Carman Design Review 10/13/20
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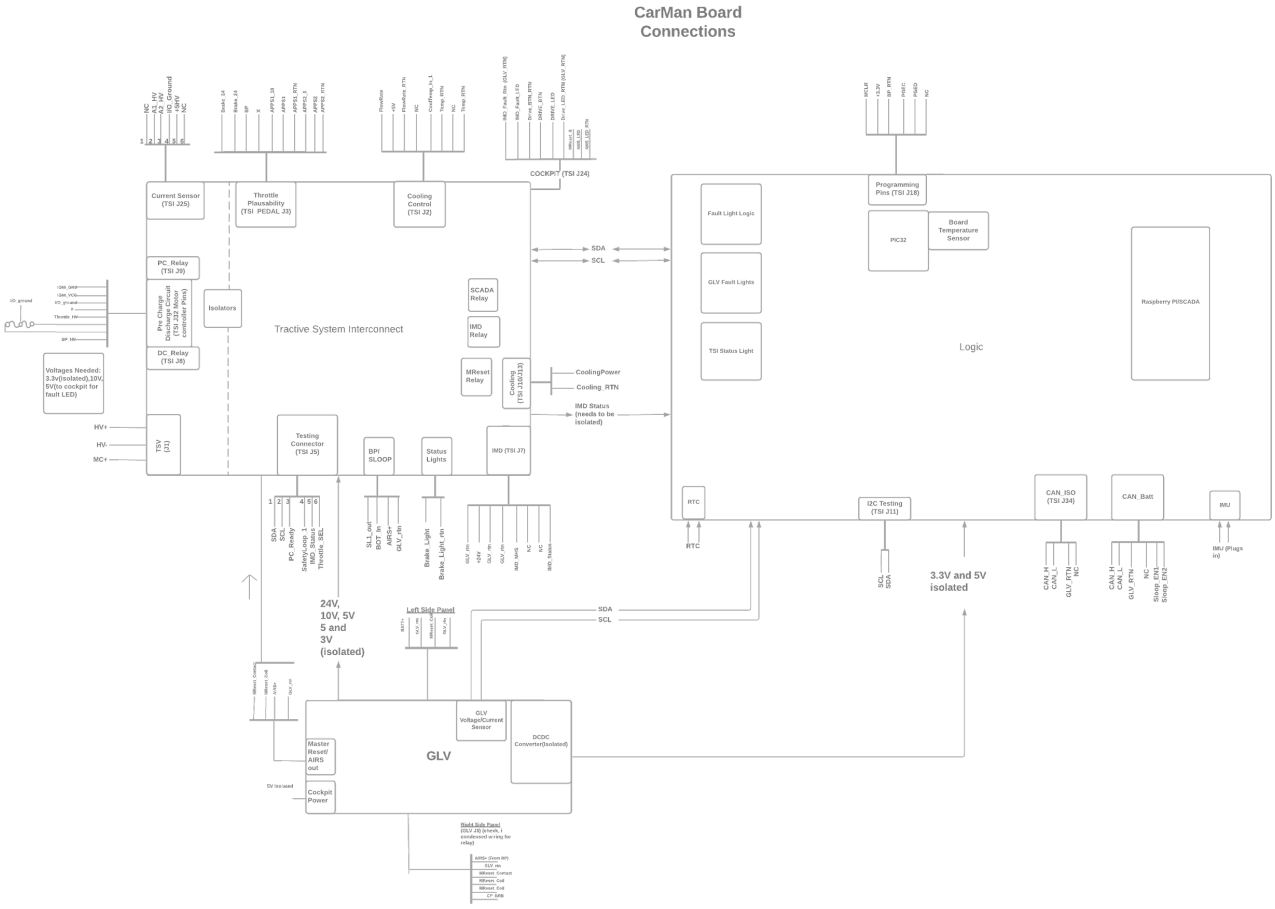
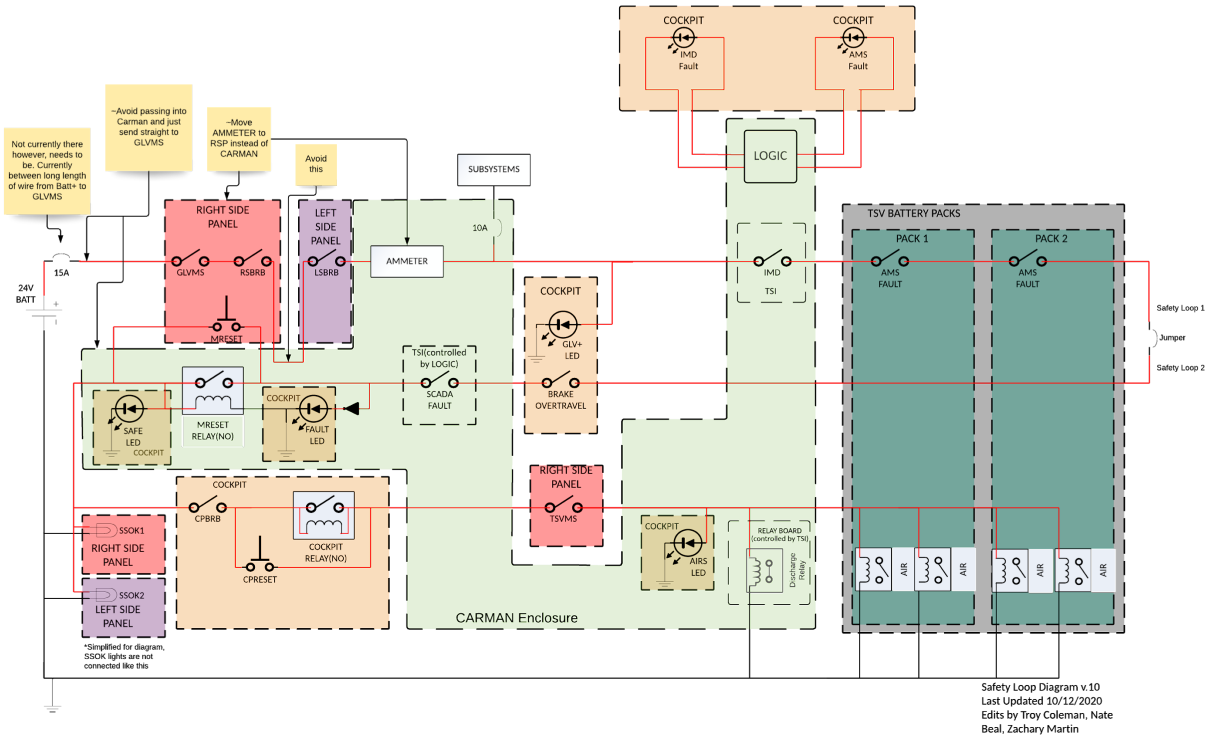
Purpose: This design review's goal was to unveil the newly designed boards within the carman enclosure and what purpose each serves. Emphasis was placed on the logic/microcontroller board, the Tractive System Interface(TSI)/interconnect board, and the grounded low voltage(GLV) breakout board(BOB).

