

Microprocessor architecture and operations of its components

Microprocessor is programmable digital device, designed with register, and timing elements.
Flip-Flop

Microprocessor has a set of instructions, designed internally to manipulate data and communicate with peripherals.

This process of data manipulation and communication is determined by a logic design of the microprocessor is called architecture.

Microprocessor can be programmed to perform functions on given data by selecting necessary instructions from its set.

Classification of these function—

- Microprocessor initiated operations
- Internal operations
- Peripheral operations

Microprocessor initiated operations and Bus organizations:

Microprocessor perform four operations-

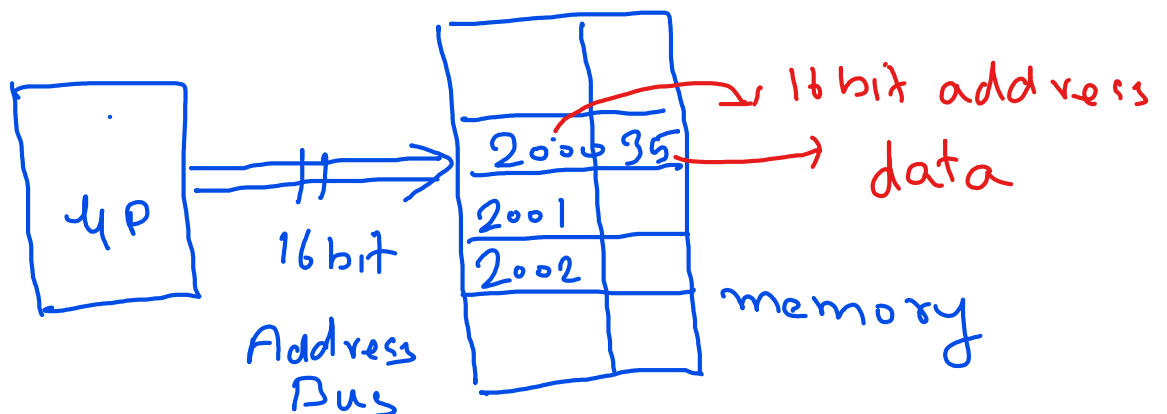
- Memory Read: Reads data from memory
- Memory Write: Writes data into the memory
- I/O Read: Accept data from input devices
- I/O Write: Send data to output devices

for commutation microprocessor to peripherals need three steps:

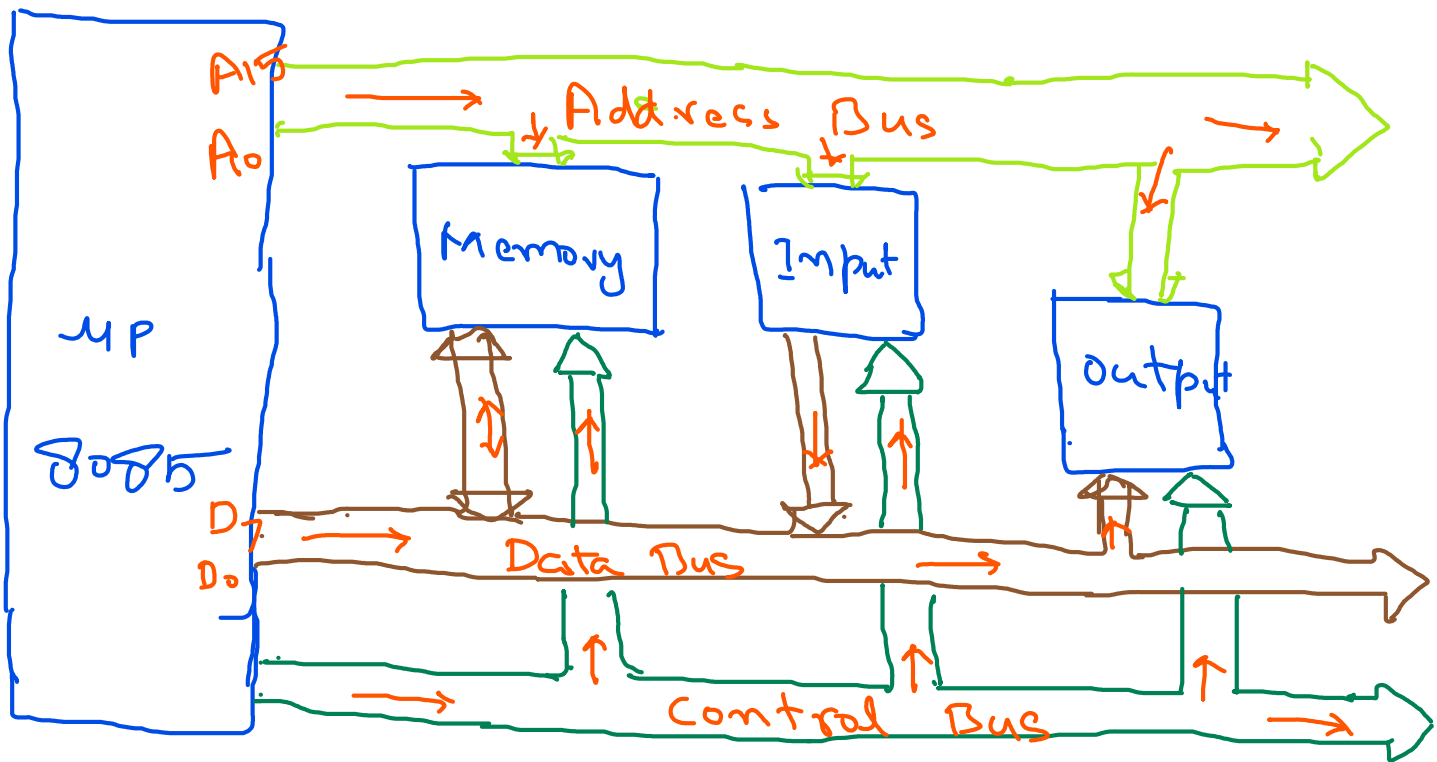
1. Identify the memory location
2. Transfer binary information
3. Provide timing or synchronization signals

Address Bus:

- group of 16 lines ($A_0, A_1, A_2, \dots, A_{15}$)
- This is unidirectional (from μP to memory)
- Functions - to identify memory or peripheral location.
- Location is in binary form called address.



8085 Bus Structure —



8085(MP) $\rightarrow$ 16 Address lines

$\downarrow$

$2^{16} = 65536$ Memory location

$\Rightarrow 64K$

$\Rightarrow$ 16 bit representation
for example.

00000101 00000111 $\Rightarrow$ 16 bit

8 bit 8 bit

↓
05

↓
07

↓
0507 H (Hexadecimal)

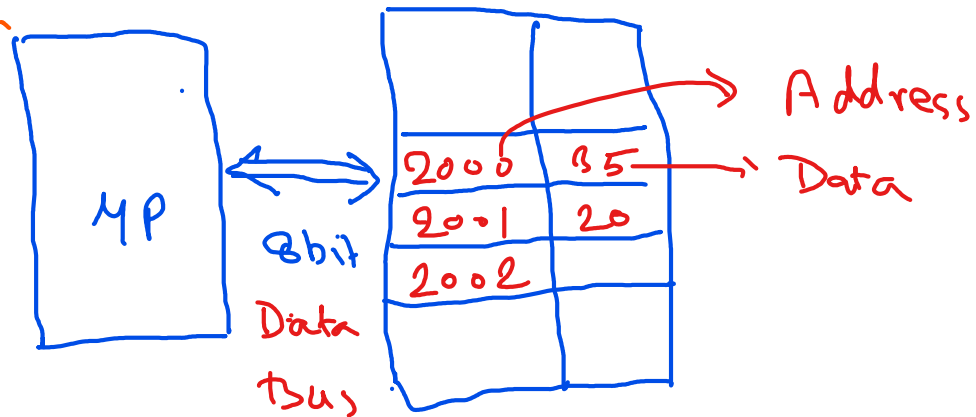
Note - 8085 $\Rightarrow$ 16 bit Address lines

