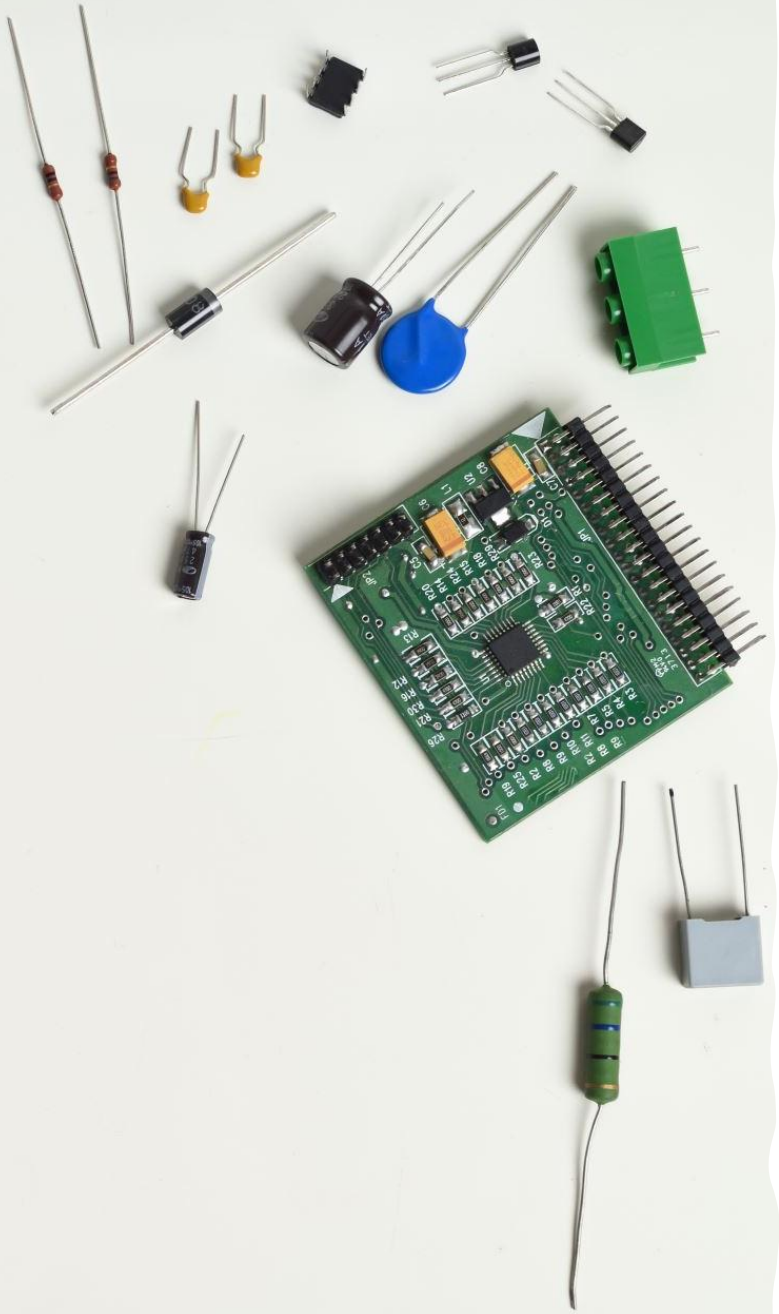


8086 Microprocessor

Program controlled semiconductor device (IC) which fetches (from memory), decodes and executes instructions.

It is used as CPU (Central Processing Unit) in computers.

Features of 8086 Microprocessor

- The 8086 is a 16-bit microprocessor.
- The 8086 has a 16-bit data bus, so it can read data from or write data to memory and ports either 16 bits or 8 bits at a time.
- The 8086 has a 20-bit address bus, so it can directly access 2^{20} or 10,48,576 (1Mb) memory locations.
- The 8086 provides fourteen 16-bit registers.
- The Intel 8086 is designed to operate in two modes, namely the minimum mode and the maximum mode.
- It performs the arithmetic and logical operations on bit, byte, word and decimal numbers including multiply and divide.

