Microprocessors and Microcontrollers

Welcome to the World of Microprocessors & Microcontrollers. This blogs gives Microprocessors and Microcontrollers along with few simple Assembly Langua Microprocessors and 8051 Microcontrollers

Wednesday, 21 May 2014

8085 Microprocessor

8085 Microprocessor

- 8085 microprocessor was introduced by Intel in the year 1976.
- The 8080 processor was updated with Enable/Disable instruction pins and Interrupt pins to form the 8085 microprocessor.
- 8085 is an 8-bit microprocessor
- It is 40 pin dual in line package IC with single + 5V supply
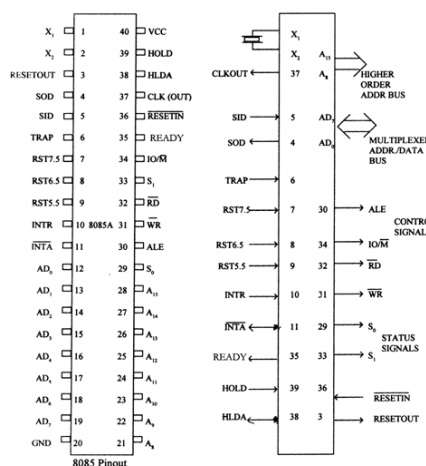- Has 8 bit data bus and 16 bit address bus

Fig1: 8085 Pin Diagram and Signal Description

As in Fig1, 8085 is a general purpose microprocessor having 40 pins and works on single power supply. To study the pin diagram we group the signals into 7 categories:

1.Power Supply
2.Clock Signals
3.Interrupt Signals
4.Address and Data bus
5.Control and Status signals
6.Serial I/O Port
7.DMA Request Signals

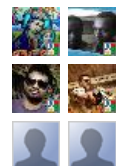## Total Pageviews

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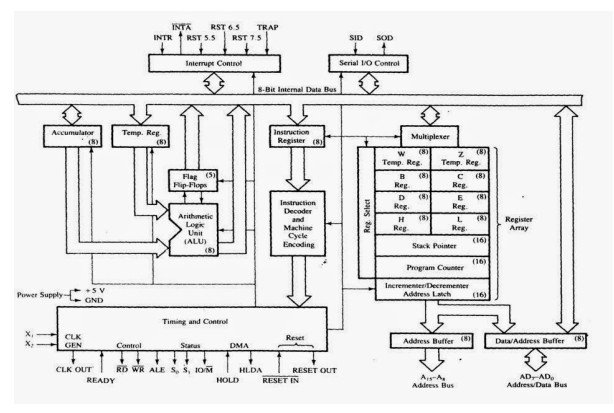Sign in

Architecture of 8085 Microprocessor

Fig2: Functional Block Diagram of 8085 Microprocessor.

Accumulator:- It is a 8-bit register which is used to perform arithmetical and logical operation. It stores the output of any operation. It also works as registers for I/O accesses.

Temporary Register:- It is a 8-bit register which is used to hold the data on which the accumulator is computing operation. It is also called as operand register because it provides operands to ALU.

Registers:- These are general purposes registers. Microprocessor consists 6 general purpose registers of 8-bit each named as B,C,D,E,H and L.   Generally theses registers are not used for storing the data permanently. It carries the 8-bits data. These are used only during the execution of the instructions.

These registers can also be used to carry the 16 bits data by making the pair of 2 registers. The valid register pairs available are BC,DE HL. We can not use other pairs except BC,DEand HL. These registers are programmed by user.

ALU:- ALU performs the arithmetic operations and logical operation.

Flag Registers:- It consists of 5 flip flop which changes its status according to the result stored in an accumulator. It is also known as status registers. It is connected to the ALU. There are five flip-flops in the flag register are as follows:

1.Sign(S)
2.Zero(Z)
3.Auxiliary carry(AC)
4.Parity(P)
5.Carry(C)
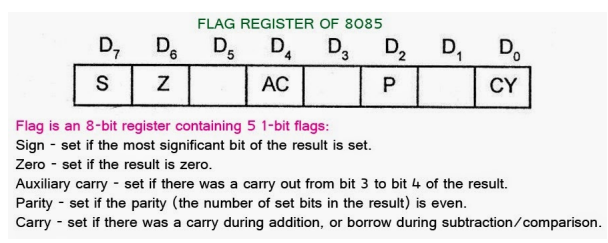
Instruction registers(IR):- It is a 8-bit register. When an instruction is fetched from memory then it is stored in this register.

Instruction Decoder:- Instruction decoder identifies the instructions. It takes the informations from instruction register and decodes the instruction to be performed.

Program Counter:- It is a 16 bit register used as memory pointer. It stores the memory address of the next instruction to be executed. So we can say that this register is used to sequencing the

program. Generally the memory have 16 bit addresses so that it has 16 bit memory.
The program counter is set to 0000H.

Stack Pointer:-It is also a 16 bit register used as memory pointer. It points to the memory location called stack. Generally stack is a reserved portion of memory where information can be stores or taken back together.

Timing and Control Unit:-It provides timing and control signal to the microprocessor to perform the various operation.It has three control signal. It controls all external and internal circuits. It operates with reference to clock signal.It synchronizes all the data transfers.
There are three control signal:
1.ALE-Airthmetic Latch Enable, It provides control signal to synchronize the components of microprocessor.
2.RD- This is active low used for reading operation.
3.WR-This is active low used for writing operation.

There are three status signal used in microprocessor S0, S1 and IO/M. It changes its status according the provided input to these pins.

