AF_IC05_ Motherboards
Unit 1

Contents

Introduction

In this unit, you'll be able to know and identify **motherboards**. A motherboard is the most important **component** of a **computer**. That's why you'll have to identify the different types of motherboards, to identify its components and to know its functionalities. In addition, you'll find out what are the different and all the additional elements that can be plugged into the motherboard such as expansion cards and peripherals associated with the motherboard connectors.

In order to do this Unit **Internet access** is a requirement.
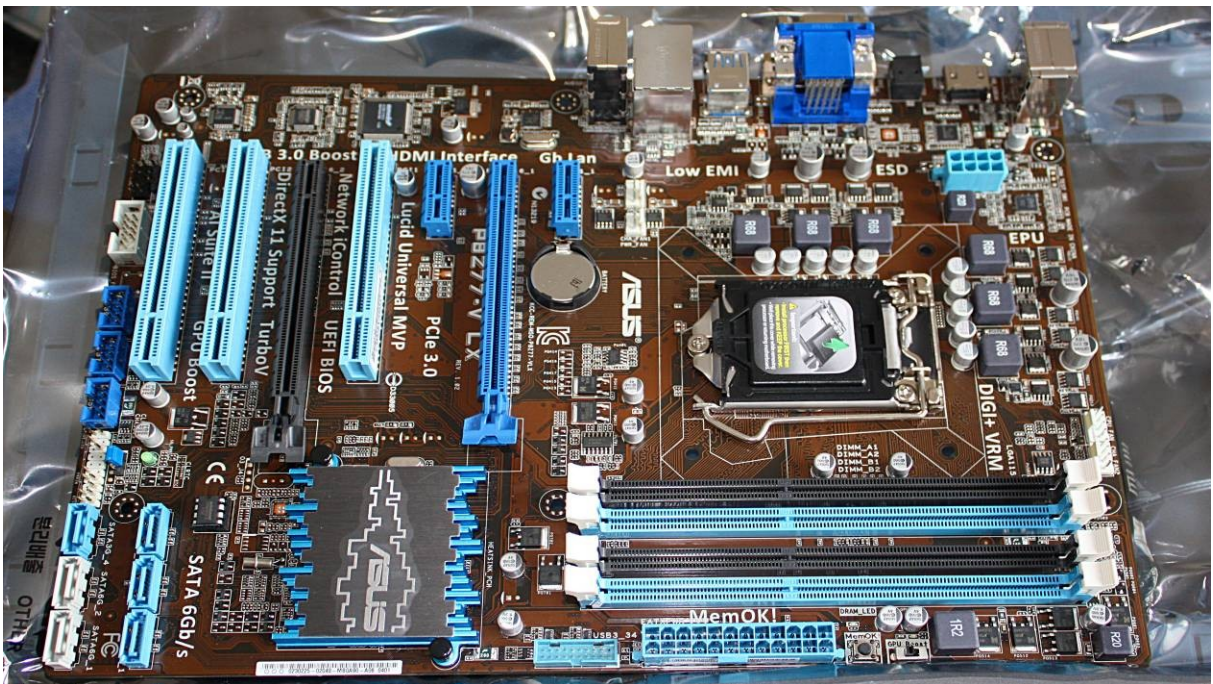
Author: Graham White

Glossary

Visit these webpages, you will learn and listen to some words related to the motherboard:

 [Quizlet activity about motherboard components and form factors](#)

 [Quizlet activity about motherboard components and other computer parts](#)

Form factors

As you know there are different computer sizes, so there are different **motherboard sizes**. These two types of computers don't have the same motherboard size:

Author: Espen Klem

Author: Jamie McCall

Common standards:

The most common motherboard **standards** are:

- ATX
- Micro-ATX
- Mini-ITX

Author: viagallery.com

TO KNOW MORE

@ http://www.computerhope.com/jargon/f/formfact.htm

@ http://en.wikipedia.org/wiki/Computer_form_factor

@ http://www.buildcomputers.net/motherboard-form-factors.html

ATX

Size: 305 × 244 mm

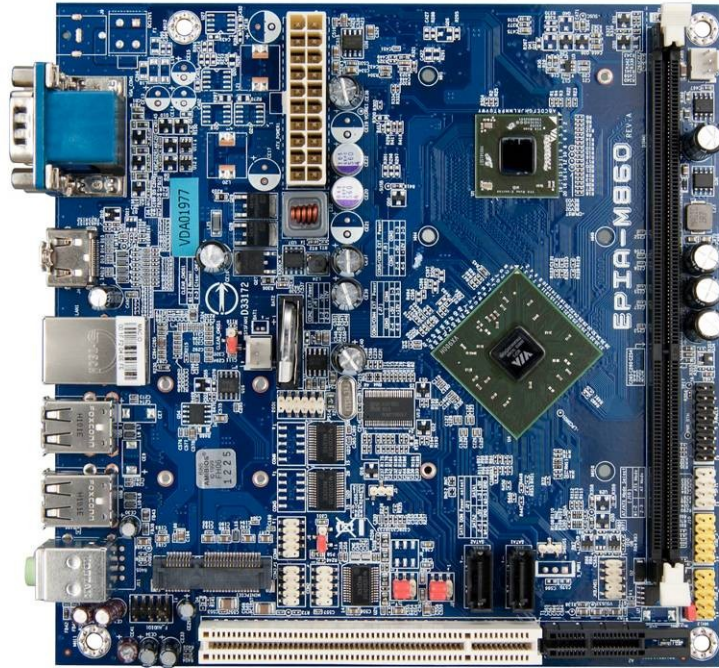*Author: Mike Saechang*

Micro-ATX

Size: 244 x 244 mm

Author: Iwan Gabovitch

Mini-ITX

Size: 170 x 170 mm

Author: viagallery.com

Motherboard components

A motherboard has a lot of components, but the main components are:

- CPU socket
- Memory slots
- Chipset
- Expansion slots
- Power connector
- Input/output connectors
- Internal connectors
- Case connectors
- Jumpers
- Battery

In this webpage you can see some of these components:

@ https://www.thinglink.com/scene/500608713455828992

TO KNOW MORE

@ http://computer.howstuffworks.com/motherboard1.htm
@ http://en.wikipedia.org/wiki/Motherboard

CPU socket

As you have learned before, CPU is one of the main computer components.

The CPU is connected to the motherboard using the CPU socket. As you can imagine both of them must have the same socket version.

