ThinkSmart Core Kit
Hardware Maintenance Manual

Read this first

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

- Chapter 1 "Important safety information" on page 1
- Documentation in the box

Contents

About this manual

This manual provides service and reference information for ThinkSmart Core Kit.

Illustrations in this manual might look different from your product.

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

Important: This manual is intended only for trained service technicians who are familiar with these products. Use this manual along with the advanced diagnostic tests to troubleshoot problems effectively. Before servicing one of these products, be sure to read and understand Chapter 1 "Important safety information" on page 1.

Chapter 1.   Important safety information

This chapter provides important safety information for your product.

Note: ThinkSmart Core is referred to as "Computer" in this chapter.

Safety notices

This information can help you safely use your computer. Follow and retain all information included with your computer. The information in this document does not alter the terms of your purchase agreement or the Limited Warranty. For more information, go to https://www.lenovo.com/warranty/llw_02.

Customer safety is important. Our products are developed to be safe and effective. However, personal computers are electronic devices. Power cords, power adapters, and other features can create potential safety risks that can result in physical injury or property damage, especially if misused. To reduce these risks, follow the instructions included with your product, observe all warnings on the product and in the operating instructions, and review the information included in this document carefully. By carefully following the information contained in this document and provided with your product, you can help protect yourself from hazards and create a safer computer work environment. If the computer is used in a manner not specified by the manufacturer, the protection provided by the computer may be impaired.

Note: This information includes references to power adapters and batteries. In addition, some products (such as speakers and monitors) ship with external power adapters. If you have such a product, this information applies to your product. In addition, computer products contain a coin-sized internal battery that provides power to the system clock even when the computer is unplugged, so the battery safety information applies to all computer products.

Conditions that require immediate action

Products can become damaged due to misuse or neglect. Some product damage is serious enough that the product should not be used again until it has been inspected and, if necessary, repaired by an authorized servicer.

As with any electronic device, pay close attention to the product when it is turned on.

On very rare occasions, you might notice an odor or see a puff of smoke or sparks vent from your product. You might also hear sounds like popping, cracking, or hissing. These might merely mean that an internal electronic component has failed in a safe and controlled manner. Or, they might indicate a potential safety issue. Do not take risks or attempt to diagnose the situation yourself. Contact the Customer Support Center for further guidance. For a list of Service and Support phone numbers, see the following Web site:

https://smartsupport.lenovo.com/supportphonelist

Frequently inspect your computer and its components for damage, wear, or signs of danger. If you have any question about the condition of a component, do not use the product. Contact the Customer Support Center or the product manufacturer for instructions on how to inspect the product and have it repaired, if necessary.

In the unlikely event that you notice any of the following conditions, or if you have any safety concerns with your product, stop using the product and unplug it from the power source and telecommunication lines until you can speak to the Customer Support Center for further guidance.

- Power cords, plugs, power adapters, extension cords, surge protectors, or power supplies that are cracked, broken, or damaged.

- Signs of overheating, smoke, sparks, or fire.

- Damage to a battery (such as cracks, dents, or creases), discharge from a battery, or a buildup of foreign substances on the battery.

- A cracking, hissing, or popping sound, or strong odor that comes from the product.

- Signs that liquid has been spilled or an object has fallen onto the computer product, the power cord, or power adapter.

- The computer product, power cord, or power adapter has been exposed to water.

- The product has been dropped or damaged in any way.

- The product does not operate normally when you follow the operating instructions.

Note: If you notice these conditions with a product (such as an extension cord) that is not manufactured for or by Lenovo, stop using that product until you can contact the product manufacturer for further instructions, or until you get a suitable replacement.

Service and upgrades

Do not attempt to service a product yourself unless instructed to do so by the Customer Support Center or your documentation. Only use a Service Provider who is approved to repair your particular product.

Note: Some computer parts can be upgraded or replaced by the customer. Upgrades typically are referred to as options. Replacement parts approved for customer installation are referred to as Customer Replaceable Units, or CRUs. Lenovo provides documentation with instructions when it is appropriate for customers to install options or replace CRUs. You must closely follow all instructions when installing or replacing parts. The Off state of a power indicator does not necessarily mean that voltage levels inside a product are zero. Before you remove the covers from a product equipped with a power cord, always ensure that the power is turned off and that the product is unplugged from any power source. If you have any questions or concerns, contact the Customer Support Center.

Although there are no moving parts in your computer after the power cord has been disconnected, the following warnings are required for your safety.

Keep fingers and other parts of your body away from hazardous, moving parts. If you suffer an injury, seek medical care immediately.

Do not touch hot surface of hot components inside the computer. During operation, some components become hot enough to burn the skin. Before you open the computer cover, turn off the computer, disconnect power, and wait approximately 10 minutes for the components to cool.

After replacing a CRU, reinstall all protective covers, including the computer cover, before connecting power and operating the computer. This action is important to help prevent unexpected electrical shock and help ensure the containment of an unexpected fire that could happen under extremely rare conditions.

When replacing CRUs, be cautious of sharp edges or corners that might cause injury. If you suffer an injury, seek medical care immediately.

Power cords and power adapters

⚠️**DANGER**

Use only the power cords and power adapters supplied by the product manufacturer.

The power cords shall be safety approved. For Germany, it shall be H03VV-F, 3G, 0.75 mm², or better. For other countries, the suitable types shall be used accordingly.

Never wrap a power cord around a power adapter or other object. Doing so can stress the cord in ways that can cause the cord to fray, crack, or crimp. This can present a safety hazard.

Always route power cords so that they will not be walked on, tripped over, or pinched by objects.

Protect power cords and power adapters from liquids. For instance, do not leave your power cord or power adapter near sinks, tubs, toilets, or on floors that are cleaned with liquid cleansers. Liquids can cause a short circuit, particularly if the power cord or power adapter has been stressed by misuse. Liquids also can cause gradual corrosion of power cord terminals and/or the connector terminals on a power adapter, which can eventually result in overheating.

Ensure that all power cord connectors are securely and completely plugged into receptacles.

Do not use any power adapter that shows corrosion at the ac input pins or shows signs of overheating (such as deformed plastic) at the ac input pins or anywhere on the power adapter.

Do not use any power cords where the electrical contacts on either end show signs of corrosion or overheating or where the power cord appears to have been damaged in any way.

To prevent possible overheating, do not cover the power adapter with clothing or other objects when the power adapter is plugged into an electrical outlet.

Power cord notice

Note: The power cord and adapter provided with this product are intended to be used with this product only. Do not use them with any other products.

For your safety, Lenovo provides a power cord with a grounded attachment plug to use with this product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.

Power cords provided by Lenovo in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA).

For units intended to be operated at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 10 amperes, 125 volts.

For units intended to be operated at 230 volts (U.S. use): Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 10 amperes, 250 volts.

For units intended to be operated at 230 volts (outside the U.S.): Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.

Power cords provided by Lenovo for a specific country or region are usually available only in that country or region.

For units intended to be operated in Germany: The power cords must be safety approved. For Germany, it must be H05VV-F, 3G, 0.75 mm2, or better. For other countries, the suitable types must be used accordingly.

For units intended to be operated in Denmark: Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.

For units intended to be operated in Norway, Sweden, Finland: Use a cord set with a two-prong attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.

If you intend to use your product in a country or region that is different from your ordering location, please purchase an additional Lenovo power cord for the country or region where the product will be used. Refer to the power cord guide provided in our Web site, https://smartsupport.lenovo.com/, for details. Some countries and regions support multiple voltages, so make sure you order the appropriate power cord for the intended voltage.

Extension cords and related devices

Ensure that extension cords, surge protectors, uninterruptible power supplies, and power strips that you use are rated to handle the electrical requirements of the product. Never overload these devices. If power strips are used, the load should not exceed the power strip input rating. Consult an electrician for more information if you have questions about power loads, power requirements, and input ratings.

Plugs and outlets

⚠️**DANGER**

If a receptacle (power outlet) that you intend to use with your computer equipment appears to be damaged or corroded, do not use the outlet until it is replaced by a qualified electrician.

Do not bend or modify the plug. If the plug is damaged, contact the manufacturer to obtain a replacement.

Do not share an electrical outlet with other home or commercial appliances that draw large amounts of electricity; otherwise, unstable voltage might damage your computer, data, or attached devices.

Some products are equipped with a three-pronged plug. This plug fits only into a grounded electrical outlet. This is a safety feature. Do not defeat this safety feature by trying to insert it into a non-grounded outlet. If you cannot insert the plug into the outlet, contact an electrician for an approved outlet adapter or to replace the outlet with one that enables this safety feature. Never overload an electrical outlet. The overall system load should not exceed 80 percent of the branch circuit rating. Consult an electrician for more information if you have questions about power loads and branch circuit ratings.

Be sure that the power outlet you are using is properly wired, easily accessible, and located close to the equipment. Do not fully extend power cords in a way that will stress the cords.

Be sure that the power outlet provides the correct voltage and current for the product you are installing.

Carefully connect and disconnect the equipment from the electrical outlet.

Power supply statement

Never remove the cover on a power supply or any part that has the following label attached.

Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

External devices

CAUTION:
Do not connect or disconnect any external device cables other than Universal Serial Bus (USB) and 1394 cables while the computer power is on; otherwise, you might damage your computer. To avoid possible damage to attached devices, wait at least five seconds after the computer is shut down to disconnect external devices.

Lithium coin-cell battery notice (for selected models)

⚠️**DANGER**

Danger of explosion if battery is incorrectly replaced.

If the coin-cell battery is not a CRU, do not attempt to replace the coin-cell battery. Replacement of the battery must be done by a Lenovo-authorized repair facility or technician.

The Lenovo-authorized repair facilities or technicians recycle Lenovo batteries according to local laws and regulations.

⚠️

When replacing the lithium coin-cell battery, use only the same type or equivalent type that is recommended by the manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of. Swallowing the lithium coin-cell battery will cause chocking or severe internal burns in just two hours and might even result in death.

Keep batteries away from children. If the lithium coin-cell battery is swallowed or placed inside any part of the body, seek medical care immediately.

Do not:

- Throw or immerse into water
- Heat to more than 100 °C (212°F)
- Repair or disassemble
- Leave in an extremely low air pressure environment
- Leave in an extremely high-temperature environment
- Crush, puncture, cut, or incinerate

Dispose of the battery as required by local ordinances or regulations.

The following statement applies to users in the state of California, U.S.A.

California Perchlorate Information:

Products containing manganese dioxide lithium coin-cell batteries may contain perchlorate.

Perchlorate Material - special handling may apply, see https://www.dtsc.ca.gov/hazardouswaste/perchlorate/.

