

# Supporting and Troubleshooting Laptops

Use Lap Features



# Supporting and Troubleshooting Laptops

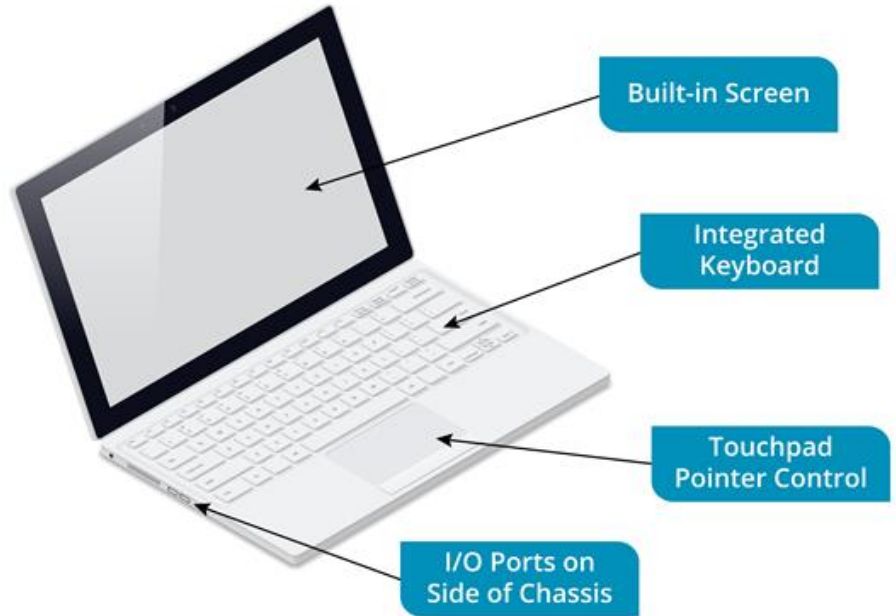
- Use Laptop Features
- Install and Configure Laptop Hardware
- Troubleshoot Common Laptop Issues

