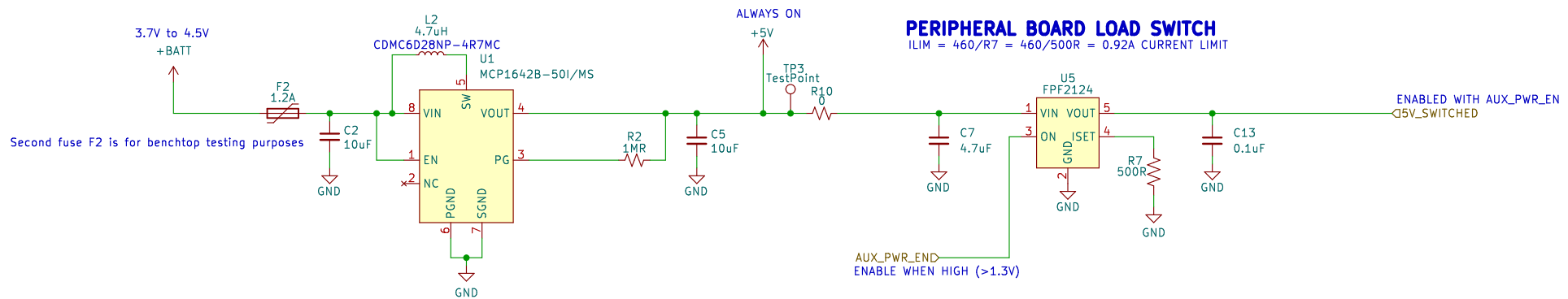


Sheet: /	
File: GrandPapa_Board.kicad_sch	
Title: Grandpapa Board	
Size: A4	Date:
KiCad E.D.A. kicad (6.0.5)	Rev: 0
Id: 1/4	

See doc for buck + boost component value calculations:
https://docs.google.com/spreadsheets/d/1l7EJ5MbtJlwyG-RCYFS4woB5pbUgJtH0A2-_d_7l/edit?usp=sharing



See doc for calculations:
https://docs.google.com/spreadsheets/d/1l7EJS5MbtJSIwG-RCYFS4woB5pbUpGjtH0A2-_d_7l/edit?usp=sharing



PERIPHERAL BOARD LOAD SWITCH

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

Convolved Payload Power Path 101

1. 12V supply power is provided from the rocket (only while on the pad prior to flight)
2. 12V regulates 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 under 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

