Purpose of the Launch Pad Computer:

* Remotely communicate with the rocket’s on board flight computer
* Remotely communicate with laptop ground station
* Fire rocket motor igniter
* Control servo motors for launch clamps

Needs of Launch Pad Computer:

* Microcontroller
* LoRa Radio Transceiver
* At least 2-3 MOSFET igniter circuits for redundancy
* 14.7V battery (what I have available already)
* 5V regulator for Teensy 4.0 and servo motors (must be capable of handing max stall current of 4 servo motors)
* Current regulation for firstfire mini motor starters (>3A)
* Pull down resistors on MOSFET circuits to prevent accidental firing
* Redundant arm switch

Resistor needed for the igniter circuit:

* Battery – 14.7V
* Recommended voltage: 12V
* Recommended current: >3A
* Using a 3.9 ohm resistor: 14.7/3.9 = 3.8 amps
* Power Dissipated: P=I^2\*R = (3.8amps)^2\*3.9ohms = 56W
  + Need a 3.9ohm resistor with high power dissipation (at least 60W)
  + <https://www.digikey.com/en/products/detail/te-connectivity-passive-product/TE60B3R9J/2367245>

Max Current Draw:

* Igniter: 2-5A
* Teensy 4.0: 250mA
* LoRa FRM95W radio: 100mA
* 4x MG90S servo: 900mA each

5V Regulator:

* Total current draw: 250mA+100Ma+900x4 mA = 3.95A
* It should be rated to 5A
* <https://www.pololu.com/product/2851>

Capacitors:

* The purpose for the capacitors on the MOSFET Igniter Circuits is to act as local energy reservoirs and avoid voltage dips when driving high current loads (e-match)
  + I chose 470 microfarad electrolytic capacitors based on the physical size of the capacitor and what I had available
  + Because the battery will be driving most of the current, I don’t need a super large capacitor, which is why 470 microfarads was good for what I needed
* The capacitors connected close to the servos are 220 microfarad capacitors
  + They serve a very similar purpose to prevent voltage dips and ensure the servos have enough power to be actuated all at the same time to release the launch clamps
* I could have done the actual calculation based on the allowable voltage drop using this equation: Voltage = I\*dt/C or based on E=1/2\*C\*V^2
  + However, considering the energy required is an arbitrary value depending on how much is supplied by the battery, I decided not to use these equations to size the capacitors