

PX

Linux User Guide



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*
- *Setup Guide*

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Discover your Lenovo computer

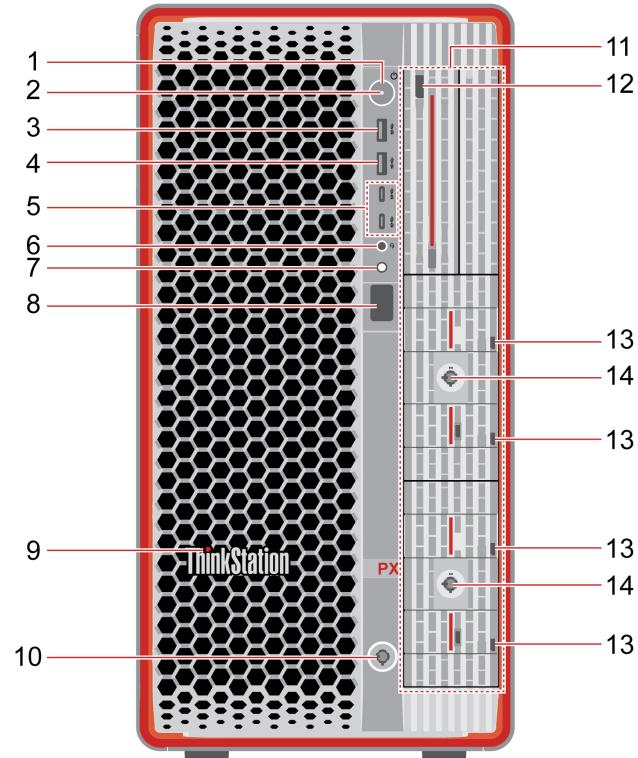
Thank you for choosing a Lenovo computer! We are dedicated to delivering the best solution to you.

Before starting your tour, please read the following information:

- Illustrations in this documentation might look different from your product.
- Depending on the model, some optional accessories, features, software programs, and user interface instructions might not be applicable to your computer.
- Documentation content is subject to change without notice. To get the latest documentation, go to <https://pcsupport.lenovo.com>.

Chapter 1. Overview

Front



Item	Description	Item	Description
1.	Power button	2.	Power indicator
3.	USB-A 3.2 Gen 2 connector*	4.	Always On USB-A 3.2 Gen 2 connector*
5.	USB-C® (3.2 Gen 2) connectors*	6.	Headset connector
7.	Diagnostic LCD switch	8.	Diagnostic LCD
9.	ThinkStation®LED	10.	Front access bay lock
11.	Front access bays (1 to 6)	12.	HDD (hard disk drive) LED label*
13.	M.2 SSD (solid-state drive) LED labels*	14.	Dual M.2 SSD enclosure locks*

* for selected models

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 1	5
3.2 Gen 2	10
3.2 Gen 2 x 2	20
Thunderbolt 3 (USB-C)	40
Thunderbolt 4 (USB-C)	40

Power indicator

Show the system status of your computer.

- **On:** The computer is starting up or working.
- **Off:** The computer is off or in hibernation mode.
- **Blinking slowly:** The computer is in sleep mode.

Always On USB-A 3.2 Gen 2 connector

With the Always On USB feature enabled, the Always On USB-A 3.2 Gen 2 connector can charge a USB-A compatible device when the computer is on, off, in sleep mode, or in hibernation mode.

To enable the Always On USB feature, do the following:

1. Enter the UEFI BIOS menu. See “Enter the BIOS menu” on page 20.
2. Click **Devices** → **USB Setup** → **Front USB Ports** → **USB Port 2** to enable the Always On USB feature.

Diagnostic LCD switch

Use the diagnostic LCD switch to turn on or turn off the diagnostic LCD, and handle occurred events.

Status	Behavior and function
No event	<p>Short press: Turn on or turn off the diagnostic LCD. Date and time will be displayed on the LCD when it is turned on. The LCD will turn off automatically if idle for three minutes.</p>
Error events occur	<p>The diagnostic LCD will turn on automatically when an error event occurs.</p> <ul style="list-style-type: none"> • Short press (when multiple events occur): Switch among error events and display the corresponding QR code of the selected event. • Long press (about 3 seconds): Clear the selected event.

Diagnostic LCD

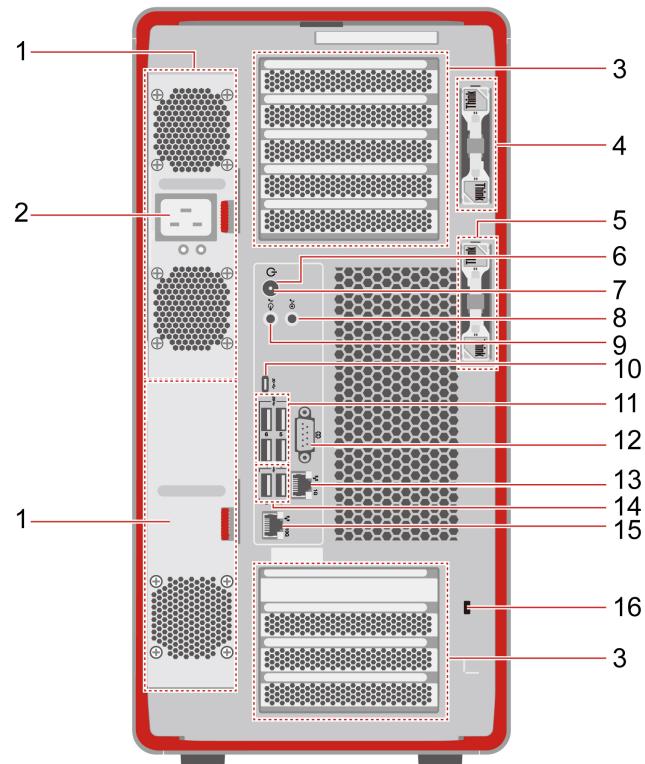
Display the diagnostic information when an issue or error is detected. You can decode the error code at <https://www.thinkworkstationsoftware.com/codes>.

HDD or M.2 SSD LED label

The storage drives have the following two types of LEDs:

LED	Status and indication
	<ul style="list-style-type: none">Solid on: The storage drive status is failure.4 Hz blinking (four times per second): Locating the storage drive.1 Hz blinking (once a second): Rebuilding RAID.Off (when the computer is powered on): The storage drive status is normal.
	<ul style="list-style-type: none">Solid on: The storage drive is online, installed, or powered on (no activity).Variable blinking: Accessing the storage drive.Off (when the computer is powered on): The storage drive is not installed or powered.

Rear



Item	Description	Item	Description
1.	Power supply unit bays (2)	2.	Power cord connector
3.	PCIe card areas	4.	Key-nest for the left side cover and front access bays
5.	Key-nest for the dual M.2 SSD enclosure	6.	Power button
7.	Power indicator	8.	Audio line-in connector
9.	Audio line-out connector	10.	USB-C (3.2 Gen 2x2) connector
11.	USB-A 3.2 Gen 1 connectors	12.	Serial connector*
13.	Ethernet connector (1 G)	14.	USB-A 2.0 connectors
15.	Ethernet connector (10 G)	16.	Security-lock slot

* for selected models

Power indicator

Show the system status of your computer.

- **On:** The computer is starting up or working.
- **Off:** The computer is off or in hibernation mode.
- **Blinking slowly:** The computer is in sleep mode.

Serial connector

Connect an external modem, a serial printer, or other devices that use a serial connector.

PCIe card areas

Install PCIe cards into these areas to improve the operating performance of the computer. Depending on the computer model, the video output connectors in these areas might be DisplayPort™ connectors or Mini DisplayPort™ connectors.

Notices for side ventilation and workplace power

Side ventilation notice

Side ventilation design is available on some models. Pay attention to the ventilation distance requirements for models with different configurations:

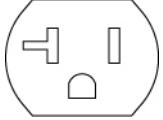
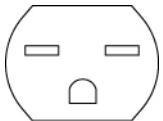
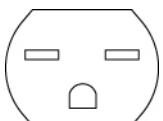
- Systems configured with rear-exhausting graphics cards (such as NVIDIA RTX 6000 Ada) do not require side ventilation.
- Systems configured with internal-exhausting graphics cards (such as GeForce RTX 4070 and GeForce RTX 4080) require side ventilation. Do not block air vents on the left side cover. To ensure heat dissipation, do not place any objects within 4.5 cm (1.8 inches) or 1 rack unit from the left side cover.
- For rack-mounted systems, a rack spacer is recommended in the gap above the system.

Note: Do not install internal-exhausting graphics cards (such as GeForce RTX 4070 and GeForce RTX 4080) on systems without side ventilation on the left side cover.

Workplace power and system configuration requirements



- Only use the power cord shipped with your computer.
- General power supply requirements:
 - Ensure that your workplace is able to support the AC outlet and AC current requirements.
 - Low AC voltage countries require up to 20 amps of AC power.
 - Japan and Taiwan region require a high AC voltage outlet.
 - See details in the table below for North America, Japan, and Taiwan region.

Low / High AC voltage	Countries or regions	Requirements
Low AC voltage	North America (110-127V AC typical)	<ul style="list-style-type: none"> Require 110-127V / 20A AC receptacle. Lenovo power cord part number: SL60P41047  125V / 20A
Low AC voltage	Japan (100V AC typical)	<ul style="list-style-type: none"> Require 200V / 12A AC receptacle. Lenovo power cord part number: SL60P41056  250V / 15A
Low AC voltage	Taiwan region (110V AC typical)	<ul style="list-style-type: none"> Require 220V / 12A AC receptacle. Lenovo power cord part number: SL60P41049  250V / 15A
High AC voltage	Countries or regions except North America, Japan, and Taiwan region	<ul style="list-style-type: none"> Require 220-240V / 12A AC various receptacle. Minimum 12A circuit per power supply

- Redundant mode hot-plug power supply requirements:
 - A dedicated circuit is recommended for each power supply to maximize redundancy.
 - System must be configured to the maximum output of single power supply. Upgrading system components may compromise redundancy.
- Teamed mode power supply requirements:
 - A dedicated circuit is required for each power supply for low AC voltage workplace and is recommended for high AC voltage workplace.
 - Teaming allows system power output up to 2350 W. Total output power is 100-240V / 27-12A AC.
 - Do not hot plug in teamed mode with system power consumption above single PSU maximum output power. This might result in immediate power off.

Specifications

Specifications	Description
Dimensions	<ul style="list-style-type: none">Width: 220 mm (8.7 inches)Height: 440.4 mm (17.3 inches, with feet)Depth: 575 mm (22.6 inches)
Weight (without packaging)	Maximum configuration as shipped: 35.6 kg (78.5 lb)
Hardware configuration	<ol style="list-style-type: none">1. Open the system menu from the top-right corner and click Settings.2. Click About.
	1850-watt 92% hot-swappable power supply, downgrade to 1400-watt (supported by firmware in some regions)
	Notes: <ul style="list-style-type: none">Only use the power cord shipped with the system and ensure that your workplace is able to support the AC outlet and AC current requirements.A dedicated circuit is recommended for each power supply.Pay attention to the hot swap using scenarios in case system power consumption above single PSU maximum output power. This might result in immediate power off.
Power supply	
Electrical input	<ul style="list-style-type: none">Input voltage: From 100 V ac to 240 V acInput frequency: 50/60 Hz
Microprocessor	To view the microprocessor information of your computer, enter Settings and click About .
	<ul style="list-style-type: none">Quantity:<ul style="list-style-type: none">1 CPU: 1, 2, 4, 6, or 8 memory modules2 CPUs: 2, 4, 8, 12, or 16 memory modulesType:<ul style="list-style-type: none">DDR5-4800 (double data rate 5 at 4800 MT/s) ECC (error correction code) RDIMM (registered dual inline memory modules)DDR5-5600 ECC RDIMM
Memory	<p>Note: See “System memory speed” on page 8 for memory speed statements.</p> <ul style="list-style-type: none">Capacity: 16 GB, 32 GB, 64 GB, or 128 GB
Storage device	<ul style="list-style-type: none">3.5-inch HDD* (hot-swappable in the front access bay)3.5-inch HDD* (in the PSU bay 2)2280 Gen 4 or Gen 5 M.2 SSD* (Onboard)2280 Gen 4 M.2 SSD* (hot-swappable in the front access bay)2280 Gen 4 or Gen 5 M.2 SSD* on an M.2 SSD PCIe adapter* <p>Type Disks in the search box and use the Disks application to view the storage drive capacity of your computer.</p> <p>Note: The storage drive capacity indicated by the system is less than the nominal capacity.</p>

Specifications	Description
Video features	<ul style="list-style-type: none"> PCIe x16 card slots on the system board for a discrete graphics card Video connectors on a discrete graphics card: <ul style="list-style-type: none"> DisplayPort connector Mini DisplayPort connector
Expansion	<ul style="list-style-type: none"> Front access bay Memory slots M.2 SSD slots PCIe slots Power supply unit bay
Network features	<ul style="list-style-type: none"> Bluetooth* Ethernet LAN Wireless LAN*

* for selected models

Note: You can enhance your computer capacity and performance by adding various devices according to the rules listed in “Expand your computer” on page 17

System memory speed

Your computer can come with the following types of memory modules and will run up to the following speed:

Memory module type	Memory module speed
DDR5-4800 ECC RDIMM	4800 MT/s
DDR5-5600 ECC RDIMM	5600 MT/s

To avoid unexpected frequency reduction, ensure that you install memory modules in a right way:

- Installed memory module quantity:
 - 1 CPU: 1, 2, 4, 6, or 8 memory modules
 - 2 CPUs: 2, 4, 8, 12, or 16 memory modules
- Install memory modules of the same type, the same capacity, and the same DRAM densities.
- Install memory modules in the correct order. See “Memory module” on page 78.

Notes:

- The actual system memory speed of the memory modules depends on the microprocessor model. For example, your computer comes with 4800 MT/s memory modules, but the microprocessor only supports up to 4400 MT/s memory modules. Then the system memory speed will be no faster than 4400 MT/s. For microprocessor models supported in your computer, contact the Lenovo Customer Support Center.
- If you install memory modules of different speed, the actual system memory speed will be set to the lowest speed of all the memory modules.

Operating environment

Maximum altitude (without pressurization)

- Operating: From 0 m (0 ft) to 3048 m (10 000 ft)

- Storage: From 0 m (0 ft) to 12192 m (40 000 ft)

Temperature

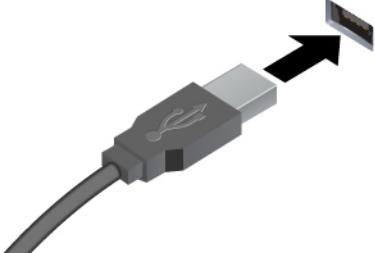
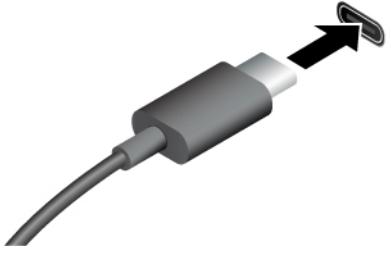
- Operating: From 10°C (50°F) to 35°C (95°F)
- Storage: From -40°C (-40°F) to 60°C (140°F)

Relative humidity

- Operating: 20%-80% (non-condensing)
- Storage: 10%-90% (non-condensing)

USB specifications

Note: Depending on the model, some USB connectors might not be available on your computer.

Connector name	Description
 <ul style="list-style-type: none"> •  USB-A 2.0 connector •  USB-A 3.2 Gen 1 connector •  USB-A 3.2 Gen 2 connector 	Connect USB-A compatible devices, such as a USB-A keyboard, USB-A mouse, USB-A storage device, or USB-A printer.
 <ul style="list-style-type: none"> •  USB-C (3.2 Gen 2) connector •  USB-C (3.2 Gen 2x2) connector 	<ul style="list-style-type: none"> • Charge USB-C compatible devices with the output voltage and current of 5 V and 3 A. • Connect to USB-C accessories to help expand your computer functionality. To purchase USB-C accessories, go to https://www.lenovo.com/accessories.

Chapter 2. Get started

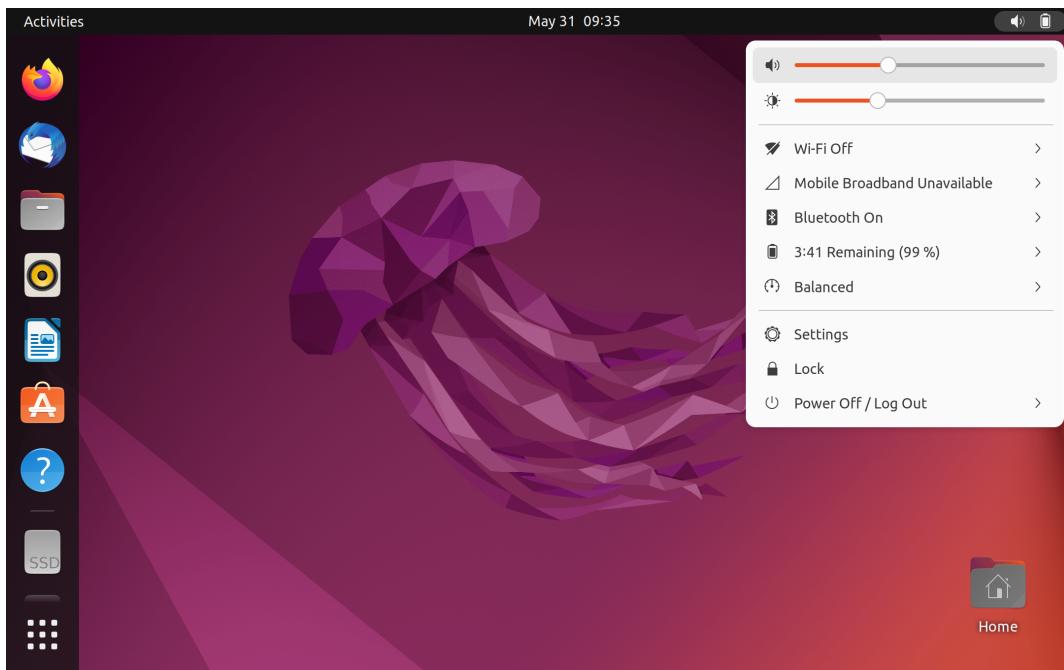
Connect an external display

1. Right-click a blank area on the desktop and select display settings.
2. Select the display that you want to configure and change display settings of your preference.

Get started with Ubuntu Desktop

Learn the basics of Ubuntu and start working with it right away. For more information about Ubuntu, see the Ubuntu documentation site at: <https://help.ubuntu.com/lts/ubuntu-help/index.html>.

The Gnome desktop is installed by default and is designed to be simple and easy to use. Details on using Gnome are available by launching the Help application or online at <https://help.gnome.org/users/>.



Launch an app

- Press the Super key (with the Windows logo) or open the Activities menu on the top left and type in the name of the application you want to launch.
- Click the **Show Applications** button on the lower left, and select the application you want to launch.

Launch settings

Open the system menu from the top-right corner and click **Settings**.

Access networks

This section helps you access networks through connecting to a wired or wireless network.

Connect to the wired Ethernet

Connect your computer to a local network through the Ethernet connector on your computer with an Ethernet cable.

Connect to Wi-Fi networks (for selected models)

If your computer includes a wireless LAN module, you can connect your computer to Wi-Fi® networks.

1. Open the system menu from the top-right corner and expand the Wi-Fi section of the menu.
2. Click **Select Network**. A list of available wireless networks is displayed.
3. Select a network available for connection. Provide required information, if needed.

Transfer data

Quickly share your files using the built-in Bluetooth technology among devices with the same features. You also can install a disc or media card to transfer data.

Connect to a Bluetooth-enabled device (for selected models)

You can connect all types of Bluetooth-enabled devices to your computer, such as a keyboard, a mouse, a smartphone, or speakers. Place the device that you are attempting to connect to less than 10 meters (33 feet) from the computer.



1. Turn on Bluetooth on the computer.
 - a. Open the system menu from the top-right corner and then click **Settings** → **Bluetooth**.
 - b. In the Bluetooth section enable Bluetooth with the toggle button at the top.
2. Any discoverable devices will be shown in the **Devices** list.
3. Select a Bluetooth device, and then follow the on-screen instructions.

Set the power plan

For ENERGY STAR® compliant computers, the following power plan takes effect when your computers have been idle for a specified duration:

- Turn off the display: After 5 minutes
- Put the computer to sleep: After 20 minutes

To awaken the computer from Sleep mode, press any key on your keyboard.

To set the power plan:

1. Go to **Settings** → **Power**.
2. Choose or customize a power plan of your preference.

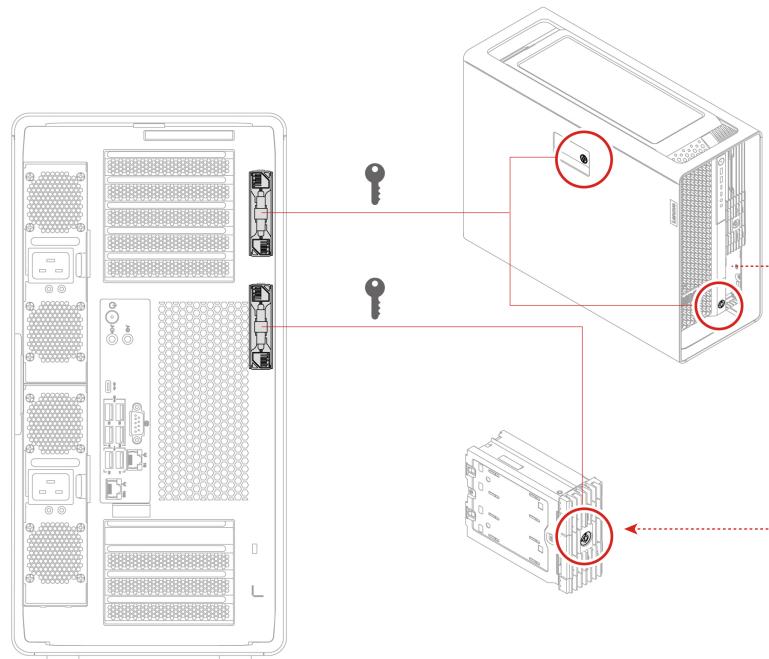
Security solutions

Lenovo values your information security. Your computer can be secured by physical locks, software solutions, and BIOS solutions. They can protect your computer from harm, theft, or unauthorized use.

Lock the computer

Note: Lenovo makes no comments, judgments, or warranties about the function, quality, or performance of the locking device and security feature. You can purchase computer locks from Lenovo.

Key lock

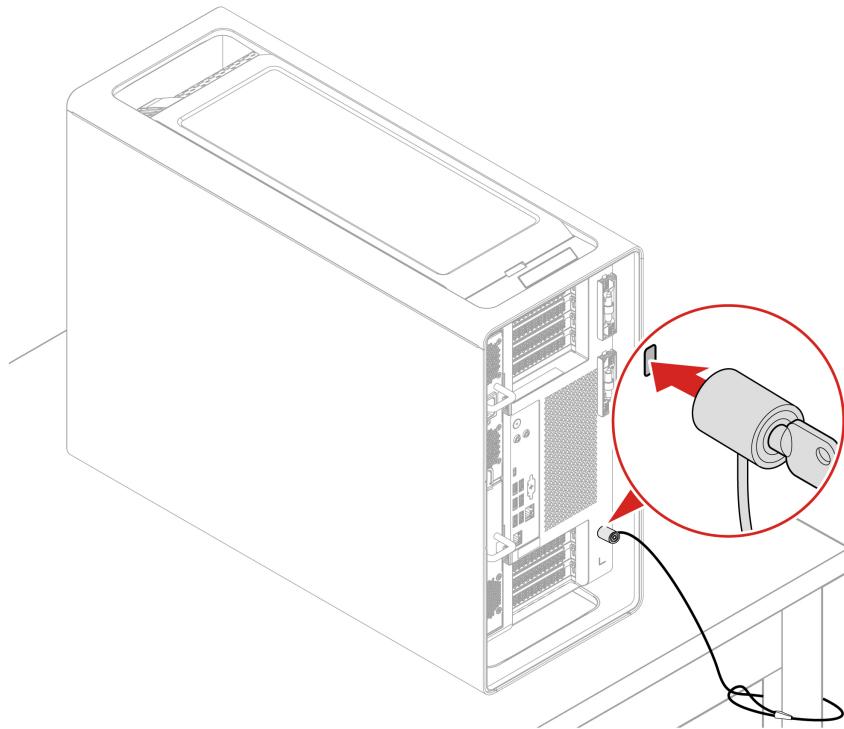


- Locks
 - Locks for side cover, front access bay, and dual M.2 SSD enclosure prevent unauthorized access to the inside of your computer chassis or storage drives.
 - The storage drive in the front access bay can be hot-swappable, which means that you can install or replace the drive without even turning off your computer. Therefore, lock the front access bay to prevent unexpected removal.
- Keys

- The keys are attached to the rear of the machine. For security, store the keys in a secure place when you are not using them.
- The keys can be carved with numbers, for example, **00**, **01**, **02**, and **03**. The key can unlock locks that are carved with the same number on the same computer or on other computers.

