

Ergo Goals/Requirements

Sunday, August 17, 2025 10:49 AM

KS9E Dash

Monday, August 25, 2025 5:46 PM

Mechanical Responsibilities (Alex Ha):

- Light layout
- Box Design
- Connector placement
 - Still needs to be decided
- General Positioning

LV Responsibilities (TBD):

- Integrating into wiring harnessing
- Power/CAN communication
- PCB Design
- Connector choice

General Goals:

- Downsize as much as possible
 - Weight decrease
- Place inside proper periphery zone
- Remove all buttons from dash
- Water resistant (rain test)
- Prevents dust ingress

Timeline:

- PP1 done by Sep. 4th
-
- Review mechanical CAD during VD Meeting

Requirements (minimum viable):

- Lights:
 - IMD
 - BMS
 - BSPD
 - Screenshot
 - VCU State
- SOC
- Tiny display for highlighted three

Analysis Goals:

- Line of sight/Visibility analysis
- Decision Matrix (Box Material)
 - Weight (2)
 - Thermal Capacity (3)
 - Cost (1)
- Weight Comparison to previous dash

Constraints:

- Steering "V"

Dash meeting August 29

- Potentially use an E-Ink display – visibility during dark?
- VCU state and SOC might not be necessary if telemetry is used
- Required lights depends on how reliable the telemetry is
- Recall that signal was poor past the second half of endurance
- HyTech has their antenna on the swan neck as it is technically a crushable object
- Current SOC display is based on percentage, not energy consumption
- Energy Delta needs to be developed, has not run on anything yet
- Petris was asked to leave pins open for future development
- Bullet power cannot be any higher than it currently is
- Inverter light not required by DAQ or d
- Current inverter light is latching

Current 4 Pin deutsch providing CAN (yellow and green) and power (red and black)



Steering Goals/Requirements

Sunday, August 17, 2025 10:50 AM

Steering Wheel Goals/Constraints

Thursday, August 28, 2025 3:48 PM

Project Constraints:

- Maintain the current steering wheel diameter
- Weight decrease

Rules:

- Has to be a continuous geometry

Wanted Buttons:

- Log Flag (sends individual can message)
- Indented driver select switch
- Power limit indented switch
- Launch control button4

Steering PCB:

- A 3d Printed shield can be made if ingress cannot be met otherwise
- Don't know if we have the money to get hubs with integrated pins
- Coiled cable is strongly suggested, but there should be support for both
- Hubs with integrated pins are fragile and complex compared to cable

CF Steering:

- Pocketing out the back and laying the pcb within the pocket
- If this is not lighter, can revert back to original steering wheel
- Its whatever its going to be designed to

Steering wheel geometry will be on same timeline as non-priority A boards

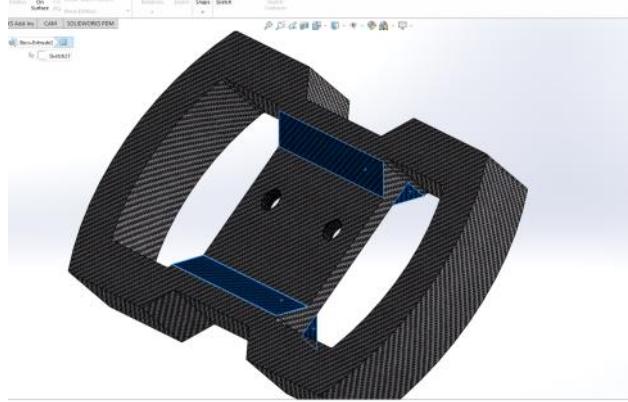
- Melissa will provide the PCB shape

Steering Wheel First Draft Feedback

Wednesday, October 8, 2025 8:17 PM

Design Notes:

- Part is currently unmanufacturable, the "gussets" shown in the image create a 3d contour that necessitates a five-axis machine to make the part. The entire part should just be a flat 2d panel.



- I know math hasn't been done yet but 1.32in thickness is pretty crazy, vibes tell me this can be like at least 4x thinner

✖

- Love actually having threads on the part, make sure you suppress the threads when you integrate into any of the team's main cad, it slows load times
- You don't really have any room to integrate buttons in spots that are reachable by thumbs that wont accidentally be hit

x

-
- We should sit down and discuss adding the cross member in the gaps, while I think thumb grips are awkward it would give you more freedom on button placement as it allows the thumbs to not slip off and accidentally hit buttons. That edge case will be something important to take into account when determining the control scheme



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- There is no good way to actually bond/fasten the polycarbonate panel to the upper part here, you need to add a slot of some sort to do so.
 - Bolt pattern in the center doesn't match our quick release hub
 - No button cutouts are implemented, there also isn't any enclosure or mounting point for a PCB



- Don't ever just fix the part in space. You can make a coincident mate between the assembly origin and your part origin
- Also this would be a hella illegal design unless the bottom indent also had the polycarbonate insert, which would really serve zero purpose.

