Ch 8: Laptop Features and Troubleshooting

Supporting and Troubleshooting Laptops

Use	Use Laptop Features
Install and Configure	Install and Configure Laptop Hardware
Troubleshoot	Troubleshoot Common Laptop Issues

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Topic A: Use Laptop Features

System Model ROG Zephyrus G14

Item	Value
OS Name	Microsoft Windows 10 Education
Version	10.0.19044 Build 19044
Other OS Description	Not Available
OS Manufacturer	Microsoft Corporation
System Name	STACKS
System Manufacturer	ASUSTeK COMPUTER INC.
System Model	ROG Zephyrus G14 GA401IH_GA401IH
System Type	x64-based PC
System SKU	
Processor	AMD Ryzen 7 4800HS with Radeon Graphics, 2900 Mhz, 8 Core(s), 16 Logical ...
BIOS Version/Date	American Megatrends Inc. GA401IH.212, 3/14/2022
SMBIOS Version	3.2
Embedded Controller Version	3.15
BIOS Mode	UEFI
BaseBoard Manufacturer	ASUSTeK COMPUTER INC.
BaseBoard Product	GA401IH
BaseBoard Version	1.0
Platform Role	Mobile
Secure Boot State	On
PCR7 Configuration	Elevation Required to View
Windows Directory	C:\Windows
System Directory	C:\Windows\system32
Boot Device	\Device\HarddiskVolume1
Locale	United States
Hardware Abstraction Layer	Version = "10.0.19041.1566"
User Name	STACKS\anton
Time Zone	Eastern Daylight Time

System Model ROG Zephyrus G14 GA401IH_GA401IH

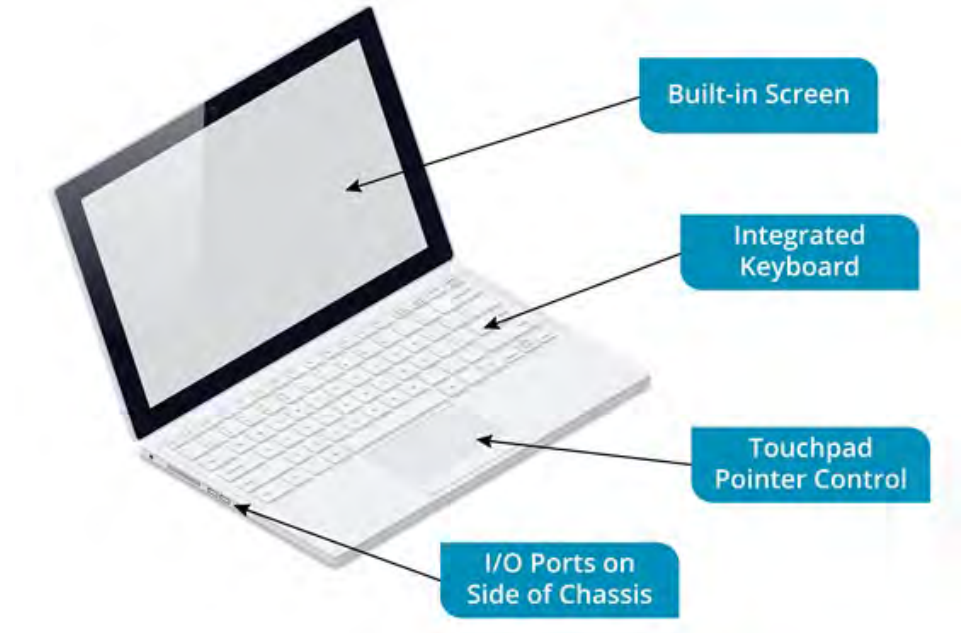|	
Installed Physical Memory (RAM)	40.0 GB
Total Physical Memory	39.4 GB
Available Physical Memory	26.5 GB
Total Virtual Memory	45.2 GB
Available Virtual Memory	30.4 GB
Page File Space	5.75 GB
Page File	C:\pagefile.sys
Kernel DMA Protection	Off
Virtualization-based security	Not enabled
Device Encryption Support	Elevation Required to View
Hyper-V - VM Monitor Mode E...	Yes
Hyper-V - Second Level Addres...	Yes
Hyper-V - Virtualization Enable...	Yes
Hyper-V - Data Execution Prote...	Yes

Laptops

Laptop: A powerful portable computer offering similar functionality to a desktop computer.

