

[EE/CprE/SE 492 Biweekly Status Report 2](#)

Dates: 9/10/18 – 9/24/18

Group #: 5

Project: Micro-Electro-Mechanical Systems (MEMS) Based Sensing System for Soil Conditions Monitoring

Client: Dr. Halil Ceylan

Advisor(s): Shuo Yang and Dr. Yang Zhang

Team Members:

Nathan Coonrod (Report Manager)

Kyle Kehoe (Communications Manager)

Jacob Verheyen (Meeting Facilitator)

David Severson (Web Master)

Sok Yan Poon (Timeline Manager)

[Summary](#)

As a team, we pushed on the new sensor PCB design, specifically schematic and layout of a PCB. The schematic and layout of the sensor redesign has been completed and ordered along with the parts needed to populate the sensor PCB. Assembly of the sensor PCB should be able to be started the week of 9/24/18. Sensor schematic and a 3D rendering of the sensor is shown below in following figures.

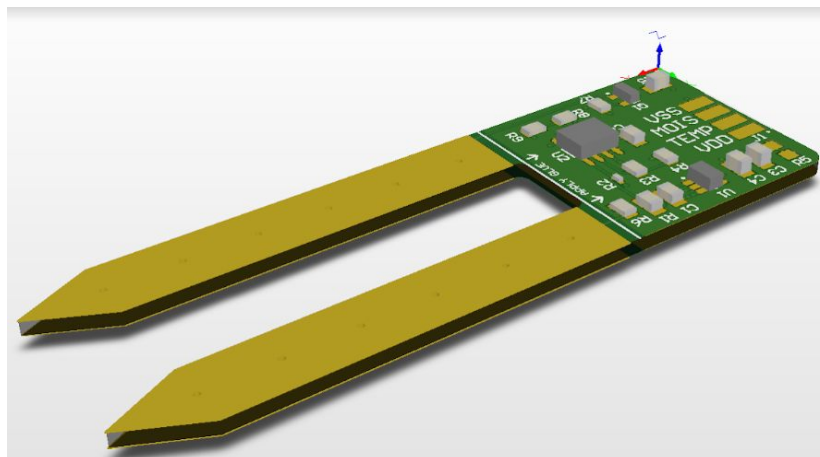


Figure 1: 3D rendering of temperature and moisture sensor PCB

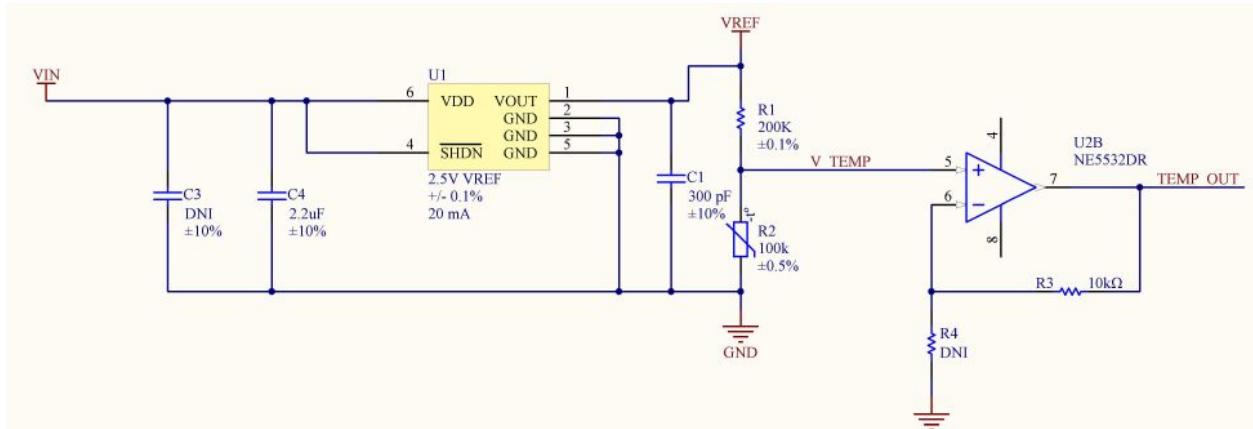


Figure 2: Schematic for temperature sensor

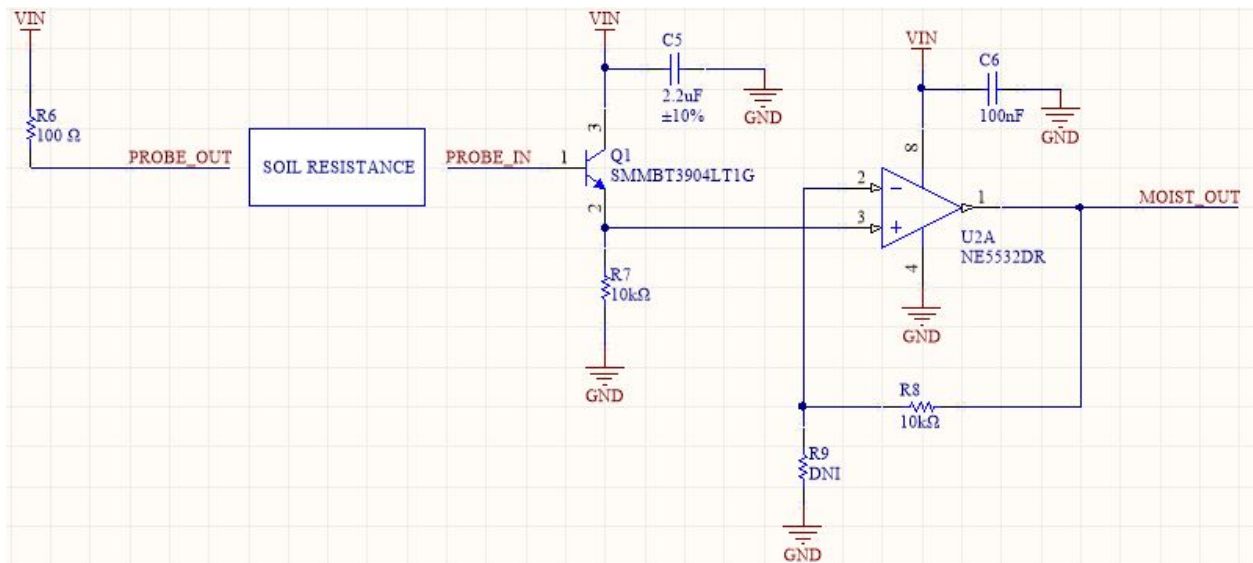


Figure 3: Schematic for moisture sensor

Another item was the schematic design of the aboveground DAQ. Schematic design is essentially complete and is currently under review by the team. PCB design and layout for the DAQ system should be able to start very soon once input is received from our adviser on the look and functionality of the enclosure the PCB should be placed in. A couple of different enclosure design ideas are scheduled to be reviewed at an in-person meeting with our adviser on 9/24/18. Once a specific design for the enclosure is decided on, we will be able to properly place components on the DAQ PCB and route interconnects accordingly.

Accomplishments