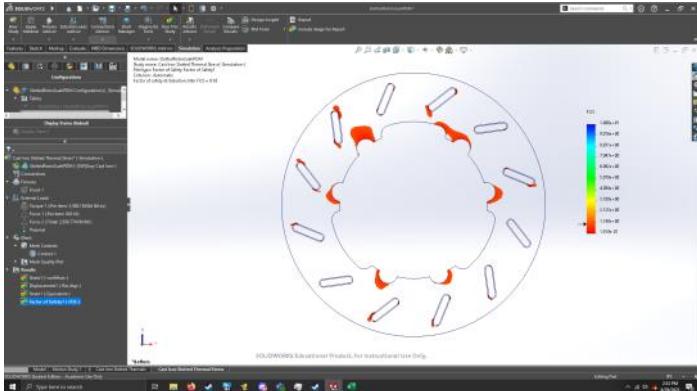
Brakes Goals/Requirements

Sunday, August 17, 2025 10:50 AM

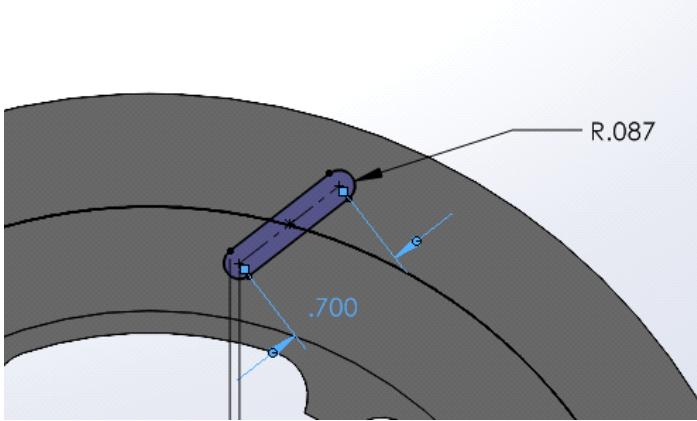
Rotor Simulation Results

Tuesday, August 26, 2025 11:34 PM

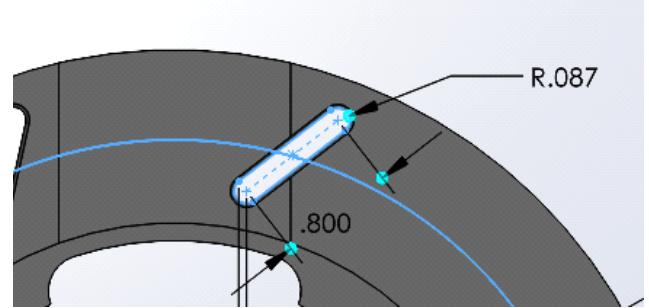
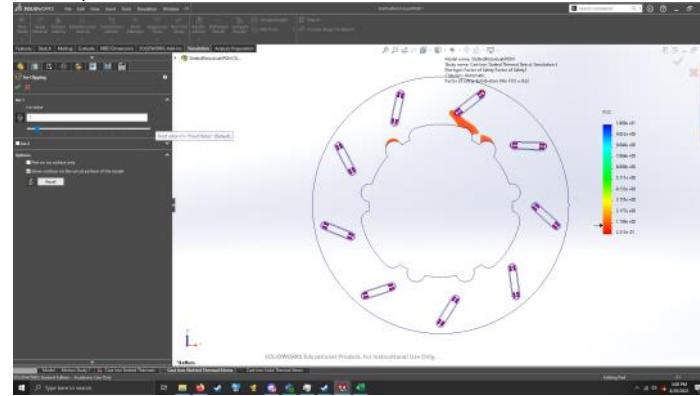
Slotted Cast Iron
90lbs Input Force Load Case, ~700F Peak Temp



0.7in slot length



Slotted Cast Iron
90lbs Input Force Load Case,



9 total slots - 0.75lb total weight

Firewall

Thursday, October 2, 2025 11:13 PM

KS8E Current Firewall (6061)- Real Weight

Calc 1.816 kg + 6 grams (x2) for side pieces
CAD - 2.2 lb (.04") = 1.828kg = **4.03 Lb** (including belt holder)
On Car - 3.97 (.07") 50 g tape = **0.11lb**
 Total = **4.14lb**

Reqd Analysis -

- Failure modes for the different thickness
 - o Shear tear out
 - o Bolt shear
 - o Bending moment

6061

Shear Tear out force(.070"):

$$F_{sto} = 2 * \text{Area} * \sigma_{ult}$$
$$= 2(78 * .07)(30000) \text{ lbs}$$
$$= 3272 \text{ lb}$$

Shear Tear out force(.040"):

$$= 2(78 * .04)(30000) \text{ lbs}$$

$$= 1872 \text{ lb}$$

Goals -

- Allow for lv harness pass thru
- Tapeless
- Lightweight to what is necessary.

7075

Shear Tear out force(.040"):

$$= 2(78 * .04)(48000) \text{ lbs}$$
$$= 2995 \text{ lb}$$

Prelim Research (ask abri) -

- What aluminum to use? (1000 or 5000 would work if no load)
- Check prev designs (KS6,KS7)
- Al tape was annoying
- Def of permeability

F.6.5.3 The Shoulder Harness Mounting Bar must be loaded only by the Shoulder Harness

The Head Restraint, **Firewall**, driver's seat and light bodywork may attach to the mounting bar

F.10.4.4 Holes and Openings for airflow:

- a. Must be round. Slots are prohibited
- b. Should be maximum 10 mm diameter
- c. Must not have line of sight to the driver, with the **Firewall** installed or removed

T.1.1.4 During this test:

- a. The steering wheel, steering column, seat and all padding may be removed
- b. The shifter, shift mechanism, or clutch mechanism must not be removed unless it is integral with the steering wheel and is removed with the steering wheel
- c. The **firewall** must not be moved or removed

T.1.6 Thermal Protection

T.1.6.1 When seated in the normal driving position, sufficient heat insulation must be provided to make sure that the driver will not contact any metal or other materials which may become heated to a surface temperature above 60°C.

T.1.6.2 Insulation may be external to the cockpit or incorporated with the Driver's Seat or **Firewall**.

X

- e. Any seals or adhesives used with the Firewall must be rated for the application environment

T.7.2.3 Bodywork must not contain openings into the cockpit from the front of the vehicle back to the Main Hoop or **firewall**. The cockpit opening and minimal openings around the front suspension components are permitted.

EV.4.3.5 Pressure relief valves must not have line of sight to the driver, with the **firewall** installed or removed

