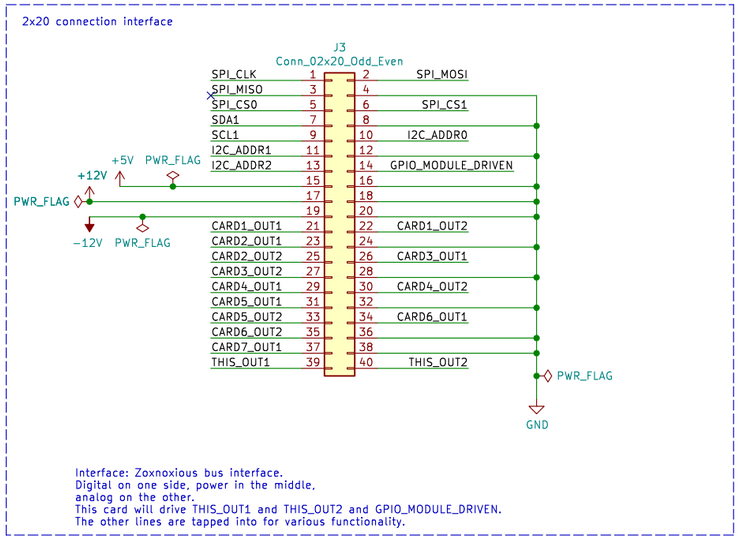
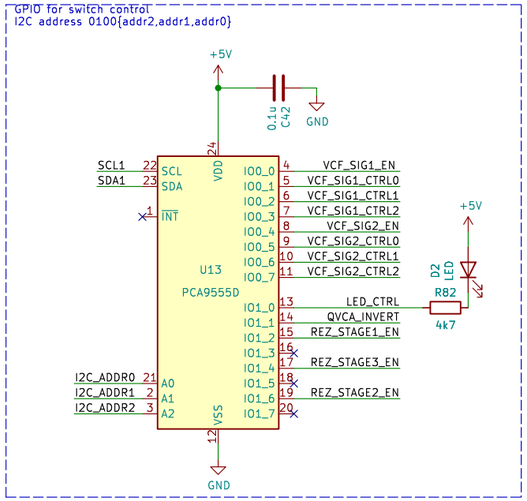
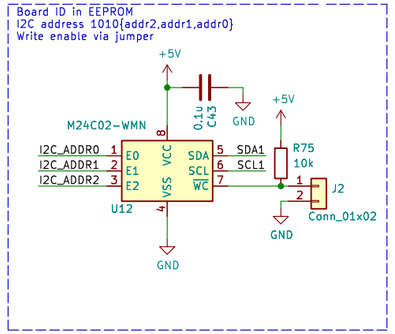
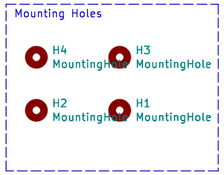
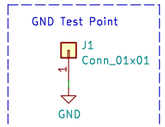
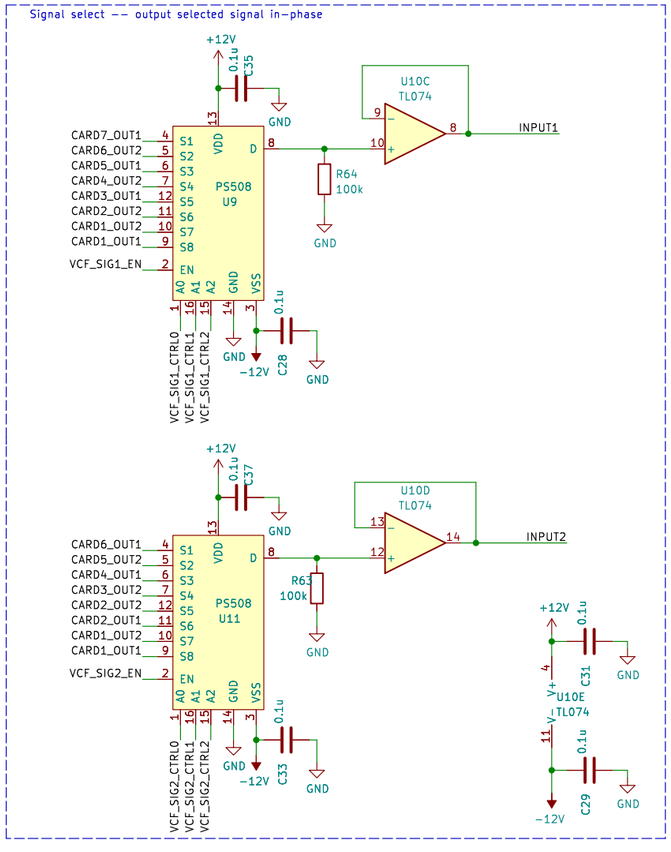