Heat and product ventilation

⚠️

Computers, power adapters, and many accessories can generate heat when turned on and when batteries are charging. Always follow these basic precautions:

- Do not leave your computer, power adapter, or accessories in contact with your lap or any part of your body for an extended period when the products are functioning or when the battery is charging. Your

computer, power adapter, and many accessories produce some heat during normal operation. Extended contact with the body could cause discomfort or, potentially, a skin burn.

- Do not charge the battery or operate your computer, power adapter, or accessories near flammable materials or in explosive environments.
- Ventilation slots, fans, and heat sinks are provided with the product for safety, comfort, and reliable operation. These features might inadvertently become blocked by placing the product on a bed, sofa, carpet, or other flexible surface. Never block, cover, or disable these features.

Inspect your desktop computer for dust accumulation at least once every three months. Before inspecting your computer, turn off the power and unplug the computer's power cord from the electrical outlet; then remove any dust from vents and perforations in the bezel. If you notice external dust accumulation, then examine and remove dust from the inside of the computer including heat sink inlet fins, power supply vents, and fans. Always turn off and unplug the computer before opening the cover. If possible, avoid operating your computer within two feet of high-traffic areas. If you must operate your computer in or near a high-traffic area, inspect and, if necessary, clean your computer more frequently.

For your safety and to maintain optimum computer performance, always follow these basic precautions with your desktop computer:

- Keep the cover closed whenever the computer is plugged in.
- Regularly inspect the outside of the computer for dust accumulation.
- Remove dust from vents and any perforations in the bezel. More frequent cleanings might be required for computers in dusty or high-traffic areas.
- Do not restrict or block any ventilation openings.
- Do not store or operate your computer inside furniture, as this might increase the risk of overheating.
- Airflow temperatures into the computer should not exceed 35°C (95°F).
- Do not install air filtration devices. They may interfere with proper cooling.

Electrical current safety information

⚠️**DANGER**

Electric current from power, telephone, and communication cables is hazardous.

To avoid a shock hazard:

- **Do not use your computer during a lightning storm.**
- **Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**
- **Connect all power cords to a properly wired and grounded electrical outlet.**
- **Connect properly wired outlets to any equipment that will be attached to this product.**
- **Whenever possible, use one hand only to connect or disconnect signal cables.**
- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**
- **Disconnect the attached power cords, battery, and all the cables before you open the device covers, unless instructed otherwise in the installation and configuration procedures.**
- **Do not use your computer until all internal parts enclosures are fastened into place. Never use the computer when internal parts and circuits are exposed.**

⚠️**DANGER**

Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To connect:
1. **Turn everything OFF.**
2. **First, attach all cables to devices.**
3. **Attach signal cables to connectors.**
4. **Attach power cords to outlets.**
5. **Turn devices ON.**

To disconnect:
1. **Turn everything OFF.**
2. **First, remove power cords from outlets.**
3. **Remove signal cables from connectors.**
4. **Remove all cables from devices.**

The power cord must be disconnected from the wall outlet or receptacle before installing all other electrical cables connected to the computer.

The power cord may be reconnected to the wall outlet or receptacle only after all other electrical cables have been connected to the computer.

⚠️**DANGER**

During electrical storms, do not perform any replacement and do not connect the telephone cable to or disconnect it from the telephone outlet on the wall.

Liquid crystal display (LCD) notice

⚠️**DANGER**

To avoid shock hazards:

- **Do not remove the covers.**
- **Do not operate this product unless the stand is attached.**
- **Do not connect or disconnect this product during an electrical storm.**
- **The power cord plug must be connected to a properly wired and grounded power outlet.**
- **Any equipment to which this product will be attached must also be connected to properly wired and grounded power outlets.**
- **To isolate the monitor from the electrical supply, you must remove the plug from the power outlet. The power outlet should be easily accessible.**

Handling:

- If your monitor weighs more than 18 kg (39.68 lb), we recommend that it be moved or lifted by two people.

Product disposal (TFT monitors):

- The fluorescent lamp in the liquid crystal display contains mercury; dispose according to local, state, or federal laws.

Battery warnings:

- Risk of explosion if battery is replaced by an incorrect type.
- Dispose of used batteries according to the instructions.

Use earphones, headphones, or a headset

- If your computer has both a headphone connector and an audio line-out connector, always use the headphone connector for earphones, headphones, or a headset. However, the headphone connector does not support the microphone of the headset.
- If your computer has both a headset connector and an audio line-out connector, always use the headset connector for earphones, headphones, or a headset.

Excessive sound pressure from earphones and headphones can cause hearing loss. Adjustment of the equalizer to maximum increases the earphone and headphone output voltage and the sound pressure level. Therefore, to protect your hearing, adjust the equalizer to an appropriate level.

Excessive use of headphones or earphones for a long period of time at high volume can be dangerous if the output of the headphone or earphone connectors do not comply with specifications of EN 50332-2. The headphone output connector of your computer complies with EN 50332-2 Sub clause 7. This specification limits the computer's maximum wide band true RMS output voltage to 150 mV. To help protect against hearing loss, ensure that the headphones or earphones you use also comply with EN 50332-2 (Clause 7 Limits) or a wide band characteristic voltage of 75 mV. Using headphones that do not comply with EN 50332-2 can be dangerous due to excessive sound pressure levels.

If your Lenovo computer came with headphones or earphones in the packaging, as a set, the combination of the headphones or earphones and the computer already complies with the specifications of EN 50332-1. If different headphones or earphones are used, ensure that they comply with EN 50332-1 (Clause 6.5 Limitation Values). Using headphones that do not comply with EN 50332-1 can be dangerous due to excessive sound pressure levels.

Choking hazard notice

CHOKING HAZARD – Product contains small parts.

Keep away from children under three years.

Plastic bag notice

DANGER

> **Plastic bags can be dangerous. Keep plastic bags away from babies and children to avoid danger of suffocation.**

Glass parts notice

CAUTION:
Some parts of your product may be made of glass. This glass could break if the product is dropped on a hard surface or receives a substantial impact. If glass breaks, do not touch or attempt to remove it. Stop using your product until the glass is replaced by trained service personnel.

Computer placement notices

Inappropriate computer placement might cause harm to children.

- Place the computer on a sturdy piece of low-rise furniture or furniture that has been anchored.
- Do not place the computer at the edge of the furniture.
- Keep the computer cables out of the reach of children.
- Some items, such as toys, might attract children. Keep such items away from the computer.

Supervise children in rooms where the above safety instructions cannot be fully implemented.

Hazardous energy statement

⚠️**DANGER**

> **Disconnect all power cords from electrical outlets before removing the computer cover or any part that has the above label attached.**

DO NOT disassemble components that have the above label attached. There are no serviceable parts inside these components.

Your product is designed for safe use. However, hazardous voltage, current, and energy levels are present inside any component that has this label attached. Disassembling of these components might cause fire or might even result in death. If you suspect a problem with one of these parts, contact a service technician.

CAUTION:

Bright Light, possible skin or eye damage. Disconnect power before servicing.

CAUTION:

Infrared Light, possible skin or eye damage. Disconnect power before servicing.

Tip-over hazard prevention notice

The computer may cause harm to children if it is not located in an appropriate place. Follow the tips below to protect children from harm caused by the computer tipping over:

- Place the computers or monitors on sturdy furniture with a low base or furniture that has been anchored. Push the computers or monitors as far from the edge of the furniture as possible.
- Keep remote controls, toys, and other items that might attract children away from the computers or monitors
- Keep the computer or monitor cables out of the reach of children.
- Supervise children in rooms where these safety tips have not been followed.

CAUTION:
Some parts of your product may be made of glass. This glass could break if the product is dropped on a hard surface or receives a substantial impact. If glass breaks, do not touch it or attempt to remove it. Stop using your product until the glass is replaced by trained service personnel.

Static electricity prevention

Static electricity, although harmless to you, can seriously damage computer components and options. Improper handling of static-sensitive parts can damage the part. When you unpack an option or CRU, do not open the static-protective package containing the part until the instructions direct you to install it.

When you handle options or CRUs, or perform any work inside the computer, take the following precautions to avoid static-electricity damage:

- Limit your movement. Movement can cause static electricity to build up around you.
- Always handle components carefully. Handle adapters, memory modules, and other circuit boards by the edges. Never touch exposed circuitry.
- Prevent others from touching components.
- When you install a static-sensitive option or CRU, touch the static-protective packaging containing the part to a metal expansion-slot cover or other unpainted metal surface on the computer for at least two seconds. This reduces static electricity in the package and your body.
- When possible, remove the static-sensitive part from the static-protective packaging and install the part without setting it down. When this is not possible, place the static-protective packaging on a smooth, level surface and place the part on it.
- Do not place the part on the computer cover or other metal surface.

Cleaning and maintenance

With appropriate care and maintenance, your computer will serve you reliably. The following topics offer information to help you keep your computer working with best performance.

Basic maintenance tips

Here are some basic points about keeping your computer functioning properly:

- Keep the computer in a clean, dry environment. Ensure that the computer rests on a flat, steady surface.
- Do not cover any of air vents. These air vents provide airflow to keep the computer from overheating.
- Keep electrical appliances such as an electric fan, radio, high-powered speakers, air conditioner, and microwave oven away from your computer because the strong magnetic fields generated by these appliances can damage the monitor and data on the storage drive.
- Keep food and drinks away from all parts of the computer. Food particles and spills might make the keyboard and mouse stick and unusable.
- Do not get the power switches or other controls wet. Moisture can damage these parts and cause an electrical hazard.

- Always disconnect a power cord by grasping the plug instead of the cord.
- Keep the computer software, device drivers, and operating system up-to-date.
- Empty your recycle bin on a regular basis.
- Clean out your Inbox, Sent Items, and Deleted Items folders in your e-mail application on a regular basis.
- Clean up files and free up storage drive space and memory space occasionally to prevent performance problems.
- Keep a log book. Entries might include major software or hardware changes, device-driver updates, intermittent problems and what you did to resolve them, and other issues you might have experienced. The cause of a problem might be change in hardware, change in software, or any other actions that might have taken place. A log book can help you or a Lenovo technician determine the cause of a problem.
- Back up your data on the storage drive regularly. You can restore the storage drive from a backup.
- Create a recovery medium as early as possible. You can use the recovery medium to recover your operating system even if Windows fails to start up.
- Get the most up-to-date operating system update patches, software programs, and device drivers.

Maintenance tips about moving the computer

Before moving the computer, take the following precautions:

1. Back up your data on the storage drive.
2. Remove any media from the drives and turn off all connected devices and the computer. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.
3. If you saved the original shipping cartons and packing materials, use them to pack the units. If you are using different cartons, cushion the units to avoid damage.

When you move the computer to another country or region, you must take local electrical standards into consideration. If the local electrical outlet style is different from the type you are currently using, contact the Lenovo Customer Support Center to purchase either an electrical plug adapter or a new power cord.

Clean your computer

CAUTION:
Remove any media from the drives and turn off all connected devices and the computer. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.

