

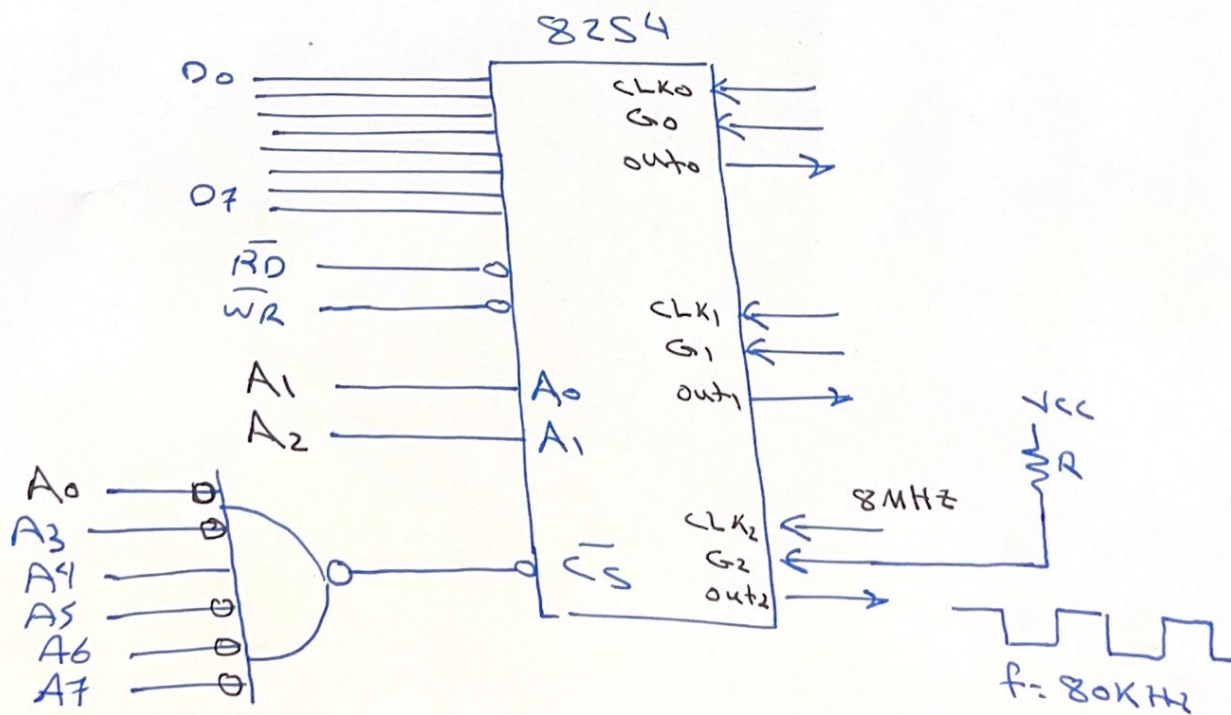
Q1 interface an 8254 to function at
 I/O Port addresses XX10H, XX12H, XX14H
 and XX16H, and write the Software that
 Program Counter 2 to generate an 80KHz
 square wave if the CLK input to counter
 is 8MHz

8421

ans

		$A_{15}A_{14}A_{13}A_{12}$	$A_{11}A_{10}A_9A_8$	$A_7A_6A_5A_4$	$A_3A_2A_1A_0$
Counter 0	XX10H	X X X X	X X X X	0 0 0 1	0 0 0 0
Counter 1	XX12H	X X X X	X X X X	0 0 0 1	0 0 1 0
Counter 2	XX14H	X X X X	X X X X	0 0 0 1	0 1 0 0
Control	XX16H	X X X X	X X X X	0 0 0 1	0 1 1 0

$\therefore$ Square wave $\therefore G_2 = 1$



(2)

