



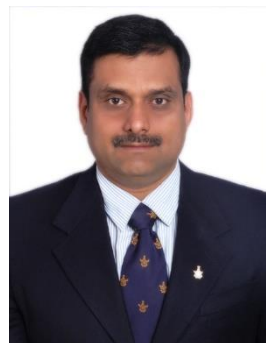
Microprocessors and Interfaces: 2021-22

Lecture 23 :

Memory Interface

Part 2 : 8088 Memory Interface

By Dr. Sanjay Vidhyadharan

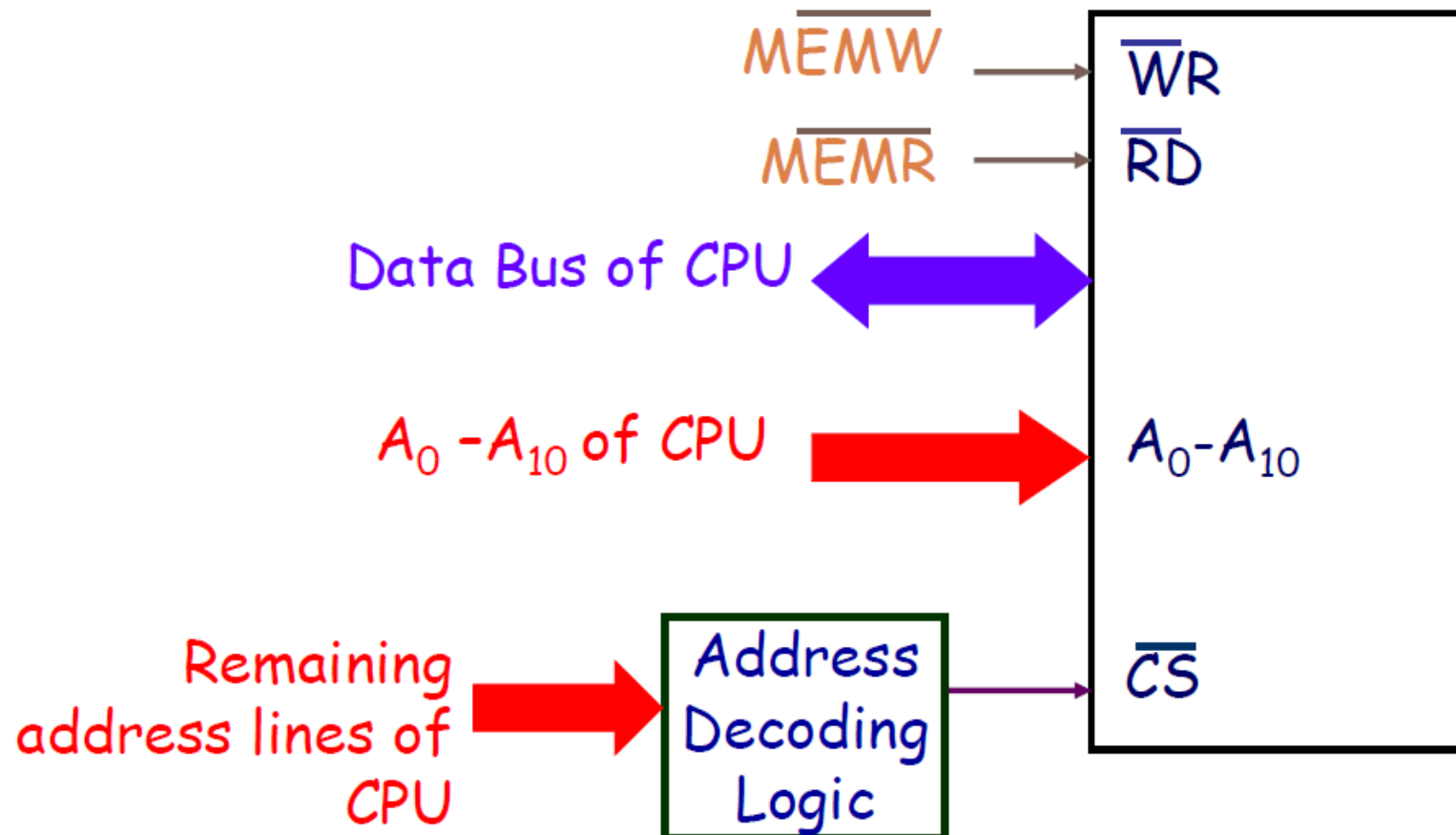


Memory Interfacing

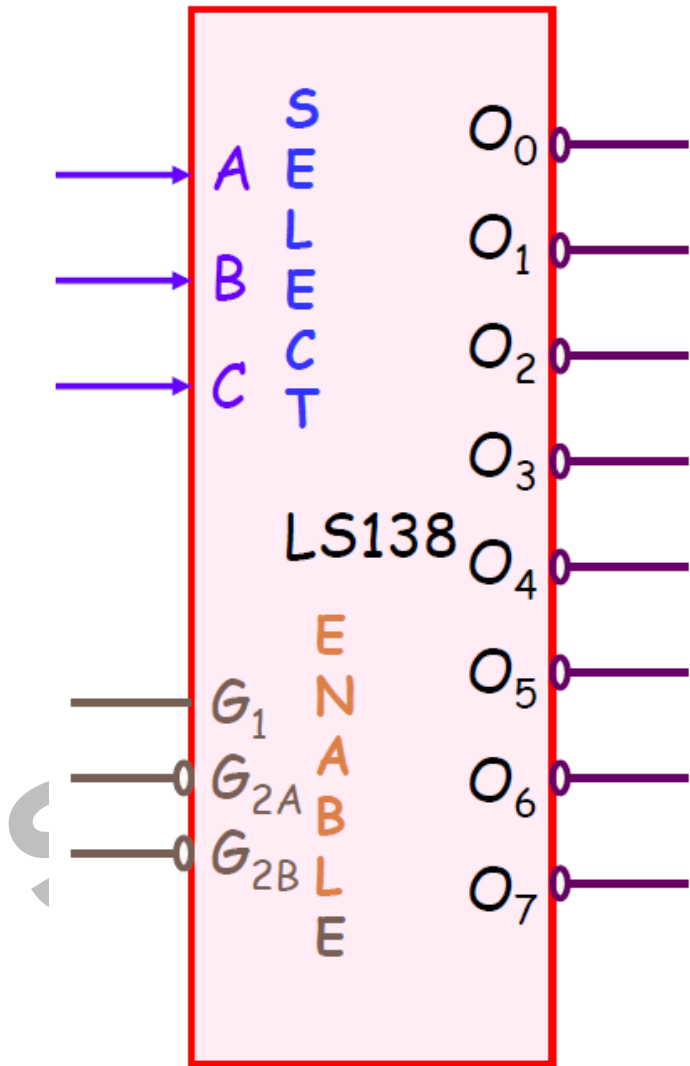
Example: Interfacing 8 K Bytes of memory to 8088 using 2K memory chips

- 8K Memory - 4 - 2K chips of memory
- Memory Mapping
 - RAM1 $00000_H - 007FF_H$
 - RAM2 $00800_H - 00FFF_H$
 - RAM3 $01000_H - 017FF_H$
 - RAM4 $01800_H - 01FFF_H$

Example: Interfacing 8Kbytes of memory to 8088 using 2K memory chips



Memory Address decoding



INPUT						OUTPUT							
ENABLE			SELECT										