In these images you can see two different sockets, the first one is for Intel processors and the second one AMD processors.
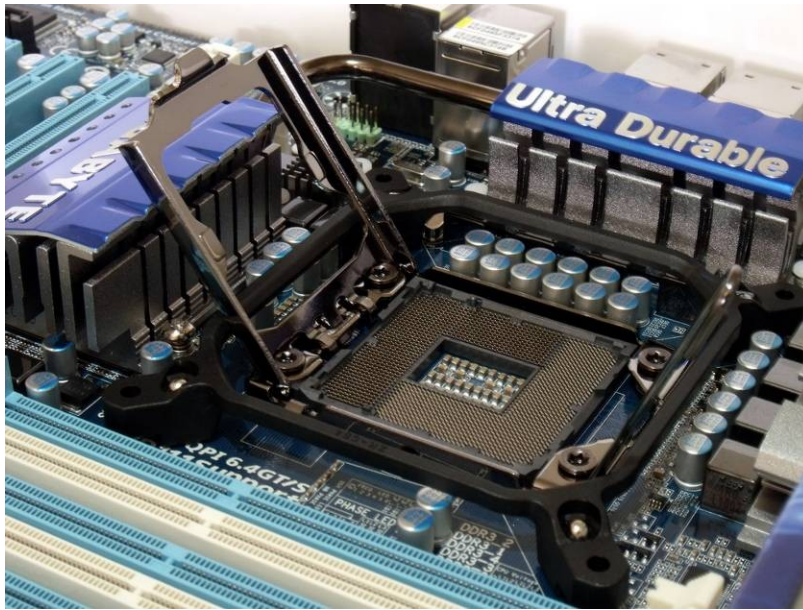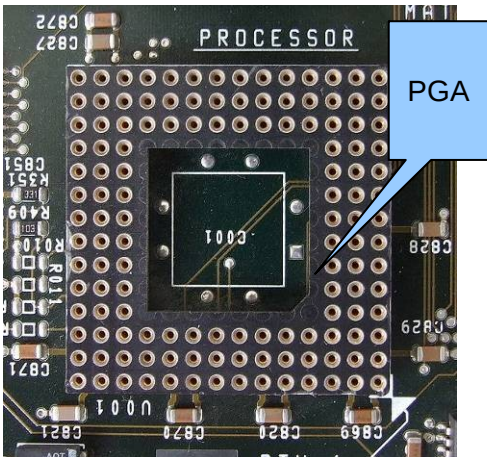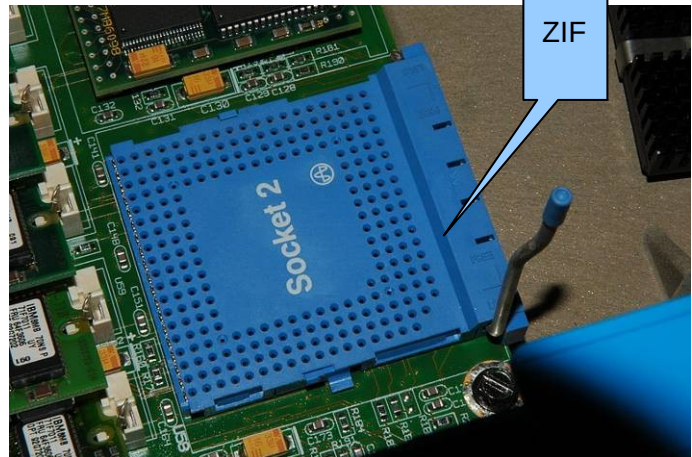

Author: pc_gamer
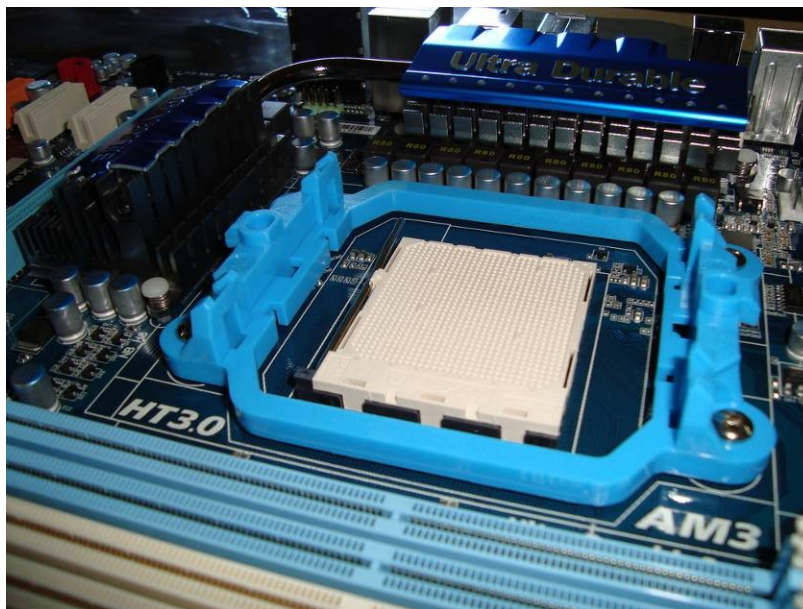
Author: Mike Babcock
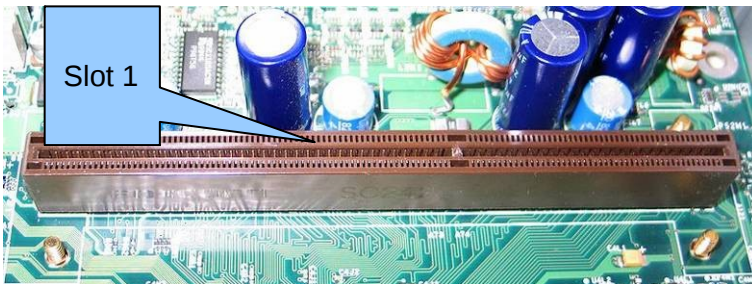
There are different types of CPU sockets:

- PGA (Pin Grid Array): old Intel 386 and 486
- ZIF (Zero Insertion Force): common type nowadays used by AMD and before by Intel.
- Slot 1 and Slot A: special socket used in some Pentium III and AMD K7 Athlon.
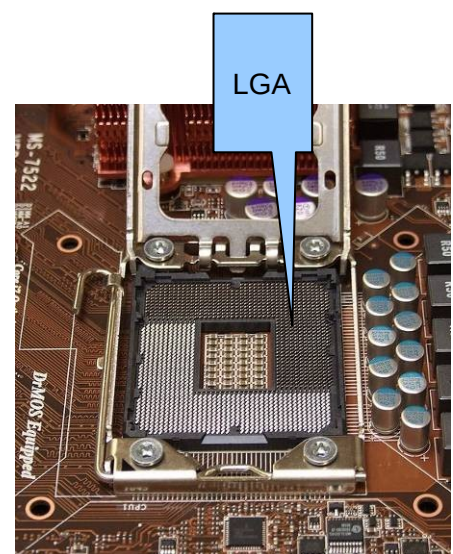- LGA (Land Grid Array): common type nowadays used by Intel.
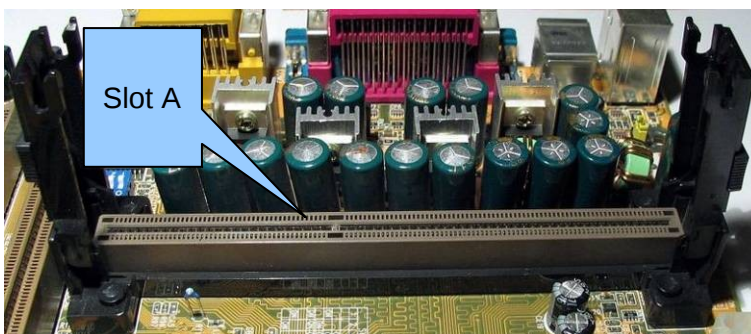

Author: Appaloosa

Author: Joshua Biggs

Author: Chris S

Author: Appaloosa

Author: Appaloosa

TO KNOW MORE

@   http://en.wikipedia.org/wiki/CPU_socket

Memory slots

As you know, RAM memory is one of main computer components.

