I. OVERVIEW

Any complex electronic system will almost always require a control unit to operate it. This can take many forms, from off-the-shelf solutions to bespoke circuits. There are two aspects of control that must be designed for; the user interface to control the skateboard, battery management, and motor/drive train control.

II. USER INTERFACE

A. Overview

- Need a way to control the motion of the board
- Need to relay information back to the rider in a non distracting way
- Need to make charging experience as easy as possible -¿ no special experience required.

B. Throttle Control

The user needs to be able to control the speed of the board intuitively and quickly, to ensure safe riding. There are already pre-existing electric skateboards that use a wireless controller with a roller as a throttle control. This allows for both accelerating, breaking, and reverse, with step wise control for fine adjustment. This only takes effect when a secondary button is held, acting as a dead-mans-switch.

C. Battery Meter

The user needs to be able to understand what the remaining range of the board is, so that they will not undertake a journey where they will run out of charge mid-journey.

III. BATTERY MANAGEMENT

A. Overview

- Safe charging and discharging
- Safe current draw during normal operation
- Monitoring battery health including charge cycle number

B. Charging

Lithium Polymer batteries have a very high energy density, which although desirable, leads to a range of safety concerns, firstly how to charge them without causing a fire.

C. Discharging

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IV. MOTOR CONTROL

A. Overview

- Types of motor that could be used, brushed vs brushless
- control methods for each type, pwm vs 3 phase control
- Efficiency of each method
- power draw
- complexity

B. Motor control

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C. Feedback

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