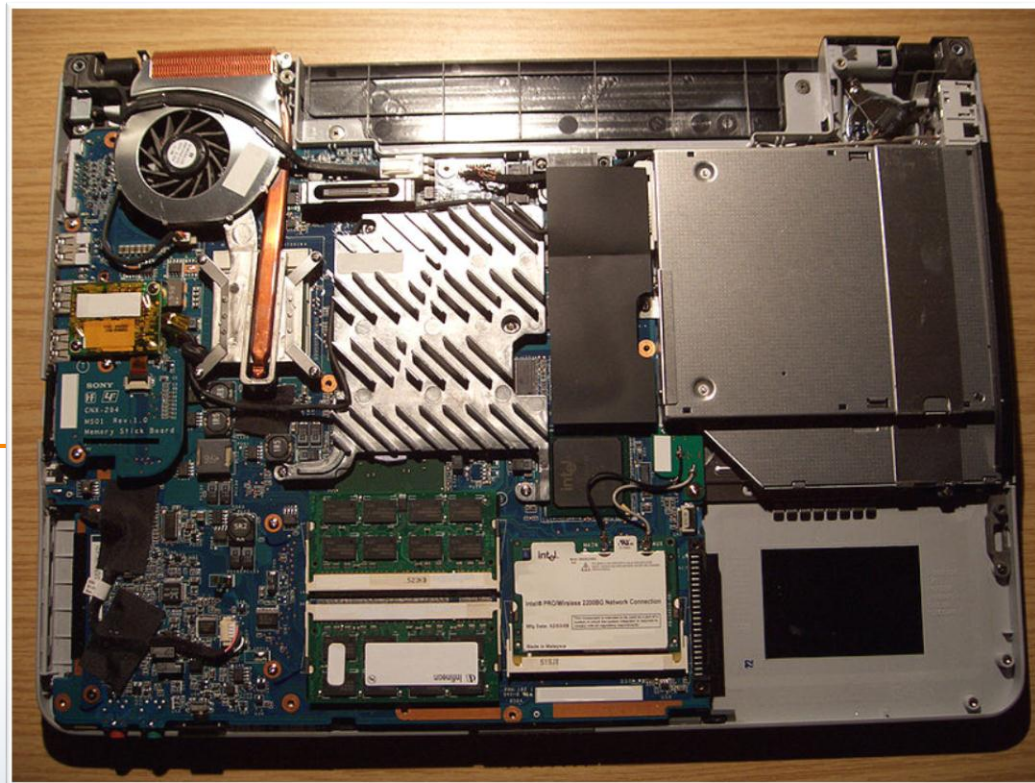


# LAPTOPS



- Laptop
- Hardware
- Input
- Power
- Display
- Motherboard
- CPU
- Hard Drive
- Memory
- Optical Drives
- Wireless NIC

- Laptop Expansion
  - PC Card
  - Express Card
  - Mini PCIe
  - Docking Station
- Laptop Locks
- Laptop Cooling

- A portable computer with a clamshell form designed for mobile use
- Has hardware that is similar to desktop and server computer
- Typically integrates a display, keyboard, touch pad/pointing stick, speakers, microphone, and web cam in one unit
- Can be powered by AC electricity or battery power
- Generally smaller than desktop computers

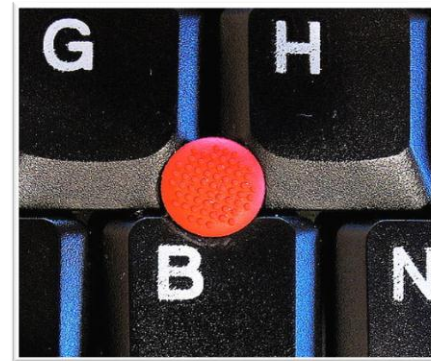
- Smaller devices are called
  - notebooks, subnotebooks,
  - netbooks, and ultrabooks
- 
- Keyboards are generally
  - smaller with less keys and keys
  - closer together



- Touchpads – replace mouse,
- used to move the mouse,
- includes R and L “mouse buttons”
- and scroll bar



- Trackpoint – eraser like head to
- move mouse





- Speakers integrated into the laptop case, various locations
- Battery – rechargeable Li-Ion, various sizes and capacities, usually inserted underneath or to the rear of the laptop case, DO NOT OPEN

