

HW3: Git Computer History

The History of AMD

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1 Introduction

The topic chosen was the history of the company Advance Micro Devices also known as AMD because the progression of hardware in the age of ever changing technology. AMD started making microprocessors for Intel and then branched out and started to compete with Intel making their own hardware. This is going to be a breakdown of a few key pieces of hardware that has come from AMD in the 53 years of its life.

2 Time Period

Our article follows the 53 year history of AMD. From its inception in 1969, its first CPU in 1975, and its first major success in 2016 with the Ryzen series CPUs.

3 Computer Hardware

From here is where the conflict with INTEL begins especially with the latter's creation of a microprocessor in 1974. AMD then followed in 1975 after reverse engineering the INTEL 8080 (Intel's second microprocessor) the AM9080. In 1978 when INTEL entered into a contract with IBM who, due to the sheer volume of processors required, requested that this contract would be completed through the use of contractors, with AMD among those chosen. This secured AMD's entry into the x86 processor market and created a technology exchange agreement with Intel so the smaller company could pro-

duce the product at IBM's desired specification. Thus AMD began production of the AM286, a copy of the INTEL80826, which held the advantage of much higher clock speeds (Intel resting at around 12.5 MHz and AMD at 20 MHz). This, in addition to the 1975 AM9080, would start a trend between AMD and Intel where Intel would produce a device and AMD, through their agreement, would take the design and create a clone which would have a much higher clock speed. The next notable release was the AM486 and the AM5x86, released in 1994 and 1985 respectively. Both devices ran the same architecture but the AM5x86 ran much faster at 133 MHz (or potentially 150 MHz) as compared to the AM486's speed of 120 MHz. These devices were the final Intel clones and marked the beginning of AMD creating CPUs of their own design and a separation from Intel. In 1991 AMD released the Am386.[1] It was a microprocessor that was compatible with Intel's next-generation 32-bit 386 microprocessor while being faster than its Intel counterpart. The Athlon processor was then released in 2000. This processor was the first 1-GHz microprocessor on the market. In 2003 the Opteron chip was launched. This chip was the first that AMD made that was intended to be used in servers.[2] [3]Amd ryzen was the next evolutionary step in major architecture since Bulldozer. Beginning in 2016, Ryzen, codenamed Zen offered 1331 pin AM4 socket type for motherboards which supported DDR4 RAM, PCIe Gen 3, enhanced sound, SATA express, and USB 3.1 gen2 10gbs. Ryzen CPU's were the first chips in AMD to be developed at 14nm, and offered integrated graphics which were mainly used for laptops.[4] AMD has developed 7 generations of CPUs since 2016 with generation 4, 5, and 6 being for laptops only, AMD also developed 4 models, Ryzen 3, 5, 7,

and 9 which stayed the same but had an increase in performance for each generation. Each model does a different task with Ryzen 3 being general work such as PowerPoint and net browsing and Ryzen 9 being used for graphic design, high game performance, and other heavy tasks, Ryzen 5 and 7 were meant to be best for gaming and multitasking.[5] Ryzen series beat AMDs old CPU technology FX series by 50 percent with its Zen 3 technology.[6] Zen 3 offered a complete redesign with 20 major changes such as wider and more flexible execution resources such as, load and store bandwidth to help feed execution, and a streamlined front-end to get more threads in flight; Higher Instruction Per Clock which could extract an average of 19 percent additional performance for every MHz of frequency; Lower Latency with 8 cores and 32MB of L3 cache which reduces core-to-core and core-to-cache latencies, which rivaled Zen 2 cache by two times as much; And Incredible efficiency, new Zen 3 architecture such as AMD Ryzen 5000 series gave a 24 percent generational improvement in energy efficiency and a 2.8 times lead over competing architectures making this CPU one of the top CPUs in the world.

1982 INTEL 8086 clone

Release Date	1982	
Architecture	16-bit	
Data Bus	16-bit	
Address Bus	20-bit	Maximum Memory Support
1 MB		
L1 Cache	None	
L2 Cache	None	
Frequency	4 - 10 MHz	
FSB	4 - 10 MHz	[7] [8]
FPU	8087 (Sold Separate)	
SIMD	None	
Fab	3000 nm	
Transistor Count	29,000	
Power Consumption	N/A	
Voltage	5 V	
Die Area	33 mm ²	
Socket	40 pins	

AMD Bulldozer Zambezi

Code Name	Zambezi
Date	October 2011
Architecture	64-bit
Data Bus	64-bit
Address Bus	64-bit
Maximum Memory Support	1 TB
L1 Cache	64 KB + (2 × 16 KB)
L2 Cache	2 MB (Full Speed)
L3 Cache	8 MB
Clock Speed	2.8 - 4.2 GHz (4.3 GHz Turbo)
Memory Controller	Dual-Channel DDR3-1866
HyperTransport	2600 MHz
Core Count	4, 6, 8
SIMD	MMX, SSE, SSE2, SSE3, SSSE3, SSE4a, SSE4.1/4.2, AVX
Instructions	AES, FMA4, XOP
Fab	32 nm
Transistor Count	N/A
Power Consumption	95 - 125 W
Voltage	0.95 - 1.4125 V
Die Area	316 mm ²
Socket	AM3+

AMD Ryzen 9 7950X

Core name	Raphael	
Release date	September 27, 2022	
Generation	5th	
Architecture	Zen 4	
Frequency	4.5 GHz	
L1 Cache	1MB	
L2 Cache	16MB	
L3 Cache	64MB	
Cores	16	
Threads	32	column
Unlocked	Yes	
Socket	AM5	
Thermal Solution	Not included	
Thermal Design Power	(TDP) 170 W	
Max. Temperature	95 °C	
Word Size	64 bit	
TSMC FinFET process (Lithography)	5 nm	
Transistor count	12600 million	

4 Computer Software

AMD has a variety of different software to serve different purposes. Although they initially started as a hardware company over the years they have begun to diverge and focus on tackling issues on the software side of things. The following are a few of the different softwares used by AMD, particularly in relation to the AMD Ryzen.

ROCm: A piece of software designed to provide a foundation for advanced computers by integrating the CPU and the GPU.

AMD Infinity Hub: A collection of GPU containers and guides for HP, AI, and Machine Learning to allow researchers to have better access to the information needed.

AMD Radeon ProRender: A rendering software designed to produce highly detailed objects and photo-realistic images.

AMD Ryzen Master Utility: The simple overclocking utility for AMD Ryzen processors.

AMD StoreMI Technology: An easy way to expand and accelerate the storage in a PC with an AMD Ryzen processor.

Outside of this AMD has taken steps to create machine learning and self-regulating CPUs in an effort to increase efficiency and hopefully to solve world issues.

5 Conclusion

We learned that AMD has a long and complex history. Though the company is now a thriving business this was not always the case. From humble beginnings, to a bitter rival to INTEL, Advanced Micro Devices has left it's mark on the computing world and will continue to improve and advance how we see computer hardware and software for years to come. It was interesting to see all of the ways that AMD grew over the past 53 years and how they kept up with the ever evolving technological world.

References

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