Computer Hardware

In this lesson, we will learn about Computer Hardware, so that we have a better understanding of what a computer is

1. Computer case

The **computer case** is the metal and plastic box that **contains the main components** of the computer. It houses the motherboard, central processing unit (CPU), power supply, and more.

Computer cases come in different shapes and sizes. A **desktop case** lies flat on a desk, and the monitor usually sits on top of it. A **tower case** is tall and sits next to the monitor or on the floor. The front of the case usually has an **on/off switch** and **one or more DVD/CD drive**

Power supply for your computer.

Built in ports on the motherboard.

-HDMI
-VGA
-DVI
-USB
-Ethernet/Network Port
-PS/2 keyboard/mouse

Expansion card Slots.

For:

-Network Card
- Sound Cards
- Graphic Cards

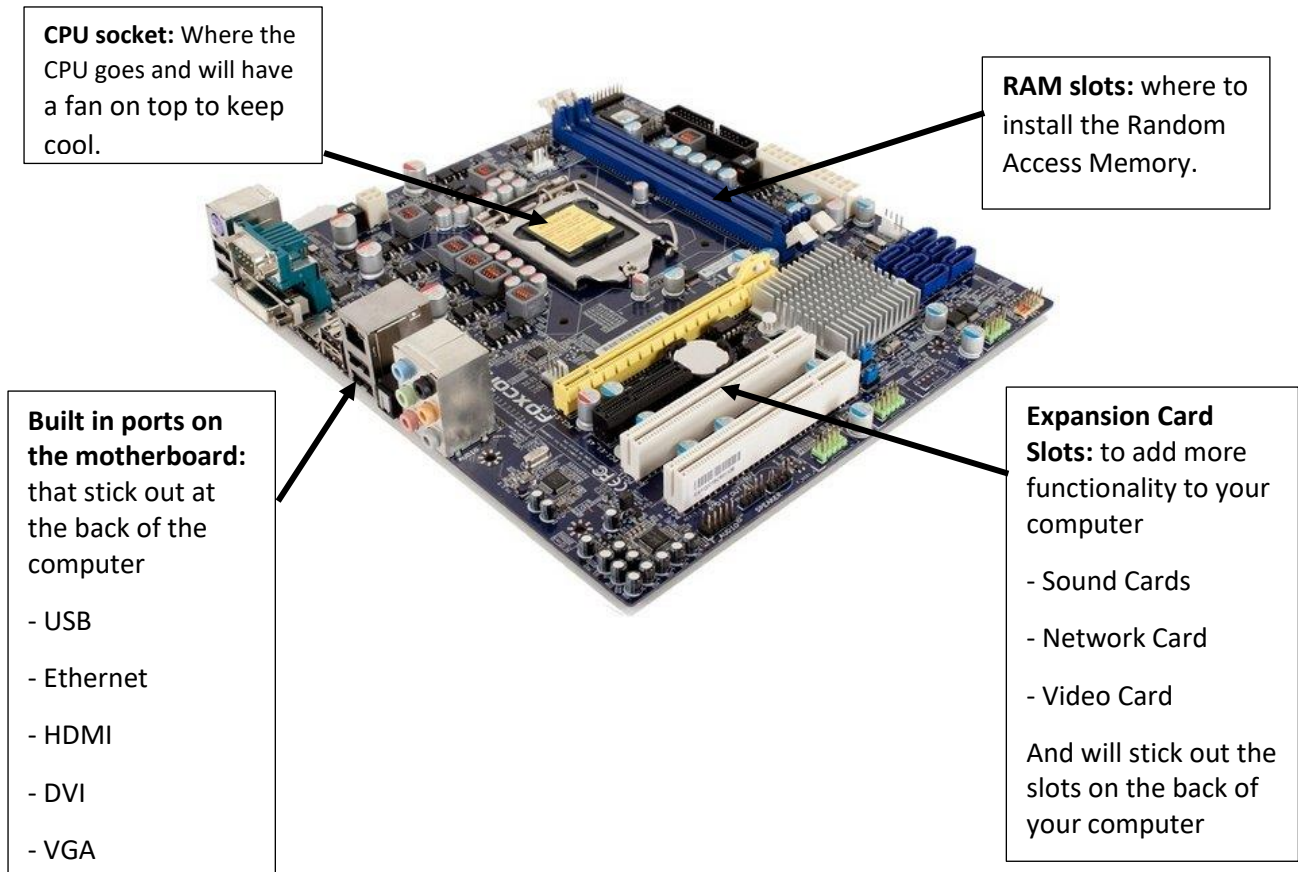To upgrade and add more functionality to your computer

2. Power supply unit

The power supply unit in a computer **converts the power** from the wall outlet to the type of power needed by the computer. It sends power through cables to the motherboard and other components.

