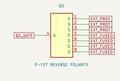
01 / EXTERNAL POWER ENTRY: J10 -> F1 (3 A fast) -> Q1 reverse-polarity P-FET -> EXT_PROT (D1 TVS, C1/C2) -> JP1 -> CONN_PWR





Q1: drain (5–8) on the input side, source (1–3) on the protected side; gate to GND through R1.











D1 = SMBJ6.0A (BV CLASS, shipped): 12V CLASS variant fits SMBJ12A. D1/C1/C2 sit behind Q1 so reversal never reaches them.





JP1: pads 1–2 bridged = CONN_PWR from EXT (shipped); bridge 2–3 for host power (+-0.2 A). BRIDGE ONE SIDE ONLY.

06 / MECHANICAL: 4 x M3 ungrounded NPTH, 3 fiducials per side



Rail flags: PWR_FLAG marks nets driven from outside the schematic (connectors, jumper-selected rail).



02 / HOST RAIL AND SIGNAL RAIL: J1 pin 2 -> F2 (0.2 A PPTC) -> HOST_FUSED -> JP2 -> SIG_VDD (driver VDD)





JP2: pads 1–2 bridged = SIG_VDD from HOST via F2 (shipped); bridge 2–3 for CONN_PWR (12V CLASS builds only). BRIDGE ONE SIDE ONLY.

D2 = CONN PWR indicator (power presence only, never READY/SAFE). TP1–TP7 are bottom-side observe-only pads.

SERVO / OUTPUT 7 (Y) — Smoothie extension board, Gadgeteer socket type Y (21), chain port J2.

Pin map J1: 1 +3V3, 2 +5V (host), 3–9 IN1–IN7 (GC/SD: only pins 6–9 = channels 4–7 are hardware PWM), 10 GND.

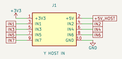
Rails: +5V_HOST (raw host 5 V, before F2) -> F2 -> HOST_FUSED -> JP2 -> SIG_VDD (driver VDD). EXT_RAW -> F1 -> EXT_FUSED -> Q1 -> EXT_PROT -> JP1 -> CONN_PWR (servo Y pins).

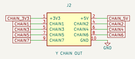
Shipped state: JP1 = EXT, JP2 = HOST. JP11–JP17 open. JP18/JP19 closed. D1 = SMBJ6.0A (BV CLASS). Servo power external; signals 5 V from the host rail.

Servo connector J3–J9: pin 1 GND, pin 2 Y (CONN_PWR through F3–F9, 1.1 A hold), pin 3 SIGNAL. Signal path: driver OUT -> R2x 10R -> OUTx (R3x 10k pull-down).

UNQUALIFIED STUDY (v03): CAD-checked topology only; not fabrication released; high-current hazard class. CERN-OHL-S-2.0. KiCad only.

03 / GADGETEER Y: HOST IN (J1), CHAIN OUT (J2) AND CHAIN LINKS JP11–JP19

















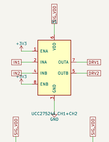




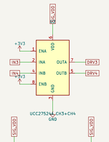


JP11–JP17 shipped OPEN (IN1–IN7 are consumed locally). JP18/JP19 shipped CLOSED (3V3 / raw host 5 V forwarded, never CONN_PWR).

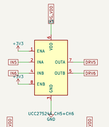
04 / DRIVERS U1–U4 (UCC27524A): ENx tied to +3V3, VDD = SIG_VDD, each with 100 nF + 1 uF bypass



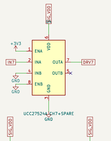














Ch4 channel B is spare (INB, ENB tied to GND, OUTB no-connect).

05 / CHANNEL CELLS 1–7: IN -> R1n pull-down -> driver -> R2n (10R) -> OUT node (R3n 10k pull-down, R4n + D1n activity LED) -> J(n+2) pin 3; CONN_PWR -> F(n+2) PPTC -> J(n+2) pin 2

CH1







CH2



CH3

CH4

CH5

CH6

CH7

v03: UNQUALIFIED STUDY, not for fabrication: hazard class high-current
Generated from design_controller.py by tools/create_schematic.py

Smoothieware / CERN-OHL-S-2.0

Sheet: /

File: servo_output.kicad_sch

Title: Smoothie Servo Output 7 (Y)

Size: A0	Date: 2026-10-01	**Rev: v10**
KiCad 8.0.4, 8.0.8		Id: 1/1