



FUNCTIONS OF COMPONENTS OF A PERSONAL COMPUTER

Components of a personal computer - Summary

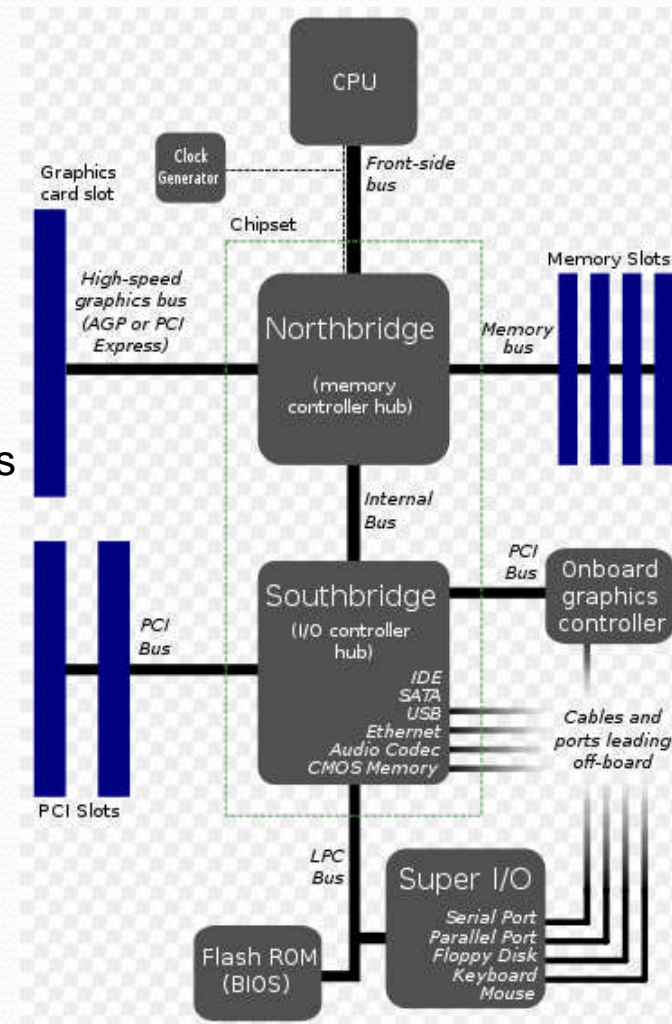
- **Computer Case – aluminium casing to store all components.**
- **Motherboard**
- **Central Processor Unit (CPU)**
- **Power supply**
- **Memory RAM**
- **Hard Disk**
- **VGA and Sound Card**
- **Input / Output Devices: ***
 - **Keyboard/Mouse, Webcam, Monitor, Printer, Scanner**
- **Removable Media Drives: ***
 - **CD/DVD/BlueRay Drive, USB drives, Floppy Disks.**
- **Software**

MOTHERBOARD

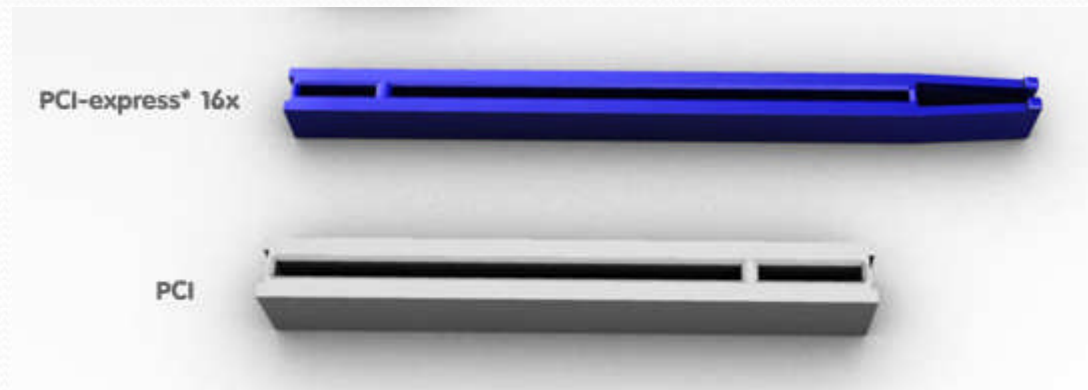
- The function of the computer motherboard is to act as the main circuit board that connects and communicates to all the devices and components attached. Most modern motherboards are using the ATX standard.
- The typical motherboard contains:
 - CPU Socket (for CPU to be inserted)
 - Chipset
 - Integrated peripherals
 - Peripherals card slots (AGP, PCI, PCI-e)
 - Memory Ram DIMM slots
 - IDE/SATA Hard disk interface slots
 - USB slots
 - PS/2 ports for keyboard, mouse.
 - Various electronic resistors, capacitors.
 - EEPROM chip that holds the BIOS Setup*
 - CMOS Battery
 - ATX Power Connectors



