COURSE: UCS1502 - MICROPROCESSORS AND INTERFACING

Memory and I/O interfacing

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This presentation covers

• Details of memory and I/O interfacing

Learning outcome of this module

• To understand the interfacing of memory and I/O.

Memory Interfacing

- Interface 2 chips of 16Kx8 EPROM and 2 chips of 32Kx8 RAM with 8086. Allocate higher address range to EPROM and lower address range to RAM.

Memory Interfacing

- Interface 2 chips of 16Kx8 EPROM and 2 chips of 32Kx8 RAM with 8086. Allocate higher address range to EPROM and lower address range to RAM.

- 2 chips of 16Kx8 EPROM
- Total size = 32K
- Asked to allocate 32K in the higher address range
- So ????? To FFFFF

- Total 32K locations = 32X1024 = 32768 = 8000H
- So to find ????? (starting address = HIGHEST LOCATION – SIZE + 1) ;
- FFFFF – 8000 + 1 = **F8000**

- **F8000 To FFFFF**

Memory Interfacing

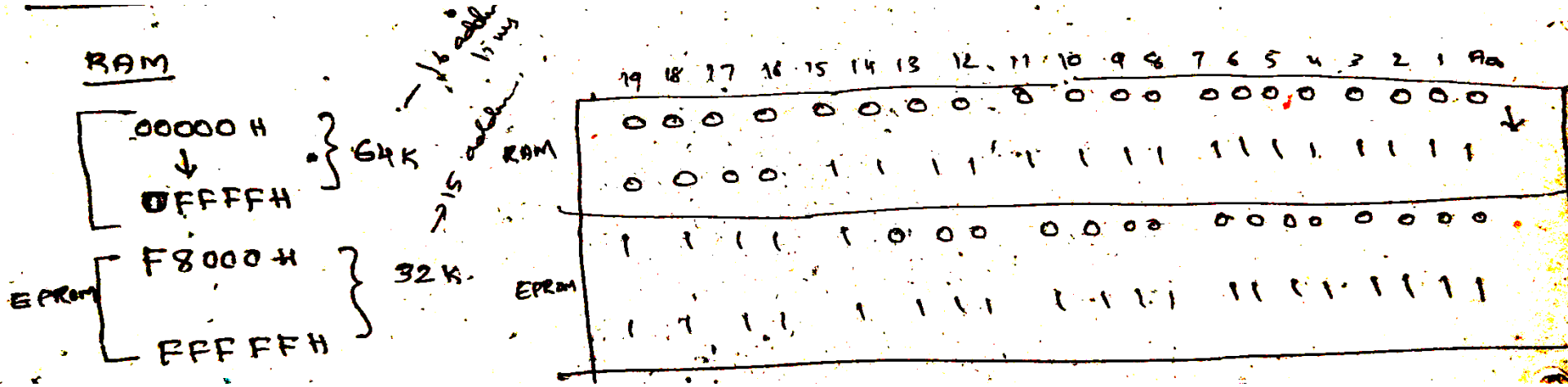
- Interface 2 chips of 16Kx8 EPROM and 2 chips of 32Kx8 RAM with 8086. Allocate higher address range to EPROM and lower address range to RAM.

- 2 chips of 32Kx8 RAM
- Total size = 64K
- Asked to allocate 64K in the lower address range
- So 00000 To ?????

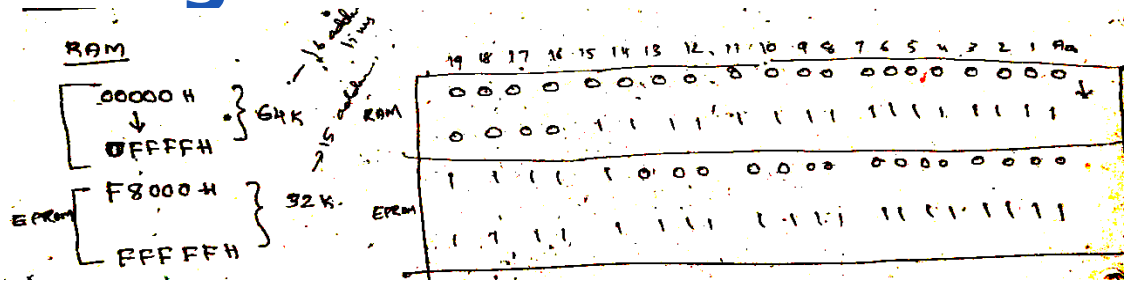
- Total 64K locations = 64X1024 = 65536 = 10000H
- So to find ????? (Ending address = Starting address + SIZE - 1) ;
- 00000 + 10000 - 1 = **FFFF**