G ₁	G _{2A}	G _{2B}	A	B	C	O ₀	O ₁	O ₂	O ₃	O ₄	O ₅	O ₆	O ₇
0	X	X	X	X	X	1	1	1	1	1	1	1	1
X	1	X	X	X	X	1	1	1	1	1	1	1	1
X	X	1	X	X	X	1	1	1	1	1	1	1	1
1	0	0	0	0	0	0	1	1	1	1	1	1	1
1	0	0	0	0	1	1	0	1	1	1	1	1	1
1	0	0	0	1	0	1	1	0	1	1	1	1	1
1	0	0	0	1	1	1	1	1	0	1	1	1	1
1	0	0	1	0	0	1	1	1	1	0	1	1	1
1	0	0	1	0	1	1	1	1	1	1	0	1	1
1	0	0	1	1	0	1	1	1	1	1	1	0	1
1	0	0	1	1	1	1	1	1	1	1	1	1	0

RAM₁ 00000_H - 007FF_H

A ₁₅	A ₁₄	A ₁₃	A ₁₂	A ₁₁	A ₁₀	A ₉	A ₈	A ₇	A ₆	A ₅	A ₄	A ₃	A ₂	A ₁	A ₀
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1

RAM₂ 00800_H - 00FFF_H

A ₁₅	A ₁₄	A ₁₃	A ₁₂	A ₁₁	A ₁₀	A ₉	A ₈	A ₇	A ₆	A ₅	A ₄	A ₃	A ₂	A ₁	A ₀
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1