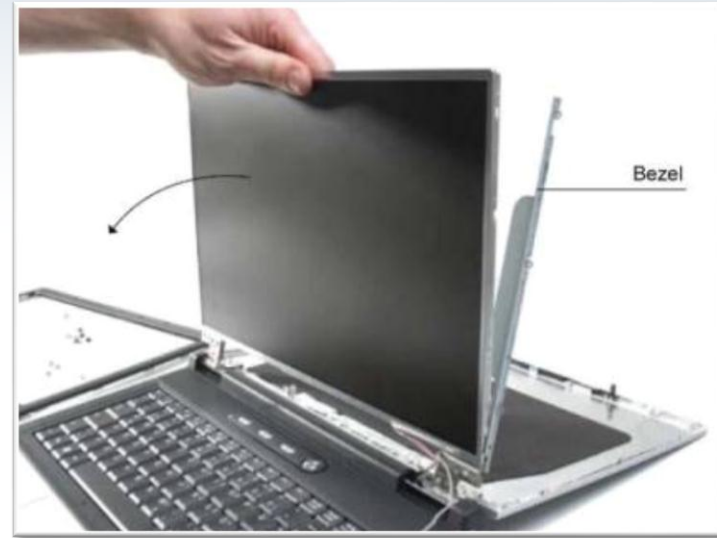


- DC Jack – connects to laptop power
- supply to power the laptop and charge
- the battery, jacks vary between
- manufacturers
  
- Power supply – converts AC power
- to DC power, power supplies vary
- between manufacturers

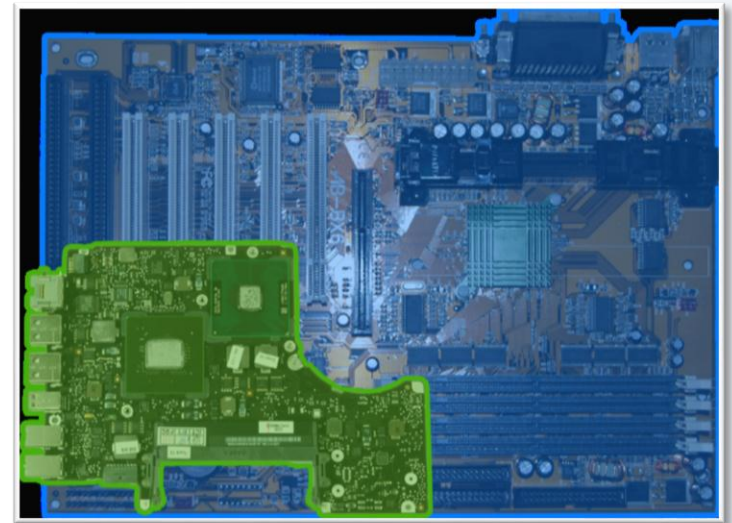




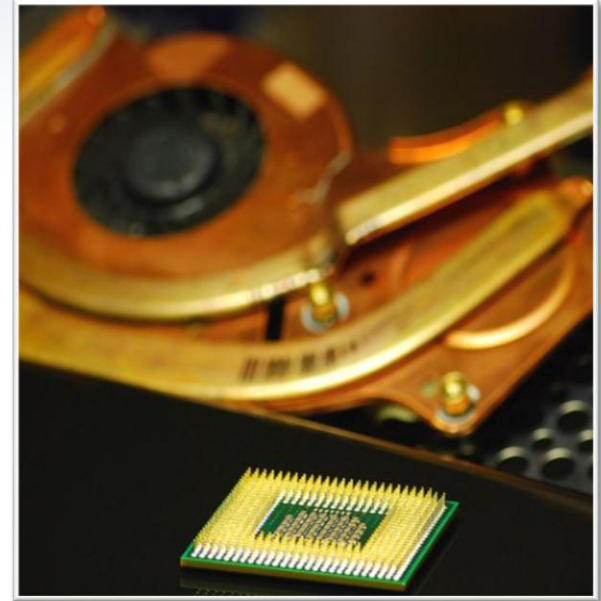
- Displays
  - Inverter DC to AC
  - Backlight
    - LCD
    - LED
    - OLED
    - Plasma
  - Wifi Antenna
- Resolution, size, clarity, energy efficiency is important



- Motherboard – very similar, much smaller, increased integration of components (USB, Firewire, Wifi, Bluetooth)
- Low power consumption
- Few expansion slots
- May have to replace motherboard to add functionality



