This document is three pages from a computer architecture and organization laboratory manual that I wrote seven years ago. A couple of schools are still using it. –Dr. Hoganson

LAB 1

OBJECTIVE: Familiarization with the IDL-800 Digital Lab.

PREPARATION: Study the diagrams of the IDL-800 Digital Lab in appendix D at the back of this manual.

Materials required:

IDL-800
2 wires

NOTE: THE FOLLOWING CAUTIONS PERTAIN TO ALL LABS, NOT JUST THIS FIRST ONE!!!

1. The IDL-800 must be off when making all connections.
2. Doublecheck your circuits on paper.
3. Doublecheck your wiring before powering up the IDL-800. Proper care and attention will ward off chip burnout.
4. When disconnecting wires, pull out each wire separately, rather than grabing a handfull and yanking.

FAILURE TO FOLLOW THE ABOVE PRECAUTIONS WILL RESULT IN A LOW OR FAILING GRADE FOR THE LAB!

PART I:

1. Locate the following components on the IDL-800:

Top angled surface:

ON/OFF power switch:	Upper left hand corner.
Function Generator:	Upper left hand - produces sin,triangular and square waves at variable voltages (aplitude) and varying frequency
Digital Volt Meter (DVM):	Upper right hand corner - used to measure voltage levels produced by circuits

Main surface (flat)

Breadboard:	Center of IDL-800 used to connect componets for constructing devices. Wires and component pins are inserted into the breadboard

7-segment LED (Light Emitting Diode):	Top left - used for outputing decimal numerals
8 LED display:	Top right - used to display the status of up to 8 different lines or bits. One bit per light. Each has a resistor to limit current flow through the diode for protection. One side of the diode (light) is wired to ground (negative). A positive voltage at the input connections will cause the light to glow.
Power controls:	Center left - +5 voltages and ground are available for powering our circuits. The variable voltages 0-15 will not be used. There are two sets of +5 and ground.
Power slide switches:	Lower left - not used in our experiments
Pulse switches:	Bottom center - used to generate a single pulse
8 logic switches:	Bottom right - used to generate up to eight bits of input data
I/O connectors:	Right middle - used for interfacing to external devies.

2. The switches S0-S7 are double-throw switches that provide a constant high or low logic level. The lights L0-L7 are logic indicators and will light when a high logic level is present. Using the two wires, verify the operation of each switch and each light, noting results in your lab notebook.

3. The function generator (also called a clock for timing circuits) generates a range a frequencies of pulses. Connect the clock with L7 and experiment with the frequency rates noting your observations in your notebook.

4. Pulse switches are A and B. Connect P-A with L7 and then P-B with L6 and experiment with each connection noting results in notebook. Also test the values of the complemented connection.

5. S0 - S7 are logic switches. Connect each switch with L0 and experiment to determine how each switch operates, and that each switch is working correctly, noting results in notebook.

6. The breadboard area consists of 4 super-strips (each 5 tie-points wide) and 12 buses. Experiment with the breadboard organization by connecting the + power to the breadboard and the breadboard to L7. Answer the following questions: Are the super-strips vertically or horizontally connected? Are the busses vertically or horizontally connected? How many ties are there on a bus? THIS IS IMPORTANT INFORMATION! GET IT RIGHT, AND MAKE A NOTE TO YOURSELF ABOUT IT FOR FUTURE LABS!

PART II: Using the Digital Volt Meter (DVM)

The DVM can be used to measure voltage levels being produced by our circuits. The DVM has four settings that affect the sensitivity of the meter. Since we will be using voltages of up to 5

volts, set the DVM selector to 20V. The DVM has both positive (red) and negative (black) connections.

1. Connect the DVM negative terminal to ground.

2. Connect the DVM positive terminal to +5V. Observe and record the value measured by the DVM. Note that it is not likely to be exactly 5 volts.

3. Connect the DVM positive to data switch 7. Experiment with each position of the switch recording the observed voltage levels at each position.

4. Connect the DVM positive to the pulse switch A. Experiment and record.

5. Connect the DVM positive to the function generator. Set the frequency generator to its lowest frequency. Carefully experiment with the amplitude controls. Record your observations

6. Set the amplitude controls to its highest level. Now increase the frequency of the waves being generated, observing and recording any changes in the measured voltages. Explain your observations.

7. Experiment with the dial that is calibrated 1-10. Explain what that dial does.