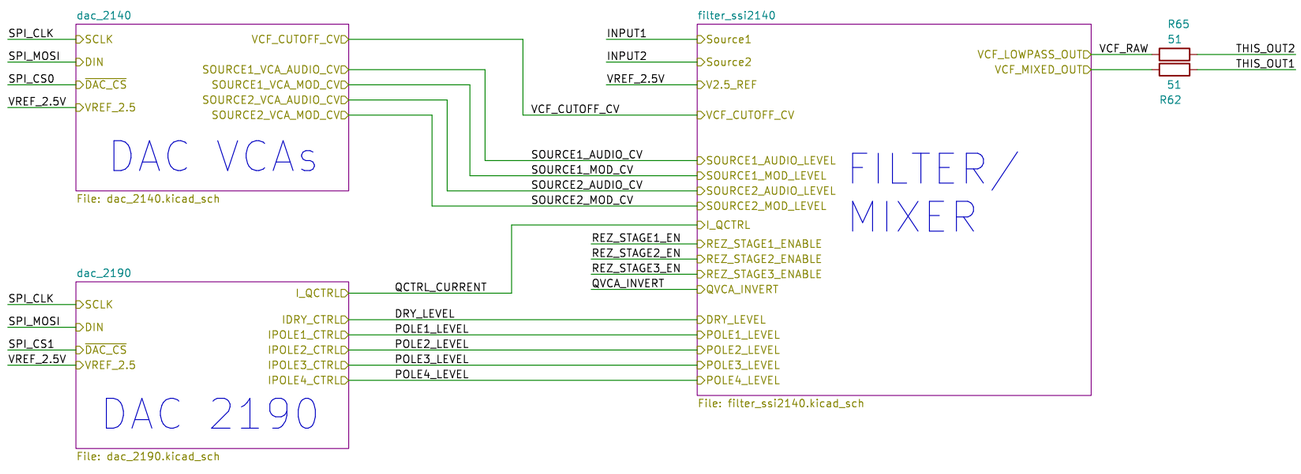


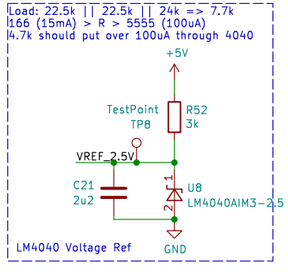


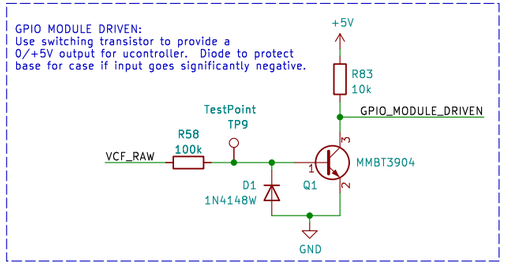












Zoxnoxious Engineering

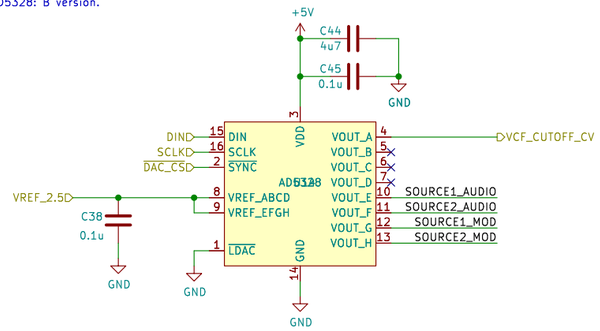
Sheet: /

File: poledancer.kicad_sch

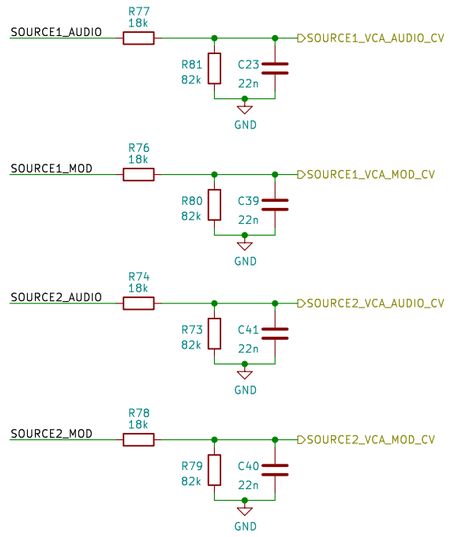
Title: Zoxnoxious Pole Dancer Mixing Filter

Size: B	Date: 2025-02-13	**Rev: 0.2**
KiCad E.D.A. kicad 7.0.11		Id: 1/4

DAC: 2.5V Reference Voltage
B grade or better.
AD5328: B version.



