
EE/CprE/SE 492 WEEKLY REPORT 01

8/17/2020 – 8/31/2020

Group number: 08

Project title: High Resolution Digitally Trimmable Resistor

Client &/Advisor: Prof. Randy Geiger

Team Members/Role: Clark Reimers - Test Engineer, Pierce Nablo - Design Engineer, Alek Benson - Information Manager, Oluwatosin Oyekan - Meeting Lead

❖ Weekly Summary

During the first 2 weeks of Senior Design we primarily got up to speed on where we left off the last semester. We met with our faculty advisor, Dr Geiger, and discussed the next steps for the coming weeks. We have agreed to continue working remotely using the method from the previous semester. Which includes using Google Meet for collaboration, and Google Docs for file management.

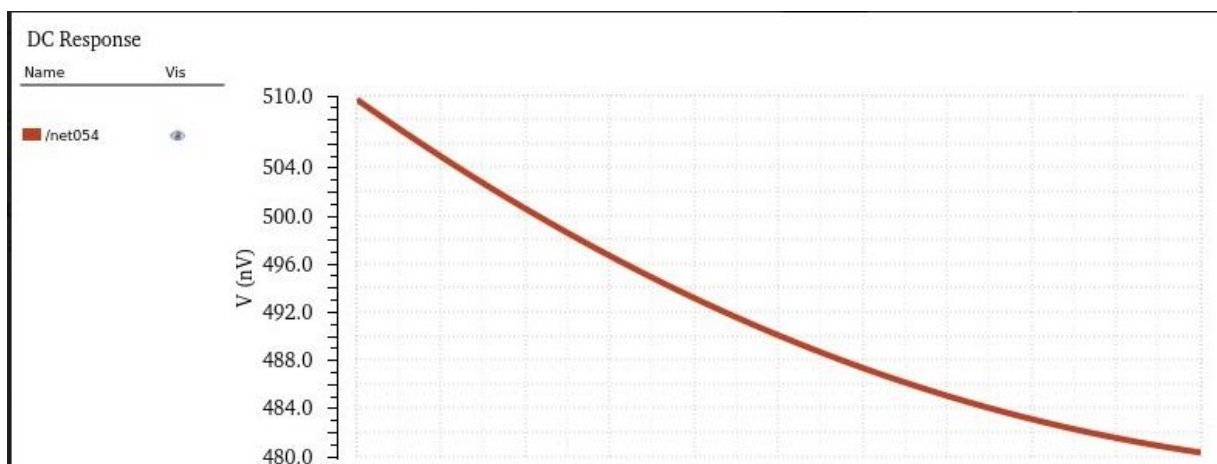
❖ Past week accomplishments

Clark Reimers:

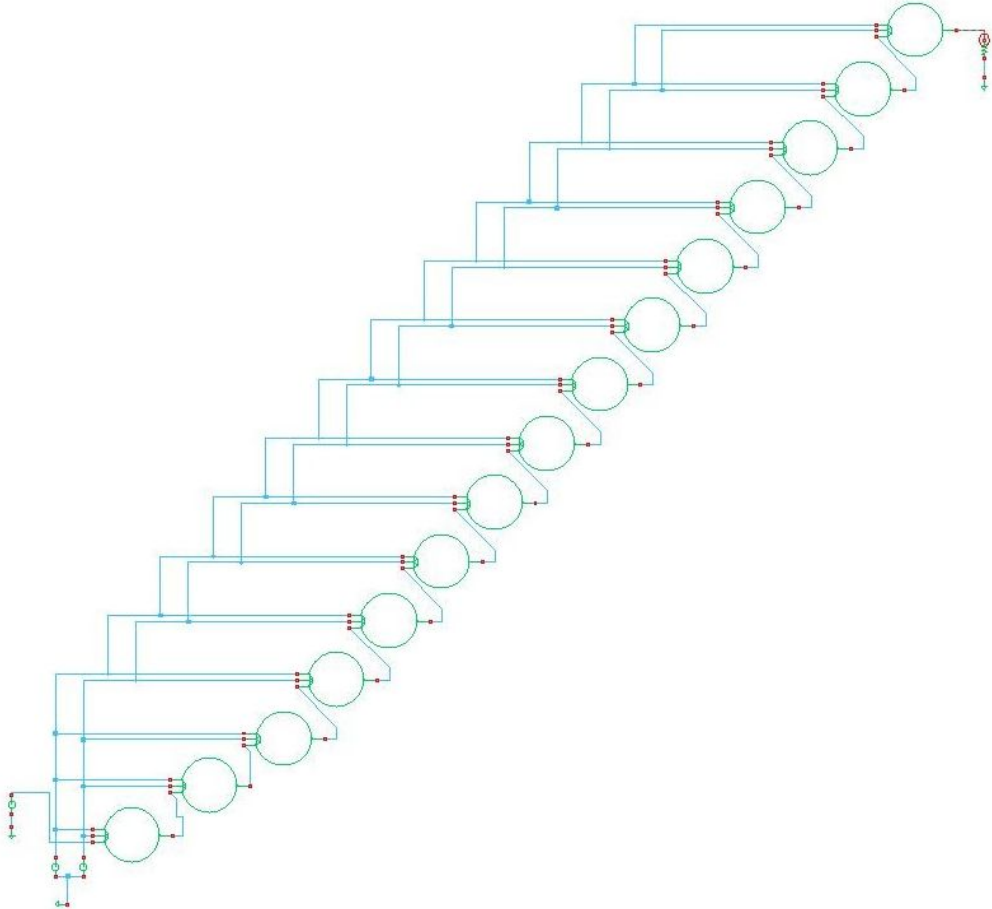
- Getting refreshed on where we left off last semester.
- Started new simulations.
- Started expansion and getting temperature coefficients of some of our earlier designs.

Voltage divider structure

Simulation:



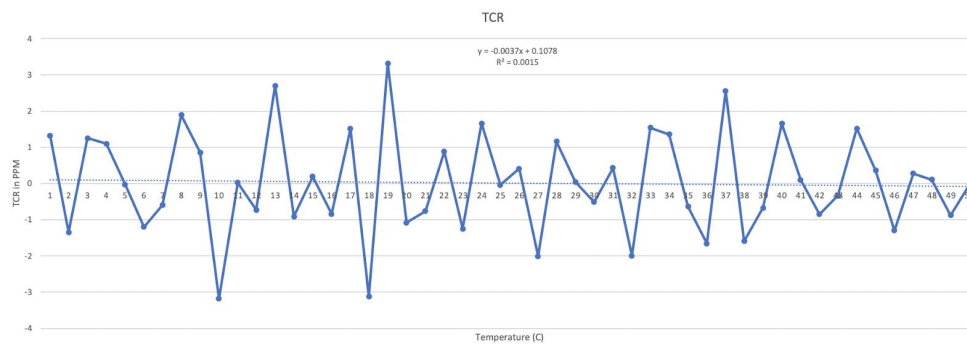
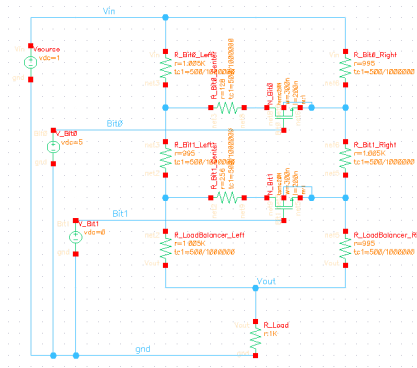
Circuit:



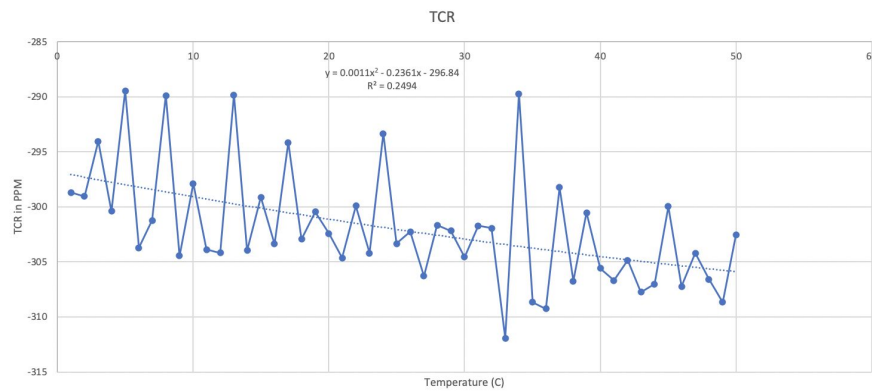
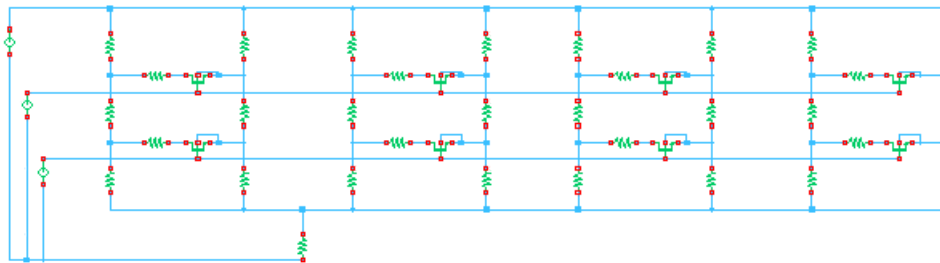
Pierce Nablo:

- Verified that working remotely still works as expected.
- Made a few structures shown below in order to see if there are any surprising results

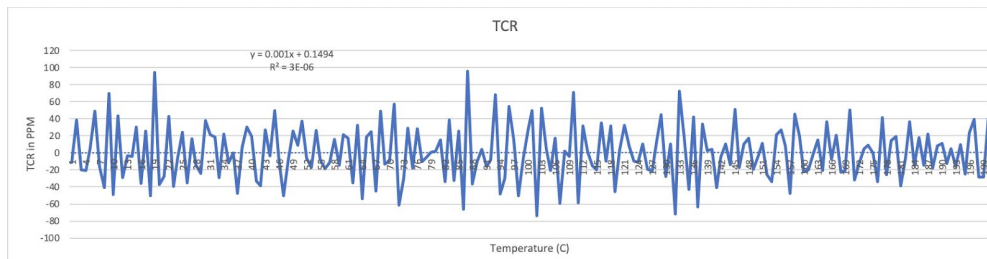
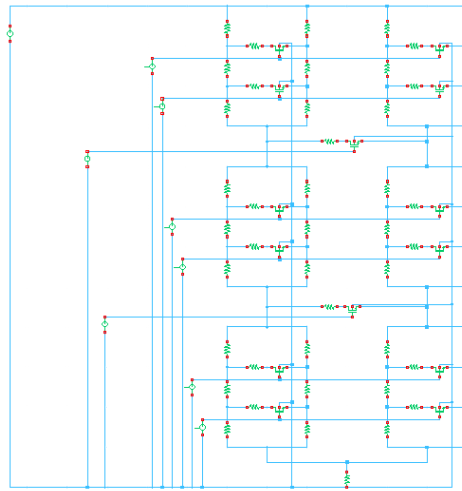
Ladder 2 Bit structure



