Intel 8086 Family of Microprocessor

Organization of the IBM Personal Computers

Covering topics

- Closer look at the IBM personal computer
- 8086 and 8088
- 80186 and 80188
- 80286
- 80386 and 80386SX
- 80486 and 80496SX

Intel 8086 microprocessors

- IBM personal computer family consists of IBM PC,PC XT, PC AT, PS/1 and PS/2 models.
- All these models are based on 8086 family microprocessors, which includes 8086, 8088, 80186, 80188, 80286, ……. .
- 8088 used in PC and PC XT.
- 80286 used in PC AT and PS/1.
- 80186 used in some PC compatible laptop models.
- PS/2 models use either 8086, 80286, 80386 or 80486.

8086 and 8088

- Intel corporation in 1978 introduced first 16-bit microprocessor.
- 8088 were introduced in 1979. Internally it has same architecture like 8086, however externally it has 8-bit data bus, and has minor clock rate as compare to 8086.
- 8088 were designed for original PC because it was less expensive.

80186 and 80188

- Enhanced version of 8086 and 8088.
- These processors incorporates some supported chips.
- Can executed some new instruction, it has extended instruction set.
- No significant advantage over 8086 and 8088 and were soon over shadowed by the development of 80286.

80286

- Introduced in 1982, were also 16-bit microprocessor.
- Can operate faster than 8086(12.5mhz vs 10mhz) and posses following advantages.
- Two modes of operation:
  - **Real Mode:** In this mode it behaves like 8086.
  - **Protected Mode:** Also called protected virtual address mode support multitasking and memory protection.
- More addressable memory: In protected mode these processors can address 16mb of physical memory compare to 8086 which can address 1mb.
- Virtual memory in protected mode: Can treat external storage like internal physical memory. So can execute programs that are too large to accommodate in physical memory, such programs can be up to 1GB.

80386 and 80386SX

- In 1985 first 32-bit microprocessor were introduced.
- Very fast 32-bit data bus, with high clock rate.
- Can operate in real mode or protected mode.
- It also has a virtual 8086 mode, designed to run multiple 8086 applications under memory protection.
- 80386 in protected mode can address 4GB of physical memory and 64TB of virtual memory.
- The 80386SX has same internal structure as 80386 but has only 16-bit data bus.

80486 and 80486SX

- Another 32-bit microprocessor introduced in 1989.
- It has 9kb of cache memory and floating point processor.
- Three time faster.
- 80486SX is similar to 80486 without floating point processor.

References

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- Intel 8080/8085 Assembly Language Programming, Radion Shack, Intel Corporation 1978
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