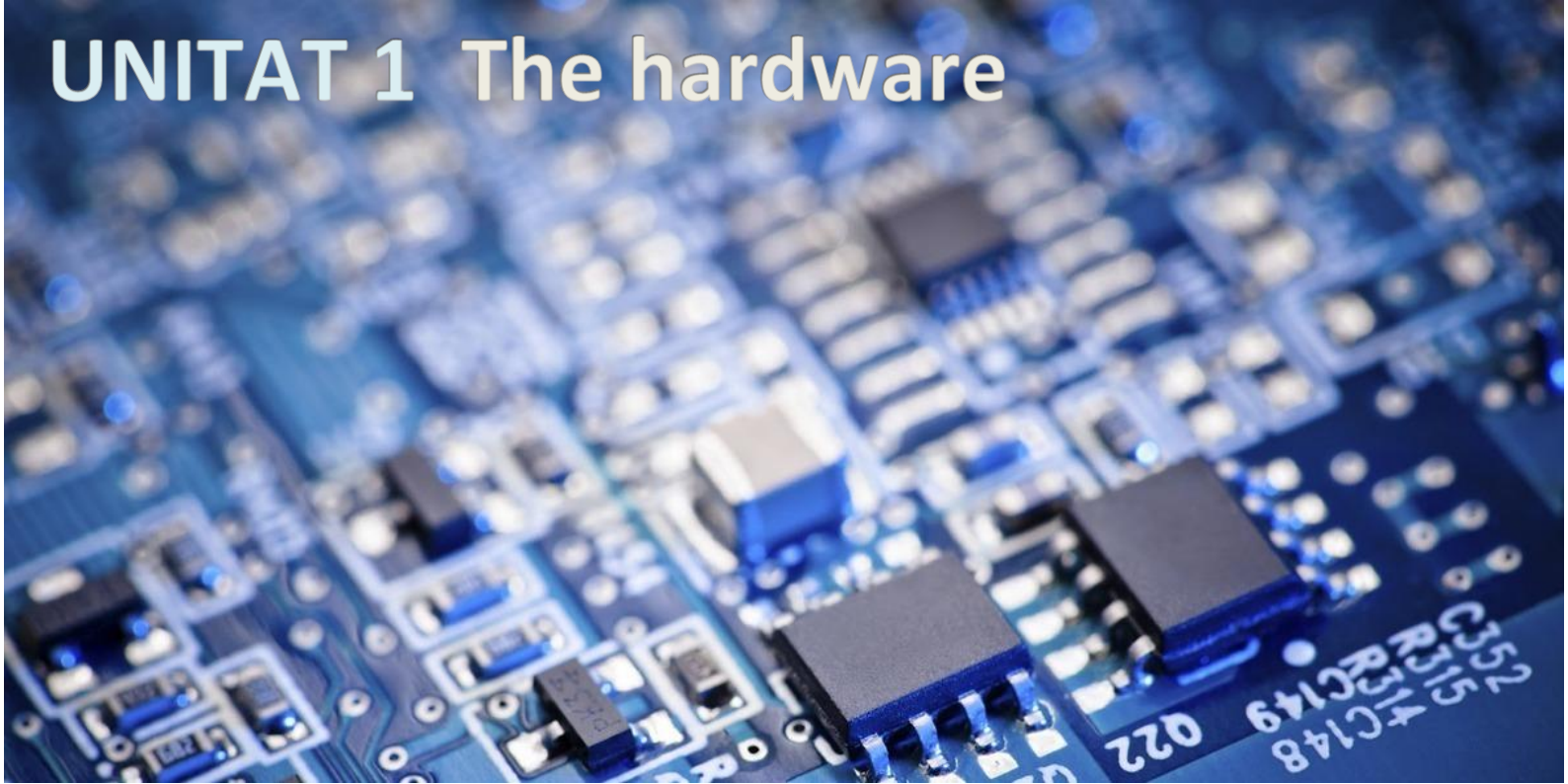


UNITAT 1 The hardware



1. Types of computer

According with its size, there are four general types of computers: Supercomputers, Mainframes, Servers and PCs.

- **Supercomputers** are machines with a large capacity to calculate and process and they can be many square meters wide. They are used by big corporations and centers of investigation.
- **Mainframes:** are big and powerful computers. They are a few meters wide and they are specialized in a specific task. They are used by big corporations and governments..
- **Servers** are powerful and very versatile machines. Their function is give services to other computer systems (called clients). Examples of servers include those used for: e-mail, files and web pages.
- **PCs.** There are laptops and desktops. Nowadays pcs have evolved so quickly that they are almost as powerful as a server..

2. Parts of the computer

PC is an electronic device composed, physically, of many electronic circuits, and many other components and accessories. In computers we distinguish two types of components:

- **Hardware:** the physical part of the computer, like circuits, cables, etc. Hardware is the general name for all the component parts of the computer we are going to study in this unit.
- **Software:** the logical part of the computer (applications, programs, operative systems). We'll study this in the next unit.

