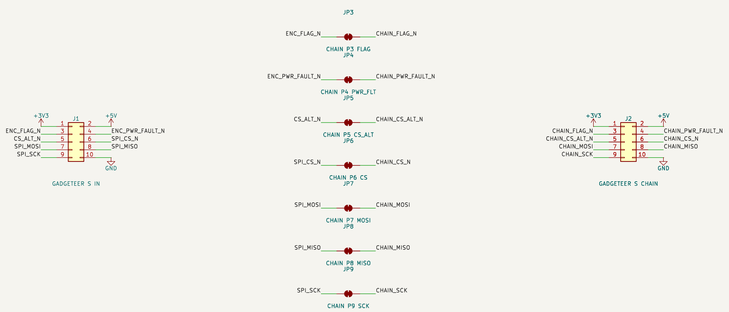
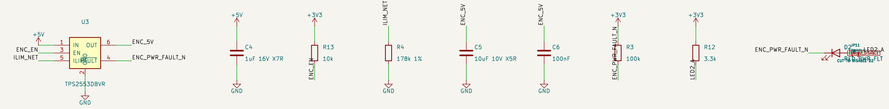
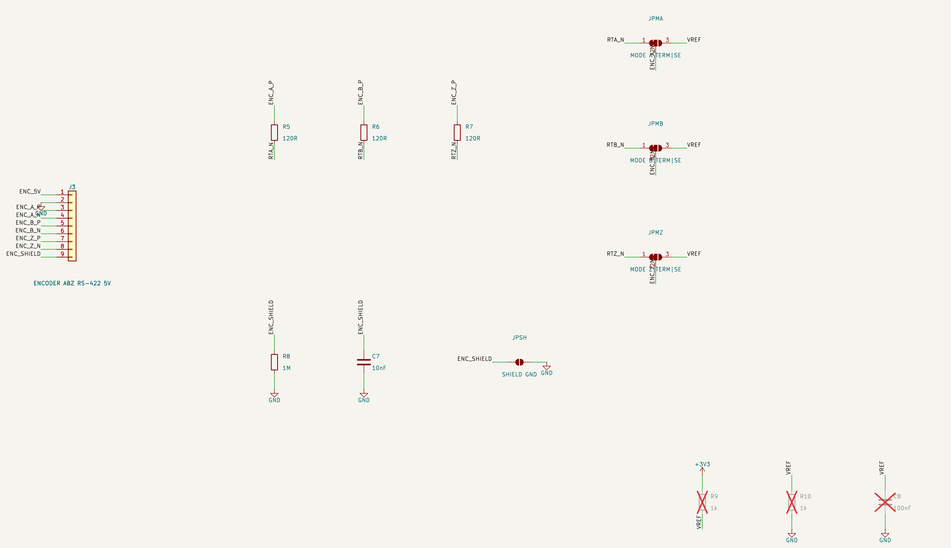
01 / GADGETEER S SOCKET J1 (IN), CHAIN JUMPERS JP3–JP9 (BRIDGED), SOCKET J2 (CHAIN)

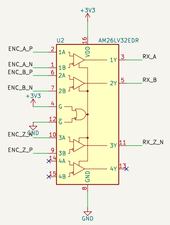


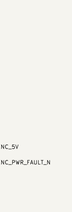
02 / ENCODER SUPPLY: U3 TPS2553 CURRENT-LIMITED SWITCH (RILIM 178 kohm), FAULT FLAG



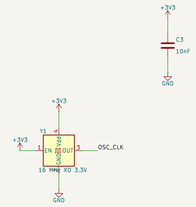
03 / ENCODER INPUT J3 (ABZ RS-422): TERMINATIONS, MODE JUMPERS, SHIELD, SINGLE-ENDED VREF, RECEIVER U2



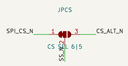




04 / COUNTER U1 LS7366R-S, 16 MHZ OSCILLATOR Y1, CHIP-SELECT JUMPER JPCS, FLAG LED D1

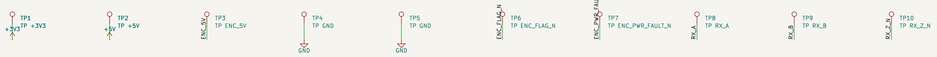








05 / TEST POINTS (BOTTOM SIDE, OBSERVE ONLY: NEVER INJECT ON TP2 OR TP3)