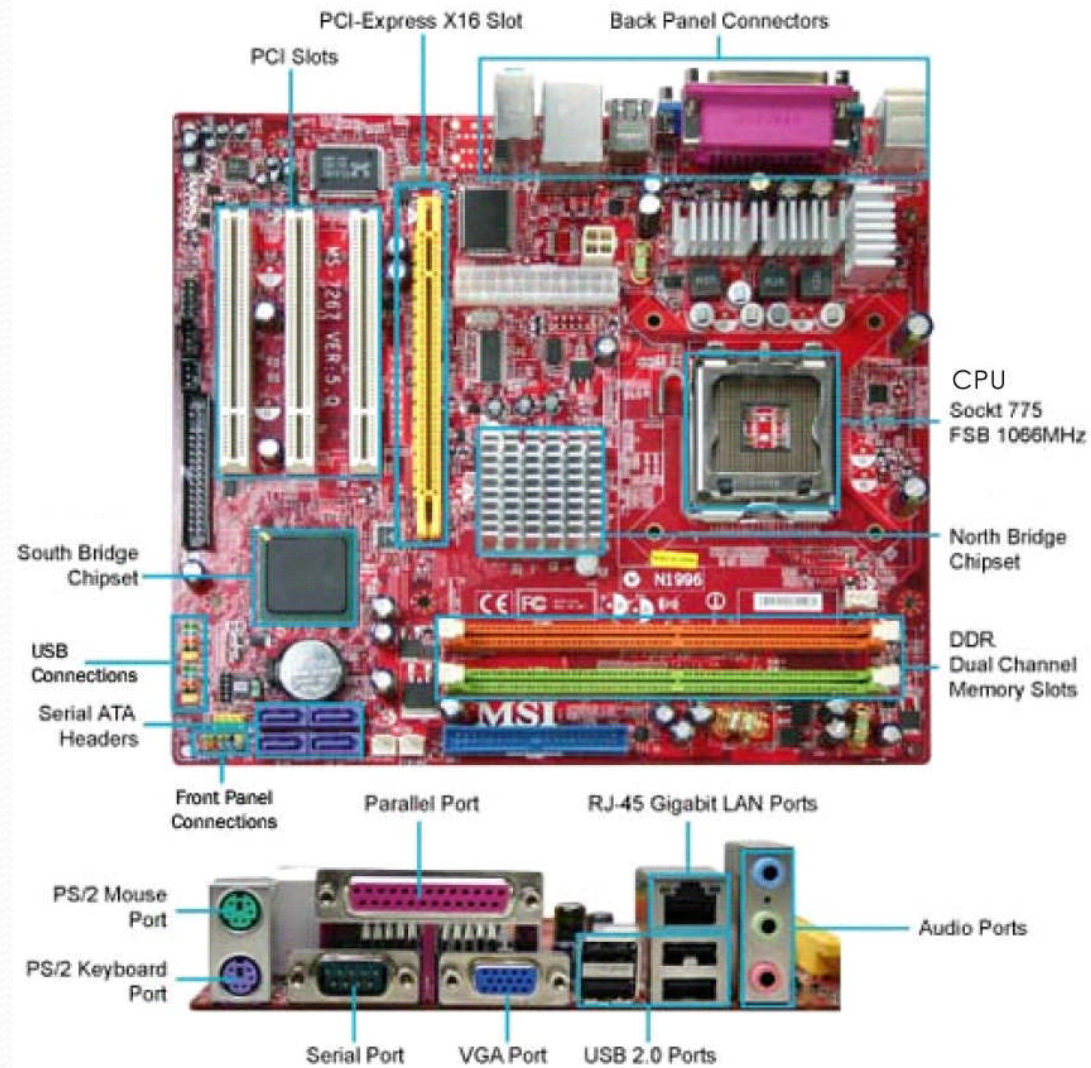
- The motherboard consists of multiple BUS types and split into two controllers, namely North bridge and South bridge.
- The North Bridge controller manages the **Internal buses** connecting to CPU, Graphic cards, Hard disks, Memory RAM and PCI-e slots.
- South Bridge I/O controller manages the **External bus** that support ports for other external peripherals such as USB ports, Firewire ports, eSATA, SCSI, PCI slots



