**Data Conversion and Lab (17.368) Report - Lab #3**

*Analog to Digital Converter*

**Name:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Date:** \_\_\_\_\_\_\_\_\_\_\_\_\_

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**Instructor Grade Sheet**

**Lab Report Format** --- --- --- --- --- --- 20 points: **\_\_\_\_**

* Report submitted
* Responses are in font and colors identified
* Required files have been emailed to instructor

**Technical Adequacy** --- --- --- --- --- --- 40 points: **\_\_\_\_**

* Report complete
* Information correct

**Lab proficiency** --- --- --- --- --- --- 20 points: **\_\_\_\_**

* Student prepared for class (accomplished pre-lab, downloaded Lab, etc.)
* Student utilized assigned Lab period
* Student demonstrated knowledge and understanding of the material
* Student demonstrated knowledge and understanding of the lab equipment
* Student demonstrated knowledge and understanding of the required computer software, when applicable

**Lab Notebook** --- --- --- --- --- --- 20 points: **\_\_\_\_**

* Attached? Yes/No
* Contains details of the lab performed? Yes/No

**Late Report Deduction** --- --- --- --- --- **Deduction:** **\_\_\_\_**

(≤1 wk late -10; > 1 wk ≤2 wks -20; >2 wks -30; No Rpt -100)

**Final Grade --- --- --- --- --- --- \_\_\_\_**

**Instructor Comments:**

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**Student Report**

**Directions:** All Lab Reports will be formatted in accordance with the below requirements. *Answers shall be typed* using the font and color after each question (overwrite the “Student response here using this font and color” with your response) unless you make other arrangements in advance with the instructor. Expand blocks as needed.

Your report needs to contain the “right” amount of detail so that the reader can understand what has transpired in the lab. It should not be in such detail that the reader could perform a step-by-step process of recreating the lab. The lab report does not have to pass the weight test (it does not mean that the longer your lab the better your grade … a short to the point report is all that is needed), however, it must contain the required material listed below.   
  
**Electronic report submission:**

Electronic submission is acceptable and preferred provided that it is in PDF format. Other formats must be discussed with the instructor. Submit this report via email ([Dohn\_Bowden@uml.edu](mailto:Dohn_Bowden@uml.edu)) no later than midnight on the due date. Your graded report will be returned via email. No hardcopy is required if you submit electronically.

**Hardcopy report submission:**

Hard copy submission will be made during the class period. Graded hard copy *or* scanned version will be returned. No electronic version is required if you submit a hardcopy.

**Lab Results:**

1. Did you work with any other student(s) in the performance of this lab? If yes, identify the other student(s). Identify who accomplished what portions of the lab.

Student response here using this font and color

**Objective 1:**

1. Identify issues encountered during the construction of your circuit.

Student response here using this font and color

1. Objective 1e … what were the measured voltages when starting with 0 volts and increasing the voltage in ½ volt steps up to 5 volts. Start the scan Zero volts to +5 volts and note the output display. Make a table like the one on page 25 of the data sheet … decoding the Digital Output LEDs.

Student response here using this font and color

1. Calculate the Vstep.

Student response here using this font and color

1. How close was your calculated Vstep compared with the calculated?

Student response here using this font and color

1. What was the calculated frequency of the A/D Clock using the R – C values in the test circuit (see page 23 of the data sheet)?

Student response here using this font and color

1. How close was your calculated A/D Clock frequency compared with your measured A/D Clock frequency?

Student response here using this font and color

1. When the value of C was changed, what did you note?

Student response here using this font and color

1. What were the results when you inputted a slow AC signal (less than 1 Hz) between 0 and 5 volts?

Student response here using this font and color

1. What were the results when the frequency was increased?. At what frequency will the A/D not be able to process the data?

Student response here using this font and color

1. What is the conversion time with the test circuit Clock frequency?

Student response here using this font and color

1. Determine the supply current used in the test circuit.

Student response here using this font and color

1. What is the max clock frequency that can be used?

Student response here using this font and color

1. Are the resistors selected for the LEDs in the test circuit the correct value? What would be an ideal value for these resistors? Now defend the value you selected.

Student response here using this font and color

1. What device would you add to the test circuit to make a better A/D converter (list at least two)?

Student response here using this font and color

**Objective 2:**

1. Identify issues encountered during the construction of your circuit.

Student response here using this font and color

1. What was the output when a low frequency sine wave was applied?.

Student response here using this font and color

1. What were the noted changes when the frequency was changed?

Student response here using this font and color

1. Adjust the sample and conversion time and note changes.

Student response here using this font and color

* + - 1. Are your findings different or the same as Objective 1.j of the lab?   
           
           
         Student response here using this font and color
      2. Did the S/H change anything?

Student response here using this font and color

**DISCUSSION OF RESULTS:**

1. DISCUSSION OF RESULTS … ***Briefly*** describe what was learned during the performance of this lab as well as the outcome of this lab.

Student response here using this font and color

**LAB QUESTIONS:**

* 1. Within this report.

**LAB NOTEBOOK:**

1. Attach a photocopy of your Lab Notebook to the end of this report or email a scanned copy (if emailed, indicate such in this report).

Photocopy attached or scanned copy emailed (indicate which)

**YOU MUST USE A LAB NOTEBOOK OR YOUR LAB GRADE WILL BE IMPACTED BY AS MUCH AS 20 POINTS.** Your notebook will include all data recorded and events that occurred during the conduct of the lab as well as any preparation calculations performed. It shall also include the observation by the instructor, when required.  
  
A lab notebook is an important record of what occurred during the performance of the lab. It can be used as OQE (Objective Quality Evidence). This is true in industry as well. Learning good record keeping is an essential technique that will be used throughout your career.

**Lab Notebook**

Insert a copy here or email a scanned copy. Identify how it was provided.