ASSEMBLED VARIANT: BASE-DIFF (R9, R10, C8 NOT FITTED; JPMA/B/Z BRIDGED 1–2 = 120 ohm TERMINATED DIFFERENTIAL)

GADGETEER S SOCKET (D1, D6): 1 +3V3, 2 +5V, 3 ENC_FLAG_N, 4 ENC_PWR_FAULT_N, 5 CS_ALT_N, 6 CS, 7 MOSI, 8 MISO, 9 SCK, 10 GND. J2 repeats J1; pins 1, 2, 10 direct, 3–9 via JP3–JP9 (bridged).

SPI MODE 0 (CPOL 0, CPHA 0), SCK <= 4 MHZ, 3.3 V. READ POSITION: RD CNTR 0x60 + 4 BYTES. CHIP SELECT: JPCS BRIDGED 1–2 = SOCKET PIN 6 (DEFAULT); CUT 1–2 AND BRIDGE 2–3 = PIN 5 (SECOND BOARD IN A CHAIN).

ENCODER J3 (KK 254, VIEW FROM TOP OF PCB): 1 ENC_5V (176 mA MAX, 100 mA DESIGN), 2 GND, 3 A+, 4 A–, 5 B+, 6 B–, 7 Z+, 8 Z–, 9 SHIELD (1 Mohm || 10 nF TO GND; JPSH OPEN BY DEFAULT).

RECEIVER U2 AM26LV32E: A, B, Z USED; 4A/4B OPEN, 4Y OPEN. G HIGH, /G LOW = ALWAYS ENABLED. Z USES THE SWAPPED PAIR (3A = Z–, 3B = Z+) SO INDEX/ IS LOW WHILE Z+ IS HIGH.

COUNT RATE LIMIT 3.0 MHZ PER CHANNEL (12 M COUNTS/S IN x4). A LEADS B = COUNT UP (LS7366R DIRECTION TO BE BENCH-CONFIRMED; THE HOST MAY INVERT THE SIGN). x4 MODE, FREE RUNNING.

SINGLE-ENDED VARIANT (SE): FIT R9, R10 (1 kohm) AND C8; CUT 1–2 AND BRIDGE 2–3 ON EACH SE CHANNEL JUMPER (JPMA/JPMB/JPMZ); CONNECT THE ENCODER OUTPUT TO THE + PIN ONLY. OPEN-COLLECTOR ENCODERS NEED AN EXTERNAL PULL-UP TO ENC_5V.

FAULT FLAGS: ENC_FLAG_N LOW = LATCHED LS7366R FLAG (CY/BW/IDX/CMP) UNTIL STR IS CLEARED; ENC_PWR_FAULT_N LOW = ENCODER SUPPLY FAULT AND COUNTING DISABLED (CNT_EN). BROKEN ENCODER WIRES ARE NOT DETECTABLE IN HARDWARE (D11).

NO HOT-PLUG ON J1/J2/J3. HOST 5 V AND 3.3 V ALLOWANCE UNRESOLVED (SHARED REGULATOR): THIS BOARD LIMITS ITSELF TO 100 mA ENCODER AND 30 mA 3V3. NO 12–24 V INPUT: SUPPLY-FEED JUMPER RULE NOT APPLICABLE.

CAD-GENERATED STUDY, NOT FABRICATION-READY, NOT CHECKLIST-ACCEPTED. CERN-OHL-S-2.0 | KiCad only | black solder mask, white silkscreen. Contract design-contract.json (generator tools/make_contract.py).

PWR_FLAG on each externally supplied rail (ERC: power inputs are driven through the connector pins)



Position feedback: one RS-422 ABZ encoder to LS7366R SPI counter on a Gadgeteer S socket
Assembled variant: BASE-DIFF (R9 R10 C8 not fitted)
Generated from design-contract.json by tools/create_schematic.py
Smoothieware / CERN-OHL-S-2.0

Sheet: /	
File: position-feedback.kicad_sch	
Title: Position feedback / BASE-DIFF	
Size: A1	Date: 2026-10-11
KiCad E.D.A. 9.0.8	**Rev: v26**
	Id: 1/1