Security lock

Lock your computer to a desk, table, or other fixtures through a security lock.



Use BIOS security solutions

This section provides BIOS solutions to secure your computer and information.

Wipe the storage drive data

It is recommended that you wipe the storage drive data before recycling the storage drive or the computer.

To wipe the storage drive data:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Security** → **secure wipe** → **Enabled**.
3. Press F10 or Fn+F10 to save the changes and exit.
4. Restart the computer. When the logo screen is displayed, press F12 or Fn+F12.
5. Select **App Menu** → **secure wipe** and press Enter.
6. Select the storage drive you will wipe and click **NEXT**.
7. Select the entire storage drive or partition to wipe as desired.
8. Select the method as desired and click **NEXT**.
9. Click **Yes** to confirm your option when the prompting window is displayed.

10. If you have set a hard disk password for the storage drive, enter the password. Otherwise, set a temporary password following the on-screen instructions. Then, click **NEXT**. The wiping process begins.

Note: Duration of the wiping process varies depending on the storage drive capacity.

11. Click **Reboot** when you are prompted to reset the system, and then one of the following will happen:
 - If the system storage drive data is wiped, you will be prompted that no operating system is found.
 - If the non-system storage drive data is wiped, the computer restarts automatically.

Cover presence switch

The cover presence switch prevents the computer from logging in to the operating system when the computer cover is not properly installed or closed.

To enable or disable the cover presence switch connector on the system board:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Security → Cover Tamper Detected** and press Enter.
3. Select **Enabled** or **Disabled** and press Enter.
4. Press F10 or Fn+F10 to save the changes and exit.

If the cover presence switch is enabled and the computer cover is not correctly installed or closed, an error message will be displayed when you turn on the computer. To bypass the error message and log in to the operating system, properly install and close the computer cover, and then disable the cover presence switch in the BIOS menu.

Intel BIOS guard

The Intel BIOS Guard module cryptographically verifies all BIOS updates. This hardware-based security helps prevent software and malware attacks on the computers BIOS.

Smart USB Protection

The Smart USB Protection function is a security function that helps prevent data from being copied from the computer to USB storage devices connected to the computer. You can set the Smart USB Protection function to one of the following modes:

- **Disabled** (default setting): You can use the USB storage devices without limitation.
- **Read Only**: You cannot copy data from the computer to the USB storage devices. However, you can access data on the USB storage devices.
- **No Access**: You cannot access the USB storage devices from the computer.

To configure the Smart USB Protection function:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Security → Smart USB Protection** and press Enter.
3. Select the desired setting and press Enter.
4. Press F10 or Fn+F10 to save the changes and exit.

UEFI BIOS passwords

You can set passwords in UEFI (Unified Extensible Firmware Interface) BIOS (Basic Input/Output System) to strengthen the security of your computer.

Password types

You can set a power-on password, supervisor password, system management password, or hard disk password in UEFI BIOS to prevent unauthorized access to your computer. However, you are not prompted to enter any UEFI BIOS password when your computer resumes from sleep mode.

- **Power-on password**

When a power-on password is set, you are prompted to enter a valid password each time the computer is turned on.

- **Supervisor password**

Setting a supervisor password deters unauthorized users from changing configuration settings. If you are responsible for maintaining the configuration settings of several computers, you might want to set a supervisor password.

When a supervisor password is set, you are prompted to enter a valid password each time you try to enter the BIOS menu.

If both the power-on password and supervisor password are set, you can enter either password. However, you must use your supervisor password to change any configuration settings.

- **Hard disk password (for selected models)**

Setting a hard disk password prevents unauthorized access to the data on the storage drive. When a hard disk password is set, you are prompted to enter a valid password each time you try to access the storage drive.

Note: After you set a hard disk password, your data on the storage drive is protected even if the storage drive is removed from one computer and installed in another.

- **System management password (for selected models)**

You can enable the system management password to have the same authority as the supervisor password to control security related features. To customize the authority of the system management password through the UEFI BIOS menu:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Security** → **System Management Password Access Control**.
3. Follow the on-screen instructions.

If you have set both the supervisor password and the system management password, the supervisor password overrides the system management password.

Set, change, and remove a password

Before you start, print these instructions.

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Security**.
3. Depending on the password type, select **Set Supervisor Password**, **Set Power-On Password**, **Set System Management Password**, or **Hard Disk Password** and press Enter.
4. Follow the on-screen instructions to set, change, or remove a password.
5. Press F10 or Fn+F10 to save the changes and exit.

You should record your passwords and store them in a safe place. If you forget the passwords, contact a Lenovo-authorized service provider.

Note: If the hard disk password is forgotten, Lenovo cannot remove the password or recover data from the storage drive.

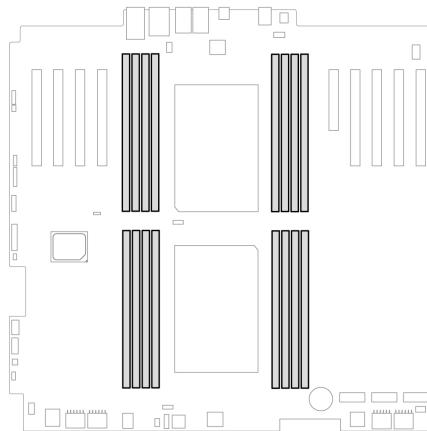
Chapter 3. Explore your computer

Expand your computer

You can enhance your computer capacity and performance by adding various devices into the following slots or bays. To add or replace a device, see Chapter 4 “CRU replacement” on page 27 for replacement instructions.

Memory slots

Your computer has sixteen memory slots. You can expand the configurations according to the rules listed in the following table.



Items	Rules
Quantity	<ul style="list-style-type: none">1 CPU: 1, 2, 4, 6, or 8 memory modules2 CPUs: 2, 4, 8, 12, or 16 memory modules
Type	<ul style="list-style-type: none">DDR5-4800 ECC RDIMMDDR5-5600 ECC RDIMM
	Note: See “System memory speed” on page 8 for memory speed statements.
Capacity	16 GB, 32 GB, 64 GB, 128 GB, or 256 GB
Others	<ul style="list-style-type: none">Install memory modules of the same type, the same capacity, and the same DRAM densities.Install memory modules in the correct order. See “Memory module” on page 78.

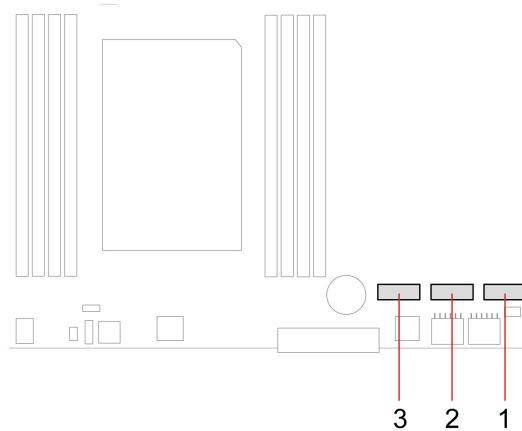
Memory fan

Your computer has at least one memory fan. If you install any of the following memory modules, two memory fans are required.

- 128 GB or 256 GB DDR5-4800 ECC RDIMM
- 64 GB, 128 GB, or 256 GB DDR5-5600 ECC RDIMM

On-board M.2 SSD slots

Your computer has three on-board M.2 SSD slots. You can expand the configurations according to the following rules.



Installation order

Installation order	Slot
1	slot 1
2	slot 2
3	slot 3

Supported M.2 SSD type

Slot	Supported M.2 SSD type
Slot 1, slot 2	<ul style="list-style-type: none">• 2280 or 22110 Gen 4 M.2 SSD• 2280 or 22110 Gen 5 M.2 SSD
Slot 3	<ul style="list-style-type: none">• 2280 Gen 4 M.2 SSD• 2280 Gen 5 M.2 SSD

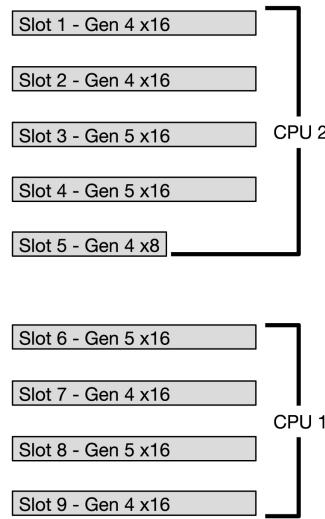
Note: For better performance, it's recommended that you install on-board M.2 SSD of the same generation.

Power of Gen 5 M.2 SSD

Slot	Power of Gen 5 M.2 SSD
Slot 1, slot 2	<ul style="list-style-type: none">• 10 W (when slot 3 is empty)• 8 W (when slot 3 is installed with Gen 5 M.2 SSD)
Slot 3	8 W

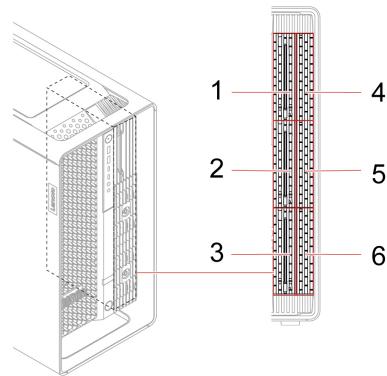
PCIe slots

Your computer has nine PCIe slots to install PCIe cards such as graphics card, BMC card, and different kinds of PCIe adapter card. For PCIe card installation order and special installation rules for certain PCIe cards, see “PCIe card installation rule” on page 71.



Front-access bays

Your computer has six front-access bays. The configuration of storage drive devices in the bays should follow the rules as shown below.

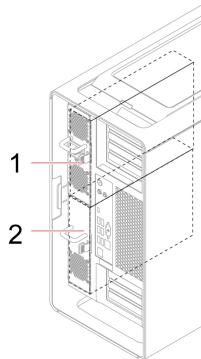


Option	Dual M.2 SSD enclosure	3.5-inch HDD (hot-swappable) in HDD bracket
1	Zero	Up to three (in bay 1 to 3)
2	One (in bay 2+5)	Up to two (in bay 1 and 3)
3	Two (in bay 2+5 and 3+6)	Up to one (in bay 1)

Note: Each dual M.2 SSD enclosure supports up to two Gen 4 M.2 SSDs (hot-swappable).

PSU bays

Your computer has two PSU bays. The configuration of devices in the bays should follow the rules as shown below.



Option	Bay 1	Bay 2
1	Empty	One PSU
2	One PSU	One PSU
3	One PSU	One 3.5-inch HDD in a PSU bay storage enclosure

UEFI BIOS

UEFI BIOS is the first program that the computer runs. When the computer turns on, the UEFI BIOS performs a self test to make sure that various devices in the computer are functioning properly.

What is UEFI BIOS

Note: The operating system settings might override any similar settings in UEFI BIOS.

UEFI BIOS is the first program that the computer runs when the computer is turned on. UEFI BIOS initializes the hardware components and loads the operating system and other programs. Your computer comes with a setup program with which you can change UEFI BIOS settings.

Enter the BIOS menu

Restart the computer. When the logo screen is displayed, press F1 or Fn+F1 to enter the BIOS menu.

Note: If you have set BIOS passwords, enter the correct passwords when prompted. You also can select **No** or press Esc to skip the password prompt and enter the BIOS menu. However, you cannot change the system configurations that are protected by passwords.

Navigate in the BIOS interface

Attention: The default configurations are already optimized for you in **boldface**. Improper change of the configurations might cause unexpected results.

Depending on your keyboard, you can navigate in the BIOS interface by pressing the following keys, or combinations of Fn and the following keys:

Key	Function
F1 or Fn+F1	General Help
Esc or Fn+Esc	Exit the submenu

Key	Function
↑ ↓ or Fn+↑ ↓	Locate an item
← → or Fn+← →	Move keyboard focus
+/- or Fn+/-	Change value
Enter	Enter the submenu
F9 or Fn+F9	Setup Defaults
F10 or Fn+F10	Save and exit

Change the display language of UEFI BIOS

UEFI BIOS supports three or four display languages: English, French, simplified Chinese, and Russian (for selected models).

To change the display language of UEFI BIOS:

1. Select **Main → Language** and press Enter.
2. Set the display language as desired.

Change the display mode of UEFI BIOS (for selected models)

You can use UEFI BIOS in the graphic mode or the text mode according to your needs.

The keys on the keyboard used to perform various tasks are displayed at the bottom of the screen. In addition to the keyboard, you also can use the mouse to make selections.

To change the display mode of UEFI BIOS:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Main → Setup Mode Select** and press Enter.
3. Set the display mode as desired.

Set the system date and time

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Main → System Time & Date** and press Enter.
3. Set the system date and time as desired.
4. Press F10 or Fn+F10 to save the changes and exit.

Change the priority boot order

If the computer does not boot from a device as expected, you can change the boot priority order permanently or select a temporary boot device.

Change the priority boot order permanently

1. Depending on the type of the storage device, do one of the following:
 - If the storage device is internal, go to step 2.
 - If the storage device is a disc, ensure that the computer is on or turn on the computer. Then, insert the disc into the optical drive.
 - If the storage device is an external device other than a disc, connect the storage device to the computer.

2. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
3. Select **Startup → Priority Boot Order**, and then follow the on-screen instructions to change the boot priority order.
4. You can also select the first priority device group by selecting **Startup → First Boot Device**, and then follow the on-screen instructions to select the first boot device within this group. Your computer will boot from the first boot device before trying the boot priority order you set in the previous step.
5. Press F10 or Fn+F10 to save the changes and exit.

Select a temporary boot device

Note: Not all discs and storage drives are bootable.

1. Depending on the type of the storage device, do one of the following:
 - If the storage device is internal, go to step 2.
 - If the storage device is a disc, ensure that the computer is on or turn on the computer. Then, insert the disc into the optical drive.
 - If the storage device is an external device other than a disc, connect the storage device to the computer.
2. Restart the computer. When the logo screen is displayed, press F12 or Fn+F12.
3. Select the storage device as desired and press Enter.

If you want to change the boot priority order permanently, select **Enter Setup** on Startup Device Menu and press Enter to enter the BIOS menu.

Enable or disable the configuration change detection feature

If you enable configuration change detection, when the POST detects configuration changes of some hardware devices (such as storage drives or memory modules), an error message will be displayed when you turn on the computer.

To enable or disable the configuration change detection feature:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Security → Configuration Change Detection** and press Enter.
3. Enable or disable the feature as desired.
4. Press F10 or Fn+F10 to save the changes and exit.

To bypass the error message and log in to the operating system, press F2 or Fn+F2. To clear the error message, enter the BIOS menu, save and then exit.

Enable or disable the automatic power-on feature

The Automatic Power On item in UEFI BIOS provides various options for you to make your computer start up automatically.

To enable or disable the automatic power-on feature:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Power → Automatic Power On** and press Enter.
3. Select the feature as desired and press Enter.
4. Enable or disable the feature as desired.
5. Press F10 or Fn+F10 to save the changes and exit.

Enable or disable the ErP LPS compliance mode

Lenovo computers meet the eco-design requirements of the ErP Lot 3 regulation. For more information, go to:

<https://www.lenovo.com/us/en/compliance/eco-declaration>

You can enable the ErP LPS compliance mode to reduce the consumption of electricity when the computer is off or in sleep mode.

To enable or disable the ErP LPS compliance mode:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Power** → **Enhanced Power Saving Mode** and press Enter.
3. Depending on whether you select **Enabled** or **Disabled**, do one of the following:
 - If you select **Enabled**, press Enter. Then, select **Power** → **Automatic Power On** and press Enter. Check whether the Wake on LAN feature is disabled automatically. If no, disable it.
 - If you select **Disabled**, press Enter. Then, go to the next step.
4. Press F10 or Fn+F10 to save the changes and exit.

When the ErP LPS compliance mode is enabled, you can wake up the computer by doing one of the following:

- Press the power button.
- Enable the Wake Up on Alarm feature to make the computer wake up at a set time.

Change BIOS settings before installing a new operating system

BIOS settings vary by operating system. Change the BIOS settings before installing a new operating system.

To change the BIOS settings:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. From the main interface, select **Security** → **Secure Boot** and press Enter.
3. Depending on the operating system to be installed, do one of the following:
 - To install the Windows 10 (64-bit) and most of Linux operating system, select **Enabled** for **Secure Boot**.
 - To install an operating system that does not support secure boot, select **Disabled** for **Secure Boot**.
4. Press F10 or Fn+F10 to save the changes and exit.

Update UEFI BIOS

When you install a new program, device driver, or hardware component, you might need to update UEFI BIOS. You can update the BIOS from your operating system or a flash update disc (supported only on selected models).

Download and install the latest UEFI BIOS update package by one of the following methods:

- Using the built-in software update service:
Ubuntu software update will check the LVFS site for any firmware updates and notify you when updates are available.
- From the Lenovo Support Web site:
 1. Go to <https://pcsupport.lenovo.com>.

2. Download the flash BIOS update driver for the operating system version or the ISO image version (used to create a flash update disc). Then, download the installation instructions for the flash BIOS update driver you have downloaded.
3. Print the installation instructions and follow the instructions to update the BIOS.

Reset system to factory default

This feature allows you to reset the UEFI BIOS to the factory default settings, including all UEFI BIOS settings and internal data. It helps you wipe user data in case that you want to dispose of or reuse your computer.

1. Restart the computer. When the logo screen is displayed, press F1 to enter the UEFI BIOS menu.
2. Select **Security** → **Reset system to Factory Default** and press Enter.
3. Several warning windows might be displayed. Do the following before resetting the system to the factory default settings:
 - a. Deactivate the Absolute Persistence Module.
 - b. Remove the NVMe password if you have set one.
4. For computer models with RAID settings, a window is displayed to remind you of data damage. Select **Yes** to proceed.
5. A window is displayed to confirm all UEFI BIOS settings will be reset. Select **Yes** to proceed.

Note: If the **Intel AMT control** and **Absolute Persistence(R) Module** are permanently disabled, these settings cannot be reset successfully.

6. Enter the supervisor password, system management password or power-on password in the window prompted.

Your computer will restart immediately. It takes a few minutes to complete the initialization process. Your computer screen might be blank during this process. This is normal and you should not interrupt it.

View UEFI BIOS Event logs

The UEFI BIOS Event log viewer provides the brief information about UEFI BIOS events. Do the following to view the logs:

1. Restart the computer. When the logo screen is displayed, press F1.
2. Select **Main** → **BIOS Event log**. Then, press Enter. The UEFI BIOS Event log interface is displayed.
3. Navigate the interface by pressing the following keys, and then check details by selecting each item.
 - ↑ ↓: Move keyboard focus
 - PgUp / PgDn: Scroll page
 - Enter: Select
 - F3: Exit

The following UEFI BIOS event logs might be listed on your screen depending on UEFI BIOS activities. Each log consists of a date, a time, and a description of the event.

- **Power On** event: This log shows the Power On Self Test (POST) routine has started with the power-on process. It includes the power-on reason, the boot mode, and the shutdown reason.
- **Subcomponent Code Measurement** event: This log shows the subcomponent code measurement has worked. It includes the validation result of each component.
- **System Preboot Authentication** event: This log shows what credential is provided to gain preboot authentication. It includes the installed password, the password type, the input device, and the authentication result.

- **BIOS Password Change** event: This log shows the change history of the UEFI BIOS passwords. It includes the password type, the type and result of the event.
- **Subcomponent Self-healing** event: This log shows the information about the subcomponent where the recovery event occurred. It includes the cause and result of the event, and the recovered firmware version.
- **BIOS Setup Configuration Change** event: This log shows the change history of the UEFI BIOS Setup configuration. It includes the item name and value.
- **Device Change** event: This log shows the change history of devices. It includes the cause and type of the event.
- **System Boot** event: This log shows which device was utilized to boot the system. It includes the boot option, the description, and the file path list.
- **System Tamper** event: This log shows the occurrence of system tamper events. It includes the cause and type of the event.
- **POST Error** event: This log shows the occurrence of errors during the POST routine. It includes the error code.
- **Flash Update** event: This log shows the occurrence of flash update. It includes the cause and result of the event, and the updated firmware version.
- **Capsule Update** event: This log shows the occurrence of UEFI capsule firmware update. It includes the cause and result of the event, and the updated firmware version.
- **Log Cleared** event: This log shows UEFI BIOS event logs are cleared. It includes the cause and result of the event.
- **Shutdown / Reboot** event: This log shows the UEFI BIOS is successfully shut down or the system is rebooted. It includes the cause and type of the event.

Chapter 4. CRU replacement

Before CRU replacement

Before replacing hardware of your computer, read this section first. You will get to know what is CRU, the CRU list, system board connectors, and prerequisites for CRU replacement.

What is CRU

Customer Replaceable Units (CRUs) are parts that can be replaced by the customer. Lenovo computers contain the following types of CRUs:

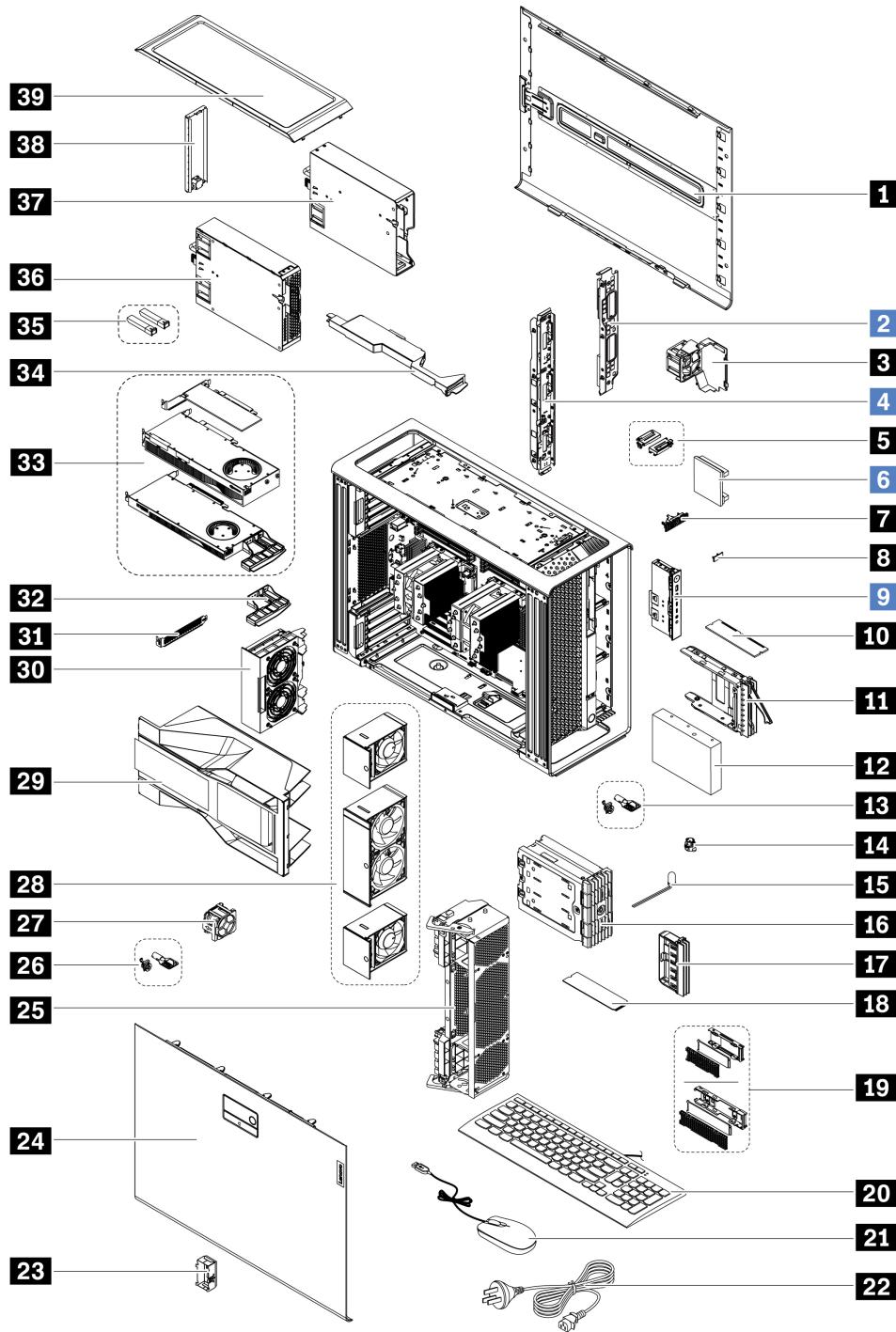
- **Self-service CRUs:** Refer to parts that can be replaced easily by customer themselves or by trained service technicians at an additional cost.
- **Optional-service CRUs:** Refer to parts that can be replaced by customers with a greater skill level. Trained service technicians can also provide service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

If you intend on installing the CRU, Lenovo will ship the CRU to you. CRU information and replacement instructions are shipped with your product and are available from Lenovo at any time upon request. You might be required to return the defective part that is replaced by the CRU. When return is required: (1) return instructions, a prepaid shipping label, and a container will be included with the replacement CRU; and (2) you might be charged for the replacement CRU if Lenovo does not receive the defective CRU within thirty (30) days of your receipt of the replacement CRU. For full details, see the Lenovo Limited Warranty documentation at:

https://www.lenovo.com/warranty/llw_02

CRU list

The following is the CRU list of your computer.



