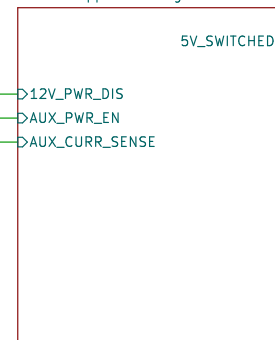
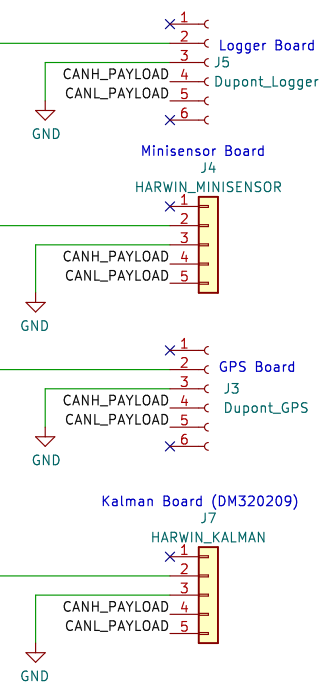


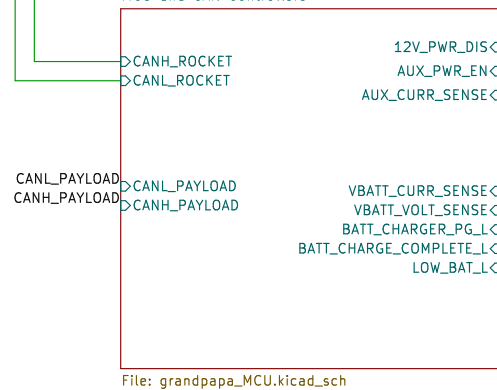
Power Supplies & Regulators



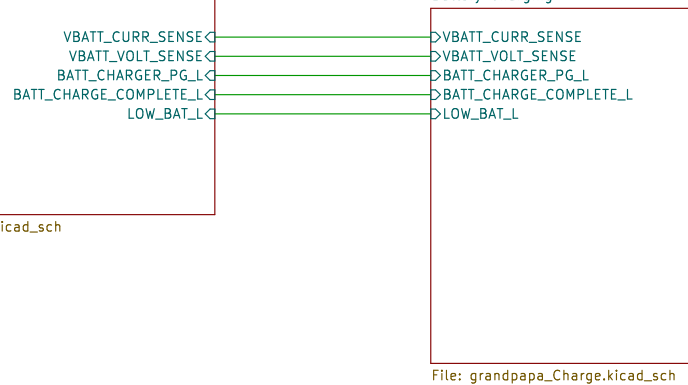
Output Connectors



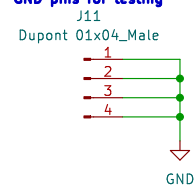
MCU and CAN Controllers



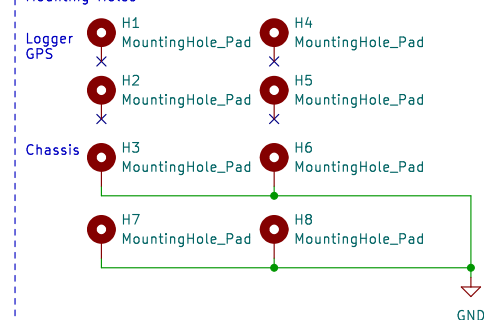
Battery Charging



GND pins for testing



Mounting Holes



See doc for buck + boost component value calculations:
https://docs.google.com/spreadsheets/d/1l7EJS5mbtJlwyG-RCYFS4woB5pbUgJtH0A2-_d_7l/edit?usp=sharing



$$V_{out} = 0.8 * ((R19 + R25) / R19)$$

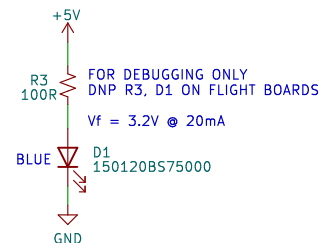
See doc for calculations:
https://docs.google.com/spreadsheets/d/1t7EJS5MbtJslwyG-RCYFS4woB5pbUpGjtH0A2-_d_7l/edit?usp=sharing