- Contains special hardware:
  - Designed for portability.
  - Runs on AC or battery.

- Uses same OSs as desktop PCs.
- Models:
  - Entry level/Budget.
  - Ultraportable.
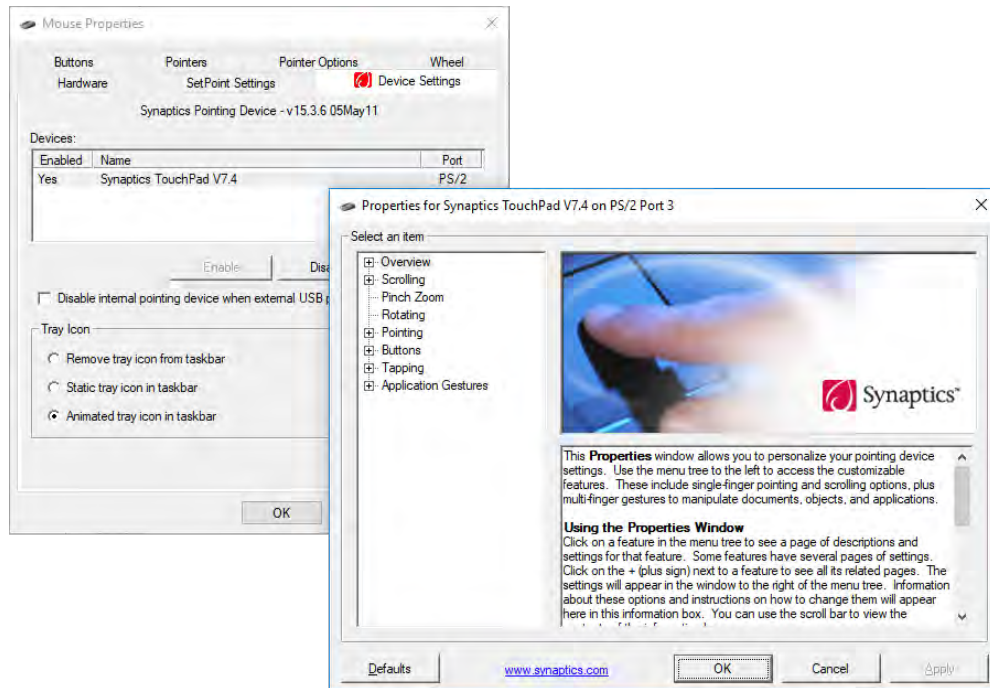 - Desktop replacement.
  - Media center.
  - Gaming unit.

Built-in Screen

Integrated Keyboard

Touchpad Pointer Control

I/O Ports on Side of Chassis

Touchpads

Touchpad: Input device used on most laptops to replace the mouse, controlled by moving fingers over the pad surface.

- Alternative to using a mouse.

- Support for multi-touch and gestures.

- Configured via the **Mouse** applet in Windows.

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Keyboards

- Function keys:
  - Display.
  - Screen orientation.
  - Wireless/Bluetooth/Cellular/GPS.
  - Volume.
  - Screen brightness.
  - Keyboard backlight.
  - Touchpad.
  - Media options.

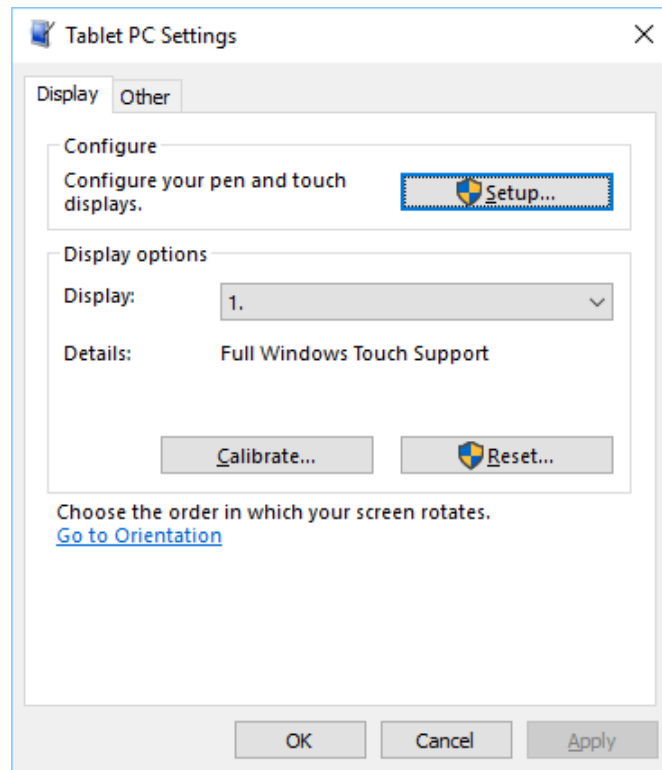- Numeric keypad or key combinations.

