



**Computer Engineering Department**

**Course Name: Microprocessor Lab**

**Number: 10636392**

**Lab Report Grading Sheet**

Instructor: Dr. Manar Qamhieh	Experiment #: 3
Academic Year: 2023/2024	Experiment Name: 8253 timer / counter
Semester: Second- Part1	

Students				
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Performed on: 20/2/2024		Submitted on: 27/2/2024		
Report’s Outcomes				
ILO __ =( ) %	ILO __ =( ) %	ILO __ =( ) %	ILO __ =( ) %	ILO __ =( ) %
Evaluation Criterion			Grade	Points
<b>Abstract</b> answers of the questions: “What did you do? How did you do it? What did you find?”			0.5	
<b>Introduction and Theory</b> Sufficient, clear and complete statement of objectives. In addition to Presents sufficiently the theoretical basis.			1.5	
<b>Apparatus/ Procedure</b> Apparatus sufficiently described to enable another experimenter to identify the equipment needed to conduct the experiment.Procedure sufficiently described.			2	
<b>Experimental Results and Discussion (In-Lab Worksheet)</b> Crisp explanation of experimental results. Comparison of theoretical predictions to experimental results, including discussion of accuracy and error analysis in some cases.			4	
<b>Conclusions and Recommendations</b> Conclusions summarize the major findings from the experimental results with adequate specificity. Recommendations appropriate in light of conclusions. Correct grammar.			1	
<b>Appearance</b> Title page is complete, page numbers applied, content is well organized, correct spelling, fonts are consistent, good visual appeal.			1	
<b>Total</b>			10	



## ➤ Abstract:

1. To know the basic principle of 8253 and microcomputer interface.
2. To master the operation mode and program theory of 8253 timing/Counter.

## ➤ Introduction:

In this experiment, we will learn new chip (8253 timing/counter). It is a programmable timer/counter with three 16-bit counters with a counting frequency range of (0–2) MHz (assuming it is 1MHz in this experiment), and we write an assembly code to show the final result on Oscilloscope.

**The Tools we will use it:** MML 8086K3, 8253, Oscilloscope.

## ➤ Procedure & Results & Discussion:

### ❖ Part 1 (Square wave):

Generating square wave using 8253 timing/counter by initializing it to counter(0) mode 3 (Square wave) with a frequency of 10kHz. Assuming input frequency is 1MHz.

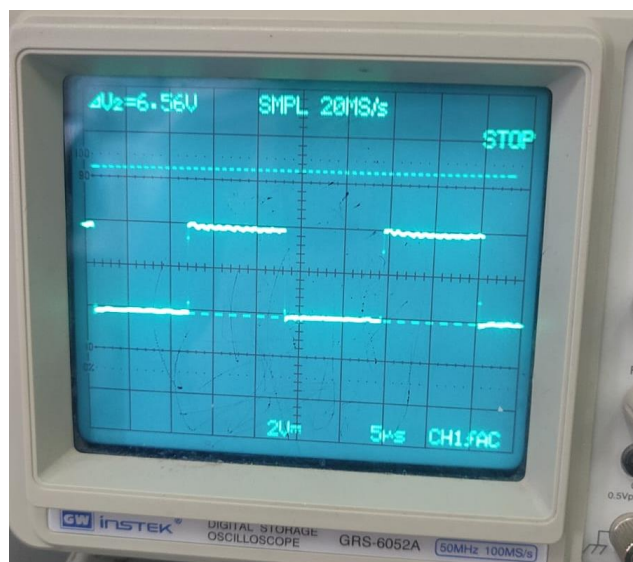
- Accessing the 8253 by control word register (43H) address.
- Setting counter 0 (00), read/load the least significant byte (01), mode 3 (011) and binary counter (0) by writing 16H to the specified address.

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

- Writing at counter 0 (40H) 100 to divide it by the input frequency (1MHz) to generate 10kHz frequency. (8 BIT)

```
C:\Users\MPLab\Desktop\E1.asm(*)
1 CODE SEGMENT
2 ASSUME CS=CODE
3 ORG 100H
4
5 START
6 mov al,16h
7 mov dx,0043h
8 out dx,al
9
10 lp
11 mov dx,0040H
12 out dx,ax
13 jmp lp
14
15 END START
16 CODE ENDSS
```

## Oscilloscope Result





### ❖ Part 2 (Rate generator):

Implementing rate generator using 8253 timing/counter by initializing it to counter(0) mode 2 (Rate generator) with a period of  $100\mu s$ . Assuming input frequency is 1MHz.

- Accessing the 8253 by control word register (43H) address.
- Setting counter 0 (00), read/load the least significant byte (01), mode 3 (010) and binary counter (0) by writing 14H to the specified address.

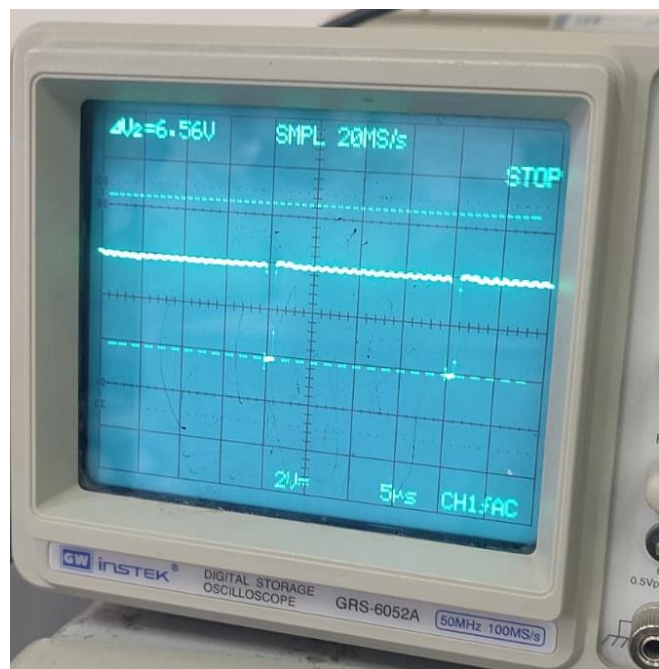
D0	D1	D2	D3	D4	D5	D6	D7
0	0	0	1	0	1	0	0

- Writing at counter(0) (40H) 100 to divide it by the input frequency (1MHz) to generate  $(1/\text{period of } 100\mu s)\text{Hz}$  frequency. (8 BIT)

```

C:\Users\MPLab\Desktop\E1.asm(*)
1 CODE SEGMENT
2 ASSUME CS:CODE
3 ORG 100H
4
5 START
6 mov al,14h
7 mov dx,0043h
8 out dx,al
9
10 lp
11 mov dx,0040H
12 out dx,ax
13 jmp lp
14
15 END START
16 CODE ENDSS
  
```

### Oscilloscope Result



### ➤ Conclusion:

We conclude from this experiment how to use 8253 timing/counter to implement different things. For example, To generate Square wave using counter(0) mode 3. Also to work as rate generator using counter(0) mode 2.