Memory modules (RAM) are connected to the motherboard using the memory slots. Like CPU socket, both of them must have the same slot version and a compatible frequency.
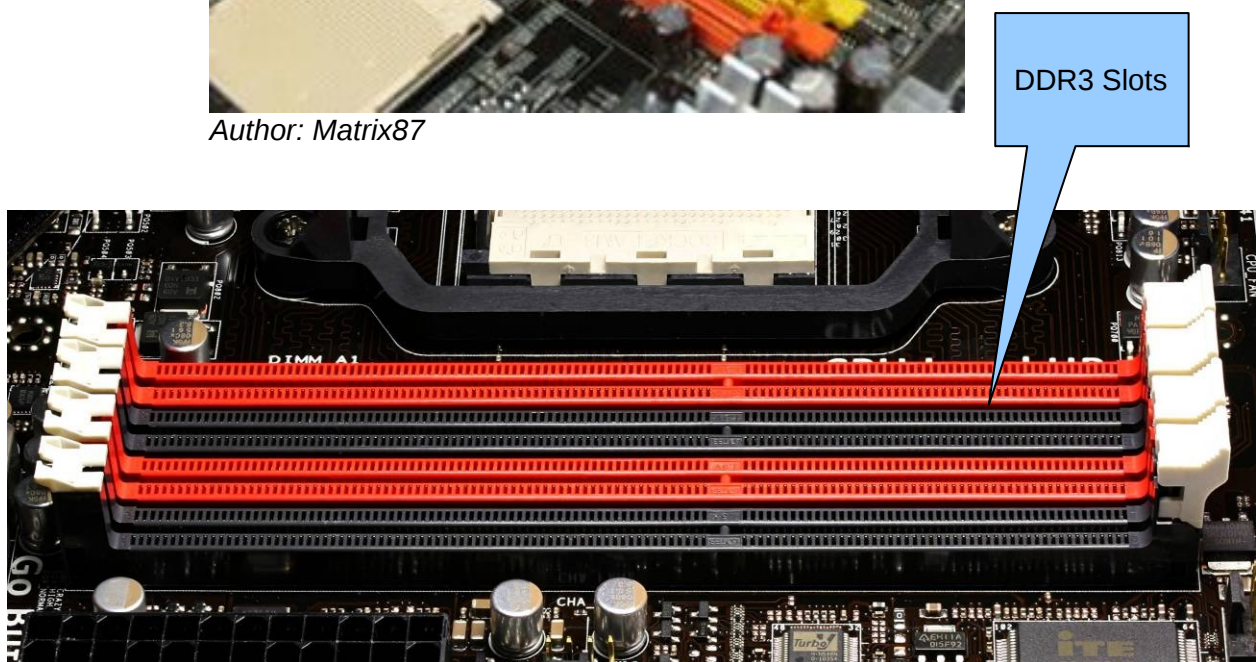
They are called DIMMs (Dual Inline Memory Module) because they have contacts in both sides (dual).

As you learned before, there different type of memory modules and they have different number of contacts:

- SDRAM: 168 pins
- DDR SDRAM: 184 pins
- DDR2, DDR3 SDRAM: 240 pins
- DDR4 SDRAM: 288 pins

DDR3 Slots

Author: Matrix87

DDR3 Slots
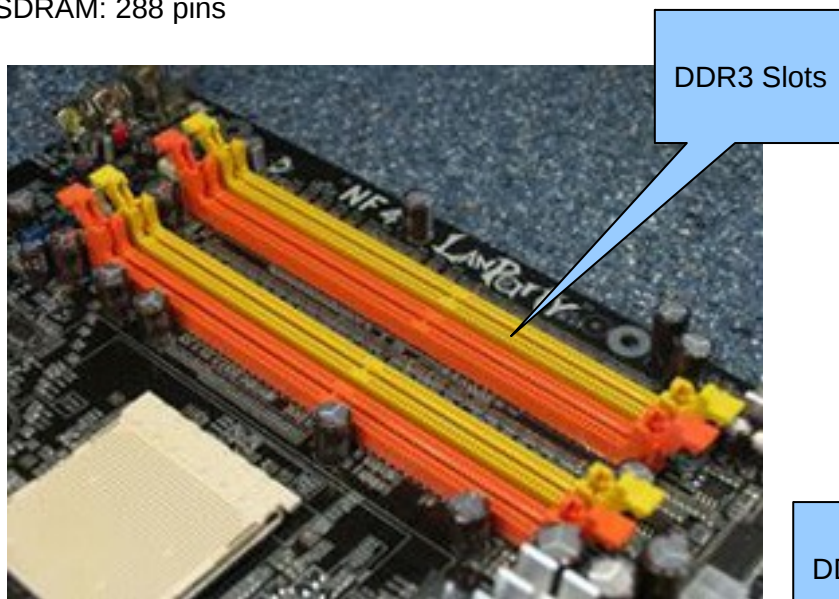
Author: D-Kuru

Chipset

The chipset is not a very known component of computers, but you must know that it is a very important component of the motherboard. It manages some functions like the data flow between the CPU, memory (RAM) and peripherals.

Chipset defines the models of CPU and memory modules compatible with the motherboard.

