

## Introduction to Microprocessor:

Microprocessor is an important part of the computer. Without it the computer is totally useless. It is a chip that has all the functions of the CPU of a computer. The micro processor has the following functions of data storage, interaction with other peripheral devices and other time related functions. The Micro processor is the CPU (central processing unit) itself which has undergone marvelous changes since its invention. Its role is to send and receive data and make the computer function well. Commands need to be given for this chip to function that is already fed inside the device in the form of current variations. On the whole we can say that a microprocessor is a CPU integrated into a small silicon chip that comprise of thousands of small components such as- diodes, transistors and resistors that work together.



## Evolution of Microprocessor:

Microprocessor has turned into the brain of millions of gadgets, since year 1971 i.e. devoid of microprocessors these wonderful innovations of millions of gadgets would have not been possible. Now come have a look at the gadgets in which the microprocessors are playing an imperative role from more than 40 long years.

- **Business Calculator:** A business calculator was invented in the year 1971. The Unicom 141P business calculator was out of the foremost gadgets that feature a microprocessor.
- **Commodore PET:** The PET was invented in the year 1971 and is broadly recognized as the primary all-in-one home computer.
- **Washing Machine:** The foremost microchip controlled washing machines were launched in the year **1977** and gave a bang to the market, showcasing the varied usages of innovative technology.
- **Arcade Mania in the year 1980:** Namco pioneered Pac-Man in the walkways of the Unite States and ignited a new trend.
- **Osborne 1 Laptop:** With five screen and 10.7kgs of weight, Osborne 1 Laptop was invented in the year 1981. It actually was the great grand-father of most modern laptops.
- **Nintendo NES:** Consoles revitalized the gaming industry in the year 1986 such as Nintendo Entertainment System.
- **Computing Democratized:** Personal & business computing blasted with a broad variety of laptops, desktops & even early tabs. These inventions came up in the year 1991.

- **MP3 Player:** The modern way to enjoy to music forever altered in the last 1990s with the foremost MP3 player, which was invented in the year 1997.
- **BlackBerry:** The Smartphone insurgence boosted with the launch of RIM's Blackberry 850. The 1<sup>st</sup> BB was accessible in the year 1999.
- **Apple iPod:** Apple launched its 1<sup>st</sup> iPod in the year 2001; its release gave the future of MP3 music format a new selection of set tunes.
- **Microsoft Windows Tablet:** Approximately a decade prior to the shopper's fascination with tab, Microsoft Windows Tablet was launched in the year 2002, business were employing these tabs for more useful jobs.
- **Netbook:** Netbooks were launched in the year 2008, as small and light-weighted gadget for carrying out uncomplicated jobs and enjoying media & internet content on the move.
- **Apple iPod:** Tabs strike the customers main-stream with the release of iPod in the year 2010.
- **Digital Signage in the year 2011:** Digital Signage was 1<sup>st</sup> of the vast new usages for the microprocessor. Intellectual, internet allied gadgets are more and more found in the daily life from business and retail to farming and automobiles.
- **Ultrabook in the year 2011:** The advancement of the Personal Computer takes an additional gigantic step as trendy Ultrabook gadgets push ahead high performance computing experience.

## Types and Specifications of Microprocessor:

### Types of microprocessor:

There are basically 5 kinds of microprocessors namely:

- **Complex Instruction Set Microprocessors:** They are also called as CISM in short and they categorize a micro processor in which orders can be executed together along with other low level activities. It mainly performs the task of uploading, downloading and recalling data into and from the memory card. Apart from that it also does complex mathematical calculations within a single command.
- **Reduced Instruction Set Microprocessor:** This processor is also called as RISC. These kinds of chips are made according to the function in which the microprocessor can carry out small things within a particular command. In this way it completes more commands at a faster rate.
- **Superscalar Processors:** This is a processor that copies the hardware on the microprocessor for performing numerous tasks at a time. They can be used for arithmetic and as multipliers. They have several operational units and thus carry out more than a one command by constantly transmitting various instructions to the superfluous operational units inside the processor.
- **The Application Specific Integrated Circuit:** This processor is also known as ASIC. They are used for specific purposes that comprises of automotive emissions control or personal digital assistants computer. This kind of processor is made with proper specification but apart from that it can also be made using the off the shelf gears.
- **Digital Signal Multiprocessors:** Also called as DSP's, these are used for encoding and decoding videos or to convert the digital and video to analog and analog to digital. They need a microprocessor that is excellent in mathematical calculations. The chips of this processor are employed in SONAR, RADAR, home theaters audio gears, Mobile phones and TV set top boxes.