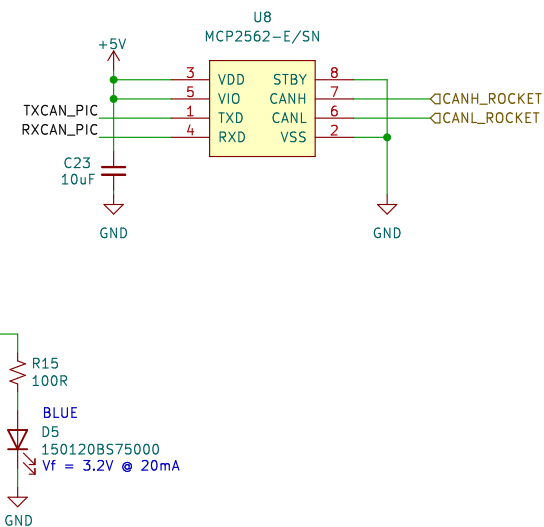
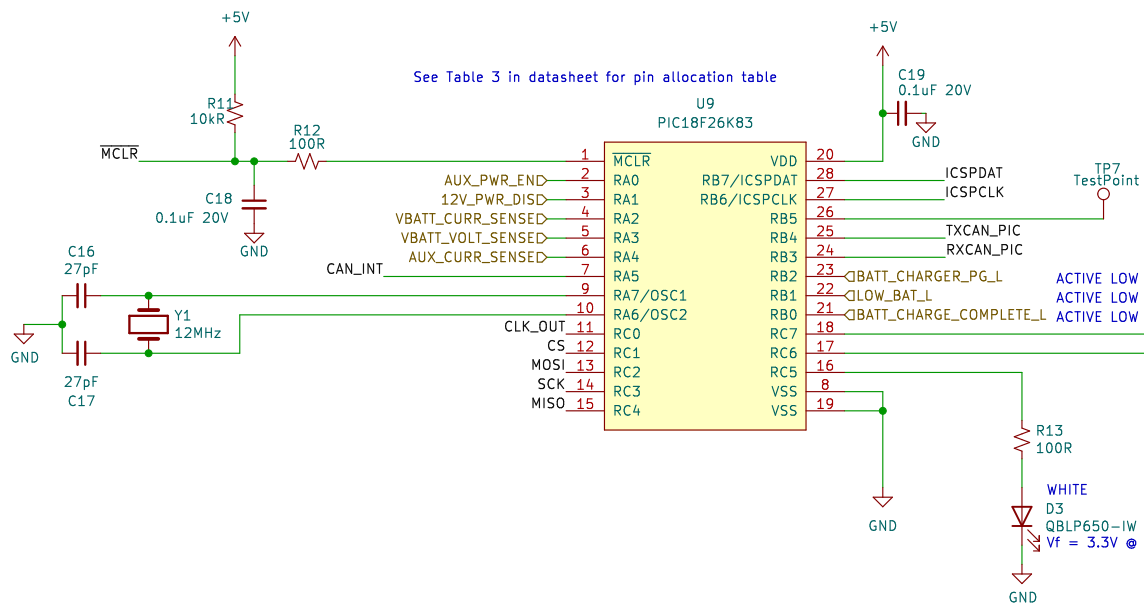
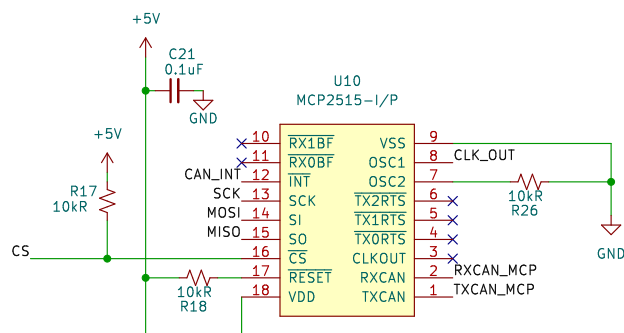


Second fuse F2 is for benchtop testing purposes

Convolved Payload Power Path 101

1. 12V supply power is provided from the rocket (only while on the pad prior to flight)
2. U1 regulates the 12V supply down to 4.5V, which is what our battery charger IC can take
3. Our battery charger takes 4.5V in and gives the battery, as well as passing the 4.5V supply onward to supply power to everything else. When it loses that external source, it switches its output to drain battery power instead – that's why +BATT varies between 3.7V (battery voltage) and 4.5V (charger pass-through)
4. +BATT supplies U2, which boosts the voltage up to a smooth 5V
5. 5V is always supplied to the MCU and CAN hardware
6. U5 controls the flow of power into the other boards hooked up to GrandPapa, to stop them from turning on and drawing power when we don't need them to





BATTERY CHARGE IC

LiPo charge voltage = 4.1V, 4.121V MAX

Fast charge current = $1000V/R_{prog1} = 1000/2k\Omega = 500mA$

Timer disabled

Charger always enabled

THERM curr = 50uA, shutdown happens at 1.24V and 0.25V

(Thermal shutoff at -55 C, see NTC RT Calculations Excel sheet in project Github folder)

$$VBATT_CURR_SENSE = I_{out} * R3 * 100V/V = (5V - 0.02V) \max = 4.98V \max$$

$$I_{\max_sense} = (4.98V) / (20mR * 100V/V) = 2.49A$$