- PCI-Express Slot designed exclusively for **graphics cards** which require large amounts of data to be passed to the north-bridge. It has 16x slot multiplies this speed by 16, giving a total speed of 4GB/s
- a PCI slot is much larger in both height and width, but the slot is shorter with less terminal pins. It is limited to 133MB/s, which is still fast enough for the majority of peripheral cards. Common example: **Wireless PCI card, Sound Card, Modem, Ethernet card (NIC)**



STANDARD LAYOUT OF A MOTHERBOARD



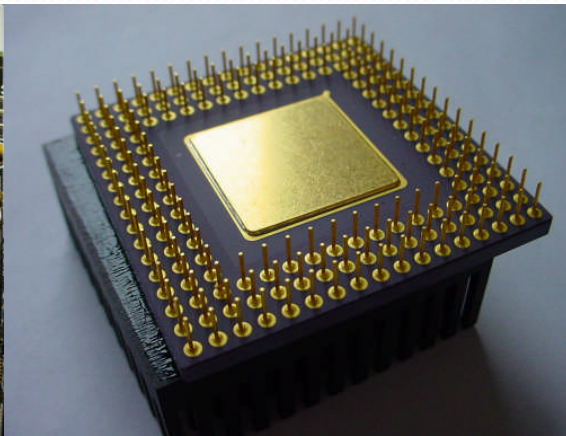
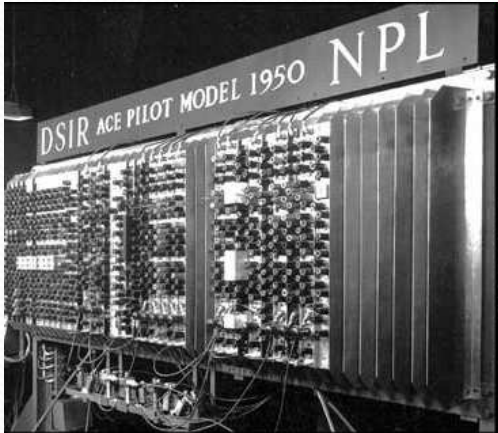
Central Processing Unit

What is the function of the central processing unit (CPU) ?

- A CPU is generally a single microprocessor made from a wafer of semiconducting material, usually silicon, with millions of electrical components on its surface. Standard CPUs contain processing units that decode and encode software instructions, perform arithmetic calculations and comparisons, make logical decision.
- A modern CPU is usually small and square with many short, rounded, metallic connectors on its underside. Some older CPUs have pins instead metallic connectors.
- CPUs require cooling as it can get hot during operation, therefore it requires a heatsink or a fan.
- The performance or speed of a processor depends on the clock rate (generally given in multiples of hertz) e.g. *Pentium 4 3.0Ghz*.

EXAMPLES OF A CPU* (Pentium, AMD)

What is your computer's processor and speed?





- **HARDWARE LAB ACTIVITY**

1. Find the nearest motherboard. Locate the CPU and PCI slots.
2. Are there any Northbridge and Southbridge controllers?
3. Is connecting a component device faster through PCI or USB ports?
4. Bonus Question: Can you find the EEPROM?

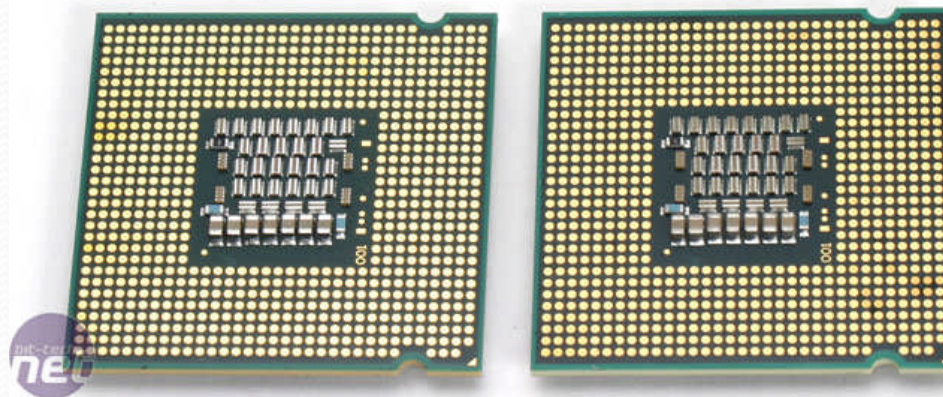
Power Supply Unit (PSU)