RAM₃

01000_H-017FF_H

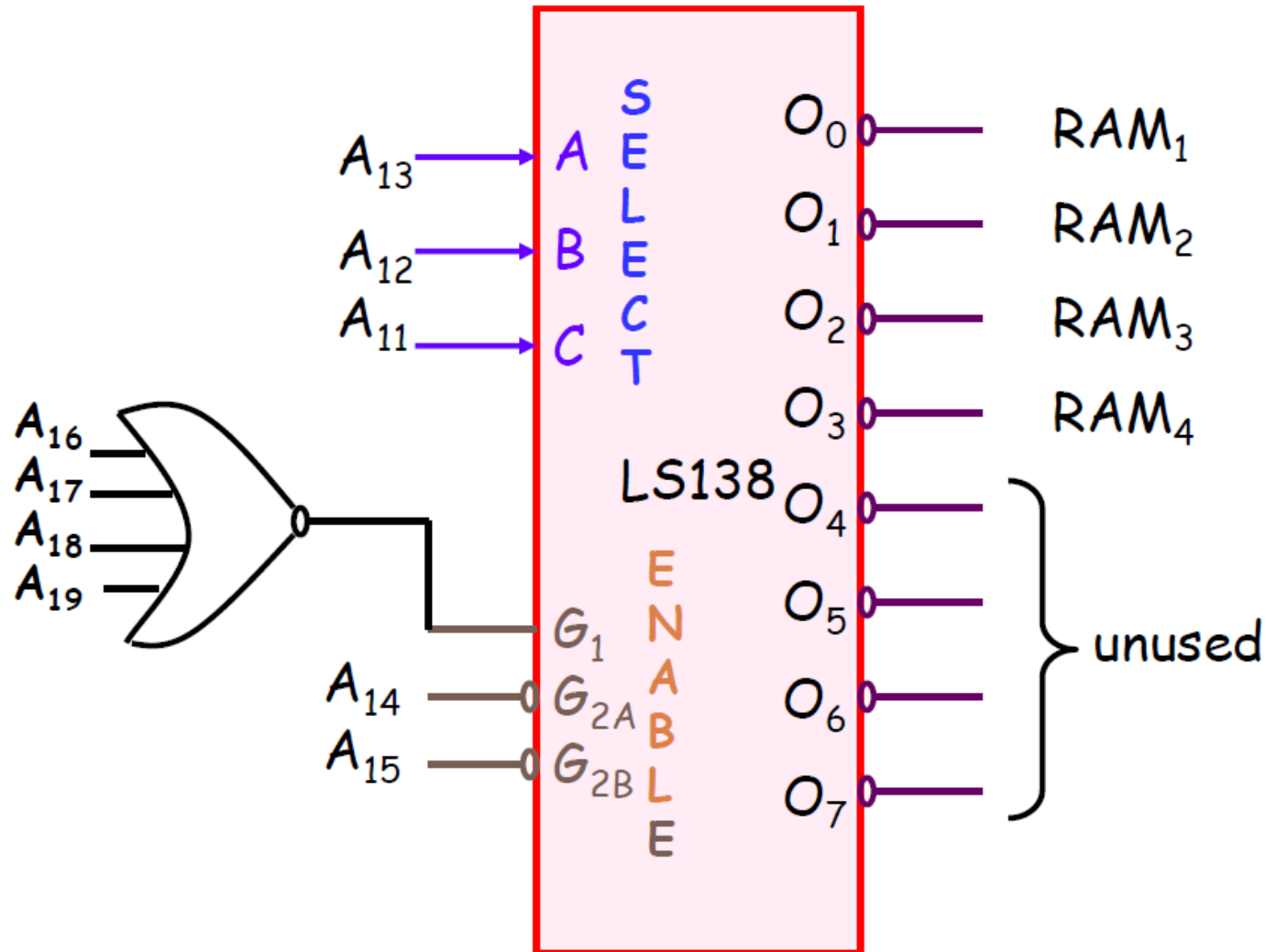
A ₁₅	A ₁₄	A ₁₃	A ₁₂	A ₁₁	A ₁₀	A ₉	A ₈	A ₇	A ₆	A ₅	A ₄	A ₃	A ₂	A ₁	A ₀
0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1

