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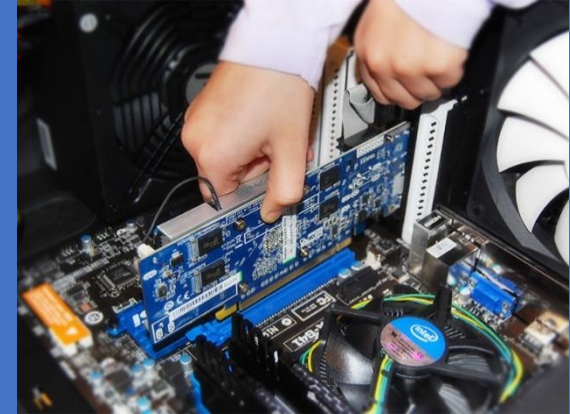


MODULE : INFORMATIQUE 1

Matériel informatique Computer hardware

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Computer hardware: the components of the computer



Description of the essential components for the operation of a computer. From the motherboard to the hard drive, discover what takes place in a PC

les composants de l'ordinateur

When we talk about a computer component or PC (Personal Computer), we are referring to the hardware located inside the computer, unlike external peripherals that are connected via cables or wireless communication means

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- 1.L'alimentation** - The power supply
- 2.Le processeur** - The processor (CPU - Central Processing Unit)
- 3.La carte mère** - The motherboard
- 4.La mémoire vive RAM** - RAM (Random Access Memory)
- 5.Le disque dur** - The hard drive
- 6.Le lecteur-graveur** - The optical drive (often used for reading and writing CDs/DVDs)
- 7.La carte graphique** - The graphics card (GPU - Graphics Processing Unit)

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These are the computer components that are described here in the simplest way possible to help you become familiar with the hardware of your PC: the power supply, the motherboard, the processor and its fan, RAM (Random Access Memory), the hard drive, the CD/DVD reader/writer, and finally the graphics card. We will not describe sound cards, network cards, USB ports, etc., as this type of hardware is not essential for the proper functioning of the PC and is often directly integrated into the motherboard.

L'alimentation



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Of course, even if you have all the components listed below, nothing will work without the electrical current supplied by the power supply. It transforms and provides the energy required for the valuable motherboard, to which a good number of elements are connected. However, the power supply is also directly connected to certain components such as the DVD reader/writer or the hard drive, for example.

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The transformation of current causes energy loss in the form of heat, so a ventilation system is installed in the power supply unit and expels air through the back of the computer case.

You can purchase a power supply unit separately, although it is often included with the PC case. A capacity of 400 watts is generally sufficient for "office configuration" computers, although some power supplies can reach up to 1000 watts for exceptional configurations.

La carte mère



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The motherboard lives up to its name.

It is the main component of your computer, the one that will "host" and connect all the others. Physically, first of all, because it is screwed to your PC case, and it also has connectors to accommodate dozens of components and peripherals.

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At the software level as well, because every piece of information sent or received by the hardware or a program inevitably passes through it.

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It's also on a small part of the motherboard where the ROM containing the BIOS is located, a small program that manages the "basic" hardware configuration and handles the connection with your operating system (Windows, Linux, etc.). These settings are retained in memory even in the absence of power, powered by the motherboard's battery.



Le processeur



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The processor also goes by several names; it is referred to as a microprocessor or CPU, which stands for Central Processing Unit in English. Its role is to process digital information, and it communicates only in binary digits or bits, a language composed of a sequence of 0s and 1s. It performs the calculations necessary for executing programs and instructions at a speed partly determined by its frequency, expressed in Hertz, or more commonly, in the case of modern processors, in Gigahertz (GHz).



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All this activity causes an increase in the temperature of the processor, especially when handling a large amount of information. That's why it is equipped with a fan on top of it, responsible for dissipating the heat and keeping it at the lowest possible temperature. In some machines with low-power processors designed for this purpose, cooling can be passive (without a fan). This is typically seen in ultra-mobile laptops.



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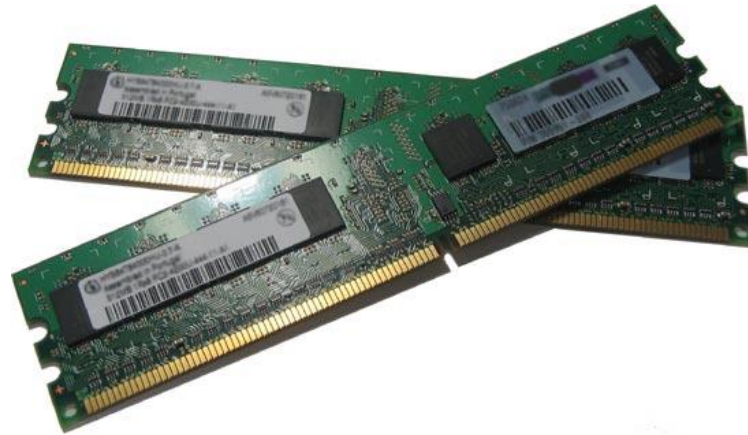


La mémoire vive "RAM"



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The Random Access Memory (RAM) is used by the processor to temporarily store data during their processing. One of the advantages of the memory used in computers is indeed its fast access speed.