∴ Counter 2 square ∴ mode 3

$$\text{Count} = \frac{f_{in}}{f_{out}} = \frac{8\text{MHz}}{80\text{KHz}} = \frac{8000\cancel{\text{K}}}{80\cancel{\text{K}}}$$

$$\underline{\text{Count} = 100}$$

control word

SC1	SC0	RW1	RW0	M2	M1	M0	Bcd
-----	-----	-----	-----	----	----	----	-----

1	0	0	1	0	1	1	0
└────────┘		└───┘		└────────┘			
Counter 2		only one byte		mode 3 square wave			

$$\text{Control} = 10010110 = 96\text{H}$$

MOV AL, 96H

OUT 16H, AL

MOV AL, 100H

OUT 14H, AL

HLT

← ← 10010110 →

if Count > 255

RW1 RW0

1	1
└───┘	
two byte	

8	4	2	1	
0	0	0	0	0
0	0	0	0	1
0	0	0	1	0
0	0	1	1	0
0	1	0	0	0
0	1	0	0	1
0	1	1	0	1
1	0	1	1	0
1	0	0	1	0
1	0	1	0	1
1	0	1	0	0
1	1	0	0	0
1	1	0	0	1
1	1	1	0	0
1	1	1	1	0

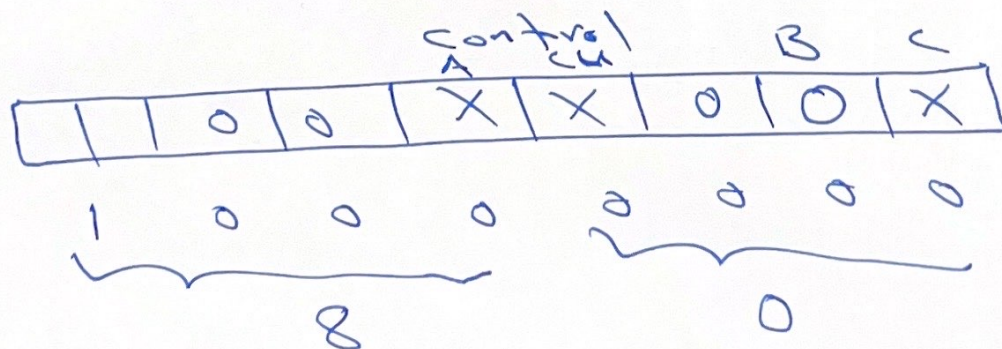
Q2 stepper motor interface with 8255 PPI 7
answer the followin

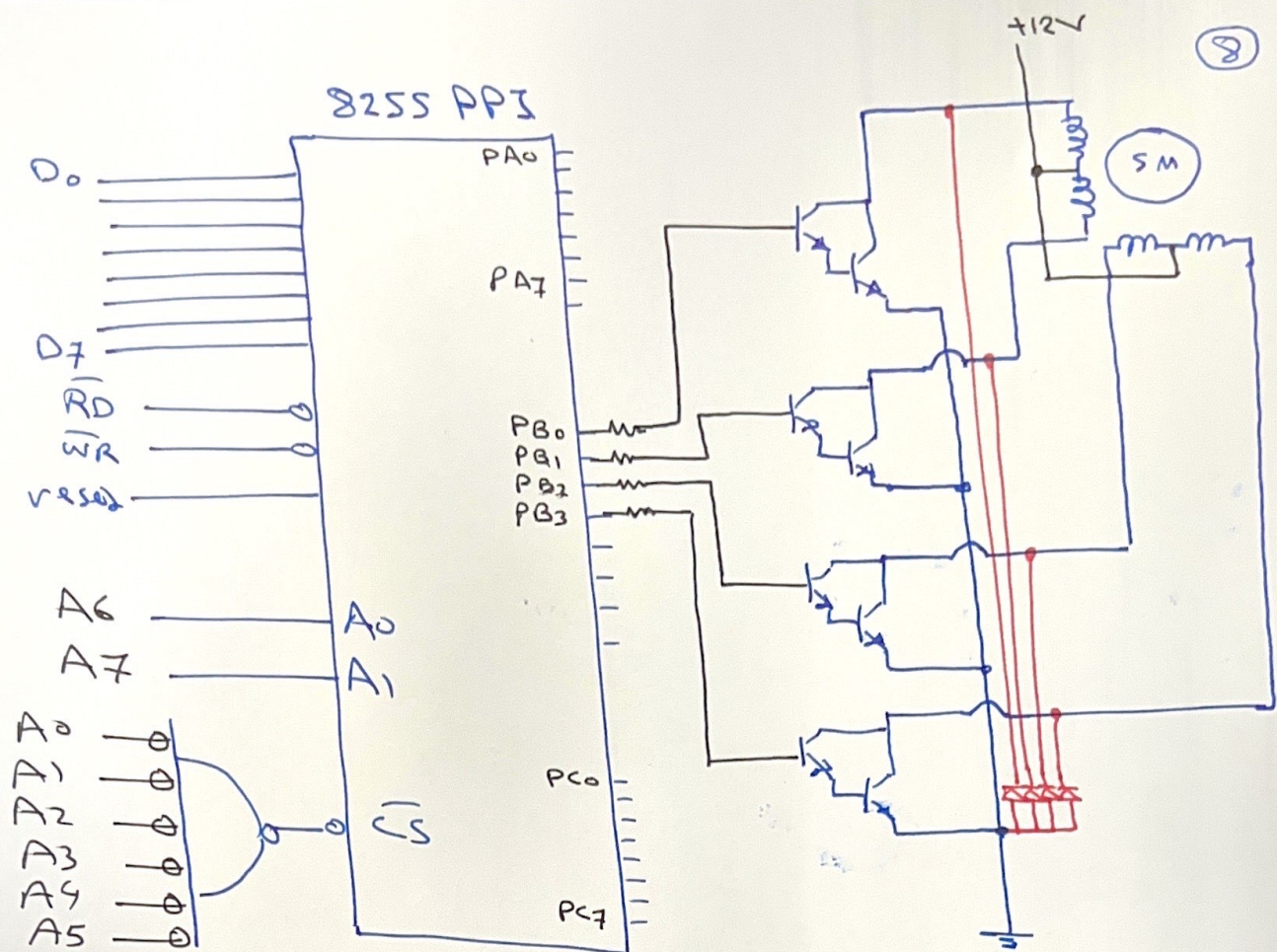
- ① Find Port address if A5-A0 connected to chipselect pin.
- ② Design the interfacing circuit if the motor interfaced with Port B
- ③ Write the required instruction for rotating motor counter clockwise if $NT=100$, motor speed = 12 RPM and CPU frequency = 1 MHz

