# Design Review 2

Group 11 - IR Remote Control

Subsystem 1 - Power and Readout Circuit - Theory

Purpose: We will have a battery powered board, so we want to be able to readout the status of the battery power.

Implementation: Input voltage of C3 is ~3 V, so we need voltage divider to measure current. To limit current losses, GPIO controlled MOSFET prevents current flow. **MAKE SURE IN PIN IS AN ADC PIN!!!**

It is.
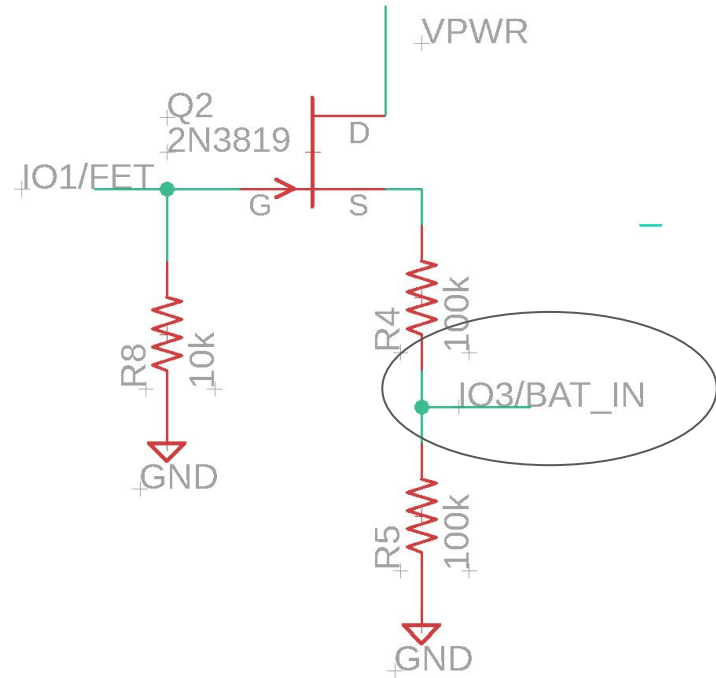
# Subsystem 1 - Power and Readout Circuit - Implement***

- Simple WRITE code for GPIO controlling gate, READ code for GPIO measuring voltage.
- Static measurement of voltage across MOSFET, resistance of resistors, current flowing through (while on and off).
- VOUT = (VBAT - VMOSFET) * R1 / (R1 + R2) - calculate output within the code in accordance with this equation.
- P = V^2 / R, 3.9 WHrs for one AA, you can do the math

MOSFET	2N3819
R1	5k
R2	5k
VOUT - ON	~1.520 V
VOUT - OFF	~0.077 V

Subsystem 2 - IRED Actuator - Theory

Purpose: C3 cannot source enough current to effectively drive the IRED at 50-100 mA. Creating a MOSFET based circuit allows the needed current flow.

Implementation: MOSFET with gate connected to C3 GPIO that created IR signal. Polarity is important, so NMOS was selected. Bandwidth and maximum current were considered. Dissipation resistor provided at the gate.
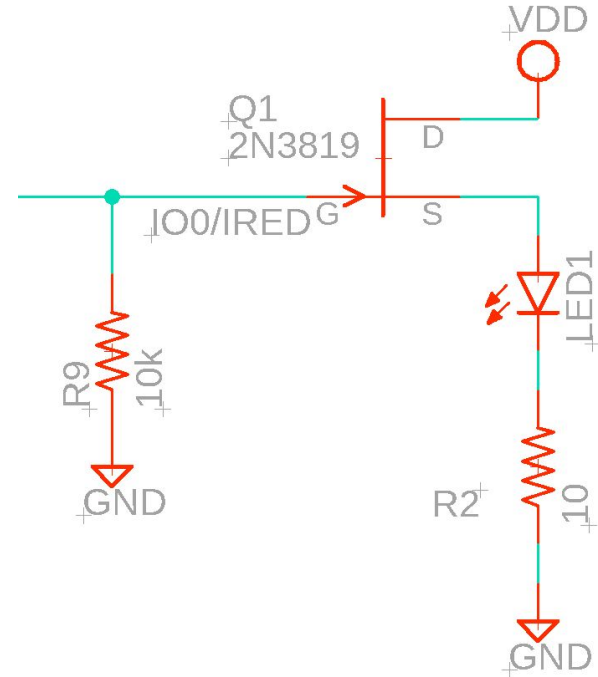
Subsystem 2 - IRED Actuator - Implement

- Build circuit and measure output current.
  - With **10 ohm** resistor and this MOSFET, measured current = **85 mA**!
  - MOSFET - 2N3819 NMOS (not PMOS, this would be inverting)
- Test effective distance of IRED with the improved irradiance and current flow using test code.
  - Effective range: at least the whole room - plenty of power and irradiation now
  - Bit overkill but whatever

Subsystem 3 - IR Detector - Theory

Purpose: We want our digital remote to have the option of adding your own buttons. Users can do this by pointing a remote to the device, selecting "add button", and the detector will record the signal and store it to its database.

Implementation: Put IR detector on the board, with supporting circuit attached to C3.
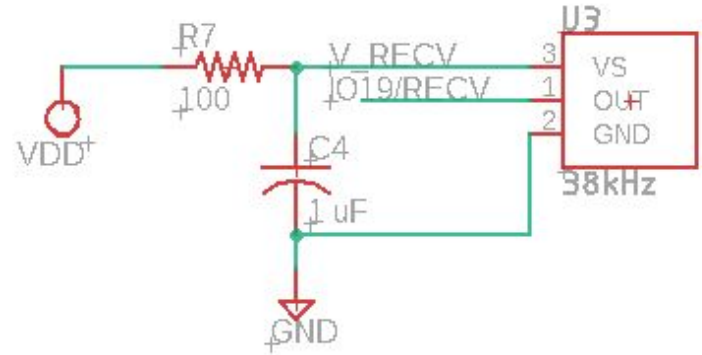
Subsystem 3 - IR Detector - Implementation ***

- Show different remotes being interpreted as different values from the same IR receiver.
- Show functionality of subcircuit.

Progress on Board