# What is the CPU?

CPU (Central Processing Unit) is the central processor of the computer. The CPU processes all the commands it receives from hardware and software running on the computer.

Abbreviations are often used in the technology world and make it sound mysterious. When exploring a new PC or laptop, the specifications will refer to the type of CPU you can expect to find in your new device. But in fact, these numbers almost never tell you why they are so important.

When faced with the decision to choose between AMD and Intel, dual-core and 4-core, or i3 and i7, you may have difficulty knowing what the difference is and why the difference is important.

## What is the CPU?



## 1. CPU concept

Called processors, central processors, or processors, CPU (Central Processing Unit) is the central processor of the computer. The CPU processes all the commands it receives from hardware and software running on the computer.

## 2. Overview of CPU

The image below is an example of the front and back of an Intel Pentium processor. The processor is placed and secured into a compatible CPU socket (CPU socket) found on the motherboard. The processor produces heat, so they are coated with a heat sink to keep cool and run smoothly.

1. Instructions for checking the temperature of CPU, VGA, hard drive of computer, laptop

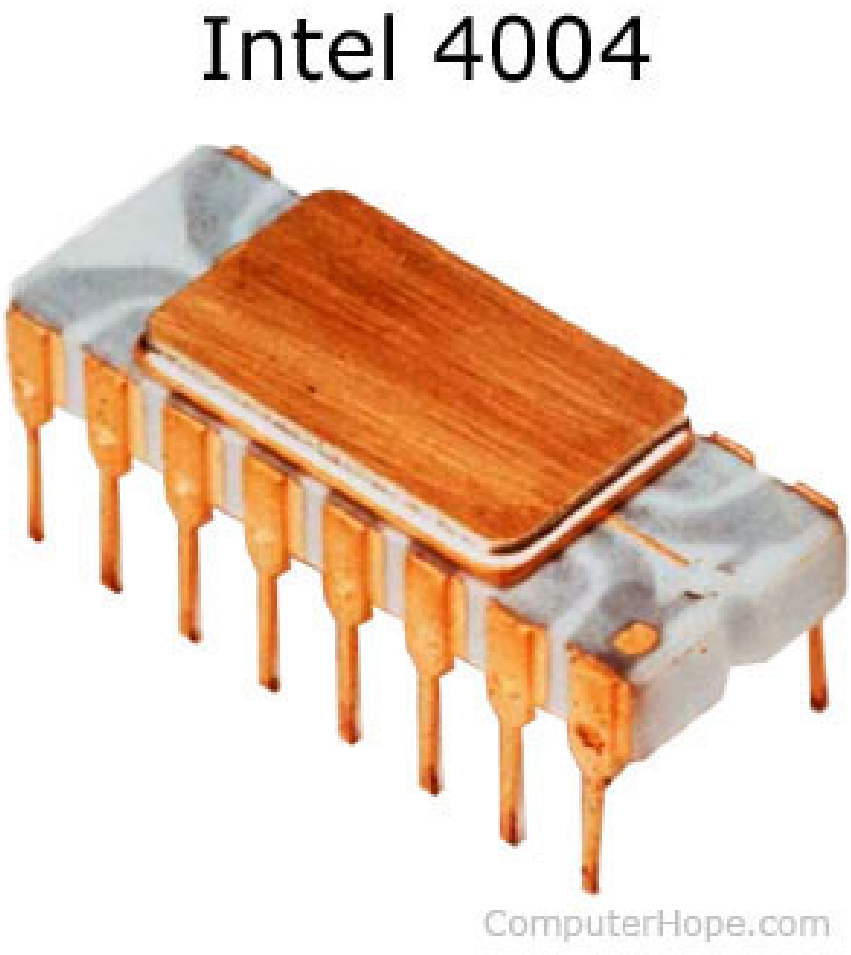
Intel Pentium processor


As shown in the figure, CPU chips are usually square or rectangular and have a small angle to place the chip in the CPU socket. At the bottom of the chip are hundreds of pins connected to each corresponding hole in the CPU socket. Today, most CPUs are the same as the images shown above. However, Intel and AMD have larger processor slots and slide into slots on the motherboard. Also, over the years, there have been dozens of different types of sockets on the motherboard. Each socket only supports specific processor types and each has its own pin

layout.