It is a good practice to clean your computer periodically to protect the surfaces and ensure trouble-free operation.

Clean the computer surface: Wipe it with a lint-free cloth dampened in mild soap and water. Avoid applying liquids directly to the surface.

Clean the keyboard: Wipe the keys one by one with a lint-free cloth dampened in mild soap and water. If you wipe several keys at a time, the cloth might hook onto an adjacent key and possibly damage it. Avoid spraying cleaner directly onto the keyboard. To remove any crumbs or dust from beneath the keys, you can use a camera blower with a brush or use cool air from a hair dryer.

Clean the computer screen: Scratches, oil, dust, chemicals, and ultraviolet light can affect the performance of your computer screen. Use a dry, soft lint-free cloth to wipe the screen gently. If you see a scratchlike mark on your screen, it might be a stain. Wipe or dust the stain gently with a soft, dry cloth. If the stain remains, moisten a soft, lint-free cloth with water or eyeglass cleaner, but do not apply liquids directly to your computer screen. Ensure that the computer screen is dry before closing it.

Chapter 2. General checkout

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

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

Important notes:

- **Only certified trained personnel should service the product.**

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

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

- **Be extremely careful during such write operations as copying, saving, or formatting.** Drives in the product that you are servicing sequence might have been altered. If you select an incorrect drive, data or programs might be overwritten.

- **Replace a FRU only with another FRU of the correct model.** When you replace a FRU, ensure that the model of the machine and the FRU part number are correct.

- **A FRU should not be replaced because of a single, unreproducible failure.** Single failures can occur for a variety of reasons that have nothing to do with a hardware defect, such as cosmic radiation, ESD, or software errors. Consider replacing a FRU only when a problem recurs. If you suspect that a FRU is defective, clear the error log and run the test again. If the error does not recur, do not replace the FRU.

- **Be careful not to replace a nondefective FRU.**

What to do first

When you return a FRU, you must include the following information in the parts exchange form or parts return form that you attach to it:
1. Name and phone number of service technician
2. Date of service
3. Date on which the machine failed
4. Date of purchase
5. Failure symptoms, error codes appearing on the display, and beep symptoms
6. Procedure index and page number in which the failing FRU was detected
7. Failing FRU name and part number
8. Machine type, model number, and serial number
9. Customer's name and address

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

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

The following are not covered under warranty:
- Display cracked from the application of excessive force or from being dropped
- Scratched (cosmetic) component
- Distortion, deformation, or discoloration of the cosmetic component
- Plastic parts, latches, pins, or connectors that have been cracked or broken by excessive force
- Damage caused by liquid spilled into the system
- Damage caused by the improper insertion of a PC Card or the installation of an incompatible card
- Forgotten product password (making the product unusable)

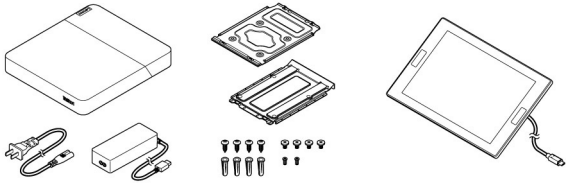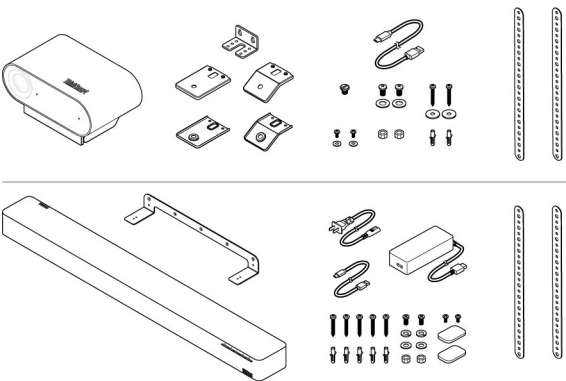- Use of an incorrect ac power adapter on laptop products
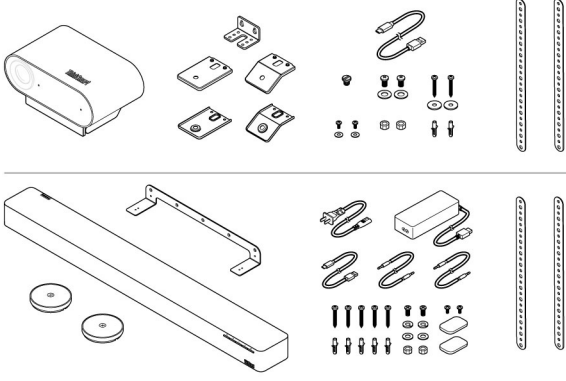
The following symptoms might indicate damage caused by nonwarranted activities:
- Missing parts might be a symptom of unauthorized service or modification.
- Check for obvious damage to a hard disk drive. If the spindle of a hard disk drive becomes noisy, the hard disk drive might have been dropped or subject to excessive force.

Chapter 3. Product Overview

ThinkSmart Core Kits are modular conferencing solutions to transform conferencing into a collaborative, productive, and smart experience. End users will enjoy the familiar Microsoft Teams Rooms (referred to as MTR) interface and IT administrators will enjoy the easily deployed and managed Windows 10 IoT system.

SKU overview

SKU	Target rooms	Inbox items*
ThinkSmart Core + Controller	Any room that already has audio and video device	
ThinkSmart Core Full Room Kit 1	From small room 16 x 16 inches (4–6 people) to large room 15 x 32 inch (12–16 people)	
ThinkSmart Core Full Room Kit 2	Extra large room (above 16 people)	

* Contact your place of purchase if any item is missing or damaged. Ensure that you retain your proof of purchase and packing material. They might be required to receive warranty service.

ThinkSmart Core connector overview
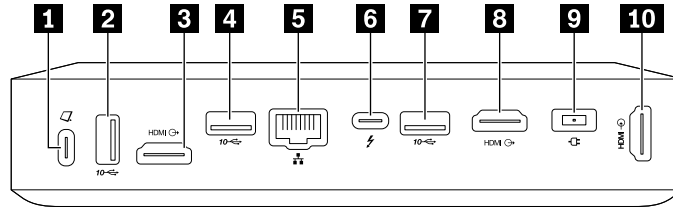
1 USB-C® (3.2 Gen 1) connector	Connect ThinkSmart Controller or other USB-C compatible device for data transfer.
2 USB 3.2 Gen 1 connector	Connect a USB-compatible device, such as a USB keyboard or USB mouse.
3 8 HDMI-out connector	Connect to an external HDMI™ display. This HDMI 1.4 connector supports display resolutions up to 3840 x 2160 pixels, 24 Hz.
4 7 USB 3.2 Gen 2 connector	Connect ThinkSmart Cam, ThinkSmart Bar XL, or other USB device.
5 Ethernet connector	Connect to a local area network (LAN).
6 USB-C (Thunderbolt™ 4) connector	Connect a USB-C device for data transfer.
9 Power connector	Connect to a power supply.
10 HDMI-in connector*	Connect to your computer only. Do not connect an external HDMI display to this connector.

* for selected models

Note: Ensure that the camera or soundbar device connected to ThinkSmart Core is MTR certified before using with the MTR software.

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 / 3.1 Gen 1	5
3.2 Gen 2 / 3.1 Gen 2	10
Thunderbolt 4	40

Chapter 4. Service checkout and symptom-to-FRU index

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

Service checkout

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

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

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

1. Turn off the product and all external devices.

2. Check all cables and power cords.

3. Set all display controls to the middle position.

4. Turn on all external devices.

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

   If you *did not* receive the correct response, proceed to step 6 on page 19.

   If you *do* receive the correct response, proceed to step 7 on page 19.

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

   - If the product displays a POST error, go to "POST error codes" on page 21.

   - If the product hangs and no error is displayed, continue at step 7 on page 19.

7. Run the Diagnostic programs.

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

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

Problem determination tips

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

- Machine type and model

- Processor or hard disk drive upgrades

- Failure symptom

   - Do diagnostics indicate a failure?

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

   - Is the failure repeatable?

   - Has this configuration ever worked?

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

   - Is this the original reported failure?

- Diagnostics version
  - Type and version level
- Hardware configuration
  - Print (print screen) configuration currently in use
  - BIOS level
- Operating system software
  - Type and version level

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

1. Are the exact machine type and models
2. Have the same BIOS level
3. Have the same adapters/attachments in the same locations
4. Have the same address jumpers/terminators/cabling
5. Have the same software versions and levels
6. Have the same Diagnostic Diskettes (version)
7. Have the same configuration options set in the system
8. Have the same setup for the operating system control files

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

Symptom-to-FRU index

The Symptom-to-FRU index lists error symptoms and possible causes. The most likely cause is listed first. Always begin with "Service checkout" on page 19. This index can also be used to help you decide which FRUs to have available when servicing a product.

Notes:

- The Symptom-to-FRU index is not specific to any machine type and are applicable to all products.
- If you have both an error message and an incorrect audio response, diagnose the error message first.
- If you cannot run the diagnostic tests or you get a diagnostic error code when running a test, but did receive a POST error message, diagnose the POST error message first.
- If you did not receive any error message, look for a description of your error symptoms in the first part of this index.

Power supply problems

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

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

POST error codes

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

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

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

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

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

Chapter 5. FAQ

Question	Answer
Does ThinkSmart Core come with the UC software preloaded?	Yes. ThinkSmart Core comes with factory imaged Windows 10 IoT and installed with the UC software.
Does ThinkSmart Core support any other UC platforms?	Yes, but it only supports one UC platform at a time.
Is there Lenovo specific software installed on ThinkSmart Core?	Yes. ThinkSmart Manager software is pre-installed from Lenovo factory. ThinkSmart Manager is Lenovo's solution for management at scale for ThinkSmart devices.
Where can I find the user guide, readme, and software download for ThinkSmart Manager?	https://smartsupport.lenovo.com/us/en/downloads/DS542392
Do I need to install an antivirus on ThinkSmart Core?	By default, Windows 10 IoT is secured through Windows Defender. Organizations should choose security software based on their requirements.
How are the drivers, software, BIOS updates delivered?	All software updates and driver updates are delivered through Windows Update. BIOS updates are manually downloaded from the Lenovo E-support portal.
Can I manage ThinkSmart Core through Microsoft Operations Management Suite (OMS)?	Please refer to https://docs.microsoft.com/zh-cn/microsoftteams/rooms/rooms-deploy.
Does ThinkSmart Core support PXE boot?	Yes.
Does ThinkSmart Core support network boot?	Yes. ThinkSmart Core supports network boot through the Ethernet connector. Restart ThinkSmart Core. During the boot, press F12 multiple times to load the Startup Device Menu. Based on your infrastructure, select the IPv4 or IPv6 option to initiate the network boot.
Does ThinkSmart Core support USB boot?	Yes. Insert a USB key into one of the USB connectors, and then restart ThinkSmart Core. During the boot, press F12 multiple times to load the Startup Device Menu. Based on your infrastructure, select the USB key to initiate the USB boot.
Can ThinkSmart Core work with HDMI extenders through Ethernet?	Yes. ThinkSmart Core is a standard HDMI-compliant device and has been tested to work with products like AMX DXLink HDMI transmitters and receivers.
Does ThinkSmart Core support Wi-Fi® connection?	A wired Ethernet connection is required for initial setup, and it is a MTR best practice to keep a hard-wired connection. Wi-Fi is supported by the hardware when logged in as Administrator, but it cannot be used for meeting calls.
Is ThinkSmart Core compatible with Apple OSX?	Yes. ThinkSmart Core is a device that runs Unified Communications software on a Windows 10 IoT Enterprise OS. Most UC software providers offer clients for Windows, Android, Apple OSX and iOS. The HDMI-in connector on ThinkSmart Core supports all the OS mentioned above.
Can I store my presentations or other materials in ThinkSmart Core for sharing?	No. All content sharing happens in real-time through client devices that are connected to ThinkSmart Core. It does not support storing any user data for sharing during meetings.
Does ThinkSmart Core support Consumer Electronics Control (CEC)?	Yes.

