



Computer Engineering Department

Course Name: Microprocessor Lab

Number: 10636392

Lab Report Grading Sheet

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|----------------------------------|---|
| Instructor: Dr. Aladdin Al-Masri | Experiment #: 5 |
| Academic Year: 2022/2023 | Experiment Name: ADC0809 analog-to-digital conversion |
| Semester: Spring 2023 | |

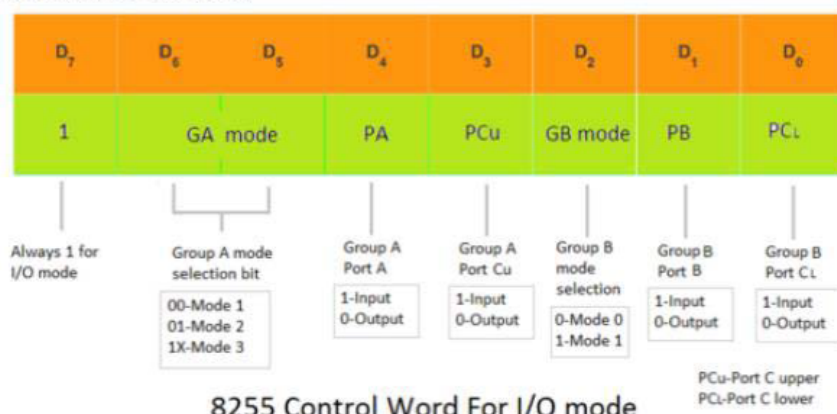
| Students | | | | |
|---|---------------|-------------------------------|---------------|---------------|
| 1. Mohammad Aker | | 2. Ahmad Ashayer | | |
| Performed on: April 18th 2023 | | Submitted on: April 25th 2023 | | |
| Report's Outcomes | | | | |
| ILO __ =() % | ILO __ =() % | ILO __ =() % | 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 | |



Procedure:

Before we begin the actual work, we must first study and understand the entire procedure, as well as the 8255 IC's setup. We must also be aware that the 8255 IC has a specific configuration code as shown in Figure 1, which it will be output for A and C and B ports.

8255A Control Word Format:



Port Address

| Register | Address |
|-----------------------|---------|
| Control word register | 0FF2BH |
| PORT A | 0FF28H |
| PORT B | 0FF29H |
| PORT C | 0FF2AH |

Figure 1: 8255 Control Word Configuration and ports Addresses.

And based on Figure 1, GA mode = 00, PA=0, PC=0, GB mode = 0, and PB = 0, so we will have **10000000** for the 8255 Config Reg which equals **80** in hex.



- The code

CODE SEGMENT

ASSUME CS:CODE

ORG 2000H

; CODE INITIALIZATIONS ARE WRITTEN HERE

START:

; YOUR CODE IS WRITTEN HERE

mov dx,0FF2BH

mov al,80h

out dx,al

main:

;to start conversion

mov dx,8000h

mov al,0

out dx,al

;read value of analog

mov dx,8000h

in al,dx

mov cx,0ffh

d:



loop d

;convert value

mov bl,51

mov ah,0

div bl

mov ch,ah; save fraction value

mov ah,0

mov bx,offset numbers1

xlat ; value in al

push ax

mov dx,0ff29h

mov al,0efh

out dx,al

pop ax

;display integer value

mov dx,0ff28h

out dx,al

push cx

mov cx,0ffh

d1:

loop d1



pop cx

;display fraction

mov al,ch

mov ah,0

mov bl,10

mul bl

mov bl,51

div bl

push ax

mov dx,0ff29h

mov al,0f7h

out dx,al

pop ax

mov dx,0ff28h

mov bx,offset numbers2

mov ah,0

xlat

out dx,al

jmp main

numbers1 db 40h,79h,24h,030h,19h,12h

numbers2 db 0c0h,0f9h,0a4h,0b0h,99h,92h,83h,0f8h,80h,98h



END START

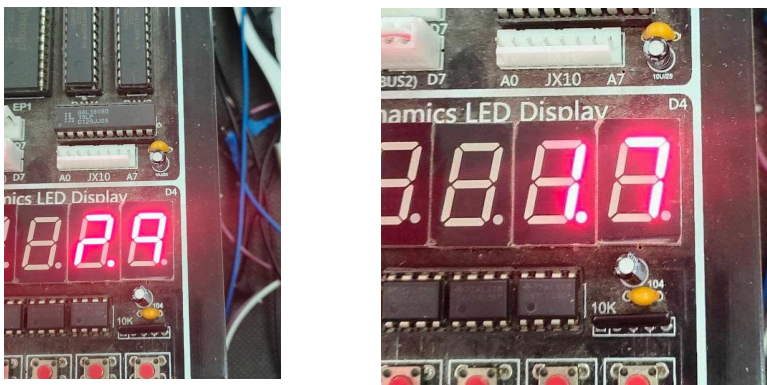
CODE ENDS

Experimental Results & Discussion:

After doing the experiment and debugging the assembly code the results was 100% as we wanted with no errors at all. While we changing the value of the input at the ADC the output was starting from 0.0 V and ending with 5 V at our wanted 7-segment displays.

Since the input at the ADC was a 0-5V analog signal, and the output was a discrete 8-bit number (0-255) and we were able to display the number at the 7-segment displays on the kit, then we have successfully converted an analog signal to a digital signal by using the ADC0809 on the kit.

These images represent the results we obtained:



Conclusions:

The conclusion of the ADC experiment using assembly language would be that the experiment was successful in converting the analog signal from the potentiometer to a digital value using the ADC module. The digital value was then displayed on the 7-segment display using assembly language code.

Additionally, the experiment showed that the code was able to correctly print the decimal fraction successfully.

Overall, the experiment demonstrated the functionality of the ADC module and the ability to manipulate the digital value in assembly language to achieve a desired outcome.