3. Motherboard

The **motherboard** is the computer's **main circuit board**. It's a thin plate that holds the CPU, memory, connectors for the hard drive and optical drives, expansion cards to control the video and audio, and connections to your computer's ports (such as USB ports). The motherboard connects directly or indirectly to every part of the computer.

CPU socket: Where the CPU goes and will have a fan on top to keep cool.

RAM slots: where to install the Random Access Memory.

Built in ports on the motherboard: that stick out at the back of the computer

- USB

- Ethernet

- HDMI

- DVI

- VGA

Expansion Card Slots: to add more functionality to your computer

- Sound Cards

- Network Card

- Video Card

And will stick out the slots on the back of your computer

4. CPU/Processor

The central processing unit (CPU), also called a **processor**, is located inside the **computer case** on the motherboard. Sometimes called the brain of the computer and its job is to carry out commands. Whenever you press a key, click the mouse, or start an application, you are sending instructions to the CPU. The CPU is generally a **two-inch ceramic square** with a **silicon chip** located inside. The chip is usually about the size of a thumbnail. The CPU fits into the motherboard's **CPU socket**, which covered by the **heat sink**, an object that absorbs heat from the CPU.
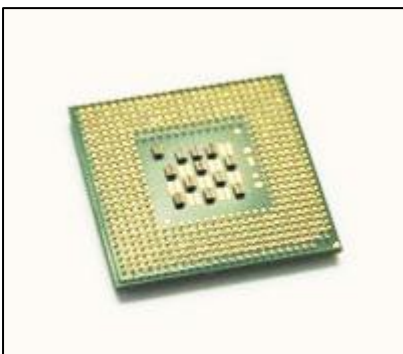
A processor's **speed** measured in **megahertz (MHz)**, or millions of instructions per second; and **gigahertz (GHz)**, or billions of instructions per second. A faster processor can execute instructions more quickly. However, the actual speed of the computer depends on the speed of many different components—not just the processor. There are many processor manufacturers for personal computers, but the most well-known ones are **Intel** and **AMD**.

5. Hard drive

The **hard drive** on your computer is where the software installed, and it is where your documents and other files are stored. The hard drive is long-term storage, which means the data is still saved even if you turn the computer off or unplug it.

The hard drive in the picture has had the top of its case removed. The Data is saved onto the round disks similar to how data is stored on DVDs and CDs.

When you run a program or open a file, the computer copies some of the data from the hard drive onto the **RAM**. When you save a file, the data is copied back to the hard drive. The faster the hard drive is, the faster your computer can start up and load programs.

6. RAM (random access memory)
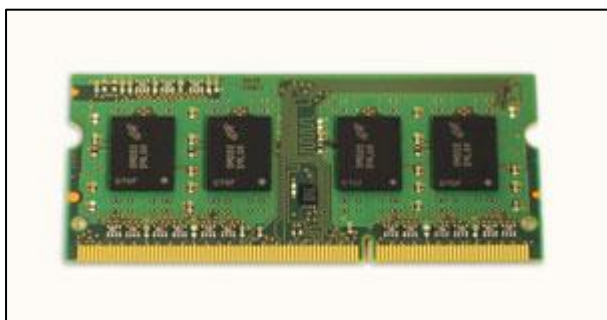
RAM is your system's short-term memory. Whenever your computer performs calculations, it temporarily stores the data in the RAM until it is needed.

This short-term memory disappears when the computer is turned off. If you're working on a document, spreadsheet, or other types of file, you'll need to save it to avoid losing it. When you save a file, the data is written to the hard drive, which acts as long-term storage.

RAM is measured in megabytes (MB) or gigabytes (GB). The more RAM you have, the more things your computer can do at the same time.

Tip: If you don't have enough RAM, you may notice that your computer is sluggish when you have several programs open. Because of this, many people add extra RAM to their computers to improve performance. Or you could just close some programs down and just run one program at once.

7. Expansion cards

Most computers have **expansion slots** on the motherboard that allow you to add various types of **expansion cards**. These are sometimes called **PCI (peripheral component interconnect) cards**. You may never have to add any PCI cards because most motherboards have built-in video, sound, network, and other capabilities. However, if you want to boost the performance of your computer or update the capabilities of an older computer, you can always add one or more cards. Below are some of the most common types of expansion cards.