Question	Answer
What are the TCP/IP ports that must be opened in the infrastructure?	There may be other requirements based on your environment. Please see • https://docs.microsoft.com/en-us/MicrosoftTeams/rooms/rooms-prep • https://docs.microsoft.com/en-us/microsoft-365/enterprise/urls-and-ip-address-ranges?redirectSourcePath=%252fen-us%252farticle%252fOffice-365-URLs-and-IP-address-ranges-8548a211-3fe7-47cb-abb1-355ea5aa88a2=o365-worldwide#BKMK_Identity
How does one configure the network proxy for ThinkSmart Core?	See the proxy configurations at https://docs.microsoft.com/en-us/microsoft-teams/proxy-servers-for-skype-for-business-online.
What is the list of supported peripherals like cameras, extended microphones or speakers?	ThinkSmart Core supports MTR certified audio or video peripherals. For more information, see https://products.office.com/en-us/microsoft-teams/across-devices/devices.
Does ThinkSmart Core support wireless display?	No.
Can I use ThinkSmart Core as a PC?	No. ThinkSmart Core is an appliance and is designed to be a meeting space-based tabletop conference room AV device.
Does ThinkSmart Core support deployment via SCCM?	Yes, For more information, see https://docs.microsoft.com/en-us/microsoftteams/room-systems/room-systems-scale.
What are the supported external cable diameters/types?	We recommend HDMI/USB cables with an external nylon mesh sheathing because they have better grip and will stay securely in place. • HDMI cable: 5 mm to 7.5 mm • USB cable: 3.5 mm to 6 mm • Power cable: 3.5 mm to 4.5 mm
What can I do if ThinkSmart Cam is lost during the meeting?	Disconnect it from ThinkSmart Core and reconnect it to ThinkSmart Core.

Chapter 6. Troubleshooting, diagnostics, and recovery

Basic procedure for resolving problems

Use the basic procedure as a starting point for resolving problems.

Prerequisite

Before you start, read "Read this first" on page i and print the following instructions.

1. Check that:
   a. The cables for all connected devices are connected correctly and securely.
   b. All components have been reassembled correctly.
   c. All connected devices that require ac power are connected to properly grounded and working electrical outlets.
   d. All connected devices are enabled in UEFI BIOS.
2. See Chapter 6 "Troubleshooting, diagnostics, and recovery" on page 25 to resolve the problem you are experiencing, run the diagnostic program, and recover your operating system.
3. If the problem persists, contact Lenovo. See Chapter 7 "Help and support" on page 35.

Troubleshooting

Use the troubleshooting information to find solutions to problems that have definite symptoms.

Startup and shutdown problems

Problem	Solution
The ThinkSmart Core does not start up after the power button is pressed.	• Ensure that ThinkSmart Core is correctly connected to power through the accompanying power adapter and power cord. • Ensure that the ThinkSmart Core voltage matches the voltage available at the electrical outlet for your country or region.
The ThinkSmart Core cannot be shut down from the operating system.	Press and hold the power button on the ThinkSmart Core for at least four seconds to turn it off.

MTR problems

Problem	Solution
MTR cannot be logged in.	- Ensure that the account and password are correct and valid. - Ensure that the ThinkSmart Core is connected to a wired network and is connected to your Office 365 account or your Skype for Business server (depends on your company's deployment). - If the ThinkSmart Core is connected to the Office 365 account, ensure that the account is not running in China.
The camera cannot be turned on in a meeting.	- Ensure that the account has been granted the authority to use the camera. - Ensure that the camera can work in administrator account with "Camera" application. - Ensure that the camera is not configured as content camera.
The calendar is not displayed.	- Ensure that the account has been granted the authority to receive meeting invitations automatically. - Check the calendar with Outlook or Office 365 Web site.

Display problems

Problem	Solution
Sometimes, the touch point is not very accurate on ThinkSmart Controller.	Please connect a keyboard and mouse to ThinkSmart Core for operations.
Sometimes, the on-screen keyboard is not popped out after touching the input box on ThinkSmart Controller.	Please connect a keyboard and mouse to ThinkSmart Core for operations.
Sometimes, the on-screen keyboard is not displayed accurately, such as: - Keyboard not fully displayed - Keyboard letters not fully displayed	Please connect a keyboard and mouse to ThinkSmart Core for operations.
Sometimes, the display mode is duplicate mode after ThinkSmart Core enters the MTR account.	The display mode is extend mode by default under the MTR account. If it is duplicate mode, restart ThinkSmart Core.
Sometimes, ThinkSmart Controller has no display after connected to ThinkSmart Core during the process of claiming device to ThinkSmart Manager.	Disconnect ThinkSmart Controller and reconnect it to ThinkSmart Core. If the problem persists, you can do one of the following: - Use your keyboard and mouse to perform operations. - Restart ThinkSmart Core.
Sometimes, ThinkSmart Controller is not the main screen and has no screen-rotation function after ThinkSmart Core is reset.	The auto setting of ThinkSmart Controller as the main screen and the auto screen rotation function are controlled by the ThinkSmart Controller configuration application. To restore them, download and install the application from https://smartsupport.lenovo.com/.

Problem	Solution
ThinkSmart Controller screen goes blank while ThinkSmart Core is on.	• Ensure that ThinkSmart Controller is connected to ThinkSmart Core correctly and securely. • Tap the ThinkSmart Controller screen to wake up the ThinkSmart Core. • The brightness and contrast is set correctly. • ThinkSmart Core voltage matches the voltage available at the electrical outlet for your country or region.

The ThinkSmart Controller screen image appears to be flickering.	• The ThinkSmart Controller screen might be affected by interference from nearby equipment. Magnetic fields around other devices, such as transformers, appliances, fluorescent lights, and other displays, might be causing the problem. Move fluorescent desk lighting or any equipment that produces magnetic fields farther away from the screen. If the problem persists, turn off ThinkSmart Core. Keep other devices at least 305 mm (12 inches) away from ThinkSmart Core. Then, turn on ThinkSmart Core.
	• Reset the refresh rate.
	  1. Right-click a blank area on the desktop.
	  2. Click **Display settings**. On the **Display** tab, click **Advanced display settings → Display adapter properties for Display 1**.
	  3. Click the **Monitor** tab, and then reset the refresh rate to be the highest and non-interlaced.

The ThinkSmart Controller screen image is discolored.	• The ThinkSmart Controller screen might be affected by interference from nearby equipment. Move fluorescent desk lighting or any equipment that produces magnetic fields farther away from the screen. • Turn off ThinkSmart Core. Keep other devices at least 305 mm (12 inches) away from ThinkSmart Core. Then, turn on ThinkSmart Core.
An external display screen is blank after connected to ThinkSmart Core.	• Ensure that the display is connected to ThinkSmart Core correctly and securely. • Select HDMI signals in the signal source setting of the display. • Restart the display. • Change the HDMI cable.
The image on an external display is not clear.	Reset the screen resolution. • Right-click a blank area on the desktop. • Click **Display settings**. • Set the screen resolution to be 1920 x 1080 pixels.

Audio problems

Problem	Solution
ThinkSmart Bar is lost during the MTR meeting.	- Ensure that it is correctly connected to power through the accompanying power adapter and power cord. - Ensure that it is turned on. - Disconnect it from ThinkSmart Core and reconnect it to ThinkSmart Core. - Ensure that it is set as the audio device for conferencing from MTR Settings.
The sound does not come from the headset or headphones connected to ThinkSmart Controller.	Select the headset or headphones as the default audio output device in advanced sound settings.

Network problems

Problem	Solution
ThinkSmart Core cannot connect to an Ethernet LAN.	- Connect the cable from the Ethernet connector to the RJ45 connector of ThinkSmart Core. - Enable the Ethernet LAN feature in UEFI BIOS. - Enable the Ethernet LAN adapter. 1. Go to **Control Panel** and view by large icons or small icons. 2. Click **Network and Sharing Center → Change adapter settings**. 3. Right-click the Ethernet LAN adapter icon and click **Enable**. - Update or reinstall the Ethernet LAN driver. - Install all networking software that is necessary for your network environment. Check with your LAN administrator for the necessary networking software. - Set the same duplex for the switch port and the adapter. If you configured the adapter for full duplex, ensure that the switch port is also configured for full duplex. Setting a wrong duplex mode might degrade performance, cause data loss, or result in lost connections.
When a Gigabit Ethernet model ThinkSmart Core is used at a speed of 1000 Mbps, the Ethernet LAN connection fails or errors occur.	Connect the network cable to the Ethernet connector using Category 5 wiring and a 100 BASE-T hub/switch (not 100 BASE-X).
My ThinkSmart Core is a Gigabit Ethernet model, but it cannot be connected to the network at 1000 Mbps, but at only 100 Mbps.	- Try another cable. - Set the link partner to auto-negotiate. - Set the switch to be 802.3ab-compliant (gigabit over copper).

Problem	Solution
The Wi-Fi feature does not work.	It is not recommended that you connect to a Wi-Fi network. If you connect to the Wi-Fi network that needs account authentication, the connection will be lost when you log in the conference room system. Connect your ThinkSmart Core to a local network through the Ethernet connector on your ThinkSmart Core with an Ethernet cable.

The Bluetooth feature does not work.	**Note:** It is not recommended that you connect a Bluetooth-enabled device to ThinkSmart Core.
	
