1. **4004**

**Description**

In 1969, Nippon Calculating Machine Corporation approached Intel to design 12 custom chips for its new Busicom 141-PF\* printing calculator. Intel engineers suggested a family of just four chips, including one that could be programmed for use in a variety of products

Intel designed a set of four chips known as the MCS-4. It included a central processing unit (CPU) chip—the 4004—as well as a supporting read-only memory (ROM) chip for the custom applications programs, a random-access memory (RAM) chip for processing data, and a shift-register chip for the input/output (I/O) port.

It had 2300 transistors. It was made possible by the use of then-new silicon gate technology allowing a higher number of transistors and a faster speed than was possible before

The Intel® 4004 became the first general-purpose programmable processor on the market—a "building block" that engineers could purchase and then customize with software to perform different functions in a wide variety of electronic devices.

**Features**

Max CPU clock rate 740-750 kHz

Upto 92600 instructions per second

Separate program and data storage

4-bit words

8-bit instructions

Address width 12 bits (multiplexed)

**Physical Specifications**

Transistors 2300

Package: 16 pins DIP

**Applications**

Busicom calculator

Arithmetic Manipulations

**Discontinued In**

1981

Reason: Intel was heavily producing CPUs on an x86 compatible architecture

1. **8008**

**Description**

The intel 8008 is an early byte-oriented microprocessor designed by Computer Terminal Corporation (CTC), implemented and manufactured by Intel. Initially know as 1201

It is an 8-bit CPU with an external 14nit address bus that could address 16 KB of mem

**Features**

Max CPU clock rate: 200kHz to 800 kHz

Data width: 8 bits

Address width: 14 bits

Seven 8-bit “scratchpad registers”: the main accumulator (A) and six other registers (B,C,D,E,H and L)

Seven-level push down address call stack. Eight registers are actually used, with the topmost register being the PC

Four condition code status flags: caary(C), even parity(P),zero(Z) and sig(S)

Indirect memory access using the H and L registers

The 8008 was implemented in 10 [μm](https://en.wikipedia.org/wiki/Micrometre) slicon gate enhancement-mode PMOS logic (P-type metal oxide semiconductor logic)

**Physical Specifications**

Transistors: 3500

Package: 18 Pin DIP

**Applications**

Computer Terminals

Calculators

Bottling Machines

1970s ASEA industrial robots

Simple computers

**Discontinued In**

1983

1. **8080**

**Description**

The intel 8080 is the second 8-bit microprocessor designed and manufactured by Intel. It first appeared in 1974 and is an extended and enhanced variant of the earlier 8008.

It is implemented in N-type metal oxide semiconductor (NMOS) which gave faster transistors than those of P-type metal oxide semiconductor logic (PMOS) (Intel 8008)

**Features**

Max XPU clock rate 2MHz to 3.123 MHz

Data width: 8 bits

Address width: 16 bits

**Physical Specifications**

Transistors: 4500

Cores: 1

Package: 40-pin DIP

**Applications**

The 8080 saw greater success in wider sets of applications and is largely credited with starting the microcomputer industry.

Used in many microcomputers, such as MITS Altair 8800 computer, IMSAI 8080.

Single board microcomputers, such as MYCRO-1 and dyna-micro/MMD-1 were based on the Intel 8080

Its early used was made in an Automated Fare Collection system customed and designed for mass transit systems around the world.

Several arcade games were based on Intel 8080.

**Discontinued**

Year 1990

1. **8085**

**Description**

The intel 8085 is an 8-bit microprocessor produced by intel and introduced in March 1976.

Its is a software-binary compatible with more-famous Intel 8080 with only two minor instructions added to support its added interrupt and serial input/output features.

However, it requires less supporting circuitry, allowing simpler and less expensive microcomputer systems to be built.

**Features**

Max CPU clock rate 3,5 and 6 MHz

The processor consists of 16 bit and 8 it address and data lines and so the capacity of the device is 216 which is 64KB approach.

This is constructed of a single NMOS chip device.

As the 8085 microprocessor has 8 bit I/O address lines, it has the ability to address 28 = 256 I/O ports.

It has an approach where it can enhance the interrupt handling mechanism.