ans
=

		A ₇	A ₆	A ₅	A ₄	A ₃	A ₂	A ₁	A ₀
Port A	00	1	0	0	1	0	0	0	0
Port B	40	1	0	1	1	0	0	0	0
Port C	80	1	0	1	0	0	0	0	0
Control	C0	1	1	1	0	0	0	0	0

stepper motor output on PortB





no. of teeth = $NT = 100$

motor speed = 12 R.P.M

$$\frac{12}{60} = \frac{1}{5} \text{ rotation/sec}$$

$\therefore 5 \text{ sec for each rotation}$

$$\frac{5 \text{ sec}}{NT} = \frac{5 \text{ sec}}{100} = 0.05 \text{ sec}$$

$\therefore \text{CLK } 1 \text{ MHz}$

$$\text{Period} = \frac{1}{f} = \frac{1}{1 \text{ M}} = 1 \mu \text{sec}$$

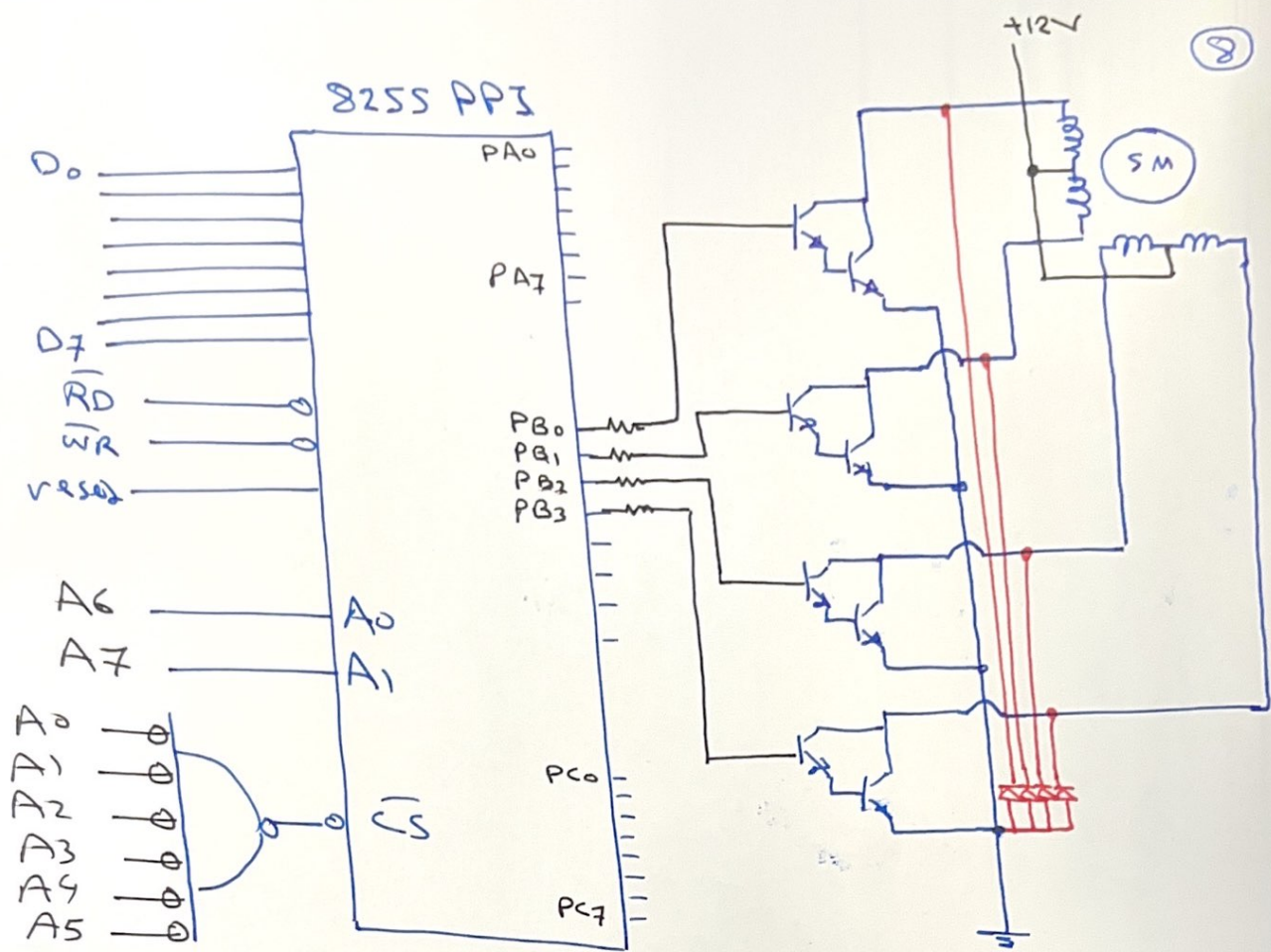
loop need 17 clock

$$\therefore \text{loop need } 17 \times 1 \mu = 17 \mu \text{sec}$$

$$\frac{0.05 \text{ sec}}{17 \mu \text{sec}} = \frac{0.05}{17 \times 10^{-6}} = 2941.17 \approx 2941$$

$$\frac{360^\circ}{100} = 3.6^\circ$$

$$\frac{360^\circ}{3.6^\circ} = 100$$



no. of teeth = NT = 100

motor speed = 12 R.P.M

$$\frac{12}{60} = \frac{1}{5} \text{ rotation/sec}$$

$\therefore$ 5 sec for each rotation

$$\frac{5 \text{ sec}}{NT} = \frac{5 \text{ sec}}{100} = 0.05 \text{ sec}$$

$\therefore$ CLK 1 MHz

Period = $\frac{1}{f} = \frac{1}{1M} = 1 \mu\text{sec}$

loop need 17 clock

$\therefore$ loop need $17 \times 1 \mu = 17 \mu\text{sec}$

$$\frac{0.05 \text{ sec}}{17 \mu\text{sec}} = \frac{0.05}{17 \times 10^{-6}} = 2941.17 \approx 2941$$

