

ENGR 271 – Assignment 2

Due Date: June 13, 2000

Read: Experiments [#3](#) and [#4](#) in the *Basic Analog and Digital* manual.

Experiment #3

Key concepts:

A/D Converter	Resolution	Calibrate	“shiftin”
Integer Math	Truncate	ADC0831	

1. Perform the experiment in stages as it is described. When you have finished the last stage, demonstrate your work to someone (outside your group) in the class. Submit your program with remarks and an original schematic.
2. If you were not able to completely explain the purpose and meaning of the code through the remark statements, write an additional paragraph to explain any un-addressed aspects of the code.
3. If you had a 4-bit A/D converter to construct the voltmeter, what would be the resolution (i.e. many steps), step size (V/step), and accuracy (+/- V)? For your output reading, how many digits would you include to the right of the decimal point and why?
4. The ADC0831 sent the binary number 11001101 to the microcontroller. What is the equivalent decimal value? Perform each step of the algorithm on pg. 57. Show your work. What is the voltage?

Experiment #4

Key concepts:

D/A Converter	Resistive Ladder Network	“out7 = n.bit3”	Addressed
Voltage Sweep	Direction	dirb, dirc, etc.	

5. Perform the experiment in stages as it is described. As you work, create one table (with five columns) listing the Decimal Step, Binary Step, and the DVM readings which correspond to Figures 4.2, 4.7, and 4.8.
6. When you have finished the last stage, demonstrate your work to someone (outside your group) in the class.
7. Answer questions 1-5 on pg. 82.
8. Using circuit analysis and assuming that P3 – P7 represent independent voltage sources, calculate the output voltage for one of the sixteen possible output voltages, except 0 V.