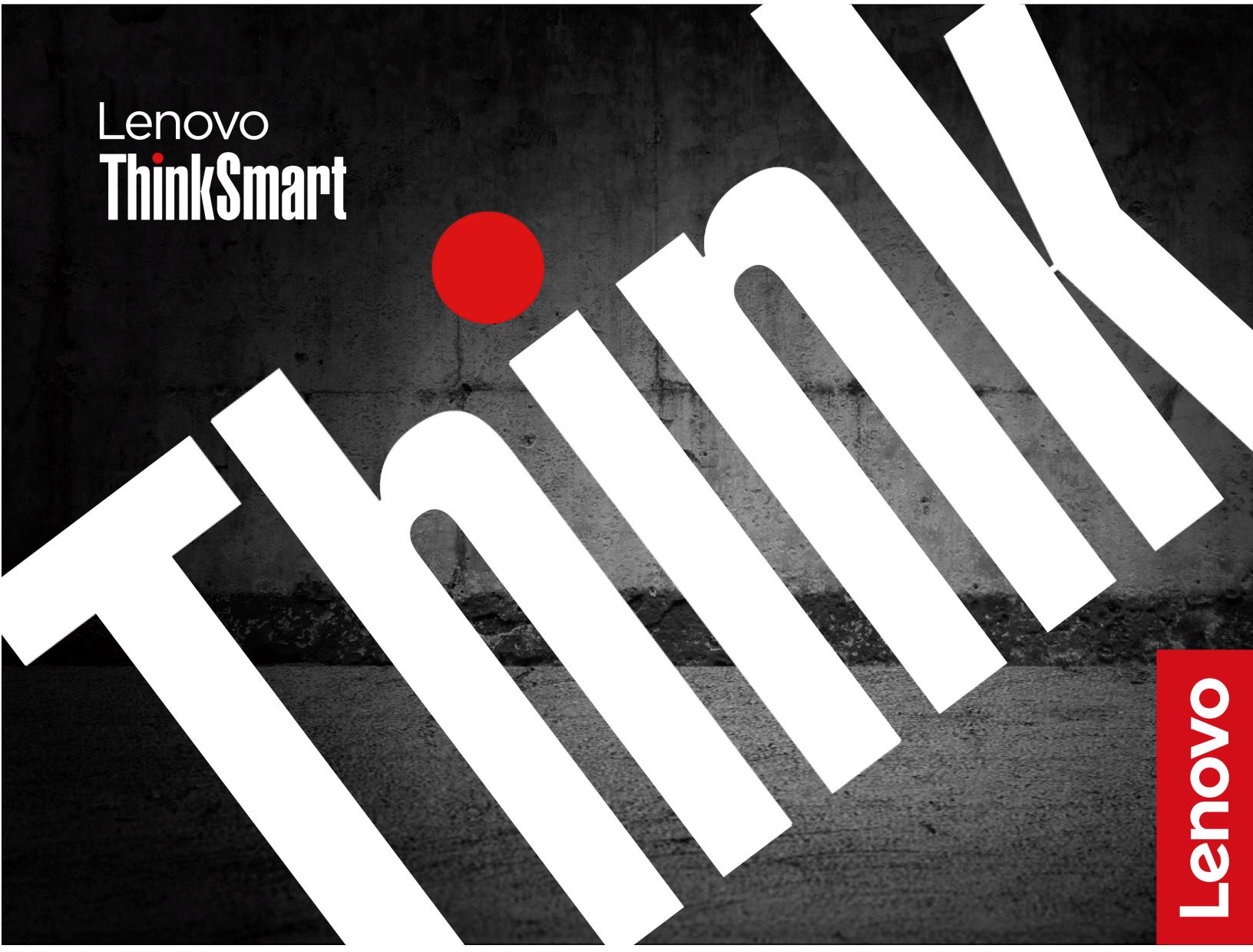
Contents

About this manual

This manual provides service and reference information for ThinkSmart® devices listed on the front cover.

Illustrations in this manual might look different from your product.

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 ThinkSmart devices. Use this manual along with the advanced diagnostic tests to troubleshoot problems effectively. Before servicing a ThinkSmart device, be sure to read and understand *Generic Safety and Compliance Notices* at https://smartsupport.lenovo.com.

Chapter 1. Product overview

Front
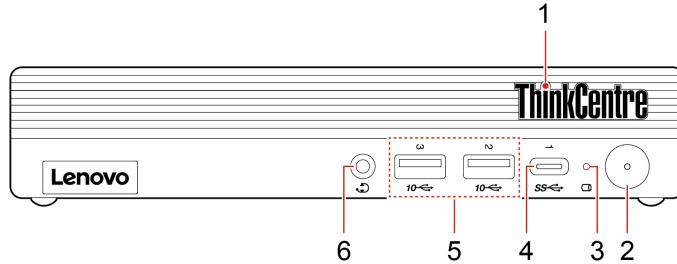
Item	Description	Item	Description
1	ThinkCentre® LED	2	Power button with power indicator
3	Storage drive activity indicator	4	USB-C® connector (USB 5Gbps) for ThinkSmart Controller
5	USB-A connectors (USB 10Gbps)	6	Headset connector

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 in the connector name for each corresponding device.

Power indicator

Show the system status of your device.

- **On:** The device is starting up or working.
- **Off:** The device is off.

Rear
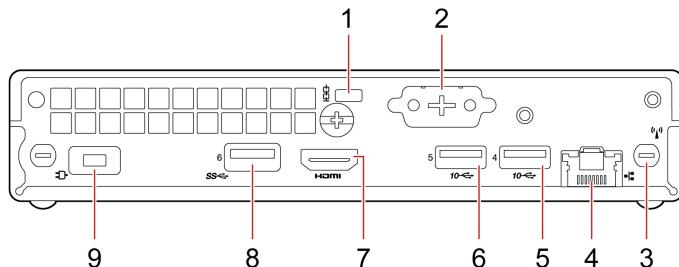
Item	Description	Item	Description
1	Security-lock slot	2	Optional connector
3	Wi-Fi® antenna slot	4	Ethernet connector

Item	Description	Item	Description
5	USB-A connector (USB 10Gbps) for HDMI Ingest Dongle	6	USB-A connector (USB 10Gbps)
7	HDMI™ out connector	8	USB-A connector (USB 5Gbps)
9	Power connector		

Optional connector

Depending on the device model, the connector might be a USB-C connector.

Chapter 2. General checkout

Some descriptions in this chapter might not apply to your particular device.

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

Important notes:

- **We recommend that service be performed by a certified service technician. If you choose to perform the service yourself, please follow all instructions carefully.**

- **Before replacing any FRU, read the entire page on removing and replacing FRUs.**

- **When you replace s, it is recommended to use new nylon-coated screws.**

- **Be extremely careful during such write operations as copying, saving, or formatting.** Drives in the device 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

Before checking problems with the device, 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 device password (making the device unusable)
- Use of an incorrect ac power adapter on laptop devices

The following symptoms might indicate damage caused by nonwarranted activities:
- Missing part might be a symptom of 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. Service checkout and symptom-to-FRU index

This chapter provides information about general service checkout and symptom-to-FRU index.

Service checkout

Attention: The drives in the device you are servicing might have been rearranged or the drive startup sequence changed. Be extremely careful during write operations such as copying, saving, or formatting. Data or programs can be overwritten if you select an incorrect drive.

General error messages appear if a problem or conflict is found by a program, the operating system, or both. For an explanation of these messages, refer to the information supplied with that software package.

Use the following procedure to help determine the cause of the problem:

1. Turn off the device and all external devices.

2. Check all cables and power cords.

3. Set all display controls to the middle position.

4. Turn on all external devices.

5. Turn on the device.
   - Look for displayed error codes.
   - Look for readable instructions or a main menu on the display.

   If you *did not* receive the correct response, proceed to step 6 on page 5.

   If you *do* receive the correct response, proceed to step 7 on page 5.

6. Look at the following conditions and follow the instructions:

   - If the device displays a POST error, go to "POST error codes" on page 7.

   - If the device hangs and no error is displayed, continue at step 7 on page 5.

7. Run the Diagnostic programs.

   - If you receive an error, replace the part that the diagnostic program calls out.

   - If the test stops and you cannot continue, replace the last device tested.

Problem determination tips

Due to the variety of hardware and software combinations that can be encountered, use the following information to assist you in problem determination. If possible, have this information available when requesting assistance from Service Support and Engineering functions.

- Machine type and model

- Processor or hard disk drive upgrades

- Failure symptom

  - Do diagnostics indicate a failure?

  - What, when, where, single, or multiple systems?

  - Is the failure repeatable?

  - Has this configuration ever worked?

  - If it has been working, what changes were made prior to its failing?

  - Is this the original reported failure?

- Diagnostics version

  – Type and version level

- Hardware configuration

  – Print (print screen) configuration currently in use

  – BIOS level

- Operating system software

  – Type and version level

Notes: To eliminate confusion, identical systems are considered identical only if they:

1. Are the exact machine types and models

2. Have the same BIOS level

3. Have the same adapters/attachments in the same locations

4. Have the same address jumpers/terminators/cabling

5. Have the same software versions and levels

6. Have the same Diagnostic Diskettes (version)

7. Have the same configuration options set in the system

8. Have the same setup for the operating system control files

Comparing the configuration and software set-up between "working and non-working" systems will often lead to problem resolution.

