ELEC 2210 LABORATORY REPORT COVER PAGE
Complete and attach this page to the front of your lab report.

Meeting # 3 MSI Circuits
Title of Lab Experiment

Student Name: Emerson, Gabriel, T
Name (Last, First, MI)

Student Email: gte0002
AU 7-character username

GTA: Paul Atilola
Name of your GTA

Section you are enrolled in: (Circle One): (1) 2 3 4 5 6 7 8

Date experiment performed (dd / mm / yy): 1/26/21

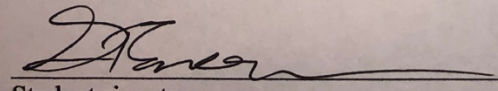
Date report submitted: (dd / mm / yy): 1/31/21

If you performed this experiment at a time other than your regularly scheduled section meeting:

Section # of the section you sat in on (Circle One): 1 2 3 4 5 6 7 8 Makeup

Name of the GTA who supervised your work: _____

I hereby certify that the contents of this report are true and complete to the best of my ability.
The lab work was performed by me exclusively, and this report was written by me exclusively.



Student signature

1/31/21
Date signed

Gabriel Emerson

ELEC2210 T 11:00am

Experiment 3: Medium Scale Integrated Circuits

01/26/21

In experiment three, the overall objective was to build and test an eight channel multiplexer and demultiplexer digital communication system. During the lab, I learned to set up and correctly connect and verify the correct operation of a 4-bit counter, a multiplexer and a demultiplexer. I also learned how to connect these components to the correct outputs in order to verify their communication. Through this lab, I was able to learn about digital communication systems through the setting up and verifying of decoders, demultiplexers and output selectors while furthering my knowledge of the ELVIS workstation and digital simulation.

Step 1:

The first part of the lab consisted of purely using just the 74LS161 4-bit counter. The table in the lab instructed exactly how to wire the chip to make the counter trigger from 000 to 111 in binary steps, then roll from 111 to 000 again on the next clock edge. These observations were made from connecting Qa, Qb, and Qc to LEDs 2-0, respectively. Overall, I encountered no problems with any wiring or logic issues, and it was very straight-forward.

Step 2:

In the second part of the experiment, we had to verify the correctness of the 74S151 8-input multiplexer. The connections listed in Table 3 located in the Experiment 3 instructions were made. All data inputs D0-D6 were connected to digital I/O DIO0-DIO6. This time the counter outputs QC-QB-QA from the previous part (counter) were connected to the C-B-A selection inputs of the multiplexer so that the count selects a channel for transmitting data. The multiplexer output Y was connected to LED7. We only used three counter outputs. The results of the multiplexer outputs are shown in Table 1. (Notice Qd is not shown in Table 1 since it was tied to ground for the entire duration of the experiment).

Step 3:

In the last part of the experiment, we had to verify correctness of the 74LS138 demultiplexer operation. The connections listed in Table 4 located in the Experiment 3 instructions were made. The counter outputs QC-QB –QA were connected to the input selection channels C-B-A of the demultiplexer. The eight demultiplexer outputs were connected to LED0-LED7 of the breadboard to display data. The Digital

Writer was used to pulse the counter CLOCK, incrementing the counter and selecting channels in sequential order. The multiplexer output Y was connected to the demultiplexer enable signal (G2) so that data signal can be transmitted from the multiplexer to the demultiplexer. The results of the demultiplexer outputs are attached shown in Table 2, and the final circuit is shown in Figure 1.

In conclusion, this lab helped me understand the use and operation of multiplexer and demultiplexers through hands on experience. Because I was physically able to see the response of the counter, multiplexer and demultiplexer when toggling through values, I feel I understand how these seemingly theoretical devices work and provide information. Throughout the lab, I ran into problems with my wiring because of a messy set up on my part. Although I was able to spot and correct the problems, I will be setting up my breadboard in a much more organized fashion during the next lab in order to eliminate these mistakes.

Table's and Figure's

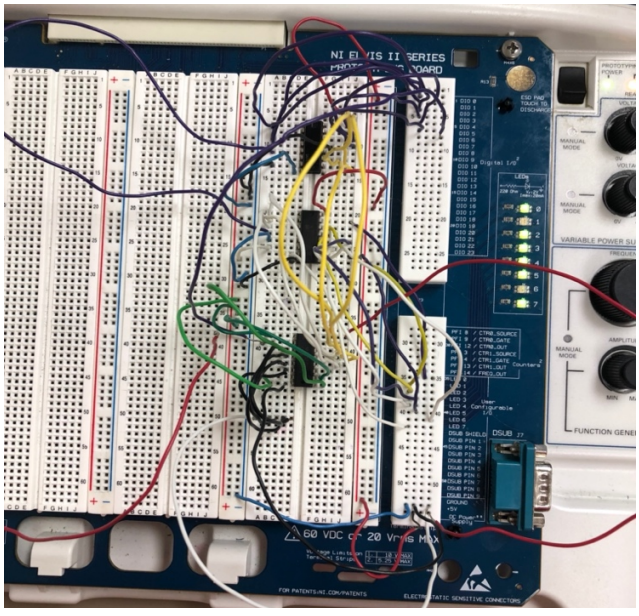
Table 1

Qa	Qb	Qc		Z
0	0	0		LED 0 is high, all others are low
0	0	1		LED 1 is high, all others are low
0	1	0		LED 2 is high, all others are low
0	1	1		LED 3 is high, all others are low
1	0	0		LED 4 is high, all others are low
1	0	1		LED 5 is high, all others are low
1	1	0		LED 6 is high, all others are low
1	1	1		LED 7 is high, all others are low

Table 2

Toggle input 7 on/off	LED 0 is off while all others are on
Toggle input 7 on/off	LED 1 is off while all others are on
Toggle input 7 on/off	LED 2 is off while all others are on
Toggle input 7 on/off	LED 3 is off while all others are on
Toggle input 7 on/off	LED 4 is off while all others are on
Toggle input 7 on/off	LED 5 is off while all others are on
Toggle input 7 on/off	LED 6 is off while all others are on
Toggle input 7 on/off	LED 7 is off while all others are on

Figure 1



ELEC 2210 Lab Checklist

Student Name Gabriel Emerson

Meeting Date & Time T 11:00 GTA Name Paul Atilola

Section # 001 Station # 104

Meeting # & Title 3 Medium Scale Integrated Circuits

Student Instructions: Fill in the items to be checked off by the GTA. When you are ready for checking off, notify the GTA. Include this sheet in your lab report.

GTA Instructions: Initial the student activities as requested in the experiment. Include comments as appropriate.

Part 1 Connect 74LS161 & Verify GTA Initials P.O.A.

Comments (GTA / Student):

Part 2 Connect 74LS151 & Verify GTA Initials P.O.A.

Comments (GTA / Student):

Part 3 Connect 74LS138 & Verify GTA Initials P.O.A.

Comments (GTA / Student):

Part 4 Cleanup GTA Initials P.O.A.

Comments (GTA / Student):

Cleanup Inspection GTA Initials P.O.A.