- Configured via the **Keyboard** applet in Windows.
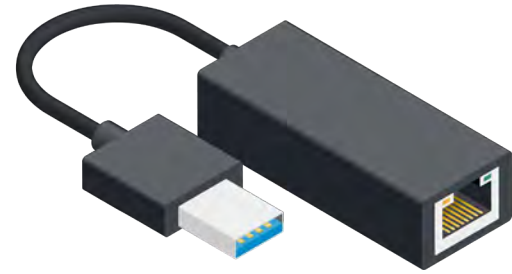
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Displays and Touchscreens

Touchscreen: A display screen combined with a digitizer that is responsive to touch input.

- Finger touch or stylus.

- Antenna for Wi-Fi adapter incorporated.

- Rotating or removable screens/keyboards.
  - Based on tablet form factors.

- Tablet PC Settings and Pen and Touch applets in Windows.
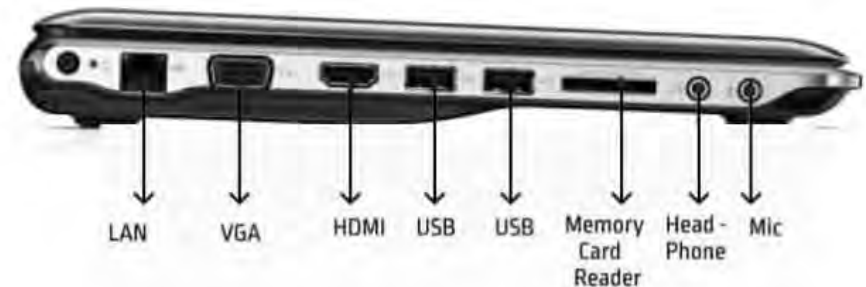 - Calibration utility.
  - Gesture settings.

9

Expansion Options

- Wired ports on left, right, and rear:
  - At least one video port.
  - Several USB Type A ports.
  - At least one USB Type C/Thunderbolt port.
  - Microphone and speaker jacks.
  - Network (RJ-45) port.
  - Possibly memory card reader.

- USB adapters:
  - USB to RJ-45.
  - USB to Wi-Fi/Bluetooth.
  - USB optical drive.

Laptop | Computer Port Explained

LAN   VGA   HDMI   USB   USB   Memory Card Reader   Head-Phone   Mic

Port Replicators and Docking Stations

- Port replicator
  - Provision additional wired ports for laptops

- Docking station
  - Port replicator plus support for removable drives and adapter cards

- Smartphone and tablet docks
  - Connect peripheral devices and use as a desktop

Physical Locks

Help prevent theft.

Key-based or combination locks.

Kensington locks and connection points.

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Discussing Laptop Features

- **What two display settings would you expect to be able to control via a laptop's Fn keys?**

- **ANSWER:**
  - Screen brightness, and toggling the output between the built-in screen and external display.

Discussing Laptop Features

- **True or false? Touchpad settings would be configured via the Touch applet in Windows Control Panel.**

- **ANSWER:**
  - False—the touchpad is configured via tabs in the **Mouse** applet.

Discussing Laptop Features

- **What device would you use to extend the functionality of a laptop while sitting at a desk?**

- **ANSWER:**
  - A docking station
  - Port replicator, which extends the number of connectivity options.

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Discussing Laptop Features

- **What feature would you expect to find on a modern touchpad, compared to older models?**

- **ANSWER:**
  - Support for multi-touch.

Discussing Laptop Features

- **What connectivity issue is resolved by providing a USB-to-RJ-45 dongle?**

- **ANSWER:**
  - Ethernet/wired network connectivity.