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Another characteristic of RAM is that it is temporary; once the operation is completed, the data is not retained and is permanently lost when the computer is turned off.

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Several types of RAM memory exist. They come in "modules" ranging from 1 to 8 GB per unit (common configurations currently offer 4 to 8 GB of RAM). The choice of RAM depends on the processor, how you use the PC, and the capabilities of the motherboard (total capacity, available slots, etc.).

Le disque dur



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The hard drive is where the data you want to keep is stored. This includes virtually everything: the operating system files, software, and most importantly, your data such as photos, videos, music, emails, and more.

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You don't see the actual disk (platter) itself or the mechanical arm that holds the read/write head as shown in the illustration. Instead, it comes in the form of a rectangular enclosure, mounted inside the PC case. The faster the rotation speed of the platters, the higher the performance. Currently, you can find hard drives spinning at 5400, 7200, 10000, or 15000 RPM (Revolutions Per Minute), with speeds of 7200 and 10000 RPM being the most common.



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It is connected to the motherboard using a ribbon cable. A jumper, which is positioned at the back of the drive, allows you to designate it as the "Master" drive, which is the primary drive, or as "Slave," which is a secondary auxiliary drive.

Modern hard drives can indeed store hundreds of gigabytes of data, and some even have capacities in the terabytes, allowing for the storage of vast amounts of data.

Et/ou le SSD



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The hard drive was essential for the operation of a computer until recently, but now it can be replaced with an SSD (Solid-state drive).

SSDs allow data storage, just like hard drives, but their design and characteristics are different.

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Indeed, an SSD does not have a mechanical arm or rotating platters like a hard drive. It is constructed solely with solid-state electronic components, which is where it gets its name. Consequently, SSDs have several advantages. They are more resistant to shocks and lighter, making them an attractive choice for laptops. Additionally, they are significantly faster, which is advantageous for all types of computers, as the overall performance of components can be hindered by the mechanical action of a traditional hard drive.

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An SSD can completely replace a hard drive, but when significant storage needs are required, it's possible to use an SSD for the system and a traditional hard drive for storing large files. SSDs are indeed more expensive when compared in terms of equivalent capacity, and they are sometimes considered less reliable over time for long-term data storage. This is why many users opt for a combination of an SSD for faster system performance and a traditional hard drive for storing large files and archival data. This configuration provides a balance between speed and storage capacity.

Le lecteur/graveur CD/DVD



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The optical drive, or burner, is attached to the case and is inserted into an open slot on the front of the PC. This allows for the opening of the tray that receives the optical disc, more commonly referred to as a CD (Compact Disc) or DVD (Digital Versatile Disc). It is connected to the motherboard via a flat cable (ribbon cable).

La carte graphique



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The graphics card, although essential for certain purposes, is listed last in this description because it can be replaced by an integrated chipset (a set of circuits) directly on the motherboard. However, for some applications, especially gaming, it is indispensable. By handling the display management, it relieves the processor of this task, processes information on its own, and uses its dedicated memory, which can significantly improve graphics performance.

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The graphics card is inserted into a connector on the motherboard. Once connected, the inputs and outputs of the card are accessible from the rear of the computer case to provide an image to the monitor and/or to a television if it is equipped with the appropriate output.

