HOLY SPIRIT UNIVERSITY OF KASLIK

SCHOOL OF ENGINEERING

Electrical, Telecommunications and Computer Engineering Department

Microprocessors – GEL445

Project: 8x128 Led Matrix

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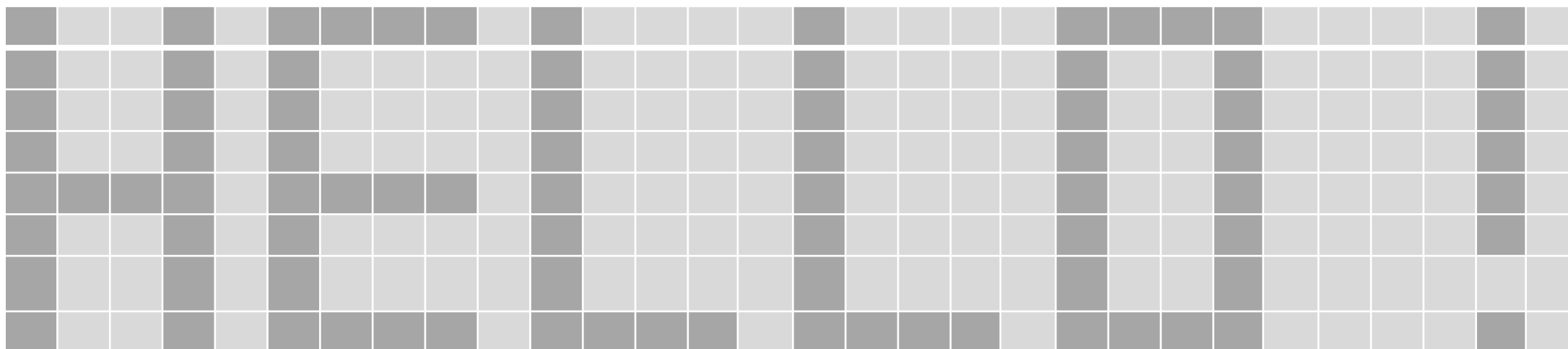**Presented to** Dr. Hayssam Serhan
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What is the project?

The project is about using a microprocessor to display characters on an 8x128 LED matrix.

The characters that we wish to display must be stored inside our buffer memory, and our led matrix will read from this buffer memory to display the characters.

Example

I/O address space

A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4	A3	A2	A1	A0	
0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	20H
0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1EH
0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1CH
0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1AH
0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	18H
0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	16H
0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	14H
0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	12H
0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	10H
0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0EH
0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0CH
0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0AH

I/O address space Cont.

A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4	A3	A2	A1	A0	
0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	08H
0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	06H
0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	04H
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	02H
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	00H

CHIP SELECT

$\overline{CS}$ L =A15+A14+A13+……+A1+A0+$M/\overline{I0}$ (Lath that writes on the 8x8 led matrix)

$\overline{CS}$ S1 =A15+A14+A13+……+A1'+A0+$M/\overline{I0}$ (Latch1 that selects which column).

$\overline{CS}$ S2=A15+A14+A13+……+A'2+A1+A0+$M/\overline{I0}$ (Latch2 that selects which column)

$\overline{CS}$ S3=A15+A14+A13+……+A'2+A'1+A0+$M/\overline{I0}$ (Latch3 that selects which column)

$\overline{CS}$ S4=A15+A14+A13+……+A'3+A2+A1+A0+$M/\overline{I0}$ (Latch4 that selects which column)

$\overline{CS}$ S5=A15+A14+A13+……+A'3+A2+A'1+A0+$M/\overline{I0}$ (Latch5 that selects which column)

$\overline{CS}$ S6=A15+A14+A13+……+A'3+A'2+A1+A'0+$M/\overline{I0}$ (Latch6 that selects which column)

$\overline{CS}$ S7=A15+A14+A13+……+A'3+A'2+A'1+A0+$M/\overline{I0}$ (Latch7 that selects which column)

$\overline{CS}$ S8=A15+A14+A13+……+A'4+A3+A2+A1+A0+$M/\overline{I0}$ (Latch8 that selects which column)

$\overline{CS}$ S9=A15+A14+A13+……+A'4+A3+A2+A'1+A0+$M/\overline{I0}$ (Latch9 that selects which column)

CHIP SELECT Cont.

