



Computer Engineering Department

Course Name: Microprocessor Lab

Number: 10636392

Lab Report Grading Sheet

Instructor: Dr. Manar Qamhieh	Experiment #: 6
Academic Year: 2023/2024	Experiment Name: LED 16x16 Dot Matrix Display
Semester: Second- Part1	

Students				
1- Wala’ Essam Ashqar.		2- Doaa Yasin Jararaa.		
3- Salsabeel Dwaikat.				
Performed on: 12/3/2024		Submitted on: 19/3/2024		
Report’s Outcomes				
ILO __ =() %	ILO __ =() %	ILO __ =() %	ILO __ =() %	ILO __ =() %
Evaluation Criterion			Grade	Points
Abstract answers of the questions: “What did you do? How did you do it? What did you find?”			0.5	
Introduction and Theory Sufficient, clear and complete statement of objectives. In addition to Presents sufficiently the theoretical basis.			1.5	
Apparatus/ Procedure Apparatus sufficiently described to enable another experimenter to identify the equipment needed to conduct the experiment.Procedure sufficiently described.			2	
Experimental Results and Discussion (In-Lab Worksheet) Crisp explanation of experimental results. Comparison of theoretical predictions to experimental results, including discussion of accuracy and error analysis in some cases.			4	
Conclusions and Recommendations Conclusions summarize the major findings from the experimental results with adequate specificity. Recommendations appropriate in light of conclusions. Correct grammar.			1	
Appearance Title page is complete, page numbers applied, content is well organized, correct spelling, fonts are consistent, good visual appeal.			1	
Total			10	

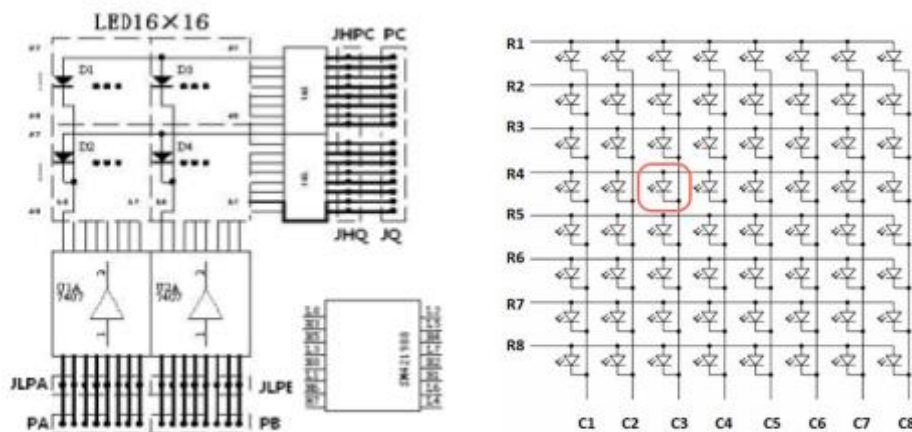


➤ Abstract:

1. To know the basic principles and function of LED 16X16 dot matrix display.
2. To master the interface circuit design between microprocessor and LED matrix block and its programming.

Introduction:

16x16 matrix LED is a common-cathode display consisting of four 8x8 LED dot matrix. This display can be used to display information as it allows both static and animated text and images. As shown in the figure below of a dot matrix display, multiple LEDs are wired together in rows and columns. This is done to minimize the number of pins required to drive them. For example, there are 256 LEDs in a 16x16 dot matrix and they require 32 pins to interface them (four 8-bit ports).



The Tools we will use it: MML 8086K3, 8255, LED 16x16 Dot Matrix Display, 86PCI Debug Software.

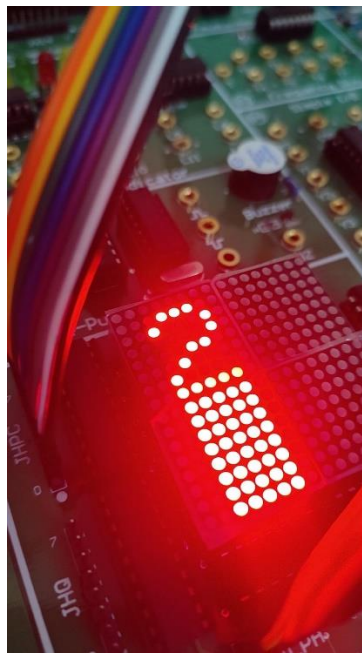
➤ Procedure & Results & Discussion:

- Part 1: Static shape
 - In this part we will display a single digit (We choose 2) on 8x8 LED matrix.
 - Connecting port A at the columns and port C at rows
 - Turning on row by row and in every row turning on different columns depends in how to display number 2
 - The values restored in arrays.
 - Using small delay (80H) after displaying every row.



