All you need to know about mobile processors

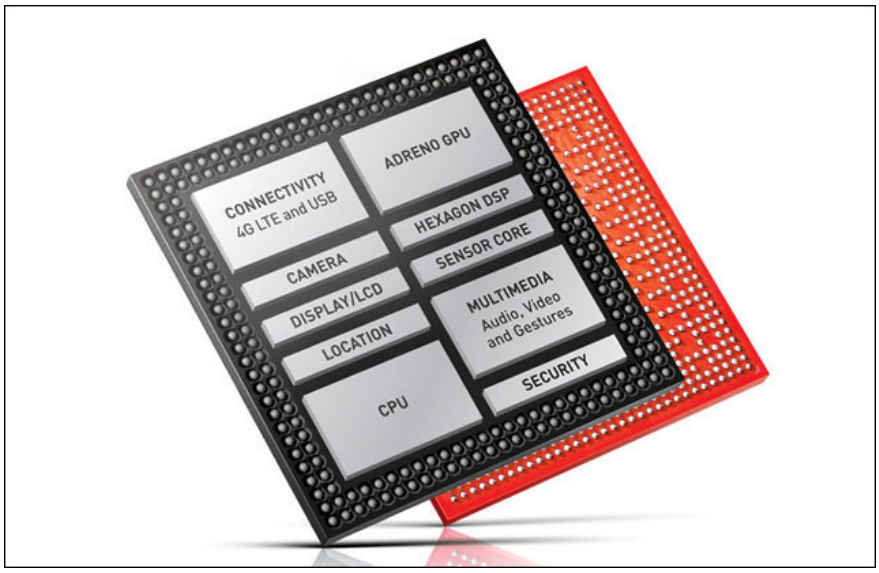
SoC system, CPU core, GPU, clock speed ... All will be clarified in this article.

There are a lot of smartphones (smartphones), tablets (tablets) on the market and each product advertises itself how faster, more powerful, and longer battery life than other competitors. Microprocessors often get the most attention when companies try to release numbers like cores, GHz (gigahertz) to show off their power.

But what do those numbers really mean? The following article will provide the necessary information around the processor of mobile devices.

SoC - System On a Chip

Talking about mobile processors, first need to understand what is 'microprocessor'. On PCs or laptops, microprocessors often mean **CPU - Central Processing Unit** - the central processor is responsible for a computer's brain. On mobile, the processor is the **System On a Chip (SoC)** - the system on the chip.



SoC system with key components is all over the chip

The on-chip system is a chip about the size of a computer's CPU, containing almost all the components needed for the device to work, including the CPU, **GPU (Graphics Processing Unit)** . , on PCs usually located on discrete graphics cards) and many sensors and radio types for functions like WiFi, Bluetooth, GPS and even cellular data.

1. AMD and Nvidia - who is the king of GPU dominance?
2. Nvidia launched the worst graphics processor ever

SoC also identifies other features that the device supports, such as image resolution, or whether the video has 4K recording. The main benefit of SoC is size, less power consumption and less heat emission.

Apple's A11, Qualcomm's Snapdragon 845 or Exynos 9 are all examples of SoC.

The Bionic A11 is the latest chip, running on Apple's iPhone X, iPhone 8 and iPhone 8 Plus

1. Samsung released the next-generation processor - Exynos 9810
2. What is the CPU?

Read the processor's parameters

So how to read the parameters for a device's processor? These are the parameters for iPhone 6 for your reference.

1. Apple A8
2. 1.4GHz Cyclone dual core, 64-bit, ARM v8
3. PowerVR GX6450

The above parameters tell us that iPhone 6 uses SoC which is the A8 designed by Apple itself. Dual core CPU (meaning there are 2 processing units), clock speed is 1.4GHz. Cyclone is the name Apple puts for the CPU. In addition, 64-bit CPU has ARM v8 structure. GPU is Imagination's PowerVR GX6450.

Let's see the next example, the parameters of the HTC One M8.

1. Qualcomm Snapdraton 801
2. Quad core 2.3GHz, 32-bit
3. Krait 400

4. Adreno 330

HTC uses Qualcomm's SoC Snapdragon 801. In early 2015, model 810 was the most advanced model. The latest model of Qualcomm Snapdragon is 845.

