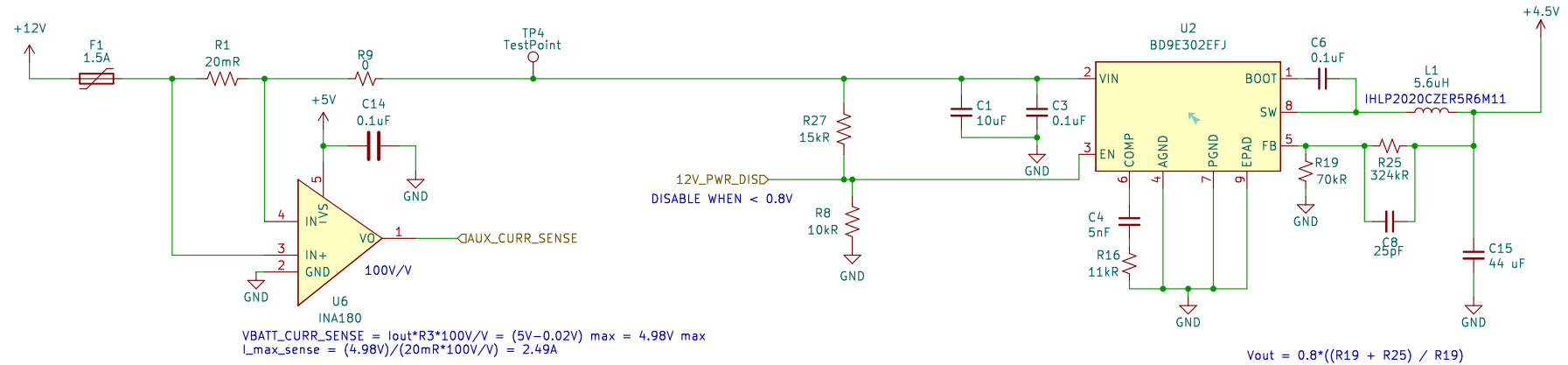


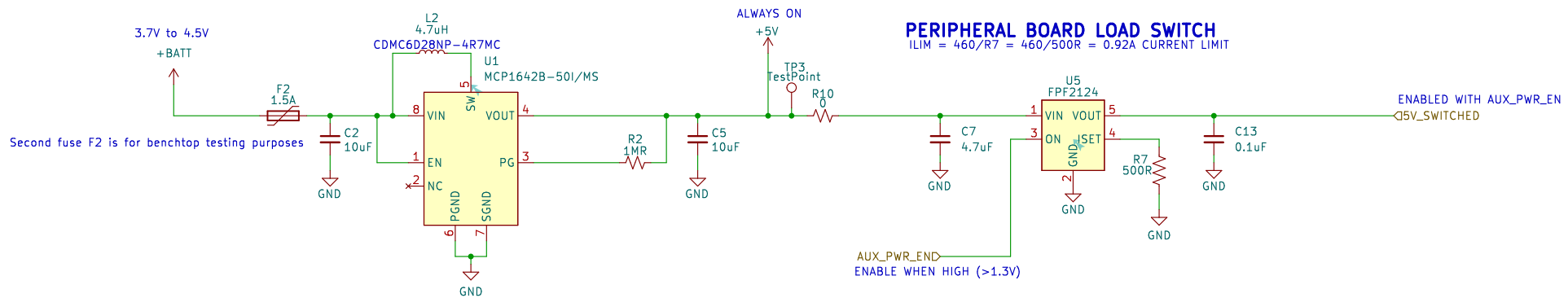
4.5V BUCK REGULATOR

$I_{max} = 1.5A$
See doc for buck + boost component value calculations:
https://docs.google.com/spreadsheets/d/1l7EJS5MbtJSlwyG-RCYFS4woB5pbUpGjtH0A2-_d_7l/edit?usp=sharing