Number	Description	Self-service CRU	Optional-service CRU
1	Right side cover	Yes	No
2	Power distribution board and bracket	No	Yes
3	Storage fan assembly	Yes	No
4	BCB board and bracket	No	Yes
5	Wi-Fi antenna cover	Yes	No

Number	Description	Self-service CRU	Optional-service CRU
6	NVLINK bridge*	No	Yes
7	ThinkStation logo badge	Yes	No
8	ID badge	Yes	No
9	Front panel IO assembly	No	Yes
10	Memory module	Yes	No
11	HDD bracket*	Yes	No
12	HDD*	Yes	No
13	Lock kit for the front access bay*	Yes	No
14	Think LED holder	Yes	No
15	Think LED cable	Yes	No
16	Dual M.2 SSD enclosure*	Yes	No
17	Blank bezel	Yes	No
18	M.2 SSD*	Yes	No
19	On board M.2 SSD heatsink kit	Yes	No
20	Keyboard	Yes	No
21	Mouse	Yes	No
22	Power cord	Yes	No
23	NVLINK retainer*	Yes	No
24	Left side cover	Yes	No
25	Front fan bracket	Yes	No
26	Lock kit for the left side cover*	Yes	No
27	Memory fan	Yes	No
28	Front fan assembly	Yes	No
29	CPU duct	Yes	No
30	Rear fan assembly	Yes	No
31	PCIe bracket	Yes	No
32	Customized PCIe extender*	Yes	No
33	PCIe card	Yes	No
34	Super capacitor module*	Yes	No
35	Ethernet-adapter-card fiber modules	Yes	No
36	Power supply assembly	Yes	No
37	PSU bay storage enclosure	Yes	No
38	Dummy cover for the upper PSU bay	Yes	No
39	Top cover	Yes	No

* for selected models

System board

Note: The system board might look slightly different from the illustration.

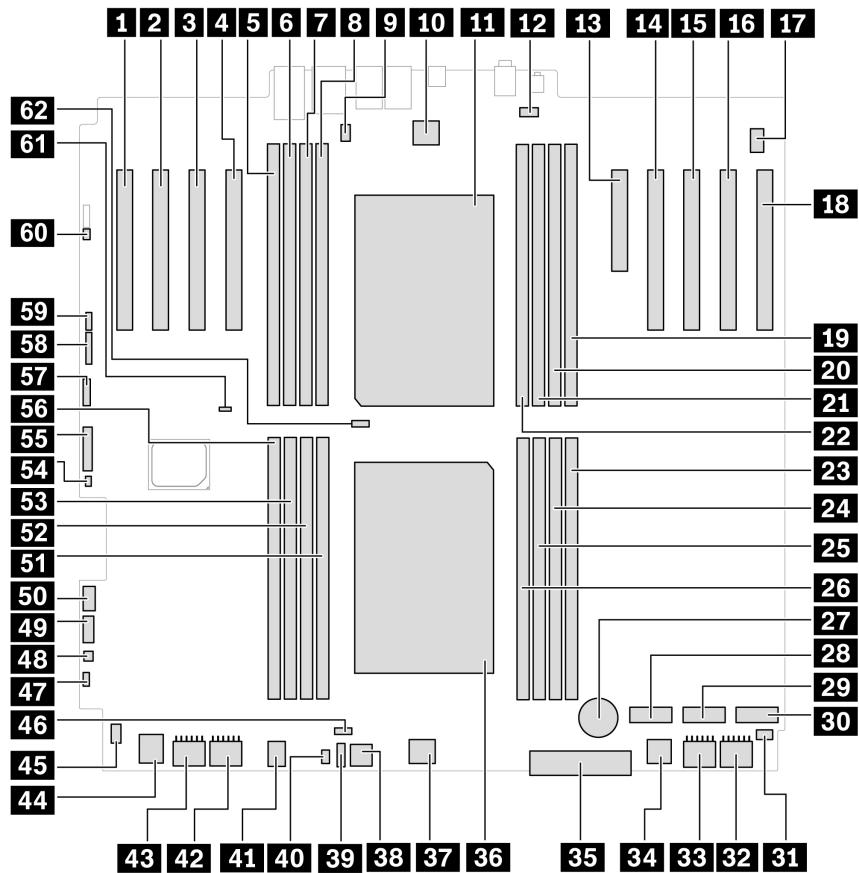


Figure 1. System board (front) part locations

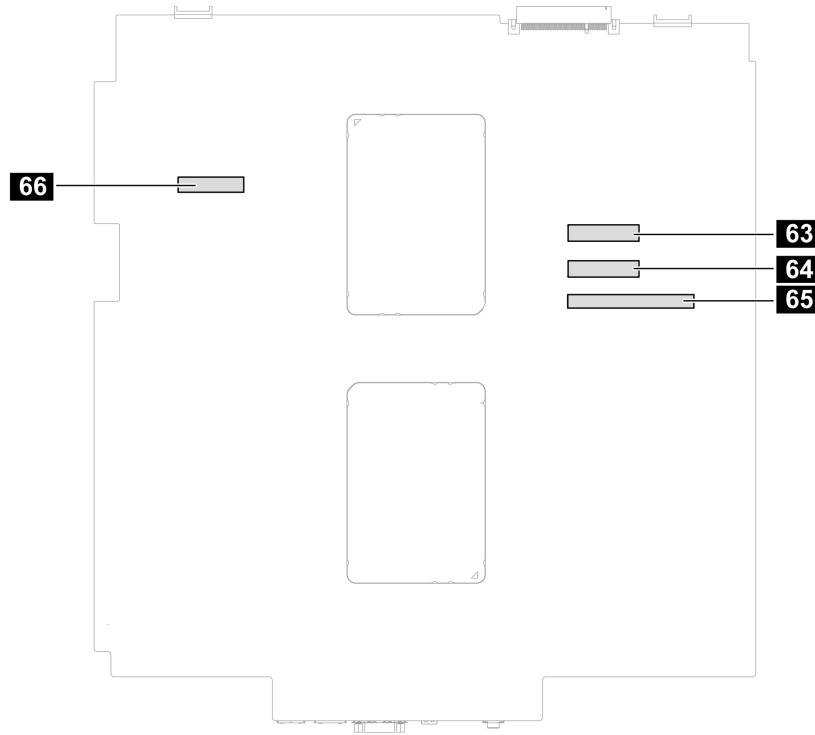


Figure 2. System board (back) part locations

Item	Item
1 PCIe card slot 9 (x 16, Gen4, Microprocessor 1)	2 PCIe card slot 8 (x 16, Gen5, Microprocessor 1)
3 PCIe card slot 7 (x 16, Gen4, Microprocessor 1)	4 PCIe card slot 6 (x 16, Gen5, Microprocessor 1)
5 Memory slot 9	6 Memory slot 10
7 Memory slot 11	8 Memory slot 12
9 Serial port (COM) connector	10 Rear-fan-assembly connector
11 Microprocessor 2*	12 Top memory-fan connector
13 PCIe card slot 5 (x 8, Gen4, Microprocessor 2)	14 PCIe card slot 4 (x 16, Gen5, Microprocessor 2)
15 PCIe card slot 3 (x 16, Gen5, Microprocessor 2)	16 PCIe card slot 2 (x 16, Gen4, Microprocessor 2)
17 Internal-speaker connector	18 PCIe card slot 1 (x 16, Gen4, Microprocessor 2)
19 Memory slot 16	20 Memory slot 15
21 Memory slot 14	22 Memory slot 13
23 Memory slot 1	24 Memory slot 2
25 Memory slot 3	26 Memory slot 4
27 Coin-cell battery	28 M.2 SSD slot 3
29 M.2 SSD slot 2	30 M.2 SSD slot 1
31 Right cover presence switch connector (intrusion switch connector)	32 Graphics card power connector 4

Item	Item
33 Graphics card power connector 3	34 Front fan assembly connector 2
35 Front panel connector	36 Microprocessor 1
37 Front fan assembly connector 1	38 Misc power connector
39 Thermal sensor connector	40 Logo LED connector
41 Bottom memory-fan connector	42 Graphics card power connector 1
43 Graphics card power connector 2	44 Front fan assembly connector 3
45 Left cover presence switch connector (intrusion switch connector)	46 Microprocessor 1 fan connector
47 Power button header	48 Thunderbolt™ power connector
49 Thunderbolt control connector	50 USB 3.2 Gen1
51 Memory slot 5	52 Memory slot 6
53 Memory slot 7	54 Drive_ACT
55 Alternative Trusted Platform Module (TPM) header	56 Memory slot 8
57 USB 2.0	58 BMC
59 VROC	60 Reset header
61 Clear CMOS jumper	62 Microprocessor 2 fan connector
63 MCIO connector 2	64 MCIO connector 1
65 Power distribution board connector	66 Drive_backplane

Prerequisites for hardware replacement

General prerequisites

Read *Generic Safety and Compliance Notices*.

Prerequisites for opening computer cover

-



During operation, some components become hot enough to burn the skin. Before you open the computer cover, remove any media from the drives, turn off the computer and connected devices, disconnect power, remove all cables and locking devices, and wait approximately 10 minutes until the computer is cool.

- Before reaching parts with cables, record the cable routing for future reference and then disconnect its cable from the system board.

Prerequisites for storage drive replacement

Attention: The internal storage drive is sensitive. Inappropriate handling might cause damage and 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 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 soft material, such as a cloth, to absorb physical shocks.

Prerequisites for hot-swappable storage drives

You can install or replace a storage drive in the front access bay. The storage drive also can be hot-swappable, which means that you can install or replace the drive without even turning off your computer. Therefore, lock the storage drive to prevent the unexpected removal. The keys are attached at the rear of the computer. Store the keys in a secure place.

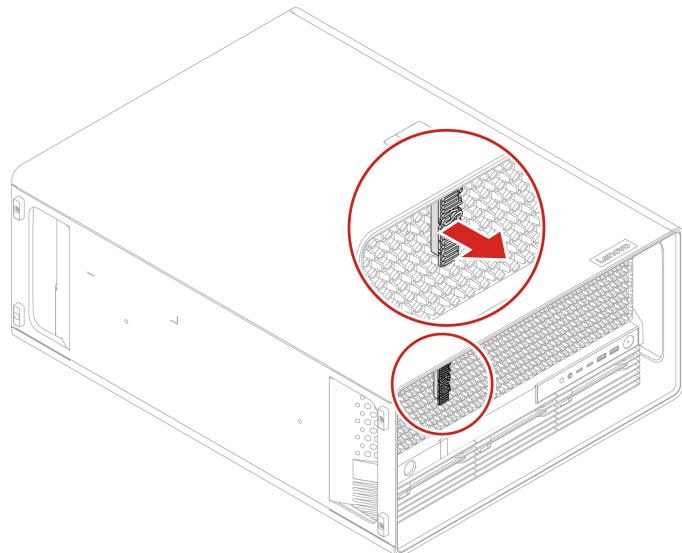
Attention: To avoid damage and loss of data, ensure that the operating system of your computer does not reside on the storage drive installed in the front access bay. If the requirement is not met, do not remove or install the storage drive when the computer is turned on.

ThinkStation logo badge

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

Removal steps

Remove the ThinkStation logo badge.

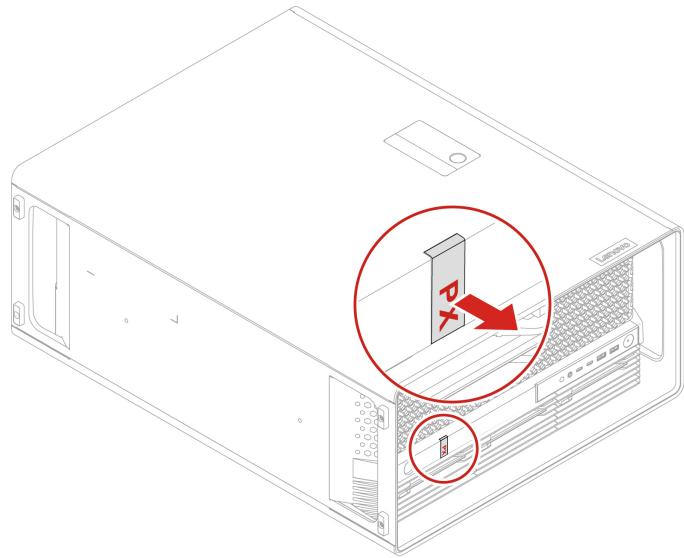


ID badge

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

Removal steps

Remove the ID badge.

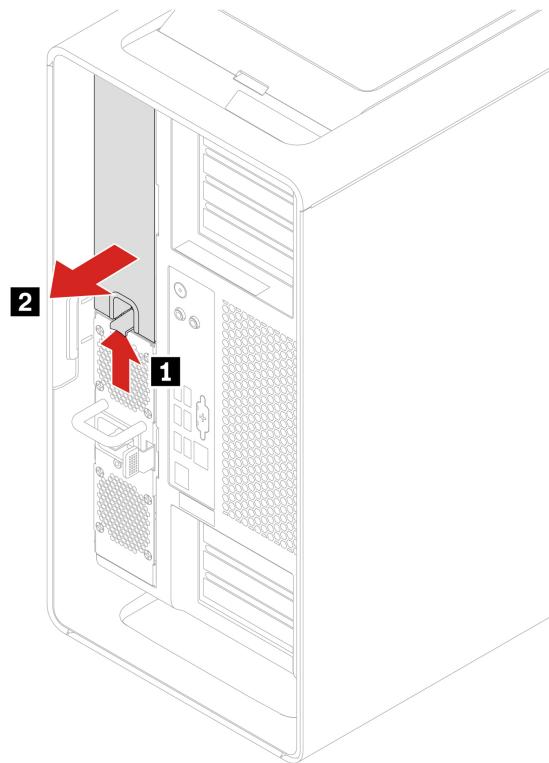


Dummy cover for the upper PSU bay

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

Removal steps

Remove the dummy cover for the upper PSU bay.

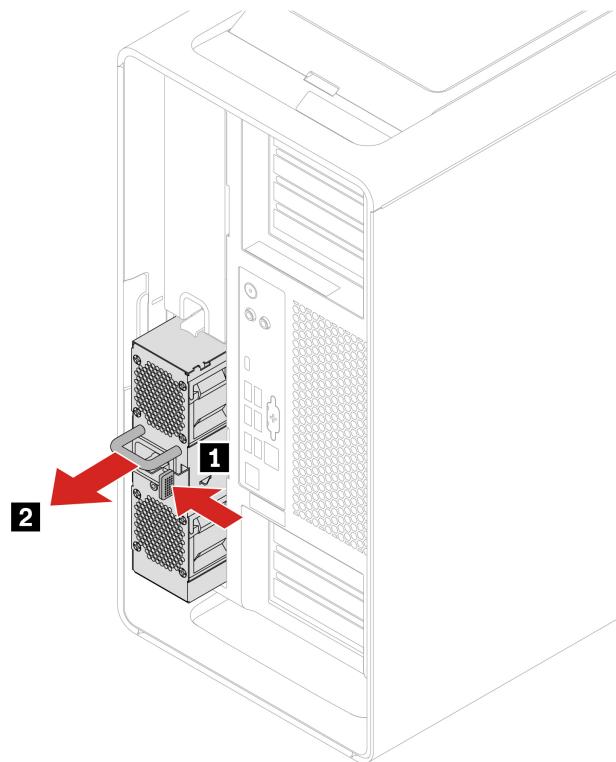


Power supply assembly

- Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.
- The power supply assembly is hot-swappable.

Removal steps

Remove the power supply assembly.

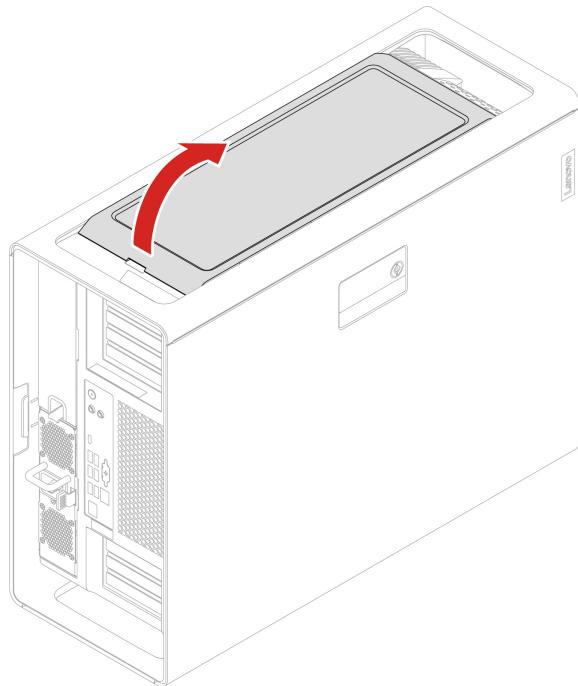


Top cover

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

Removal steps

Remove the top cover.

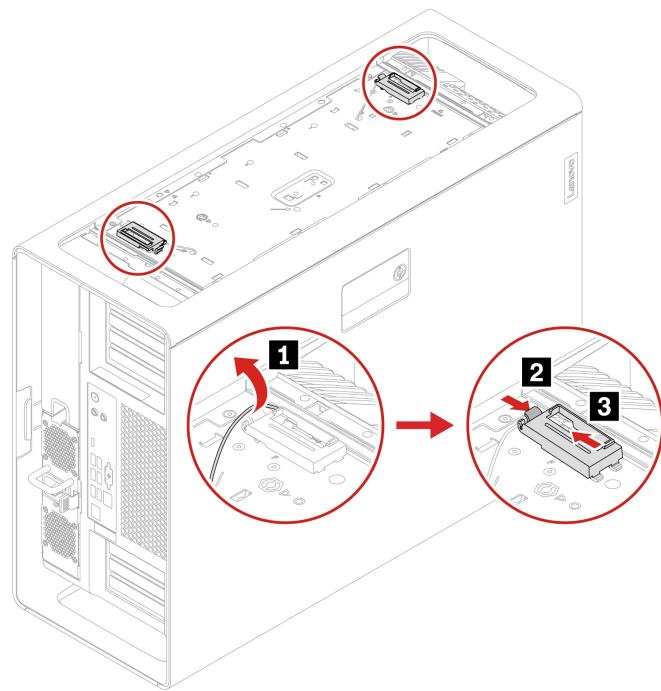


Wi-Fi antenna cover

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

Removal steps

1. Remove the “Top cover” on page 35.
2. Remove the Wi-Fi antenna cover.

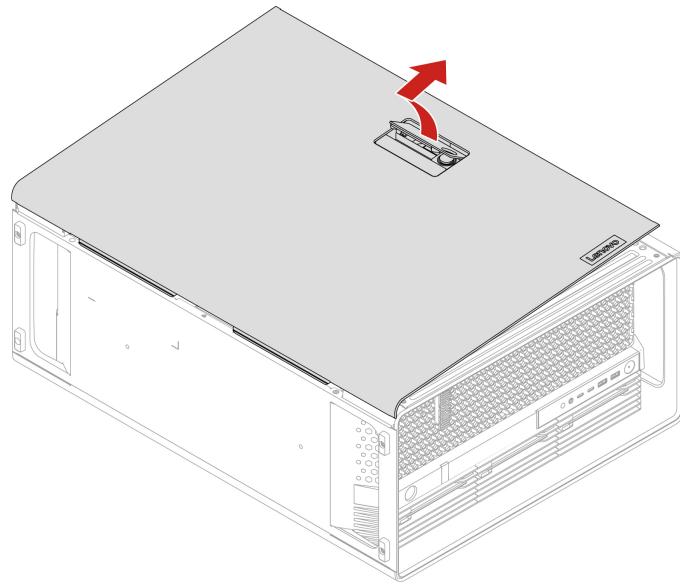
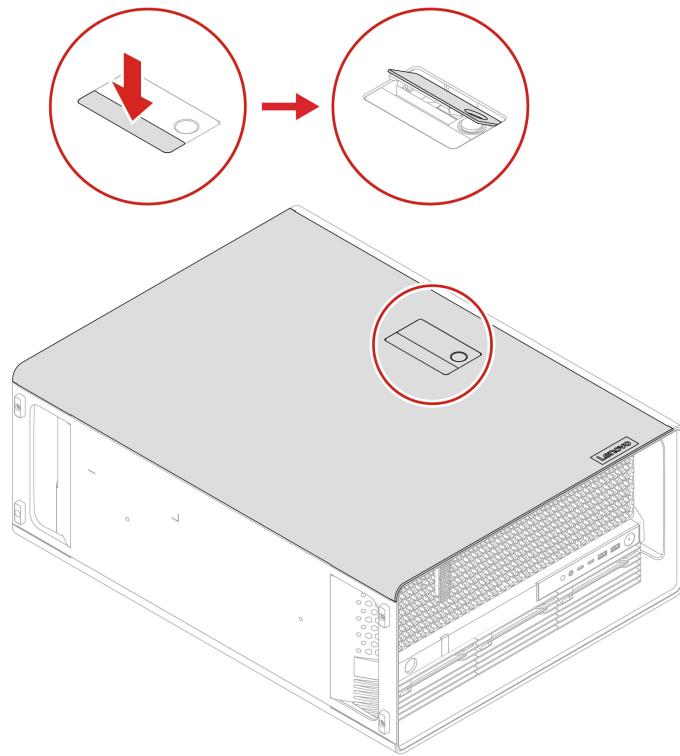


Left side cover

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

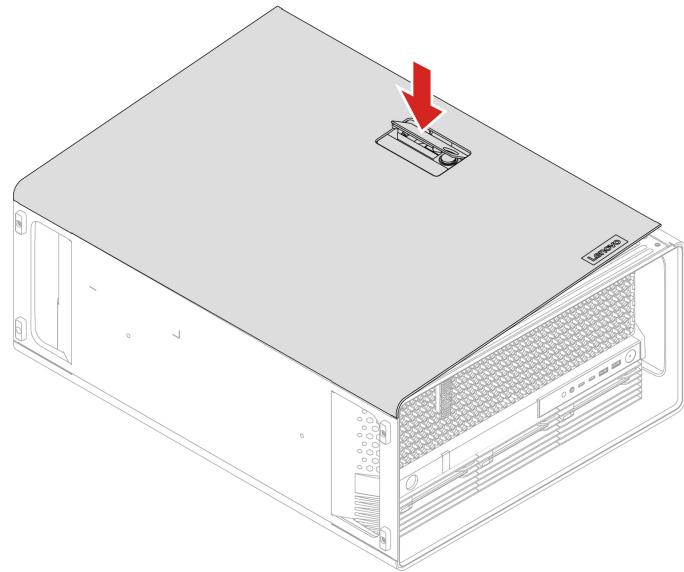
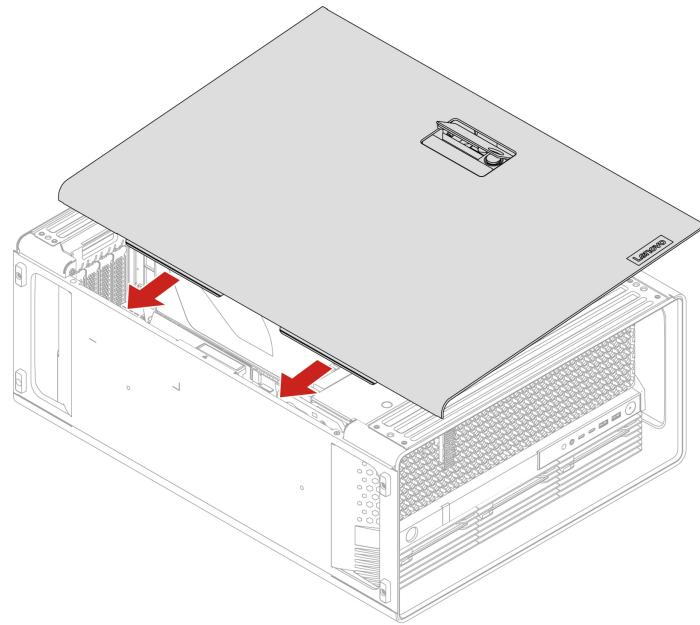
Removal steps

1. Lay the computer on its side for easier access to the left side cover.
2. Remove the left side cover.



Installation steps

Install the left side cover.