Hardware components

- **CPU** (Central Processing Unit): the components located in the case of the computer. It is equivalent to the brain of the computer and it is the place where all the information is processed.
- **Peripherals:** all of the devices which are connected to the CPU like speakers, monitor, mouse, etc.

2.1. The CPU

Central Unit, commonly known as box, or CPU, also serves to save and protect the components of the computer. Inside of the Central Unit will find the main components of a computer:

- Motherboard
- Processor
- RAM memory
- Hard drive
- Expansion card

2.2. The peripherals

The computer **peripherals** are the components that connect to the CPU. Examples include speakers, the screen, the mouse, etc. According to the direction in which digital information is being sent, the peripherals are divided into three types: Input, Output and Input-and-output.

- **Output peripherals:** Digital information goes from the CPU to the peripherals. For example, in the case of a screen, the image is sent from the CPU to the screen..
- **Input peripherals:** Digital information goes from the peripherals to the CPU. An example is the keyboard. The text that we type is sent from the keyboard to the CPU.
- **Output and input peripherals:** Digital information goes in both directions. An example is a pen drive, to which you can write information (output), but the CPU can also read information (input).

3. Components of a computer

3.1. Components of a computer

If you open a computer, you will see a large amount of cables and other components. We want to know how these cables and components make a computer work!

The components of the computer can be divided into three types:

- **Electrical Support Components:** Provide the energy necessary for all of the computer components to work correctly.
- **Electronic Components:** Perform specific tasks.
- **Buses and Connectors:** Join the different components.

3.2.1. Electrical components

The **power supply** brings the electricity needed by all the components of the CPU. How does it do that? The power supply is connected directly to the electricity source (an outlet or a battery) and it transforms into a direct current. From the power supply cables with connectors take power out in voltages of 5 and 12 V.

3.2.2. Electronic components

The motherboard

The **motherboard** is the concentrator component used by the computer to connect and communicate many of its components, such as the CPU, the memory, and the peripherals.

Parts of the motherboard

- **The chipset:** a base on which the processor is attached.
- **The RAM memory slot:** the place where the module of RAM memory is connected to the motherboard.
- **PCI slot:** the place where a PCI card is connected to the motherboard.
- **AGP slot:** the place where a video card is connected to the motherboard.
- **Input-output connectors:** used to connect input and output peripherals.
- **CMOS battery:** a battery to power the motherboard.
- **Disk drive connectors:** to connect disk drives to the motherboard (IDE or SATA)
- **BIOS:** memory module where the computer configuration is stored.

The processor

The **processor** is the most important component of the computer. It is an electronic circuit that works as the Central Processing Unit, controlling all the calculations of the computer. The processor is located over the chipset and it becomes very hot, above all if the work load is high; because of that it needs a metallic heat sink with a fan or another form of refrigeration. The processor will spike in the chipset on the motherboard.

Processor speed

The processor incorporates a clock that marks the rhythm of work generating electrical impulses. For each promotion, the processor performs an operation. The processing speed is measured in GHz; a processor to 4 GHz receives 4000 millions of pulses each second.

The processor heats up a lot, specially if the work load is very high; for this reason, the processors have a metallic dissipator with a fan or another way of refrigeration.

Most of the processors you can buy are made by two brands:

- Intel
- AMD

The memory

The **memory** allows the computer to save and retrieve information. As we saw before, the memory can be permanent (even when we turn off the computer, the information remains) or temporary (when we turn off the computer the information is deleted).

Examples of temporary and permanent memory are:

- **Temporary memory:** the most common are the RAM memory modules.
- **Permanent memory:** flash memory (pen drives, memory cards), most types of magnetic computer storage devices (e.g. hard disk drives, floppy disks), and optical discs (CDs, DVDs, bluray disks).

Expansion cards

Expansion cards provide a computer with extra functions or they can improve quality or performance of the computer. Expansion cards must be connected to specific places called slots. The slots in desktop computers are called PCI or AGP.

Laptop's expansion cards

In most modern computers (especially laptops) these expansion cards are directly integrated into the motherboard. This makes the computer cheaper to produce, and the computer has less components (which means better ventilation and less probability of breaking components), however, the quality of these components is not always as good as in a non-integrated expansion card.

3.3. Buses and connectors

- **Bus:** The cable or line (circuit) through which a digital signal is transported. This signal contains information that goes from the motherboard to the peripherals, or vice versa.

Drive Buses

- **IDE bus:** Until recently, this was the most used to connect the hard drive or CD/DVD drives to the motherboard. Now the IDE bus has been replaced by the SATA bus, which is faster.
- **SATA bus:** The type of bus currently used for its speed.
- **AGP bus:** The type used to connect graphics cards; now these are outdated.

Buses of the expansion cards

Bus AGP: The most used until now to connect graphics cards to motherboard.

Bus PCI/PCIexpress: Used by the rest of the cards. Today, the video cards uses the PCIexpress bus.

- **Connector:** The mechanism that allows us to connect a device to the motherboard or to an expansion card.

- PS2
- Serial port
- Parallel port
- USB
- Firewire
- Ethernet
- Modem
- In/out
- Microphone
- VGA/SVGA
- S-Video
- DVI
- HDMI