8. Video card
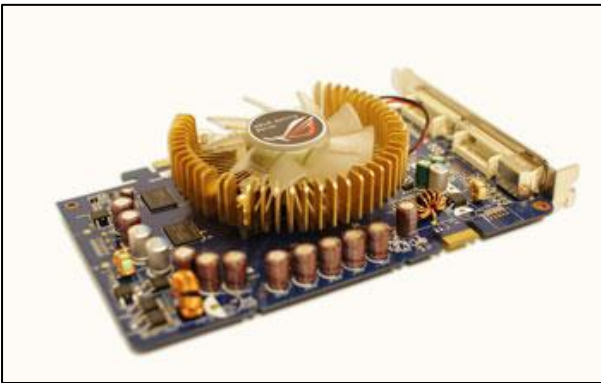
The **video card** is responsible for **what you see** on the monitor. Most computers have a **GPU (graphics processing unit)** built into the motherboard instead of having a separate video card. If you like playing graphics-intensive games, you can add a faster video card to one of the **expansion slots** to get better performance.

9. Sound card

The **sound card** also called an audio card is responsible for **what you hear** in the speakers or headphones. Most motherboards have integrated sound, but you can upgrade to a dedicated sound card for higher-quality sound.

10. Network card

The **network card** allows your computer to communicate over a network and access the Internet. It either can connect with an Ethernet Port or through a wireless connection (often called Wi-Fi). Many motherboards have built-in network connections, and a network card can be added to an expansion slot.

11. Ports and Connectors

USB Port

Universal Serial Bus (USB) is by far the most common port that is used with computers. As the name suggests Universal, has become the most common standard that most peripherals use today. A mouse, keyboard, flash drives, and even smartphones to upload your pictures.

USB Cable and Connector

USB cables and connectors are quite easy to identify, but also cables can supply devices with power from any computer and chargers for mobile phones also use them today.

However, there are other smaller USB connectors and cables as you can see below compared to the standard USB

Mini USB Port   **Micro USB Port**

Display ports

HDMI Port

High-Definition Multimedia Interface is a video/audio port you find them on most devices nowadays laptops, televisions, DVD players and media players.

HDMI is the best port to use for quality of the picture

HDMI Cable and Connector

Fast transfer rates, cables, and connectors are easily recognized.

DVI Port

Digital Visual Interface another high-resolution interface for high definition still popular on desktop computers but HDMI is preferred for its smaller form factor.

DVI connector and cable compared to the smaller HDMI connector and cable.
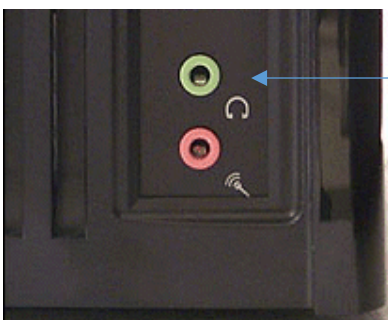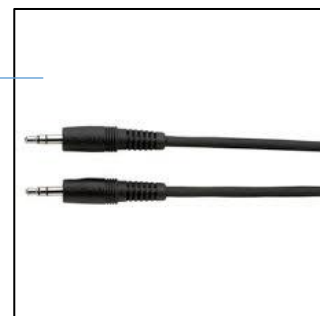
VGA Port and Connector

Older style port and cable you may find on some older computers.

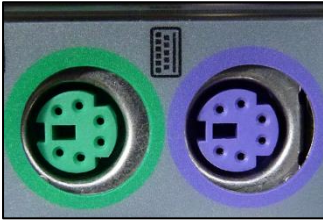Quality not as good and does not carry audio.

Connecting Headphones, Microphone

Identified by symbols.

Older keyboard and Mouse Port and Connectors

Older ports and connections for mouse and keyboard.

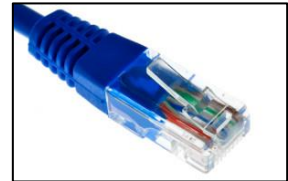Found on older computers, we mostly use USB now to connect mice and keyboards.

Networking Ethernet Ports

For connecting to the internet, a wired connection is always best for the reliability of data transfer but also for speed.

The cable and connector are easily recognizable with a clear head and you can see a lot of different colored wires inside.

The other end of the cable you would connect to a router. But a good option nowadays is wireless, the benefits are you can be more mobile and it is easier to setup.

Power Supply:

Notice all the cables coming out to supply power to all the different components.

CPU and Heatsink:

Heatsink is to keep CPU cool it runs at very high temperatures.

Expansion Cards:

In this example looks like they have a Graphics/Video Card in for better performance and gaming.

DVD/CD Drive:

This side is the front of the case where you can insert DVDS/CDs.

Hard drive:

Long term storage, where all your programs, pictures, files, folders and your operating system is kept.

RAM:

Random Access Memory is short term memory.

Programs that are currently running in RAM is much faster than directly accessing data from a hard drive.