Discussing Laptop Features

- **What is the brand name of the standard cable lock security system for laptops?**

- **ANSWER:**
  - Kensington.

Topic B: Install and Configure Laptop Hardware

Laptop Disassembly Processes

- Hand tools and parts:
  - Smaller screws than desktops—use jeweler's tools
  - Document screw locations, ribbon cables, other connectors
  - Organize removed parts

- Form factors and plastics/frames
  - Most use proprietary components
  - Chassis incorporates:
    - Motherboard
    - Power supply
    - Display screen
    - Keypad
    - Touchpad

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Laptop FRUs

- Review manufacturer's service documentation before starting upgrades or repairs (VOID Warranty)

- Fewer FRUs than desktop PCs.

- FRUs accessible from behind a screw plate on the bottom of the unit.
  - HDD
  - Optical drive
  - RAM
  - Wi-Fi and other adapters

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Mass Storage for Laptops

- Same types as for PCs:
  - HDD, SSD, and hybrid solutions.
  - Normally one internal storage device.

- Smaller form factors:
  - 2.5 and 1.8 inches.
  - Slower than PC counterparts.

- Data and power connectors:
  - SATA for most magnetic and hybrid drives.
  - Micro SATA for some 1.8" drive bays.
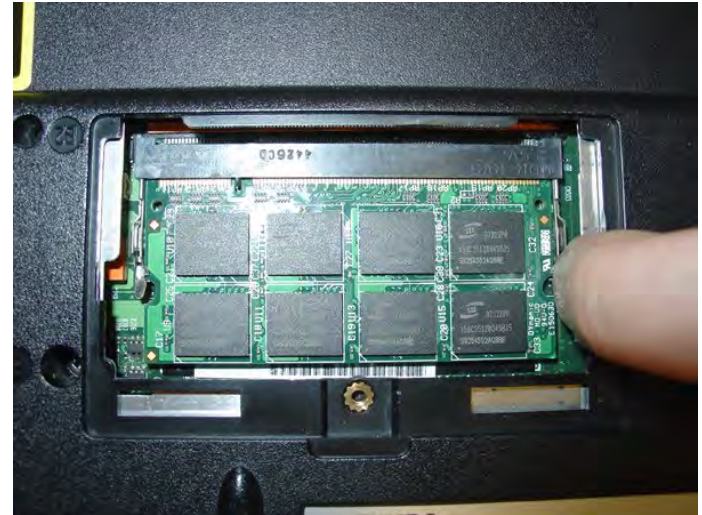 - SATA, mSATA, or M.2 for SSDs.

Laptop HDD

TYPES OF HARD DRIVES

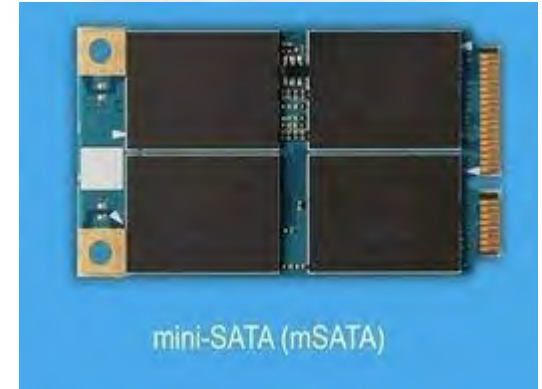SATA HDD | SATA SSD | M.2 NVMe | M.2 SATA

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Laptop RAM

SODIMM: Memory that is half the size of DIMMs, are available in 32- or 64-bit data paths and are commonly found in laptops and iMac systems.

- Packaging for different DDR types:
  - DDR and DDR2: 200 pins
  - DDR3: 204 pins
  - DDR4: 260 pins

- Angled slots allow for easy removal and installation.

- Disassembly might be required to reach all installed RAM.

Adapter Cards for Laptops

- Uses:
  - Modems
  - Wireless networking
  - SSD storage

- Adapter formats:
  - Mini-PCI
  - mSATA
  - M.2

- For wireless adapter upgrades:
  - Reconnect antenna wires or install new antenna kit.
  - If cellular functionality, a SIM is required.

mini-SATA (mSATA)

Optical Drives for Laptops

- Slimline models used.

