Learn about clock speed: Base Clock and Boost Speed

In recent years there has been the term Boost Speed. Most microprocessors, whether graphic or computational, have both, in which the basic speed shares the same Base Clock terminology, and at the new speed, Intel calls Turbo Boost, AMD calls it Turbo Core. So what do they really mean and where do they differ?

Speaking of microprocessors, most people look at the clock speed. This is the number of clock cycles or calculations that a microprocessor performs in a second, usually measured in megahertz (million cycles) or gigahertz (billions of cycles). Although many people do not know exactly what it is, this is an easy comparison. Suppose you want to buy a computer, usually people will assume that the larger the number, the faster the machine will run (for example, the 2.5GHz processor will be faster than the 2.3GHz processor).

1. 4 simple ways to check the configuration and hardware information of computers and laptops

But besides that basic number, in recent years there has been the term Boost Speed. Most microprocessors, whether graphic or computational, have both, in which the basic speed shares the same Base Clock terminology, and at the new speed, Intel calls Turbo Boost, AMD calls it Turbo Core. So what do they really mean and where do they differ?

The faster the processor runs, the more electricity it consumes and more heat. For example, Intel Core i7-5820K processor has 6 CPU cores with Base Clock which is 3.3GHz and Turbo Boost is 3.6GHz. Basic tasks won't need 3.6GHz, even if you don't need 3.3GHz. So what must be run faster and consume more electricity unnecessarily?

Overclocking is the only thing that people who have knowledge and high needs do. Overclocking is the change of the multiplier of the cycle, accelerating the processor. Each CPU has a low number of cycles, then multiplied by a factor. For example, a CPU with a 300MHz base factor and a 11x multiplier will have a clock speed of 3.3GHz. The Boost mode mentioned above is overclocking, but not by people but by the automated system.

When the computer realizes that it needs to run more rounds (such as render video for example), it checks the speed with the temperature. If it is cool enough, it will perform overclocking to accelerate. Overclocking depends on how long the system takes, how long the cooling capacity lasts.

It should be noted that the highest clock rate only applies to 1 processor. If you only use 1 processor, you will be overclocked completely, but if you use multiple cores (for example, in the case of the Intel chip mentioned above is 6 cores), not all will reach the maximum speed. This depends on the motherboard, the higher board will allow for higher life.

Computers can also overclock themselves when needed

The phone will be slightly different. Often the manufacturer does not say how much the mobile chip's Base Clock is due to the fact that the number does not say anything about the chip. Under normal conditions, the computer processor runs at the speed of Base Clock but on the phone it does not. The speed of many ARM chips is only a few hundred MHz, but it allows them to run idle mode, saving power and heat.

The Base Clock doesn't really mean much in reality. When you use the phone, the processor will immediately increase the speed needed to do the job. It keeps that speed as long as it depends on the manufacturer because if the processor is too hot, it will adjust itself. Therefore, although using 2 identical chip phones, the clock speed is completely different. You can look at the case of Apple's iPhone slowdown scandal to understand the manufacturer's impact with machine speed.

Boost Speed ??is actually more like a guideline than a mandatory rule. On your computer, you should never worry about running under the Base Clock speed (unless you force it to run at a low level), but on a mobile device is different. Today's laptops are quite similar to phones. For example, the MacBook Air has an Intel Core i5 1.6Ghz core with Boost Speed ??of 2.7GHz, which means there will be a big trade-off between speed and battery life. Like phones, laptops do not have a cooling system as strong as desktops, so they cannot maintain Boost speed for long.

Also note that the clock speed does not determine all about the chip, but also depends on the number of processors, bus speed, buffer memory size, RAM speed, HDD and SSD. This number can be used to compare different versions of the same chip but different brands (Intel and AMD chips) or different lines (new and old chips from Intel) are not really meaningful.

So people have to benchmark each chip to give it the right rating. Benchmark basically has 2 types that are theoretical and practical.

Benchmark according to the theory of scores, is based on a benchmark software running on the browser or installed on the machine, sometimes checking whether the machine runs this software fast or slow. Overall this number is quite vague and does not indicate how bad the chip is.

Practical Benchmark captures software that performs certain tasks such as video rendering or file compression. Anandtech, for example, uses WinRAR to check, compress 2,876 files (1.52GB equivalent) and count time. The 5820K chip took 46.17 seconds while the 5930K chip only needed 44.95 seconds to complete. The conversion of video files can be measured by the number of frames in the video . Although the difference may not be much, it also shows the difference.

In general, knowing the speed of Base Clock and Boost Speed ??is necessary, if they are higher then of course it will be good, but these are not the only factors for you to evaluate the CPU of the machine as well as make a buying decision. The table below shows the advantages and disadvantages of some factors when evaluating computer processors.

Quality of Benefits Score minus High speed clock Machine faster

1. It takes more electricity
2. Hotter

Low basic clock speed, high overclocking speed
1. More effective
2. Longer battery life (with mobile devices)

It is possible for the machine to be adjusted more slowly Overclocking capability Speed ??up the system
1. More expensive
2. Need better cooling system

Multi-core Perform better multi-threaded tasks
1. Usually run poorly
2. Bigger processor

Hyper-Threading Duplicate the number of efficient processor cores for optimized software
1. Most software is not optimized
2. More expensive

Integrated graphics on chips No GPU needed Not all chips are available
See more:

1. Instructions for overclocking the CPU
2. Overclock CPU, GPU and RAM easily and safely
3. CPU: Speed ??is not all

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