Note: If a locking device is available, use it to lock the computer after installing the computer cover.

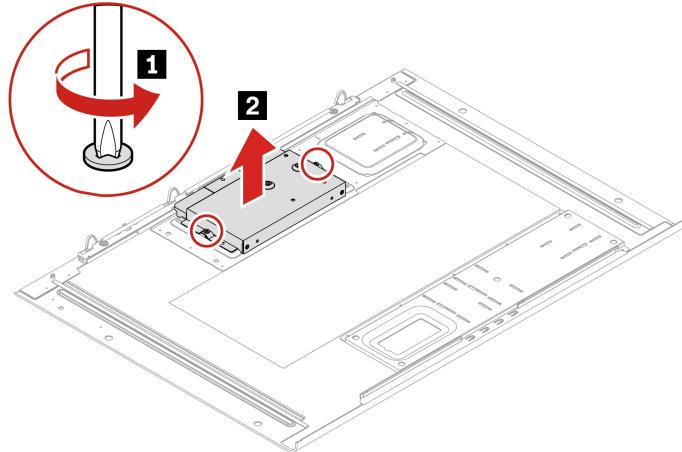
Lock kit for the left side cover

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

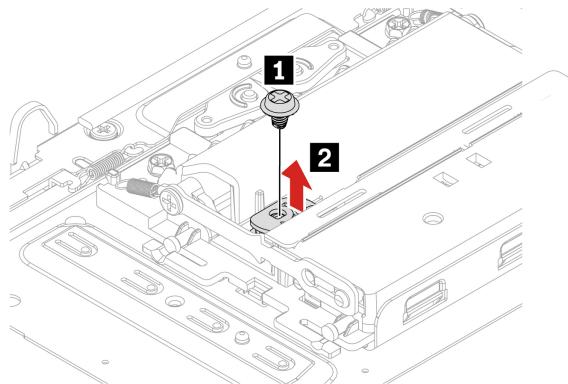
Removal steps

1. Remove the “Left side cover” on page 37.
2. Remove the left side cover lock.

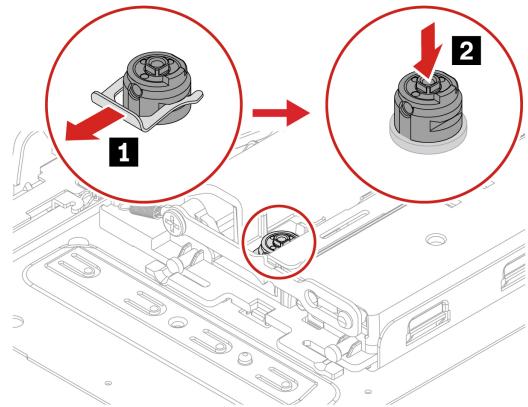
Note: Loosen the two screws that secure the lock handle cover. The two screws cannot be removed from the lock handle cover.



Screw (quantity)	Color	Torque
6-32*3.8 mm, Zn coated (2)	Blue	3.0 ± 0.5 lb/in

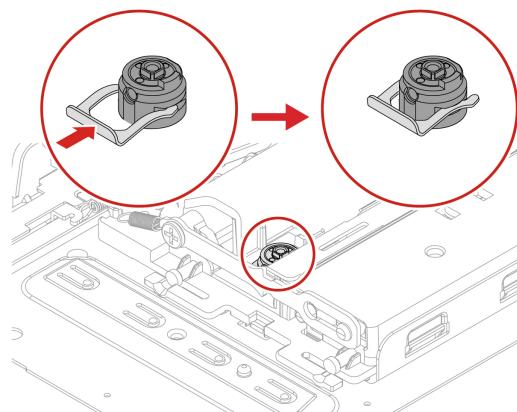
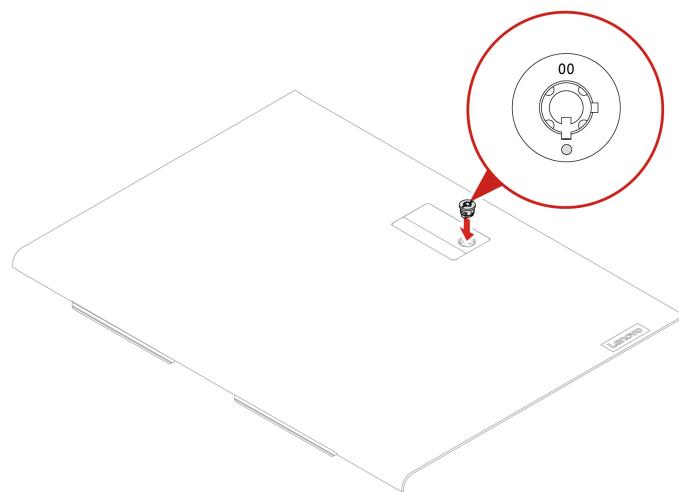


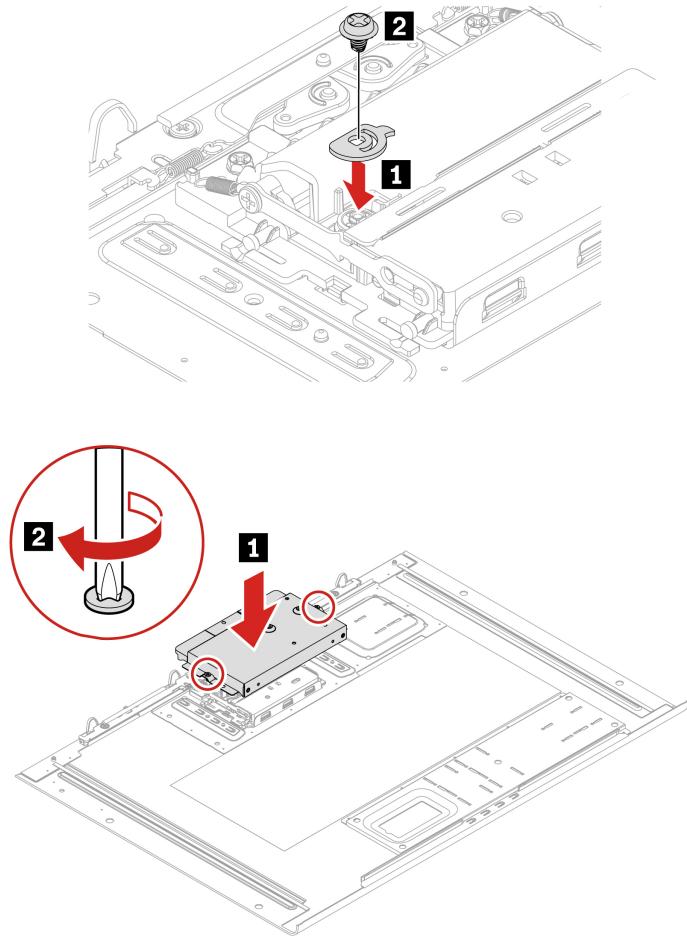
Screw (quantity)	Color	Torque
M3 x 4.2 mm, Zn coated (1)	Blue	5.0 ± 0.5 lb/in



Installation steps

Install the left side cover lock.



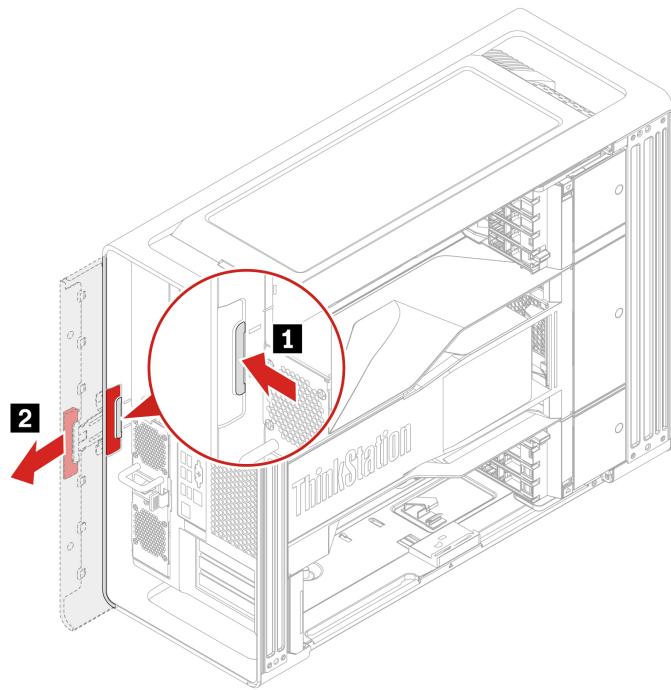
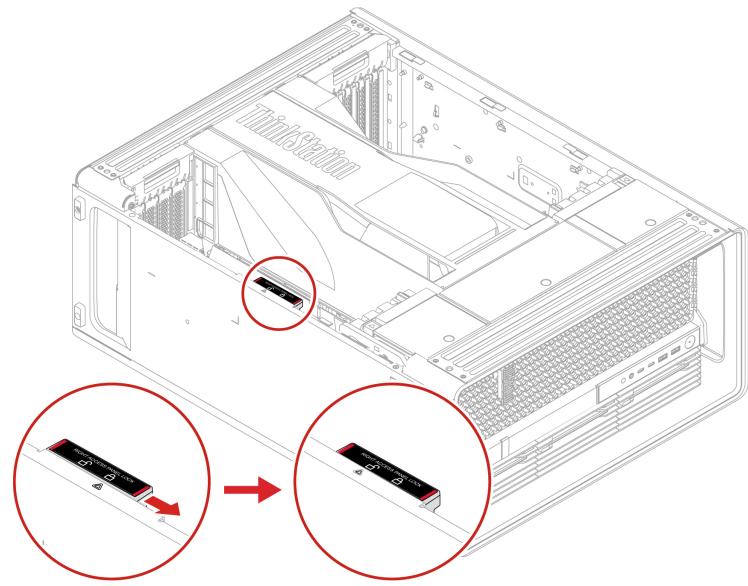


Right side cover

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

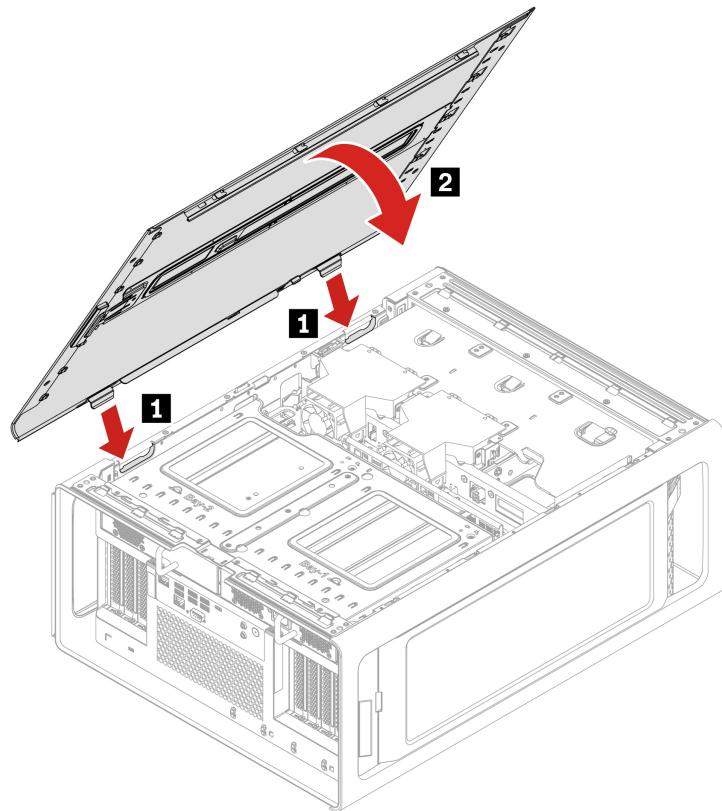
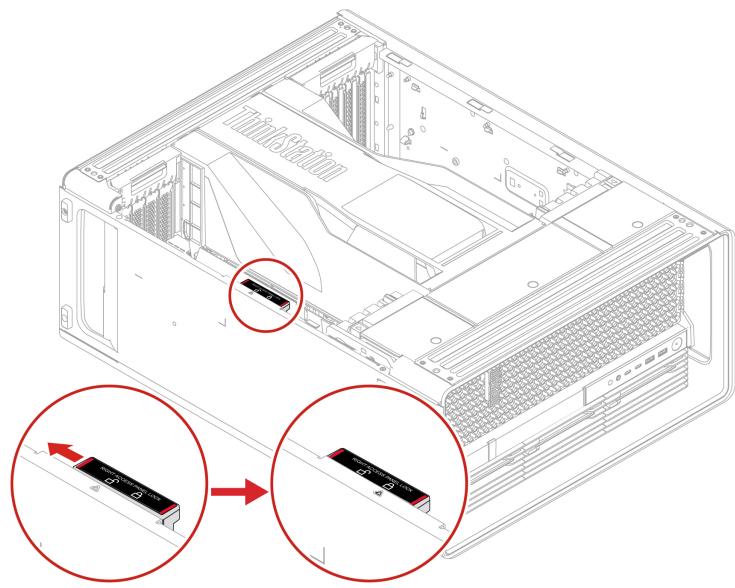
Removal steps

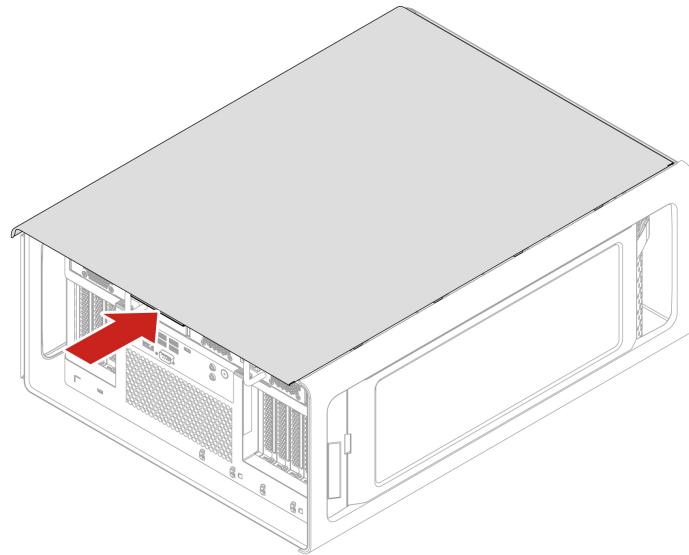
1. Remove the “Left side cover” on page 37.
2. Remove the right side cover.



Installation steps

Install the right side cover.



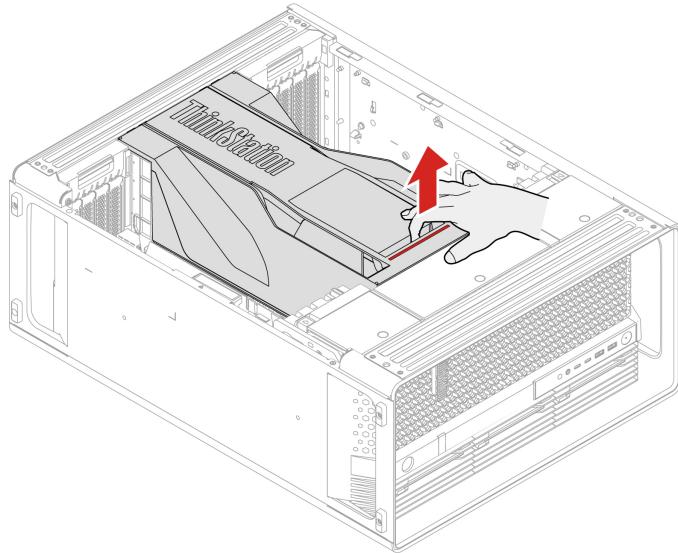


CPU duct

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

Removal steps

1. Remove the “Left side cover” on page 37.
2. Remove the CPU duct.

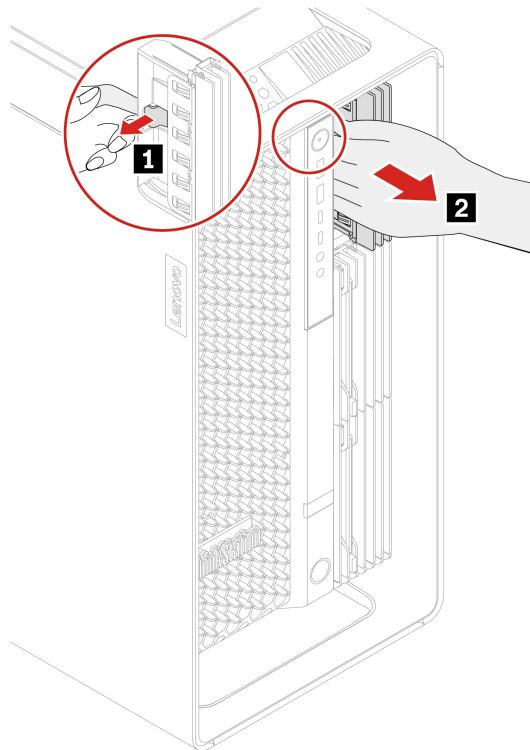


Blank bezel

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

Removal steps

1. Remove the HDD bracket beside the blank bezel. See “HDD in the front access bay” on page 50.
2. Remove the blank bezel.



Fans

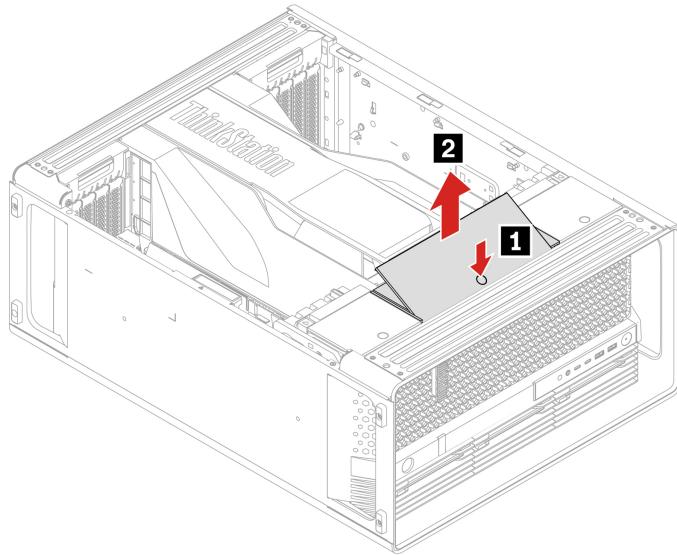
By reading this section, you will learn to replace the fans in your computer.

Front fan assembly

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

Removal steps

1. Remove the “Left side cover” on page 37.
2. Remove the front fan assembly.

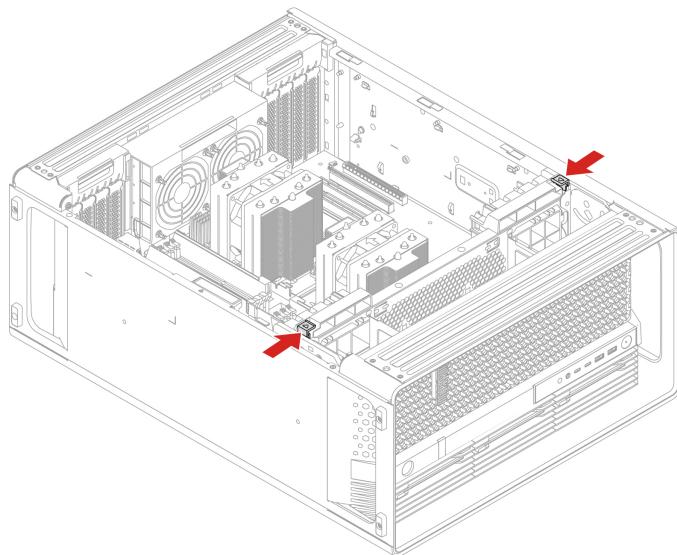


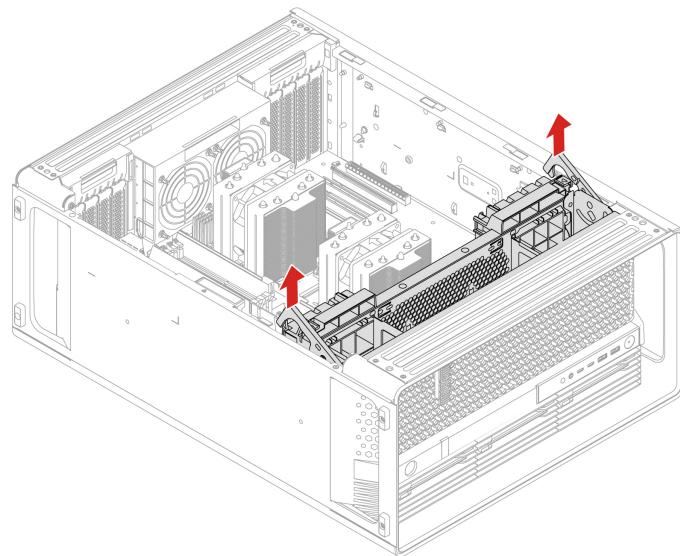
Front fan bracket

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

Removal steps

1. Remove the following parts, if any:
 - a. “Left side cover” on page 37.
 - b. “CPU duct” on page 45.
 - c. “Front fan assembly” on page 46.
2. Remove the front fan bracket.