- Normally accessible through the bottom panel.

- SATA data and power connectors.

- For replacements, use same OEM part or same caddy design.

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Laptop CPU and Motherboard Upgrades

- CPU is upgradeable if the new device is supported by the motherboard.

- CPU is covered by a heat-pipe.
  - Long, flat metal strip.

- **Sometimes it's more economical to replace the system board, OR laptop**

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Laptop Video Card Upgrades

- Often an integrated graphics adapter.
  - Advantageous in terms of battery life and cooling.

- Typically, has limited video memory or shares system memory.

- Not usually upgradeable but may be replaceable.
  - High-end video cards require specific power and cooling.
  - Modular approach not possible due to limited space.

Laptop Component Replacement

- Find a source for "like-for-like" replacements
  - Ensures proper fit and function

- Built-in display will be:
  - LCD (TFT) with fluorescent backlight
  - LCD with LED backlight
  - OLED

- Replacing speakers requires disassembly down to the system board.
- Model compatibility.
- Connect the audio cables.

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Laptop Input Device Replacement

- Keyboards
- Touchpads
- Webcams
- Microphones
- Smart card readers

29

Laptop Power Supplies

- Building power:
  - Need AC to DC converter.
  - Auto switching or manual.
  - DC jacks prone to failure.

- Battery operation:
  - Li-ion battery packs.
  - 6, 9, and 12 cell versions.
  - Normally accessed through bottom of the unit.
  - Charging options.
  - Tips for maximizing battery life.

Discussing Laptop Hardware Installation and Configuration

- **What is the process for installing memory in a laptop?**

- **ANSWER:**
  - Verify that the DDR version of the upgrade module is supported by the motherboard. Take anti-static precautions.

  - Locate the memory slot, which is usually accessed via a panel on the back cover. Move the connector up to 45º and insert the memory card, taking care to align it correctly. Push the card flat again.

Discussing Laptop Hardware Installation and Configuration

- **What distinguishes a magnetic hard drive designed for a laptop from one designed for a PC?**

- **ANSWER:**
  - Laptop drives size are 2.5" (or sometimes 1.8"), rather than 3.5".
  -
  - They also tend to be slower (5,400 rpm, rather than 7,200 or 10,000 rpm) and lower capacity..

Discussing Laptop Hardware Installation and Configuration

- **What type of standard adapter card might be used to connect internal FRU devices to the motherboard of a laptop?**

- **ANSWER:**
  - Mini-PCIe, mSATA, or M.2.

Discussing Laptop Hardware Installation and Configuration

- **A user reports that when they plug in anything to a USB port on the laptop, the device is not recognized by the system. Is this something you can easily repair?**

- **ANSWER:**
  - Typically, the processor, the DC jack, and USB ports are attached directly on the board and cannot be replaced without replacing the whole laptop motherboard..
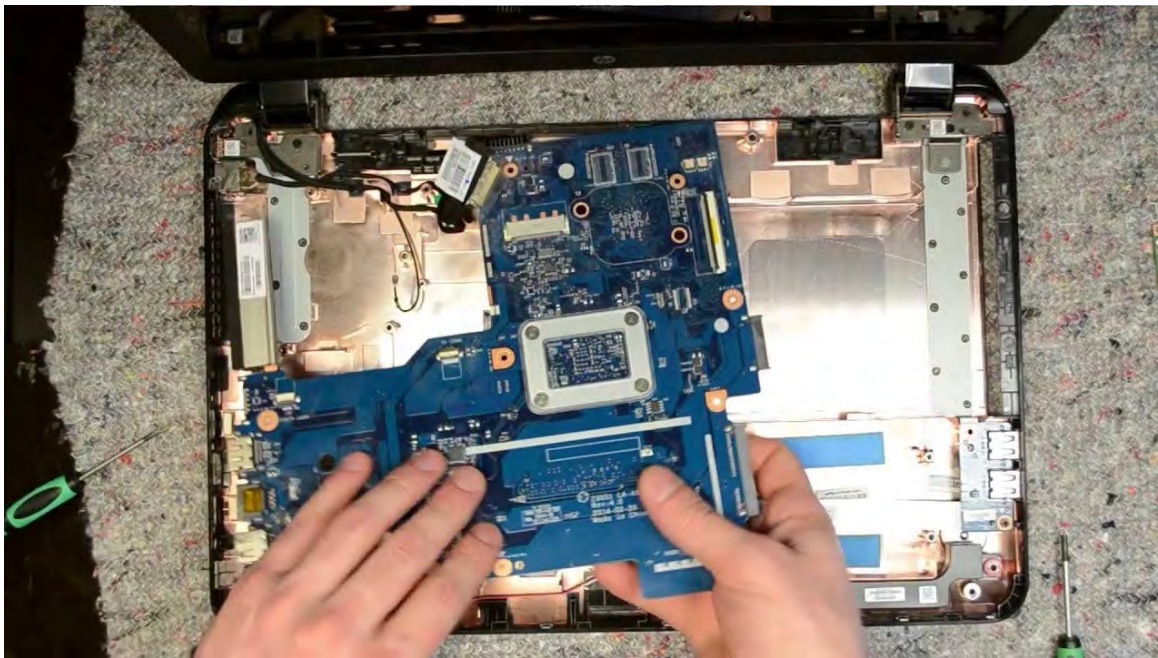
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Discussing Laptop Hardware Installation and Configuration