Intel 8080 $\Rightarrow$ 20 bit "

Pentium processor $\Rightarrow$ 32 bit "

Data Bus:-

- group of 8 lines
- Bidirectional



8 bit data $\Rightarrow 2^8 = 256$ numbers

Range - 00H to FFH

0000 0000 $\Rightarrow$ 00H

0000 0001 $\Rightarrow$ 01H

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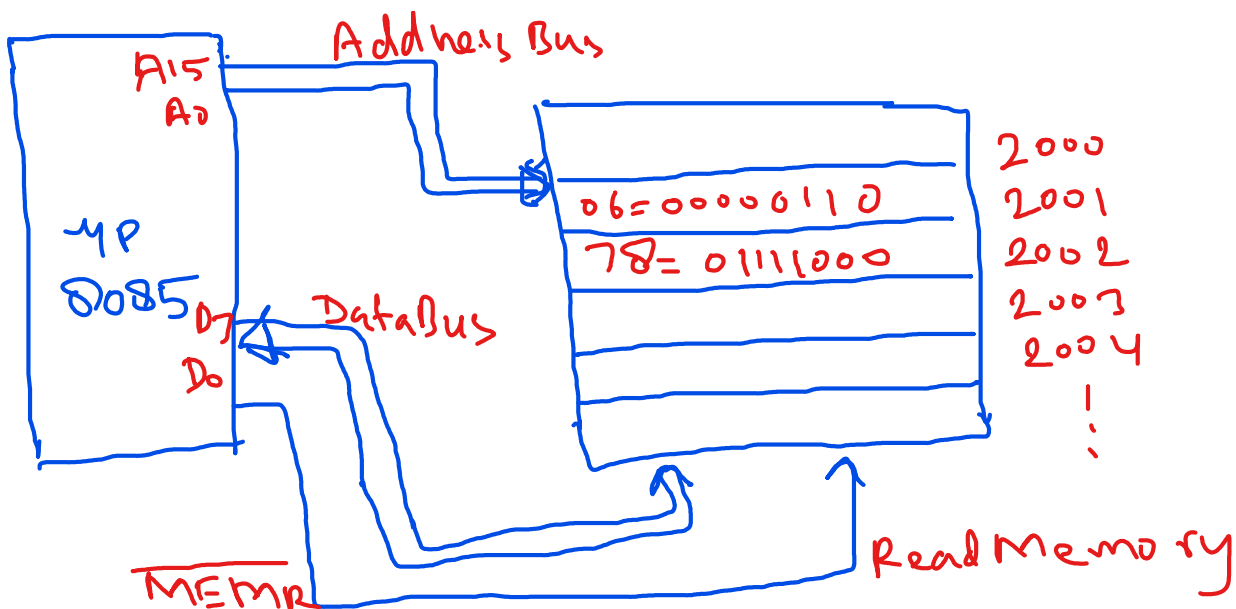
1111 1111 $\rightarrow$ FFH

8085 $\Rightarrow$ 8 bit data bus $\Rightarrow$ 8 bit μ P
 8086
 Zilog Z8000
 Motorola 68000 $\Rightarrow$ 16 bit " $\Rightarrow$ 16 bit μ P
 Intel 80386/486 $\Rightarrow$ 32 bit " $\Rightarrow$ 32 bit μ P

Control Bus:-

- Various single lines
- carry synchronization signal
- function - providing timing signal
- Bus - these are not group of lines like data bus or Address bus but
- provide electronic pulsed generated by μ P (like read or write signal)

Memory read operation —



Internal Data Operations and 8085 Registers:-

- How and what operation performed with data
- These operations are —
 - * Store 8 bit data
 - * Perform Arithmetic and Logic operations
 - * Test for conditions
 - * Sequence the execution of instructions
 - * Store data temporarily during execution in the defined 16 memory location called stack.

Ex

2000	06
2001	78
2002	3E
2003	F2
2004	80
2005	76

MVI B, 76H

MVI A, F2H

ADD B

HLT

8085 Programmable register —