Symptom-to-FRU index

The Symptom-to-FRU index lists error symptoms and possible causes. The most likely cause is listed first. Always begin with "Service checkout" on page 5. This index can also be used to help you decide which FRUs to have available when servicing a device.

Notes:

- The Symptom-to-FRU index is not specific to any machine type and are applicable to all devices.

- If you have both an error message and an incorrect audio response, diagnose the error message first.

- If you cannot run the diagnostic tests or you get a diagnostic error code when running a test, but did receive a POST error message, diagnose the POST error message first.

- If you did not receive any error message, look for a description of your error symptoms in the first part of this index.

Power supply problems

If you suspect a power problem, use the following procedures.

Check/Verify	FRU/Action
Check the following for proper installation. • Power cord • On/Off switch connector • On/Off switch power supply connector • System board power supply connectors • Microprocessor connection	Reseat connectors
Check the power cord for continuity.	Power cord
Check the power-on switch for continuity.	Power-on switch

POST error codes

Each time you turn on the system, it performs a series of tests that check the operation of the system and some options. This series of tests is called the *Power-On Self-Test*, or *POST*. POST checks the following operations:

• Some basic system-board operations
• Memory operation
• Video operation
• Whether the boot drive is working

If the POST detects a problem, an error message appears on the screen. A single problem might cause several error messages to appear. When you correct the cause of the first error message, the other error messages probably will not appear on the screen the next time.

Error code	POST error message	Description/Action
0135	CPU fan failure System fan failure Power fan failure Front fan failure Rear fan failure Auxiliary fan failure ODD fan failure	This error message is displayed when a fan fails and the system might be overheating. Press F10 to exit.
0162	Setup data integrity check failure	This error indicates the checksum of BIOS Setup data in NVRAM is bad. In BIOS Setup, the "Save Changes and Exit" operation is needed in order to clear this error.
0164	Memory configuration change has occurred	This error message is displayed when the memory size is changed. Press F10 to exit.
1762	Storage device configuration change has occurred	This error message is displayed when a hard disk drive change or an optical drive change has been made. Press F10 to exit.

Error code	POST error message	Description/Action
8998	Not enough shadow RAM resources for OPTION ROM, not all devices initialized. Suggest removing some add-on cards, or changing to UEFI mode in BIOS setup.	This error message is displayed when the shadow RAM resources for option ROM are insufficient. If the legacy option ROM is insufficient, remove some add-in cards. For the system that supports UEFI, set UEFI as the first priority.
8999	Not enough PCIe/PCI MMIO resources. Currently only one video card is enabled. Remove some PCIe cards.	This error message is displayed when the PCIe/PCI MMIO (memory mapped input/output) resources are insufficient. Remove some add-in cards.

Chapter 4. Hardware removal and installation

This chapter provides instructions on how to remove and install hardware for your device.

Handling static-sensitive devices

Do not open the static-protective package containing the new part until the defective part has been removed and you are ready to install the new part. Static electricity, although harmless to you, can seriously damage device components and options.

When you handle options and other device components, take these precautions to avoid static-electricity damage:

- Limit your movement. Movement can cause static electricity to build up around you.
- Always handle options and other device components carefully. Handle PCI/PCIe cards, memory modules, system boards, and microprocessors by the edges. Never touch any exposed circuitry.
- Prevent others from touching the options and other device components.
- Touch the static-protective package containing the part to a metal expansion-slot cover or other unpainted metal surface on the device for at least two seconds. This reduces static electricity from the package and your body before you install or replace a new part.
- When possible, remove the new part from the static-protective package, and install it directly in the device without setting the part down. When this is not possible, place the static-protective package on a smooth, level surface and place the part on the package.
- Do not place the part on the device cover or other metal surface.

Service tool kit

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

No.	Tool name	Specification	Product scope	Tool type
1	Screwdriver: Phillips Head 0	PH0	All	Common tool
2	Screwdriver: Phillips Head 00	PH00	All	Common tool
3	Screwdriver: Phillips Head 01	1	All	Common tool
4	Screwdriver: Phillips Head 01	1, Shank length greater than 6 inches	ThinkStation/DT	Common tool
5	Screwdriver: Phillips Head 02	2, Shank length greater than 6 inches	ThinkStation/SC/DT	Common tool
6	Screwdriver: Torx Head T5	T5	IdeaPad	Common tool

| No.	Tool name	Specification	Product scope	Tool type
7	Screwdriver: Torx Head T15	T15, for Chassis outside	ThinkStation	Common tool
8	Screwdriver: Torx Head T20	T20, Shank length greater than 6 inches, for heatsink and CPU	ThinkStation	Common tool
9	Screwdriver: Torx Head T30	T30, Shank length greater than 6 inches, for heatsink and CPU	ThinkStation	Common tool
10	Pry tools 1	N/A	All	Common tool
11	Tweezers (conductive)	N/A	All	Common tool
12	Tweezers (isolated)	N/A	All	Common tool
13	Suction cup	N/A	All	Common tool
14	Hexagonal socket (for VGA)	H5 mm or 4.8 mm	ThinkCentre/Tiny	Common tool
15	Hexagonal socket (for Tinyantenna)	H8 mm	ThinkCentre/Tiny	Common tool
16	Ajustable Torque Screwdriver	0.2 Nm to 4.0 Nm, Threadripper CPU, CAMM, etc	All	Common tool
17	ESD Mat	ESD Mat	All	Common tool
18	USB Flash Drives	For Golden Key, Chrome Reloads, AutoPilot, etc	All	Common tool
19	USB-C to USB-A Converter	For USB-C only systems	All	Common tool
20	SSD/WWAN/IC Thermal pad	Thermal pads are typically used under the SSD/WWAN/IC in different thicknesses, the most common being 0.5 mm.	All	Consumable
21	Silicone grease for CPU or heatsink repairing	N/A	All	Consumable
22	Polyamide tape	N/A	All	Consumable

No.	Tool name	Specification	Product scope	Tool type
23	Mylar tape	N/A	All	Consumable
24	Eraser	N/A	All	Consumable
25	Electrical tape	N/A	All	Consumable
26	Double sided tape	N/A	All	Consumable
27	Conductive tape	N/A	All	Consumable
28	Cleaning pads/wipes	N/A	All	Consumable
29	Heat gun	N/A	All	Special Tool (Depot only)
30	Brown brush	25 mm to 35 mm wide	All	Special tool
31	Contact Cleaner Spray	WD-40 Contact Cleaner for battery connector	ThinkPad X1 Carbon	Special tool
32	Hexagonal socket	17 mm	Yoga AIO 7 27ACH6/ Yoga AIO 7 27ARH6	Special tool

Note: The silicone grease can be applied to the surfaces of the microprocessor and heat sink to eliminate air gaps. For parts with silicone grease applied, it is suggested that you apply new grease during the installation.

Major FRUs and CRUs

Your device contains the following types of CRUs and FRUs:

- **Self-service CRUs:** Refer to parts that can be replaced easily by customer themselves or by trained service technicians at an additional cost.
- **Optional-service CRUs:** Refer to parts that can be replaced by customers with a greater skill level. Trained service technicians can also provide service to replace the parts under the type of warranty designated for the customer's machine.
- **FRUs:** Refer to parts that are more complicated to replace and it is recommended that these should be replaced by trained service technicians. If customers elect to replace the FRUs by themselves, we recommend that you ensure the correct instructions provided by Lenovo are carefully followed.
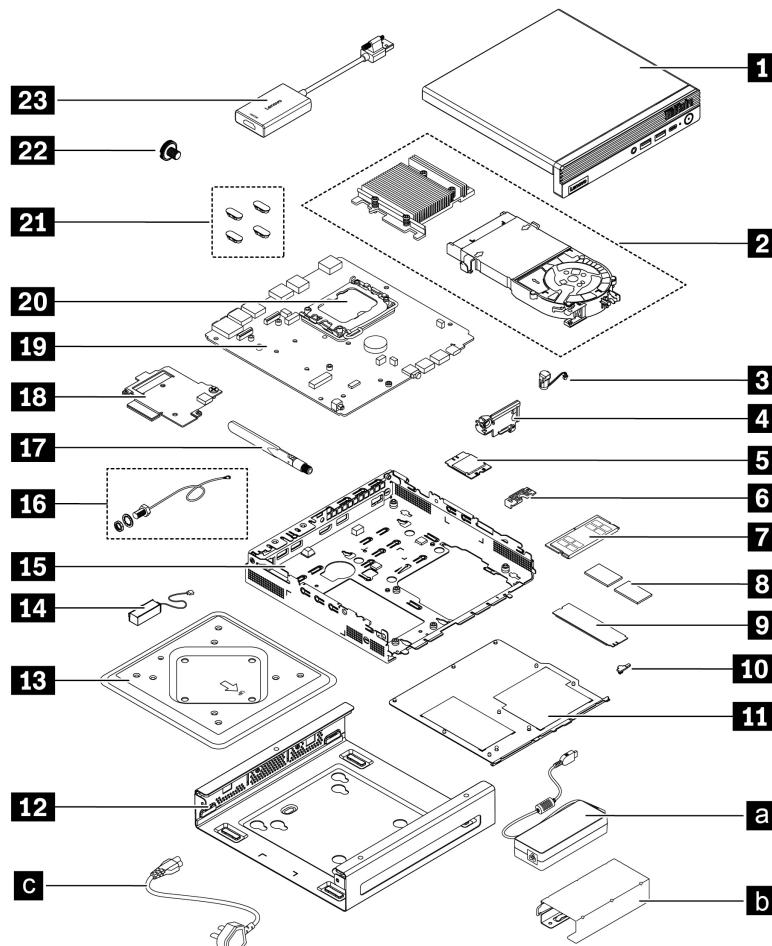
Number	Description	Self-service CRU	Optional-service CRU
1	Front cover (with power button)	Yes	No
2	System fan and heat sink	No	Yes
3	LED cable	No	Yes
4	Antenna bracket	No	No
5	Wi-Fi card	No	No
6	Wi-Fi card shield	No	No
7	Memory module	Yes	No
8	M.2 solid-state drive thermal pads	Yes	No
9	M.2 solid-state drive	Yes	No
10	M.2 solid-state drive clip	No	Yes
11	Bottom cover	Yes	No
12	VESA® mount bracket kit*	Yes	No
13	Wall (Desk) mount*	Yes	No
14	Front Wi-Fi antenna	No	No
15	Chassis	No	No