○ **The Code**

<p>CODE SEGMENT ASSUME CS:CODE ORG 2000H</p> <p>START: MOV AL, 80H MOV DX, 0FF2BH ;CWR OUT DX, AL</p> <p>MOV AL, 0FFH MOV DX, 0FF29H ;PORT B OUT DX, AL</p> <p>MAIN: MOV SI, OFFSET ROWS MOV DI, OFFSET COLS MOV CX,0</p> <p>LP: MOV AL, [SI] MOV DX, 0FF2AH ;PORT C Indicates the beginning of the ROWS ARRAY OUT DX, AL</p> <p>MOV AL, [DI] MOV DX, 0FF28H ;PORT A Indicates the beginning of the COLS ARRAY OUT DX, AL</p>	<p>PUSH CX ;DELAY MOV CX, 500 DELAYS: NOP LOOP DELAYS POP CX</p> <p>INC DI ; INDICATES NEXT ELEMENT IN COLS ARRAY INC SI ; INDICATES NEXT ELEMENT IN ROWS ARRAY INC CX ; NEXT LED CMP CX, 7 ;CHECK IF IT ARRIVE 8X8 JE MAIN ; GO TO ELEMENT 0 IN ARRAYS JMP LP ; COMPLETE</p> <p>COLS DB 83H, 0FBH, 0F7H, 0CFH, 0BFH, 0BBH, 0C7H ;NUMBER 2 ROWS DB 01H, 02H, 04H, 08H, 10H, 20H, 40H ;ON</p> <p>END START CODE ENDS</p>
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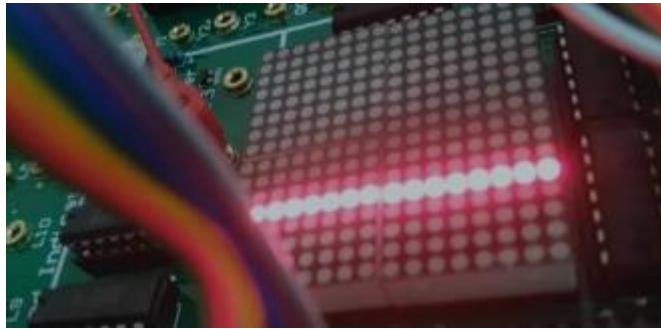


○ Part 2 : Basic animation

- Displaying basic animation on 8x16 LED matrix. Turning on a single column and makes it rotate over the display starting from C1 to C16 and goes back.
- Connoting port A and port B at the columns and port C at rows.
- Turning on all the rows by outing 0FFH at port c.
- The values of the columns restored in array by turning on column by column.
- Firstly, turning on port A columns and turning off port B columns by outing 0FFh to port B. Then turning off B and turning on C. Finally, the loop continues and repeats.
- Using delay (50000) after displaying every column.

○ The Code

<pre> CODE SEGMENT ASSUME CS:CODE ORG 2000H START: MOV AL, 80H MOV DX, 0FF2BH , CWR OUT DX, AL MAIN: MOV AL, 0FFH MOV DX, 0FF29H ;PORT B OUT DX, AL MOV SI, OFFSET COLS MOV CX,8 LPA: MOV AL, [SI] MOV DX, 0FF28H ;PORT A Indicates the beginning of the COLS ARRAY OUT DX, AL MOV AL, 0FFH MOV DX, 0FF2AH ;PORT C ALL ROWS IS ON OUT DX, AL PUSH CX MOV CX, 50000 DELAYS: NOP LOOP DELAYS POP CX INC SI LOOP LPA </pre>	<pre> MOV AL, 0FFH MOV DX, 0FF28H ;PORT A OUT DX, AL MAIN1: MOV SI, OFFSET COLS MOV CX,8 LPB: MOV AL, [SI] MOV DX, 0FF29H ;PORT B OUT DX, AL MOV AL, 0FFH MOV DX, 0FF2AH ;PORT C OUT DX, AL PUSH CX MOV CX, 50000 DELAYS1: NOP LOOP DELAYS1 POP CX INC SI LOOP LPB JMP MAIN COLS DB 0FEH, 0FDH, 0FBH, 0F7H, 0EFH, 0DFH, 0BFH, 7FH END START CODE ENDS </pre>
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➤ Conclusion:

We conclude from this experiment how to display several things at led dot matrix and how to control it using 8255 by connecting the rows at port C and the columns at port A, B and C.