

L12-CS8421

Chapter 5: Memory, Part 2 of 2

CS8421

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Class

Will

Start

Momentarily...

This is a classic analysis, that shows up in many textbooks.

Example:

Ram chips have 28 pins

Need 1M addresses of 16 bits

As usual, need $V+$, GND, R/W, Chip-Select

A) Determine the best organization.

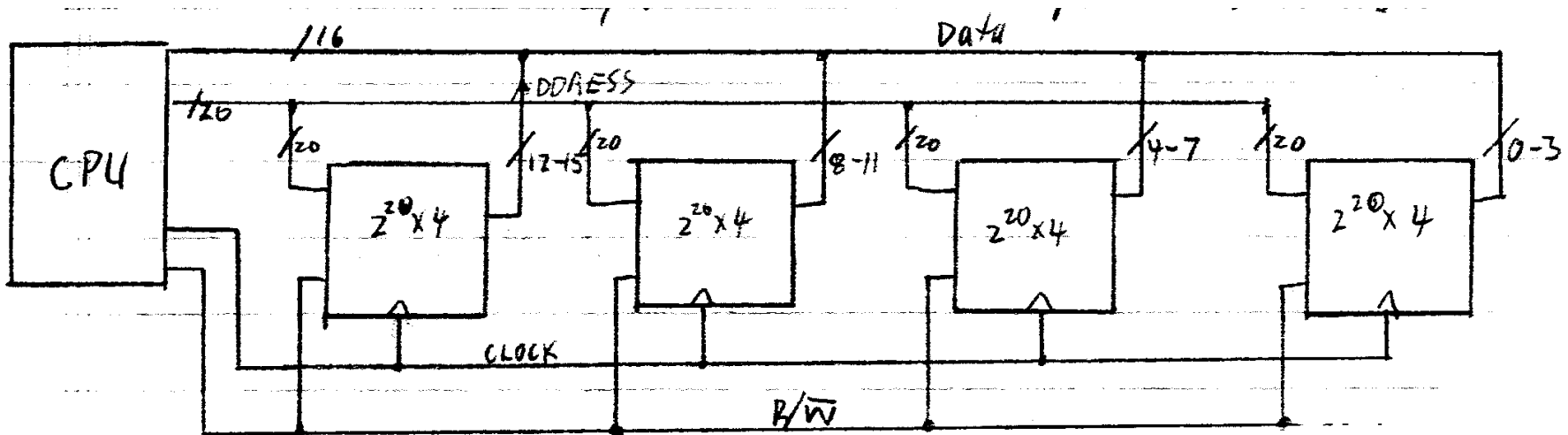
Explain/justify your answer and show all your work.

B) Draw a schematic diagram of your solution

Addr	Data	Mem Org		Bits/Chip	Chips for Word	Banks Req'd	Total Chips
23	1	$2^{23} \times 1$	8M X 1	8M	16	1	16
22	2	$2^{22} \times 2$	4M X 2	8M	8	1	8
21	3	$2^{21} \times 3$	2M X 3	6M	6	1	6
20	4	$2^{20} \times 4$	1M X 4	4M	4	1	4
19	5	$2^{19} \times 5$	512K X 5	2.5M	4	2	8
18	6	$2^{18} \times 6$	256k X 6	1.5M	3	4	12
17	7	$2^{17} \times 7$	128K X 7	896K	3	8	24
16	8	$2^{16} \times 8$	64K X 8	512K	2	16	32

The 1M X 4 organization minimizes chip count, with no unused bits on the chip. A single bank is required, so no decoder will be needed.

- Requires only one bank of memory to make all needed addresses, so, no separate decoder is needed.



Problem:

Ram chips have 24 pins

The computer needs 1M addresses of 8 bits per address

As usual, need $V+$, GND, R/W, Chip-Select

A) Determine the best organization.

Explain/justify your answer and show all your work.

B) Draw a schematic diagram of your solution

Need 1M address of 8 bits. 24 pins per chip.

Addr	Data	Mem Org		Bits/Chip	Chips for Word	Banks Req'd	Total Chips
19	1	$2^{19} \times 1$	512K X 1	512K	8	2	16
18	2	$2^{18} \times 2$	256K X 2	512K	4	4	16
17	3	$2^{17} \times 3$	128K X 3	384K	3	8	24

- Diagram

Problem:

Ram chips have 28 pins

The computer needs 4M addresses of 8 bits per address

As usual, need $V+$, GND, R/W, Chip-Select

A) Determine the best organization.

Explain/justify your answer and show all your work.

B) Draw a schematic diagram of your solution

**End
Of
Today's
Lecture.**