Number	Description	Self-service CRU	Optional-service CRU
16	Rear Wi-Fi antenna cable	No	No
17	External Wi-Fi antenna	Yes	No
18	PCH heat sink	No	No
19	System board	No	No
20	Microprocessor	No	No
21	Chassis rubber	No	Yes
22	Thumb screw	Yes	No
23	HDMI Ingest Dongle*	Yes	No
a	ac power adapter	Yes	No
b	External adapter cage*	Yes	No
c	Power cord	Yes	No

* for selected models

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

System board illustration
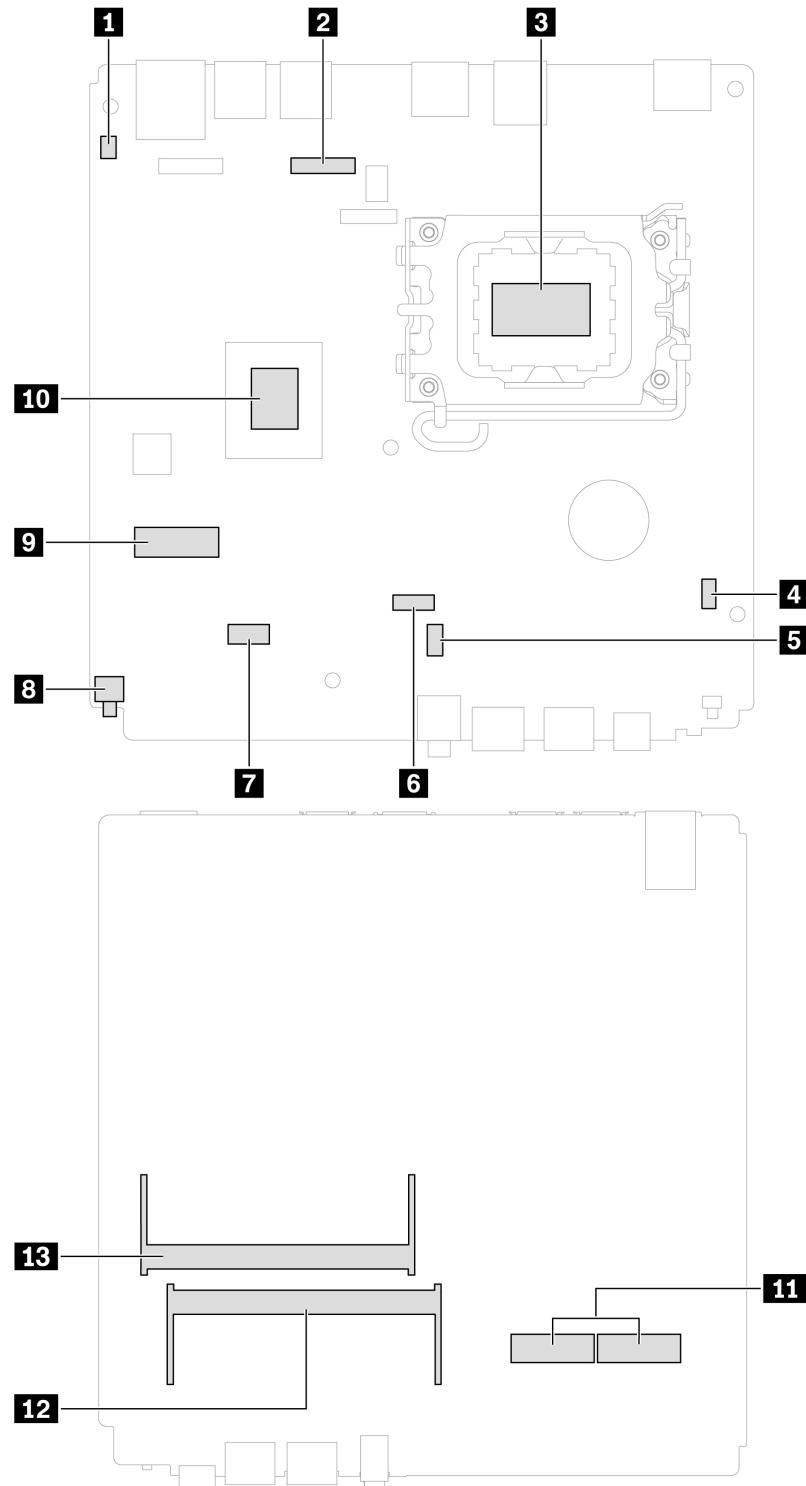
1 Clear CMOS	**2** I/O board connector
3 Microprocessor socket	**4** ThinkCentre LED connector

5 Internal speaker connector	**6** System fan connector
7 SATA connector for hard disk drive	**8** Cover presence switch connector (intrusion switch connector)
9 M.2 Wi-Fi card slot	**10** PCH
11 M.2 solid-state drive slot (2)	**12** Memory slot (DIMM2)
13 Memory slot (DIMM1)	

Removing and installing hardware

This section provides instructions on how to remove and install hardware for your device.

Attention: Do not open your device or attempt any repair before reading and understanding the *Generic Safety and Compliance Notices* at https://smartsupport.lenovo.com.

External options

You can connect external options to your device, such as a keyboard, mouse, audio device, or camera. For some external options, you must install additional software in addition to making the physical connection. When installing an external option, see Chapter 1 "Product overview" on page 1 to identify the required connector. Then, use the instructions that come with the option to help you make the connection and install any required software or device drivers.

Power adapter and power cord

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

For access, do the following:

1. Turn off the device and remove all connected devices and cables.
2. Disconnect the device from ac power and all connected cables.

Removal steps
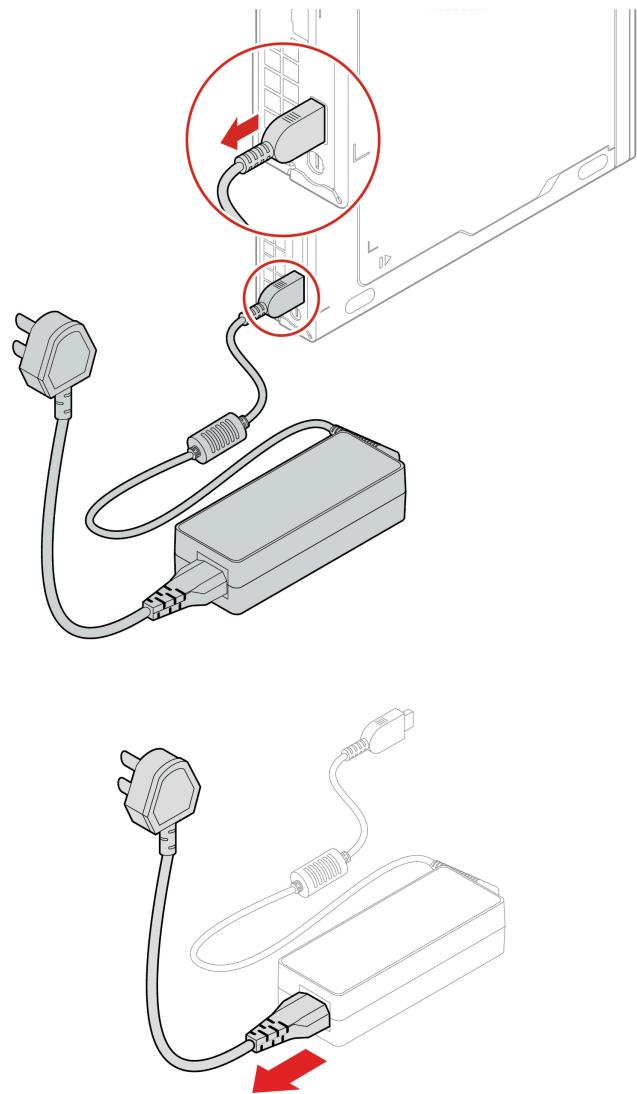
External adapter cage

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

For access, do the following:

1. Turn off the device and remove all connected devices and cables.
2. Disconnect the device from ac power and all connected cables.

