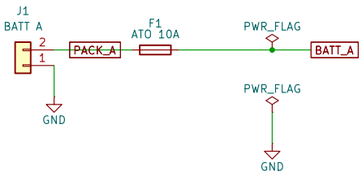
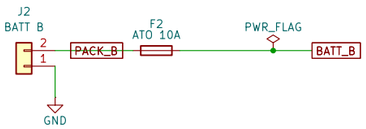
3.6 Power connectors: pack inputs





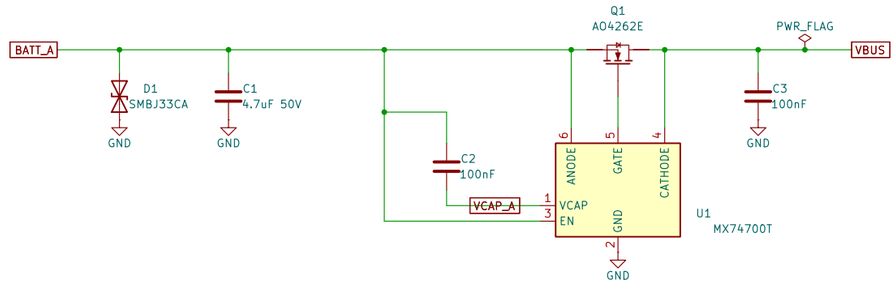
J1, J2: XT60PW-M (male pins) mate with the female XT60 on each pack adapter lead.

F1, F2: ATO blade holder (rated 30 A) with 10 A fuse, one per pack, ahead of every other part on that input.

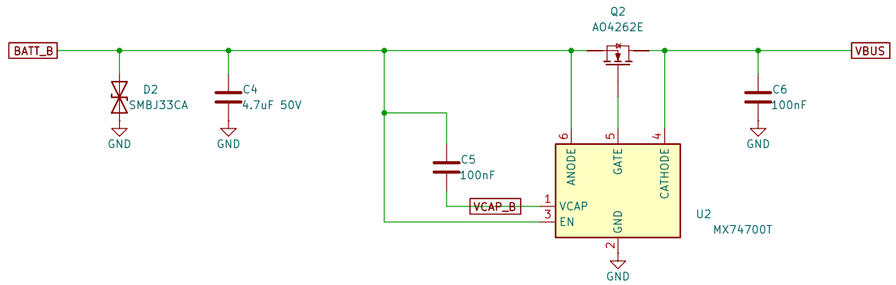
3.1 Ideal diode stages (x2)

U1, U2: MX74700T (pin for pin with TI LM74700-Q1). EN tied to ANODE (always on). C2/C5: VCAP >= 10 x Ciss of Q1/Q2 (1.65 nF).

