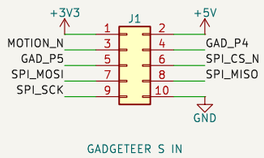
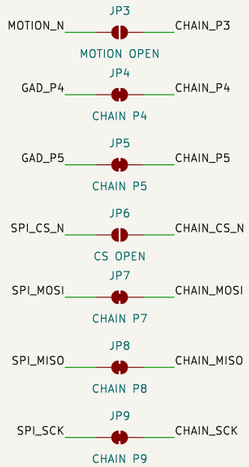
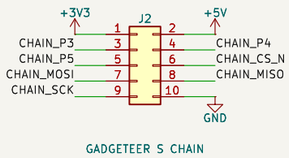
01 / GADGETEER S SOCKET (HOST), CHAIN JUMPERS JP3..JP9 AND CHAIN SOCKET

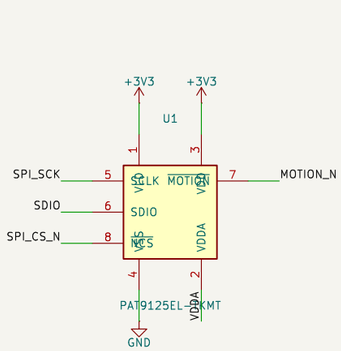




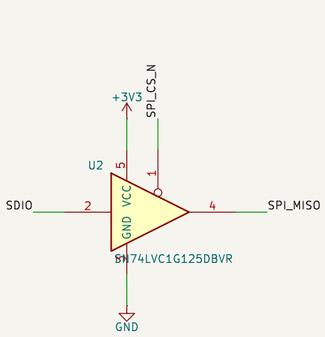


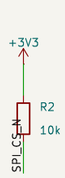


02 / PAT9125EL SENSOR, MISO RELEASE BUFFER (U2), MOSI–TO–SDIO RESISTOR (R1), CS PULL–UP (R2) AND DECOUPLING

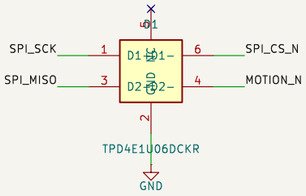


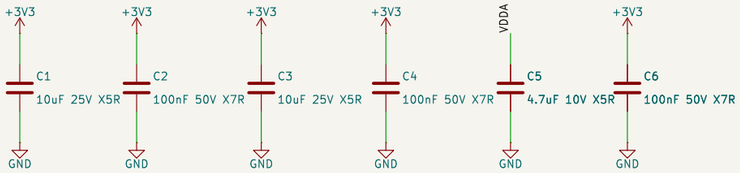






03 / ESD ARRAY D1 AND BOTTOM TEST PADS (OBSERVE ONLY)







Socket map (D1, CLAUDE.md S row): 1 +3V3, 2 +5V (no local load, passed to J2 and TP1 only), 3 MOTION_N (U1 pin 7, push–pull active low), 4/5 GPIO pass–through, 6 CS (U1 NCS, U2 OE#, R2 pull–up), 7 MOSI (R1 only, never MISO), 8 MISO (U2 buffer output only), 9 SCK, 10 GND. J2 repeats J1 through JP3..JP9.

Jumper defaults: JP3 (MOTION) OPEN, JP6 (CS) OPEN, JP4/JP5/JP7/JP8/JP9 bridged. One CS per board: use the SPI hub. Cut or bridge jumpers with power OFF.

U1 reference wiring: PixArt PAT9125EL datasheet v1.2 Figure 12 (3–wire SPI bridged to 4–wire: MOSI –> R1 3.3 k –> SDIO). U1 pad 9 (TEST) must stay unconnected: not drawn.

U2 SN74LVC1G125: A = SDIO, Y = SPI_MISO, OE# = CS. MISO is driven only while CS is low and is Hi–Z when the board is unpowered (loff). R2 10 k keeps CS high.

D1 clamps SCK, CS, MISO and MOTION_N at J1; MOSI is protected by R1. D1 pin 5 is NC. NO HOT–PLUG: no inrush limiter, undefined contact order, input clamps can back–power U1.

Optical rule: no LED or emitter on the board; keep the area around U1 window free of white silkscreen and bare metal (holder shades the aperture).

Laser: U1 contains an invisible 850 nm VCSEL, Class 1 by vendor claim only (not measured here). Do not view the aperture with optics while powered.

ERC: all same–name labels are connected. +3V3, +5V and GND carry PWR_FLAG; VDDA is driven by the U1 power output. 12–24 V source jumper rule: not applicable (no power input).

CERN–OHL–S–2.0 | KiCad only | black solder mask, white silkscreen | v02 STUDY: design intent, not built, not tested, not fabrication ready.

Generated from design–contract.json by tools/create_schematic.py

PAT9125EL optical filament progress sensor; SPI via Gadgeteer S socket; STUDY, not fabrication ready

Smoothieware / CERN–OHL–S–2.0

Sheet: /

File: filament–sensor.kicad_sch

Title: Smoothie filament progress sensor

Size: A3	Date: 2026–10–01	**Rev: v25**
KiCad E.D.A. 9.0.8		Id: 1/1