BUS FROM S1 (J1, BOTTOM side of S2)

J1
Bus from S1

VLED_UV
5V_reg
SDA
ENABLE_0
3V3_reg
SCL

Stack connector from S1: brings in VLED_UV, the logic rails, I2C and ENABLE_0.

CURRENT-SET DAC

5V_reg
C15 100nF
C16 10uF 10V
SCL
SDA
VDD
SCL
SDA
VOUT
VCI1
A0
LDAC
VREF
GND
EP
R11 11.3k 1%
R17 4.7k 1%
C3 10nF
U4
AD5693RACPZ-RL7

U4 AD5693R: 16-bit DAC; its output sets the LED current.
R11/R17 scale its 0–5 V output into the iC-HG30 CI input range.
C3: reference bypass. C15/C16: supply decoupling.

U4 AD5693RACPZ: I2C 0x4C (A0 = GND), ~LDAC = GND (updates on write).
Internal 2.5 V ref is on at power-up; set GAIN = 2 in the control
register for a 0–5 V span. Powers up at 0 V.
CI = 0.29 x VCI1 –> -1.43 V at 5 V full scale.

CURRENT SINK (iC-HG30, 4 channels in parallel)

U5 iC-HG30: fast low-side current sink in the LED cathode path. CI1–4 set the current, EN1–4 switch it on/off in ~1 ns (strobing); LDK1–4 sink the LED current.

5V_reg
0R
R23
C17 100nF
C18 10nF
C19 10uF 10V
U5
R23, C17–C19: U5 supply filter
VDD
CI1
CI2
CI3
CI4
CI5
CI6
EN1
EN2
EN3
EN4
EN5
EN6
ELVDS
TTL/LVDS
Pwr Temp Mon
NER
GND_PAD
GND
LDK1
LDK2
LDK3
LDK4
LDK5
LDK6
AGND1
AGND2
AGND3
AGND4
AGND5
AGND6
SHUNT_HI
R25 20mR WSK2512
R26 10R
R27 10R
LED_K
VLED_UV
D6 B340A
J2 LED+ wire
J3 LED- wire

J2/J3: wire pads for the LED cable (~20 AWG) to the LED board J1 (LED+) / J3 (LED–). D6: free-wheeling diode; catches the cable-inductance spike when U5 turns the LED off (iC-HG30 Fig. 6). Place it next to U5 and the pads.

STROBE (ENABLE_0 low = LED on)

HG_EN
3V3_reg
C23 100nF
R29 100k
ENABLE_0
R28 100k
U7
74LVC1G04

U7: inverts ENABLE_0 into HG_EN, which drives EN1–4 of U5.
R29 holds ENABLE_0 high, so the LED is off by default;
R28 holds HG_EN low (LED off) if U7 is unpowered.

iC-HG30

R25: 20 mOhm sense resistor in the LED current return path.

LED CURRENT MONITOR

3V3_reg
C20 100nF
C22 100nF
C21 1uF
Vin+
Vin-
Vs+
Vs+
Convert
GPIO
SCL
SDA
A0
A1
GND
GND
SMBus_Alert
Overlimit
Warning
Critical
ENABLE_0
SCL
SDA
3V3_reg
U6
INA209AIPWR

U6 INA209: measures the LED current on R25 and reports it over I2C. R26/R27/C20: low-pass filter on the sense lines.

U6 INA209 (0x41): LED current on R25 (20 mOhm), +/-80 mV range.
Convert = ENABLE_0 (triggered mode syncs to strobes).
Route R25 sense leads as a Kelvin pair.

VLED_UV
5V_reg
3V3_reg

S2 DRIVER (top of stack)
U5 iC-HG30: channels 1–4 in parallel, 0.5 A each at 2 A (1 A CW max per channel).
  Channels 5–6 unused: CI/EN to GND, LDK open (iC-HG30 Rev B4 p.8).
  ~0.8 A/ch max part (3.2 A total), ~0.5 A/ch typ (2.0 A), ~0.3 A/ch min (1.2 A).
  Set 2.00 A in firmware by trimming the DAC code to the INA209.
  U5 dissipates ~2.5 W at 2 A (up to ~5.7 W with a low-Vf LED).
BUS: 1,2 VIN (NC here) | 3,4,12 GND | 5,6 VLED_UV | 7 5V_reg | 8 3V3_reg |
  9 SDA | 10 SCL | 11 ENABLE_0
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

Sheet: /
File: XFM5050UV-S2-Driver.kicad_sch

Title: XFM-5050-UV stack 2/2: DAC + iC-HG30 current sink

Size: B	Date: 2026-11-12	**Rev: C**
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