Replacement procedures
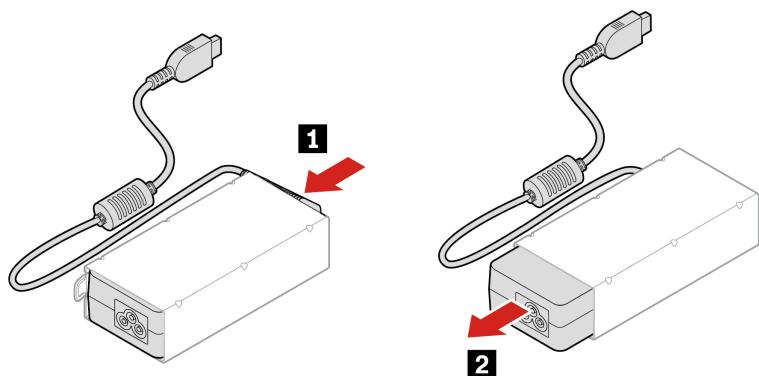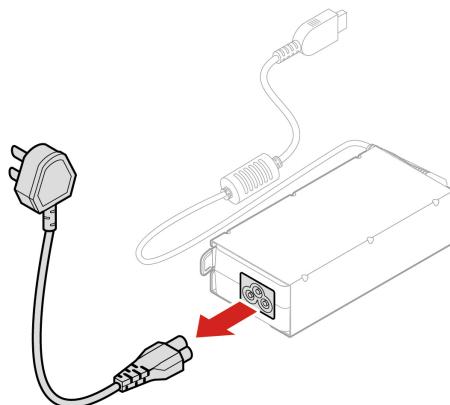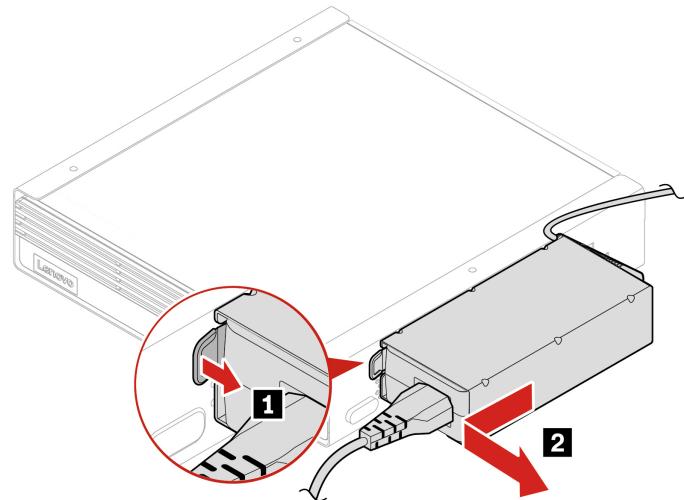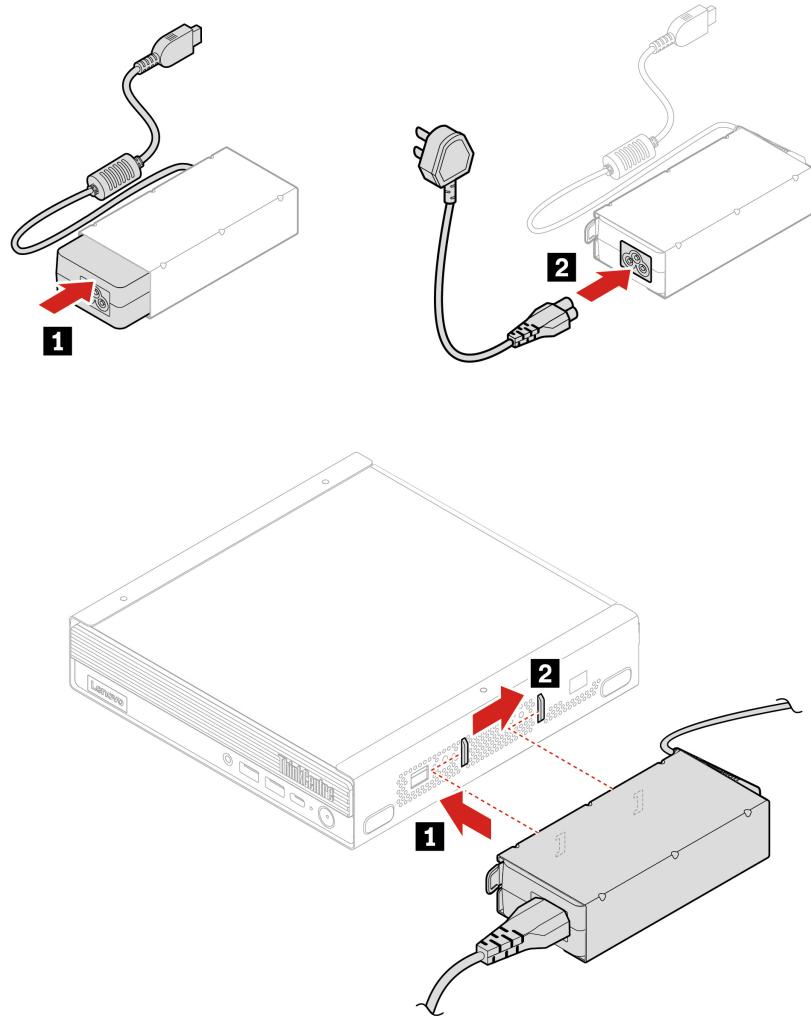
VESA mount bracket kit and wall (desk) mount

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

For access, do the following:

1. Turn off the device and remove all connected devices and cables.
2. Disconnect the device from ac power and all connected cables.
3. Remove the external adapter cage, if any. See "External adapter cage" on page 16.

Removal steps
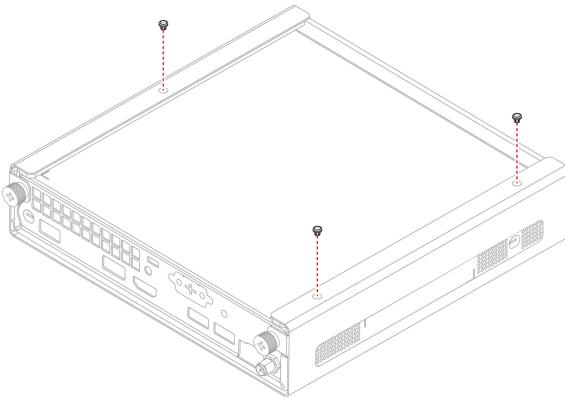
Screw (quantity)	Color	Torque
M4 x 4.5 mm, Zn coated(3)	Black	5.0 ± 0.5 lb/in
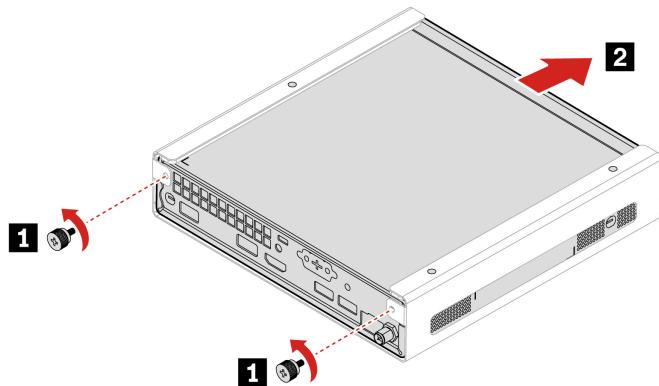
Screw (quantity)	Color	Torque
M3 x 6 + 2.2 mm, Zn coated(2)	Black	1.5 ± 0.2 lb/in
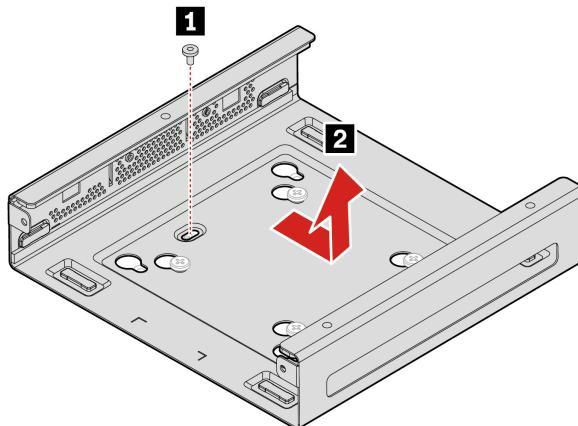
Screw (quantity)	Color	Torque
M3 x 6 mm, Zn coated(1)	Black	4.0 ± 0.5 lb/in
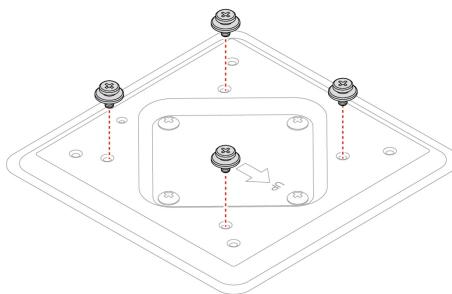
Screw (quantity)	Color	Torque
M4 x 4.5 mm, Zn coated(4)	Black	5.0 ± 0.5 lb/in
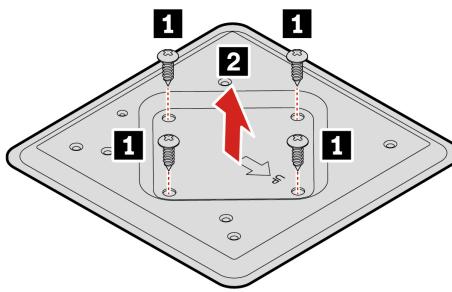
| Screw (quantity)	Color	Torque
ST5 x 16 mm, Zn coated(4)	Black	50.0 ± 0.5 lb/in (for drywall) 130.0 ± 0.5 lb/in (for hardwood)

HDMI Ingest Dongle

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

For access, do the following:
1. Turn off the device and remove all connected devices and cables.
2. Disconnect the device from ac power and all connected cables.

