LAFAYETTE
ELECTRICAL & COMPUTER ENGINEERING

Formula Electric Vehicle ECE 492 – Spring 2018

Grounded Low Voltage (GLV) & Vehicle Supervisory Control and Data Acquisition (VSCADA)

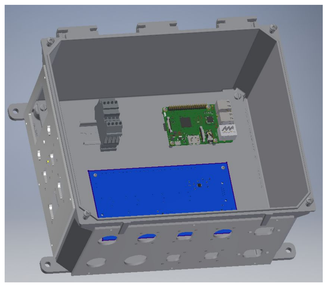
GLV Overview

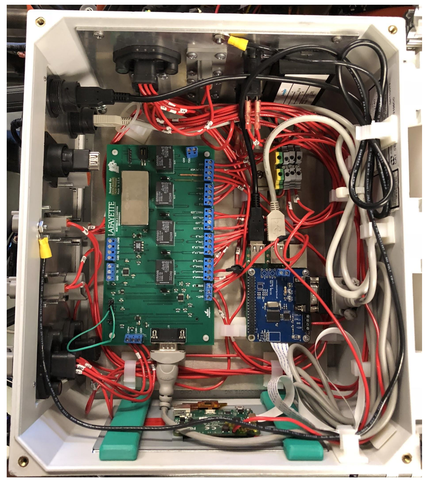
The GLV Systems contains four main subsystems:

GLV Power- 24V provided to all subsystems
Safety Loop- Closes AIR's to energize high voltage system
BOB- Safety loop routing and relays, ADC and DAC functionality
Vehicle User Interface- Hardware for user interface with the vehicle

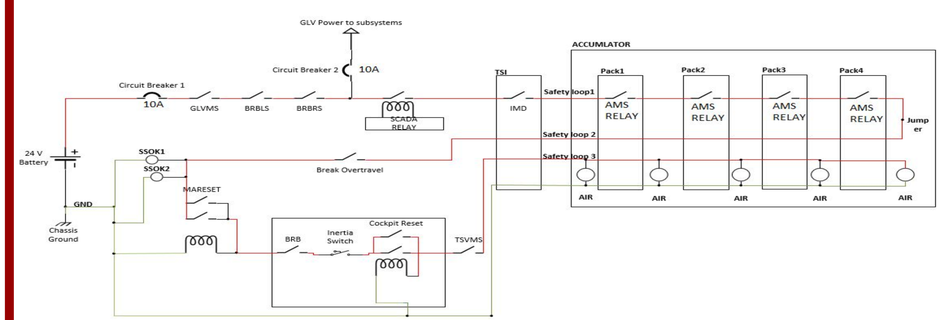
GLV Enclosure:

Contains:
BOB board
VSCADA display
GLV voltage and current display
Raspberry Pi





Safety Loop Diagram



Contact Information

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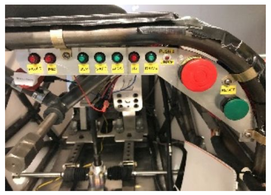
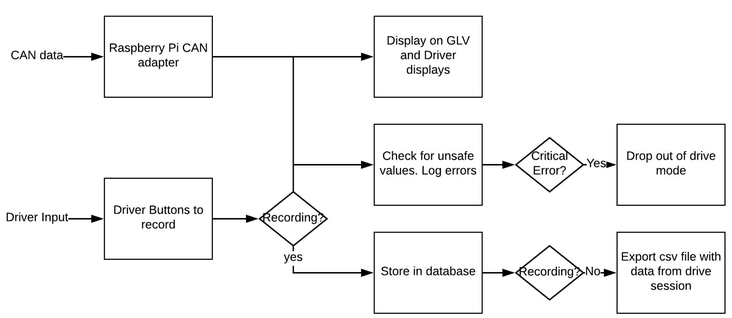
Vehicle User Interface

Interface on Vehicle



VSCADA Process



VSCADA Overview

Stores, Displays, and Reacts to CAN bus data.

Raspberry Pi CAN adapter receives CAN data
Software Parses CAN data into human-readable form:
- Displayed on GLV and driver displays
- Checked to ensure values are within safe ranges
- Stored in a local sql database when system is recording

Export to csv file and save to flash drive or locally on pi

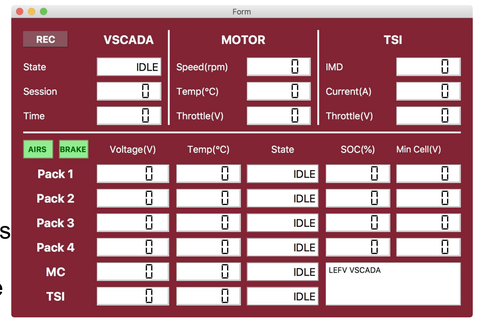
Equipment

Hardware:
- Raspberry Pi 3 B
- PI2CAN CAN adapter
- Raspberry Pi 7" Touch Display
- 20x4 USB LCD Display

Software:
- Python 3
- Sqlite Database
- Peewee library (ORM)
- LED Display C++ Library
- QT Creator (UI)

VSCADA GUI

- VSCADA section displays state, session number and the time that session takes.
- MOTOR section displays vehicle speed and motor temperature and throttle voltage it gets.
- TSI section displays IMD number, its current and throttle output.
- Bottom half sections display voltage information, current drawn and state of battery pack, motor controller and TSI.



Acknowledgements:

Past years 2015, 2016 and 2017 work on GLV gave us the opportunity to integrate everything together for a complete system of GLV. Without their work this could not have been completed.