	• Enable the Bluetooth feature in UEFI BIOS.
	• Enable all Bluetooth devices.
	  1. Right-click the **Start** button to open the **Start** context menu.
	  2. Click **Device Manager**. Type the administrator password or provide confirmation if prompted.
	  3. Expand **Bluetooth** to display all Bluetooth devices. Right-click each Bluetooth device, and then click **Enable device**.
	  4. Expand **Network adapters** to display all network devices. Right-click each Bluetooth device, and then click **Enable device**.
	• Turn on the Bluetooth radio.
	  1. Open the **Start** menu.
	  2. Click **Settings ➙ Devices ➙ Bluetooth & other devices**.
	  3. Turn on the **Bluetooth** switch to enable the Bluetooth feature.
	• Update or reinstall the Bluetooth driver.

Performance problems

Problem	Solution

The free storage drive space is insufficient.	• Clean out your Inbox, Sent Items, and Deleted Items folders from your e-mail application.
	• Clean up your C drive.
	  1. Open the **Start** menu.
	  2. Click **Windows System ➙ File Explorer ➙ This PC**.
	  3. Right-click your C drive and then click **Properties**.
	  4. Check the amount of free space, and then click **Disk Cleanup**.
	  5. A list of unnecessary file categories is displayed. Select the category you want to delete, and then click **OK**.

Drive problems

Problem	Solution
There is a warning icon besides **XMOS Control** under **Other devices** of Device Manager in the administrator account.	ThinkSmart Bar is an external device. Connect ThinkSmart Core to Internet to get the ThinkSmart Bar driver updated, then the warning icon will disappear.
"No Operating System Found" message or the system not starting up from the correct storage drive.	• Ensure that all storage drives are connected correctly and securely. • Ensure that the storage drive ThinkSmart Core starts up from is listed as the first startup device in the UEFI BIOS. **Note:** In rare cases, the storage drive with the operating system might get corrupted or damaged. In such cases, you might need to replace the storage drive.

USB device problems

Problem	Solution
A USB device cannot be accessed.	• Connect the USB cable from the USB connector to the USB device. If the USB device has its own power cord, connect the power cord to a grounded electrical outlet. • Turn on the USB device and keep the device online. • Install any device drivers or programs supplied with the USB device. Refer to the documentation that comes with the USB device for more information. • Disconnect and reconnect the USB connector to reset the USB device. • Ensure that the Smart USB Protection function is disabled in UEFI BIOS.

Diagnostics

Use diagnostic solutions to test hardware components and report operating-system-controlled settings that interfere with the correct operation of your computer.

To use the Lenovo diagnostic:

1. Turn on or restart the computer.
2. Before Windows starts, repeatedly press and release the F10 key until the Lenovo diagnostic opens.

   Note: If a BIOS password has been set, the UEFI BIOS will not open until you enter the correct password.
3. Follow the instructions on the screen to use the diagnostic program.

Recovery

This section introduces the recovery information of the Windows 10 operating system. Ensure that you read and follow the on-screen recovery instructions. The data on your computer might be deleted during the recovery process. To avoid data loss, make a backup copy of all the data that you want to keep.

Restore system files and settings to an earlier point

1. Go to **Control Panel** and view by large icons or small icons.

2. Click **Recovery** ➙ **Open System Restore**. Then, follow the on-screen instructions.

Restore your files from a backup

Note: If you use the File History tool to restore your files from a backup, ensure that you backed up your data earlier with the tool.

1. Go to **Control Panel** and view by large icons or small icons.
2. Click **File History** ➙ **Restore personal files**. Then, follow the on-screen instructions.

Reset from Windows

Note: The items in the graphical user interface (GUI) might change without notice.

1. Ensure that an external display is connected to the computer.
2. Open the **Start** menu, and then click **Settings** ➙ **Update & Security** ➙ **Recovery**.
3. In the **Reset this PC** section, click **Get started**.
4. Select **Remove everything** ➙ **Just remove my files** ➙ **Reset**. Then, your computer will reset to its factory state within a few hours.

   Notes:

   - Reset option **Keep my files** is not supported.
   - Please do not turn off or restart your computer during the reset.
   - It is normal that ThinkSmart Controller will go blank for a while during the reset process.

Reset from BIOS

Note: The items in the graphical user interface (GUI) might change without notice.

1. Ensure that an external display is connected to the computer.
2. Ensure that a keyboard is connected to the computer.
3. Restart your computer. At the beginning of the boot process, keep pressing F11 on the keyboard until Windows recovery environment opens.
4. Select **Troubleshoot** ➙ **Reset this PC** ➙ **Remove everything** ➙ **Just remove my files** ➙ **Reset**. Then, your computer will reset to its factory state within a few hours.

   Notes:

   - Reset option **Keep my files** is not supported.
   - Please do not turn off or restart your computer during the reset.
   - It is normal that ThinkSmart Controller will go blank for a while during the reset process.

Use advanced options

1. Open the **Start** menu, and then click **Settings** ➙ **Update & security** ➙ **Recovery**.
2. In the **Advanced startup** section, click **Restart now** ➙ **Troubleshoot** ➙ **Advanced options**.
3. Select a preferred option, and then follow the on-screen instructions.

Windows automatic recovery

Note: Ensure that your computer is connected to ac power during the recovery process.

The Windows recovery environment on your computer operates independently from the Windows 10 operating system. It enables you to recover or repair the operating system even if the Windows 10 operating system fails to start.

After two consecutive failed boot attempts, the Windows recovery environment starts automatically. Then, you can choose repair and recovery options by following the on-screen instructions.

Create and use a recovery USB device

It is recommended that you create a recovery USB drive as early as possible as a backup for the Windows recovery programs. With the recovery USB drive, you can troubleshoot and fix the problems even if the preinstalled Windows recovery programs are damaged. If you did not create a recovery USB drive as a precautionary measure, you can contact Lenovo Customer Support Center and purchase one from Lenovo. For a list of the Lenovo Support phone numbers for your country or region, go to:
https://smartsupport.lenovo.com/supportphonelist

Create a recovery USB drive

Attention: The creation process deletes anything stored on the USB drive. To avoid data loss, make a backup copy of all the data that you want to keep.

1. Ensure that your computer is connected to ac power.
2. Prepare a USB drive with capacity of at least 16 GB. The actual USB capacity required depends on the size of the recovery image.
3. Connect the prepared USB drive to the computer.
4. Type `recovery` in the search box. Then, click **Create a recovery drive**.
5. Click **Yes** in the User Account Control window to allow the Recovery Media Creator program to start.
6. In the Recovery Drive window, follow the on-screen instructions to create a recovery USB drive.

Use the recovery USB drive

If your computer cannot be started, go to Chapter 7 "Help and support" on page 35 first to try to solve the problem by yourself. If the problem persists, use the recovery USB drive to recover your computer.

1. Ensure that your computer is connected to ac power.
2. Connect the recovery USB drive to the computer.
3. Turn on or restart the computer. When the logo screen is displayed, press F12. The Boot Menu window opens.
4. Select the recovery USB drive as the boot device. Then, follow the on-screen instructions to complete the process.

Update the device driver

Attention: Reinstalling device drivers will change the current configuration of the computer.

You should download the latest driver for a component when you notice poor performance from that component or when you added a component. This action might eliminate the driver as the potential cause of a problem. Download and install the latest driver by one of the following methods:

• From the Lenovo Support Web site:

Go to https://smartsupport.lenovo.com/ and select the entry for your computer. Then, follow the on-screen instructions to download and install necessary drivers and software.

• From Windows Update:

Note: The device drivers provided by Windows Update might not be tested by Lenovo. It is recommended that you get device drivers from Lenovo.

1. Open the **Start** menu.
2. Click **Settings ➙ Update & Security ➙ Windows Update**.
3. Follow the on-screen instructions.

Chapter 7. Help and support

This chapter provides help and support information for your product.

Note: ThinkSmart Core is referred to as "Computer" in this chapter.

Self-help resources

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

Resources	How to access?
Product documentation: • *Deployment and User Guide* • Documentation in the box • This *Hardware Maintenance Manual* • *Regulatory Notice*	Go to https://smartsupport.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: • Drivers and software • Diagnostic solutions • Product and service warranty • Product and parts details • Knowledge base and frequently asked questions	https://smartsupport.lenovo.com/
Windows help information	• Open the **Start** menu and click **Get Help** or **Tips**. • Use Windows Search or the Cortana® personal assistant. • Microsoft support Web site: https://support.microsoft.com
Accessibility information	https://www.lenovo.com/accessibility

Additional services

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

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.

We expect you will have years of productive meeting experiences with our collaboration solution. To assist you in getting this collaboration solution installed in your environment, we have included two of our most popular ThinkSmart services: Deploy and Maintain.

Customer Action

You must register this service with Lenovo so a service technician can contact you to schedule initial deployment service:

https://support.lenovo.com/us/en/professionalserviceregistration

To register, please provide the contact information for the person we should engage with, along with purchase information (place and date of purchase along with sales order or invoice number).

Included Services

- **Deploy**: A ThinkSmart service to help setup, configure and integrate collaboration solution devices into your environment. All deployments include full documentation reports after complete.

- **Maintain**: A one-year (renewable) maintenance contract where technicians will assist with updates and device changes and provide easy to follow Do's and Don'ts. Device operability health check ins will ensure collaboration solution is healthy and running smoothly. Redeployment of solution, if required, into a different meeting space is included.

  Note: These services are delivered virtually, with multi-lingual technicians available WW, ready to handle live support via video meeting, phone, email, or IM.