- Kyle: Helped with schematic of PCB sensor redesign and interconnect routing of sensor PCB. Worked on implementing wake-up interrupt for Arduino sleep mode.
- Nathan: Replacement sensor schematic and PCB design. Help with DAQ schematic design. Investigation of DAQ enclosure options.
- Jacob: Nearly completed the schematic for the DAQ. Researched possible enclosure options.
- David: Researched options for enclosures. Researched options for connectors from DAQ to sensor. Assisted with software to put microcontroller into sleepmode.
- Sok Yan: Research and working on Arduino sleep mode and wake-up interrupt.

Pending Issues

- Arduino sleep mode interrupt debouncing issue
 - Could use an extra capacitor to help with debouncing
- Sensor output buffer will not work as designed
 - Needs drop in replacement part (trivial)

Individual Contributions

Name	Contribution	Hours This Week	Hours Cumulative
Kyle	Sensor schematic and PCB, Arduino interrupt coding	7	13.5
Nathan	Sensor schematic + PCB, DAQ schematic	7	13
Jacob	DAQ schematic, enclosure research	9	15
David	Enclosure, connector research. Software assistance	6	12
Sok Yan	Arduino code for sleep mode and wake-up interrupt	7	13.5

Plan for Coming Weeks (9/24/18 – 10/8/18)

- Kyle: Keep pushing on software development. Assisting with assembly of sensor PCBs and their characterization and testing. Work on layout and placement for DAQ PCB.
- Nathan: Continue helping with DAQ schematic and PCB design, assemble and test sensor PCBs, help develop DAQ software in preparation for first revision hardware.
- Jacob: Design PCB for DAQ. Help moisture sensor characterization with David and Shuo.
- David: Start characterizing moisture sensors with Shuo at his laboratory. Start soldering components onto the sensors that were developed by Nathan and Kyle.
- Sok Yan: Continue implement arduino sleep-mode and wake-up interrupt.