Does not support pipelining.

8085 has 5 flags

**Physical Specifications**

Transistors: 6500

Package: 40-pin DIP

**Applications**

The 8085 processor was used in a few early personal computers, for example, the TRS-80 Model 100 line.

The rad-hard version of the 8085 has been on board instrument data processors for several NASA and ESA space physics missions in 1990s and early 200s.

**Discontinued**

Year: 2000

1. **8086**

**Description**

The 8086 (also called iAPX 86) is a  [16-bit](https://en.wikipedia.org/wiki/16-bit) [microprocessor](https://en.wikipedia.org/wiki/Microprocessor) chip designed by [Intel](https://en.wikipedia.org/wiki/Intel) between early 1976 and June 8, 1978, when it was released.

The 8086 gave rise to the [x86](https://en.wikipedia.org/wiki/X86) architecture, which eventually became Intel's most successful line of processors.

**Features**

Max CPU clock rate: 5MHz to 10 MHz

Data width: 16 bits

Address width: 20 bits

Memory Capacity: 1 MB

More than one processor is used. An additional external processor can also be used.

It supports pipelining

Intel 8086 supports memory segmentation whereas 8085 didn’t support memory segmentation.

8086 has 9 flags

**Physical Specifications**

Transistors: 29000

Package: 40 pin DIP

**Applications**

Intel 8086 were used I early IBM PCs.  a version of the 8086 with an 8-bit [data bus](https://en.wikipedia.org/wiki/Bus_(computing))

It started the x86 architecture that still dominates desktops and servers computing today.

[NASA](https://en.wikipedia.org/wiki/NASA) used original 8086 CPUs on equipment for ground-based maintenance of the [Space Shuttle Discovery](https://en.wikipedia.org/wiki/Space_Shuttle_Discovery) until the end of the space shuttle program in 2011

The IBM Displaywriter word processing machine also used 8086.

**Discontinued**

Year: 1998

1. **8088**

**Description**

The **Intel 8088** ("*eighty-eighty-eight*", also called **iAPX 88**)[[2]](https://en.wikipedia.org/wiki/Intel_8088#cite_note-i86-2)[[3]](https://en.wikipedia.org/wiki/Intel_8088#cite_note-i186-3)[[4]](https://en.wikipedia.org/wiki/Intel_8088#cite_note-i286-4) [microprocessor](https://en.wikipedia.org/wiki/Microprocessor) is a variant of the [Intel 8086](https://en.wikipedia.org/wiki/Intel_8086). Introduced on June 1, 1979

The 8088 has an eight-bit external [data bus](https://en.wikipedia.org/wiki/Bus_(computing)) instead of the [16-bit](https://en.wikipedia.org/wiki/16-bit) bus of the 8086.

The 16-bit registers and the one [megabyte](https://en.wikipedia.org/wiki/Megabyte) address range are unchanged

the 8086 and 8088 have the same [execution unit](https://en.wikipedia.org/wiki/Execution_unit) (EU)—only the [bus interface unit](https://en.wikipedia.org/wiki/Bus_(computing)) (BIU) is different. The original [IBM PC](https://en.wikipedia.org/wiki/IBM_Personal_Computer) is based on the 8088

8088 has 9 flags

**Features**

Max CPU clock rate: 5MHz to 16MHz

Data width: 8 bits

Address width: 20 bits

**Physical Specifications**

Transistors: 29000

Package: 40 pin DIP

44 pin PLCC

**Applications**

The original IBM PC is the most influential microcomputer to use the 8088.

**Discontinued**

Year: 1998

1. **80286**

**Description**

The [Intel](https://en.wikipedia.org/wiki/Intel) **80286**[[3]](https://en.wikipedia.org/wiki/Intel_80286#cite_note-3) (also marketed as the **iAPX 286**[[4]](https://en.wikipedia.org/wiki/Intel_80286#cite_note-i286-4) and often called **Intel 286**) is [microprocessor](https://en.wikipedia.org/wiki/Microprocessor) that was introduced on February 1, 1982.

