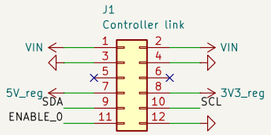
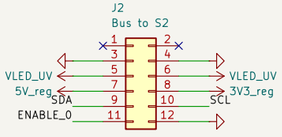
CONTROLLER LINK (J1, BOTTOM side of S1)



Ribbon from the controller: brings in VIN, GND, the 5 V / 3.3 V logic rails, I2C and ENABLE_0 (the strobe input).

BUS TO S2 (J2, TOP side of S1)

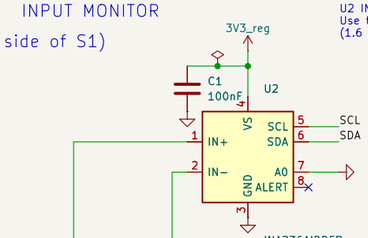


Stack connector up to S2: passes VLED_UV, the logic rails, I2C and ENABLE_0.

INPUT MONITOR

U2 INA236: input power monitor. Reports VIN voltage, current and power over I2C.

U2 INA236A: A0 = GND -> I2C 0x40.
Use the +/-81.92 mV range
(1.6 A typ = 16 mV on R5).

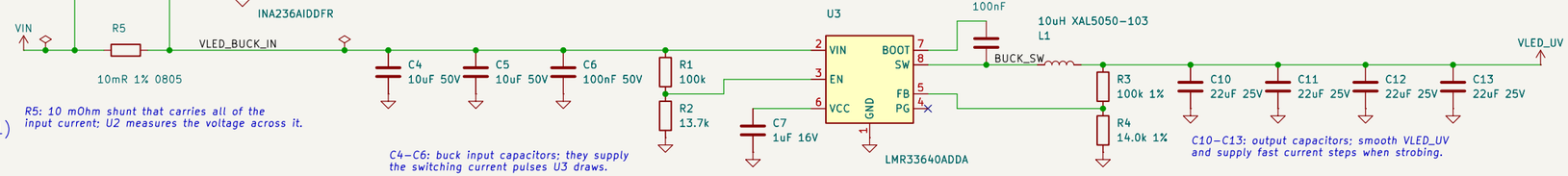


LED RAIL BUCK

U3 LMR33640: synchronous buck converter that steps VIN (11-36 V) down to the 8.14 V LED rail (VLED_UV).

C8: bootstrap capacitor that powers U3's high-side switch.

L1: buck inductor; stores energy each switching cycle to feed the LED rail.



R5: 10 mOhm shunt that carries all of the input current; U2 measures the voltage across it.

C4-C6: buck input capacitors; they supply the switching current pulses U3 draws.

R1/R2: enable divider, turns U3 on above ~10 V. C7: decoupling for U3's internal LDO.

C10-C13: output capacitors; smooth VLED_UV and supply fast current steps when strobing.

R3/R4: feedback divider that sets the LED rail voltage (see table below).

VLED_UV = 1.0 V x (1 + R3/R4) = 8.14 V with R4 = 14.0k.
Match R4 to the LED Vf bin (bin max + ~1.2 V):
  V3 17.4k V4 16.0k V5 14.7k V6 14.0k V7 13.0k V8 12.1k
EN UVLO ~10 V via R1/R2; VIN must be 11-36 V.
L1 XAL5050-103: Isat 4.9 A, Irms 3.6 A; peak ~2.8 A at 36 V in.
U3 sits on the bottom side directly under L1 (single via column).

S1 POWER (bottom of stack)
J1 (BOTTOM side) takes the controller ribbon: VIN 11-36 V, GND, 5V_reg, 3V3_reg,
  SDA, SCL, ENABLE_0. Pins 5-6 (VLED_UV) are not connected.
J2 (TOP side) carries VLED_UV, 5V_reg, 3V3_reg, I2C, ENABLE_0 and GND up to S2:
  VIN pins 1-2 are not connected.
BUS (2x6 1.27 mm, same XY on both boards): 1,2 VIN | 3,4,12 GND | 5,6 VLED_UV |
  7 5V_reg | 8 3V3_reg | 9 SDA | 10 SCL | 11 ENABLE_0
No bulk electrolytic on VIN: do not hot-plug VIN through long leads (ringing).
UV-C (275 nm) is hazardous to eyes and skin.



LED: Luminus XFM-5050-UV-D130, 275 nm UV-C, 2 A typ / 3.2 A max
19 mm round board, part of a 2-board stack (S1 bottom, S2 top)

MBARI

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Title: XFM-5050-UV stack 1/2: input monitor + LED rail buck

Size: B	Date: 2026-11-12	**Rev: C**
KiCad E.D.A. 10.0.6		Id: 1/1