P09222 Formula Team ECU Case Design Review Summary

While meeting with the customer, some issues were addressed and a list was created of items that require further analysis during the winter term. The thermal analysis showed that the components will not burn out if the case is surrounded by standing air with an ambient temperature of 125° F at steady state under extremely conservative conditions. Further analysis is required with standing air on only one side of the case and the frame of the car on the other. The possibility of reducing the amount of thermal interface material to decrease net weight was also suggested. A 3-D ANSYS model with point heat loads, reduced thermal interface material, and standing air on only one side of the case will show a more accurate representation of the case under the conditions mentioned above. From this model, I will be able to find the most efficient way to dissipate heat while keeping the net weight to a minimum (a secondary concern of the customer).

Another topic discussed was the need to create a second access port on the back side of the case to allow easy access to the board for reprogramming. I will need to work the PCB designer to incorporate this change into my design revisions.

The preliminary case design requires a few changes before manufacturing including a more efficient way to secure the lid to the base. Since welding the lid will create issues with installing/accessing the board, another fastening method is necessary which will be researched and analyzed during the winter term. Overall, the customer expressed satisfaction with the preliminary design and a secondary detail design review will be held to update the customer on the changes made to the design.