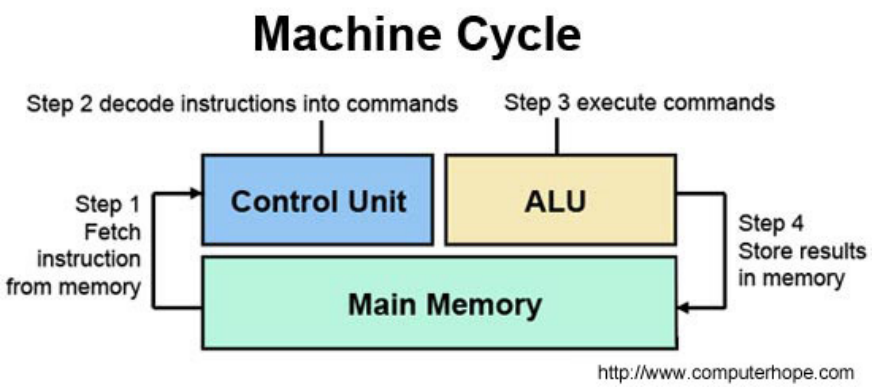
## 3. CPU history

The first CPU was developed at Intel with the help of Ted Hoff and others in the early 1970s. The first processor Intel released was the 4004 processor as shown below.




## 4. CPU components

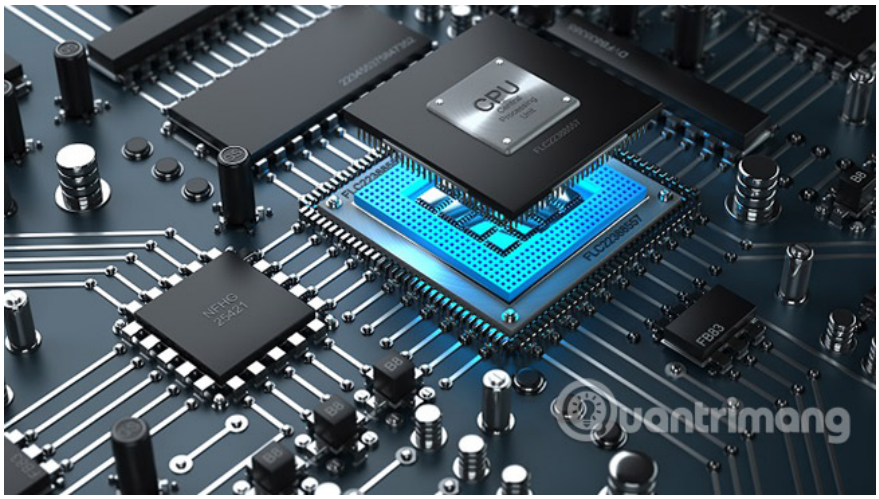
In CPU, the main components are ALU (arithmetic and logic - Arithmetic Logic Unit) to perform mathematical operations, logic, manipulation and CU (Control Unit) to control all the operations of Processor.




In the history of computer processors, speed (clock speed) and processor capacity have improved significantly. For example, the first microprocessor, the Intel 4004, was released on November 15, 1971 with 2,300 transistor semiconductor components and 60,000 operations per second. Intel Pentium processor has 3,300,000 transistor semiconductor components and performs about 188,000,000 instructions per second.

# 5. How does the CPU work?

There has been a series of improvements over the years, since the first CPUs appeared. However, the basic functionality of the CPU remains the same, including three steps: Fetch, decode and execute.




## Fetch

As you would expect, the fetch process involves receiving a command. The command is represented as a sequence of numbers and passed to the CPU from RAM. Each command is only a small part of any operation, so the CPU needs to know which command will come next. The current command is held by a **Program Counter** - program counter (PC). The PC and the commands are then placed into an **Instruction Register** - the register (IR). The length of the PC is then increased to refer to the address of the next command.

## Decryption

When a command is fetched and stored in IR, the CPU will transmit the command to a circuit called a decoder. This converts the command into signals that are transferred to other parts of the CPU to perform the action.

### Enforcement

In the final step, the commands are decoded, sent to the relevant parts of the CPU to be executed. The results are usually written to a CPU register, where they can be referenced by the following commands. Imagine it being like a memory function on a computer.

## 6. How many cores does the CPU have?

In the beginning, the CPU had only a single core. This means that the CPU is limited to a single set of tasks. This is one of the reasons the calculation is relatively slow and time consuming, but it is enough to change the world at that time. After pushing the single-core CPU to its limits, manufacturers began looking for new ways to improve performance. The move to improve this performance leads to the creation of multi-core processors. Currently, you will often hear phrases like dual-core, 4-core and multi-core (or multi-core).

For example, a dual-core processor is really just two separate CPUs on a single chip. By increasing the number of cores, the CPU can handle multiple processes simultaneously. This is effective for the desire to increase performance and reduce processing time. Dual-core processors soon gave way to 4-core processors with 4 CPUs, and even multi-core processors with 8 CPUs. In addition to hyperthreading technology, your computer can perform tasks as if they have up to 16 cores.

## 7. Learn the parameters

Having some knowledge about the operation of a CPU coming from brands and with different cores is extremely helpful. However, there are many options out there with the same high-end specifications. There are a number of other specifications that can help you make decisions when you need to buy a CPU.