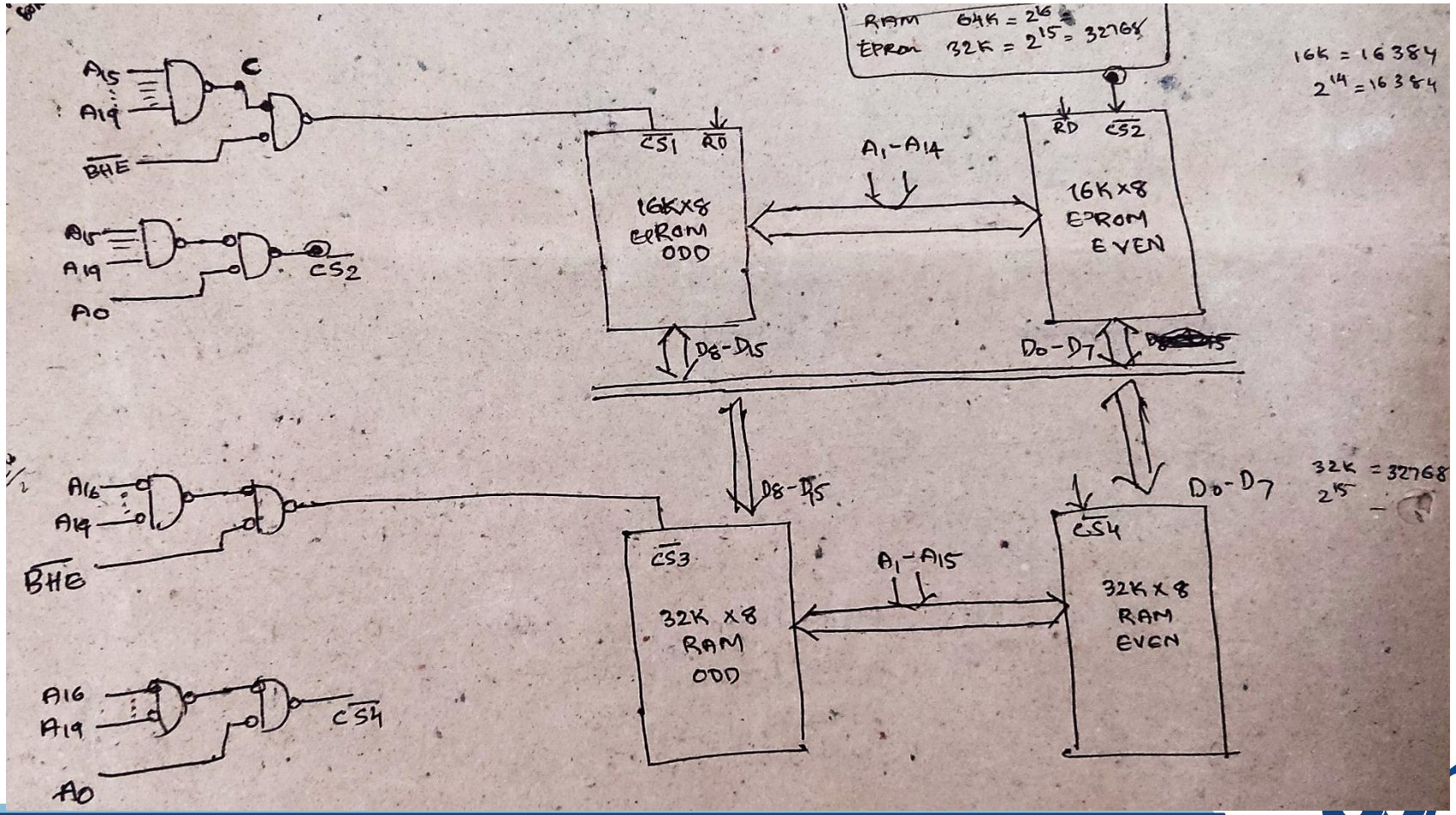
- **00000 To 0FFFF**

Memory Interfacing



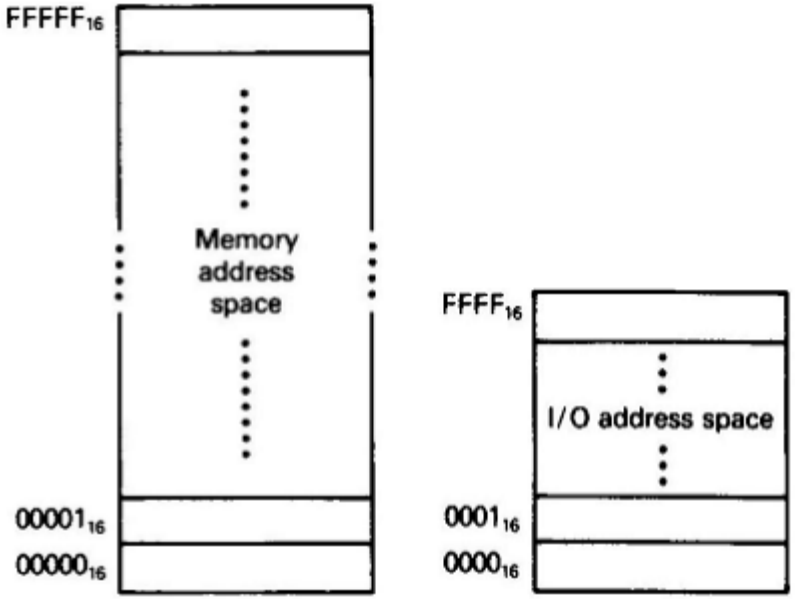
Memory Interfacing





I/O Interfacing

- 2 ways of interfacing
- Memory mapped I/O
- I/O mapped I/O (isolated I/O or peripheral mapped I/O)



I/O Interfacing

Memory mapped I/O

- Allocates memory addresses to Input-Output devices.
- I/O devices are treated as memory locations.
- Any instructions related to memory can be used for accessing the Input-Output device.
- The Input-Output device data are also given to the Arithmetic Logical Unit.