Fifth Generation **Pentium**

Fourth Generation
During 1980s
Low power version of HMOS technology (HCMOS)
32 bit processors
Physical memory space 2^{24} bytes = 16 Mb
Virtual memory space 2^{40} bytes = 1 Tb
Floating point hardware
Supports increased number of addressing modes

Intel 80386

Third Generation
During 1978
HMOS technology ⇒ Faster speed, Higher packing density
16 bit processors ⇒ 40/ 48/ 64 pins
Easier to program
Dynamically relatable programs
Processor has multiply/ divide arithmetic hardware
More powerful interrupt handling capabilities
Flexible I/O port addressing

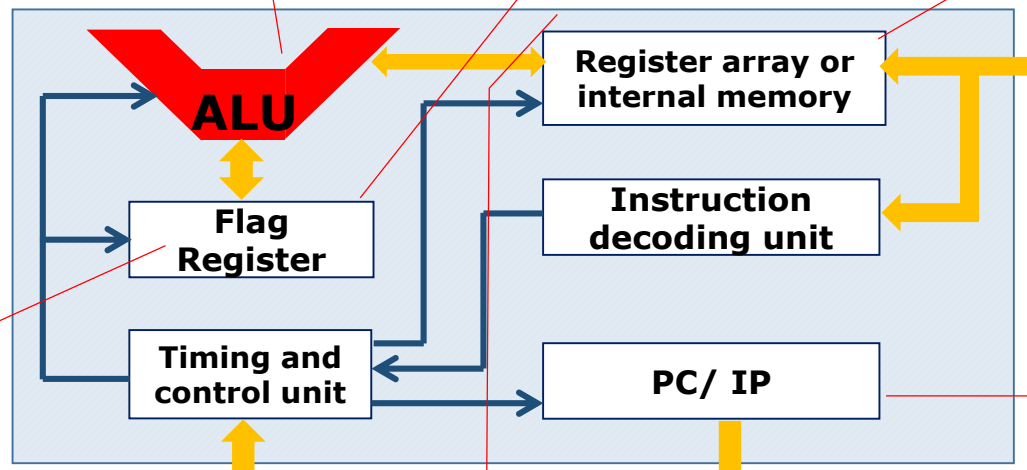
Intel 8086 (16 bit processor)

Second Generation
During 1973
NMOS technology ⇒ Faster speed, Higher density, Compatible with TTL
4 / 8/ 16 bit processors ⇒ 40 pins
Ability to address large memory spaces and I/O ports
Greater number of levels of subroutine nesting
Better interrupt handling capabilities

Intel 8085 (8 bit processor)

First Generation
Between 1971 – 1973
PMOS technology, non compatible with TTL
4 bit processors ⇒ 16 pins
8 and 16 bit processors ⇒ 40 pins
Due to limitations of pins, signals are multiplexed

Functional blocks



Computational Unit; performs arithmetic and logic operations

Various conditions of the results are stored as status bits called flags in flag register

Internal storage of data

Generates the address of the instructions to be fetched from the memory and send through address bus to the memory

Generates control signals for internal and external operations of the microprocessor

Decodes instructions; sends information to the timing and control unit

Overview of 8086

First 16- bit processor released by INTEL in the year 1978

Originally HMOS, now manufactured using HMOS III technique

Approximately 29, 000 transistors, 40 pin DIP, 5V supply

20-bit address to access memory ⇒ can address up to 2^{20} = 1 megabytes of memory space.

Addressable memory space is organized in to two banks of 512 kb each; Even (or lower) bank and Odd (or higher) bank. Address line A_0 is used to select even bank and control signal $\overline{BHE}$ is used to access odd bank

Uses a separate 16 bit address for I/O mapped devices ⇒ can generate 2^{16} = 64 k addresses.

Operates in two modes: minimum mode and maximum mode, decided by the signal at MN and $\overline{MX}$ pins.