It was the first 8086-based CPU with separate, non-[multiplexed](https://en.wikipedia.org/wiki/Multiplexed) [address](https://en.wikipedia.org/wiki/Address_bus) and [data buses](https://en.wikipedia.org/wiki/Bus_(computing)) and also the first with [memory management](https://en.wikipedia.org/wiki/Memory_management) and wide protection abilities.

**Features**

Max CPU clock rate: 4MHz to 25MHz

FSB speeds: 4MHZ to 25MHz

Data width: 16 bits

Address width: 24 bits

It has a segment-based memory management.

It consisted of four independent units:

1) Address unit

2) Bus Unit

3) Instruction unit

4) Execution unit

The intel 80286 has a 24 bit address bus and was able to address up to 16MB of RAM unlike its predecessor which could address 1MB.

Real Mode:

This microprocessor acts as a version of 8086 which is quite faster. The instruction programmed in 8086 can be executed in 80286. (Memory addressability upto to 1MB of physical memory)

Protected Mode:

It was the first x86 CPU family microprocessor to support protected virtual address mode called protected mode.

It supported multitasking because multiple programs can be executed using virtual memory.

(Memory addressability of 16MB of physical memory and 1GB of vitual memory)

Another important feature was the it prevented unauthorized access

**Physical Specifications**

Transistors: 134000

Package: 68 pin PLCC (Plastic leaded chip carrier)

98 pin LCC (Leadless chip carrier)

100 pin PQFP

68 pin PGA (Pin Grid Array)

**Applications**

Several multitasking instructions were introduced in the protected mode of 80286, which are helpful for multitasking operating systems.

**Discontinued** Year: 1991

1. **80386**

**Description**

The intel 386, originally released as 80386 and later renamed as i386, is a 32 bit microprocessor introduced in 1985.

The processor was a significant evolution in the x86 architecture, and extended a long line of processors.

**Features**

Max CPU clock rate: 12 MHz to 40 MHz

Data width: 32 bits

Address width: 32 bits.

The 80386 added a three stage instruction pipeline (fetch, decode, execute) which it brings up to total 6 stage instruction pipeline

It offered support for register debugging (DR0-DR7)(MOV instructions are used to access them.)

It featured three operating modes:

1) Real mode

2) Protected Mode

3) Virtual Mode

The 80386 is operated I real mode(i.e. 8086 mode) and it allows the microprocessor to address data in the first 1MB of memory

The protected mode was extended to allow to address upto 4 GB of memory

The New virtual mode made it possible to run one or more real mode programs in a protected environment, although some programs were not compatible.

The 80386 has a physical memory of 4GB that can be addresses as a virtual memory with up to 64 TB.

**Physical Specifications**

Transistors: 275000

Package: 132 pin PGA

132 pin PQFP

**Applications**

The first PC based on the intel 80386 as Compaq Deskpro.

intel 386 supported windows 95

Used in mobile phones such as BlackBerry 950 and Nokia 9000 communicator.

**Discontinued**

Year: 2007

1. **80486**

**Description**

The 80486 also i486 was a family of 32 bit 4th generation x86 microprocessors introduced by intel in 1989. It was the first to include more than 1 million transistors on it.

**Features**

Max CPU clock rate: 16 to 100 MHz

FSB speed: 16 MHz to 50 MHz

Data width: 32 bits

Address width: 32 bits

Virtual Address width: 32 bits(Linear and 46 bits (Logical))

Cache: L1 cache 8KB to 16KB

Performance Approximately 2 times faster as the i386 or i286 clock cycle

The improved performance was due to its 5 stage pipeline with all stage bound to a single cycle

The improved FPU (Floating point Unit) chip was significantly faster.

A new feature found in 80486 is the BIST (built in self test) that tests the microprocessor, coprocessor and cache at reset time.

**Physical Specifications**

Transistors: 1.2-1.6 Million

Package: PGA(Socket 1,2,3)

196 pin PQFP

208 pin SQFP

**Applications**

Windows 85,98,NT were the last Microsoft Operating systems to support it.

It continued to be used in embed systems.