Removal steps
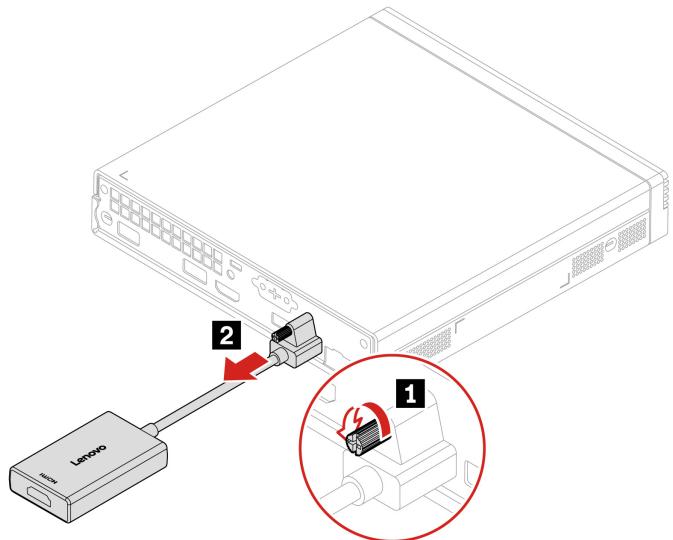
External Wi-Fi antenna

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

For access, do the following:
1. Turn off the device and remove all connected devices and cables.
2. Disconnect the device from ac power and all connected cables.

Removal steps
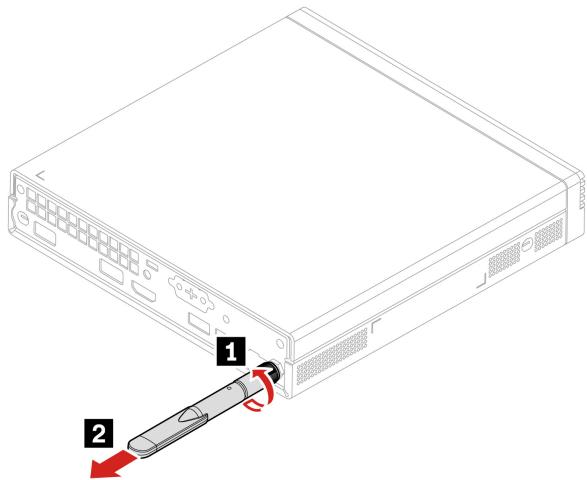
Front cover (with power button)

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

For access, do the following:

1. Turn off the device and remove all connected devices and cables.
2. Disconnect the device from ac power and all connected cables.
3. Unlock any locking device that secures the front cover.
4. Remove the following parts in order, if any:

   - "External adapter cage" on page 16
   - "VESA mount bracket kit and wall (desk) mount" on page 18
   - "HDMI Ingest Dongle" on page 21
   - "External Wi-Fi antenna" on page 21

Removal steps
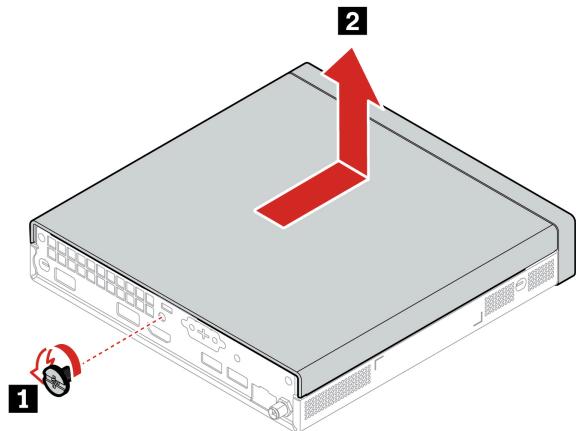
Screw (quantity)	Color	Torque
M4 x 5 mm, Zn coated(1)	Black	3.0 ± 0.5 lb/in

PCH heat sink

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

The heat sink might be very hot. Before you open the device cover, turn off the device and wait several minutes until the device is cool.

For access, do the following:

1. Turn off the device and remove all connected devices and cables.
2. Disconnect the device from ac power and all connected cables.
3. Remove the following parts in order, if any:

   - "External adapter cage" on page 16
   - "VESA mount bracket kit and wall (desk) mount" on page 18
   - "HDMI Ingest Dongle" on page 21
   - "External Wi-Fi antenna" on page 21
   - "Front cover (with power button)" on page 22

Removal steps

| Step	Screw (quantity)	Color	Torque
1	M3 x 3.2 mm, Nickel coated(2)	Silver	3.0 ± 0.5 lb/in
2	M3 x 4.4 mm, Nickel coated(1)	Black	3.0 ± 0.5 lb/in

System fan and heat sink

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

⚠️

The heat sink might be very hot. Before you open the device cover, turn off the device and wait several minutes until the device is cool.

For access, do the following:

1. Turn off the device and remove all connected devices and cables.
2. Disconnect the device from ac power and all connected cables.
3. Remove the following parts in order, if any:
   - "External adapter cage" on page 16
   - "VESA mount bracket kit and wall (desk) mount" on page 18
   - "HDMI Ingest Dongle" on page 21
   - "External Wi-Fi antenna" on page 21
   - "Front cover (with power button)" on page 22
4. Disconnect the LED cable and then remove the ThinkCentre LED bracket with the LED.
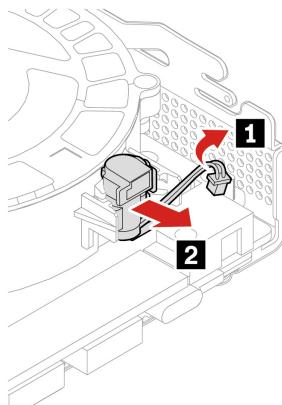
5. Disconnect the system fan cable from the system fan connector on the system board.

Replacement procedures
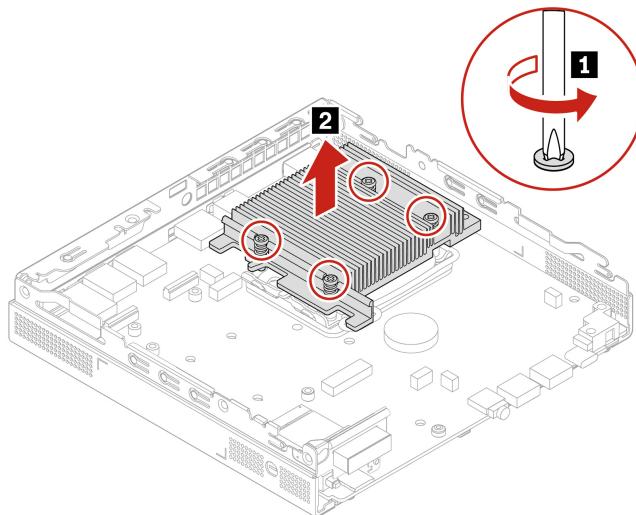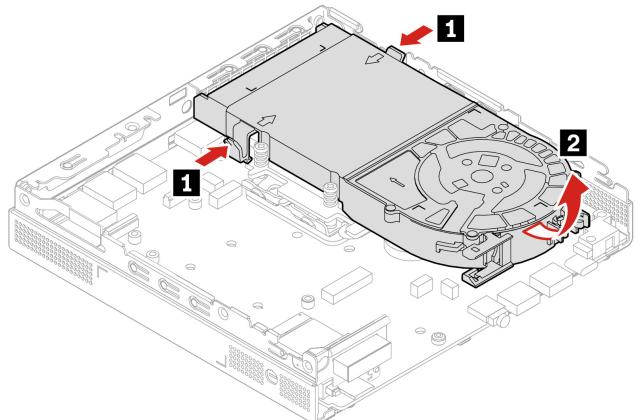
| Screw (quantity)	Color	Torque
M3 x 3L mm, Nickel coated(4)	Silver	6.0 ± 0.5 lb/in
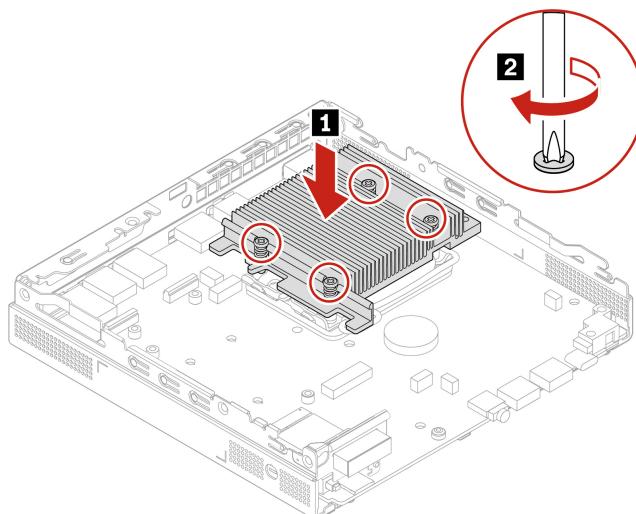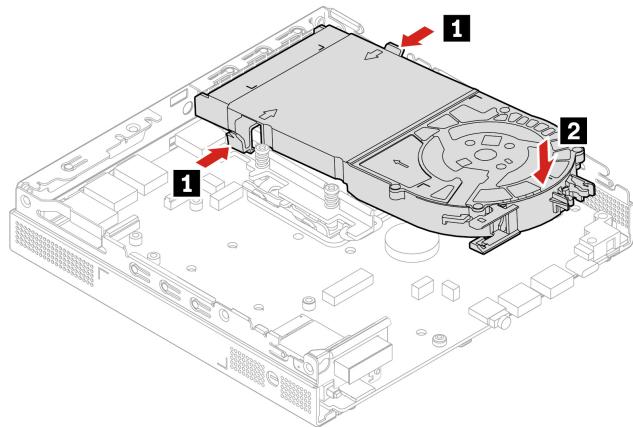
Wi-Fi card and Wi-Fi card shield