The chipset is attached to the motherboard so it's especially important to choose a good one in order to be able to make future changes in the CPU or the RAM memory of your computer.
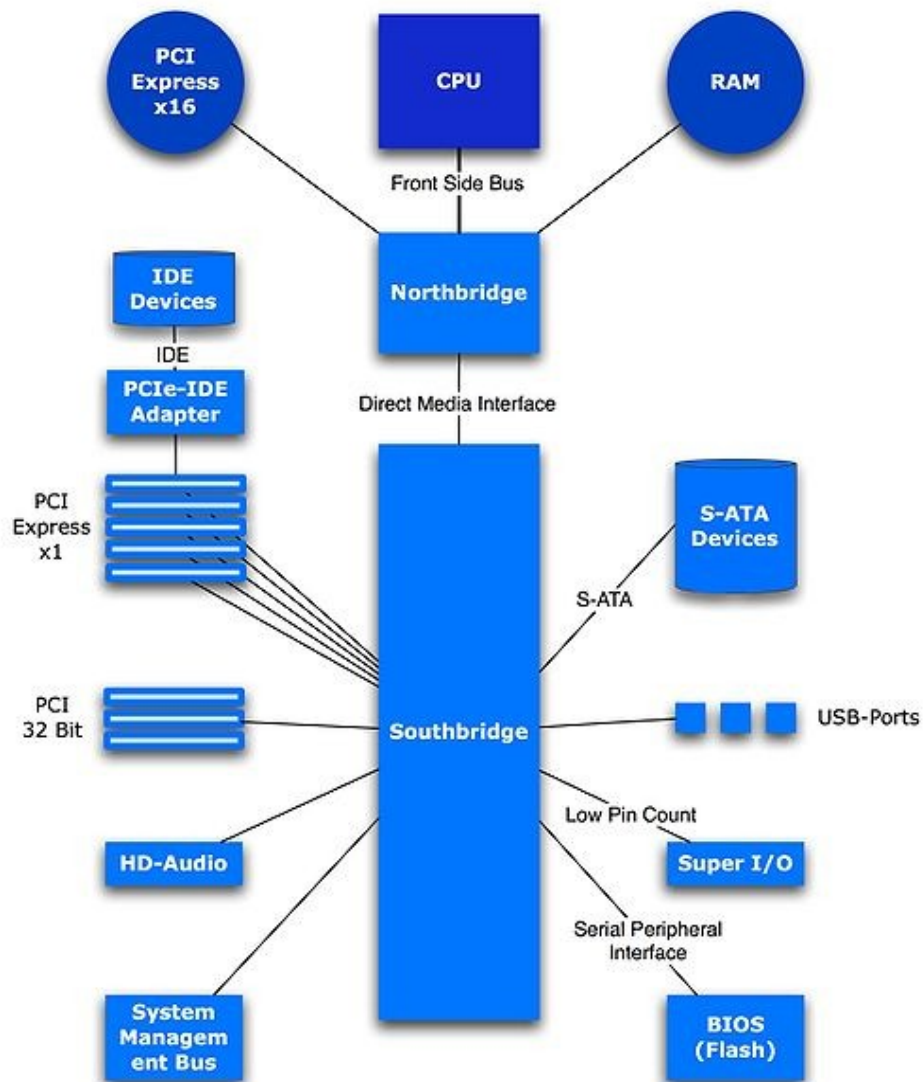

Author: MOS6502

Author: "Jonathan Zander (Digon3)"

Traditional chipset

Traditionally the chipset was composed of two chips: Northbridge and Shoutbridge.

Northbridge managed communication between CPU, memory and graphic card (high speed devices) and Southbridge managed communication with slow devices: hard disks, PCIe slots, USB ports, serial and parallel ports, ...
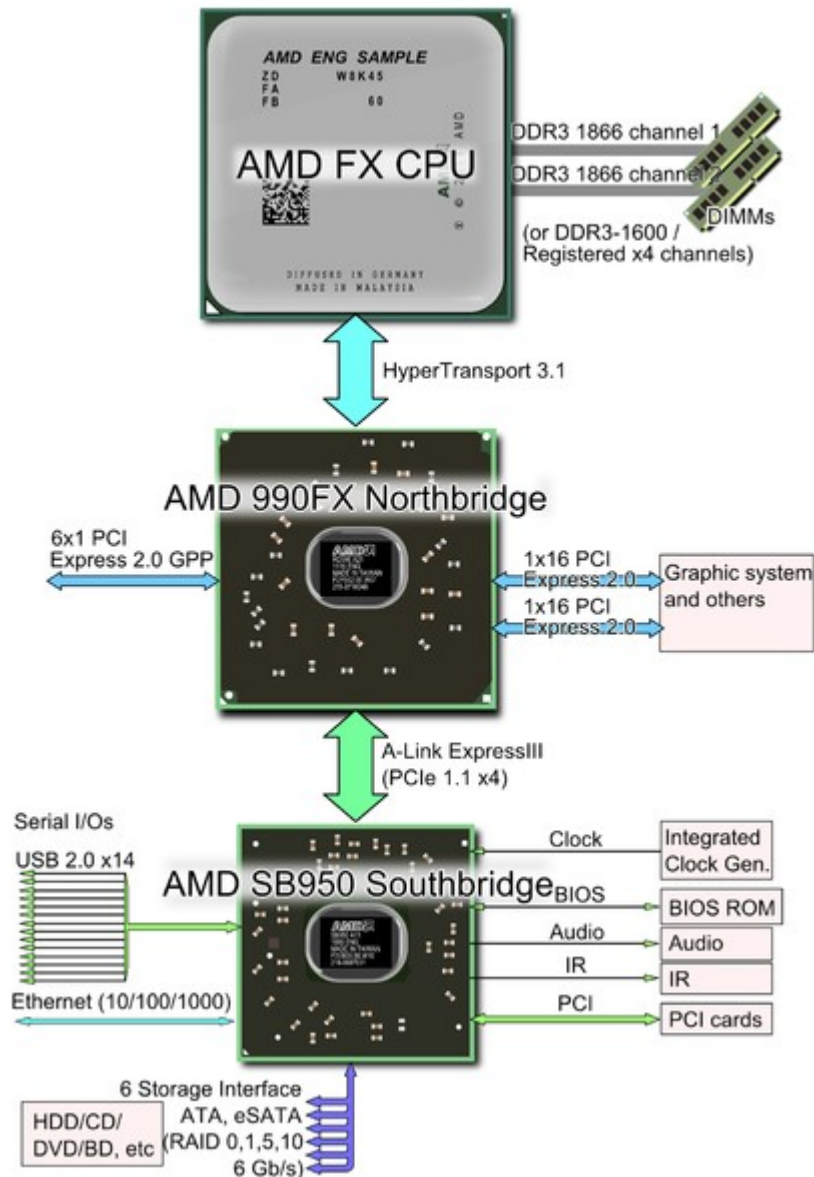

