Intel has ruled over the central processing unit (CPU) market for decades, pumping out quality chips that were typically unmatched in performance. This has begun to shift as AMD has risen to the challenge as of late, but this is only a recent development. When Intel released the Pentium processor in 1993 it boasted a clock speed of 60-66 MHZ and contained 3.1 million transistors utilizing an 800 nm production process. The processor was dubbed Pentium because Intel wanted to avoid having companies trying to copy their previous naming conventions. This processor also came with its own problems; mainly the infamous bug knows as the FDIV bug, which cost Intel roughly 450 million dollars to recall (The Editors of Tom’s Hardware 2006).

The Pentium processors successor was dubbed as the Pentium Pro. This was one of the fastest chips on the market and made its debut in 1995. This chip had a clock speed of 150 – 200 MHz and contained 5.5 million transistors. This chip was so good when Intel created the first supercomputer that hit tera flop speeds they made it using Pentium Pro processors. Intel then went on to release the Pentium MMX version which was only a slight upgrade. However, they used a lot of components that they had developed themselves. The Pentium 2 Xeon was created which had higher bus speeds and a greater cache after the release of the Pentium 2, and was designed with servers in mind. Every year or two Intel continued to pump out Pentium branded processors, with the most significant new design releasing in 2000, called the Pentium 4. This CPU utilized an architecture Intel dubbed “NetBurst”, its transistors where much smaller than the previous iteration of CPU’s and went from 160 nm to 65nm; the smaller the transistor the less power consumption they use (The Editors of Tom’s Hardware 2006). On top of smaller transistors, the CPU itself utilized a dual core design. Which is when the chip contains essentially 2 CPUs are connected which allow it to perform much faster than a standard single CPU design.

In 2003 Intel released a Pentium M processor which was specifically designed with power consumption and thermal temperature in mind for laptops. Intel has continued the updates to the Pentium processor line even to this day. However, even though it started off in 1993 as their main CPU, it is now part of their entry-level CPU line. The latest 10th generation Intel Pentium is labeled as Pentium Gold. It contains clock speeds up to 4.2 GHz with 2 cores and 4 threads. Its main selling point is the power consumption is low and so is the price, but with only 2 cores it is far inferior to much pricier CPU’s.

The only real competitor of Intel is AMD. Although for majority of time, intel has dominated the market for computer processor chips, only recently has AMD produced processor chips that outperforms intel processor chips. AMD released their Zen 3, a CPU microarchitecture using TSMC’s 7nm process for the chiplets. The Zen 3 has a 19% higher instructions per cycle in comparison to the previous iteration, Zen 2. In comparison to intel’s highest preforming CPU, the Core i9-11900K, AMD’s Ryzen 9 5900X preforms better. For one the Ryzen 9 5900X has 12 cores and 24 threads support whereas the Core i9-10900K has 10 Cores and 20 threads supports. This in turn, makes Ryzen 9 5900X to have a better power consumption and overall performance. Although, intel Core i9-11900K has a better clock rate when overclocking in comparison to when Ryzen 9 5900X overclocks. In terms of pricing, although Ryzen 9 5900X is more expensive (~ $549) vs intel Core i9-11900K (~$539) the performance increase of the Ryzen 9 5900X makes it far more worth the value. Although the AMD processing chips are currently outclassing intel processor chips currently, intel does intend to release a new line of chips later this year.

Another company other than Intel or AMD that produces processor chips is the Chinese company Zhaoxin. They made x86 compatible CPUs, one of which is called KX-U6880A which has 8 cores and 8 threads. Has 3.0Ghz, supports PCIe 3.0 x16 with dual-channel DDR4-2666 memory. In comparison to the competitors of Intel or AMD, their processors are lacking having significant. Their CPU is outclassed in almost every way. In comparison, Intel’s core i5 line runs 5 times faster than the KX-U6880A which is Zhaoxin highest end CPU and the core i5 is the just intel’s middling CPU.

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