Project #	Project Name	Project Track	Project Family
P09222	FSAE ECU III	Vehicle Systems Technology	FSAE Autosports
Start Term	**Team Guide**	**Project Sponsor**	**Doc. Revision**
20081	DR. NYE	FSAE	1

Project Description

Project Background:

The long term goal is to have a working, reliable ECU that will replace a commercial model that is currently in use. The current model in use is too expensive and excessive for the needs of the RIT Formula team and a customized ECU for the car will improve the team's chances of winning the final competition. This is the 3rd FSAE ECU design project following P07222 and P0221, where this project will modify the previous design and conduct further testing to develop an ECU that can be used by the RIT Formula team.

Problem Statement:

The primary goals are to have a functional, reliable, and cost effective ECU that can be implemented before next year's SAE competition. The unit will be based on the previous models, but will be redesigned as needed to fulfill these goals.

Objectives/Scope:

1. Fix the difficulties with the power-up sequence caused by the TI voltage regulator.
2. Repair the PCB board. This includes modifying the traces, repairing damaged pads, and adjusting the diameters of the pin holes.
3. Replace or modify the AD8387 Op-Amp.
4. Modify the injector circuit for better efficiency.
5. Reformulate the design to be as light and compact as possible.
6. Redesign the case for improved heat dissipation and vibration.
7. Modify the processor program code to obtain better performance and control.
8. Improve communication and control of sensors through the microprocessor.

Deliverables:

- Fully functioning ECU
- Modified program for use with ECU
- All design documentation user manuals

Expected Project Benefits:

- Significant cost benefits
- Improved credibility for competition
- Customized unit to effect specific needs of car, making upgrades more effective

Core Team Members:

- Dereck Bojanowski
- Jordan Hibbits
- Robert Joslyn
- Giovanni Sorrentino
- Bob Raymond
- Andrew Rittase

Strategy & Approach

Assumptions & Constraints:

1. By the end of this project the ECU must be functional enough to implement for the 2009 competition.
2. The cost should be minimal due to the previous ECU projects.
3. The project will mostly be based on modification to the previous design.
4. The design will follow the same requirements that the last project team followed.

Issues & Risks:

- The customized ECU might damage the car, while the commercial ECU from Motec is very reliable.
- The PCB board will require some changes to be made, however no one on the team has much experience with PCB board redesign or with the programs required for the redesign.
- The ECU case needs to be redesigned to be light, ergonomic, esthetically pleasing, water-proof/resistant, well suited for vibration, and capable of very good heat dissipation.
- Communication between the various control sensors and the microprocessor.
- Timing for the fuel injection system.

Notes

Due Date	Action Item
Term 1 Week 6	Build of working product
Term 1 Week 10	Lab testing and refining
Term 2 Week 6	Field testing and refining
Term 2 Week 11	Field use of final product