# 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.

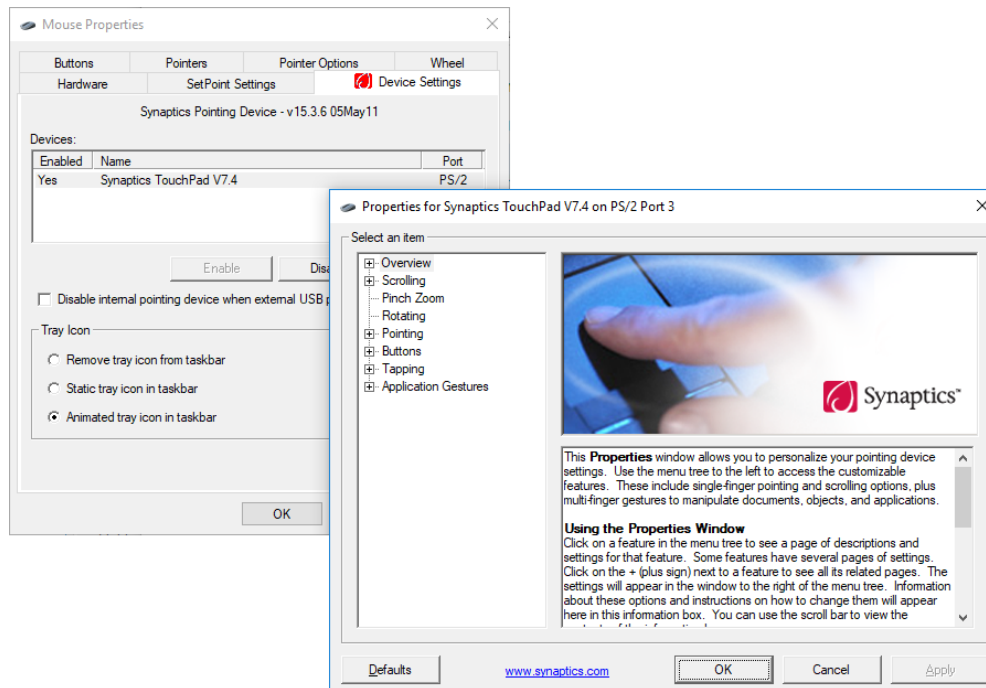


# Touchpads



**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.



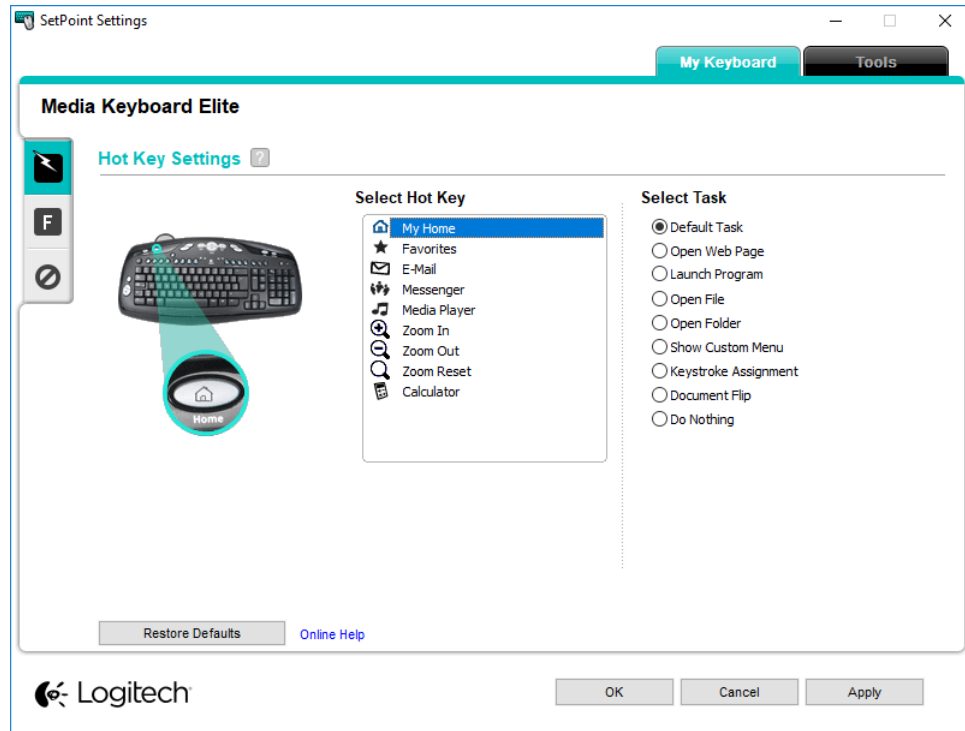
# Keyboards (Slide 1 of 2)

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



# Keyboards (Slide 1 of 2)

- Configured via the Keyboard applet in Windows.