- **Several laptops need to be replaced in the next fiscal cycle, but that doesn't begin for several months. You want to improve functionality as much as possible by upgrading or replacing components in some of the laptops that are having problems. Which items are most easily replaced in a laptop?**

- **ANSWER:**
  - The fixed drive, system memory (RAM), and plug-in wireless card will be the easiest upgradable components to install.

  -

Topic C: Troubleshoot Common Laptop Issues

Common Laptop Issues

Display issues:
     Built-in displays
     Touchscreens
     External displays

Power and cooling issues

Input and output device issues

GPS and location services issues

OS and app issues:
     Performance
     Unresponsive apps

37

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Display Issues

Troubleshooting Displays
TechnologyGee.com

Problems with built-in displays:

- Is it really the built-in display?
- Backlights and inverters prone to failure

Problems with touchscreen displays:

- Not responsive
- Does not act as expected

Problems with external displays:

- No image
- Wrong image
- Image is too large or too small

38

Guidelines for Troubleshooting Display Issues

Built-in displays:

Where does the problem really lie?

Check for physical damage.

Check the resolution.

Check the driver.

Touchscreen displays:

Is it clean?

Check for physical damage.

Try using it in another location.

Check software configuration.

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Guidelines for Troubleshooting Display Issues

External displays.

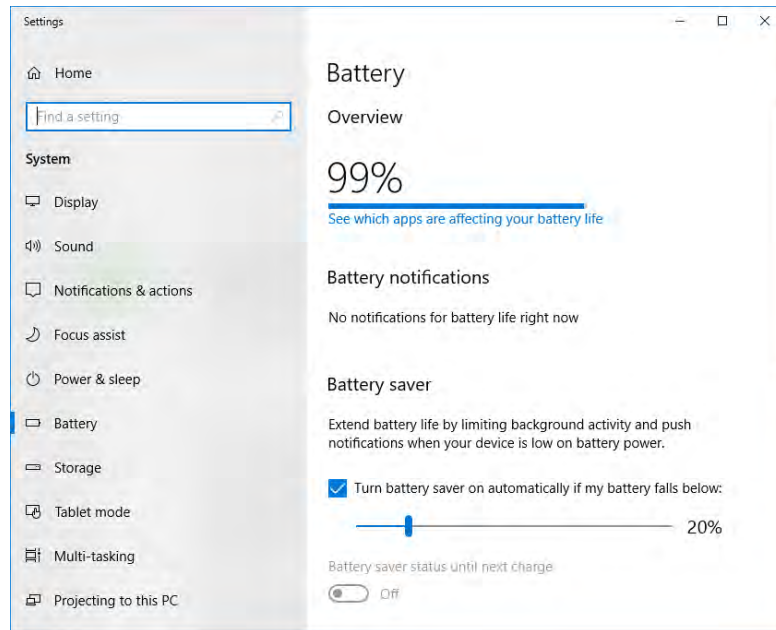Check the keyboard toggle switch.

Check power and input mode.