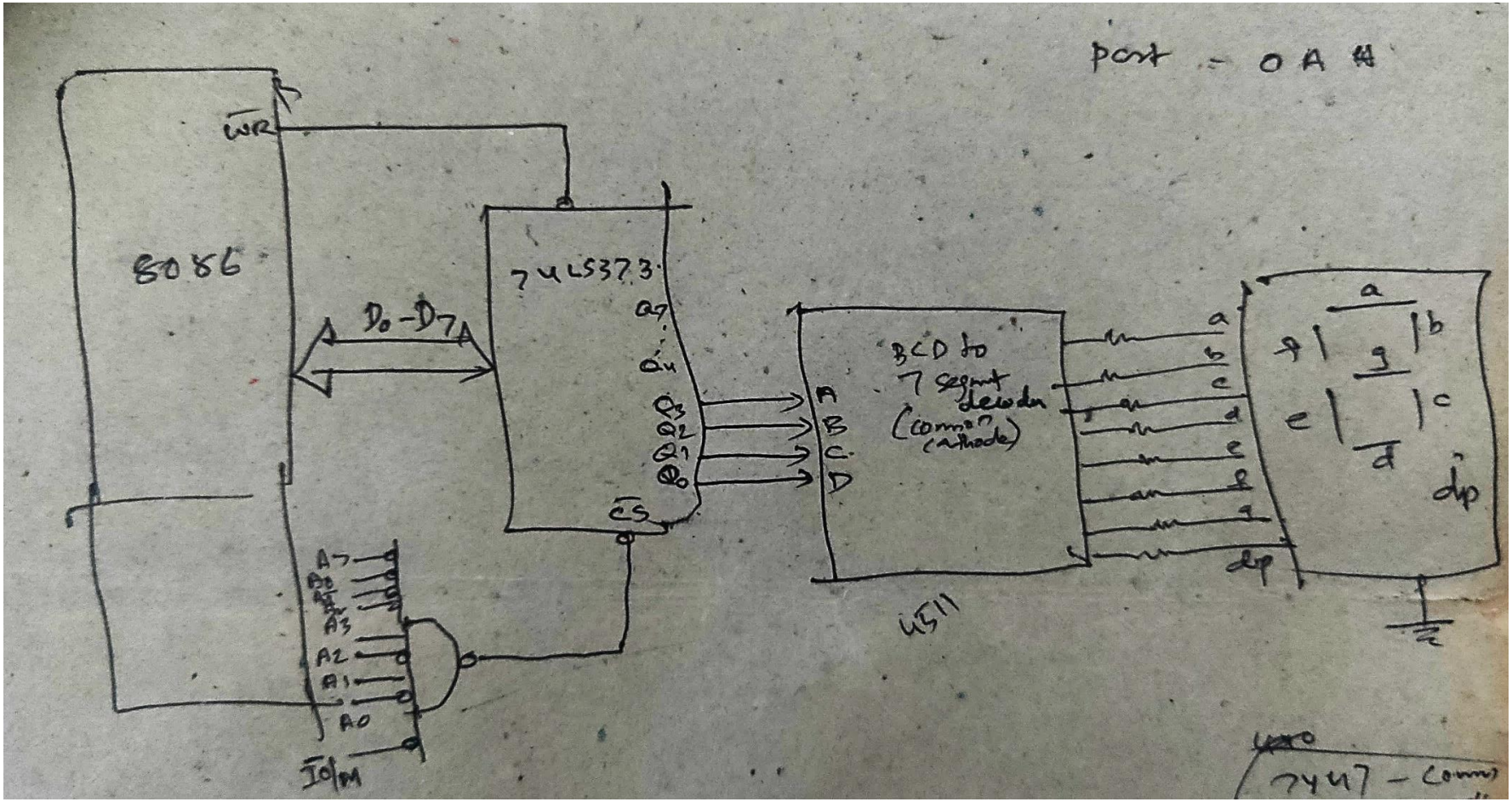
I/O mapped I/O

- Allocates separate I/O address ranges to Input-Output devices
- Only IN and OUT instructions can be used for accessing such devices.
- The ALU operations are not directly applicable to Input-Output data.

I/O Interfacing

- Design an 8086 interface and write ALP for displaying the count from 0 to 9 continuously in a 7 segment LED display. Select the port address suitably. Use I/O mapped I/O for interfacing.

I/O Interfacing

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LABEL1:   MOV AL,00
LABEL2:   OUT 0AH,AL
          CALL DELAY
          INC AL
          CMP AL, 0A
          JZ LABEL1
          JMP LABEL2
```

References

- Doughlas V. Hall, “Microprocessors and Interfacing, Programming and Hardware”, Second Edition, TMH.

Thank you