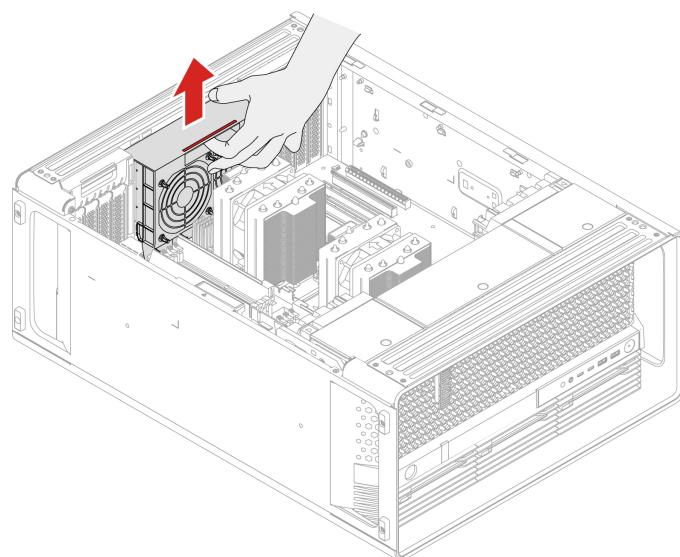


Rear fan assembly

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

Removal steps

1. Remove the following parts, if any:
 - a. “Left side cover” on page 37.
 - b. “CPU duct” on page 45.
2. Remove the rear fan assembly.

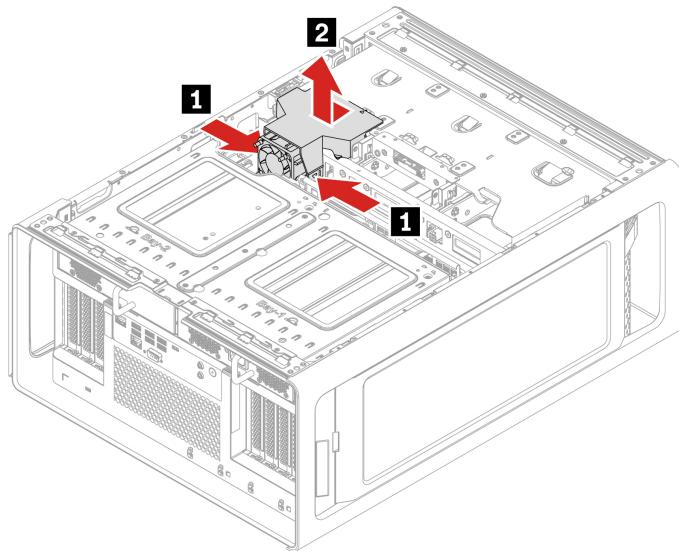


Storage fan assembly

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

Removal steps

1. Remove the following parts, if any:
 - a. “Left side cover” on page 37.
 - b. “Right side cover” on page 42.
2. Remove the storage fan assembly.

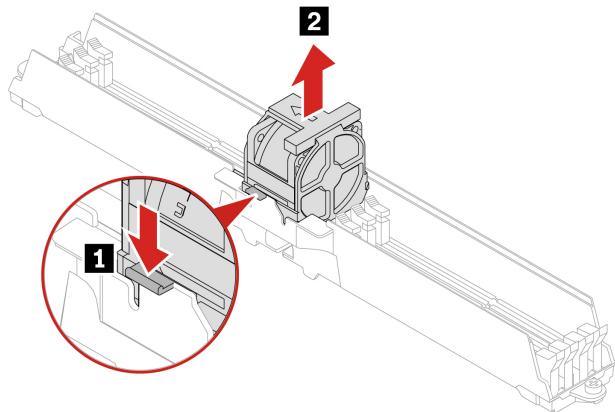


Memory fan

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

Removal steps

1. Remove the following parts, if any:
 - a. “Left side cover” on page 37.
 - b. “CPU duct” on page 45.
 - c. “Front fan assembly” on page 46.
 - d. “Front fan bracket” on page 47.
 - e. “Rear fan assembly” on page 48.
2. Remove the memory fan.



Storage drives

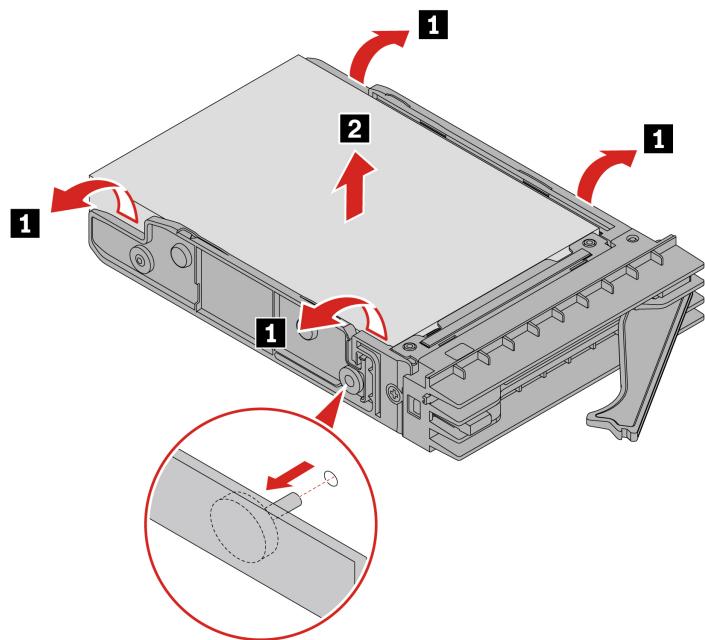
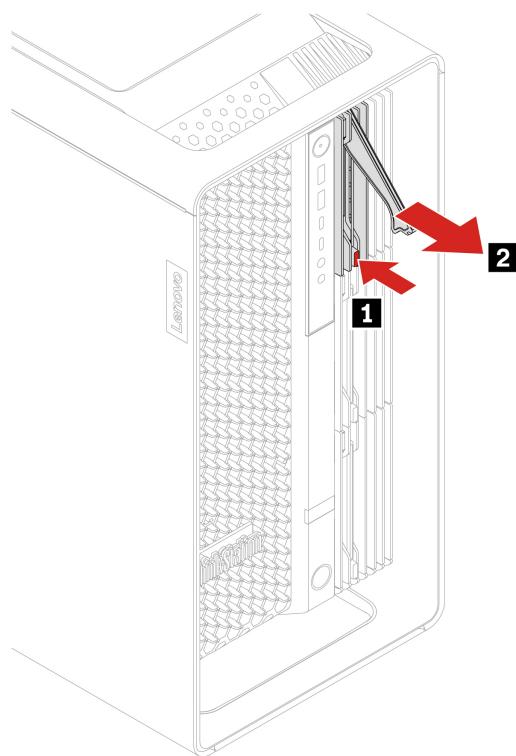
By reading this section, you will learn to replace storage drives in your computer.

HDD in the front access bay

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

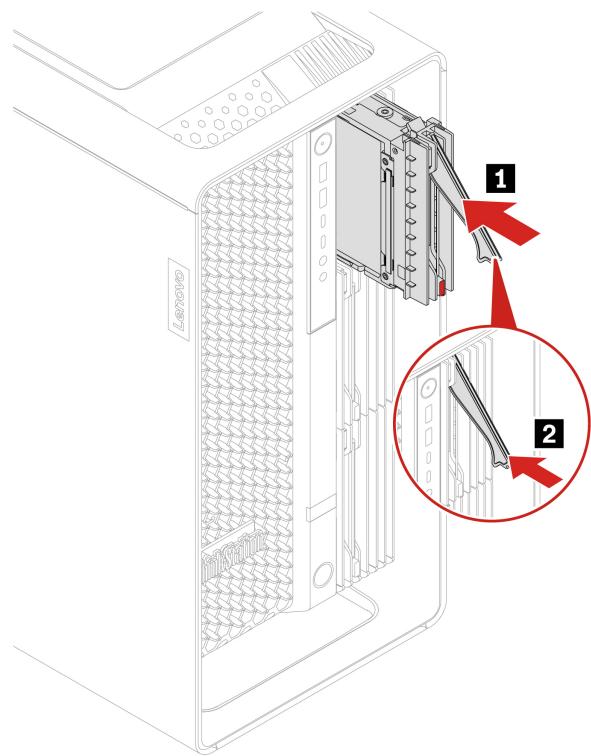
Removal steps

You might need to use the key attached at the rear of the computer to unlock the front access bay and then remove the HDD.



Installation steps

Install the HDD.

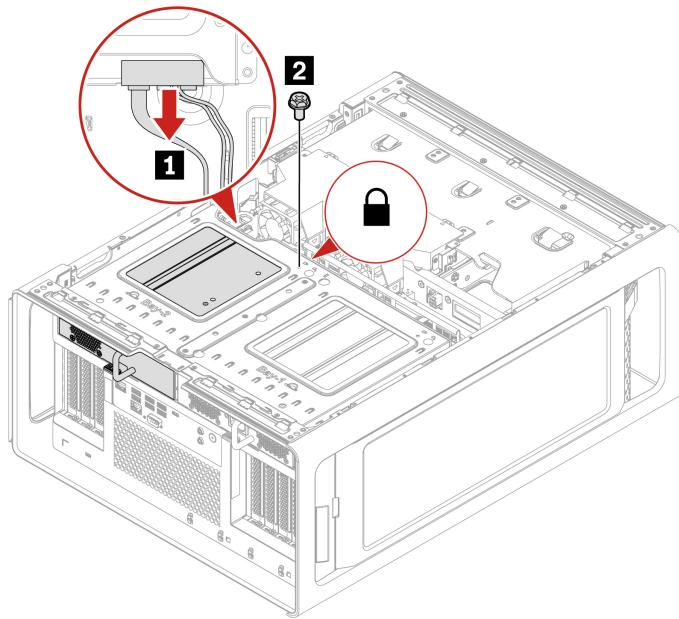


HDD in the PSU bay storage enclosure

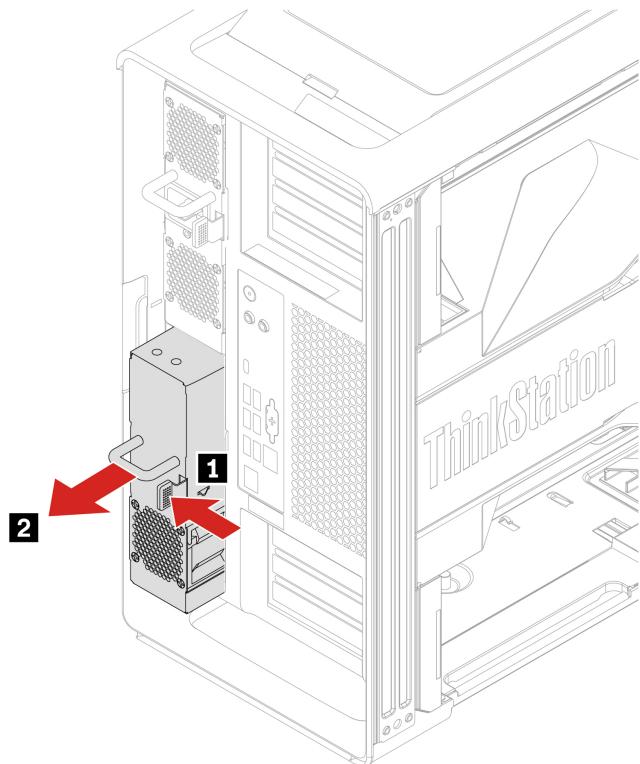
Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

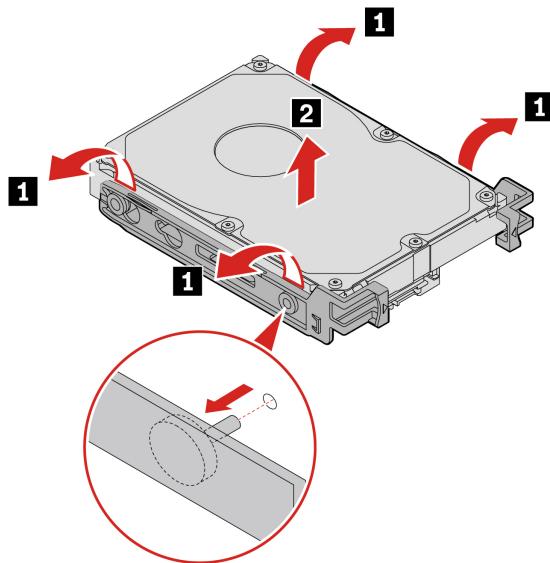
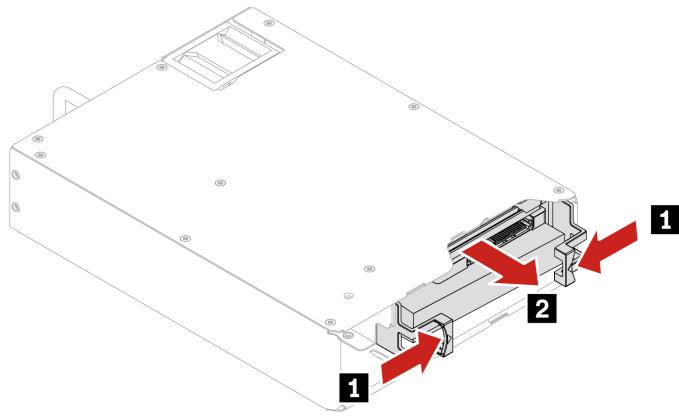
Removal steps

1. Remove the following parts, if any:
 - a. “Left side cover” on page 37.
 - b. “Right side cover” on page 42.
2. Remove the HDD in the PSU bay storage enclosure.



Screw (quantity)	Color	Torque
M3 x 5 mm, Nickel coated (1)	Black	5.0 ± 0.5 lb/in



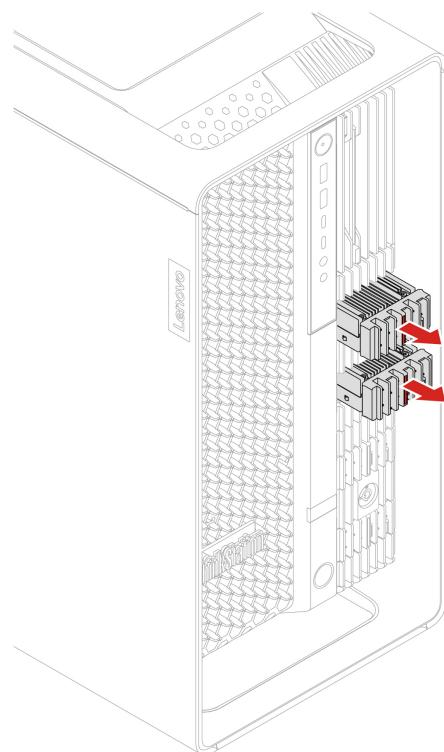
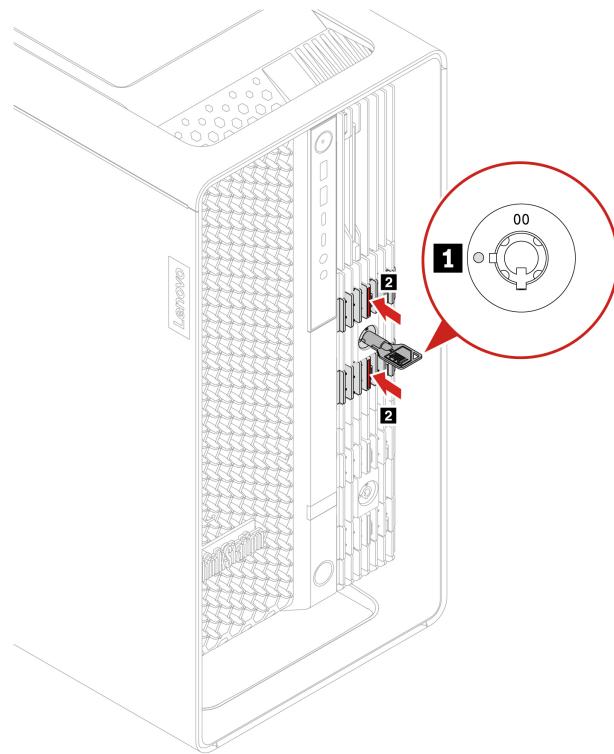


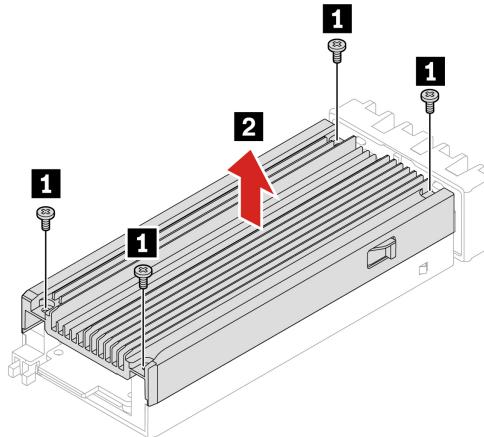
M.2 SSD in the front access bay

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

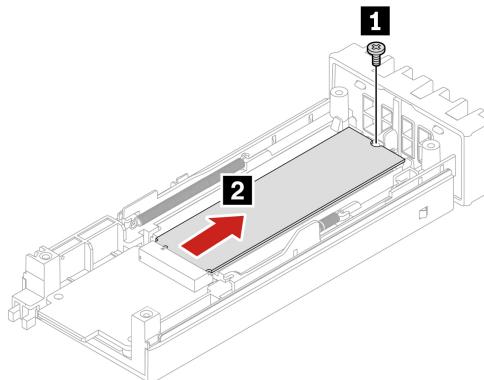
Removal steps

Remove the M.2 SSD.





Screw (quantity)	Color	Torque
M2 x 4.5 mm, Zn coated (4)	Black	1.5 ± 0.2 lb/in



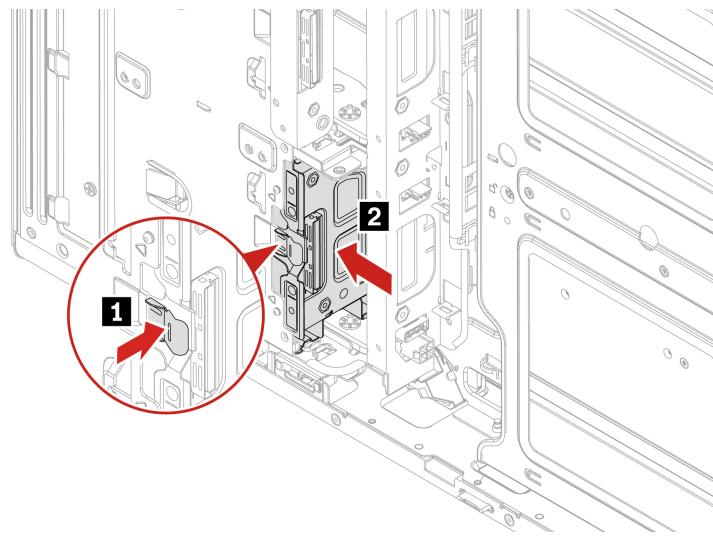
Screw (quantity)	Color	Torque
M2 x 4.5 mm, Zn coated (1)	Black	1.5 ± 0.2 lb/in

Dual M.2 SSD enclosure

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

Removal steps

1. Remove the following parts, if any:
 - a. “M.2 SSD in the front access bay” on page 54.
 - b. “Left side cover” on page 37.
 - c. “Right side cover” on page 42.
 - d. “Storage fan assembly” on page 49.
2. Remove the dual M.2 SSD enclosure.

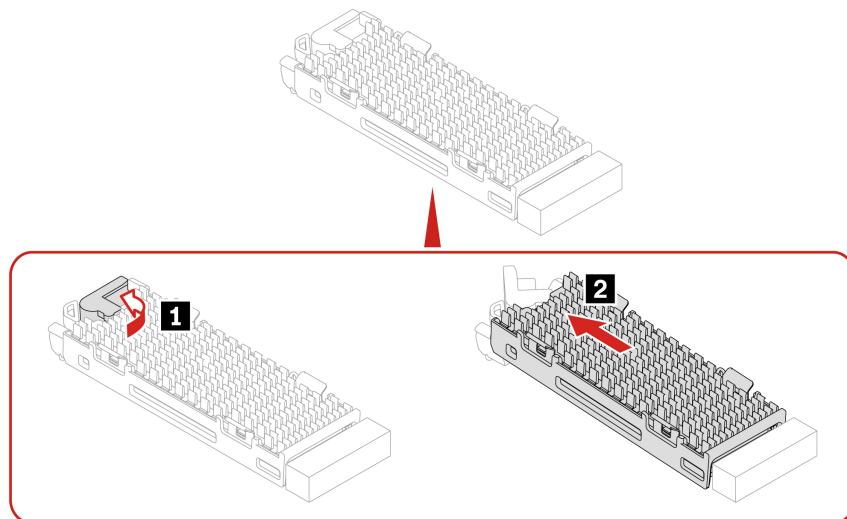


Onboard M.2 SSD and its heatsink kit

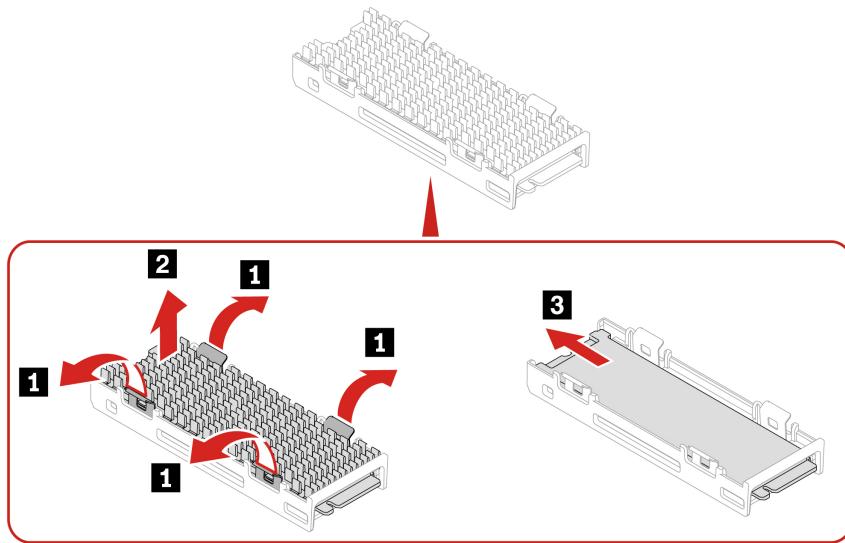
Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

Removal steps

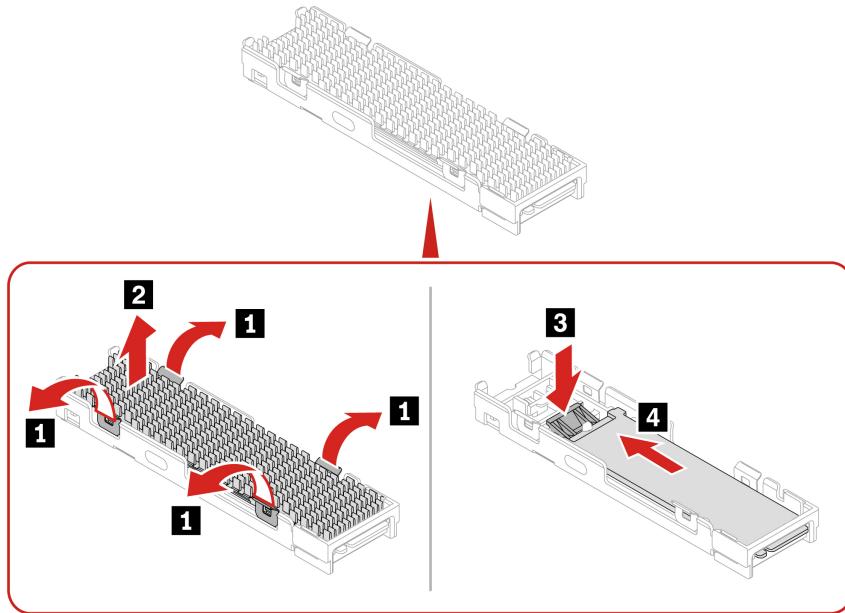
1. Remove the following parts, if any:
 - a. “Left side cover” on page 37.
 - b. “CPU duct” on page 45.
 - c. “Front fan assembly” on page 46.
 - d. “Front fan bracket” on page 47.
2. Remove the onboard M.2 SSD with its heatsink kit.



