



Computer Engineering Department

Course Name: Microprocessor Lab

Number: 10636392

Lab Report Grading Sheet

Instructor: Dr. Manar Qamhieh	Experiment #: 4
Academic Year: 2023/2024	Experiment Name: 8279 Keyboard / Display Interface
Semester: Second- Part1	

Students				
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3- Salsabeel Dwaikat.				
Performed on: 27/2/2024		Submitted on: 5/3/2024		
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 principle of 8279 and microcomputer interface.
2. Use 8279 to interface the six 7-segment display arrays.
3. Use 8279 to interface the 4x4 matrix keyboard.

Introduction:

In this experiment, we will learn new chip (8279 Keyboard / Display Interface). It is a programmable keyboard and display interface device so it may be programmed for the desired operation..

The Tools we will use it: MML 8086K3, 8279, 86PCI Debug Software.

➤ Procedure & Results & Discussion:

○ Part 1:

- In this part we will display (GP-6) on the 7-segment display.
- At the first we set Keyboard/Display on various operations throw the table shown :

D ₇	D ₆	D ₅	Function
0	0	0	Keyboard/Display Mode Set
0	0	1	Program Clock
0	1	0	Read FIFO/Sensor RAM
0	1	1	Read Display RAM
1	0	0	Write Display RAM
1	0	1	Display Write Inhibit/Blanking
1	1	0	Clear
1	1	1	End Interrupt/Error Mode Set

- We have to write -Mode Set- control and sent it to address 0FF81H (the value 0H).

D0	D1	D2	D3	D4	D5	D6	D7
0	0	0	0	0	0	0	0
Keyboard/Display mode (Set)			8-bit char display		Encoded scan keyboard whit 2- key lockout		



- Then we -set clock - control and sent it to address 0FF81H. (the value 32H)

D0	D1	D2	D3	D4	D5	D6	D7
0	0	1	1	0	0	1	0
Program clock				Scale factor			

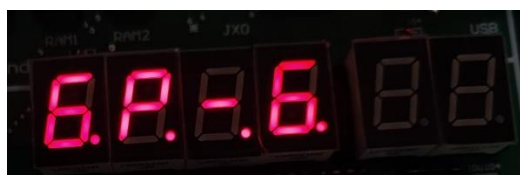
- Then we - set clear - control and sent it to address 0FF81H (the value 0DFH).

D0	D1	D2	D3	D4	D5	D6	D7
1	1	0	1	1	1	1	1
Clear				Clear everything			

- When we display a digit or character on 7-segment we will active the led we want by give it 0.

○ The Code

CODE SEGMENT ASSUME CS: CODE ORG 2000H START: MOV AL, 0H ;SET MOV DX, 0FF81H OUT DX, AL MOV AL, 32H ;CLOCK OUT DX, AL MOV AL, 0DFH ;CLEAR OUT DX, AL MOV CX, 0FFH ; DELAY LP: NOP LOOP LP MAIN: MOV AL, 85H ;SELECT THE FIRST 7-SEGMENT MOV DX, 0FF81H OUT DX, AL MOV AL, 020H ;PRINT G MOV DX, 0FF80H OUT DX, AL	MOV AL, 84H ;SELECT THE 2ND 7-SEGMENT MOV DX, 0FF81H OUT DX, AL MOV AL, 0C0H ;PRINT P MOV DX, 0FF80H OUT DX, AL MOV AL, 83H ;SELECT THE 3D 7-SEGMENT MOV DX, 0FF81H OUT DX, AL MOV AL, 0F3H ;PRINT - MOV DX, 0FF80H OUT DX, AL MOV AL, 82H ;SELECT THE 4TH 7-SEGMENT MOV DX, 0FF81H OUT DX, AL MOV AL, 20H ;PRINT 6 MOV DX, 0FF80H OUT DX, AL JMP MAIN END START CODE ENDS
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○ The Code With Autoincrement

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CODE SEGMENT
ASSUME CS: CODE
ORG 2000H