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AMD Radeon RX 580

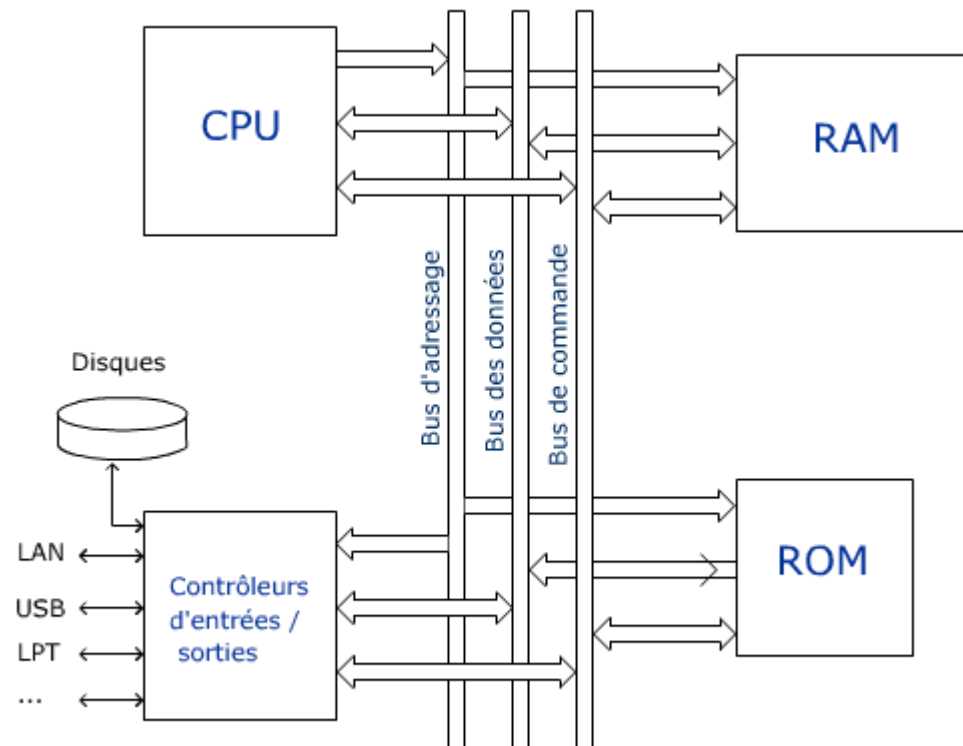


Nvidia GeForce GTX 1660 Ti

BUS

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The bus(es), a communication system between the components of a computer. They allow connecting the various functional parts of this computer to each other.



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In computer science, a bus enables the transport of information between different components of a computer. It can, for example, be used to connect the microprocessor to the central memory, storage devices, or peripherals. From a technical perspective, it consists of a set of wires (i.e., a ribbon cable) or "traces" on an integrated circuit.

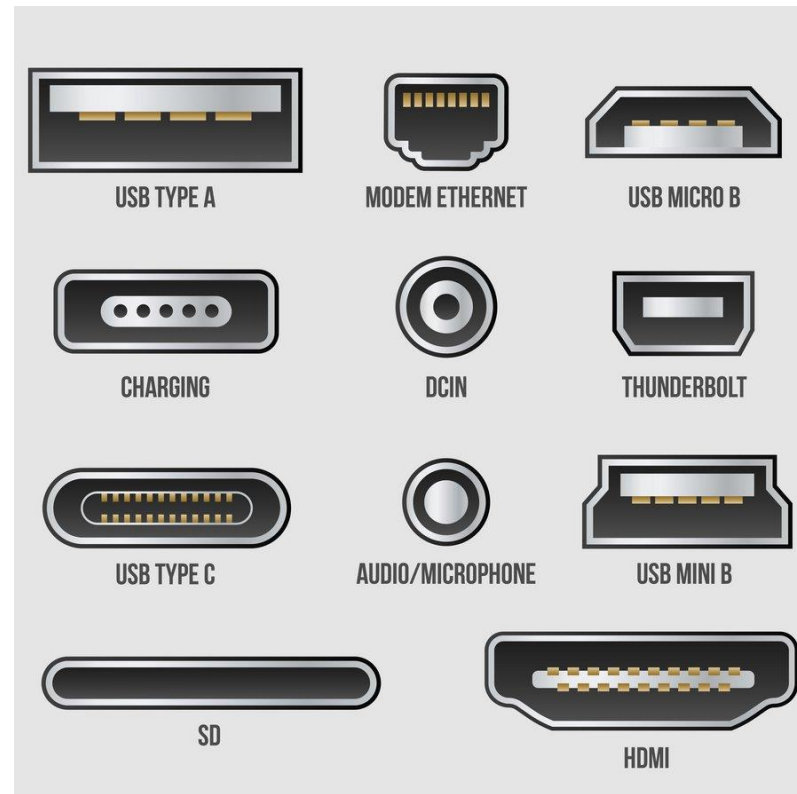
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Each of these traces allows for the conveyance of information in parallel. Therefore, their quantity influences the data transfer speed between the components of the computer. This is why, for example, we talk about processors in 32 bits or 64 bits (a bit is a binary number, meaning it's a fundamental piece of information that can travel on one of these wires at a given moment).

Entrées-sorties

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Input-output (I/O) devices: These are devices that enable communication with the outside world (USB, serial port, etc.).



FIN

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Other elements can also be considered as primary components, but they can also be found as peripherals (the second lesson: peripherals):

- Sound card
- Network card(s)...

All of these elements, once connected to the motherboard, make up what is called the central unit of the computer.