### Microprocessor Specifications:

- **External and Internal Data Bus:** The most initial microprocessors could handle information only in 8 bits. As the width of the data bus increases it determines the amount of information that can be moved in and out in a single operation. Apart from that it also states the amount of instructions and numbers that can

be used. Also the width of the internal bus and storage area differs from the external bus. Thus it differs from company to company. However the Pentium processors have an external 64 bit data bus.

- **Cache Memory:** When the speed of the processor increases the RAM finds it difficult to withstand it. Thus to minimize the size and the cost, RAM uses dynamic RAM which is faster in one hand while on the other very expensive. Thus it is used less for temporary storage of files on the microprocessor this is called as cache memory. It is also called as high speed memory and is operated by a cache controller that identifies which data and instruction would be required for the next and accordingly loads it into the cache.
- **Speed of Clock:** The oscillator that is fixed above the motherboard generates a number of electronic pulses that is used by the computer to synchronize operations. The change in the signal from positive to negative and vice versa is a cycle and thus the amount of cycle per second is calculated in hertz. The processor's speed is generally the multiple of the external bus.
- **MIPS:** A microprocessor generally requires 10 clocks cycle to complete a single instruction. Also the speed of the clock does not relate directly to the speed at which the CPU processes the instructions. To measure more than one instruction at a time modern processors have multiple pipelines, however apart from this a more accurate way to measure the speed of the processor is with the help of MIPS (Millions of instructions per second).
- **Power Consumption:** Power consumption is also a way of measuring the performance of the microprocessor. The formula for this is volts X Amps = watts. If the power consume id much then it is give as heat and if there is low consumption it helps in increasing the batter life of notebook computers.

## 8085 Microprocessor:

This was introduced by the Intel Company in the year 1977 to 1990. It was compatible with Intel 8080 but needed less support of the hardware. The 5 in the model was added as it requires plus 5 voltages. Minus 5 voltage and plus 12 voltage. It is an 8 bit general purpose microprocessor that can easily store 64k bite of memory. These were used in computers that used the CP or M operating system.

## 8085 Microprocessor architecture:

In this microprocessor the program can be located from anywhere in the memory. Also the program, data and the stack memories occupy equal memory. Also the information can be placed anywhere as it uses 16 bit addresses. It has about 5 interrupts that range from the lowest to the highest. It has 256 input and output ports.

## 8086 Microprocessor:

This is more advanced that 8085 microprocessor as it has 16 bit microprocessor chip. It was released between the years 1976 to 1978. It was designed in order to allow the assembly language for the 8008. 8080. New kinds of instructions were added in this microprocessor and microcoded divide and multiply instructions. It had 16 bit registers including the stack pointer.

## 8086 Microprocessor architecture:

The total memory size of this is 1 MB KB. Also it sues 16 bit pointers. However it can address only 64 kb of memory. It sues special segment registers in order to use memory more than 64 kb. The programs can be located anywhere in the memory instructions such as jump and call can be used within the 64 kb code limit. It can access data in any one among the 4 available segments

## Microprocessor and Interfacing:

A microprocessor to become a more useful device needs to be connected to other electronic device. In order to design a computer the microprocessor needs to be interfaced to the main memory, keyboard, USB ports, disk memory etc. now in this process of interfacing we come across two types namely Memory Interfacing and I/O Interfacing.

- **Memory interfacing:** The microprocessor needs to access memory for the purpose of reading instructions and codes stored in the memory the memory requires a set of signals to read from and write to the registers. The same way the microprocessor too transmits signals for the purpose of data reading and writing. The process of interfacing here requires the match the requirement of the memory with the signals of the microprocessor. Thus, it should be designed in such a way that both of these match thus the primary purpose of the memory interfacing is to help the microprocessor in reading and writing data at the given register of the chip.
- **I/O interfacing:** The keyboard and the displays need to be interfaced with the microprocessor as it is used as a channel of communication. This is called as I/O interfacing. Latches and buffers are used in this type for interfacing keyboards and displays with the microprocessor. However one drawback in this method is that it can just perform a single function. It performs as an input device when connected to the buffer and as an output device when connected to the latch. Thus this interfacing has a limited capability.

Now that you know what is a microprocessor and what are its different types and usage in our technology you will definitely not have any doubt regarding it in your near future and can confidently answer to people who know the least about it.

Source: <http://www.electronicshub.org/microprocessors/>