LAFAYETTE
ELECTRICAL & COMPUTER ENGINEERING

Formula Electric Vehicle
ECE 492 - Spring 2017
Tractive System Interface

Overview

The overall goal of the Tractive System Interface is to safely connect high voltage from the packs to the motor controller.
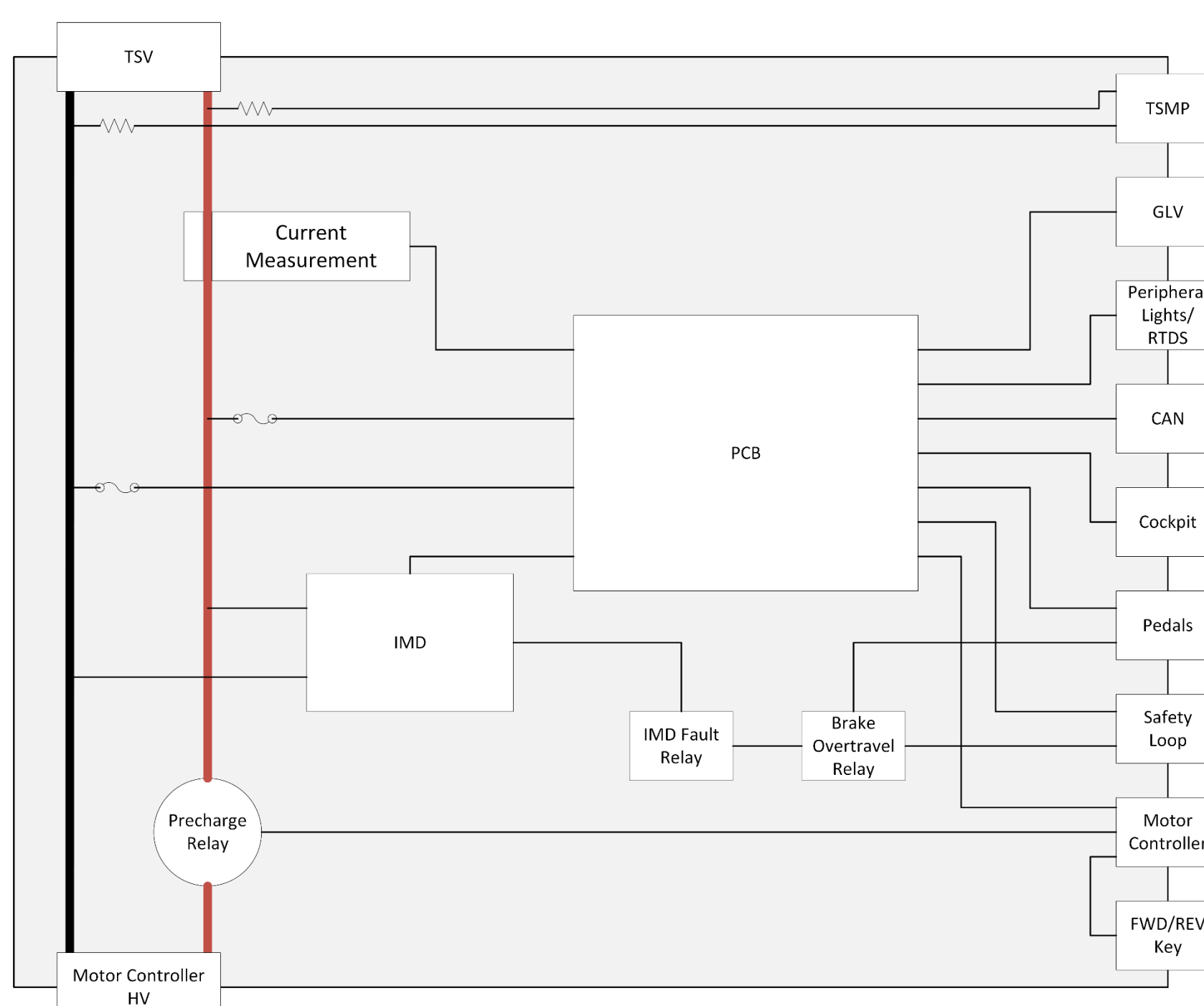

Fig. 1: Simplified system block diagram

TSI Board

- Responsible for all logical control of subsystem
- Monitor throttle, brake, and driver input to determine drive state and action
- Capable of interfacing with VSCADA
  - Send observed data
  - Reception and transmission of remote throttle control
- Control of status lights

Fig. 4: Fully populated TSI board

Functionality

The system is designed to facilitate a number of other functions based upon rules described by FSAE.