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

For access, do the following:

1. Turn off the device and remove all connected devices and cables.

2. Disconnect the device from ac power and all connected cables.

3. Remove the following parts in order, if any:

   - "External adapter cage" on page 16

   - "VESA mount bracket kit and wall (desk) mount" on page 18

   - "HDMI Ingest Dongle" on page 21

   - "External Wi-Fi antenna" on page 21

   - "Front cover (with power button)" on page 22

Removal steps
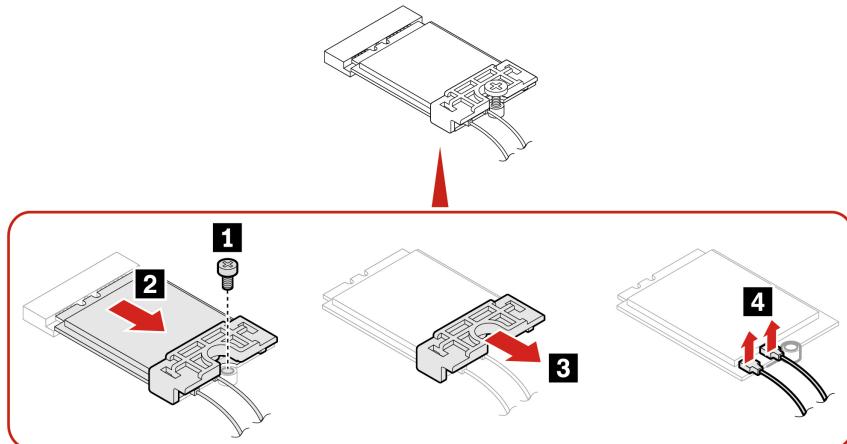
Screw (quantity)	Color	Torque
M2 x 3 mm, Nickel coated(1)	White	1.5 ± 0.2 lb/in

Note: While installing, ensure that you connect the gray cable to the connector labeled 1 (auxiliary) and the black cable to connector labeled 2 (main) on the card.

Bottom cover

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

For access, do the following:
1. Turn off the device and remove all connected devices and cables.
2. Disconnect the device from ac power and all connected cables.
3. Unlock any locking device that secures the bottom cover.
4. Remove the following parts in order, if any:
    - "External adapter cage" on page 16
    - "VESA mount bracket kit and wall (desk) mount" on page 18
    - "HDMI Ingest Dongle" on page 21
    - "External Wi-Fi antenna" on page 21
    - "Front cover (with power button)" on page 22
5. Turn over the device so that the bottom cover is facing up.

Replacement procedures
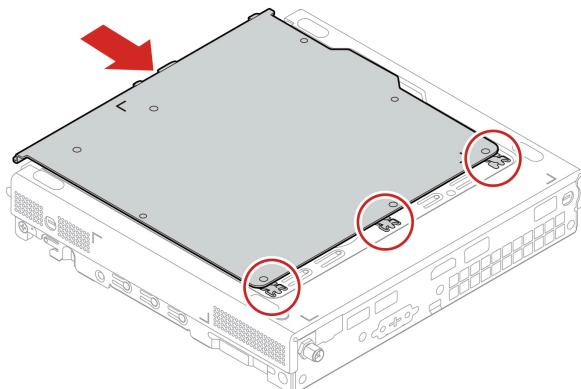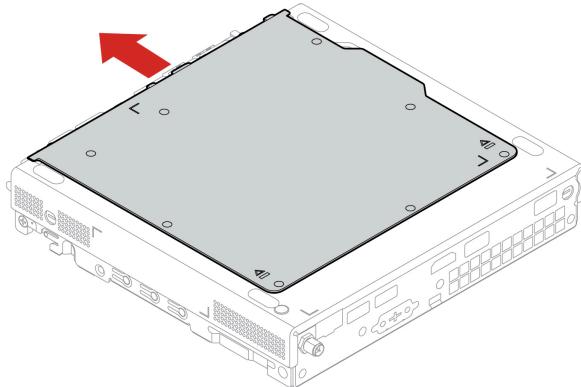
M.2 solid-state drive

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

The heat sink might be very hot. Before you open the device cover, turn off the device and wait several minutes until the device is cool.

Attention: The internal storage drive is sensitive. Inappropriate handling might cause damage and permanent loss of data. When handling the internal storage drive, observe the following guidelines:

- Replace the internal storage drive only for repair. The internal storage drive is not designed for frequent changes or replacement.
- Before replacing the internal storage drive, make a backup copy of all the data that you want to keep.
- Do not touch the contact edge of the internal storage drive. Otherwise, the internal storage drive might get damaged.
- Do not apply pressure to the internal storage drive.
- Do not make the internal storage drive subject to physical shocks or vibration. Put the internal storage drive on a soft material, such as cloth, to absorb physical shocks.

For access, do the following:

1. Turn off the device and remove all connected devices and cables.
2. Disconnect the device from ac power and all connected cables.
3. Remove the following parts in order, if any:

   - "External adapter cage" on page 16
   - "VESA mount bracket kit and wall (desk) mount" on page 18
   - "HDMI Ingest Dongle" on page 21
   - "External Wi-Fi antenna" on page 21
   - "Front cover (with power button)" on page 22
   - "Bottom cover" on page 27

Removal steps
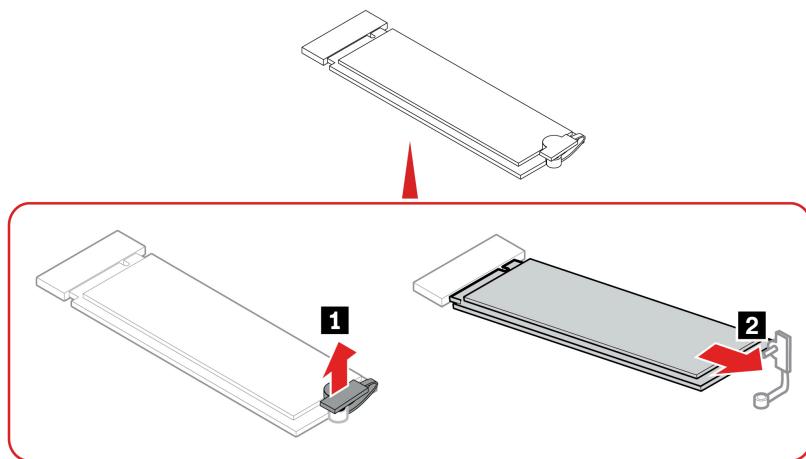
# Memory module

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

Ensure that you follow the installation order for memory modules shown in the following illustration.
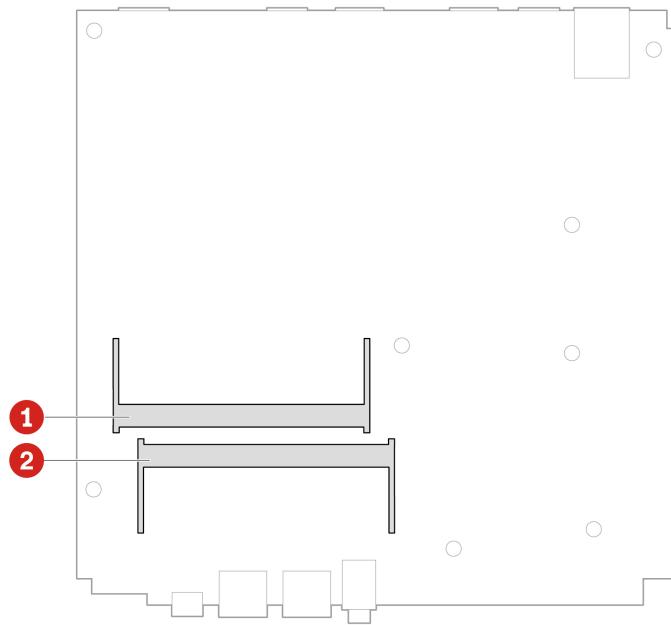

For access, do the following:

1. Turn off the device and remove all connected devices and cables.
2. Disconnect the device from ac power and all connected cables.
3. Remove the following parts in order, if any:
   - "External adapter cage" on page 16

- "VESA mount bracket kit and wall (desk) mount" on page 18
- "HDMI Ingest Dongle" on page 21
- "External Wi-Fi antenna" on page 21
- "Front cover (with power button)" on page 22
- "Bottom cover" on page 27

**Replacement procedures**
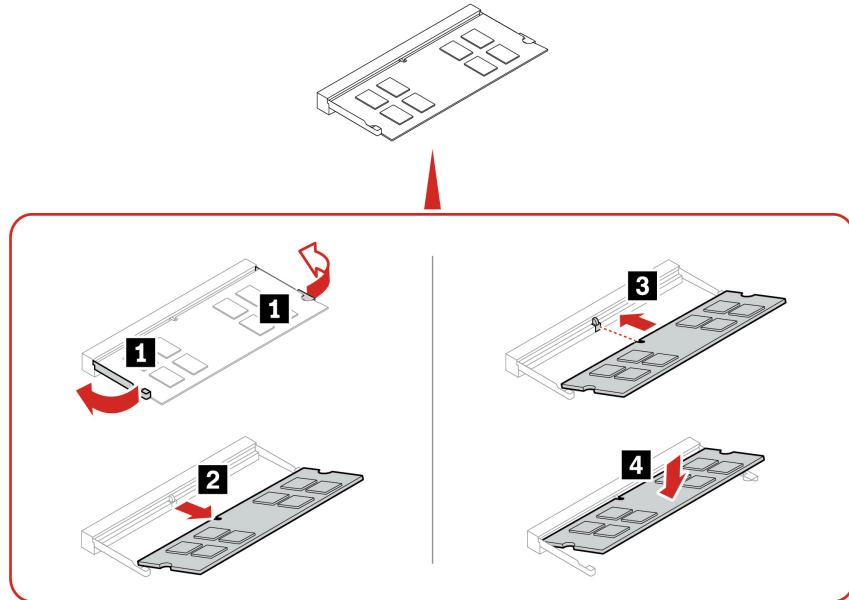
Rear Wi-Fi antenna cable

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

For access, do the following:
1. Turn off the device and remove all connected devices and cables.
2. Disconnect the device from ac power and all connected cables.
3. Remove the following parts in order, if any:
   - "External adapter cage" on page 16
   - "VESA mount bracket kit and wall (desk) mount" on page 18
   - "HDMI Ingest Dongle" on page 21
   - "External Wi-Fi antenna" on page 21
   - "Front cover (with power button)" on page 22
   - "Wi-Fi card and Wi-Fi card shield" on page 26

Removal steps
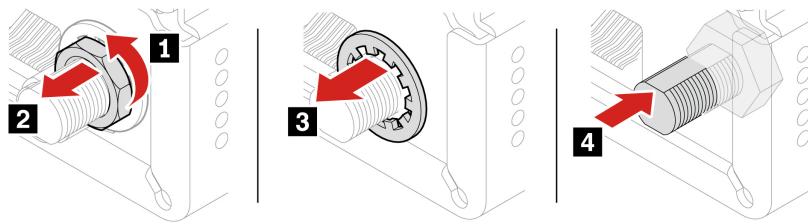
Front Wi-Fi antenna

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

For access, do the following:

1. Turn off the device and remove all connected devices and cables.
2. Disconnect the device from ac power and all connected cables.
3. Remove the following parts in order, if any:

   - "External adapter cage" on page 16
   - "VESA mount bracket kit and wall (desk) mount" on page 18
   - "HDMI Ingest Dongle" on page 21
   - "External Wi-Fi antenna" on page 21
   - "Front cover (with power button)" on page 22
   - "Wi-Fi card and Wi-Fi card shield" on page 26

Replacement procedures
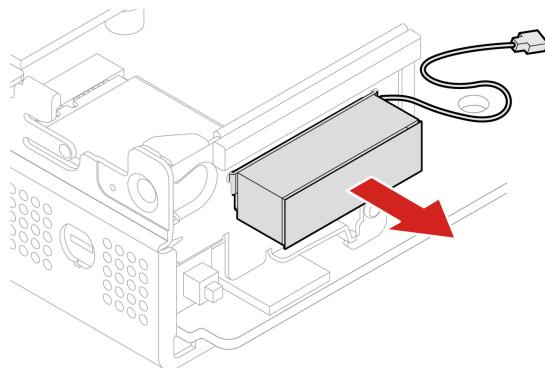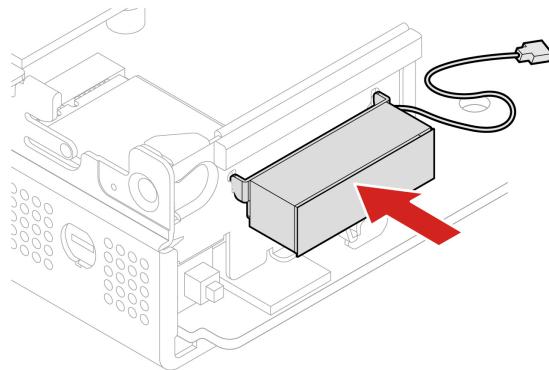
Antenna bracket

**Prerequisite**

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

For access, do the following:

1. Turn off the device and remove all connected devices and cables.
2. Disconnect the device from ac power and all connected cables.
3. Remove the following parts in order, if any:

   - "External adapter cage" on page 16
   - "VESA mount bracket kit and wall (desk) mount" on page 18
   - "HDMI Ingest Dongle" on page 21
   - "External Wi-Fi antenna" on page 21
   - "Front cover (with power button)" on page 22
   - "Wi-Fi card and Wi-Fi card shield" on page 26
   - "Front Wi-Fi antenna" on page 31

Removal steps
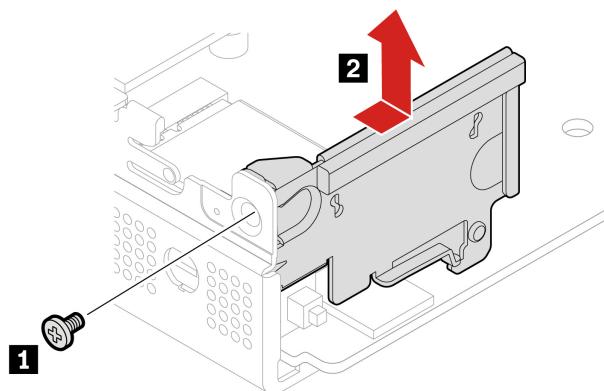
Screw (quantity)	Color	Torque
M3 x 4 mm, Zn coated(1)	Black	3.0 ± 0.5 lb/in

Microprocessor

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

⚠️

The heat sink might be very hot. Before you open the device cover, turn off the device and wait several minutes until the device is cool.

For access, do the following:

1. Turn off the device and remove all connected devices and cables.
2. Disconnect the device from ac power and all connected cables.
3. Remove the following parts in order, if any:
   - "External adapter cage" on page 16
   - "VESA mount bracket kit and wall (desk) mount" on page 18
   - "HDMI Ingest Dongle" on page 21
   - "External Wi-Fi antenna" on page 21
   - "Front cover (with power button)" on page 22
   - "PCH heat sink" on page 23
   - "System fan and heat sink" on page 24

Removal steps

Notes:

- Your microprocessor and socket might look different from the one illustrated.
- Touch only the edges of the microprocessor. Do not touch the thermal grease on the top. Do not touch the gold contacts on the bottom.
- Do not drop anything onto the microprocessor socket while it is exposed. The socket pins must be kept as clean as possible.
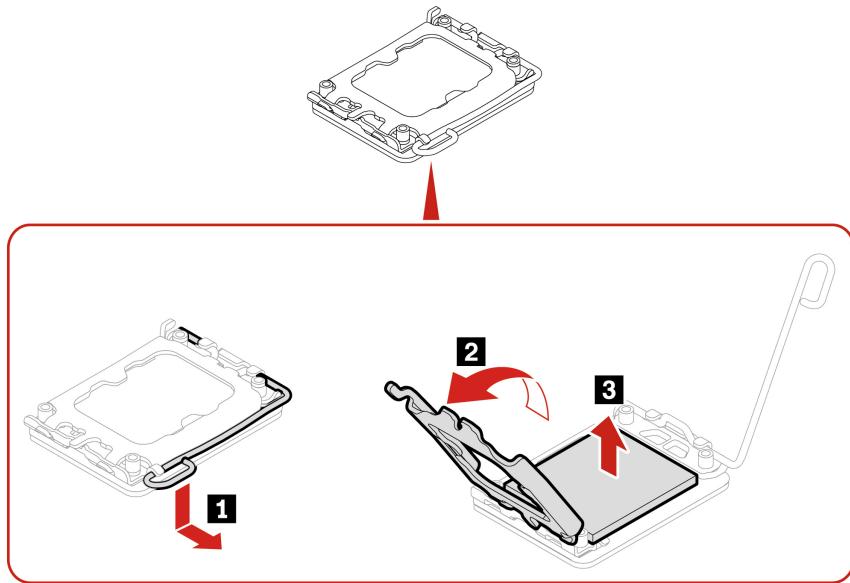
Installation steps

Notes:

- Before you attach the CPU to the computer, clean all thermal grease that has been used and then apply new thermal grease. Apply new thermal grease at an amount of 0.55 grams, on the parts marked **a** as shown in the following illustration. Either too much or too less application of grease can cause a thermal problem due to imperfect contact with a component.
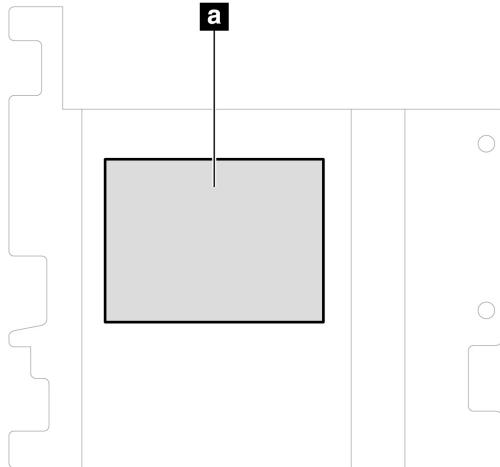
- Do not touch the thermal grease. Do not touch the gold contacts on the bottom. Touch only the edges of the microprocessor.
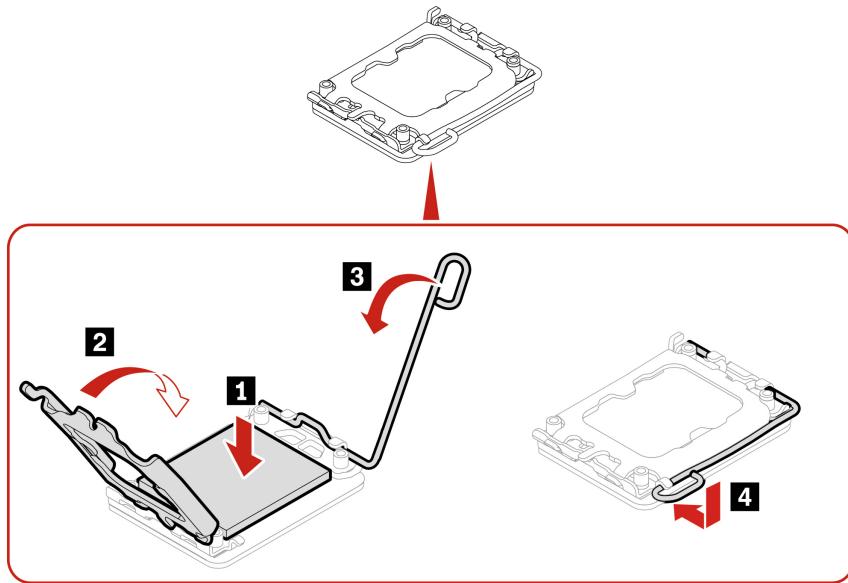
System board

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

The heat sink and microprocessor might be very hot. Before you open the device cover, turn off the device and wait several minutes until the device is cool.

Notes:

- Your microprocessor sockets and socket covers might look slightly different from the illustrations in this topic.

- Do not touch the pins on the microprocessor socket or the gold contacts on the microprocessor.
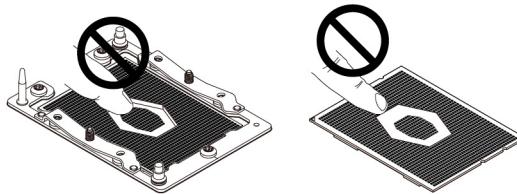
For access, do the following:

1. Turn off the device and remove all connected devices and cables.

2. Disconnect the device from ac power and all connected cables.

3. Remove the following parts in order, if any:

    - "External adapter cage" on page 16
    - "VESA mount bracket kit and wall (desk) mount" on page 18
    - "HDMI Ingest Dongle" on page 21
    - "External Wi-Fi antenna" on page 21

- "Front cover (with power button)" on page 22
- "PCH heat sink" on page 23
- "System fan and heat sink" on page 24
- "Wi-Fi card and Wi-Fi card shield" on page 26
- "Bottom cover" on page 27.
- "M.2 solid-state drive" on page 28.
- "Memory module" on page 29.
- "Rear Wi-Fi antenna cable" on page 30.
- "Front Wi-Fi antenna" on page 31.
- "Antenna bracket" on page 32.
- "Microprocessor" on page 33.

Removal steps

1. Record the cable routing and cable connections, and then disconnect all cables from the system board. See "System board illustration" on page 14.

2. Remove the following screws that secure the system board, and then carefully lift the system board out of the chassis.

    Note: Carefully handle the system board by its edges.
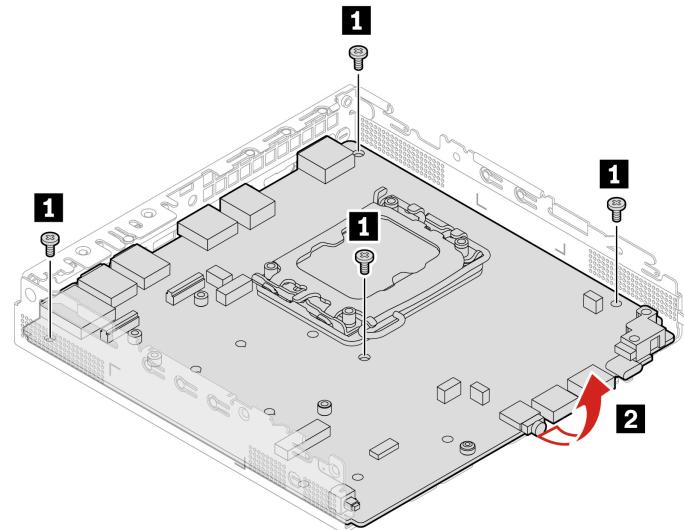
Screw (quantity)	Color	Torque
M3 x 5 mm, Zn coated(4)	Blue	3.0 ± 0.5 lb/in

The failing system board must be returned with a microprocessor socket cover to protect the pins during shipping and handling.

Chapter 5. Help and support

This chapter provides help and support information for your product.

Find your serial number

This topic helps you find the device serial number.

Refer to the illustration below for the label location of your device's serial number.

MT-M XXXX-XXXXXX S/N XXXXXXXX
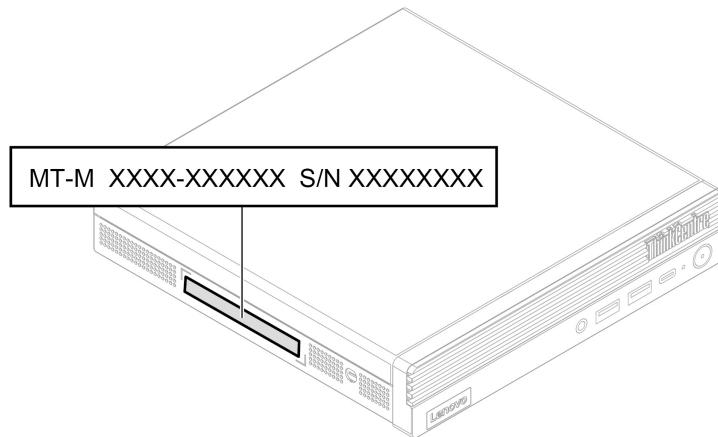
Self-help resources

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

Resources	How to access?
Lenovo Support Web site	https://smartsupport.lenovo.com
Product specifications	https://psref.lenovo.com
Windows help information	• Open the **Start** menu and click **Get Help** or **Tips**. • Use Windows Search. • Microsoft support Web site: https://support.microsoft.com
ThinkSmart Manager Services	https://support.lenovo.com/solutions/tsm
Microsoft Teams Rooms	https://learn.microsoft.com/MicrosoftTeams/rooms
Lenovo Community	https://forums.lenovo.com

Additional services

Thank you, Lenovo customer, for your purchase of a ThinkSmart device.

During and after the warranty period, you can purchase additional services from Lenovo at:

. Service availability and service name might vary by country or region.

Call Lenovo

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

Before you contact Lenovo

Prepare the following before you contact Lenovo:

1. Record the problem symptoms and details:

   - What is the problem? Is it continuous or intermittent?
   - Any error message or error code?
   - What operating system are you using? Which version?
   - Which software applications were running at the time of the problem?
   - Can the problem be reproduced? If so, how?

2. Record the system information:

   - Product name
   - Machine type and serial number

Lenovo Customer Support Center

During the warranty period, you can call Lenovo Customer Support Center for help.

Telephone numbers

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

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

Services available during the warranty period

- Problem determination - Trained personnel are available to assist you with determining if you have a hardware problem and deciding what action is necessary to fix the problem.
- Lenovo hardware repair - If the problem is determined to be caused by Lenovo hardware under warranty, trained service personnel are available to provide the applicable level of service.
- Engineering change management - Occasionally, there might be changes that are required after a product has been sold. Lenovo or your reseller, if authorized by Lenovo, will make selected Engineering Changes (ECs) that apply to your hardware available.

Services not covered

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

For the terms and conditions of the Lenovo Limited Warranty (LLW) that apply to your Lenovo hardware product, see the LLW documentation at:
https://www.lenovo.com/warranty/llw_02

The LLW is also preinstalled on your device. To access the LLW, go to the following directory:
`C:\Windows\System32\oobe\info\default`

Appendix A. Notices and trademarks

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