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 (on the bottom of the product)

Lenovo Customer Support Center

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

Telephone numbers

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

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

Services available during the warranty period

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

Services not covered

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

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

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

C:\Windows\System32\oobe\info\default

Chapter 8. Hardware removal and installation

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

Handling static-sensitive devices

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

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

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

Service tool kit

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

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

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

Major FRUs and CRUs

Your product contains the following types of CRUs and FRUs:

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

For detailed FRU and CRU information, such as the FRU part numbers and supported models, go to:
http://www.lenovo.com/serviceparts-lookup
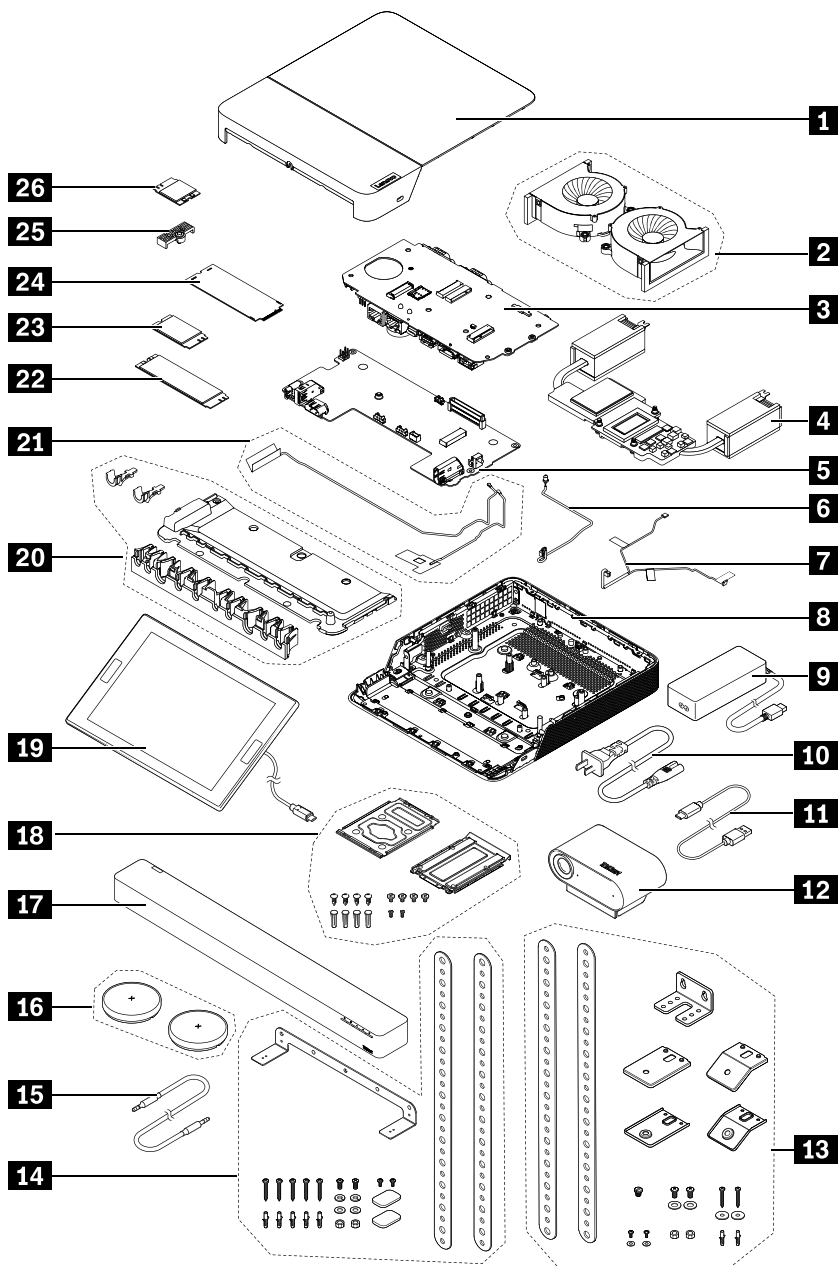
Number	Description	Self-service CRU	Optional-service CRU
1	Top cover	No	No
2	System fan	No	No
3	System board	No	No
4	Heat sink	No	No
5	Skype board	No	No

Number	Description	Self-service CRU	Optional-service CRU
6	LED cable	No	No
7	Thermal sensor	No	No
8	Bottom chassis	No	No
9	Power adapter 65W/90W	Yes	No
10	Power cord	Yes	No
11	Camera/soundbar cable 5 m	Yes	No
12	ThinkSmart Cam	Yes	No
13	ThinkSmart Cam brackets & screws	No	No
14	ThinkSmart Bar brackets & screws	No	No
15	Satellite microphone cable	Yes	No
16	Satellite microphone module for ThinkSmart Bar	Yes	No
17	ThinkSmart Bar	Yes	No
18	ThinkSmart Core brackets & screws	Yes	No
19	ThinkSmart Aux Display	Yes	No
20	Decor cover	No	No
21	Wi-Fi antenna cables (2)	No	No
22 23	Solid-state drive	No	No
24	Video capture card	No	No
25	Wi-Fi card shield	No	No
26	Wi-Fi card	No	No

System board and Skype board

System board
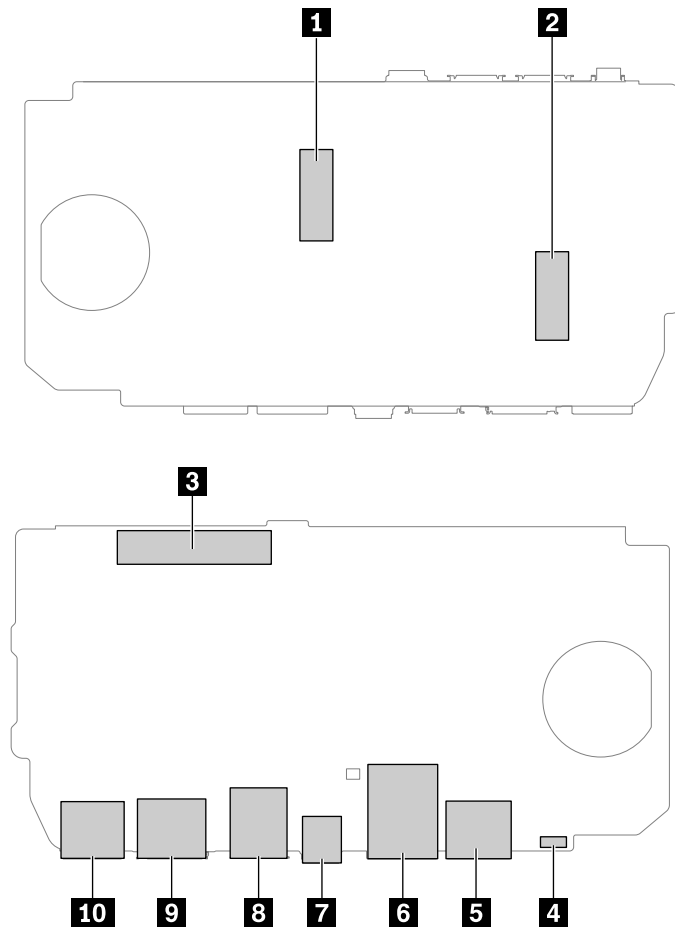
1 M.2 solid-state drive slot	**2** Wi-Fi card slot
3 Board-to-board connector	**4** Clear CMOS (Complementary Metal Oxide Semiconductor)
5 USB-A connector	**6** Ethernet connector
7 USB-C connector	**8** USB-A connector
9 HDMI-out connctor	**10** DC-in connector

Skype board
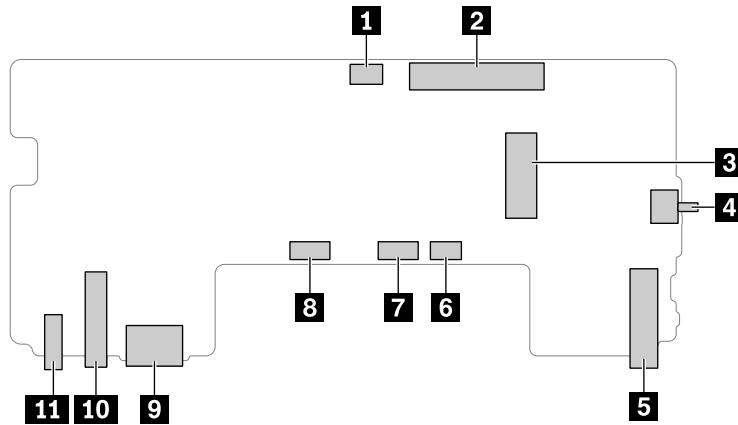
1 LED cable connector		**2** Board-to-board connector	
3 Video capture card slot		**4** Power button	
5 HDMI-in connector		**6** Thermal sensor connector	
7 8 System fan cable connector		**9** HDMI-out connector	
10 USB-A connector		**11** USB-C connector	

Looking up FRU information

For detailed FRU information, including part numbers, descriptions, and substitution part numbers, go to: https://support.lenovo.com/partslookup

Removing hardware

This section provides instructions on how to remove and install hardware for ThinkSmart Core. You can expand the capabilities of your product and maintain your product by removing or installing hardware.

To remove and install the ThinkSmart Bar, ThinkSmart Bar XL, and ThinkSmart Cam, refer to the *Quick Start Guide*.

Attention: Do not open your product or attempt any repair before reading and understanding the Chapter 1 "Important safety information" on page 1.

External options

You can connect external options to the ThinkSmart Core. For some external options, you must install additional software in addition to making the physical connection. When installing an external option, see "ThinkSmart Core connector overview" on page 17 to identify the required connector. Then, use the instructions that come with the option to help you make the connection and install any required software or device drivers.

Top cover

Prerequisite

Before you start, read Chapter 1 "Important safety information" on page 1 and print the following instructions.

⚠️ 🔥

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

For access, do the following:

1. Disconnect the power cord from electrical outlet and disconnect all the cables from the Core.
2. Place a clean soft cloth, and then lay down the Core with the top cover facing up.
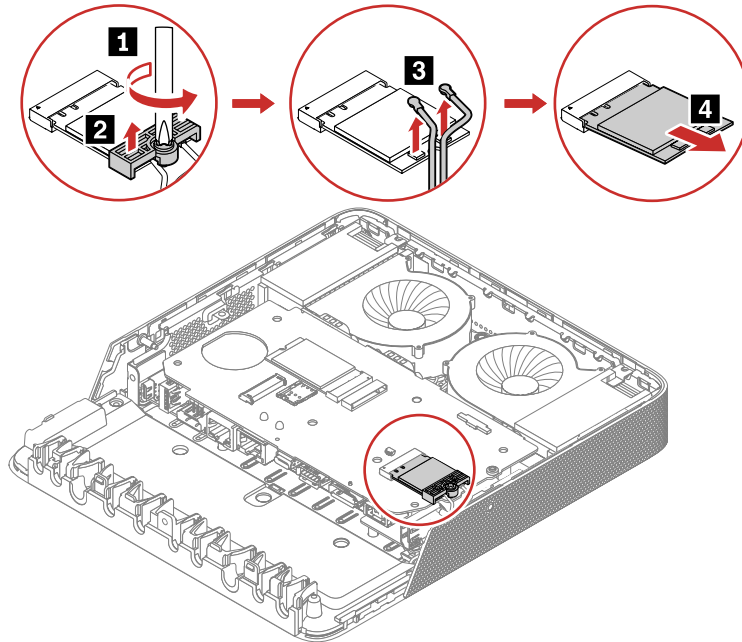
Removal step
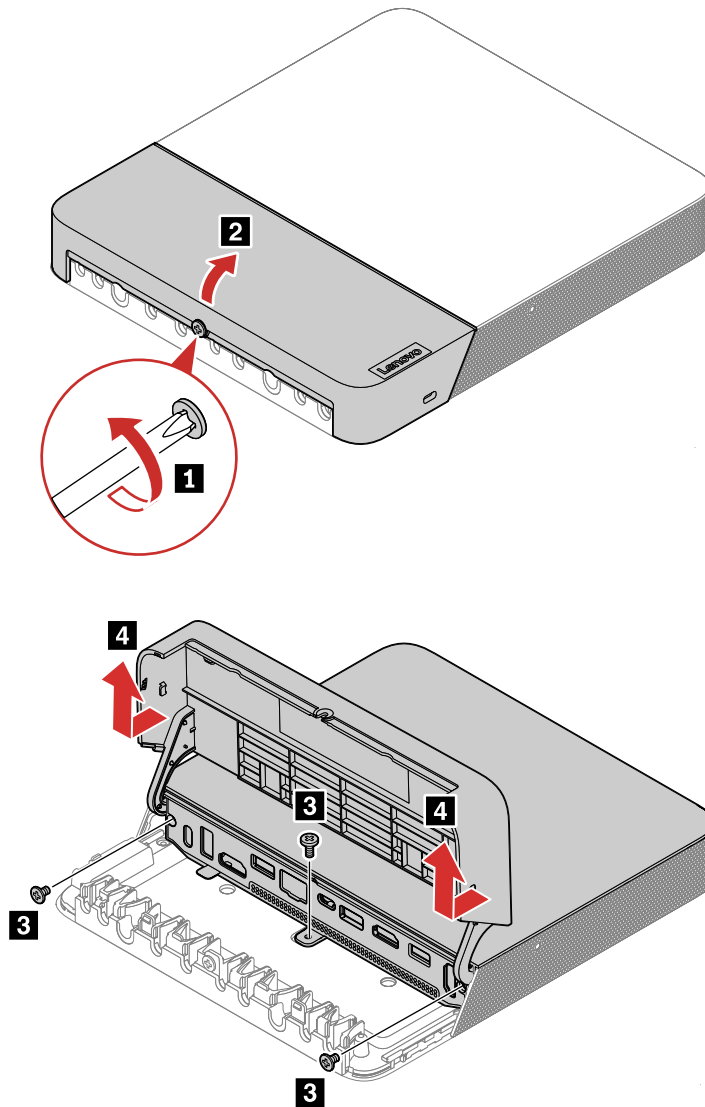
M.2 solid-state drive