Check the resolution.
Look for updated drivers.
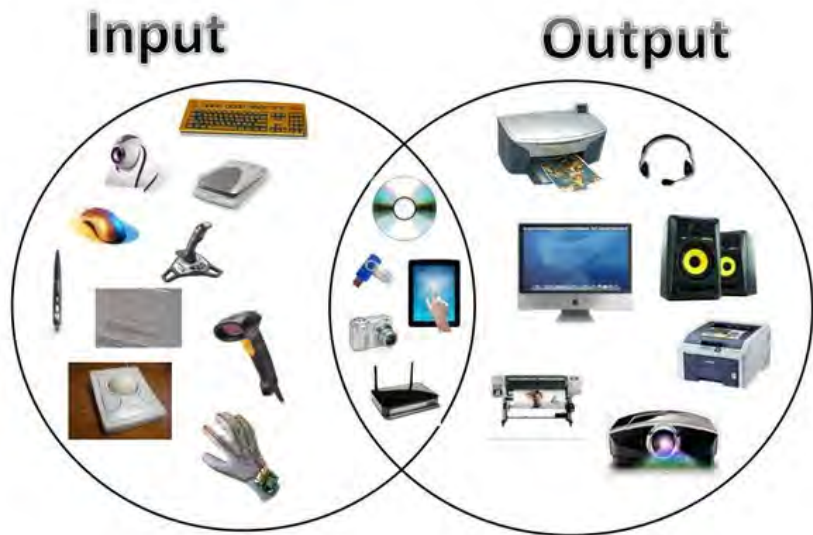
Swap out displays and cables.

40

Power and Cooling Issues

- Battery issues.
  - Verify proper insertion and clean contacts.

- Short battery life.
  - Windows 10 Settings app for battery use by apps.

- Swollen batteries.
- AC power issues.

- Overheating.
  - Dust and heat.
  - Lack of ventilation.

Input and Output Device Issues

- Input devices.
  - Stuck keys.
  - Improper or unintentional use of Fn keys.
  - NumLock use.
  - Oversensitive touchpad.

- Sound and speaker issues.
  - No sound.
  - Sound is distorted.

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Guidelines for Troubleshooting Input and Output Device Issues

- Clean the keyboard with compressed air.
- Check Fn key status.
- Check NumLock key status.
- Check drivers.
- Check volume control
- Check playback device configuration
- Check sound card.

Communication and Connectivity Issues

Connectivity:

- Physical issues and software configuration problems.
- Wireless devices need power.
- Issues can arise after laptop wakes from Sleep or Hibernation mode.
- Possible electromagnetic interference.

GPS and Location Services:

- No functionality.
- Limited functionality.
- Signal strength decreases when indoors.

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Troubleshooting Common Laptop Issues

- **A user complains that their Bluetooth keyboard, which has worked for the last year, has stopped functioning. What would you suggest is the problem?**

- **ANSWER:**
    - The batteries in the keyboard have run down—replace them.

Troubleshooting Common Laptop Issues

- **You received a user complaint about a laptop being extremely hot to the touch. What actions should you take in response to this issue?**

- **ANSWER:**
  - Overheating can be a sign that dust and dirt is restricting the necessary airflow within the device.

Troubleshooting Common Laptop Issues

- **You are troubleshooting a laptop display. If the laptop can display an image on an external monitor but not the built-in one**
- **Which component do you know is working, and can you definitively say which is faulty?**

- **ANSWER:**
  - The graphics adapter is working.
  - The problem must exist either in the cabling to the built-in screen or with a screen component.

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Troubleshooting Common Laptop Issues

- **A user working in graphics design has just received a new laptop. The user phones to say that performance with the graphics program in the office is fine but dismal when he takes the laptop to client meetings. What could be the cause?**

- **ANSWER:**
  - The laptop could be using reduced performance settings to conserve battery life.

Troubleshooting Common Laptop Issues

- **A laptop user reports that they are only getting about two hours of use out of the battery compared to about three hours when the laptop was first supplied to them. What do you suggest?**

- **ANSWER:**
  - New Battery - Batteries lose maximum charge over time.

Troubleshooting Common Laptop Issues

- **A laptop user is complaining about typing on their new laptop. They claim that the cursor jumps randomly from place-to-place. What might be the cause of this?**

- **ANSWER:**
  - The user could be touching the touchpad while typing, or vibrations could be affecting the touchpad.
  - Update the driver or reduce the sensitivity/disable touch and tap events.