3. Remove the M.2 SSD from its heatsink kit.
 - Gen 4 M.2 SSD

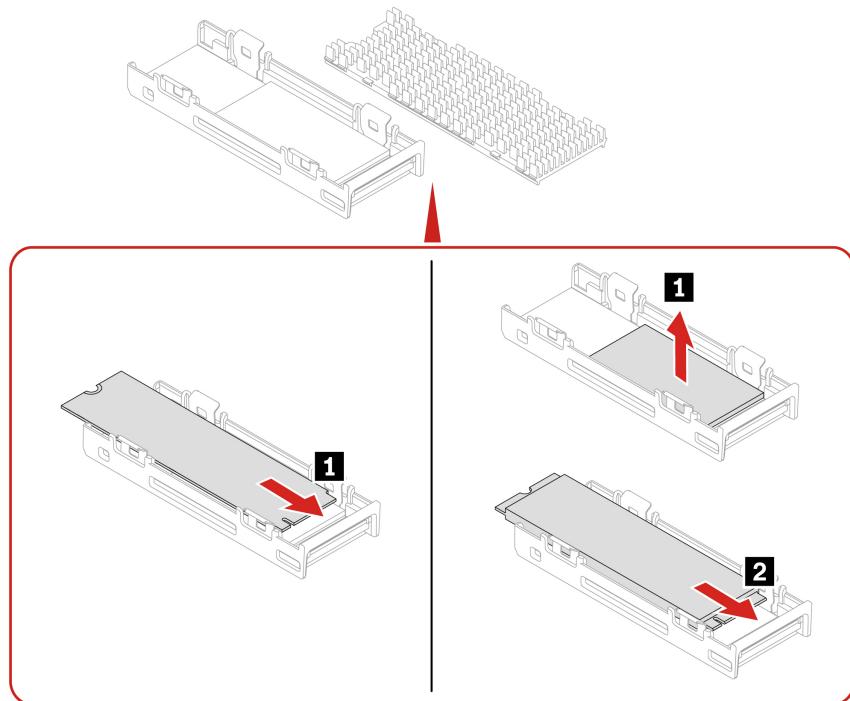


- Gen 5 M.2 SSD



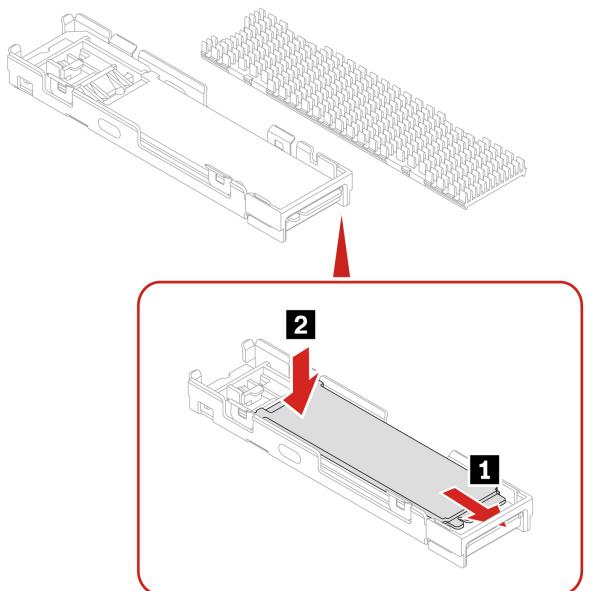
Installation steps

1. Remove the protective film from both heatsink and thermal pad before installing the onboard M.2 SSD.
2. Install the M.2 SSD into its heatsink kit.
 - Gen 4 M.2 SSD

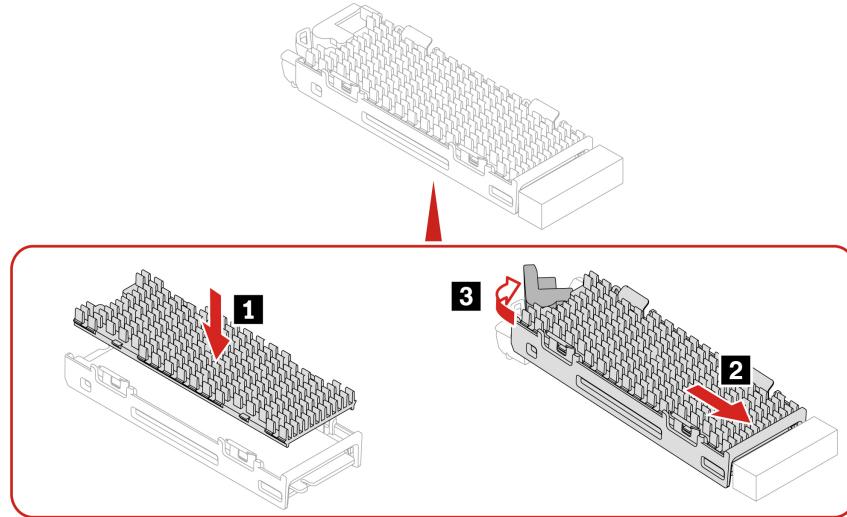


Note: If the new Gen 4 M.2 SSD is double-sided, remove the 1.5-mm thick thermal pad upward first.

- Gen 5 M.2 SSD

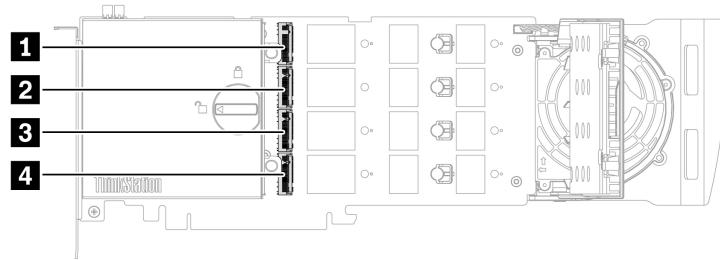


3. Install the M.2 SSD heatsink.



M.2 SSD on an M.2 SSD PCIe adapter

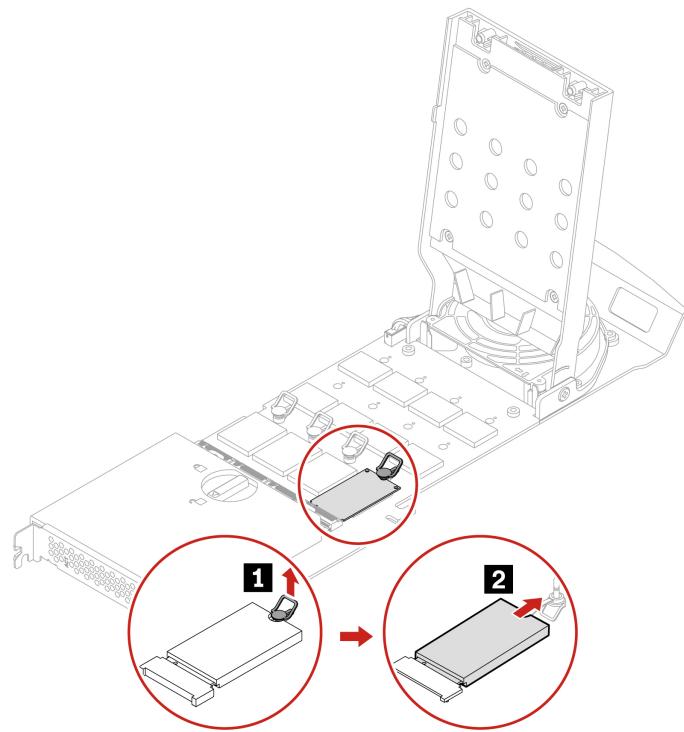
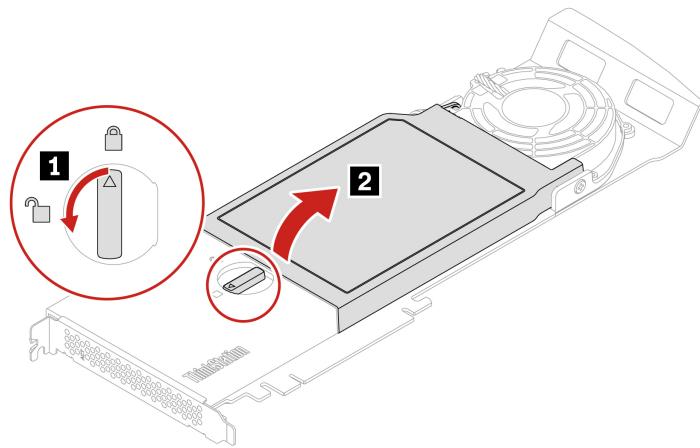
- Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.
- Install M.2 SSDs in the following order as shown:



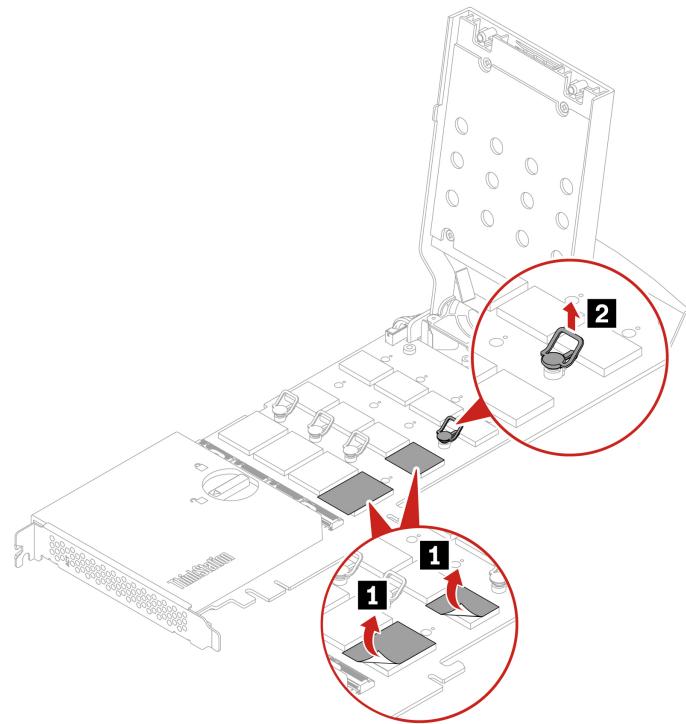
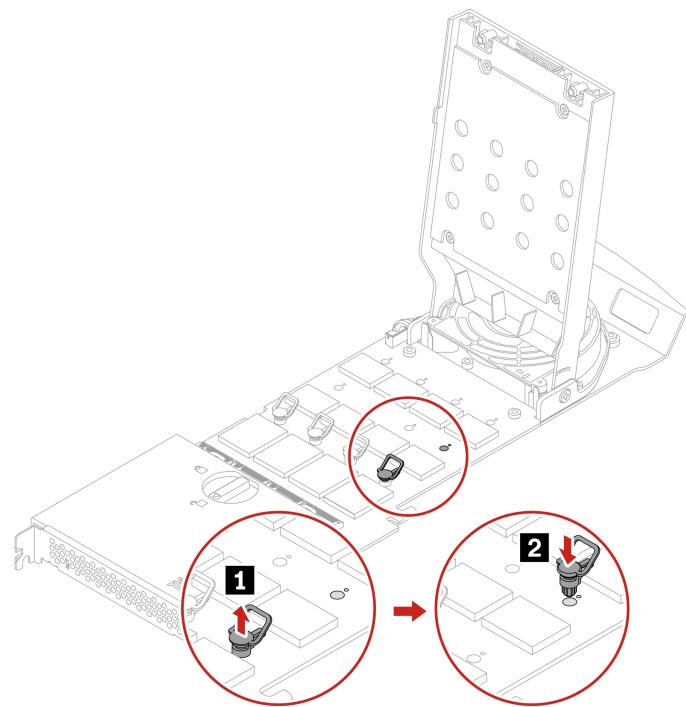
- For better performance, it's recommended that the generation of M.2 SSD match with the generation of M.2 SSD PCIe adapter. For example, install Gen 4 M.2 SSD on Gen 4 M.2 SSD PCIe adapter and install Gen 5 M.2 SSD on Gen 5 M.2 SSD PCIe adapter.

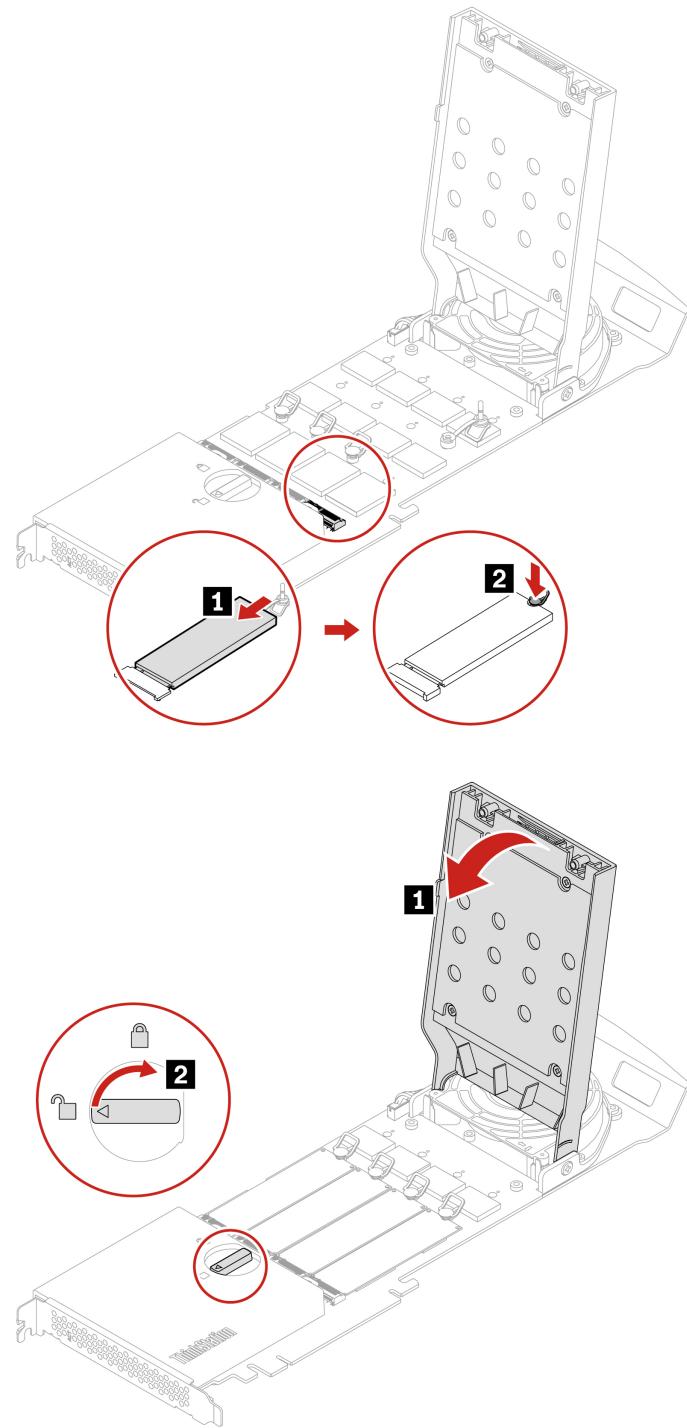
Replacement steps

- Remove the following parts, if any:
 - “Left side cover” on page 37.
 - “CPU duct” on page 45.
- Remove the M.2 SSD PCIe adapter from the PCIe card slot. See “Full-length PCIe card” on page 69.
- Replace the M.2 SSD on the M.2 SSD PCIe adapter.



If necessary, move the retention latch to an appropriate location to suit the length of the new M.2 SSD.





Note: Install the M.2 SSD PCIe adapter in a PCIe x16 card slot on the system board. See “System board” on page 30.

PCIe cards

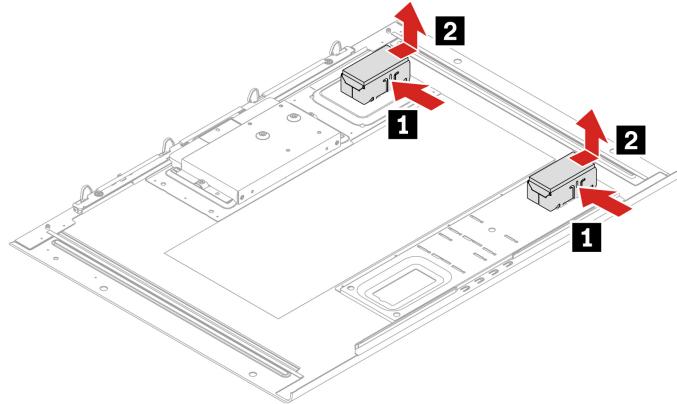
By reading this section, you will learn to replace PCIe cards, including graphics cards, in your computer.

NVLINK retainer

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

Removal steps

1. Remove the “Left side cover” on page 37.
2. Remove the NVLINK retainer.

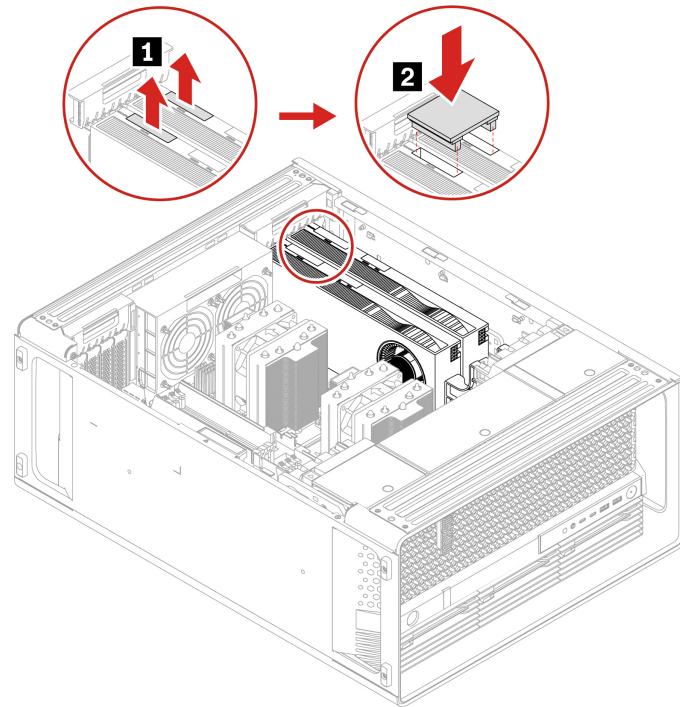


NVLINK bridge

- Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.
- The NVLINK bridge is shipped in an accessory box within the computer carton box. You need to take it out from the packaging and install it by yourself.

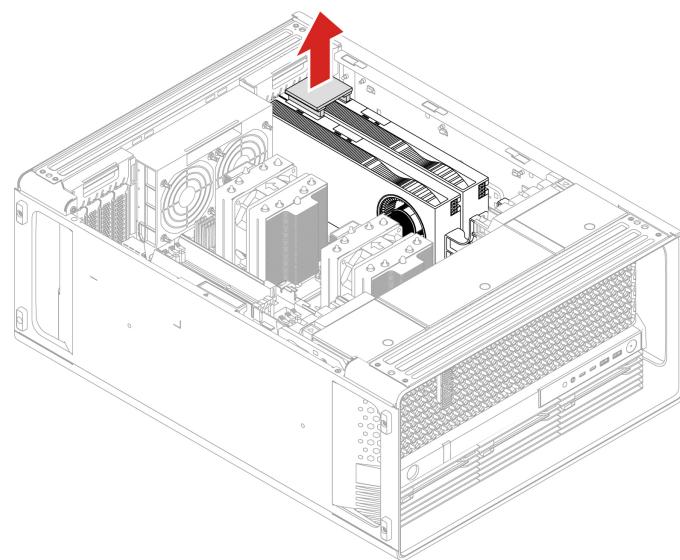
Installation steps

1. Remove the following parts, if any:
 - a. “Left side cover” on page 37.
 - b. “CPU duct” on page 45.
2. Install the NVLINK bridge.



Removal steps

1. Remove the following parts, if any:
 - a. “Left side cover” on page 37.
 - b. “CPU duct” on page 45.
2. Remove the NVLINK bridge.

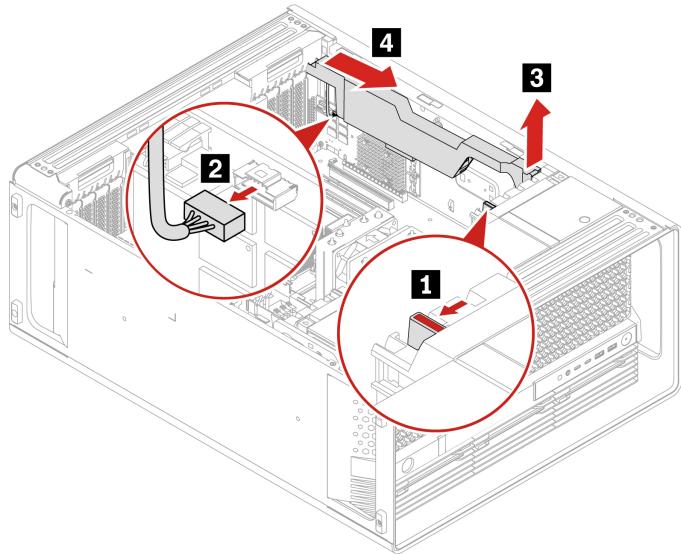


Super capacitor module

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

Removal steps

1. Remove the following parts, if any:
 - a. “Left side cover” on page 37.
 - b. “CPU duct” on page 45.
2. Remove the super capacitor module.



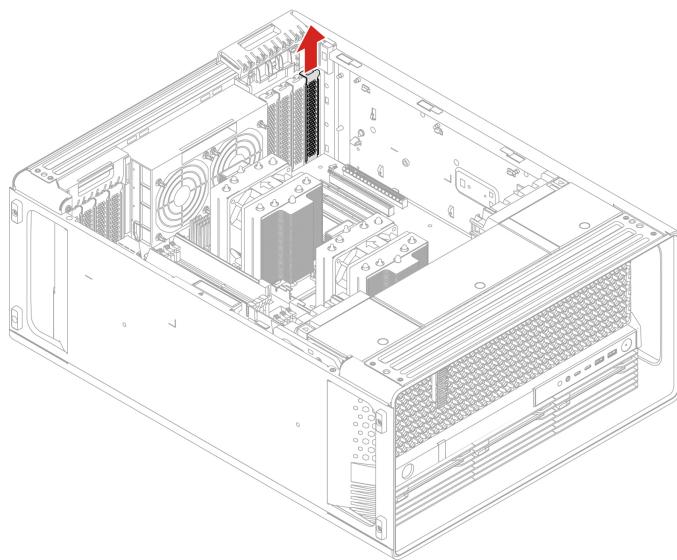
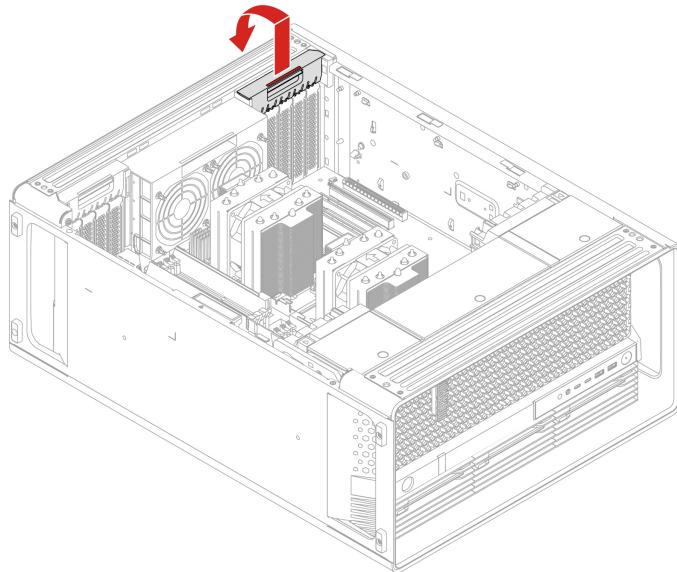
Note: When installing a new super capacitor module, connect the super capacitor module cable to the super capacitor module connector (J14) on the RAID card.

PCIe bracket

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

Removal steps

1. Remove the following parts, if any:
 - a. “Left side cover” on page 37.
 - b. “CPU duct” on page 45.
2. Remove the PCIe bracket.