START:
MOV AL, 0H ;SET
MOV DX, 0FF81H
OUT DX, AL

MOV AL, 32H ;CLOCK
OUT DX, AL

MOV AL, 0DFH ;CLEAR
OUT DX, AL

MOV CX, 0FFH ; DELAY
LP: NOP
LOOP LP

MAIN:
MOV AL, 92H ;SELECT THE FIRST 7-SEDIMENT
MOV DX, 0FF81H
OUT DX, AL

MOV AL, 20H ;PRINT 6
MOV DX, 0FF80H
OUT DX, AL

MOV AL, 0F3H ;PRINT -
MOV DX, 0FF80H
OUT DX, AL

MOV AL, 0C0H ;PRINT P
MOV DX, 0FF80H
OUT DX, AL

MOV AL, 020H ;PRINT G
MOV DX, 0FF80H
OUT DX, AL

JMP MAIN
END START
CODE ENDS
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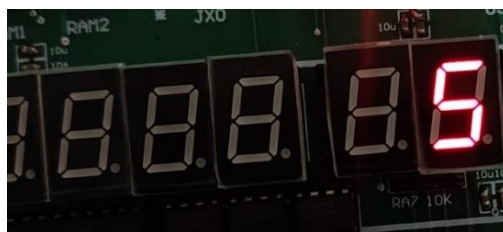
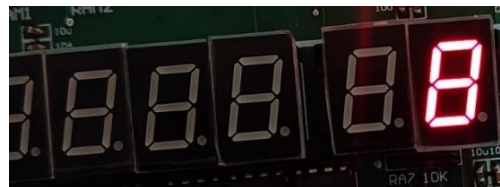


○ Part 2 :

- We want to Make Counter that count from 0 to 9 then return to 0, First we evaluate the value (0-9) that will show on segment.

● The Code

<pre>CODE SEGMENT ASSUME CS: CODE ORG 2000H START: MOV AL, 0H ;SET MOV DX, 0FF81H OUT DX, AL MOV AL, 32H ;CLOCK OUT DX, AL MOV AL, 0DFH ;CLEAR OUT DX, AL MOV CX, 0FFH ; DELAY LP: NOP LOOP LP START2: MOV SI, OFFSET DARR MOV CX, 10</pre>	<pre>MOV AL, 80H ;SELECT THE FIRST 7-SEGMENT MOV DX, 0FF81H OUT DX, AL MAIN: MOV AL, [SI] MOV DX, 0FF80H OUT DX, AL PUSH CX MOV CX, 0FFFFH LP1: NOP LOOP LP1 POP CX INC SI LOOP MAIN JMP START2 DARR DB 0CH, 9FH, 4AH, 0BH, 99H, 29H, 28H, 8FH, 08H, 89H END START CODE ENDS</pre>
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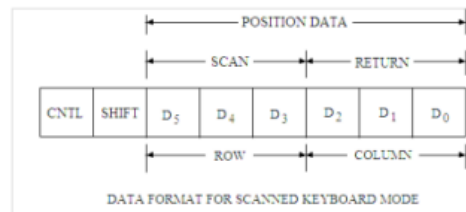




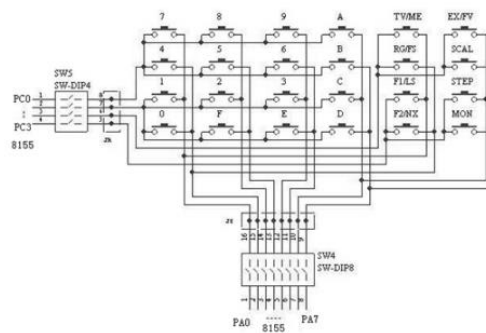
○ Part 3 :

- In this part, we will press the keyboard, and the result of the pressed button appears on the 7-segment display.
- An 8-bit word is formed, with the 6-bit position data for the key pressed and two bits for control (CNTL) and SHIFT lines.

The format for the scanned keyboard mode is as shown.



- The scan counter has three scan bits (D5-D3) as 000 to 111 for the row on which the pressed key is located. The column counter also has three bits (D2-D0) as 000 to 111 for column on which the pressed key is located. Figure below shows the keyboard circuit which has 4 return lines and 8 scan lines.





• The Code

<pre> CODE SEGMENT ASSUME CS: CODE ORG 2000H START: MOV AL, 0H ;SET MOV DX, 0FF81H OUT DX, AL MOV AL, 32H ;CLOCK OUT DX, AL MOV AL, 0DFH ;CLEAR OUT DX, AL MOV CX, 0FFH ; DELAY LP: NOP LOOP LP MAIN: MOV DX, 0FF81H IN AL, DX AND AL, 07H CMP AL, 0 JE MAIN MOV DX, 0FF80H IN AL,DX AND AL, 3FH MOV AH, AL MOV CL, 0 </pre>	<pre> LOOP: MOV AL, CL MOV BX, OFFSET K XLAT CMP AL,AH JE P INC CL CMP CL, 16 JE LP JMP LOOP P: MOV BX, OFFSET L MOV AL, 83H MOV DX, 0FF81H OUT DX, AL MOV AL, CL XLAT MOV DX, 0FF80H OUT DX, AL JMP MAIN L DB 0CH, 9FH, 4AH, 0BH, 99H, 29H, 28H, 8FH, 08H, 89H, 88H, 08H, 6CH, 0CH, 68H, 0E8H K DB 09H, 01H, 11H, 21H, 08H, 18H, 28H, 00H, 10H, 20H, 30H, 38H, 31H, 39H, 29H, 19H END START CODE ENDS </pre>
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➤ Conclusion:

We learn configuration the 8279. and how to use it (Some uses of it) also We learn how to Display on 7 segments digits and characters and We learn how to Know which key I pressed in Keyboard.