RAM₄

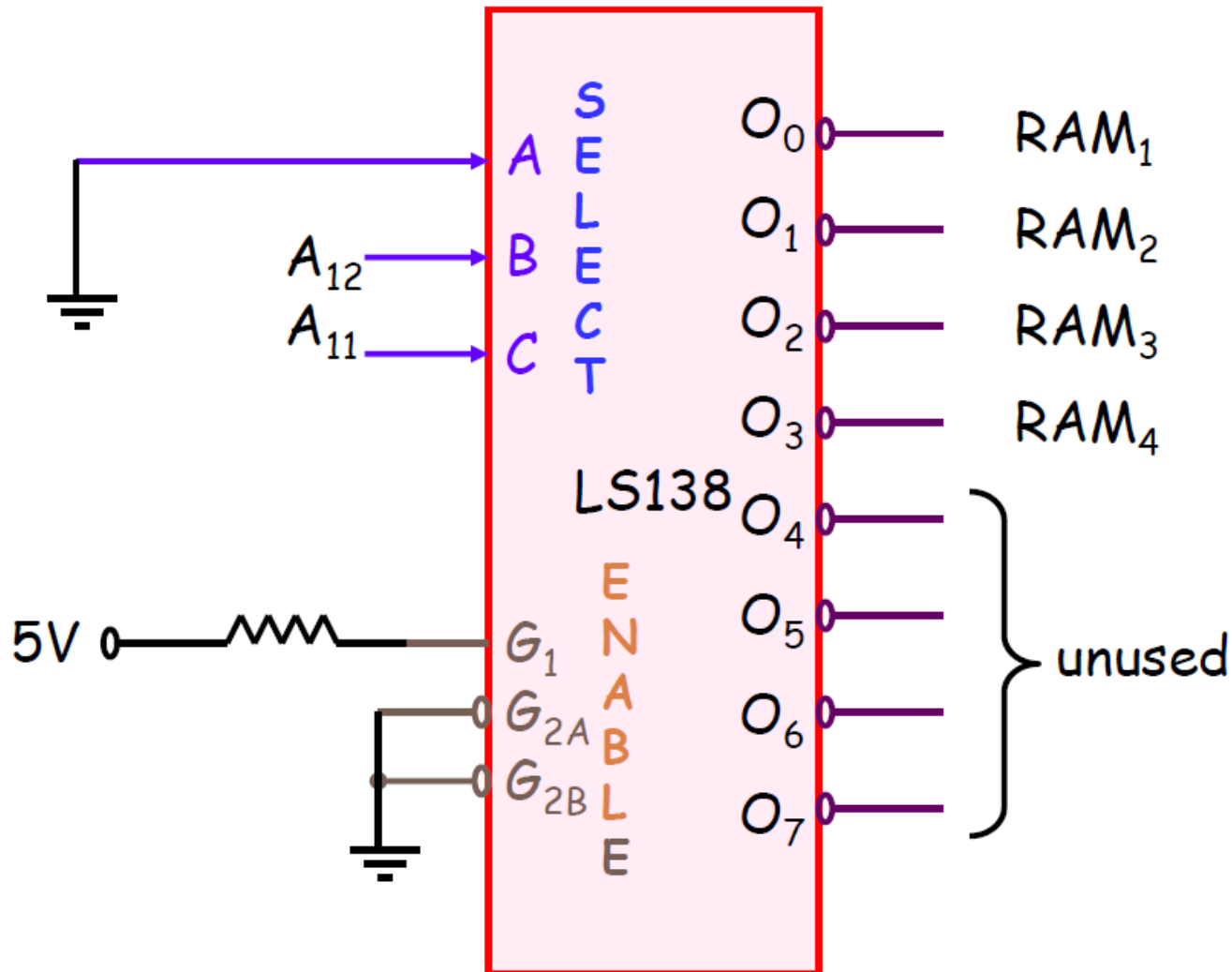
01800_H-01FFF_H

A ₁₅	A ₁₄	A ₁₃	A ₁₂	A ₁₁	A ₁₀	A ₉	A ₈	A ₇	A ₆	A ₅	A ₄	A ₃	A ₂	A ₁	A ₀
0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1

Absolute Addressing



Incremental Addressing



Example

Interface the memory to 8088 using the chips available

4K - 2716 (ROM) starting at 00000_H

8K - 6116 (SRAM) starting at 08000_H

Example

Memory Requirements

2716 - ROM - size 2K (16/8)

ROM - 4k

Number of 2716 required - 2

6116 - RAM size 2k (16/8)

RAM - 8k

Number of 6116 required - 4

Example

Memory map:

ROM₁ - 00000_H - 007FF_H

ROM₂ - 00800_H - 00FFF_H

RAM₁ - 08000_H - 087FF_H

RAM₂ - 08800_H - 08FFF_H

RAM₃ - 09000_H - 097FF_H

RAM₄ - 09800_H - 09FFF_H

Example

ROM₁

00000_H - 007FF_H

A ₁₅	A ₁₄	A ₁₃	A ₁₂	A ₁₁	A ₁₀	A ₉	A ₈	A ₇	A ₆	A ₅	A ₄	A ₃	A ₂	A ₁	A ₀
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1

ROM₂

00800_H - 00FFF_H

A ₁₅	A ₁₄	A ₁₃	A ₁₂	A ₁₁	A ₁₀	A ₉	A ₈	A ₇	A ₆	A ₅	A ₄	A ₃	A ₂	A ₁	A ₀
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1

RAM₁

08000_H - 087FF_H

A ₁₅	A ₁₄	A ₁₃	A ₁₂	A ₁₁	A ₁₀	A ₉	A ₈	A ₇	A ₆	A ₅	A ₄	A ₃	A ₂	A ₁	A ₀
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1

Example

RAM₂

08800_H- 08FFF_H

A ₁₅	A ₁₄	A ₁₃	A ₁₂	A ₁₁	A ₁₀	A ₉	A ₈	A ₇	A ₆	A ₅	A ₄	A ₃	A ₂	A ₁	A ₀
1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1

RAM₃

09000_H-097FF_H

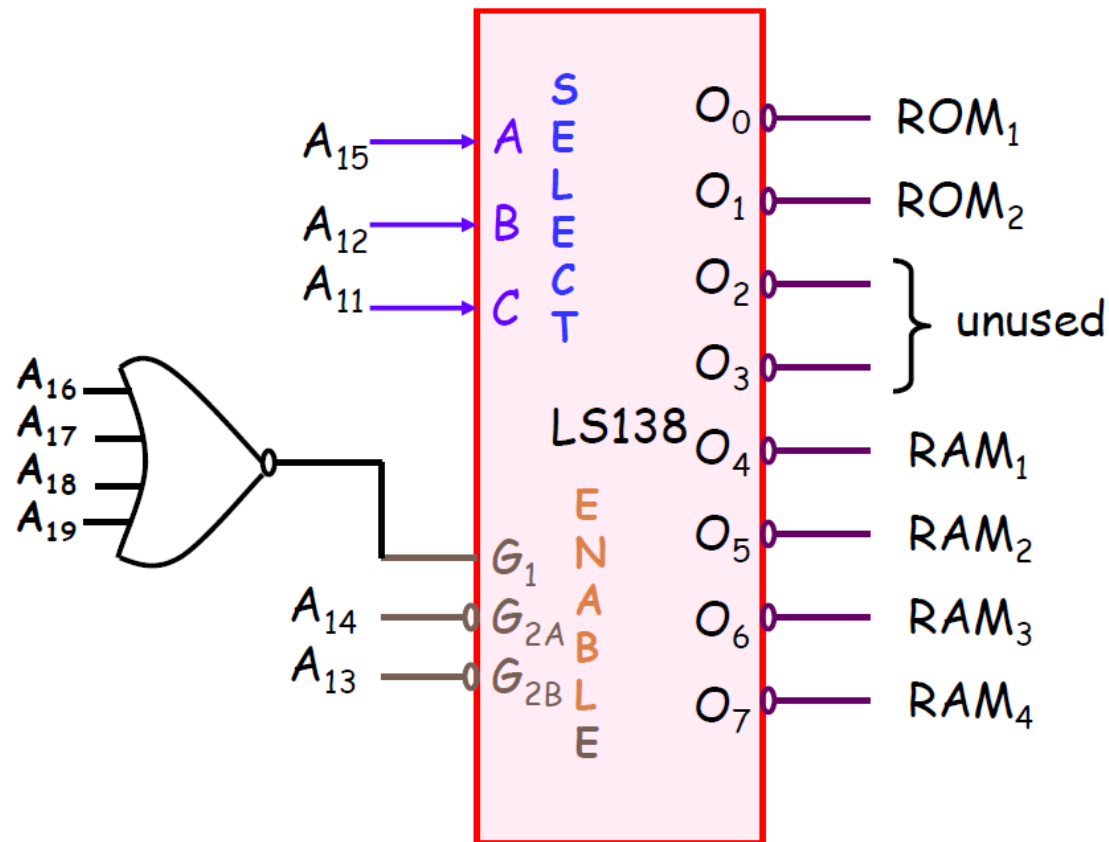
A ₁₅	A ₁₄	A ₁₃	A ₁₂	A ₁₁	A ₁₀	A ₉	A ₈	A ₇	A ₆	A ₅	A ₄	A ₃	A ₂	A ₁	A ₀
1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1