**Discontinued**

Year 2007

1. **Pentium**

**Description**

**Pentium** is a brand used for a series of [x86](https://en.wikipedia.org/wiki/X86) architecture-compatible [microprocessors](https://en.wikipedia.org/wiki/Microprocessor) produced by [Intel](https://en.wikipedia.org/wiki/Intel). The [original Pentium](https://en.wikipedia.org/wiki/Pentium_(original)) was released in 1993. It was code-named “P5”

It was instruction set compatible with the [80486](https://en.wikipedia.org/wiki/Intel_80486) but was a new and very different microarchitecture design.

It is almost identical to the earlier 80386 and 80486 microprocessors. Only difference is that it contains a dual cache (Instruction and data) and a dual integer unit.

**Features**

Max CPU clock rate: 60-300 MHz

FSB speed: 50-66 MHz

Cache: L1 Cache: 16-32 KB

The Superscalar structure of the Pentium contains three independent processing units:

1) Floating point unit

2) Two Integer processing units

A new mode of operation called the System Memory Management (SMM) mode has been added to the Pentium. It is intended for high-level system functions as power management and security

The built-in self-testing allows the Pentium to be tested when power is first applied to the system.

**Physical Specifications**

Sockets: socket 4

Socket 5

Socket 7

**Applications**

Mostly developed to have s robust hardware for multitasking in IBM mainframe computers.

**Discontinued**

Year 2000

1. **Pentium Pro**

**Description**

The **Pentium Pro** is a sixth-generation [x86](https://en.wikipedia.org/wiki/X86) [microprocessor](https://en.wikipedia.org/wiki/Microprocessor) developed and manufactured by [Intel](https://en.wikipedia.org/wiki/Intel) and introduced on November 1, 1995

**Features**

Max CPU clock rate: 150 MHz to 200 MHz

FSB speeds: 60 MHz o 66 MHz

The Pentium Pro is an enhanced version of the Pentium microprocessor that contains not only the level 1 caches found inside the Pentium, but the level 2 cache of 256 K or 512K found on most main boards

The Pentium Pro incorporated a new [microarchitecture](https://en.wikipedia.org/wiki/Microarchitecture), different from the Pentium's [P5](https://en.wikipedia.org/wiki/P5_(microarchitecture)) microarchitecture. It has a decoupled, 14-stage superpipe lined architecture which used an instruction pool.

The only hardware difference between the Pentium Pro and the earlier microprocessors is the addition of 2M paging and four extra address lines that allow access to a memory address space of 64 GB.

An even bigger factor in the Pentium Pro’s performance improvement is down to the combination of technologies known as dynamic execution. This includes branch prediction, data flow analysis and speculative execution

**Physical Specifications**

Transistors: 5.5 million

Socket: socket 8

**Applications**

Pentium chips were mostly widely used CPUs for general purpose computing.

**Discontinued**

Year: 1998

1. **Pentium II**

**Description**

The **Pentium II**[[2]](https://en.wikipedia.org/wiki/Pentium_II#cite_note-2) brand refers to [Intel](https://en.wikipedia.org/wiki/Intel)'s sixth-generation [microarchitecture](https://en.wikipedia.org/wiki/Microarchitecture) ("[P6](https://en.wikipedia.org/wiki/P6_(microarchitecture))") and [x86](https://en.wikipedia.org/wiki/X86)-compatible [microprocessors](https://en.wikipedia.org/wiki/Microprocessor) introduced on May 7, 1997.

Pentium II featured an improved version of the first *P6*-generation core of the [Pentium Pro](https://en.wikipedia.org/wiki/Pentium_Pro), which contained 5.5 million transistors. However, its L2 cache subsystem was a downgrade when compared to the Pentium Pros.

**Features**

Max CPU clock speed: 233 MHz to 450 MHz

FSB speeds: 66 MHz to 100 MHz

The Pentium II was basically a more consumer-oriented version of the Pentium Pro. It was cheaper to manufacture because of the separate, slower L2 cache memory.

The slower and cheaper L2 cache's performance penalty was mitigated by the doubled L1 cache and architectural improvements for legacy code.