$\overline{CS}$ S10=A15+A14+A13+……+A'4+A3+A'2+A1+A0+$M/\overline{I}0$ (Latch10 that selects which column)

$\overline{CS}$ S11=A15+A14+A13+……+A'4+A3+A'2+A'1+A0+$M/\overline{I}0$ (Latch11 that selects which column)

$\overline{CS}$ S12=A15+A14+A13+……+A'4+A'3+A2+A1+A0+$M/\overline{I}0$ (Latch12 that selects which column)

$\overline{CS}$ S13=A15+A14+A13+……+A'4+A'3+A2+A'1+A0+$M/\overline{I}0$ (Latch13 that selects which column)

$\overline{CS}$ S14=A15+A14+A13+……+A'4+A'3+A'2+A1+A0+$M/\overline{I}0$ (Latch14 that selects which column)

$\overline{CS}$ S15=A15+A14+A13+……+A'4+A'3+A'2+A'1+A0+$M/\overline{I}0$ (Latch15 that selects which column)

$\overline{CS}$ S16=A15+A14+A13+……+A'5+A'4+A'3+A'2+A'1+A0+$M/\overline{I}0$ (Latch16 that selects which column)

Memory Address Space

A19	A18	A17	A16	A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4	A3	A2	A1	A0
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
								EPROM 27128											
1	1	1	1	1	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	1	1	1	1
								RAM 62128											
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

DELAY TIME

Delay:

20 images/second

$\frac{1}{20} = 0,05$ sec ➔ $\frac{0,05}{128} = 0.390625$ ms

Thus, $6x * \frac{1}{14*10^6} = 0.039625 * 10^{-3}$ ➔ $x = 911$ (in decimal)

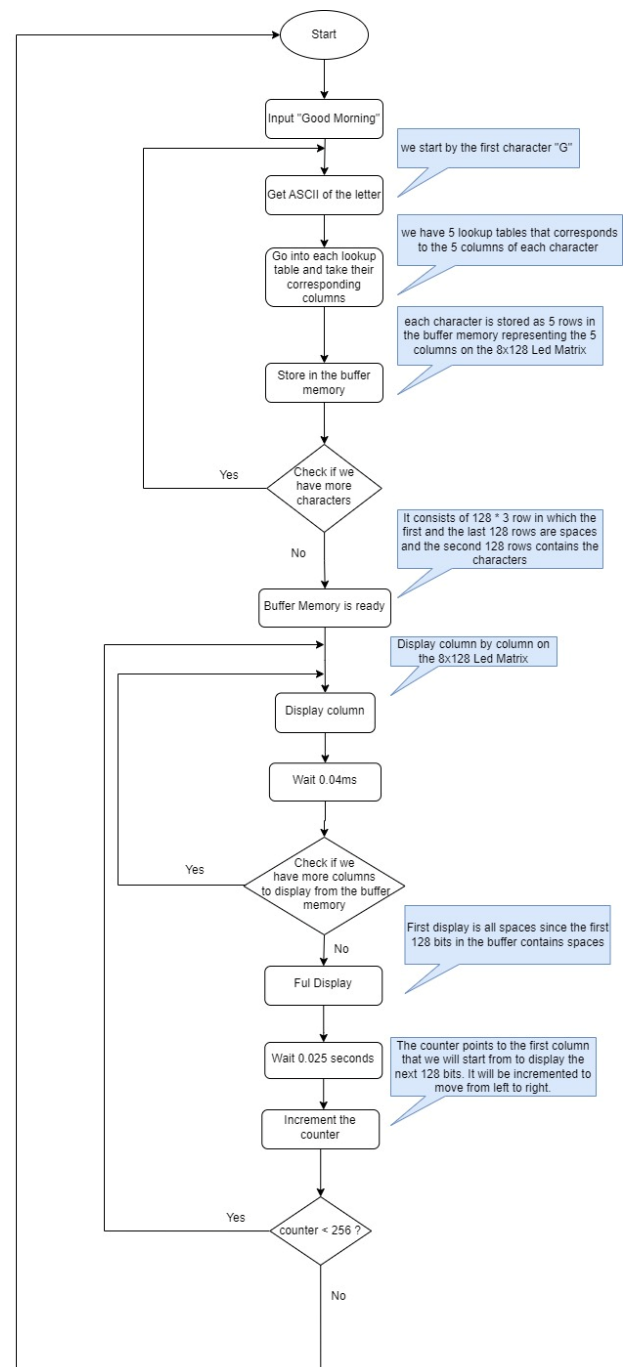➔Hence delay time is 038FH

Delay Shift:

$6x * \frac{1}{14*10^6} = 0.025$➔ $x = 58333$ (in decimal)

➔Hence delay time is E3DDH

Thank you

PS: Assembly code and schema attached to the zip file.