- **A power supply unit (PSU) supplies direct current (DC) power to the other components in a computer.**
- Modern PSU uses ATX Motherboard standard.
- Standard power connectors:
 - ATX connectors
 - Molex 4pin connectors
 - Serial ATA power connector
 - 6 pin connectors for PCI-e cards



Memory (CPU L1 and L2 Cache / Memory RAM)

- Memory is also known as primary storage, primary memory, main storage, internal storage, main memory, and RAM (Random Access Memory)
- **L1 cache and L2 cache memory is built-in to a CPU** and helps speed access to important and frequently-used data.



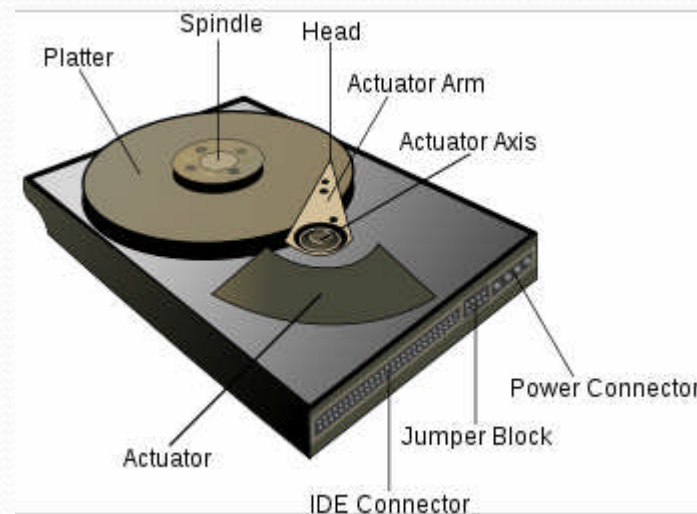
Memory RAM (Random Access Memory)

- a RAM provides temporary space for your computer to read and write data to be accessed by the CPU (central processing unit).
- The bigger the size of RAM, the faster data is retained and transferred. This is because larger data can be stored. E.g. compared with a 256mb RAM and a 1GB RAM. A 1GB RAM can hold almost 5 times more volatile data.
- A RAM also has different speeds of data transfer rate (measured in Mhz)*.
- Some common examples of a RAM:
 - SDRAM
 - DDR1, DDR2, DDR3

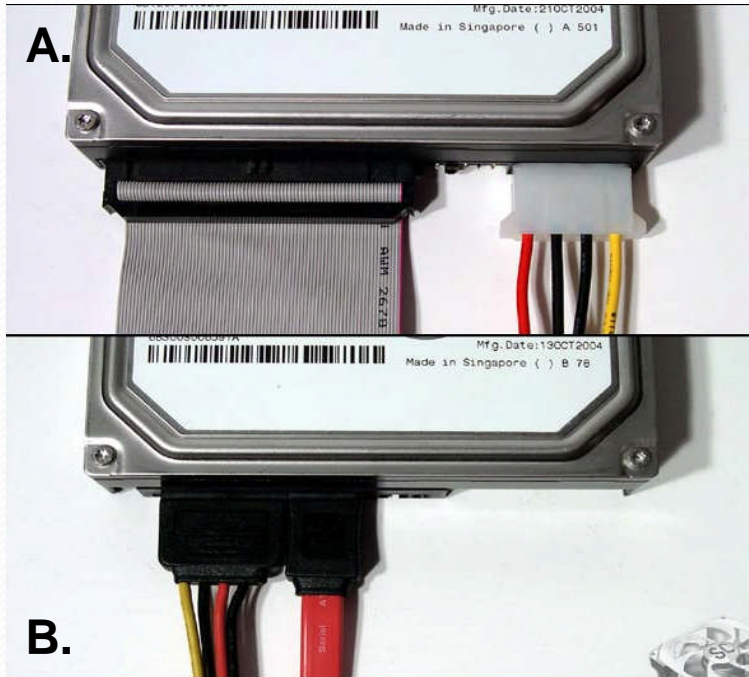


Hard Disk

- A **hard disk drive (HDD)**; also **hard drive** or **hard disk**) is a non-volatile data storage device.
- It features rotating platters on a motor-driven spindle within a protective enclosure. Data is magnetically read from and written to the platter by read/write heads that float on a film of air above the platters.
- Typical Hard disks has a 5400rpm or 7200rpm speed. (rotation per minute)
- Current desktop hard disks capacity ranges from 120 GigaBytes to 2 TerraBytes or more.
- Can either be 3.5" (desktop computers)
- Or 2.5" (laptop computers)
- What is a Solid State Disk (SSD)?

