Viking Motorsports
Digital Dash
Project Requirements
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Background

Objective

The digital dash will give the operator of the electric car critical system warnings of various systems. The warnings will come from a CAN bus connected from the electric car VCU that will be connected to a microcontroller contained in the digital dash unit. The microcontroller will parse the CAN data and display it on the LCD contained in the digital dash unit. The microctonroller, LCD and a power supply will be contained in a waterproof enclosure that is easily installable on to the current setup of the Formula SAE electric car.

Constraints

The LCD display must be readable in all weather conditions. A trans-reflective display that is 500-900 nits bright will allow the display to be readable in sunlight. A waterproof enclosure will allow the device to operate in rainy conditions and allow it to be readable in rain. The digital dash unit must be large enough to be readable but small enough to be mountable on the dash of the electric car. A 3.5” LCD screen will allow for both size constraints.

Standards

The digital dash unit must adhere to the Formula SAE rules. The main article here is that the digital dash must be contained inside the cockpit of the electric car.

REQUIREMENTS SPECIFICATION		
Marketing Requirements	**Engineering Requirements**	**Justification**
2	The unit must have a trans-reflective screen capable of 500-900 nits.	The digital dash will be used in direct sunlight and must be readable in such conditions.
5	It must be able to be powered by a 12V DC source.	The unit will be powered from the main battery on board the electric car.
5	A power supply must be designed for the digital dash to be robust against electrical noise.	The 12V battery is just a nominal value. The actual value will fluctuate quite a bit and the digital dash must operate at a fluctuating voltage.
5	The electric car must run with or without the display.	In case of digital dash failure the electric car must still be operable.
3,5	Unit must boot up in less than 30 seconds.	The digital dash must boot up quickly so it is not a nuisance to turn on and use.
3,5	The digital dash should be reasonably simple to reconfigure and add/remove variable/messages to display	The digital dash must be easy for another user to add information to it with a user manual.
2	The unit must be weather-proof.	The digital dash will be used in rain and must be usable in such conditions.
1	Total parts and manufacturing should not exceed $500.	The digital dash must be relatively cheap to accommodate the Viking Motorsport budget.
3,4	The digital dash should be easily readable, big fonts, non cluttered display	The operator will need to quickly glance at the display and get information quickly.
4,5	The digital dash should be small and easily mounted	The electric car dash does not have a lot of space available and will need to be moved around easily.
3,5	The digital dash should gather data from the VCU to display to the dash.	The electric car is already logging all the information that needs to be displayed on the digital dash.

1. The system should have a cost of $500 or less.
2. The display should be usable in all weather conditions.
3. The system should alert the operator to system warnings.
4. The system should be physically small.
5. The system should be easy to install.