RAM₄

09800_H-09FFF_H

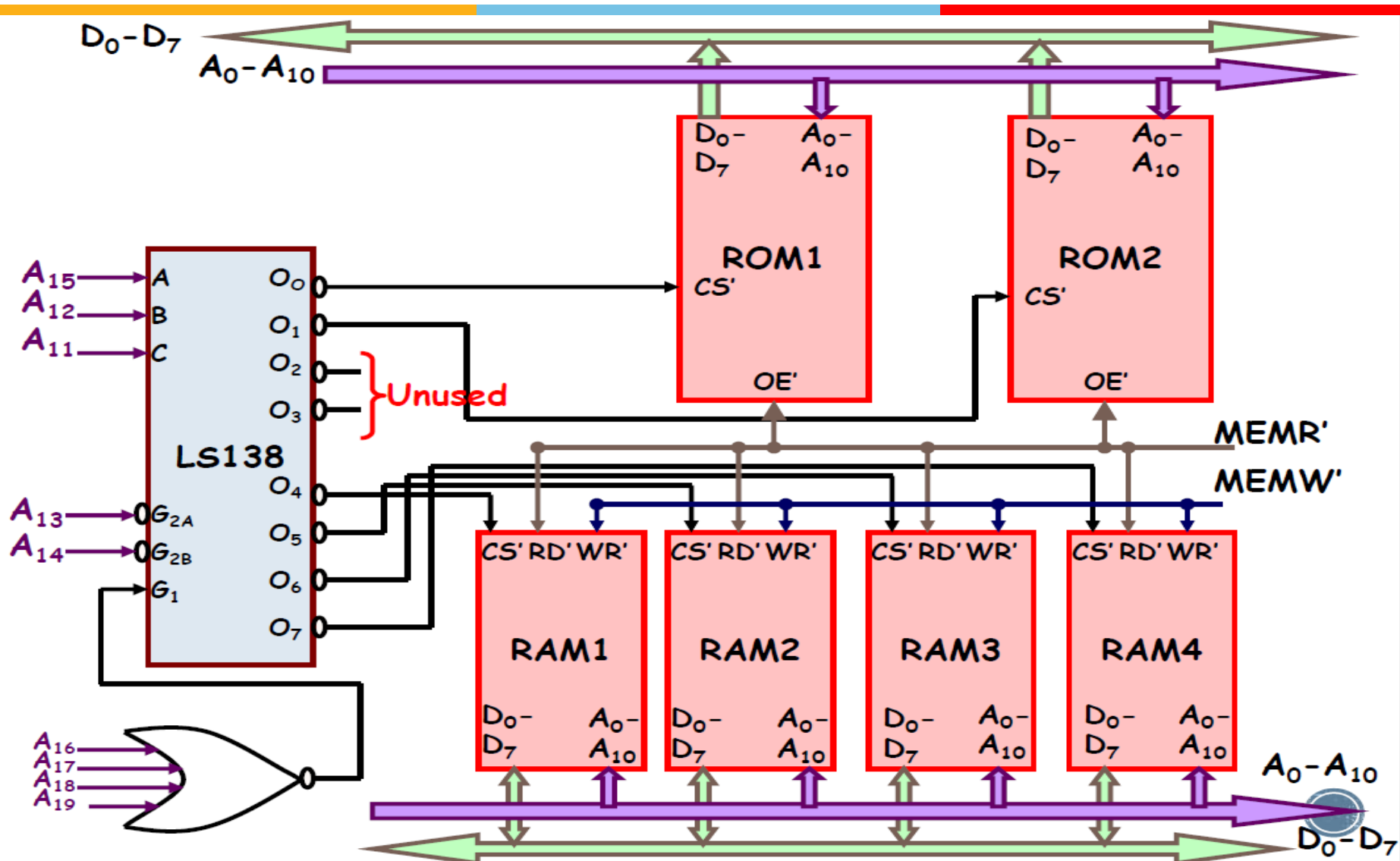
A ₁₅	A ₁₄	A ₁₃	A ₁₂	A ₁₁	A ₁₀	A ₉	A ₈	A ₇	A ₆	A ₅	A ₄	A ₃	A ₂	A ₁	A ₀
1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1

Example



Absolute Addressing

Example





Thank You