Author: Alainkaa
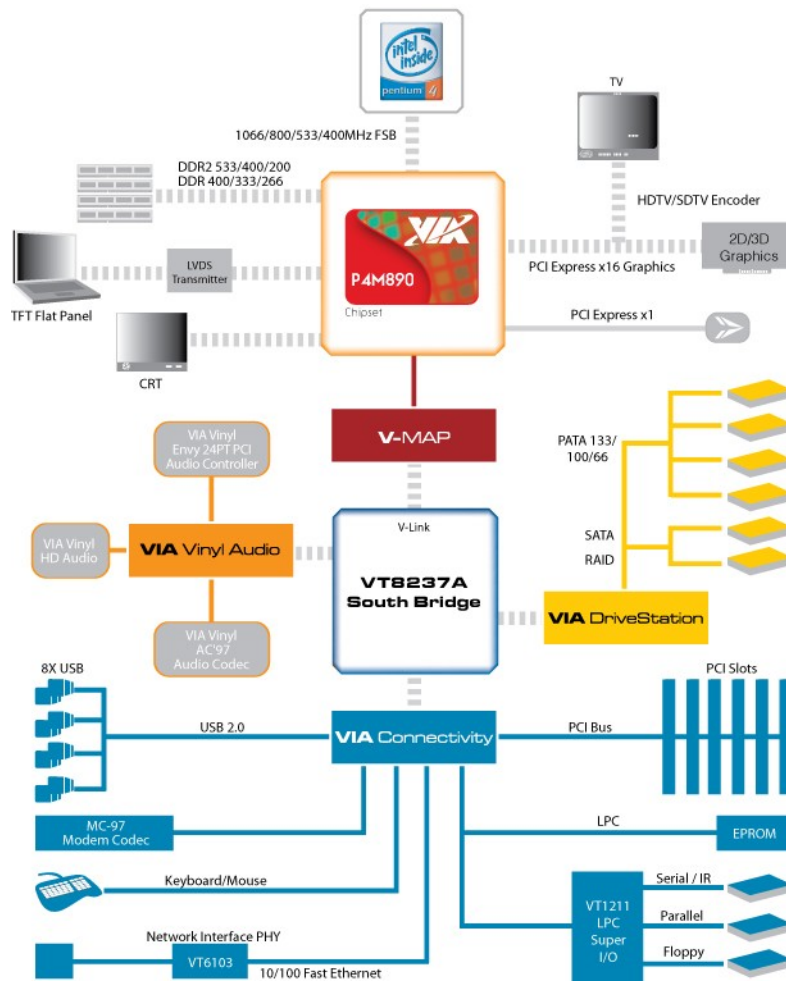
Author: viagallery.com

AMD

Using traditional technology communication between CPU, RAM and graphics cards depended on the chipset.
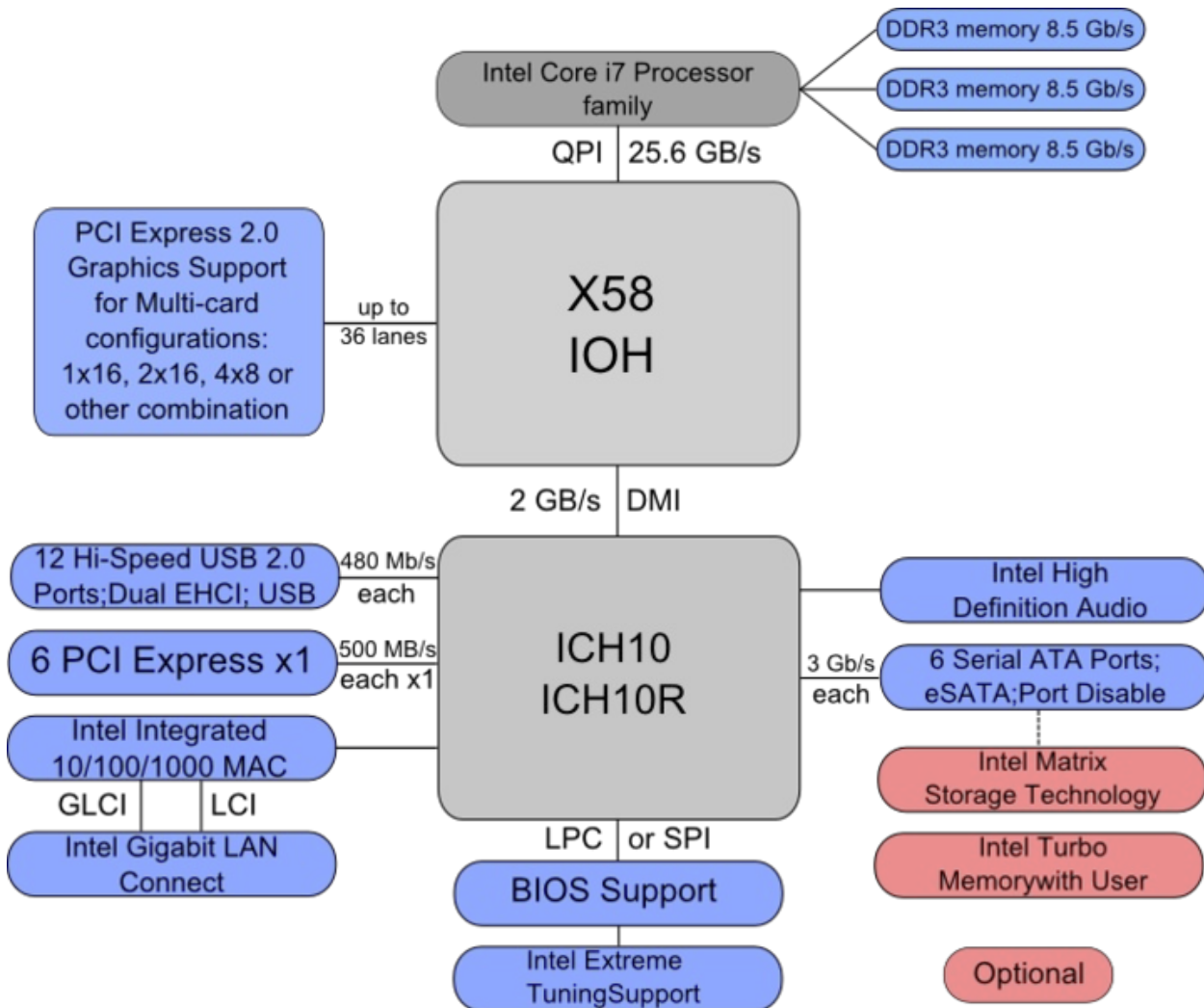In 2003 AMD introduced a new technology. The memory controller was integrated into the CPU.
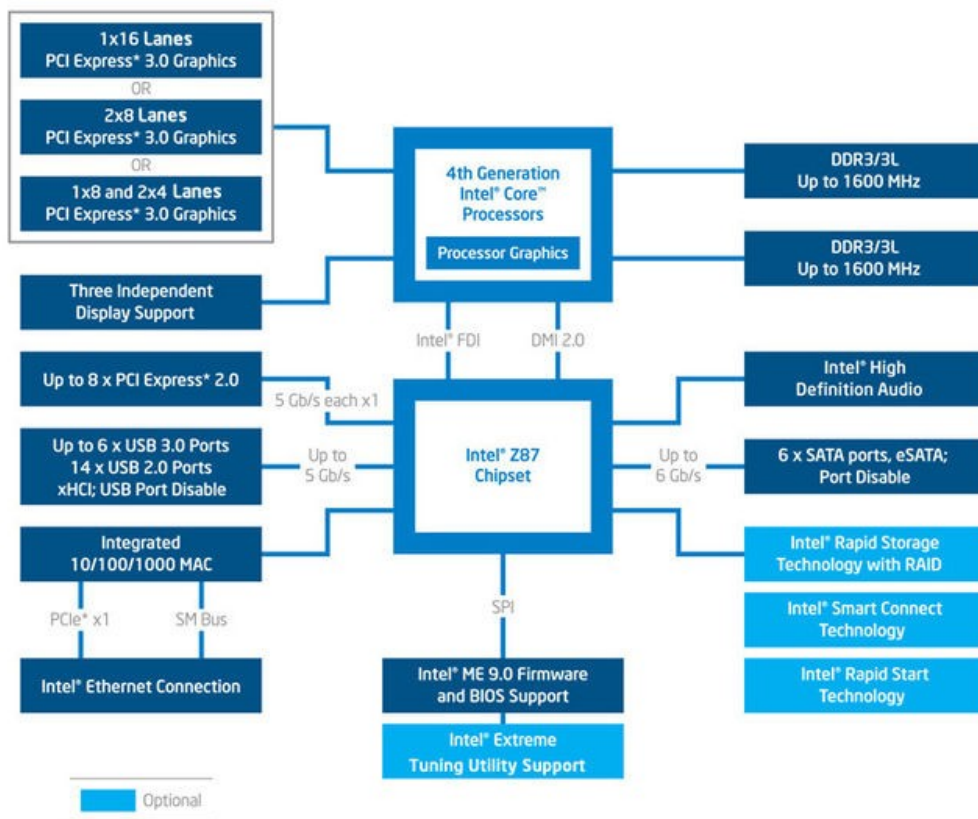This technology allowed the CPU to access directly to the memory.

