

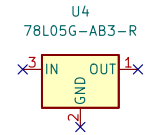
RP2040 datasheets suggests a regulated reference voltage and the price is reasonable so why not.

$2.5 \times (1 + 2.2e3 / 10e3) + 2.2e3 \times 1e-6 = 3.0522$
 We have at most 1% accuracy because of Vref.
 We have 1% error for 150 uA through 200R, i.e. plus 0.03 V.
 Current consumption is 1.5 mA. Cut jumper to avoid that consumption.

power options:
 1. 24V -> D3 -> DCDC -> 5V
 2. VBUS -> D5 -> 5V

Option 1 will win if we have both. Option 2 won't provide full 5V and our main functions need 24V (e.g. the heaters). It should be enough for programming the MCU and some debugging.

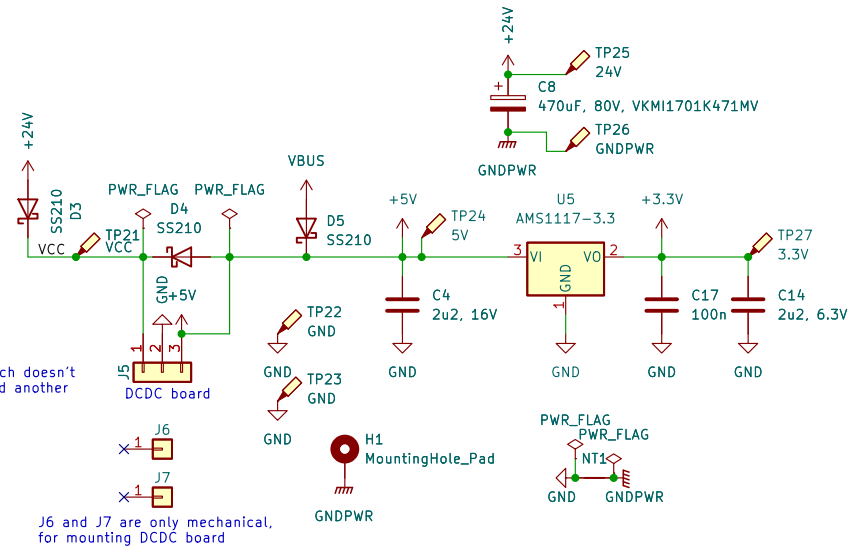
D4 is necessary to protect an LDO if VBUS is connected without 24V with empty C8 (or if fuse on 24V is tripped). We might not need it for the DCDC but it should be safer to keep it in. The downside is that we will charge C8 from USB.



SOT-89 can only handle 18 mA @ 24V due to power limit of package. We usually won't need more than maybe 80 mA but we need up to 400 mA if MCU is under heavy load (90 mA) and we are driving a shorted bus (250 mA).

Current consumption will be much lower in the normal case (with LEDs turned off, not sending most of the time, MCU not doing much). I would expect more like 30 mA.

LDO replaced by DCDC, which doesn't fit on the board so we need another board. Very annoying!



Sheet: /Power/
 File: power.kicad_sch

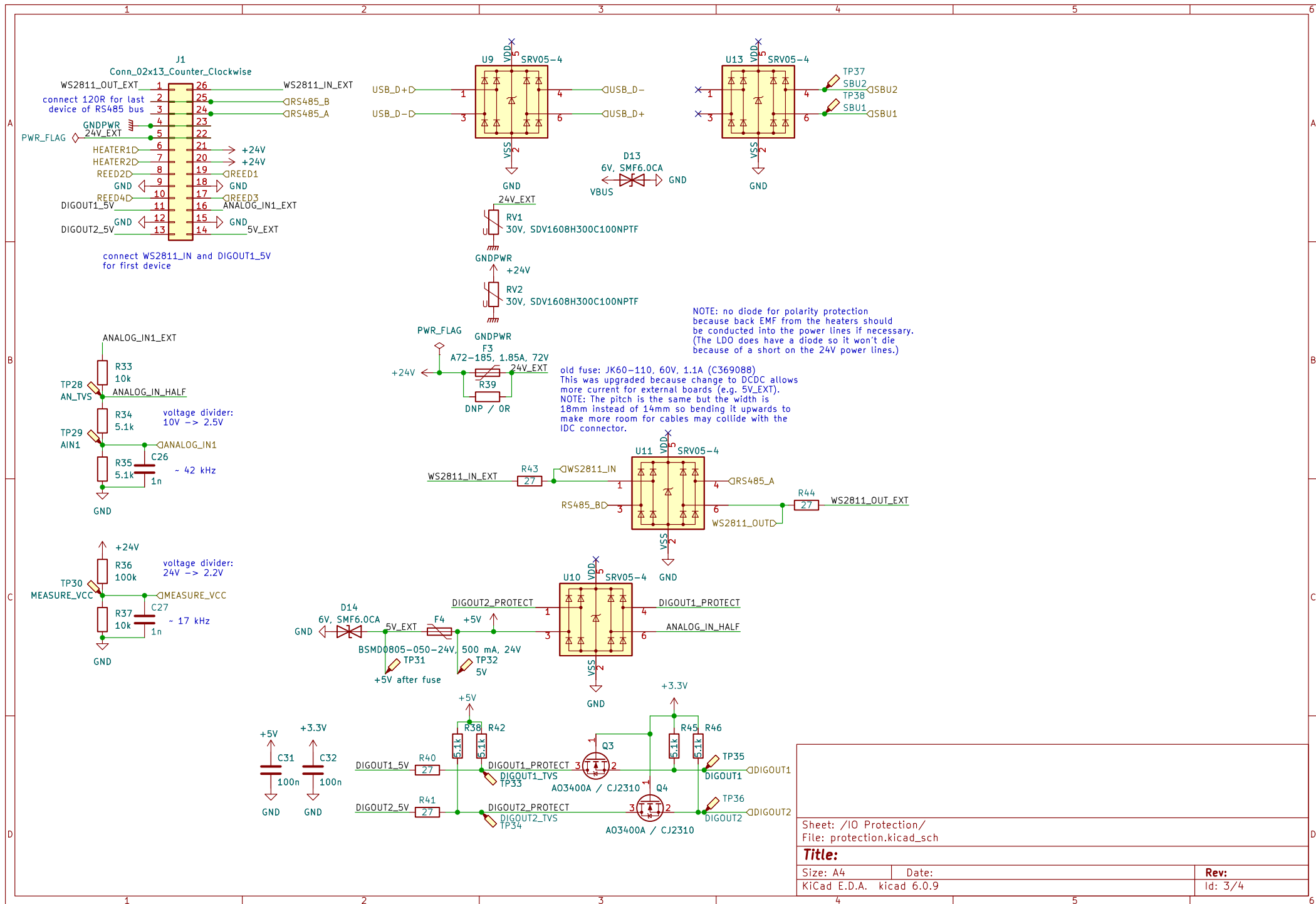
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Sheet: /IO Protection/
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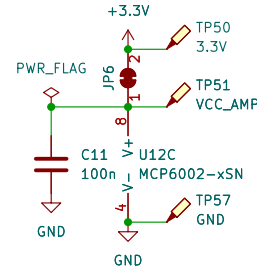
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C



D

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