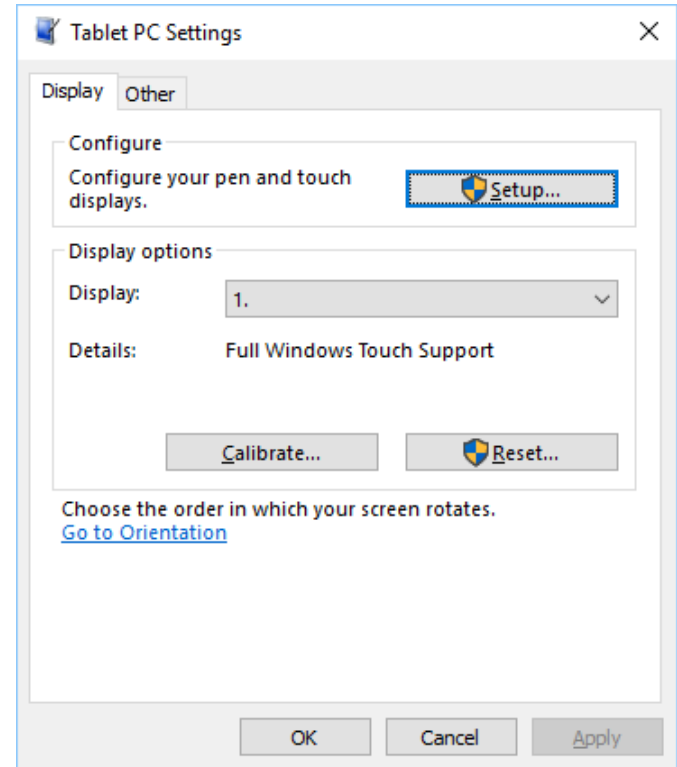


# Displays and Touchscreens (Slide 1 of 2)



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



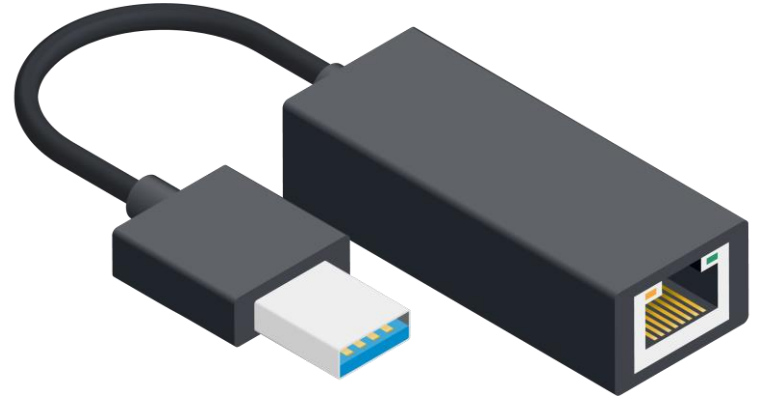
# Displays and Touchscreens (Slide 2 of 2)





# 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.



# Port Replicators



**Port replicator:** A simple device to extend the range of ports available for a laptop computer when it is used on a desk.

- Connects keyboards, monitors, mice, and network cabling to a laptop.
- Generally does not add new functionality.



# Docking Stations



**Docking station:** A sophisticated type of port replicator designed to provide additional ports and functionality to a portable computer when used at a desk.

- Can provide additional functionality.
- Media bay can support expansion cards or drives.



# Physical Locks

- Help prevent theft.
- Key-based or combination locks.
- Kensington locks and connection points.



# Activity



Discussing Laptop Features

# Supporting and Troubleshooting Laptops

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
  - Review manufacturer's service documentation before starting upgrades or repairs

# Laptop FRUs

- 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



# 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.

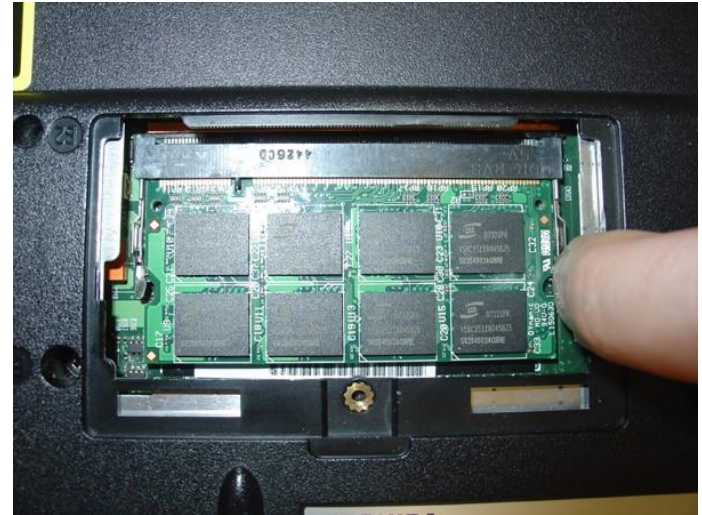


# Laptop RAM



**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.

# 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.

# Laptop CPU and Motherboard Upgrades

- CPU is upgradeable if the new device is supported by the motherboard.
- CPU is covered by a heatpipe.
  - Long, flat metal strip.
- Sometimes it's more economical to replace the system board.
  - Detach the stand-offs.
  - Probably also need to update chipset driver or notebook system software.
  - Allow Windows to discover the new device using Plug-and-Play.