Author: Shigeru23

Intel

In 2008 Intel followed AMD.

Author: Salam32

Newer CPU also integrate PCIe controller and graphics.
Chipset vendors have integrated all functions in a single chip.

Author: Intel

Activities 1

1. Practice: Try to guess which device or computer part is connected to:

@   https://www.thinglink.com/scene/505057762699378690

Expansion slots

Expansion slots are used to expand computer **functionalities** and **capabilities**. You use and expansion slot to connect to the motherboard some computer components like graphics card, wifi card, sound card, hard disk drive,…

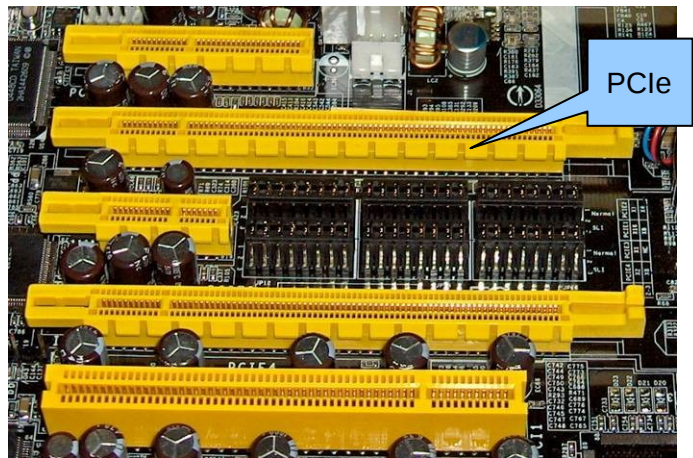The function of an expansion slot is to connect an expansion bus with an expansion card.

Expansion slots are managed by the Chipset
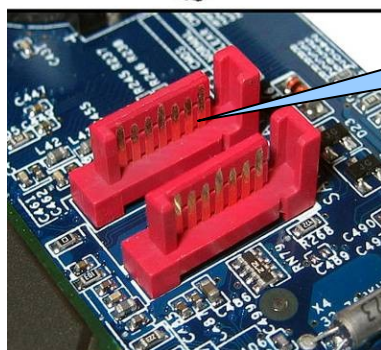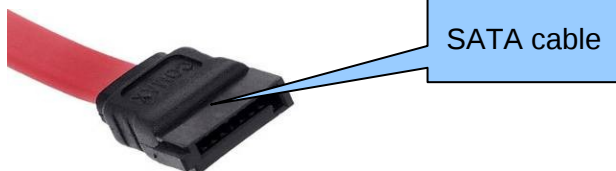
The main bus specifications are:

- Bus size: bits.

- Clock frequency: it's not the same as CPU's.

- Bus bandwidth: maximum data transfer speed..
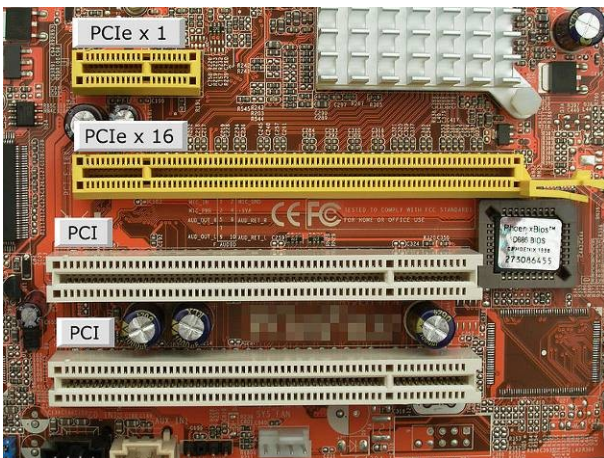
Author: Smial

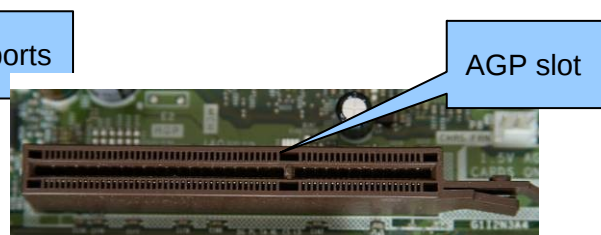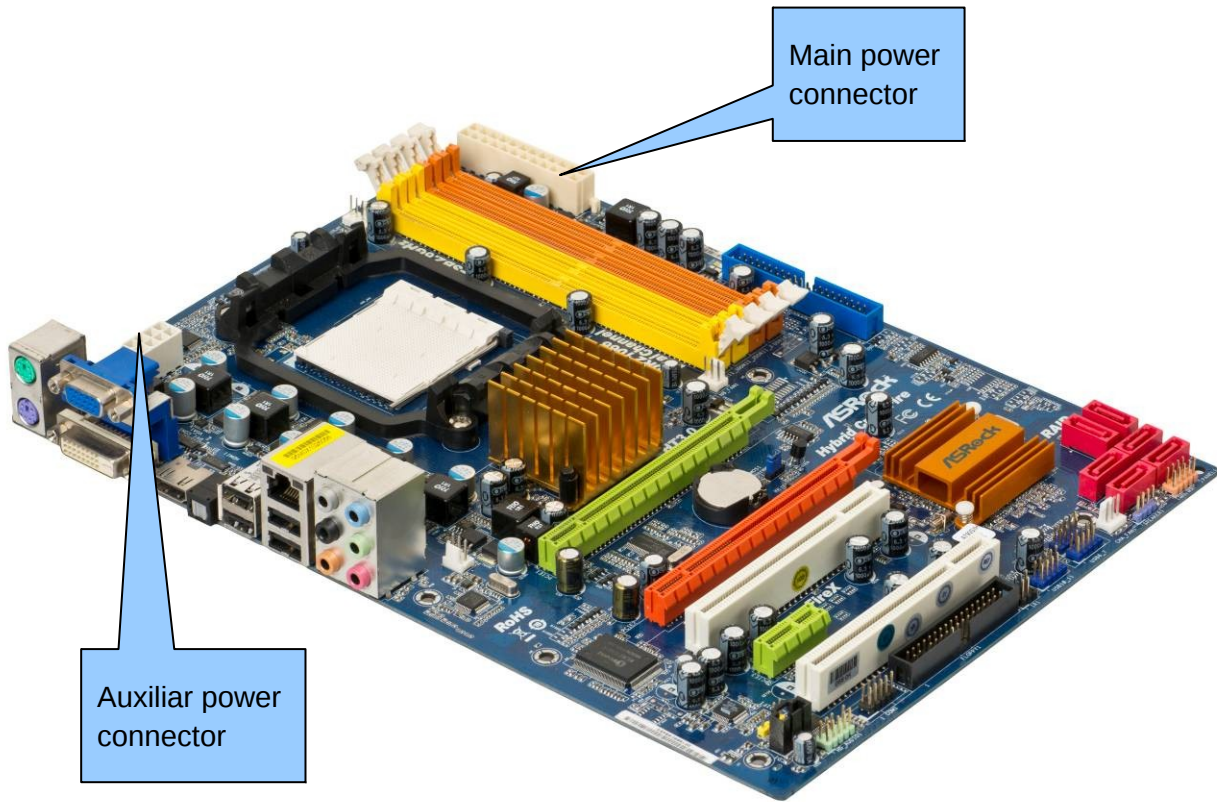*Author: w:user:snickerdo*