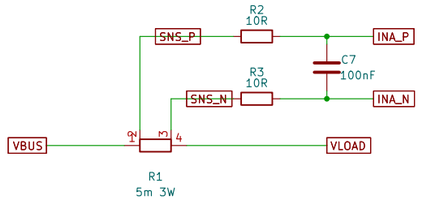
Stage A



Stage B

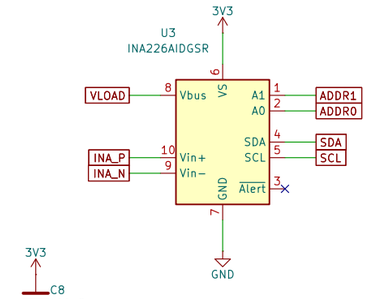


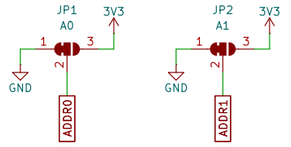
3.2 Current and voltage sense



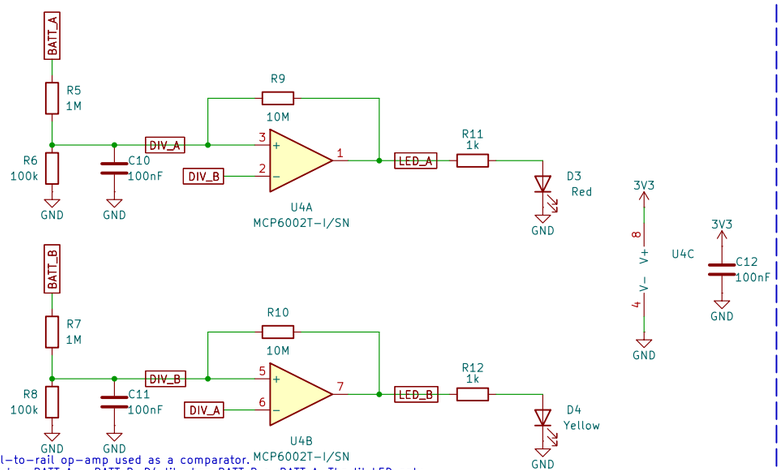
R1: 5 mOhm, Kelvin pads. SNS_P / SNS_N: 0.25 mm pair from the inner sense pads, no vias. R2, R3, C7 at U3.

INA226 address (JP2 = A1, JP1 = A0):
GND, GND = 0x40 (default, as supplied)
GND, VS = 0x41
VS, GND = 0x44
VS, VS = 0x45





3.3 Active-pack indicator



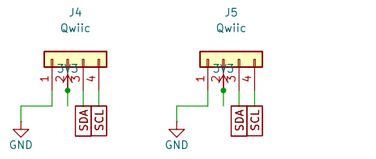
U4: rail-to-rail op-amp used as a comparator. D3 lit when BATT_A > BATT_B, D4 lit when BATT_B > BATT_A. The lit LED only changes over once the other pack is ~0.33 V higher (~65 mV per cell): R9 and R10 (10M against the 90.9k divider source) each shift their node by ~30 mV. The dividers are 1 %: packs closer than ~0.2 V (0.8 V worst case) may show either LED. Place D3 within 5 mm of J1 and D4 within 5 mm of J2.

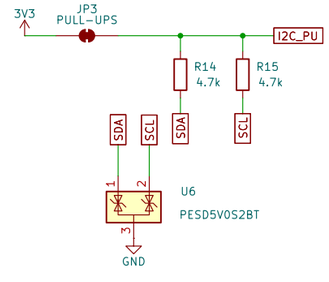
3.5 3.3 V rail



No regulator on the board (removed in rev 2). 3V3 comes only from the host, through J4 or J5. U3, U4 and the LEDs are off until the host powers up; the ideal diodes do not need 3V3.

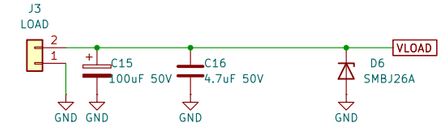
3.4 I2C connectors





Qwiic order: 1 GND, 2 3V3, 3 SDA, 4 SCL. Cut JP3 to drop the pull-ups. U6 sits at J4/J5.

3.6 Power connectors: load output



J3: XT60PW-F (female), so a pack lead cannot be plugged into LOAD.

D6: last-ditch clamp only (26 V standoff, below U3's 40 V limit). The ideal diodes block regen current from the packs, so the load must not regenerate into VBUS (regen off or brake resistor).

Notes

1. Packs: 5S Li-ion tool packs (Ryobi ONE+, Einhell Power X-Change). 21.0 V full. Parts are rated for 6S (25.2 V).
2. Load: 100 W peak (6.7 A from a 15 V pack), 40 W continuous. 10 A fuses. Power nets (poured, 0.5 mm clearance): PACK_A, PACK_B, BATT_A, BATT_B, VBUS, VLOAD, GND.
3. The board cannot disconnect a pack (FET body diodes conduct). The host must stop the load at the pack cut-off voltage.
4. No 3.3 V regulator: U3, U4 and the LEDs run from the host's 3V3. U3 ALERT is not connected.