This included:

- Throttle Plausibility
- Brake Interface
- Voltage Measurement
- Current Measurement
- Motor Controller Interface
- Drive State
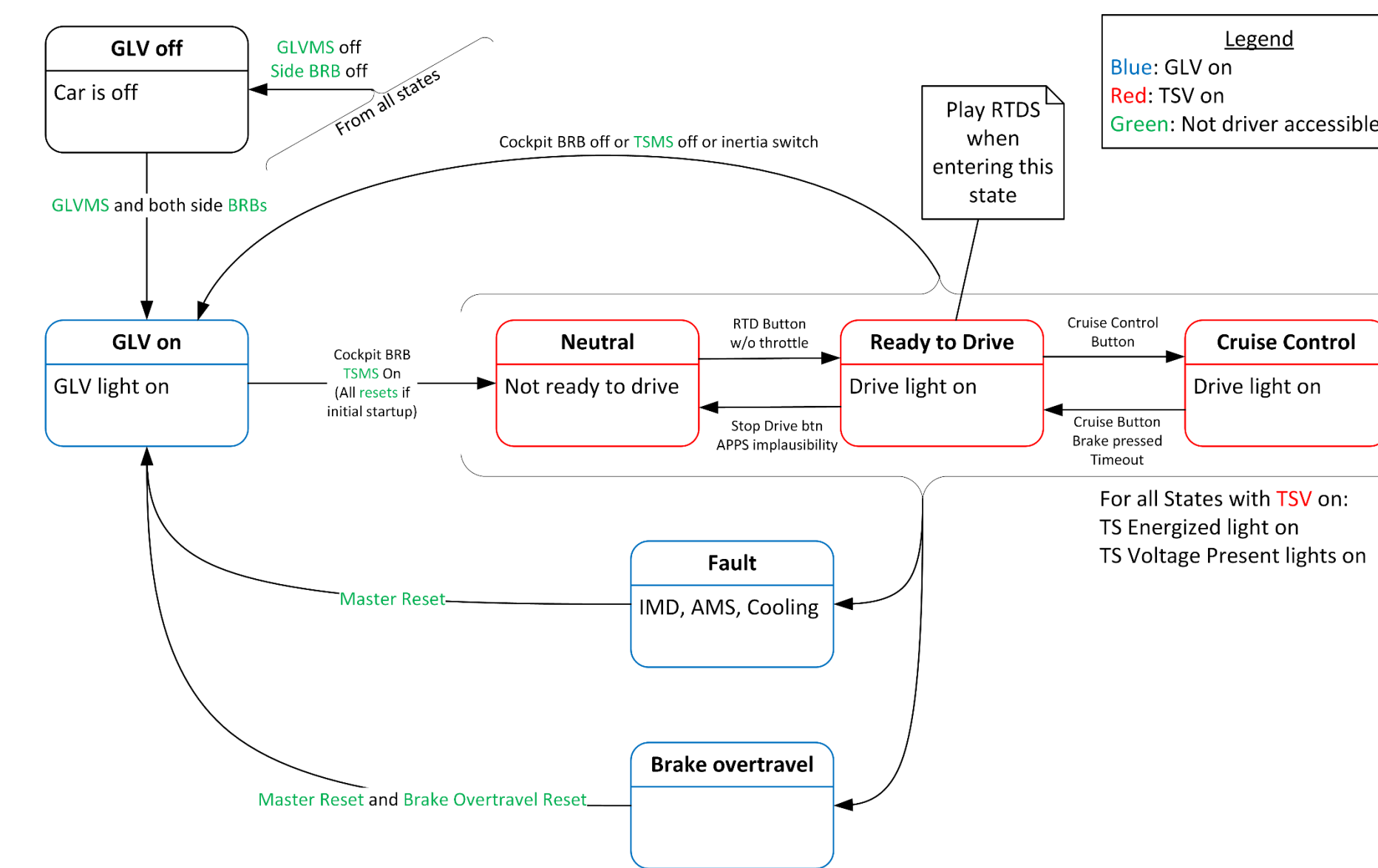- Insulation Monitoring Device (IMD)

Fig. 2: Detailed shutdown conditions and states of the car.