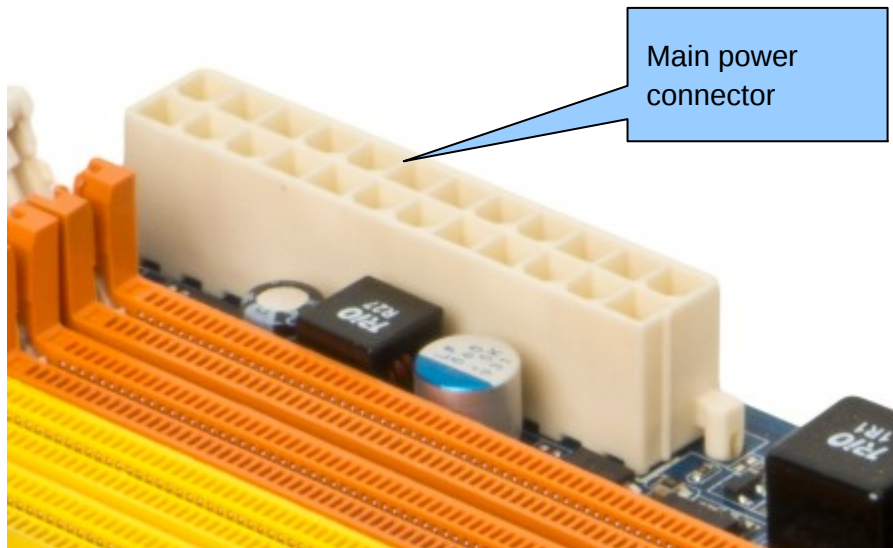
Author: en:User:Berkut

Author: BloodIce

Power connector

The **power supply connector** delivers power to the motherboard. It's a connector with 24 pins. Old connectors had 20 pins. Some old motherboards had a second connector with 4 pins.

Main power connector

Auxiliar power connector

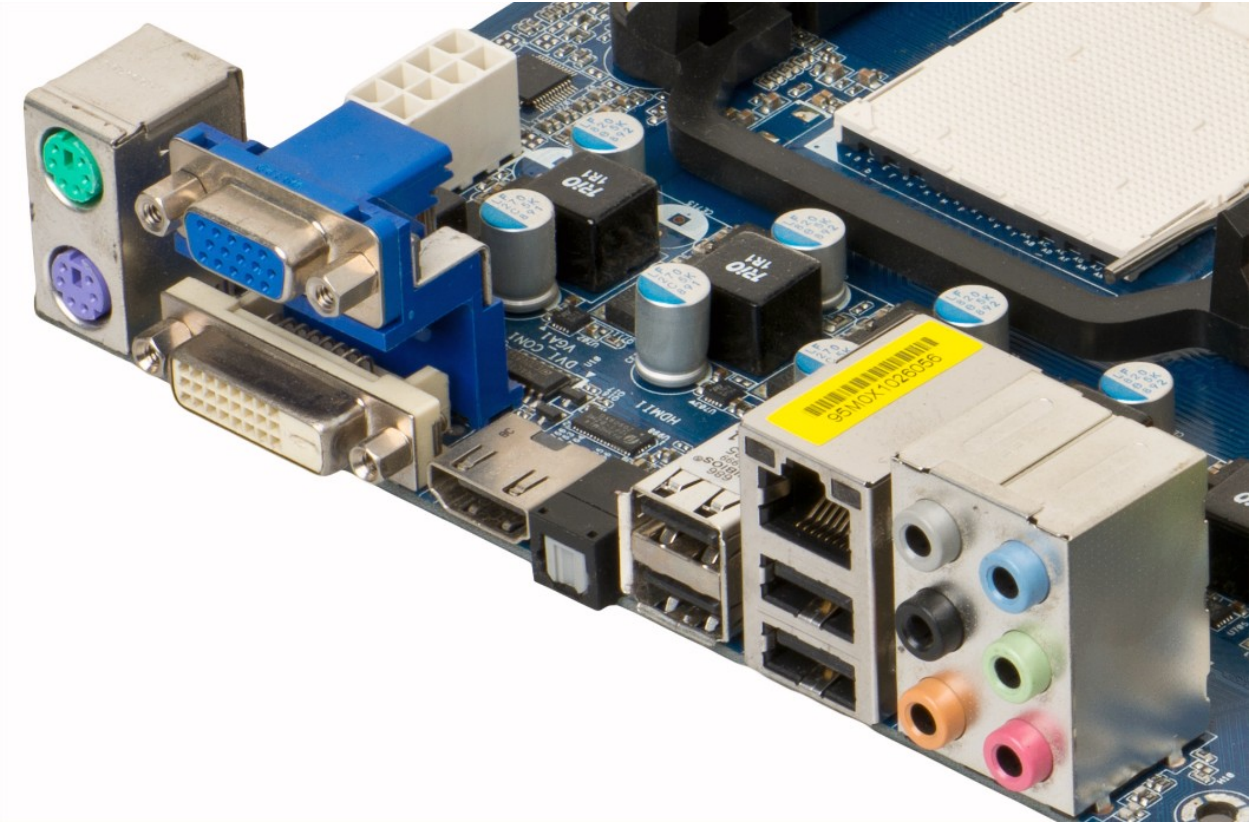*Author: Evan-Amos*

Main power connector

Author: Evan-Amos

Input/output connectors

You need these connectors for **connecting peripherals** like the keyboard, mouse, printer, headphones …

They can be called also external ports, rear ports

They are attached to the motherboard. Computer cases have a special hole in the rear side in order to access these connectors.