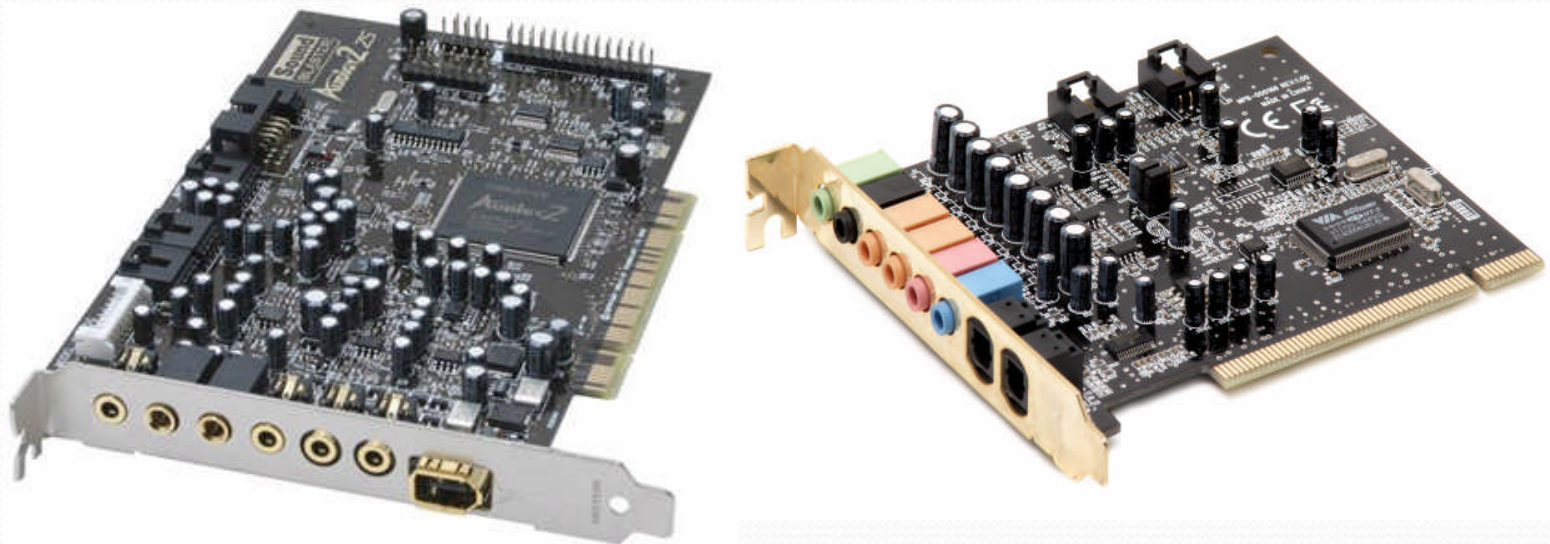


Which Hard disk is Parallel ATA and Serial ATA *?



Sound Card

- Sound card can be integrated into a motherboard or using an expansion PCI card, that facilitates the input and output of audio signals to and from a computer under control of computer programs.



Network Interface Card

- Is also called NIC, Ethernet Card, LAN card, LAN Adapter
- Can be connected to the motherboard either through PCI or USB interface ports.
- It is a computer hardware component that connects a computer to a computer network, and Internet. It can be wired (using cables) or wireless (WIFI *)
- Typically support transfer rate of 10 Mbit/s Ethernet, 100 Mbit/s Ethernet and 1000 Mbit/s



CD /DVD/BLU RAY ROMs

- Also known as optical drives, due to optical lasers used to read CDs.
- CD ROM * =
 - C**ompact **D**isc **R**ead-**O**nly **M**emory
- DVD ROM * =
 - D**igital **V**ersatile **D**isc **R**ead-**O**nly **M**emory
- a type of optical disk capable of storing large amounts of data
 - CDs can store 700MB (megabyte)
 - DVDs can store 4.7GB (gigabyte)
 - Blu-ray can store 25 to 50 GB *(gigabyte)
 - Why is it called a Blu-ray?



REFERENCES:

- Please check the blog for latest class exercise:
 - CSMMTSSR.WORDPRESS.COM