

How can you interface 8085/8086/80386 microprocessor?

Answer: We can interface 8085/8086/80386 microprocessor as shown in figure below.

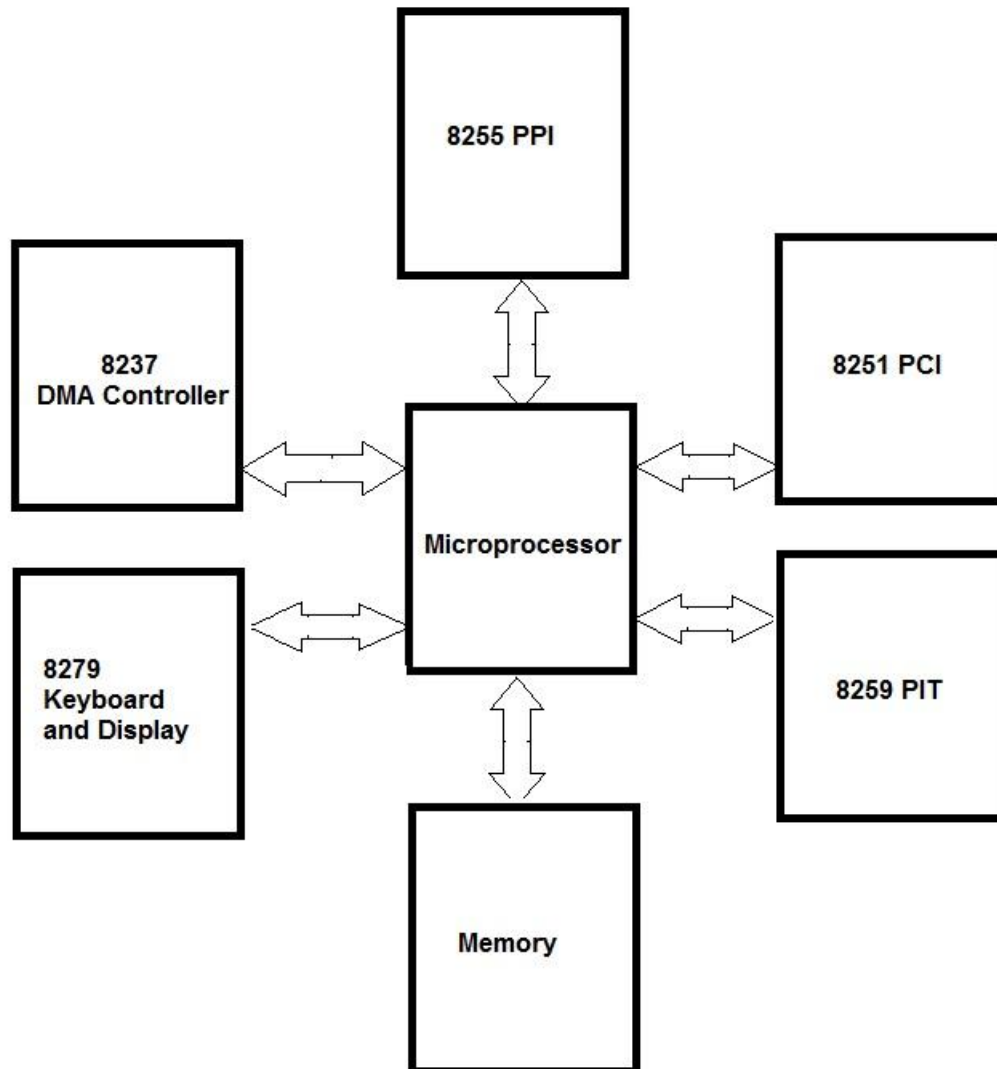


Figure: Microprocessor Interfacing

After drawing figure describe about each block and function of each block in brief. (you can write same answers for interfacing 8085/8086 or any other microprocessors).

Q. Write a Program in 8-bit microprocessor to multiply two 16-bit data stored in memory location from 3000H.

Solution: LHLD 3000H
 XCHG
 LHLD 3002H
 MOV B, H

```

        MOV C, L
        LXI H, 0000H
    AGAIN: DAD D
        JNC SKIP
        INR A
    SKIP:    DCX C
        JNZ AGAIN
        SHLD 3004H        ; result of multiplication stored from memory location
3004H
        STA 3006H        ; carry stored in memory location 3006H
        HLT

```

Q. Write program for 8-bit microprocessor to add two 16-bit numbers stored in memory location 2000H and 3000H and store the result in 4000H

Solution:

```

    LHLD 2000H
    XCHG
    LHLD 3000H
    DAD D
    SHLD 4000H
    HLT

```

Q. Write program for 8085 to subtract 16-bit number at memory location 2000H from 16-bit number at location 2010H. Store the result at 2020H.