Author: Evan-Amos

### *Case and internal connectors*

Finally you must connect the motherboard to the case switch, buttons and leds. Cases usually have 5 main connectors:

- Power switch
- Power led
- HDD led
- Reset button
- Speaker

If the computer case has some front USB and audio connectors they are connected to the motherboard also.

There are some FAN connectors: case fans and CPU fan

Author: Evan-Amos
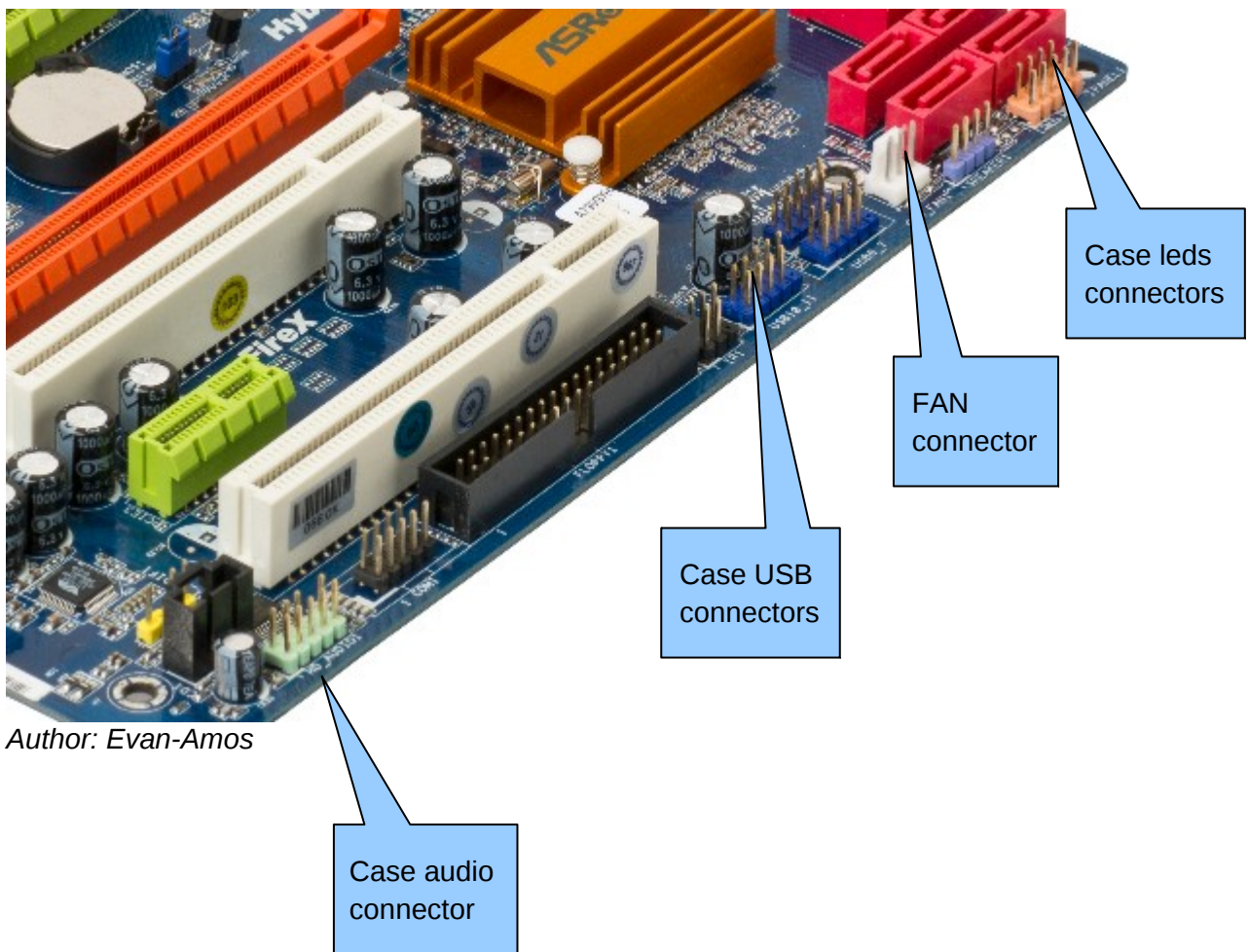
Battery, jumpers and beep speaker

A **battery** is needed to maintain **system configuration**: clock, passwords, boot order, …

When battery power is too low it must be changed. It lasts between 2 and 6 years.

Usually motherboards have a special jumper (clear **CMOS**) in order to clear system configuration (CMOS).

Sometimes they have a little beep speaker in order to advert users when something is wrong or out of order: CPU, memory, graphics card, …
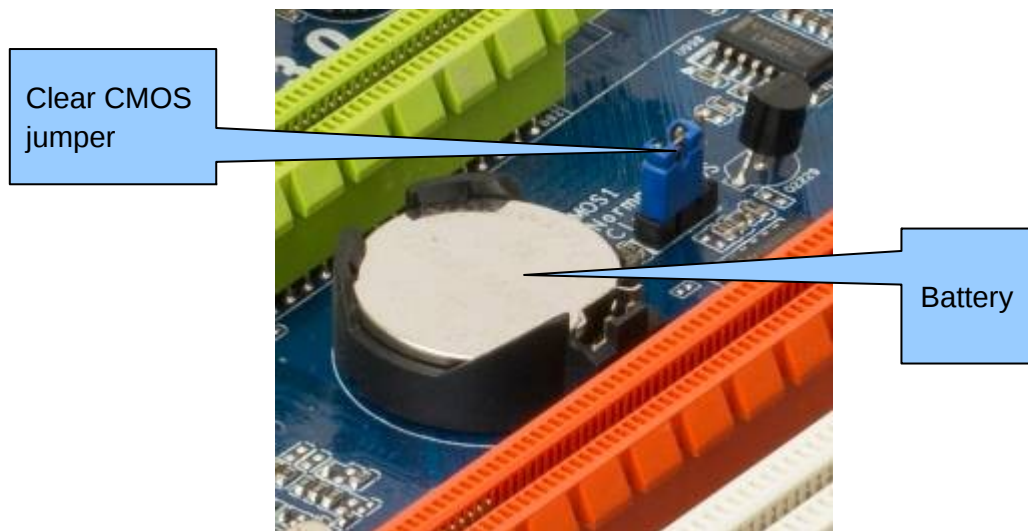
Author: Evan-Amos

Activities 2

1. In this motherboard try to identify all slots, ports, sockets, … that we have learnt in this unit:

Author: andreas.hopf

2. Search for two motherboards (one for Intel processors and one for AMD processors) in an EU online store and complete this table:

	Intel processors	AMD processors
Brand and model		
Chipset		
Compatible processors		
RAM: technology, number of slots and max capacity		
Max CPU speed		
HDD or DVD connectors		
PCIe ports		
Externals ports		
Integrated peripherals		

Links		

Bibliography and Webgraphy

@   http://en.wikipedia.org

@   http://www.thefreedictionary.com

@   https://dl.dropboxusercontent.com/u/1159579/SMX-M01.zip
Authors: Joan Coll and Marc Nicolau