**Physical Specifications**

Sockets: slot 1

MMC 1

MMC 2

Mini Cartridge

PPGA B^15

**Applications**

Widely used in personal computers

Used in Mobile phones

**Discontinued**

Year: 2003

1. **Pentium III**

**Description**

The **Pentium III** refers to [Intel](https://en.wikipedia.org/wiki/Intel)'s [32-bit](https://en.wikipedia.org/wiki/32-bit) [x86](https://en.wikipedia.org/wiki/X86) desktop and mobile [microprocessors](https://en.wikipedia.org/wiki/Microprocessor) based on the sixth-generation [P6 microarchitecture](https://en.wikipedia.org/wiki/P6_(microarchitecture)) introduced on February 26, 1999.

**Features**

Max CPU clock rate: 400 MHz to 1.4 GHz

FSB speeds: 100 MHz to 133 MHz

Internet Streaming SIMD Extensions for enhanced video, sound and 3D Performance.

Integrated high performance 16 KB instruction and 16 KB data, nonblocking, level one cache

256 KB Integrated Full speed level two cache allows for low latency on read/store operations

8-way cache associativity provides improved cache hit ratio on read/store operations

Intel processor serial number

Power management capabilities

1) System management mode

2) Multiple Low Power states

Error correcting code for system Bus data

**Physical Specifications**

Sockets: slot 1, socket 370, socket 495(Mobile) and socket 479(Mobile)

**Applications**

**Discontinued**

2007

1. **Pentium IV**

**Description**

**Pentium 4**[[1]](https://en.wikipedia.org/wiki/Pentium_4#cite_note-1)[[2]](https://en.wikipedia.org/wiki/Pentium_4#cite_note-2) is a series of single-core [CPUs](https://en.wikipedia.org/wiki/Central_processing_unit) for [desktops](https://en.wikipedia.org/wiki/Desktop_computer), [laptops](https://en.wikipedia.org/wiki/Laptop) and entry-level [servers](https://en.wikipedia.org/wiki/Server_(computing)) manufactured by [Intel](https://en.wikipedia.org/wiki/Intel). The processors were shipped from November 20, 2000

**Features**

Max CPU Clock Rate: 1.3 GHz to 3.8 GHz

FSB speeds: 400 MT/s to 1066 MT/s

Intel NetBurst microarchitecture

Hyper Pipelines Technology

* Advance Dynamic Execution
* Very Deep Out-of-order execution

Enhanced Branch Prediction

16KB Level 1 data cache

1MB advanced Transfer Cache (Full speed Level 2)with 8 way associativity and Error correcting code

Enhanced floating point and multimedia unit for enhanced video, audio, encryption and 3D performance

Power management capabilities

1) System management mode

2) Multiple Low Power states

144 Streaming SIMD Extension 2 (SSE2) instruction

**Physical Specifications**

Transistors: 42M 180 nm

55M 130 nm

169 130 nm

125 90 m

188 nm

Sockets: socket 423, socket 478, LGA 775

**Applications**

Used in personal computers

It was used to serve multiple users

Graphic related applications speeds were increased

**Discontinued**

Year 2008

1. **Pentium Prescott**

**Description**

On February 1, 2004, Intel introduced a new core codenamed "Prescott". The core used the [90 nm](https://en.wikipedia.org/wiki/90_nanometer) process for the first time

**Features**

Max CPU clock rate: 3.5 GHz

It had an expanded 31 stage pipeline

Improved branch prediction in Prescott

Intel also increased the L2 cache size to 1MB, as well as doubling the L1 cache size to 16KB

Improved Hyper Threading(Simultaneous Multithreading ) Performance

**Physical Specifications**

Transistors: 125 Million

**Applications**

**Discontinued**

1. **Intel Core 2**

**Description**

**Features**

**Physical Specifications**

**Applications**

**Discontinued**

1. **Pentium Dual Core**

**Description**

**Features**

**Physical Specifications**

**Applications**

**Discontinued**

1. **Intel 64 Netburst**

**Description**

**Features**

**Physical Specifications**

**Applications**

**Discontinued**

1. **Intel 64 Core**

**Description**

**Features**

**Physical Specifications**

**Applications**

**Discontinued**

1. **Intel 64 Broadwell**

**Description**

**Features**

**Physical Specifications**

**Applications**

**Discontinued**