Motherboard Parts and Functions:

The motherboard is one of the most important parts of the PC, but as a tech enthusiast, you probably already know that. What you might not know, though, is the role played by each chip, port or slot present on a motherboard. A lot of people simply don’t care about these aspects, but if you’re the do-it-yourself type, knowing everything there is to know when it comes to motherboards can help you when it comes to troubleshooting, upgrading or even building your own PC.

Motherboard Basics

A computer has many components, each with their own roles and functions. The role of the motherboard is to allow all these components to communicate with each other. Considering the fact that all the other components are installed on the motherboard or connected to it, it is safe to say that the motherboard is the central piece of a PC, the component that brings it all together.
**Processor Socket**

The processor socket is the central piece of a motherboard, usually being located near the center of the motherboard. It’s also the central piece because it holds the processor – the brain of your computer.

**Power Connectors**

No computer component can operate without power, and a motherboard is no exception. The power connector, commonly a 20 or 24-pin connector, can be situated either near the right edge of the motherboard, or somewhere close to the processor socket on older motherboards. This is where the power supply’s main connector gets attached, providing power to the motherboard and all the other components.

Newer motherboards have an additional 4-pin or 8-pin connector near the processor, used to supply additional power directly to the processor.

**Memory Slots**

Located in the upper-right part of the motherboard, the memory slots are used to house the computer’s memory modules. The number of slots can vary, depending on motherboard, from 2, in low-end motherboards, all the way up to 8 memory slots, on high-end and gaming motherboards.

It is important to pay close attention to the type of memory a motherboard supports, in order to buy the appropriate memory modules. Newer motherboards support DDR3 memory, the current industry standard memory architecture, but motherboards with DDR2 memory slots and even DDR1 memory slots are still present on the market. An interesting aspect is that there are some older motherboard models that supported different types of memory, and usually come with two DDR1 memory slots and 2 DDR2 memory slots, or two DDR2 slots and two DDR3 slots. These motherboards were great options for people that wanted to upgrade a motherboard without having to upgrade all the other components as well.

The number of memory slots should be an important criterion to take into account when choosing a motherboard, as it will determine the maximum amount of memory you can install.
**Video Card Slot**

This is the type of slot that doesn’t need an explanation, as its name doesn’t leave much room for interpretation as to what its role is. Coming in the form of a PCI-Express slot on newer motherboards or AGP on older ones, the video card slot is situated right below the processor.

It is not uncommon for older motherboards, especially those that target the office segment, to lack this slot, meaning that you won’t be able to install a discrete video card, thus having to rely on the integrated one. At the opposite pole, high-end gaming motherboards come with multiple video card slots, allowing the installation of multiple video cards in a SLI or CrossFire configuration.

**Expansion Slots**

Expansions have the role of letting you install additional components to enhance or expand the functionality of your PC. You can install a TV tuner, a video capture card, a better soundcard, etc. – you get the idea. These ports are located under the video card slot, and come in the form of PCI slots (on older motherboards) or a scaled-down version of PCI-Express slots (on newer motherboards). Some motherboards come with both types of expansion slots. The number of slots is usually dependent on the format of the motherboard – larger motherboards (full ATX) have more, while smaller formats (micro-ATX) have fewer, if any.

**IDE and SATA Ports**

IDE and SATA ports are used to provide connectivity for the storage devices and optical drives. The IDE interface is somewhat outdated, so you shouldn’t be surprised if you see a lot of new motherboards coming without this type of port. It was replaced by the smaller and much faster SATA interface, which currently reached its 3rd revision, being able to achieve maximum speeds of up to 600 MB/s, as opposed to the IDE interface, which can reach a maximum of 133 MB/s.

It is not uncommon for manufacturers to include SATA ports of different revisions, such as two SATA2 ports and two SATA3 ports. Considering the fact that most optical drives on the market come with a SATA connector, and these devices are not bandwidth-hungry, using a SATA2 port for an optical drive is perfectly acceptable. In fact, most mechanical hard drives cannot achieve
SATA3 speeds due to mechanical limitations, so unless you plan to use multiple high-performance solid state drives in your PC, which can benefit of the higher speeds of SATA3, a combination of SATA2 and SATA3 shouldn’t make much of a difference.

**BIOS Chip and Battery**

The BIOS chip contains the basic code needed to take your computer through the boot process, up to the point where the operating system takes over. Since the BIOS code is stored on a memory chip that needs constant power to function, a battery is also present to keep the chip powered when the computer is unplugged.

**Northbridge and Southbridge**

If you have a look at your motherboard, chances are you’ll see a square metal component somewhere in the lower-right part of the board. This metal component is actually a heatsink, and its role is to provide thermal protection for the Northbridge – one of the most important components of a motherboard. The northbridge is responsible for coordinating the data flow between the memory, the video card and the processor. A secondary chip, known as Southbridge, has a similar function, coordinating the data flow between the processor and peripherals such as sound cards or network cards.

**Front Panel Connectors, USB Headers and Audio Header**

The front panel connector is where all the elements present on the front of your case are connected. Power button, reset button, power led, audio connectors and USB connectors – they are all connected to the front panel or the corresponding headers.

**Rear Connectors**

These connectors are the bridge between the outside of your computer and the inside. The name is a bit misleading, as the connectors are actually located on the left edge of the motherboard; however, since these connectors are accessible from the outside, the name simply implies where they are accessible from – the rear of the PC case. External peripherals such as keyboard, mouse, monitor, speakers and so on are all connected via these connectors.