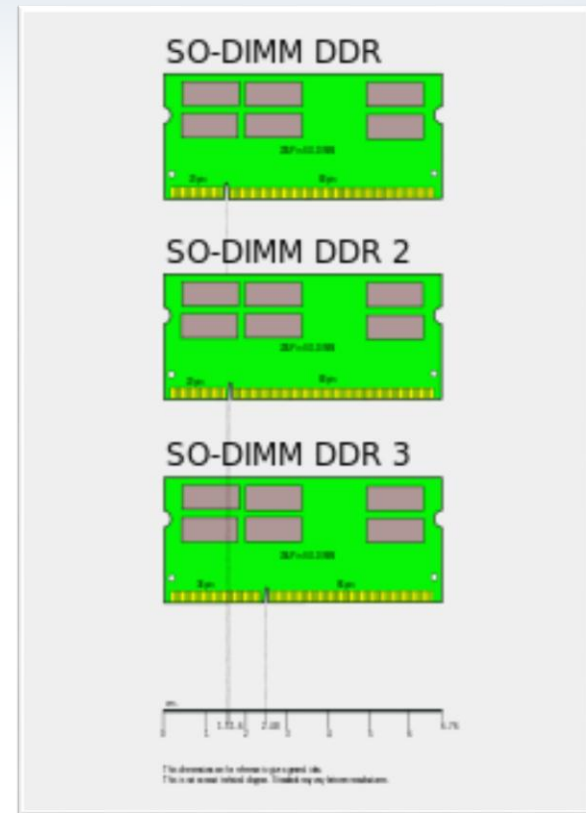
- CPU
  - Designed to use less power
  - Decreases CPU and bus speed to save power and maximize battery life
- Some are designed to be used with
- passive cooling
- Some may be soldered onto the motherboard



- Hard Drive
  - Use smaller 2.5 inch drives
    - Less storage capacity
  - Slower due to rotational speed
  - May be hard to access, varies
  - Use PATA and SATA
  - May have to use external storage (USB, Firewire, eSATA) to expand storage



- SO-DIMM
  - Small outline. ~1/2 size of DIMM
  - Decreased power consumption
- Some laptops use proprietary memory
- Some laptops allow RAM to be expanded/replaced
- Flash memory can be used





- Similar to full size
- Smaller
- Some laptops do not have an optical drive, such as Netbooks and Ultrabooks
- USB, Firewire external drives can be used



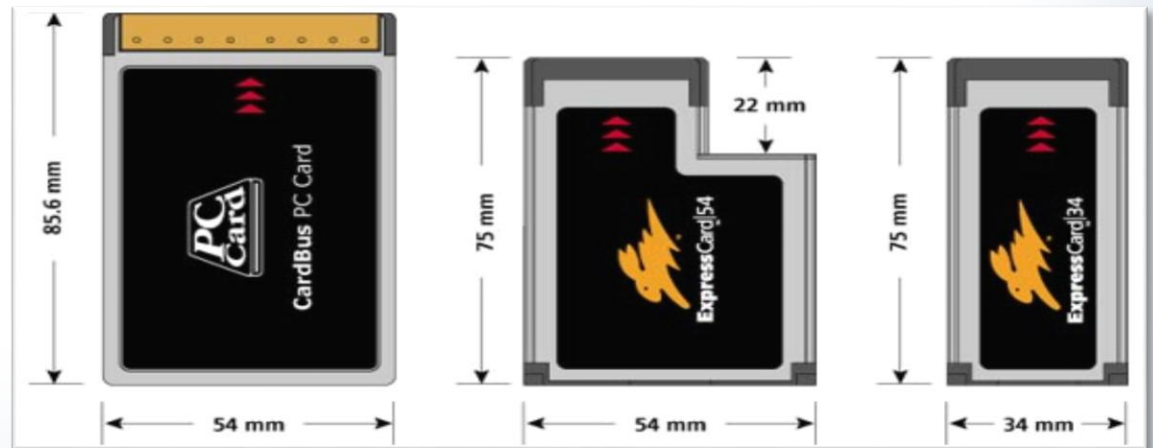
- Most laptops include a Wifi NIC
- Antenna for Wifi NIC is usually routed around the display
- Can be upgradable, varies
- May be integrated on the motherboard



- Aka PCMCIA – Personal Computer Memory Card International Association
- Credit card size
- Type 1: 16 bit, memory
- Type 2: 16/32 bit, use a dongle
- Type 3: 16/32, external hard drives



- Replaces PC Card
  - Lower power
  - Increased bandwidth
  - PCI Express and USB capability
- Smaller than PC Card
- Size: 34mm / 54mm



- Internal
- Used to increase communication capability
- Wifi cards are commonly connected via Mini PCIe
- USB capability





- Connects to laptop to provide additional connection ports and hardware capability
- Used when a laptop replaces a desktop
- Some allow expansion cards to be installed on the docking station
- Usually powers the laptop and charges the battery
- Connection port and features for docking station vary by manufacturer
- Not all laptops can connect to a docking station



- Due to portable nature, laptops are easily stolen
- Locks are usually attached to cables that attach the laptop to a large or hard immovable object
- Kensington lock port – the standard port that locks attach to on the laptop



- Laptops are designed to run cooler
- Active cooling by internal fans
- Cooling pads – sit under the laptop to protect the user from heat and to improve cooling
  - Active – fans
  - Passive – heat absorbing





# THANK YOU

---