Testing

- Testing focused on functionality of the board.
- Test panel (Fig. 5) simulates subsystem's driver interface
- Able to simulate throttle plausibility checks, as well as brake press and over-travel.
- Used to confirm drive state operability

Fig. 5: Test panel of driver interface

Integration

- Successfully integrated into vehicle chassis
- Tested implemented features with components mounted to car
- Subsystem functioned to allow car to drive

Fig. 6: TSI integrated into car

Enclosure

- Enclosure designed to neatly house entire subsystem
- Electric insulation necessary to ensure safe operation
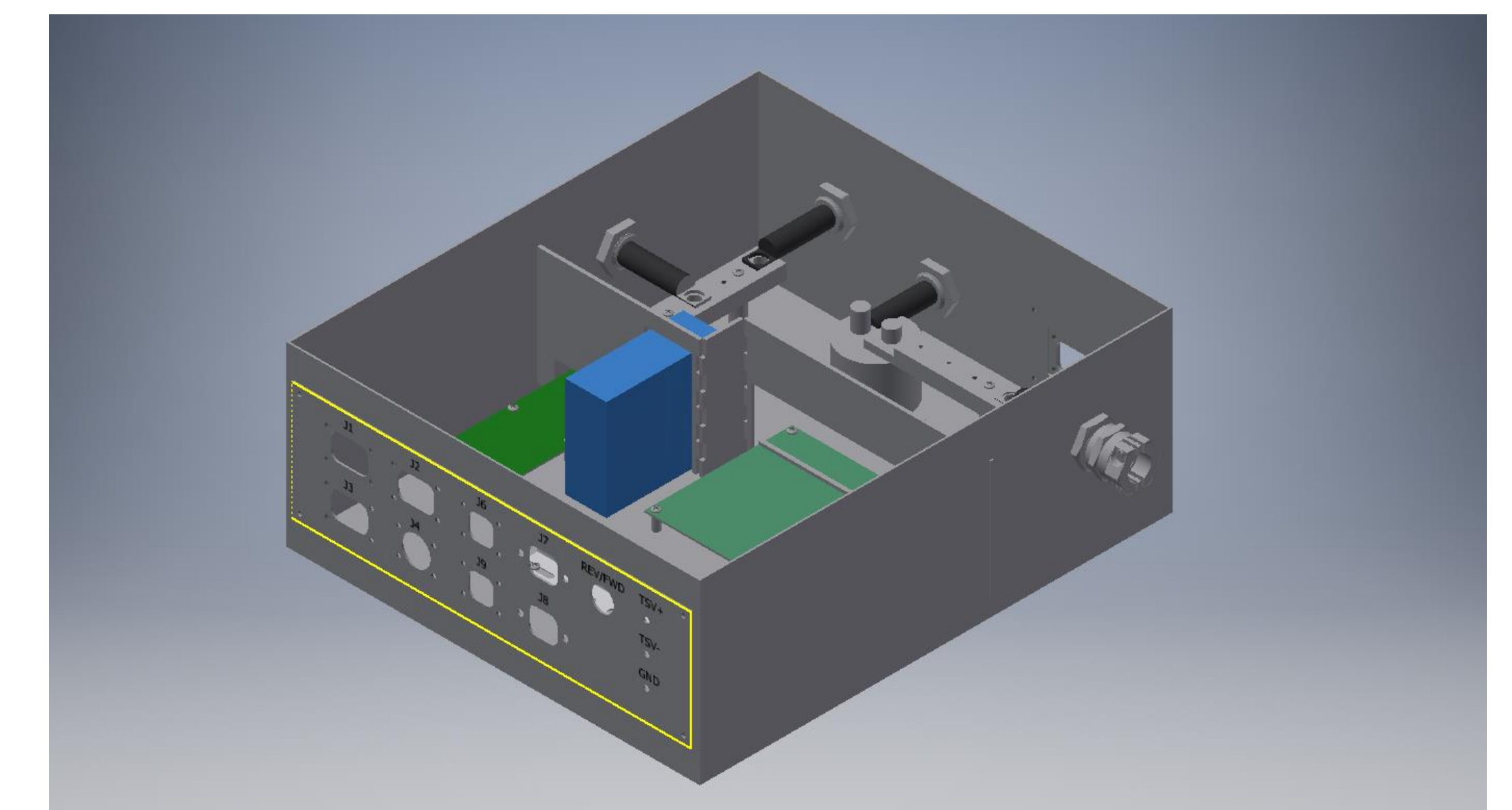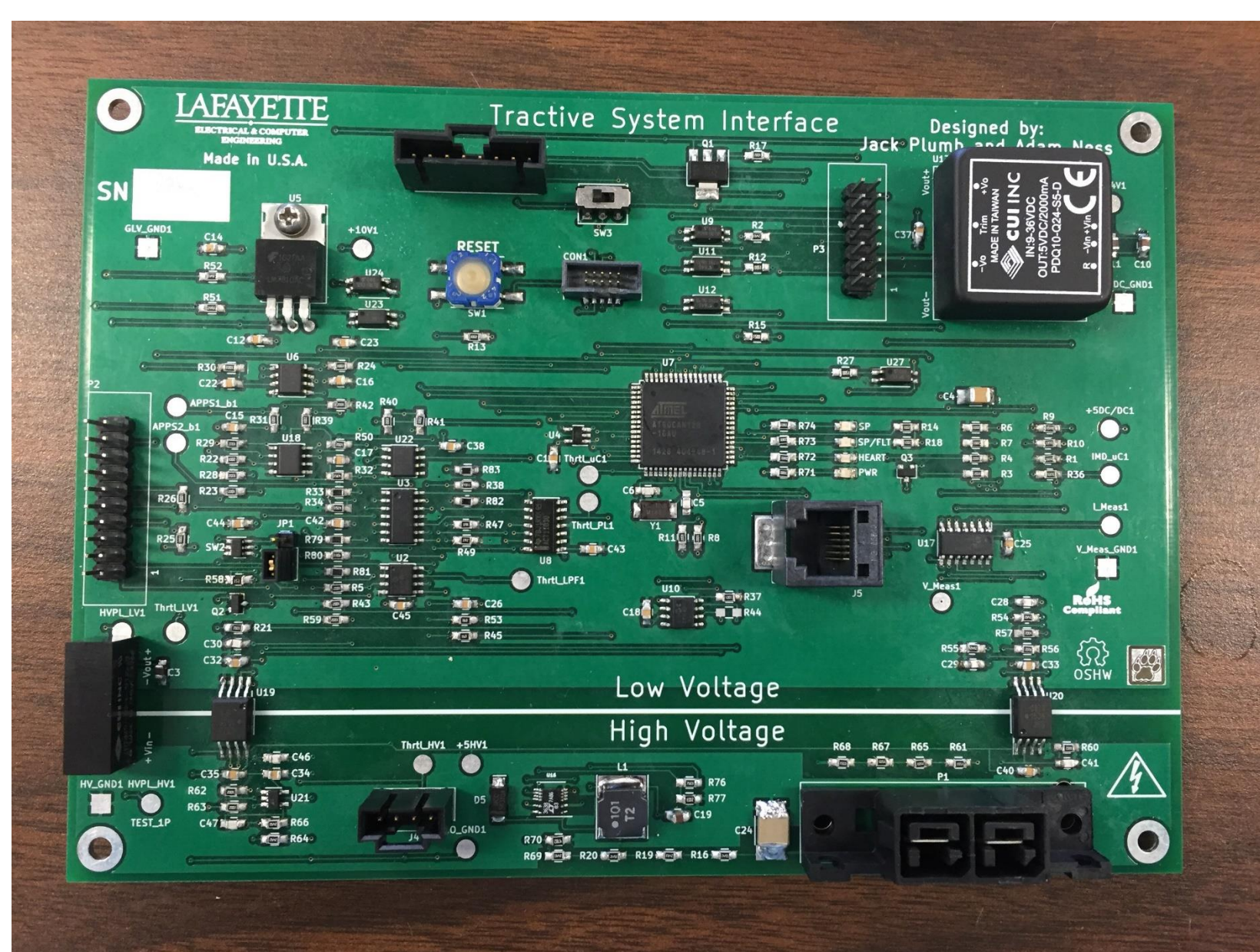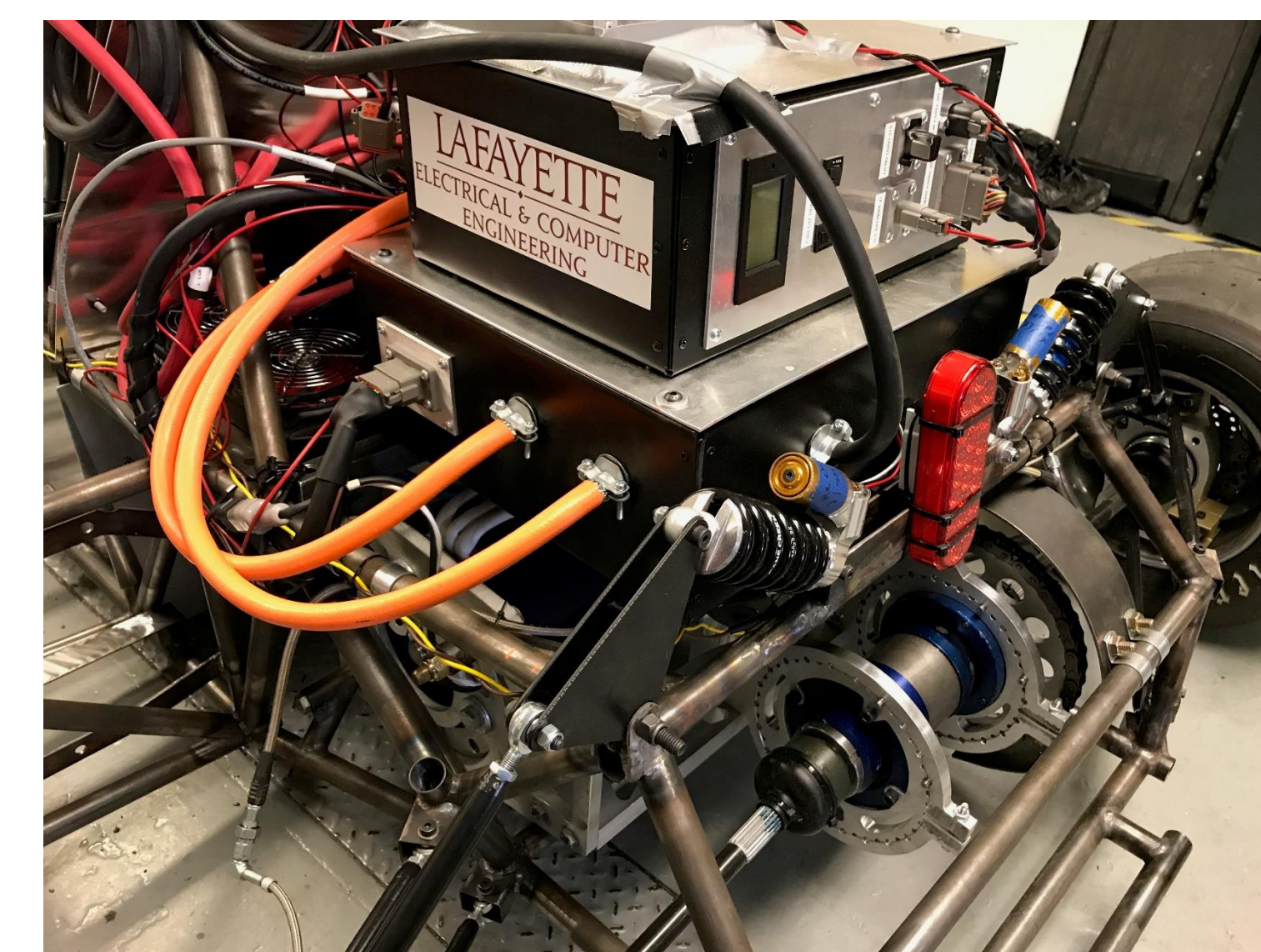- Panels fabricated to allow for changes to design

Fig. 3: Assembled Inventor file of TSI enclosure

The Team

Fig. 7 Left to Right: Jack Plumb, Adam Ness, Christer Hoeflinger

Acknowledgements