1. Learn about Snapdragon microprocessors on smartphones and tablets
2. 5 things to know about Qualcomm Snapdragon 845 chip

Quad core CPU has a clock speed of 2.3GHz. With twice the number of cores and up to 50% faster, this phone is significantly more powerful than the iPhone 6, but this is not all the deciding factor.

Krait 400 is the name of the CPU, also has ARM structure. Graphics used is Adreno 330 GPU, which is also part of SoC.

Microprocessor architecture

In both examples above, the CPU has an ARM structure. This is the structure created by ARM Holdings, which includes control scripts that control how the CPU works, is licensed to many SoC manufacturers when integrating it into their products.

ARM has dominated the mobile market for many years, mainly due to low power consumption (improved battery life). Intel has also tried to enter this market in the past few years with x86 (which is popular on computers) but has not achieved success.

1. Intel shook hands with AMD to release the 8th generation chip competing with Nvidia
2. What is Intel's new Core i9 CPU line?
3. Intel updates the CPU price list for PCs with X 12 series of chips

For ordinary users, there is no need to understand the details of ARM structure, just know that the latest version will be better (faster, more efficient) the old version.

Core and clock speed

These are two factors that users can benefit from, often people think that bigger numbers will be better, but the truth is not so simple.

The clock speed measured in Gigahertz (GHz) is the speed at which CPU processes control scripts. If the parameters are equal, the 2.5GHz processor will be faster than 2.0GHz. But in fact, rarely other things are absolutely equal. New processors are usually faster than older processors, even with slower clock speeds. CPUs with new architecture will be faster, and the number of cores will also make a difference.

The core is a processing unit in the CPU. Each core handles tasks independently or can be combined to perform more demanding tasks.

Typically, on multi-core processors, the cores will share the work of the operating system or running applications without ever reaching the maximum speed. As a result, the device runs fast, responds well, supports multitasking better, produces less heat, and has less power.

But that doesn't mean Samsung's 8-core Exynos processor will be twice as fast as the Snapdraton quad core or four times faster than Apple's A8. There are many other technical factors that affect the speed and performance of a processor. In addition, the software also needs to be tailored to support multiple cores.

Apple surpassed Intel because Intel just sat there

The device's ability to optimize is also influential. Apple produces both microprocessors and operating systems on the iPhone, so it can optimize both, making the dual-core CPU not as powerful as being able to catch up or even surpass higher-spec Android phones.

In general, larger numbers may mean better equipment, but not always.

32-bit and 64-bit

The first 64-bit phone was the iPhone 5S, launched in 2013. Android was a bit slower due to the lack of 64-bit processors and partly because it was not ready until Lollipop launched at the end of 2014. 64 -bit not only means faster but also allows the device to do more.

64-bit is often used on PC and laptop devices

It is true that 64-bit processors for applications use more than 4GB of RAM, but it must take several generations to reach this problem. It is important that 64-bit is often referred to as 'computer class', and when it comes to the 64-bit era, the boundary between phone, tablet, computer will become dimmer.

1. Compare smartphones and desktops: Why is the phone slower than a computer?

The need to switch to 64-bit processors is due to ARM v8 (with 64-bit architecture) much faster than ARM v7. So many high-end phones run 64-bit processors faster, even if not because of 64-bit support but faster.

Role of GPU graphics processor

GPUs are less important than other parameters because they are often associated with SoC. So if the manufacturer uses the Snapdragon 805, it will have Adreno 420 GPU already. GPUs affect the visual part of the user experience, like motion effects . so it also somewhat affects the speed of using the device they feel.

Conclude

The above are important elements of a mobile processor. When reading the parameters, you will see many different companies with their own characteristics, the most popular now is Apple's A-Series, Snapdragon from Qualcomm and Exynos of Samsung. There are also other products like NVIDIA K1, Mediatek, Intel Atom.

See more:

1. What's the new generation of CPUs released by Intel?
2. Apple will stop using Intel chips on Macs from 2020, switching to 'homegrown' chips.
3. Intel brought its strongest chip, a Core i9 processor, to a laptop