$$\frac{360^\circ}{100} = 3.6^\circ$$

$$\frac{360^\circ}{3.6^\circ} = 100$$

```
MOV AL, 80H
OUT C0H, AL

MOV BL, 100

MOV AL, 33H
back: OUT 40H, AL

ROL AL, 1

MOV CX, 2941

self: loop self

DEC BL
JNZ back

HLT
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Q3 By using 8254 PPS Programm Counter
for generating 10KHz square wave if

The count 1000BCD find the frequency
input and Design the circuit with
start address 60H, then write the
required instruction?

ans $f_{out} = 10\text{KHz}$

count = $N = (1000)_{BCD}$

count = $\frac{f_{input}}{f_{out}}$

$f_{input} = \text{count } f_{out}$

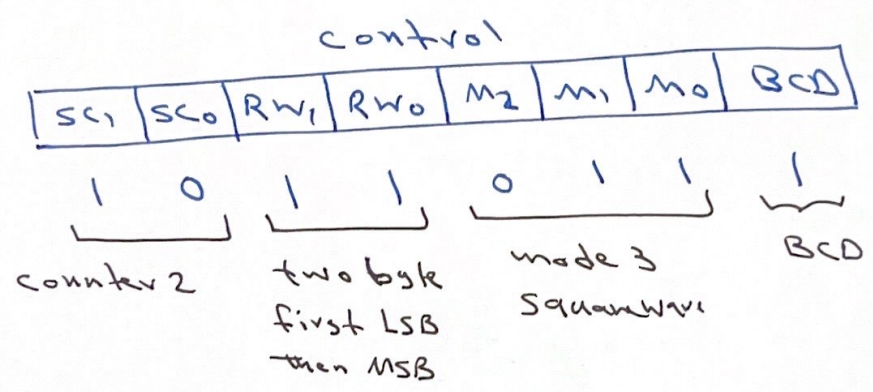
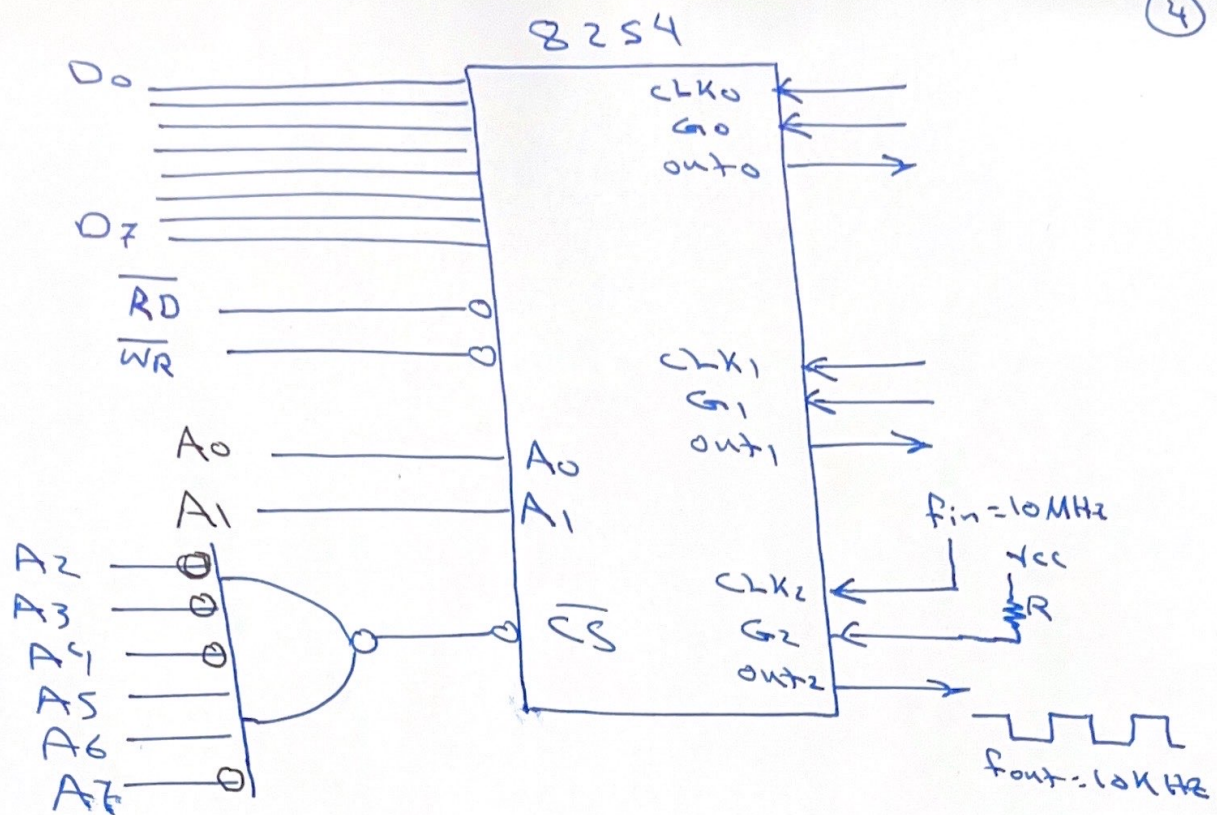