5V BOOST REGULATOR

$I_{MAX} = 1A$
See doc for calculations:
https://docs.google.com/spreadsheets/d/1l7EJS5MbtJSlwyG-RCYFS4woB5pbUpGjtH0A2-_d_7l/edit?usp=sharing

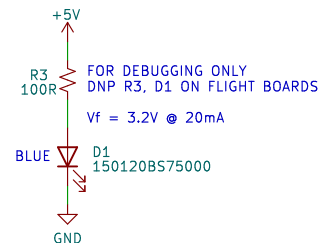


PERIPHERAL BOARD LOAD SWITCH

$I_{LIM} = 460/R7 = 460/500R = 0.92A$ CURRENT LIMIT

Convoluted 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 charges 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



Sheet: /Power Supplies & Regulators/
File: grandpapa_Power.kicad_sch

Title:

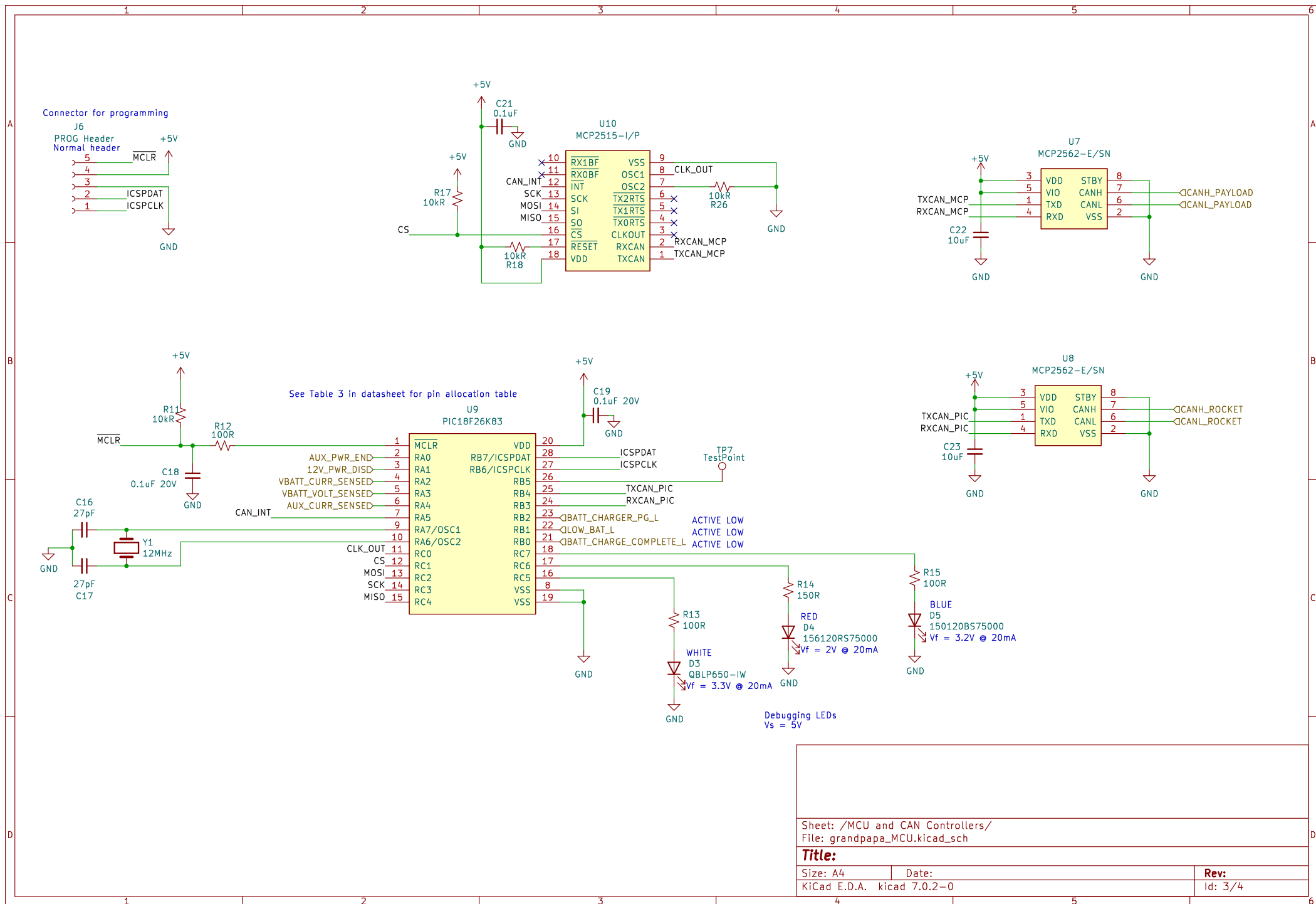
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Date:

KiCad E.D.A. kicad 7.0.2-0

Rev:

Id: 2/4



Sheet: /MCU and CAN Controllers/
File: grandpapa_MCU.kicad_sch

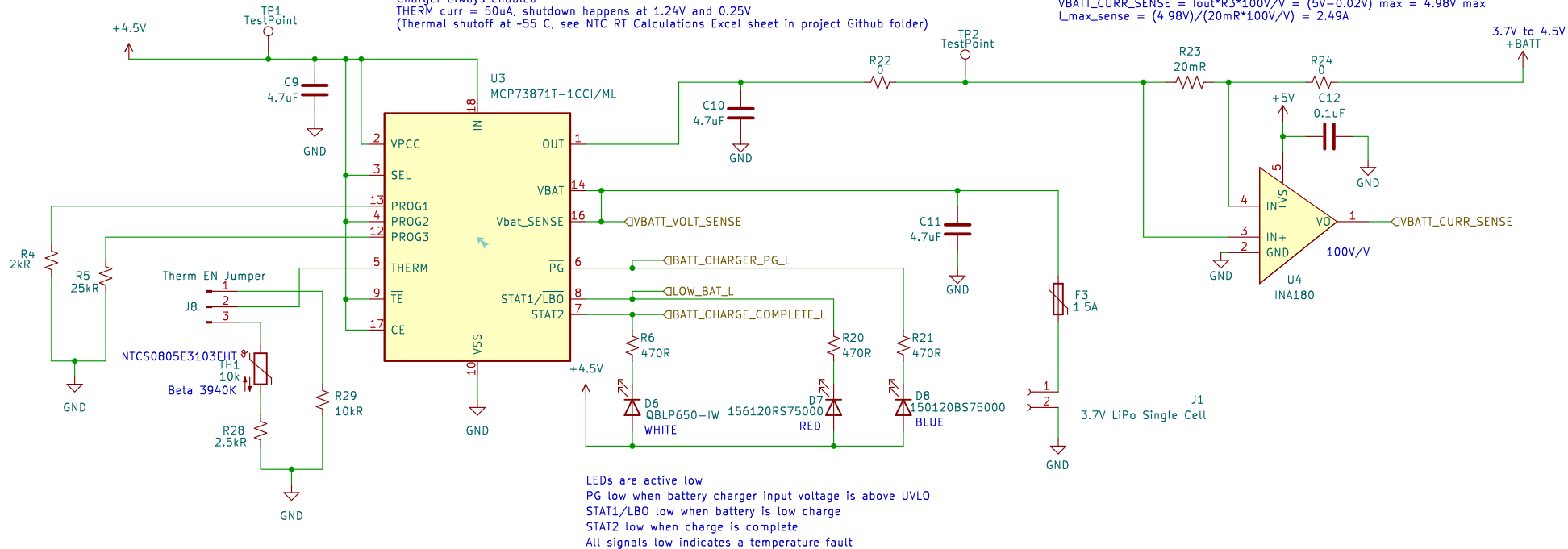
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BATTERY CHARGE IC

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)

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

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



Sheet: /Battery Charging/
 File: grandpapa_Charge.kicad_sch

Title:

Size: A4

Date:

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Rev:

Id: 4/4