### Mobile and desktop

Traditional computers are large static electronic devices that are supplied with continuous power. However, the shift to mobile phones and the proliferation of smartphones means we are basically, always carrying a computer with us. Mobile processor optimized for efficiency and power consumption can allow device batteries to last as long as possible.

Manufacturers have named mobile processors and desktop processors the same name, but with a variety of prefixes. This comes from the reason they are different products. Mobile processor prefix with extremely low power ' **U** ', **'HQ'** for high performance graphics and **'HK'** for high performance graphics with overclocking capability. Desktop processor prefixes include ' **K** ' for overclocking capability and ' **T** ' for optimal power.

### 32 or 64 bit

Processor does not receive continuous data stream. Instead, it receives data in smaller blocks called a "word". The processor is limited by the number of bits in a word. When the 32-bit microprocessor was first designed, it seemed like a very large word size. However, Moore's Law is still maintained and suddenly computers can handle more than 4GB of RAM - opening the door to a new 64-bit processor.

### Thermoelectric design

Thermoelectric design is a measure of maximum power in Watts units that your CPU will consume. In addition to lower power consumption, it also has the ability to generate less heat.

### CPU socket type

To create a fully functional computer, the CPU needs to be attached to other components through the motherboard. When choosing a CPU, you need to make sure that the CPU socket and motherboard match.

### Cache memory BL2 / L3

L2 and L3 cache memory is fast memory, available for CPU use during processing. The more cache you have, the faster your CPU will work.

### Frequency

Frequency refers to the operating speed of the processor. Before multi-core processors, frequency is the most important performance number when comparing different CPUs. Although the features have been added, it is still an important specification to consider. For example, it can help a fast dual-core CPU outperform a slow 4-core CPU.

## 8. CPU types

Previously, computer microprocessors used numbers to identify processors and helped identify processors faster. For example, the Intel 80486 processor (486) is faster than the 80386 processor (386). After introducing the Intel Pentium processor (considered 80586), all computer processors started using names like Athlon, Duron, Pentium and Celeron.

Today, in addition to the different names of computer processors, there are many architectures (32-bit and 64-bit), different speeds and capabilities. Below is a list of common CPU types for home or business computers.

**Note:** There are several versions for some CPU types.

## AMD processor

K6-2
K6-III
Athlon
Duron
Athlon XP

Sempron
Athlon 64
Mobile Athlon 64
Athlon XP-M
Athlon 64 FX

Turion 64
Athlon 64 X2
Turion 64 X2
Phenom FX
Phenom X4

Phenom X3
Athlon 6-series
Athlon 4-series
Athlon X2
Phenom II

Athlon II
E2 series
A4 series
A6 series
A8 series
A10 series

## Intel processor

4004
8080
8086
8087
8088
80286 (286)
80386 (386)
80486 (486)

Pentium
Pentium w / MMX
Pentium Pro
Pentium II
Celeron
Pentium III
Pentium M
Celeron M

Pentium 4
Mobile Pentium 4-M
Pentium D

Pentium Extreme Edition
Core Duo
Core 2 Duo

Core i3
Core i5
Core i7

AMD Opteron, Intel Itanium and Xeon series are CPUs used in high-end workstations and servers. Some mobile devices such as smartphones and tablets, use ARM CPUs. These CPUs are smaller in size, require less power and generate less heat.

# 9. How fast is the data transfer CPU?

As with any device that uses electrical signals, the data moves at almost the speed of light, at 299,792,458 m / s. Achieving almost the speed of light depends on the environment (the metal in the wire) that the signal is moving so that most electrical signals move at a rate of about 75 to 90% of the speed of light. .

1. Which CPU is faster: old but 'quality' or 'popular' but new?

# 10. Can a GPU be used instead of CPU?

The answer is no. Although the GPU can handle data and perform many CPU-like tasks, it is not capable of performing many of the functions required by typical operating systems and software.

# 11. Can a computer work without a CPU ?

The answer is no. All computers require some type of CPU.

CPU is really the computer's brain. It does all the tasks that we often associate with computers. Most other components of the computer always support CPU operation. Improvements made in processing technology including hyper-threading and multi-core play an important role in the technical revolution.

Being able to distinguish between Intel i7 dual-core and 4-core AMD X4 860K will help you make the decision much easier. That not only refers to the ability to save money when buying hardware but also shows many other ways to upgrade your computer.

How much do you know about CPU? Do you want to upgrade your computer? Let us know in the comments below!

See more:

1. Overclock CPU, GPU and RAM easily and safely
2. Instructions for checking the temperature of CPU, VGA, hard drive of computer, laptop
3. Instructions for using CPU-Z, read the CPU-Z parameters provided