FOR DEBUGGING ONLY
DNP R3, D1 ON FLIGHT BOARDS

$V_f = 3.2V @ 20mA$

BLUE

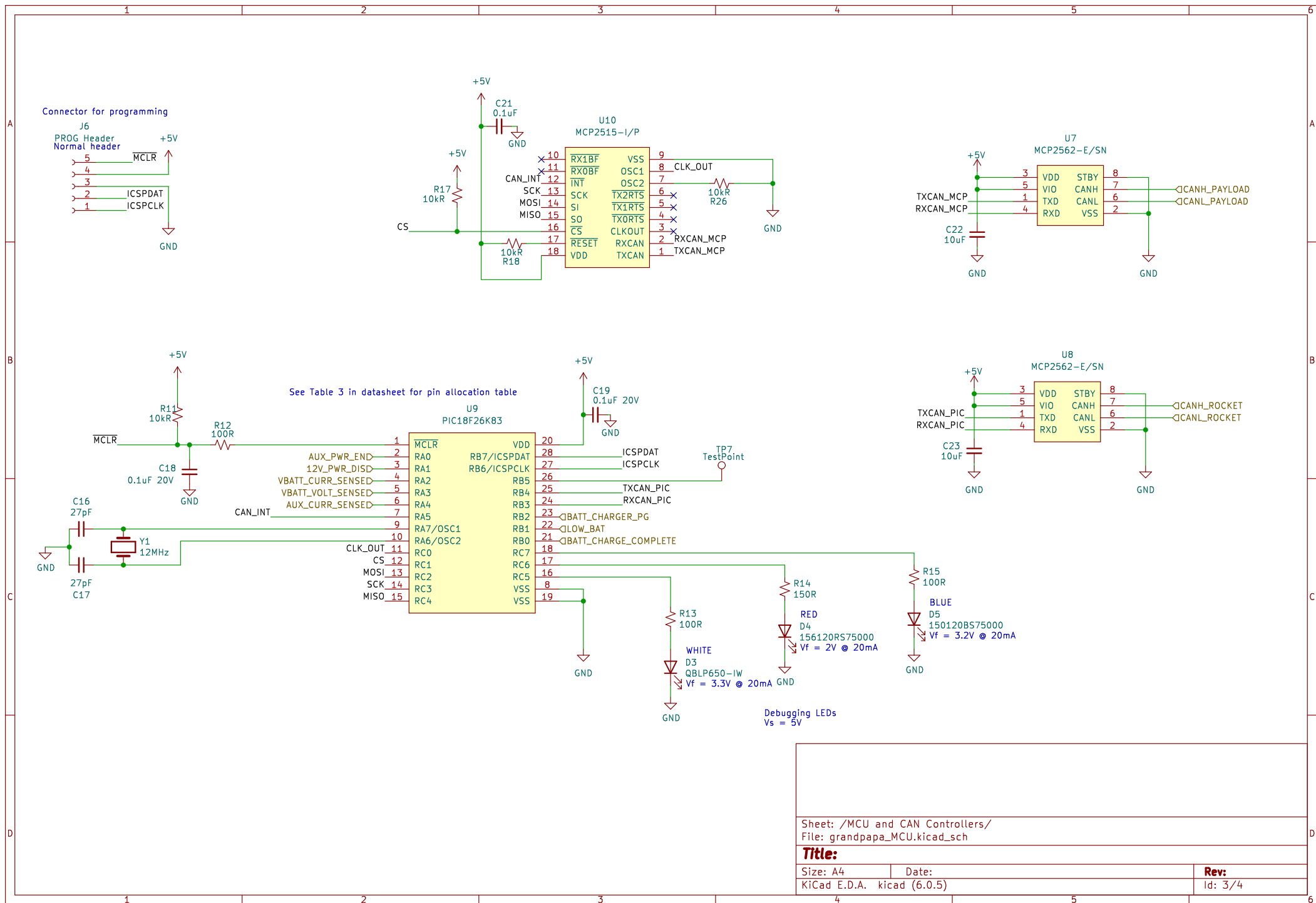
D1
150120BS75000

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

Title:

Size: A4	Date:
KiCad E.D.A. kicad (6.0.5)	

Rev:
Id: 2/4



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

Title:

Size: A4

Date:

KiCad E.D.A. kicad (6.0.5)

Rev:

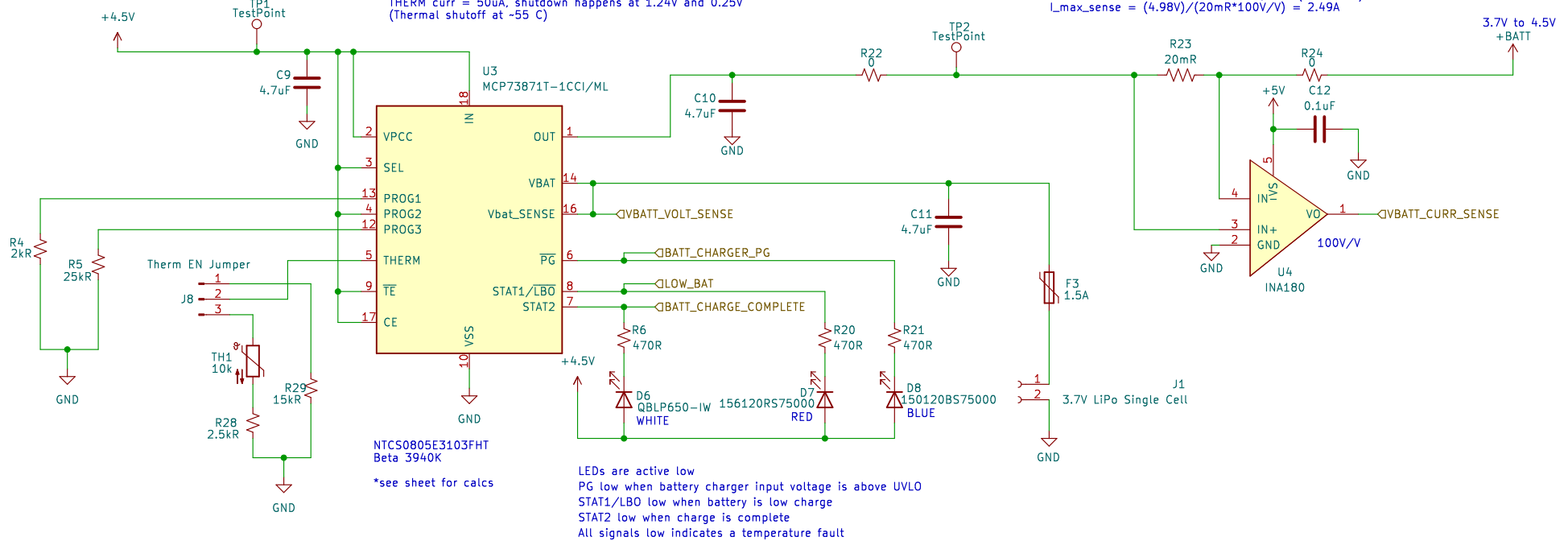
Id: 3/4

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)

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

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



NTCS0805E3103FHT
Beta 3940K

*see sheet for calcs

LEDs are active low
 PG low when battery charger input voltage is above UVLO
 STAT1/LBO low when battery is low charge
 STAT2 low when charge is complete
 All signals low indicates a temperature fault

Sheet: /Battery Charging/
 File: grandpapa_Charge.kicad_sch

Title:

Size: A4

Date:

KiCad E.D.A. kicad (6.0.5)

Rev:

Id: 4/4