Prerequisite

Before you start, read Chapter 1 "Important safety information" on page 1 and print the following instructions.

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

Attention:

- The M.2 solid-state drive is sensitive. Inappropriate handling might cause damage and permanent loss of data. When handling the M.2 solid-state drive, observe the following guidelines:
  - Replace the M.2 solid-state drive only for upgrade or repair. The M.2 solid-state drive is not designed for frequent changes or replacement.
  - Before replacing the M.2 solid-state drive, make a backup copy of all the data that you want to keep.
  - Do not touch the contact edge of the M.2 solid-state drive. Otherwise, the M.2 solid-state drive might get damaged.
  - Do not apply pressure to the M.2 solid-state drive.
  - Do not make the M.2 solid-state drive subject to physical shocks or vibration. Put the M.2 solid-state drive on a soft material, such as cloth, to absorb physical shocks.

For access:

1. Remove the top cover. See "Top cover" on page 44.
2. Remove the thermal pad if any.

Removal step

- Type I
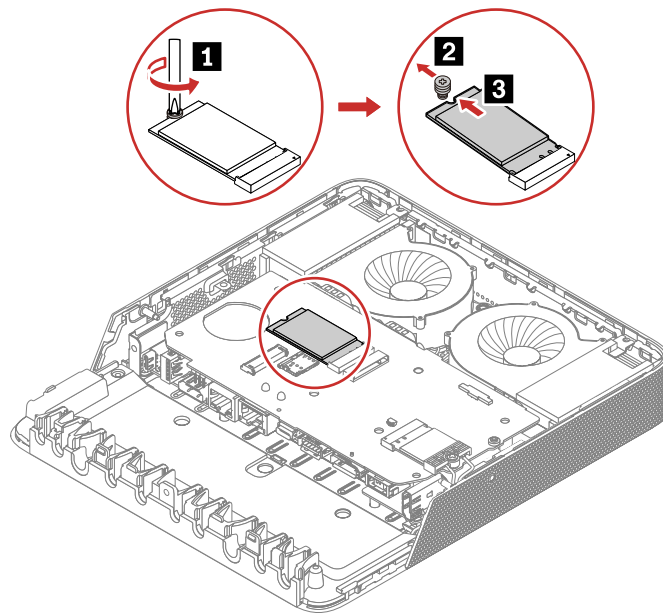
• Type II
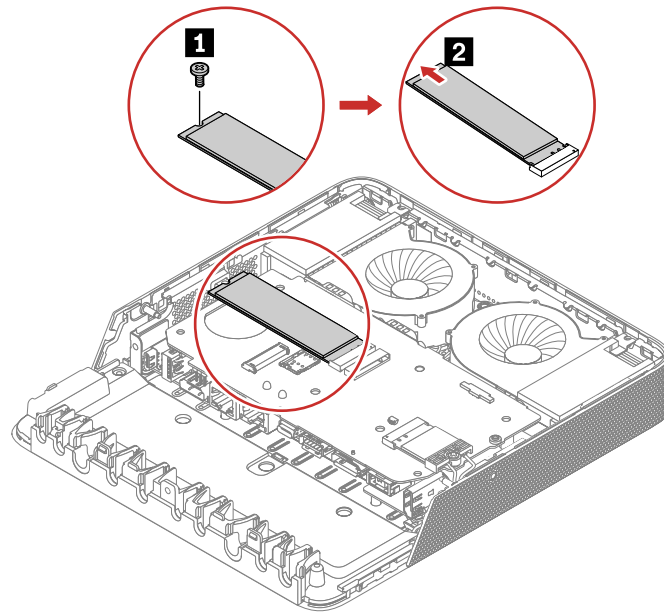
Wi-Fi card

Prerequisite

Before you start, read Chapter 1 "Important safety information" on page 1 and print the following instructions.

For access:

1. Remove the top cover. See "Top cover" on page 44.
2. Remove the thermal pad if any.

Removal step

System board and heat sink

Prerequisite

Before you start, read Chapter 1 "Important safety information" on page 1 and print the following instructions.
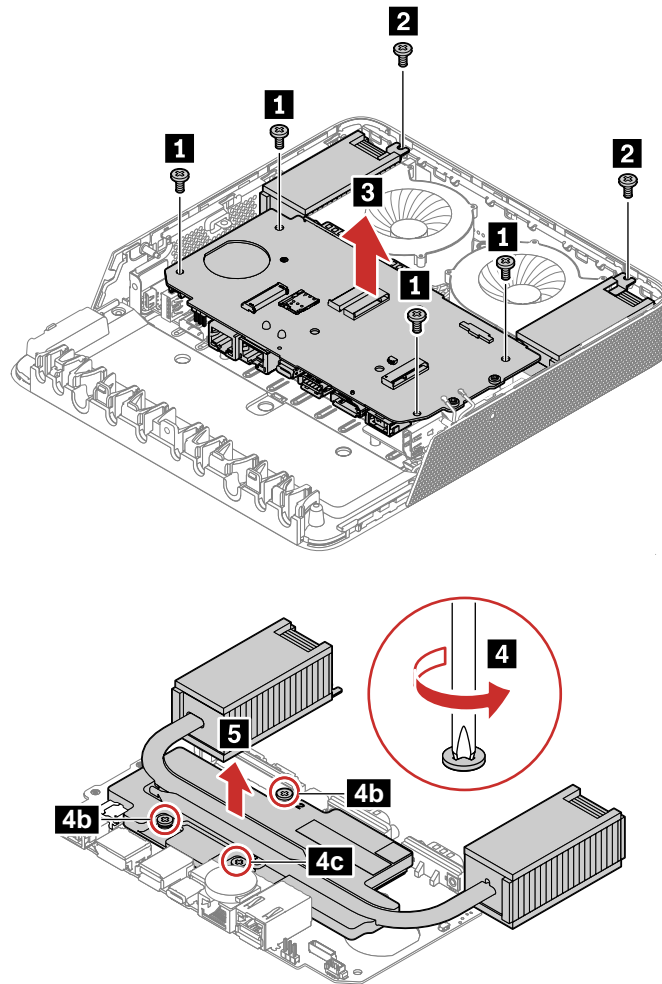
⚠️ 🔥

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

For access, remove the following FRUs:

- "Top cover" on page 44
- "M.2 solid-state drive" on page 45
- "Wi-Fi card" on page 47

Removal steps

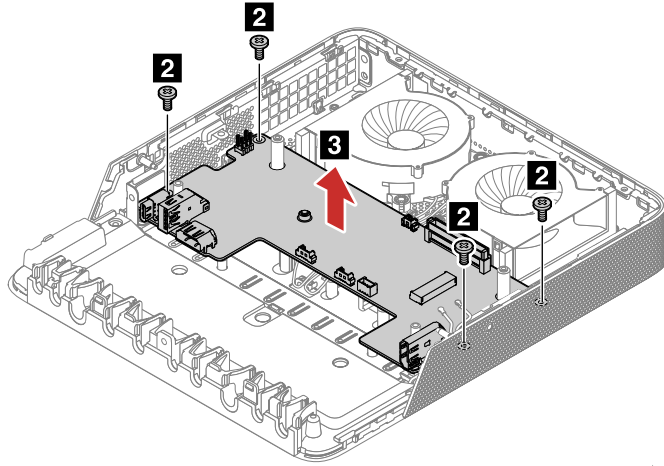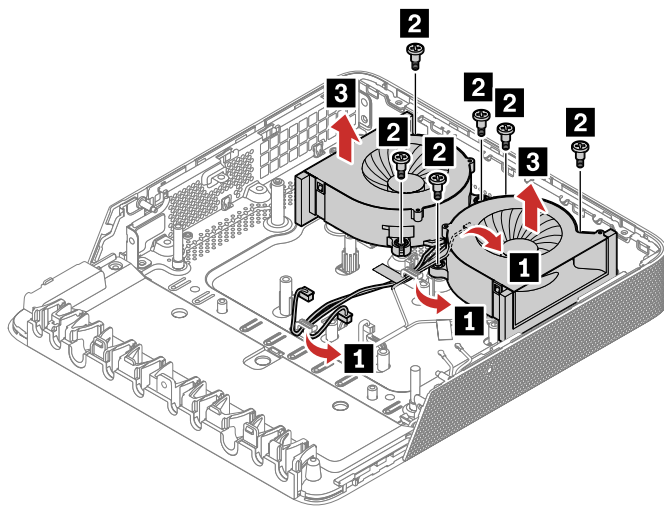# Video capture card

Prerequisite

Before you start, read Chapter 1 "Important safety information" on page 1 and print the following instructions.