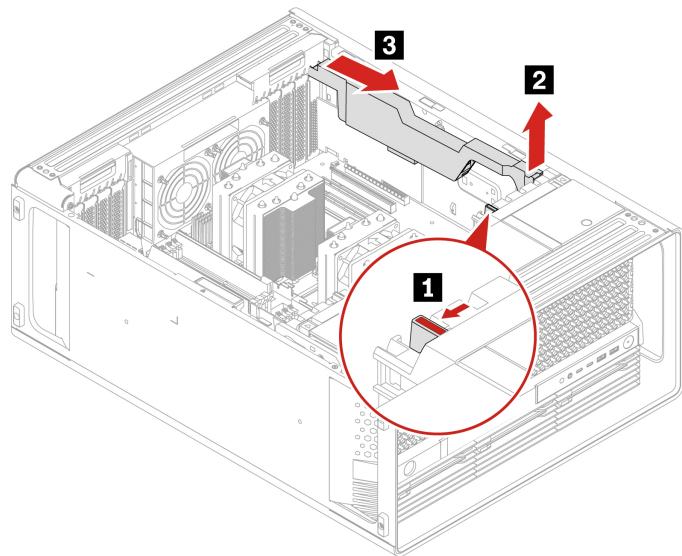


Half-length PCIe card

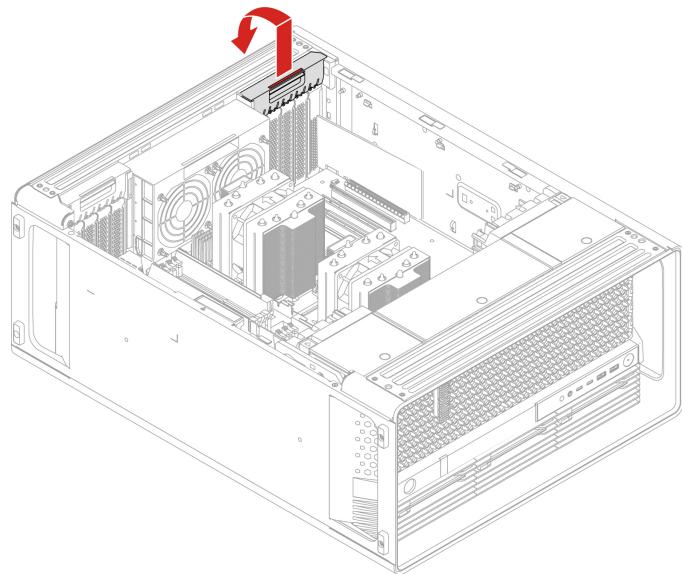
Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

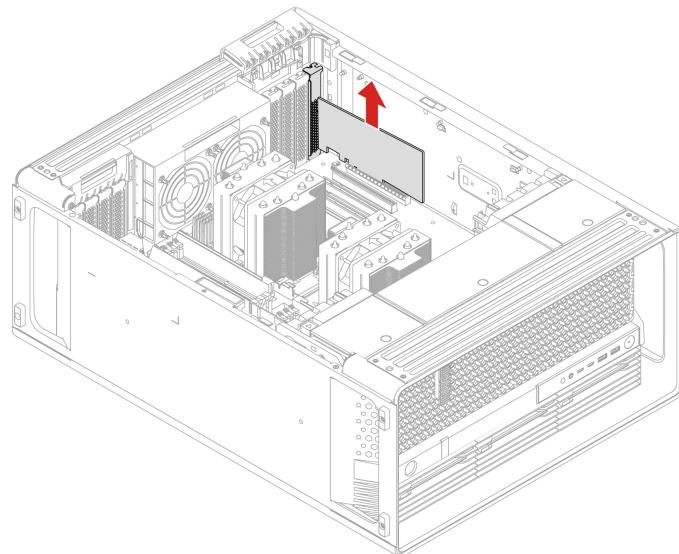
Removal steps

1. Remove the following parts, if any:
 - a. “Left side cover” on page 37.
 - b. “CPU duct” on page 45.
2. Remove the PCIe card.
 - a. Remove the PCIe card retainer. The PCIe card retainer is only available on some graphics cards.

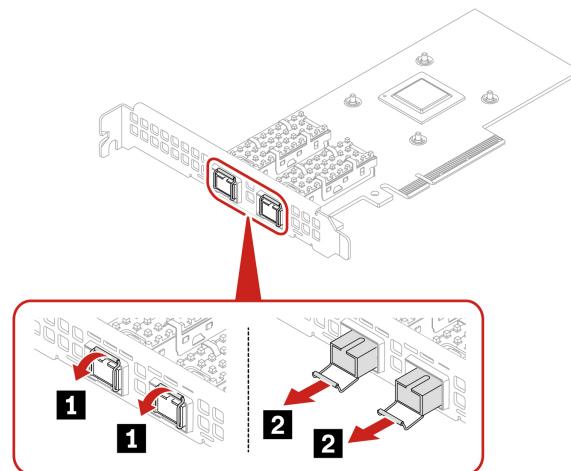


- b. Open the handle and remove the PCIe card. The card might fit tightly into the slot. If necessary, alternately move each side of the card a small amount until the card is removed from the slot.





- c. For some Ethernet adapter cards, the following fiber modules can be removed.

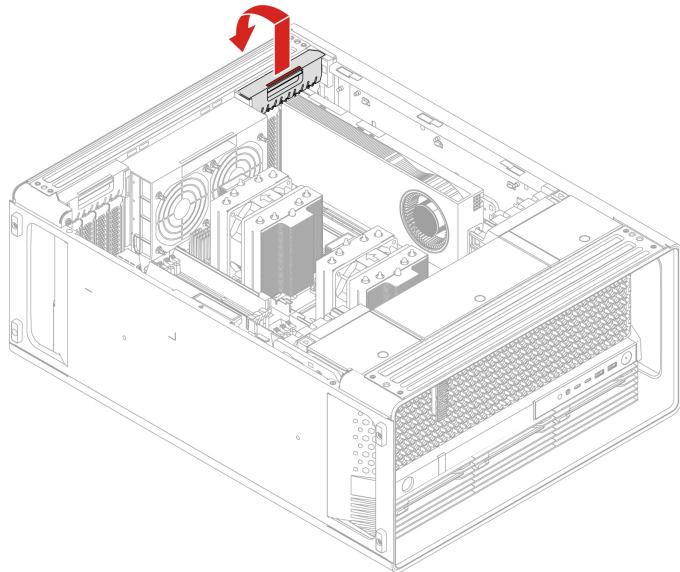


Full-length PCIe card

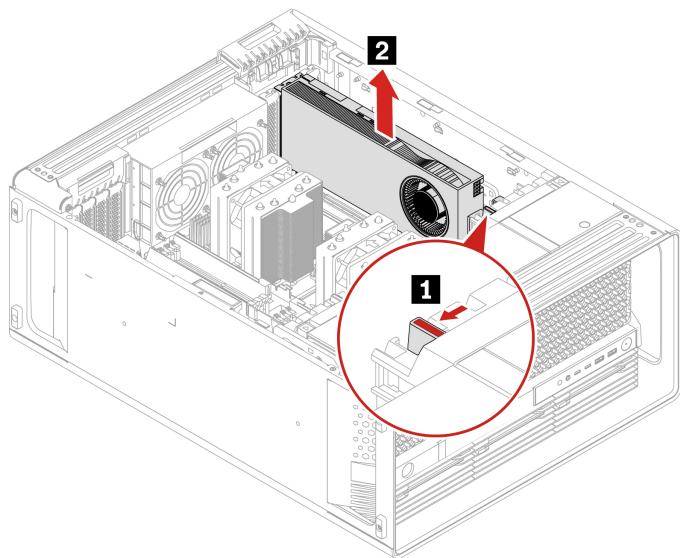
Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

Removal steps

1. Remove the following parts, if any:
 - a. “Left side cover” on page 37.
 - b. “CPU duct” on page 45.
2. Remove the full-length PCIe card.
 - a. Open the handle.



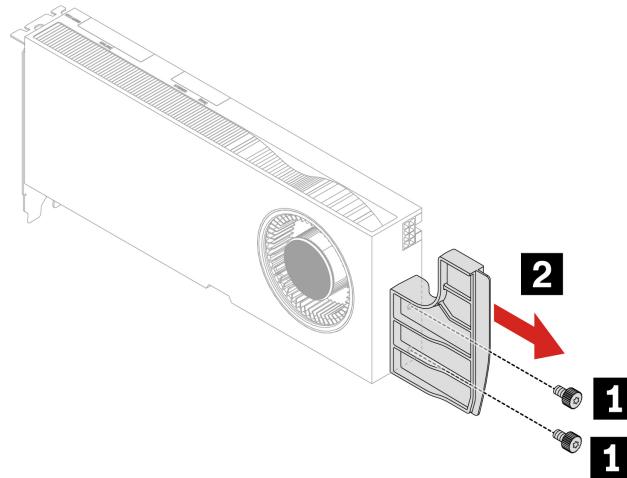
- b. Remove the PCIe card. The card might fit tightly into the slot. If necessary, alternately move each side of the card a small amount until the card is removed from the slot.



- c. Remove the PCIe card extender if needed.

Notes:

- For computer models with GFX RTX 4000 Ada, the graphics card and the PCIe card extender work as a CRU assembly. Do not try to remove the extender.
- For computer models with double-width or wider graphics cards (such as NVIDIA RTX 6000 Ada and GeForce RTX 4080), the PCIe card extender is a customized CRU part. You can remove it according to the following illustration.
- If you want to install a double-width or wider graphics card, install the customized PCIe card extender first.



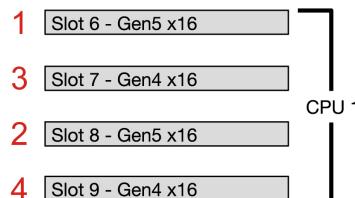
Screw (quantity)	Color	Torque
M3 x 5.5 mm, Nickel coated (2)	Black	5.5 ± 0.5 lb/in

PCIe card installation rule

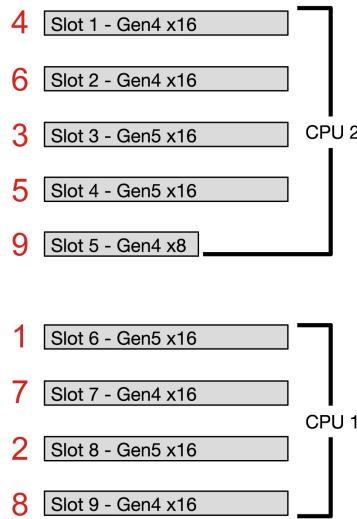
Before installing PCIe card, you need to remove “PCIe card bracket” on page 66.

Install PCIe cards according to the following order and special rules for certain PCIe cards.

- **Installation order**
 - **1 CPU**



- **2 CPUs**

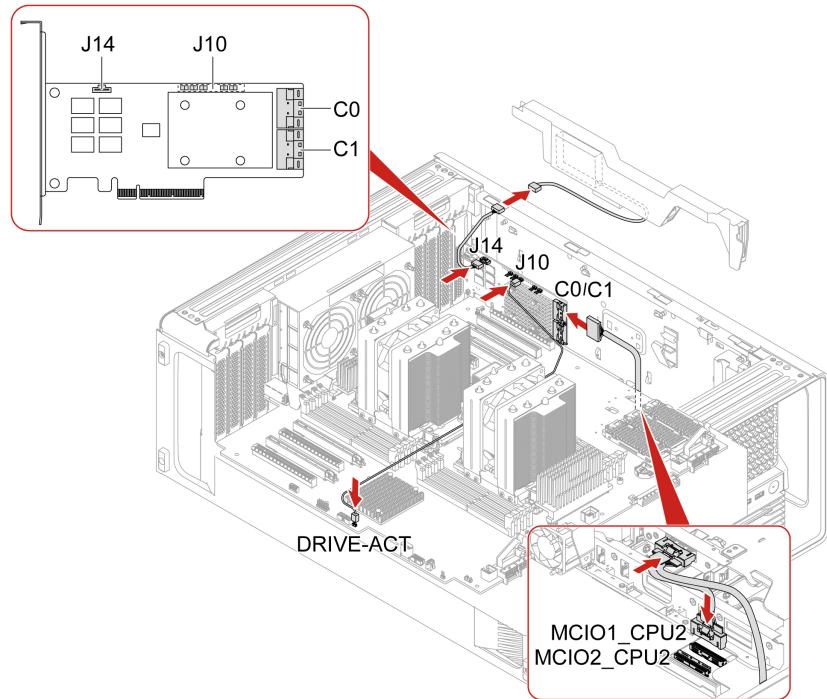


- **Special installation rules for certain PCIe cards**

PCIe card	Installation rules
Intel AX210 Wi-Fi card	Install in slot 1.
Thunderbolt card	Install in slot 9.
Gen 5 M.2 SSD PCIe adapter	Install in slot 8, slot 3, and slot 4.
NVIDIA ConnectX-6 Ethernet Adapter card	Do not install in slot 5.
Intel X710-DA2 Ethernet Adapter card	Do not install in slot 5.
Geforce RTX 40X0 graphics card	Do not change its original installation slot.
NVIDIA A800 graphics card	<ul style="list-style-type: none"> – Ensure that one of the following graphics cards for display is installed. <ul style="list-style-type: none"> – NVIDIA RTX 4000 Ada – NVIDIA RTX A1000 – NVIDIA RTX T1000 – If the quantity of NVIDIA A800 graphics card is 4, install them in slot 6, slot 8, slot 2, and slot 4.
Graphics card for display	<ul style="list-style-type: none"> – Ensure that at least one NVIDIA A800 graphics card is installed. – If the quantity of NVIDIA A800 graphics card is 1, 2, or 3, install the graphics card for display in slot 6. – If the quantity of NVIDIA A800 graphics card is 4, install the graphics card for display in slot 1.
BMC card (for selected models)	<ul style="list-style-type: none"> – Install in slot 8. – Ensure that at least one graphics card is installed.

Cable connection

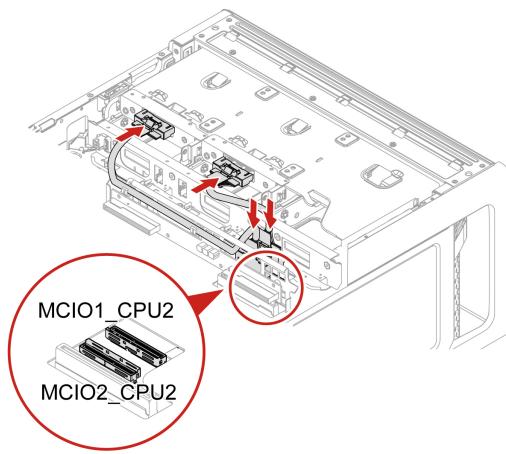
Note: The connectors on the cards or system board might look slightly different from the illustrations.



Notes:

- C0 connector priority is higher than C1 connector.
- MCIO connector 1 priority is higher than MCIO connector 2.
- Front access bay 2+5 priority is higher than front access bay 3+6 .

Figure 3. Cable connection for BCM9560 RAID AIC



Notes:

- MCIO connector 1 priority is higher than MCIO connector 2.
- Front access bay 2+5 priority is higher than front access bay 3+6.

Figure 4. Cable connection for M.2 SSD enclosure

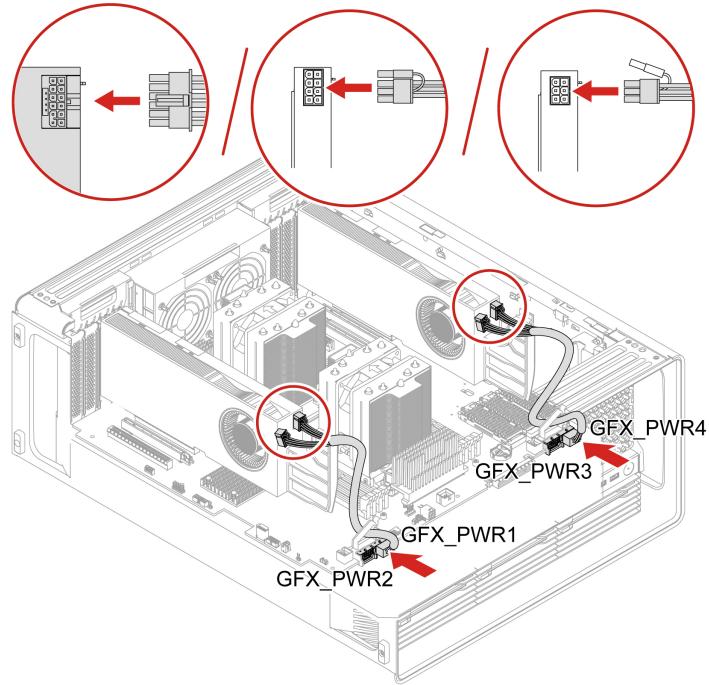


Figure 5. GFX GV100/RTX A5500/RTX A4500/RTX 5000 Ada/RTX 4500 Ada/RTX 4000 Ada Aux power connection

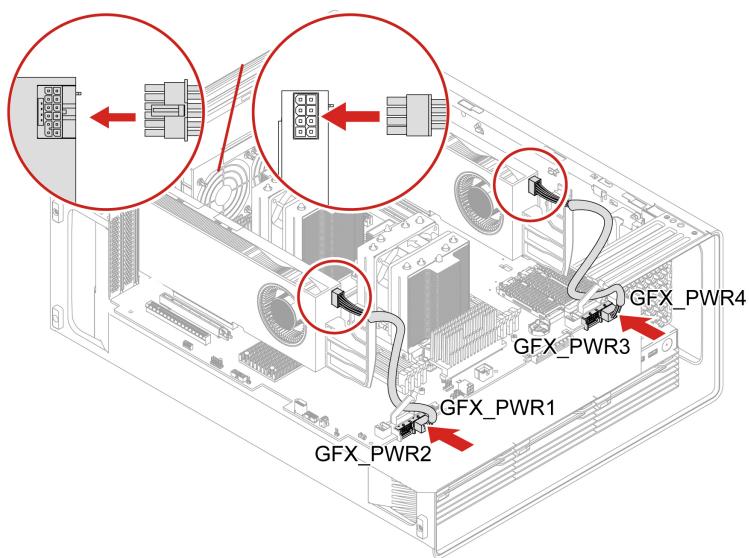
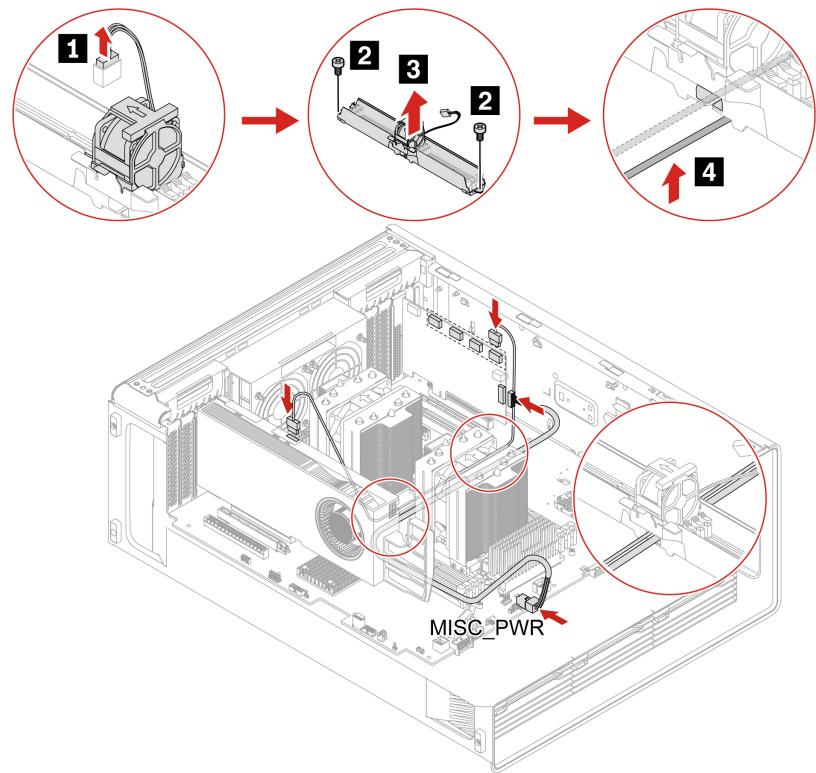


Figure 6. GFX RTX A6000/RTX 6000 Ada Aux power connection



Note: When the NVIDIA Quadro SYNC II card and the graphics card are located in the upper PCIe card area and lower PCIe card area respectively, ensure that you remove the memory fan duct to route the SYNC II card cable and power cable through the cable slot of the memory fan duct as illustrated above.

Figure 7. Cable connection for NVIDIA Quadro SYNC II card

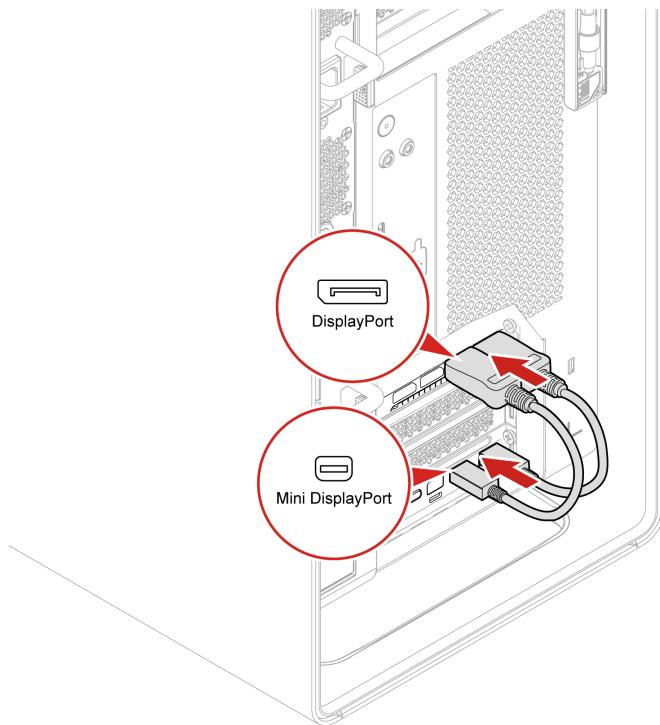


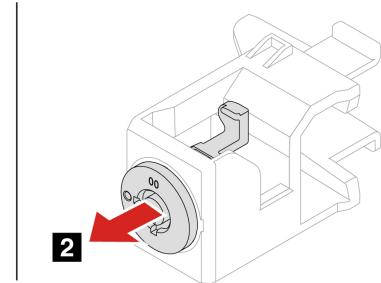
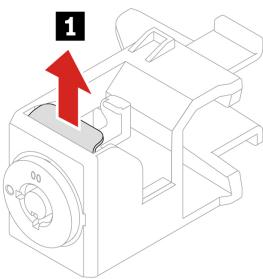
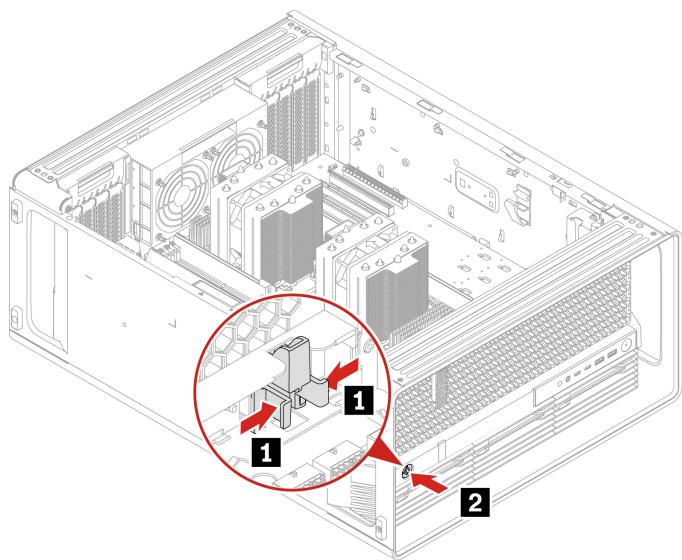
Figure 8. Cable connection for Thunderbolt card

Lock kit for the front access bay

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

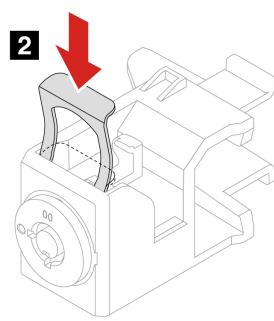
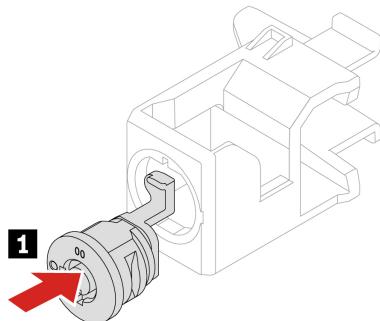
Removal steps

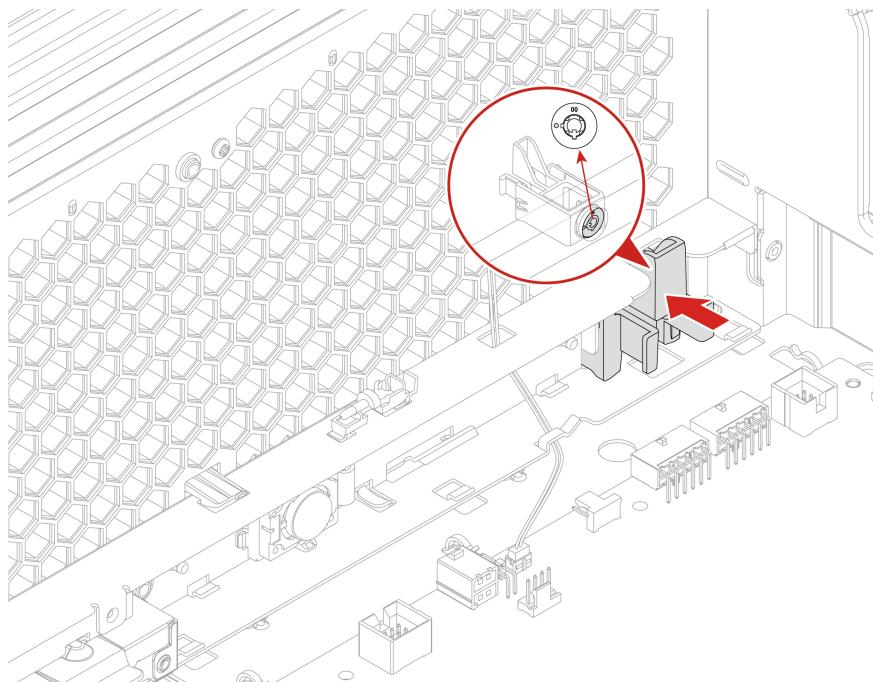
1. Remove the following parts, if any:
 - a. “Left side cover” on page 37.
 - b. “CPU duct” on page 45.
 - c. “Front fan assembly” on page 46.
 - d. “Front fan bracket” on page 47.
2. Remove the front access bay lock.