# 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

# Laptop Display and Digitizer Replacement

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



# Laptop Speaker Replacement

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

# Laptop Input Device Replacement

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

# 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.



# Activity



Discussing Laptop Hardware Installation and Configuration

# Activity



## Installing and Configuring Laptop Hardware

# Supporting and Troubleshooting Laptops

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

# Display Issues

- 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



# Guidelines for Troubleshooting Display Issues (Slide 1 of 2)

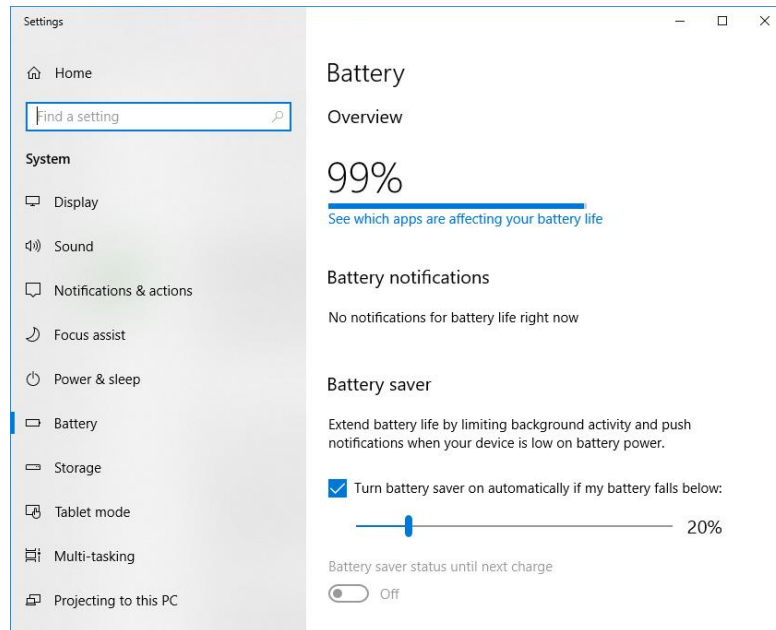
- Built-in displays:
  - Where does the problem really lie?
  - Check for physical damage.
  - Check the resolution.
  - Check the driver.
- Touchscreen displays:
  - Is it clean?
  - Check for physical damage.
  - Try using it in another location.
  - If recently serviced, are wires reconnected?
  - Check software configuration.

# Guidelines for Troubleshooting Display Issues (Slide 2 of 2)

- External displays.
  - Check the keyboard toggle switch.
  - Check power and input mode.
  - Check the resolution.
  - Look for updated drivers.
  - Swap out displays and cables.

# 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.



# Guidelines for Troubleshooting Power and Cooling Issues (Slide 1 of 2)

- Battery issues:
  - Follow manufacturer guidelines on charging.
  - Use approved chargers.
  - Avoid fire, water, drops, or other impacts.
  - Use recommended battery.
  - Use power management features.
- AC power issues:
  - Check and verify operational needs.
  - Test the outlet with known good devices.
  - Look for the LED on the AC adapter.
  - Check the plug's fuse.

# Guidelines for Troubleshooting Common Laptop Issues (Slide 2 of 2)

- AC power issues (continued):
  - Check the DC socket on the laptop.
  - Verify the adapter supplies adequate power.
  - Disconnect peripherals one at a time to see if power problems remain.
- Cooling issues.
  - Keep the air ducts clean.
  - Use compressed air to blow dust out.
  - Use computer vacuum to remove dust.

# 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.

# Guidelines for Troubleshooting Input and Output Device Issues

- Clean the keyboard with compressed air.
- If serviced recently, verify all cables were reconnected.
- Check Fn key status.
- Check NumLock key status.
- Check drivers.
- Check volume control, playback device configuration, sound card, and internal wiring.

# 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.



# Guidelines for Troubleshooting Communication and Connectivity Issues

- Check adapters, Fn keys, and antenna connections.
- Check batteries on wireless mice and other devices.
- Check for driver updates to address sleep mode issues.
- For intermittent connectivity, move the devices around or use an antenna.
- For GPS issues, verify it's enabled and not in airplane mode.
  - Also be sure individual apps have been granted permission to use location services.

# OS and App Issues

- Slow performance
- Unresponsive devices and apps
- Email issues

# Guidelines for Troubleshooting OS and App Issues

- For slow performance, check apps that require lots of memory.
- For unresponsive apps, perform a reset.
- For email issues, check the support documentation for the email client/encryption program to get certificate information.

# Activity



## Troubleshooting Common Laptop Issues

# Reflective Questions

1. In your professional experience, have you supported laptop computers? If not, what kind of experience do you have with using them?
2. Of the common laptop issues discussed in this lesson, which do you expect to encounter most often? Briefly explain your response.