Ladder 2 Bit, subassembly wired in parallel

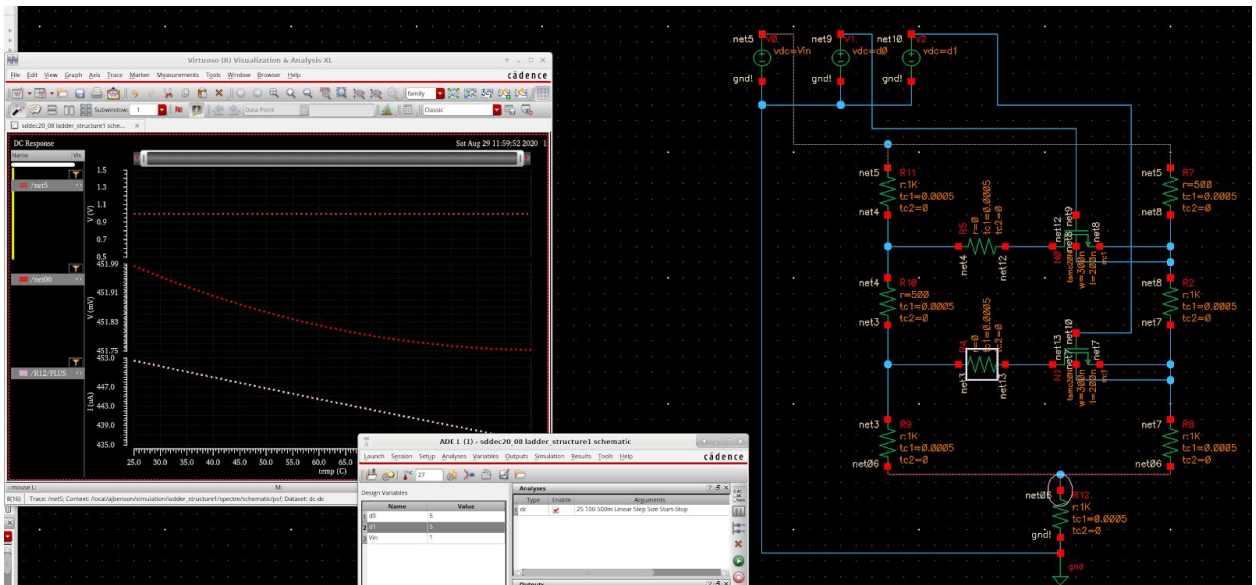


Ladder 2 Bit nested structure



Alek Benson:

- Re-Configured simulation and meeting environments.
- Re-Simulated ladder structure to understand the abilities on correcting manufacturing defects.
- Modified ladder structure to be reconfigured for actively trimming the resistance.
- Simulated ladder structure using active trim, similar to digi-pot.
- Documented details of simulations and meeting notes.
- Documented information on definitions for Dr. Geiger, worked on TCR definition and simulation precision parameters, and simulation goals.



Oluwatosin Oyekan:

- Refreshed with the team where we left off last semester.
- Did some research on how to find the temperature coefficient of a circuit.
- Researched how the ladder structure would be able to trim a resistor and tried to understand the math behind it

❖ **Pending issues**

Clark Reimers:

- We discovered that we were not getting accurate calculations from the simulator and need to look into fixing this.

Pierce Nablo:

- No issues

Alek Benson:

- We need to find a recurring meeting time with Dr. Geiger. The meetings we currently have scheduled will not work in the future.

Oluwatosin Oyekan:

- No Issues

❖ **Individual contributions**

<u>Name</u>	<u>Hours 8/17 - 8/24</u>	<u>Hours 8/24 - 8/31</u>	<u>Hours cumulative</u>
Clark Reimers	7	9	16
Pierce Nablo	8	10	18
Alek Benson	7	9	16
Oluwatosin Oyekan	7	8	15

❖ **Plans for the upcoming week**

Clark Reimers: I want to continue working with some old design ideas and find their temperature coefficients. I also want to start coming up with new design ideas. The goal will be to work towards a design with a low temperature coefficient of the resistor ratios.

Alek Benson: The plan for the upcoming week is to first come to an understanding with Dr. Geiger about the TCR calculations because of a misunderstanding of ΔT . Also, I will continue to modify the ladder structure to do some larger scale trims. Another goal is to simulate the re-configured ladder structure in order to get TCR data, and compare it to other schematics.

Oluwatosin Oyekan: The plan for this week is to figure out the TCR for the circuit designs, and then run simulations for the designs.

Pierce Nablo: For the next week, I want to look at some issues I was having with simulation in order to mitigate computational error in the simulation environment. In addition I will need to plan for the peer review presentation.

❖ **Summary of weekly advisor meeting**

We met with our advisor to reaffirm where we were with our project and make plans for moving forward. We worked on a few things between the time we last met, so we went over that as well. Dr. Geiger informed us that our simulation precision was not good enough for our data. He told us that we need to set some parameters to give us better results in our data. We also need to find what TCR calculation to use on our data depending on the change in temperature.