AS3364 control voltages:
voltage range 0–2V, divide down.
RC filter @ ~500 Hz



Sheet Vref load: 45k || 45k ==> 22.5k

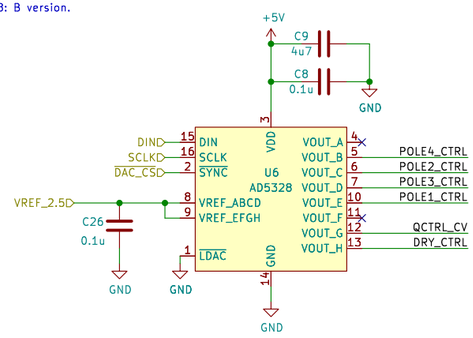
Zoxnoxious Engineering

Sheet: /dac_2140/
File: dac_2140.kicad_sch

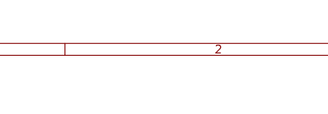
Title: Zoxnoxious Pole Dancer Mixing Filter

Size: B	Date: 2025-02-13	**Rev: 0.2**
KiCad E.D.A. kicad 7.0.11		Id: 2/4

DAC: 2.5V Reference Voltage
B grade or better.
AD5328: B version.



QCTRL input is current, abs max of 500uA
with 222uA for oscillation using standard resonance setup.
Target around 320uA with an RC filter @ 800 Hz



SSI2190 Control:
Max control current 100uA.
Run DAC @ 2.5V (1X scale).
RC filter @ ~560 Hz

Sheet Vref load: 45k || 45k ==> 22.5k

Zoxnoxious Engineering
Sheet: /dac_2190/
File: dac_2190.kicad_sch
Title: Zoxnoxious Pole Dancer Mixing Filter
Size: B | Date: 2025-02-13 | **Rev: 0.2**
KiCad E.D.A. kicad 7.0.11 | Id: 3/4

Filter and Mixer Core

Allow modulation at 4V p-p to cover >50% the filter range.
=> At -18.4mV/octave control, shoot for ~100mV p-p control.

Nominal Z-card source is 4V p-p.
Recommended input of 2140 is 2V p-p going into
10k/200 resistor divider for 40mV p-p at input pin
(or 1V p-p, depending which part of datasheet you read!).
Cut Z-card source by 1/2 through 3364 VCA in and feedback R.
The 15k feedback R is required for the QVCA out,
so that sets 3364 VCA in to 15*2 ==> 30k.

Recommended input of 2190 is 10V p-p going into 50k/220
resistor divider: 40mV p-p at input pin, per datasheet.
Using 20k/220 for divider should give about the same level.

All filter caps 1% C0G

If it weren't for QVCA voltage compliance
this could be 1-opamp as a diff amp

A couple things on that opamp U11B...
15k is useful as the I-to-V for the 3364 VCA outputs. So
15k all around. The QVCA input can be switched phase
based on the invert switch. This works as a summing only
because the 3364 is current output, not voltage.

VCF Control Inputs

Control Range:
Datasheet: -18.4 mV/oct; 0V => 1 kHz
Design for range of 13.75 Hz to 14080 Hz (ten octaves)
log2(f1/f2)*(-18.4mV) for range:
113.8mV : 13.75Hz; -70.2mV : 14080 Hz
Shoot for range a bit greater than this
by allowing scaling & offset

Sheet Vref load: 24k

Decoupling caps close to pins

Resonance Compensation

An overly complex resonance compensation scheme is attempted.
SSI app note AN701 details this using the SSI2164. This attempts the concept.
Pole 1 switchable with a weight of 1.
Pole 2 switchable with a weight of 1.
Pole 3 switchable with a weight of 2.
Pole 4 hardwired in the 2140 with a weight of 1.
Used in conjuntion with QVCA_INVERT to phase correct the output, mode dependent.
Useful combinations in the form (weight pole 1, 2, 3, 4):
1LP, 1HP: 1, 0, 0, 1 (REZ_STAGE1 set, QVCA_INVERT set) (not quite 2P bandpass, but close)
2LP, 2HP: 0, 1, 2, 1 (REZ_STAGE2, REZ_STAGE3 set, QVCA_INVERT unset)
uncompensated: 0, 0, 0, 1 (hardwired, QVCA_INVERT set)
These are approximate filter equivalents as the weights aren't quite right.

Output and Scaling

Unused / Spares

Zoxnoxious Engineering	
Sheet: /filter_ssi2140/	
File: filter_ssi2140.kicad_sch	
Title: Zoxnoxious Pole Dancer Mixing Filter	
Size: B	Date: 2025-02-13
KiCad E.D.A. kicad 7.0.11	Id: 4/4
	Rev: 0.2