

Carman Design Review 11/3/20
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Purpose: To go over the KiCad schematics of GLV, TSI, and Logic while checking the carman ICD diagram.

Diagrams: 11_3_20 files on website under Carman tab.

Topics Discussed:

Carman ICD

- Get rid of top level (yellow) wires
- Start numbering at 1
- Types of connectors and wires used?
- Lots of separate connectors vs. 1 large connector
- Show TSV and GLV
- IMD and Discharge Relay have connections to the Relay Board

GLV

- Is V/I sensor differential or do you need GLV ground?
- Bigger R for LEDs to make them less bright
- Safety Loop 0.5A nominal roughly, 5A only for a moment when AIRs close
- 10A breaker on SL overkill, need to make sure breaker blows before fuse
- Cooling 3-4A nominal
- Have 3 5A breakers: Safety Loop, Cooling, Other subsystems
- Put current estimates on schematic, near power supply pins
- Why isolate on GLV? Send non isolated to logic where it then can be isolated. Don't need a separate isolator on GLV then
- We need to hook up to chassis gnd at 1 and only 1 point, nothing to do with GLV_RTN

Logic

- How to mount pi? Upside down- pins are reversed, hard to connect to display. Alternatively go rightside up and have a 40pin ribbon connector
- Local power on board, don't send from TSI. Do conversions on the board.
- Will our Can to Spi work?
- Don't need I2C translator, run IMU, RTC, and GLV sensor on 3.3V
- Put LEDs on
- Programming port for PIC- do we want to have to open carman to program it? PicKit in carman, run usb out to enclosure? If so, need to make sure we add it to the ICD. Alternatively, use a pic then can be programmed with usb/serial.
- Add Screen to PIC for debugging? Could control it with UART, put it on the enclosure. <https://www.amazon.com/UART-20x4-Black-White-Background/dp/B07Q3SJ6Q1>
- Delete U7 as it's not being used.

TSI

- Change name from "Top Level" on the first page of KiCad.

- TSAL_RTN should NOT be hooked up to GLV_RTN! Must be its own separate thing.
- Get rid of external Can ISO, bring MC can into HV side and have transceiver straddle HV and GLV sides.
- Try to add more things to I2C line- flowrate, safety_loop, Brake_Pressed_uc, etc. so that the connector between TSI and LOGIC isn't so large.
- Have a switch to make car go forwards or backwards, mount either on carman with lockable key switch or keep on board. 2 pins from MC are forward/reverse.

Throttle Plausibility

- Brake_Pressed_uC needs pullup on TSI. Throw onto I2C?
- Apps1 and 2 wires for foot peddle

PC +DC Circuit

- Does the design actually work?
- Delete extra connector at top of page
- Does Brake_Pressed_HV = BP_HV?
- Our PC is running off high voltage. If 24V_HV fails, AIRS could still close but DC relay wouldn't close. No injury but lots of that sweet, sweet, sweet magic smoke
- Net name for Safety Loop (HV?) wrong
- Add Cap for Drive button, put on I2C?
- R97 100K? Want to protect PIC

I/V Temp and Throttle Voltage

- No temp reading on board but called this? We moved the temp to Logic, why not have two?

Can and GLV Power

- Why Can transceiver?
- Cooling needs to be finalized. 12V switchable power is what they need.
- Run Scada and IMD relay with transistor
- Have jumper/switch to force Scada relay closed incase code doesn't work.
- Remove weird and obsolete hierarchical sheet that shows up when you save KiCad as pdf.
- Just use Voltage divider for IMD_Status rather than going through a converter
- Don't want to change Pacman boards. Rather than take sloop_en from them, monitor the Can line for an AMS fault which can then be passed into the logic.
- Is it ok to control light using Can line while the relay stays mechanical? Must ask judges.
- Missing Fault LED! That's what tells you that the safety loop is closed and operational.

Action Items:

- 1. Update schematics**
- 2. Update ICD**
- 3. Create Layouts**