Diagrams:



Safety Loop



Topics Discussed/Minutes:

1. Move 15A fuse to terminal of battery: Battery to 15A fuse to Right Side Panel to Left Side Panel to Carman.
2. Should the Master Reset Relay be moved to the right side panel? Less wire means less resistance, but you would need an extra wire to go to carman to keep supplying power to systems excluded from the safety loop(like SCADA).
3. Put V/A meter on the Right Side Panel so we can easily see battery measurements.
4. Why have 3 separate boards, and not just 1 big one? Size, debugging concerns. Nice to have 1 wholly digital board and 1 wholly analog board with A2D converters to give digital outputs. Could just partition areas of one board.
5. GLV V/A sensor problem:its I2C has to be isolated, but the sensor needs to use the raw 24V signal and ground.
6. Need to show returns on the I2C lines.
7. Isolate voltage on all of carman so that each board has a common ground? Would now have to deal with external interfaces, as different systems could have different grounds. Need to connect them or isolate them.
8. Rather than do #7, do no isolation so that each board has common ground, and use regulators on board(through isolating converters, like an opto isolator). Need to isolate Can bus from the motor controller(there's low voltage and high voltage can), we also need to keep in mind battery pack's Can bus, it'll need the same ground.
9. Perhaps we put the pi and pic32 on Carman ground, making the Can bus gnd the same as Carman gnd.
10. For Cooling: Temperature readings from motor controller via Can sent to pic32.

11. Don’t need individual returns for each LED to gnd, can come back on same ground.
12. Could make interconnect between boards just 1 ribbon cable.
13. Carman needs to power the SCADA display: I2C, usb perhaps? Also needs power, hooks up to pi.
14. Raspberry Pi draws a lot of current(about 2A).
15. If converters just on each board, could get rid of GLV BOB and have a din rail.
16. Should probably use 2 circuit breakers that are on the side panels: 1 for Safety Loop(about 10A), 1 for everything else(about 5A).

Action Items:

1. Correct the GLV Safety Loop diagram.
2. Carman interface and wiring diagram(high level-showing interconnects between other systems).
3. Low level designs(KiCad).