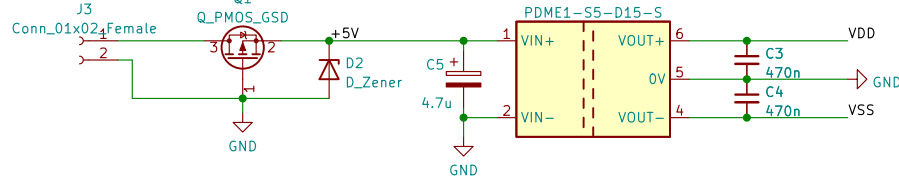


Power

Board can be powered by external +5 V connected to J3. MOSFET Q1 is for reverse voltage protection. Expect ~3 A current, so use MOSFET with low $R_{DS(on)}$. Zener diode is to prevent over-voltage.

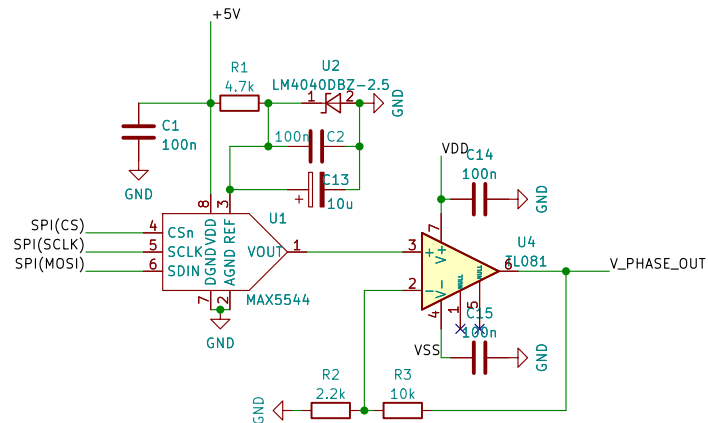
Alternatively, if the Red Pitaya is connected to power through USB then the board will draw power from the Red Pitaya pin. No reverse voltage protection is needed here.

+/-15 V is generated from DC-DC converter, used to power ICs on board J3



Auxiliary control voltage

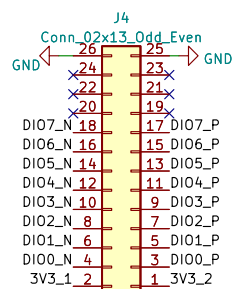
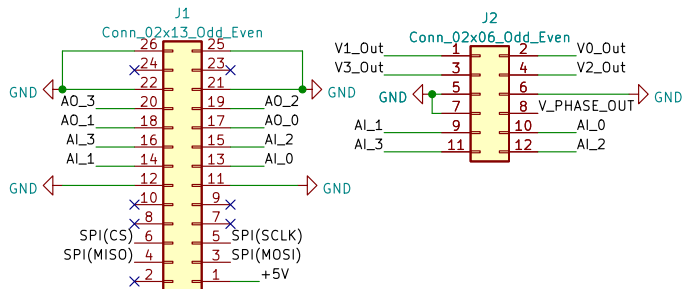
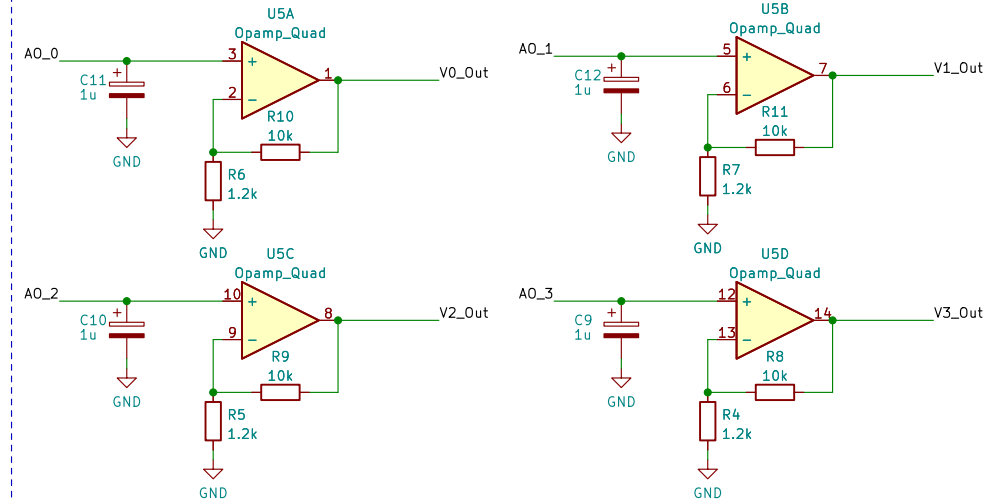
Possible future addition for phase-locking outputs from laser system. Red Pitaya generates a voltage to be applied to another EOM in series with the IQ modulator to adjust the relative phase between the CS-SSB path and the carrier-only path. Higher-speed control without PWM harmonics may be desirable. This DAC has a 1 μ s settling time, and the amplifier has a GBW of 5 MHz. DAC is programmed using the SPI interface.



PWM filtering and amplification.

Red Pitaya PWM outputs are low-pass filtered with a 200 Ohm resistor and 8.2 nF capacitor, giving a corner frequency of 97 kHz. The addition of an extra 1 μ F capacitor in parallel reduces the corner frequency to 790 Hz. For a PWM frequency of 244 kHz (10 bits at 250 MHz), this suppresses the fundamental by 50 dB.

Non-inverting amplifier resistors are chosen to give a maximum output voltage of 14.9 V (from 1.6 V), which should be within the compliance of the op-amps.



IQ bias lock "shield" for the Red Pitaya. Amplifies PWM outputs from original [0,1.6] V to [0,12.3] V. Additional circuitry for possible phase lock

Sheet: /

File: red-pitaya-pwm-shield.kicad_sch

Title: IQ bias lock "shield" for Red Pitaya

Size: A4

Date:

KiCad E.D.A. kicad 6.0.11-2627ca5db0-126-ubuntu20.04.1

Rev: 1

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