Installation steps

Install the front access bay lock.



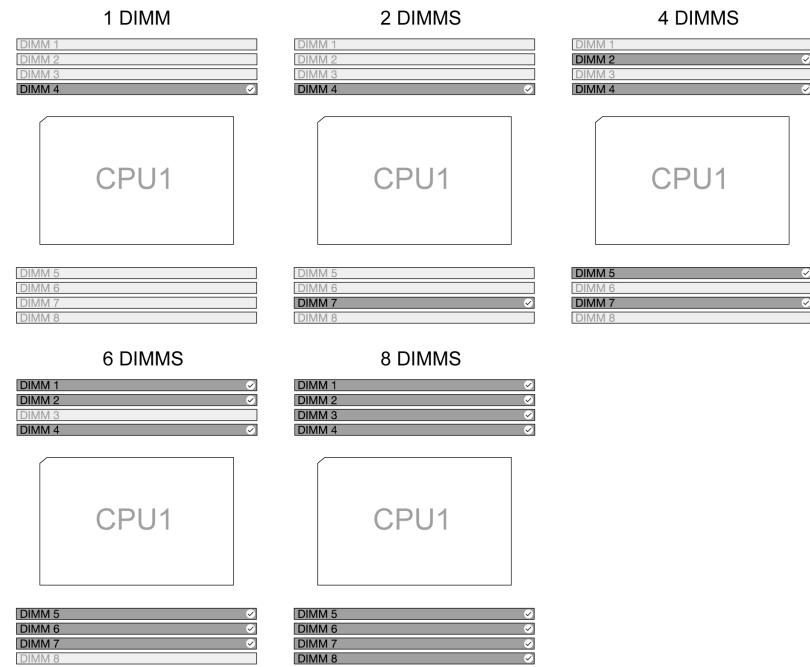


Memory module

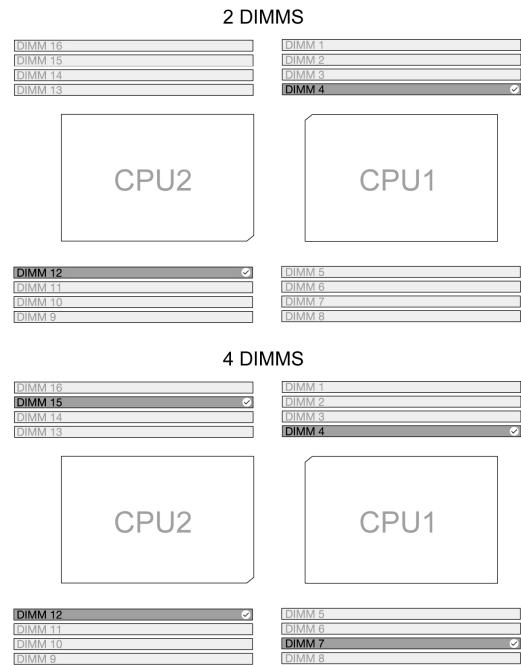
- Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.
- To remove or install the memory module, wait for several seconds after disconnecting power cords from the system according to the following table. It allows the system to be completely discharged of electricity.

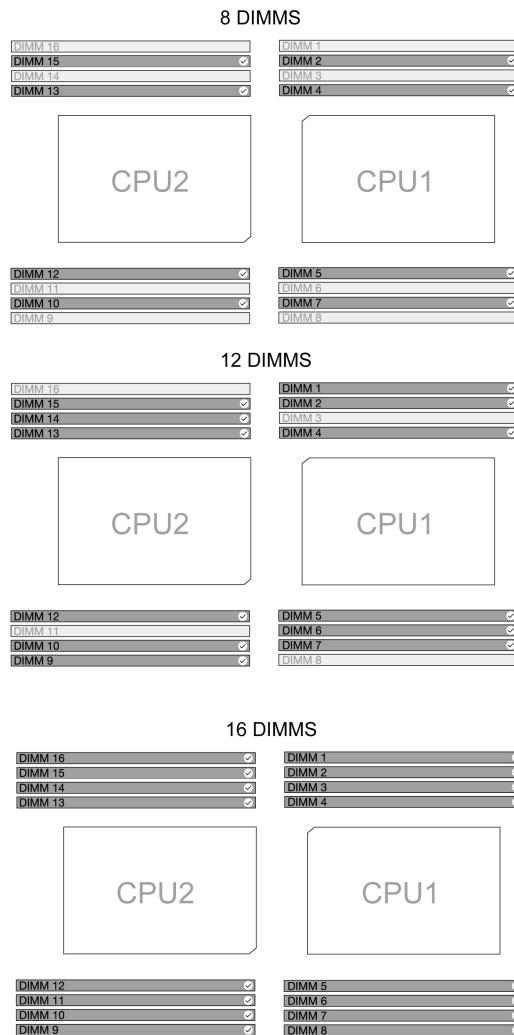
Power supply assembly status	Waiting time
Removed	15 seconds
Installed	30 seconds

- Ensure that you follow the installation order for memory modules shown in the following illustration.
 - **1 CPU**



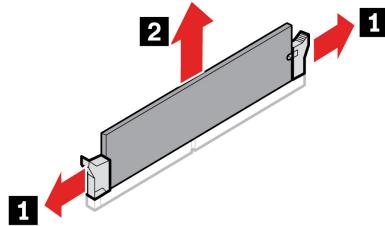
– 2 CPUs





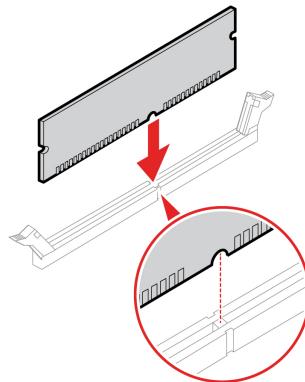
Removal steps

1. Remove the following parts, if any:
 - a. “Left side cover” on page 37.
 - b. “CPU duct” on page 45.
 - c. “Front fan assembly” on page 46.
 - d. “Front fan bracket” on page 47.
 - e. “Rear fan assembly” on page 48.
 - f. “Memory fan” on page 49.
2. Remove the memory module.



Installation steps

Install the memory module.

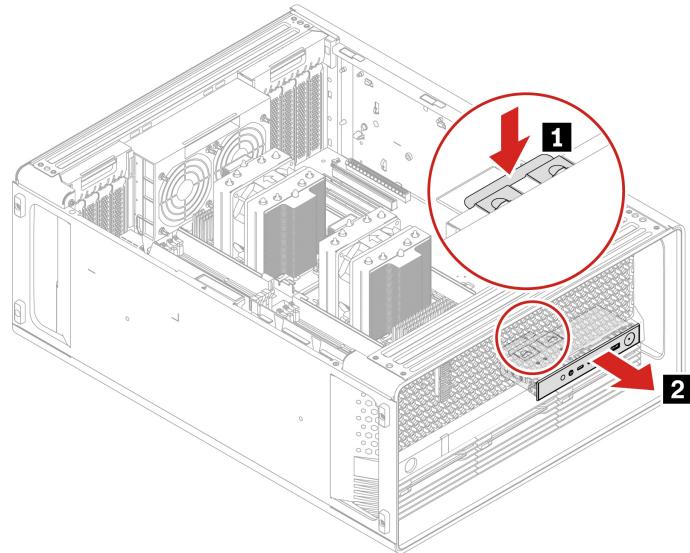


Front panel IO assembly

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

Removal steps

1. Remove the following parts, if any:
 - a. “Left side cover” on page 37.
 - b. “CPU duct” on page 45.
 - c. “Front fan assembly” on page 46.
 - d. “Front fan bracket” on page 47.
2. Remove the front panel IO assembly.

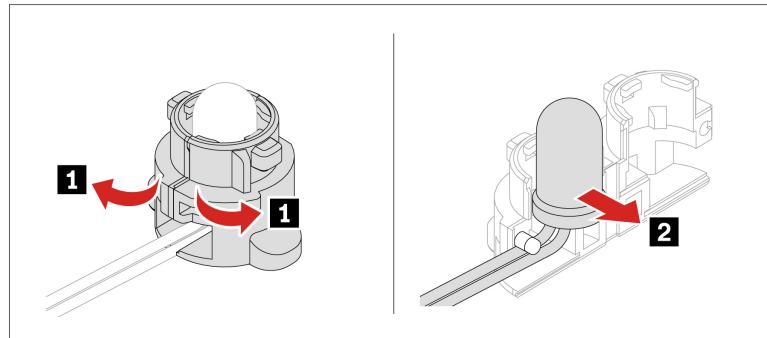
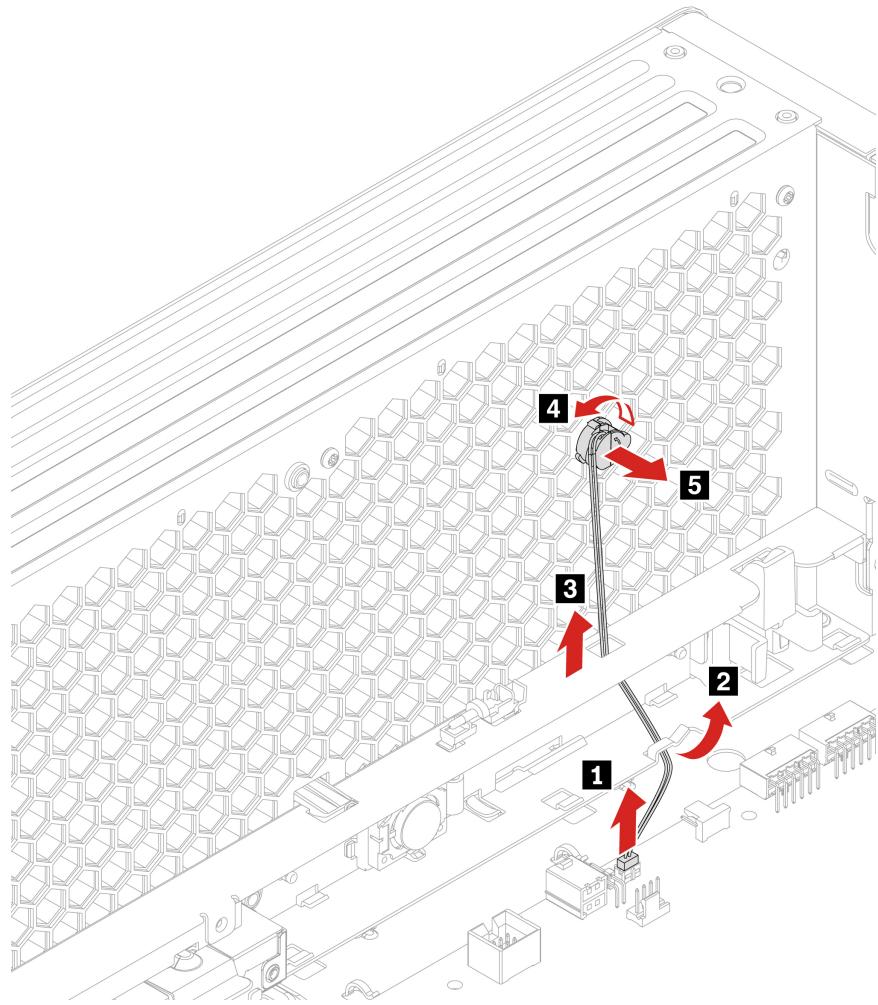


Think LED holder and cable

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

Removal steps

1. Remove the following parts, if any:
 - a. “Left side cover” on page 37.
 - b. “CPU duct” on page 45.
 - c. “Front fan assembly” on page 46.
 - d. “Front fan bracket” on page 47.
2. Remove the Think LED holder and cable.



Power distribution board and bracket

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

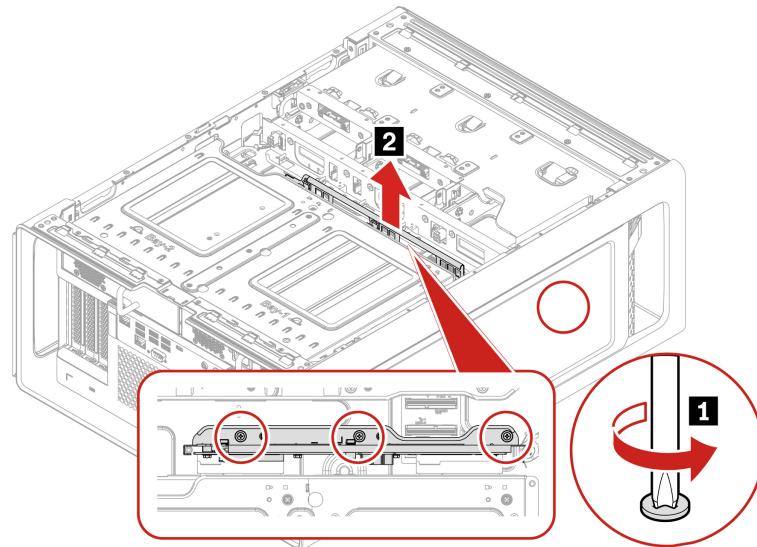
Removal steps

1. Remove the following parts, if any:
 - a. “Power supply assembly” on page 35.

- b. “Left side cover” on page 37.
- c. “Right side cover” on page 42.
- d. “HDD in the PSU bay storage enclosure” on page 52.

2. Loosen the three screws to remove the power distribution board and bracket.

Note: The three screws cannot be removed from the power distribution board bracket.



Screw (quantity)	Color	Torque
6-32*3.8 mm, Zn coated (3)	Blue	3.0 ± 0.5 lb/in

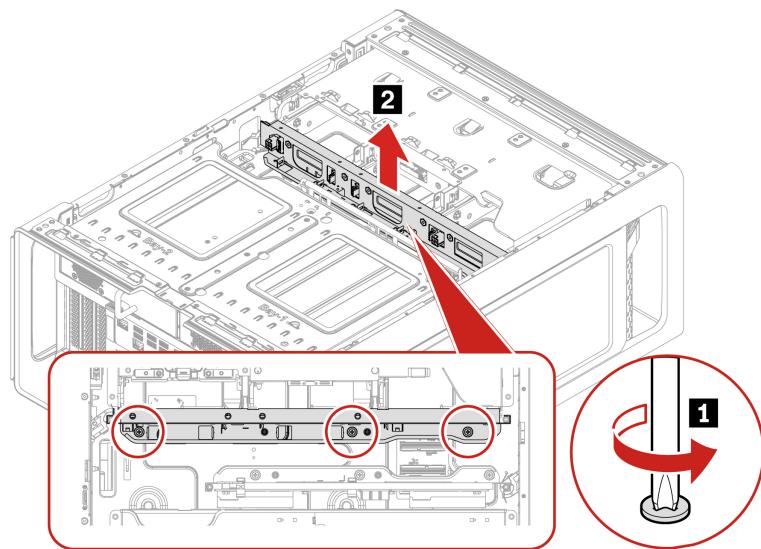
BCB board and bracket

Before you start, ensure that you have read “Prerequisites for hardware replacement” on page 32.

Removal steps

1. Remove the following parts, if any:
 - a. “HDD in the front access bay” on page 50 and “M.2 SSD in the front access bay” on page 54.
 - b. “Left side cover” on page 37.
 - c. “Right side cover” on page 42.
 - d. “Storage fan assembly” on page 49.
2. Loosen the three screws to remove the BCB board and bracket.

Note: The three screws cannot be removed from the BCB board bracket.



Screw (quantity)	Color	Torque
6-32*3.8 mm, Zn coated (3)	Blue	3.0 ± 0.5 lb/in

Chapter 5. Help and support

Self-help resources

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

Resources	How to access?
Product documentation:	
<ul style="list-style-type: none">• <i>Safety and Warranty Guide</i>• <i>Generic Safety and Compliance Notices</i>• <i>Setup Guide</i>• <i>This User Guide</i>• <i>Regulatory Notice</i>	Go to https://pcsupport.lenovo.com . Then, follow the on-screen instructions to filter out the documentation you want.
Lenovo Support Web site with the latest support information of the following:	
<ul style="list-style-type: none">• Drivers and software• Diagnostic solutions• Product and service warranty• Product and parts details• Knowledge base and frequently asked questions	https://pcsupport.lenovo.com
Ubuntu help information	https://help.ubuntu.com/its/ubuntu-help/index.html

Lenovo diagnostic tools

Use diagnostic solutions to test hardware components and report operating-system-controlled settings that interfere with the correct operation of your computer. If a four-digit error code is displayed on the diagnostic LCD (for selected models) on the front panel or the diagnostic indicator on the front panel turns on:

1. Use your smartphone to scan the QR code displayed on the diagnostic LCD to open <https://www.thinkworkstationsoftware.com/codes>.
2. Decode the error according to the four-digit error code displayed on the diagnostic LCD.

For more information, go to <https://www.thinkworkstationsoftware.com/diags>.

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:

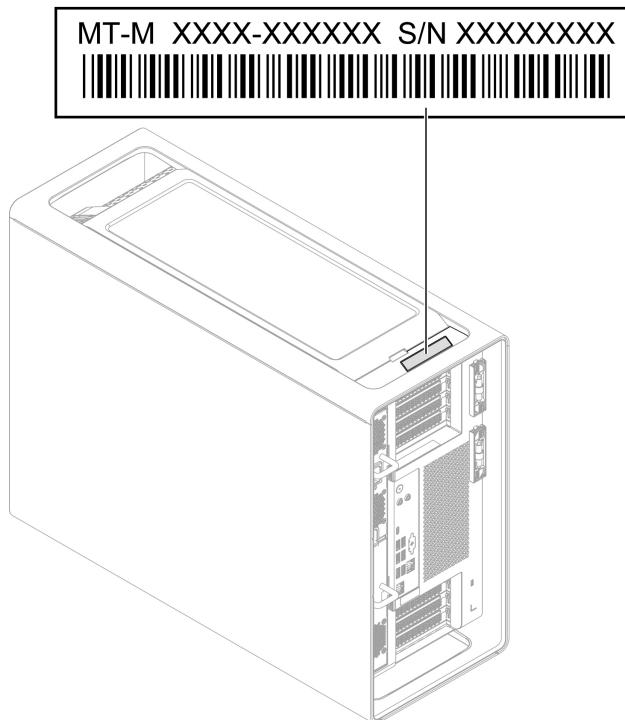
1. Record the problem symptoms and details:
 - What is the problem? Is it continuous or intermittent?
 - Any error message or error code?
 - What operating system are you using? Which version?

- 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

The following illustration shows where to find the machine type and serial number of your computer.



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://pcsupport.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.

Certification-related information

Product name: ThinkStation PX

Machine types: 30EU, 30EV, and 30EY

Further compliance information related to your product is available at <https://www.lenovo.com/compliance>.

Compliance information

For more compliance information, refer to *Regulatory Notice* at <https://pcsupport.lenovo.com> and *Generic Safety and Compliance Notices* at https://pcsupport.lenovo.com/docs/generic_notices.

Purchase additional services

During and after the warranty period, you can purchase additional services from Lenovo at: <https://pcsupport.lenovo.com/warrantyupgrade>

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

Purchase accessories

Lenovo has a number of hardware accessories and upgrades to help expand the capabilities of your computer. Options include memory modules, storage devices, network cards, power adapters, keyboards, mice, and more.

To shop at Lenovo, go to <https://www.lenovo.com/accessories>.

Appendix A. Supplemental information about the Ubuntu operating system

In limited countries or regions, Lenovo offers customers an option to order computers with the preinstalled Ubuntu® operating system.

If the Ubuntu operating system is available on your computer, read the following information before you use the computer. Ignore any information related to Windows-based programs, utilities, and Lenovo preinstalled applications in this documentation.

Access the Lenovo Limited Warranty

This product is covered by the terms of the Lenovo Limited Warranty (LLW), version L505-0010-02 08/2011. You can view the LLW in a number of languages from the following Web site. Read the Lenovo Limited Warranty at:

https://www.lenovo.com/warranty/llw_02

The LLW also is preinstalled on the computer. To access the LLW, go to the following directory:

/opt/lenovo

If you cannot view the LLW either from the Web site or from your computer, contact your local Lenovo office or reseller to obtain a printed version of the LLW.

Access the Ubuntu help system

The Ubuntu help system provides information about how to use the Ubuntu operating system. To access the help system from Home Screen, move your pointer to the Launch bar, and then click the **Help** icon. If you cannot find the **Help** icon from the Launch bar, click the **Search** icon on the bottom left, and type Help to search it.

To learn more about the Ubuntu operating system, go to:

<https://www.ubuntu.com>

Get support information

If you need help, service, technical assistance, or more information about the Ubuntu operating system or other applications, contact the provider of the Ubuntu operating system or the provider of the application. If you need the service and support for hardware components shipped with your computer, contact Lenovo. For more information about how to contact Lenovo, refer to the *User Guide* and *Safety and Warranty Guide*.

To access the latest *User Guide* and *Safety and Warranty Guide*, go to:

<https://pcsupport.lenovo.com>

Access open-source information

This device includes software made publicly available by Lenovo, including software licensed under the General Public License and/or the Lesser General Public License (the open source software).

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You may send your request in writing to the address below accompanied by a check or money order for \$15 to:

Lenovo Legal Department
Attn: Open Source Team / Source Code Requests
8001 Development Dr.
Morrisville, NC 27560

Please include the version of the OS and the version of the Linux Kernel pre-shipped on this Device as part of your request. Be sure to provide a return address.

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