IO/M(Active Low)	S1	S2	Data Bus Status (Output)
0	0	0	Halt
0	0	1	Memory WRITE
0	1	0	Memory READ
1	0	1	IO WRITE
1	1	0	IO READ
0	1	1	Opcode fetch
1	1	1	Interrupt acknowledge

Serial Input Output Control:-There are two pins in this unit. This unit is used for serial data communication.

Interrupt Unit:-There are 6 interrupt pins in this unit. Generally an external hardware is connected to these pins. These pins provide interrupt signal sent by external hardware to microprocessor and microprocessor sends acknowledgement for receiving the interrupt signal. Generally INTA is used for acknowledgement.

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Labels: 8085

What is a Microcontroller?

Microcontroller?

- A microcontroller (abbreviated µC, uC or MCU) is a small computer on a single integrated circuit
- It has a processor core, memory, and programmable input/output peripherals.
- Microcontrollers are **dedicated** to one task and run one specific program continuously.
- The program is stored in ROM(read-only memory) and generally does not change.
- Microcontrollers are "**embedded**" inside some other device (often a consumer product) so that they can control the features or actions of the

product
- Another name for a microcontroller, is "embedded controller."
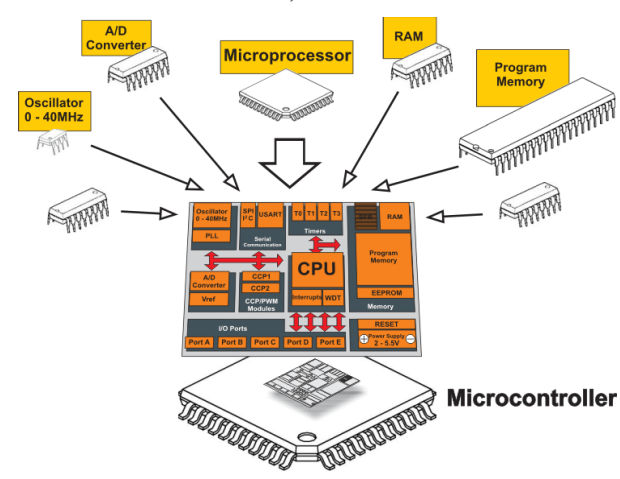
- A typical low-end microcontroller chip might have 1,000 bytes of ROM and 20 bytes of RAM on the chip,along with eight I/0 pins
- With a microcontroller, you have one specific task you are trying to accomplish, and low-cost, low-power performance is what is important.

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What is a Microprocessor?

Microprocessor?

- **Digital IC** built into a square of silicon.
- "**Brain**" of a computer
- Also called as CPU - Incorporates functions of CPU on a single chip
- Programmable device that accepts digital data as input
- Example of sequential digital logic, as it has internal memory
- Perform arithmetic operations, transfer data, make decisions
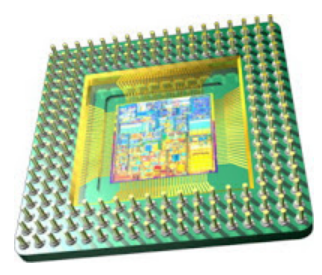
What does a Microprocessor have?

- Contain **millions of transistors** connected by extremely fine wires of aluminum or copper.
- Consists of a control unit and an arithmetic and logical unit (ALU)
-
  Every microprocessor has a fixed set of instruction for its operation
- Has **address bus**, or pathway, along which addresses for storing data travel.
- Has **data bus**, or pathway, along which data is sent to and retrieved from memory.

- Read (RD) and write (WR) lines (connections) that instruct memory.
- A clock line that determines when data is sent
- Arithmetic Logic Unit
- Intruction Decoder
- Registers

How will you choose a Microprocessor?

Microprocessors are defined by the following three characteristics

- **Clock speed.** In MHz, of how many pulses per second are generated by an oscillator within the chip.
- **Bandwidth** (of the data bus). The number of bits of information (1s or 0s) that can be processed at a time.
- **Instruction set.** The complexity of the instructions the microprocessor is capable of performing.

How does a Microprocessor work?

- Fetch - Microprocessor first **fetches** the instruction from the address stored in the Program Counter (PC).
- Decode - Fetched instruction is **decoded** so that it can be interpreted by the microprocessor.
- Execute - Once decoded, the instruction can then be **executed** and the PC incremented so that it contains the address of the next instruction
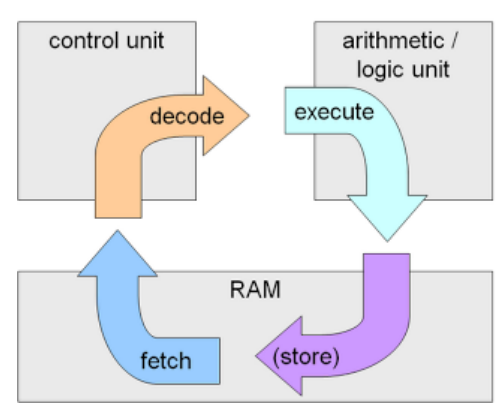
History of Microprocessor

1. Intel 4004 - 1971 - 4bit microprocessor used in calculators
2. Intel 8008 - 1972 - 8bit microprocessor
3. Motorola 6800- 1974 - 8bit microprocessor
4. Intel 8080 - 1975 - 8bit microprocessor
5. Zilog Z80 - 1976 - 8bit microprocessor
6. **Intel 8085 – 1977 – 8bit microprocessor**
7. **Intel 8086 – 1978 – 16bit microprocessor**
8. Intel 8088 - 1979 - 16bit microprocessor

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