$= N f_{out}$

$= 1000 \times 10\text{KHz}$

$= 10\text{MHz}$

$\therefore$ start address 60H

		A ₇ A ₆ A ₅ A ₄	A ₃ A ₂ A ₁ A ₀
counter 0	60H	0110	0000
counter 1	61H	0110	0001
counter 2	62H	0110	0010
Control	63H	0110	0011



∴ control is $\underbrace{1011}_B \underbrace{011}_7 = \text{B7H}$

Count = $(\underline{1000})_{\text{BCD}}$

↓ ↓
 MSB LSB

⑤

MOV AL, B7H

OUT 63H, AL

MOV AL, 00

OUT 62H, AL

MOV AL, 10

OUT 62H, AL

HLT



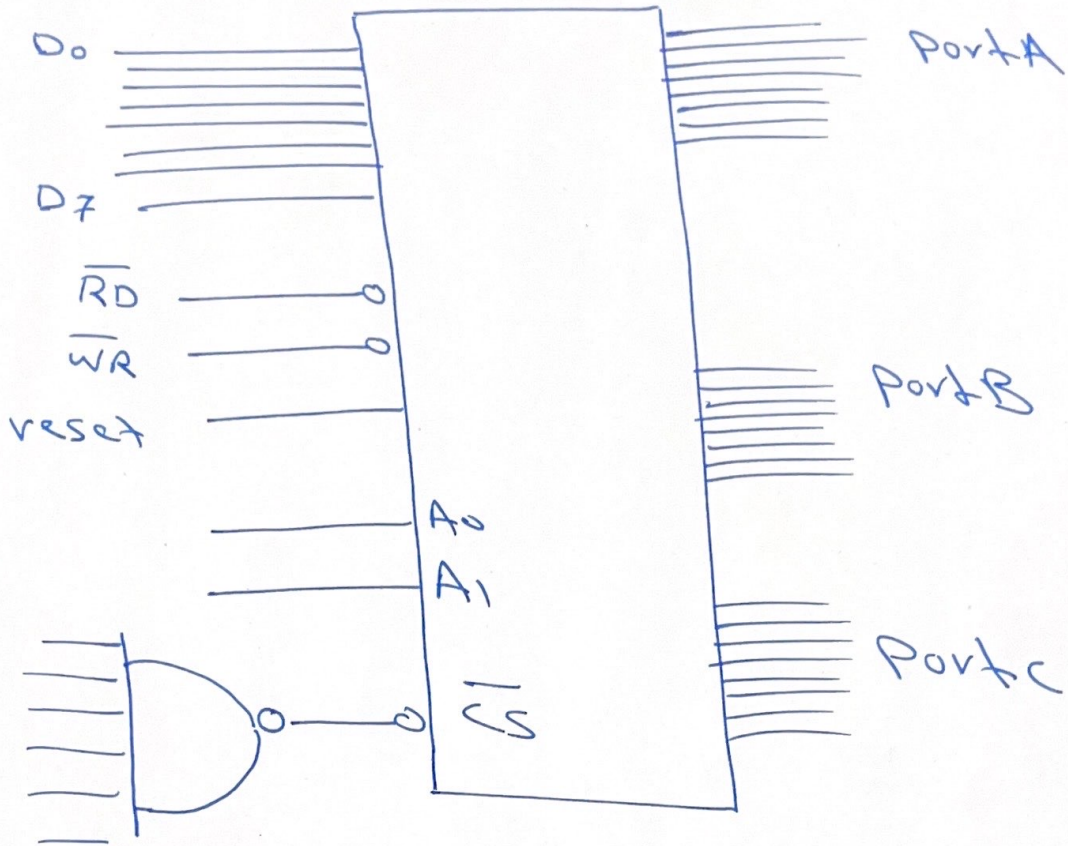
note

if Vate generation continuous Pulse

∴ Continuous Pulses ∴ mode 2

8255 PPI

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	A ₁	A ₀
Port A	0	0
Port B	0	1
Port C	1	0
Control	1	1