For access, remove the following FRUs:

- "Top cover" on page 44
- "M.2 solid-state drive" on page 45
- "Wi-Fi card" on page 47
- "System board and heat sink" on page 48

Removal step
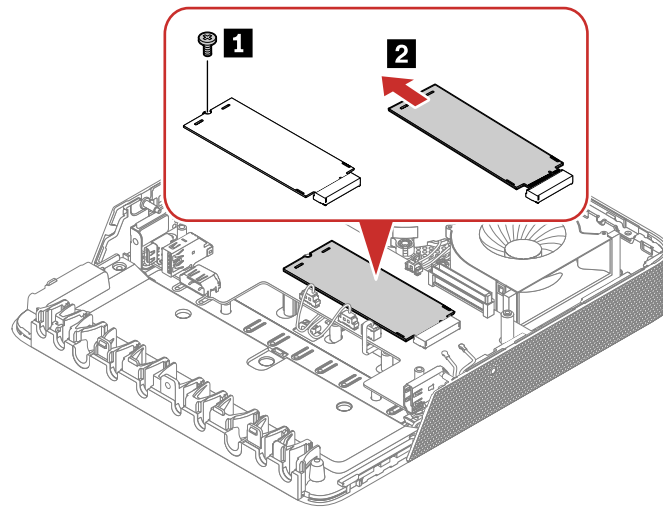
Skype board

Prerequisite

Before you start, read Chapter 1 "Important safety information" on page 1 and print the following instructions.

For access, remove the following FRUs:

- "Top cover" on page 44
- "M.2 solid-state drive" on page 45
- "Wi-Fi card" on page 47
- "System board and heat sink" on page 48
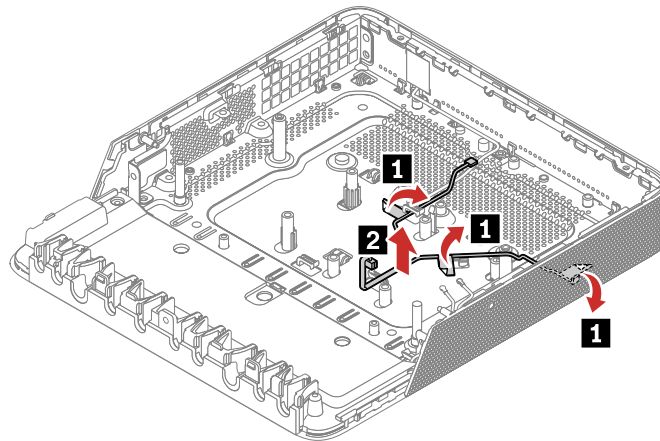- "Video capture card" on page 49

Removal steps
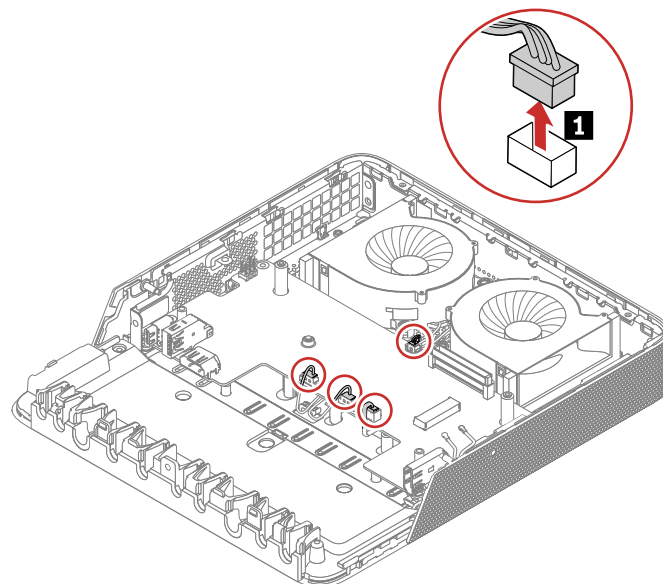
System fan

Prerequisite

Before you start, read Chapter 1 "Important safety information" on page 1 and print the following instructions.

For access, remove the following FRUs:

- "Top cover" on page 44
- "M.2 solid-state drive" on page 45
- "Wi-Fi card" on page 47
- "System board and heat sink" on page 48
- "Video capture card" on page 49
- "Skype board" on page 50

Removal step

Thermal sensor
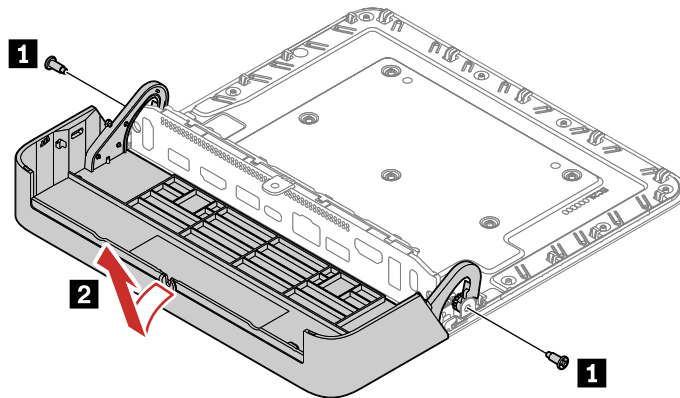
Prerequisite

Before you start, read Chapter 1 "Important safety information" on page 1 and print the following instructions.

For access, remove the following FRUs:

- "Top cover" on page 44
- "M.2 solid-state drive" on page 45
- "Wi-Fi card" on page 47
- "System board and heat sink" on page 48
- "Video capture card" on page 49
- "Skype board" on page 50
- "System fan" on page 51

Removal step

Cable cover

Prerequisite

Before you start, read Chapter 1 "Important safety information" on page 1 and print the following instructions.

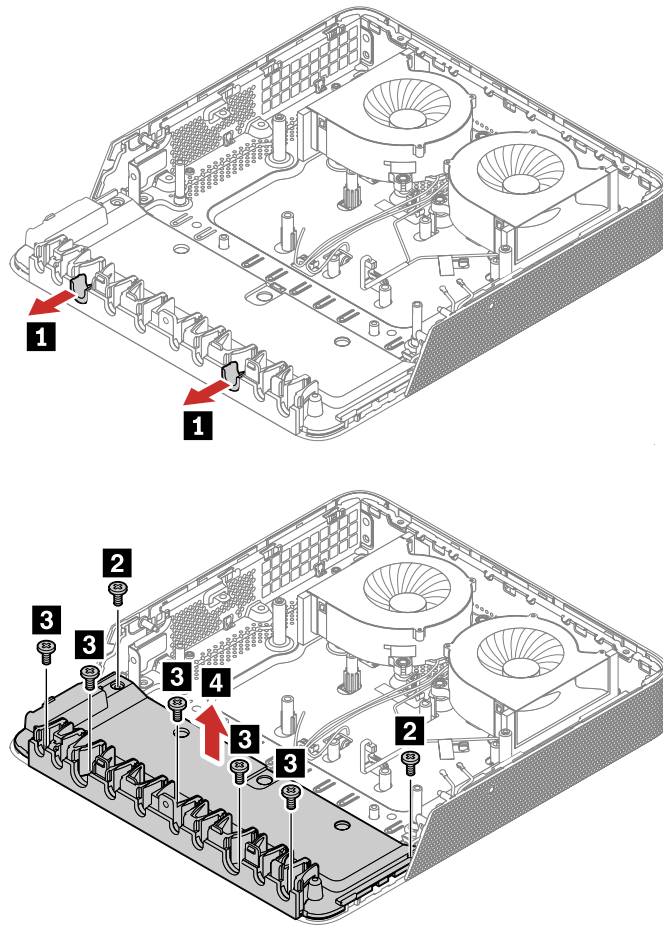For access, remove the top cover. See "Top cover" on page 44.

Removal step

Decor cover

Prerequisite

Before you start, read Chapter 1 "Important safety information" on page 1 and print the following instructions.

For access, remove the top cover. See "Top cover" on page 44.

Removal step


Wi-Fi antenna cables

Prerequisite

Before you start, read Chapter 1 "Important safety information" on page 1 and print the following instructions.

For access, remove the following FRUs:

- "Top cover" on page 44
- "M.2 solid-state drive" on page 45
- "Wi-Fi card" on page 47
- "System board and heat sink" on page 48
- "Video capture card" on page 49
- "Skype board" on page 50
- "Decor cover" on page 53

Removal step

ThinkSmart Core Kit Hardware Maintenance Manual
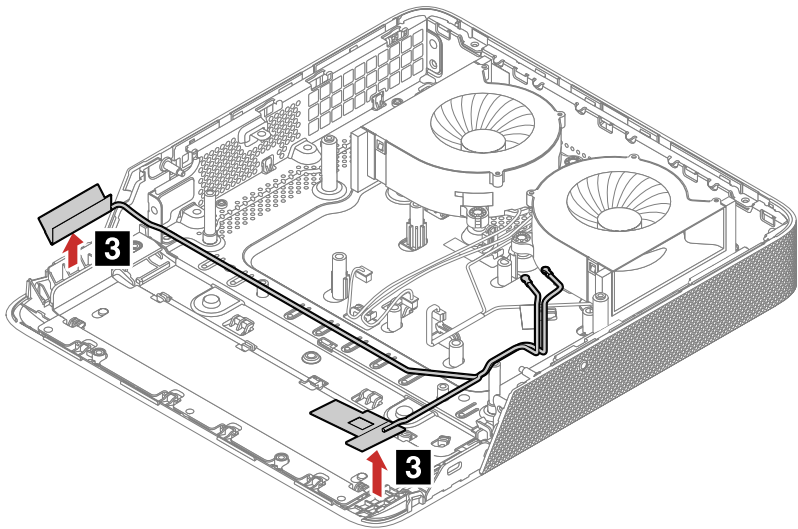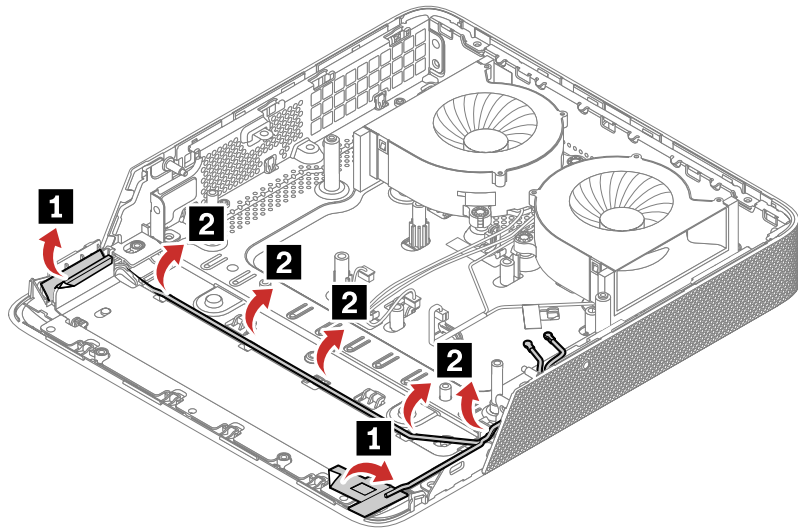
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