# Modular Engine Control System (MECS)

## Project

**There are two purposes of this project:**

- Develop an open source platform for designing electronic engine control systems

- Demonstrate the platform by designing an electronic control system for a small gasoline powered engine

**Demonstration Objectives:**

- Modify a small gasoline engine to run on electronic control

- Write a VHDL library

- Construct all components and wiring in a durable fashion

## System

Ignition system components implemented in demonstration engine
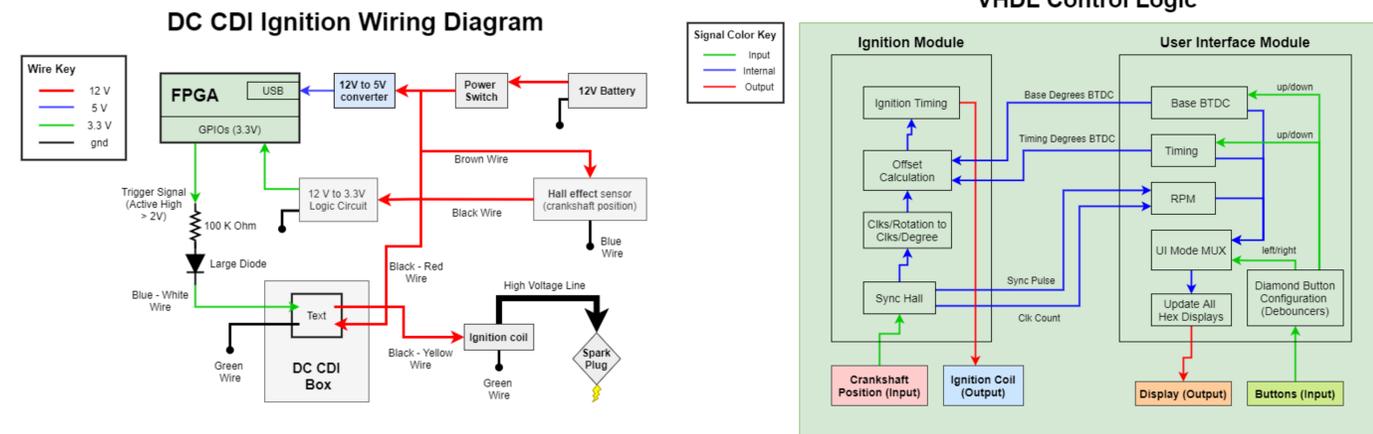


## Methods

- The MECS design method is an iterative process. The following steps apply to both physical components and VHDL control logic.

  - Define the required functionality of a module
  - Build a prototype module which accomplishes the required functionality
  - Test the functionality of the prototype, make changes as necessary
  - Build permanent implementation of module

- The MECS design method was used to create a electronic engine control system using the following major components :

  - Harbor Freight 79cc predator engine
  - DC CDI ignition and Hall effect sensor
  - DE10 Lite FPGA and VHDL control logic library

## Conclusion

- The demonstration system allows the user to run the engine, as well as view and modify the ignition timing in real time

- The MECS design method was proven an effective tool for electronic engine control system design

- **Future work**:

  Implementing a full EFI system using the MECS design method would require more time

COLLEGE of ENGINEERING
UtahState University.

Christian Hogan
christian.hogan@aggiemail.usu.edu