Solution:

```

    LHLD 2000H
    XCHG
    LHLD 2010H
    MOV A, L
    SUB E
    MOV L, E
    MOV A, H
    SBB D
    MOV H, A
    SHLD 2020H
    HLT

```

Q. Write a 8-bit microprocessor to store 60h, BAH,7CH,10H in the memory location starting from the 2000H add these data and store the result in 3000H and carry flag in 5001H.

Solution:

```

    MVI A, 60H
    STA 2000H

```

MVI A, BAH
STA 2001H

MVI A , 7CH
STA 2002H
MVI A, 10H
STA 2003H

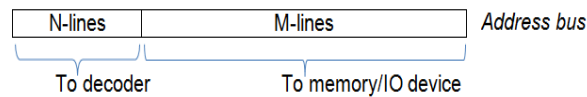
MVI B, 04H
LXI H, 2004H
MOV A, M

L1: INX H
ADD M
JNC L2
INR E

L2: DCR B
JNZ L1
STA 3000H
MOV A, E
STA 5001H
HLT

Q. What do you understand by the decoding in the case of memory interfacing? Explain address using 3 to 8 decoders.

Answer: The process of generating chip select signal (CS) using the address lines of the microprocessor and a decoder or logic-gates, to interface memory devices or IO devices with microprocessor is called address decoding. During address decoding, the address lines of a microprocessor is divided into two parts. N most significant lines and M list significant bits. The N most significant lines are passed to decoder/logic-gates to generate CS signal, whereas the M list significant lines are passed directly to the device (memory/IO).



Address decoding is of two types:

Full Address Decoding (Unique/Absolute Address Decoding)

Partial Address Decoding (Non-Unique Address decoding)

Full Address Decoding: If all the address lines of a microprocessor system is used to address a memory or IO devices, such address decoding is called full address decoding. The address of the memory/IO in this scheme is unique so it is also called unique address decoding or absolute address decoding.

Partial Address Decoding: If all the address lines of microprocessor is not used i.e. only some address lines are used to address a memory location or IO device then it is called partial address decoding. The address of the memory location/IO device is not unique i.e. the memory or IO device may have two or more address. It is also called non-unique address decoding.

Example:

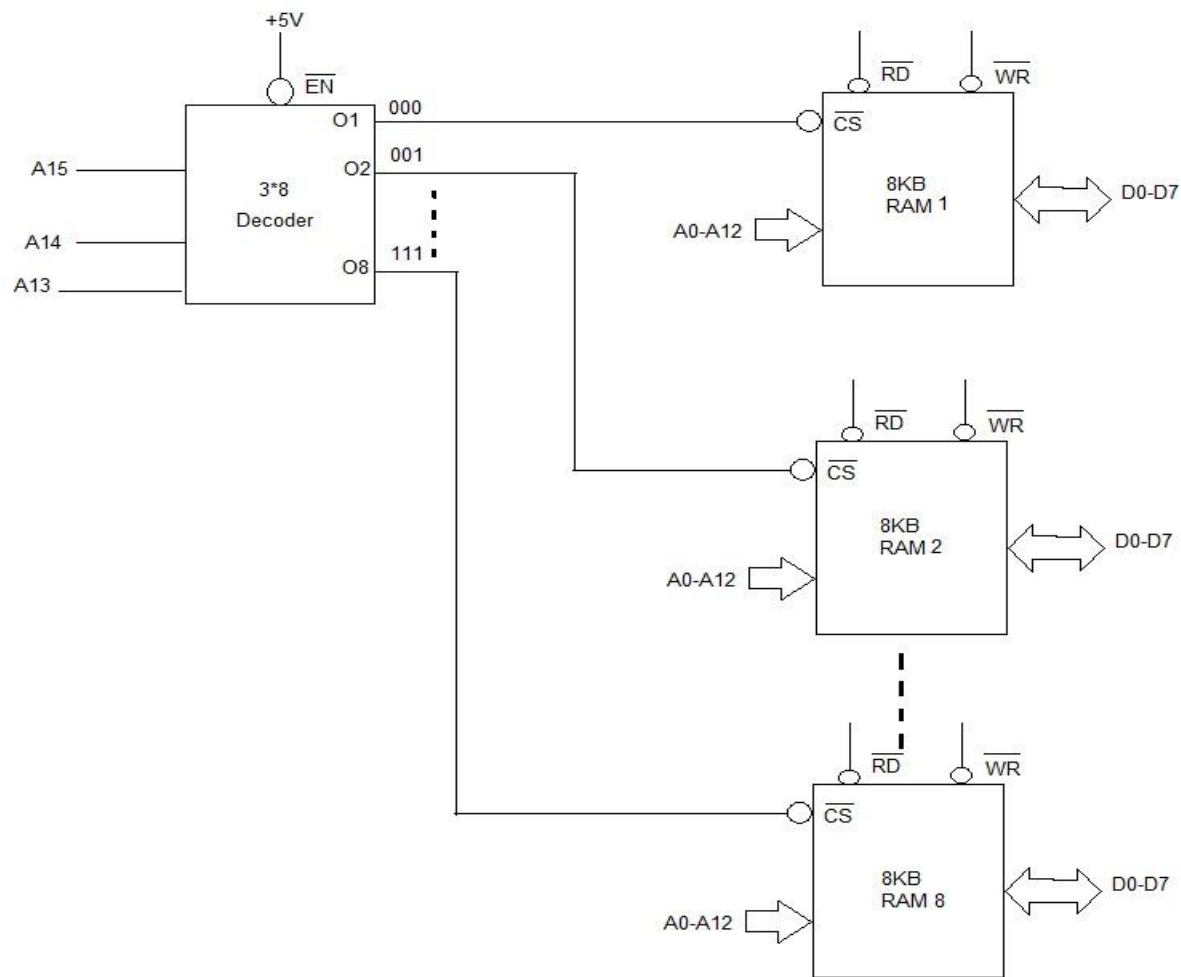
Here we have interfaces eight RAM memory chips each of size 8KB with 8085 Microprocessor using 3*8 decoder.

No. of address lines IN 8085 MP= 16 (A0-A15)

Size of RAM = 8K = $2^3 2^{10} = 2^{13}$

No. of address lines required for RAM= 13 = (A0-A12)

Decoder to be used: 3*8



Address Space:

Memory	A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4	A3	A2	A1	A0	Hex address	
RAM1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000H	Starting Address
	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1FFFH	Ending Address
RAM2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2000H	Starting Address
	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3FFFH	Ending Address
RAM8	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	E000H	Starting Address
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	FFFFH	Ending Address

Hints: For each RAM Starting address: Put 0 to address lines A0 to A12

Ending address: Put 1 to address lines A0 to A12

For A13, A14 and A15, put the output of decoder for both starting and ending address.

Q. What is i/o interface in 8085 MPU?

Answer: Explain about 8255 Programmable Peripheral Interface

Q. How can you achieve pipe lining in the basic microprocessor? Explain the type of basic pipelining with suitable diagram.

Answer: Explain about Instruction Cycle i.e Fetch Cycle and Execute Cycle of SAP-1 with diagram for any SAP-1 instruction. (Refer SAP-1 Notes)

Q. Write an assembly language program for 8086 microprocessor to read string from keyboard and display each word in separate line. The length of string can be up to 60 characters.

Solution:

```
.MODEL SMALL
.STACK
.DATA
    string DB ?
.CODE
    MAIN PROC
        .STARTUP
            MOV CX, 60          ; string length
            MOV SI, OFFSET string

            REPEAT: MOV AH, 01H
                    INT 21H
                    MOV [SI], AL
                    INC SI
                    LOOP REPEAT

                    MOV CX, 60 ; string length
                    MOV SI, OFFSET string

            AGAIN:  MOV DL, [SI]
                    MOV AH, 02H
                    INT 21H
                    CMP [SI], ' ' ; compare with SPACE to print word in new line
                    JNE SKIP

                    MOV DL, 10
                    MOV AH, 02H
                    INT 21H

                    MOV DL, 13
                    MOV AH, 02H
                    INT 21H

            SKIP:  INC SI
                    LOOP AGAIN
```

```
        .EXIT  
    MAIN ENDP  
END MAIN
```