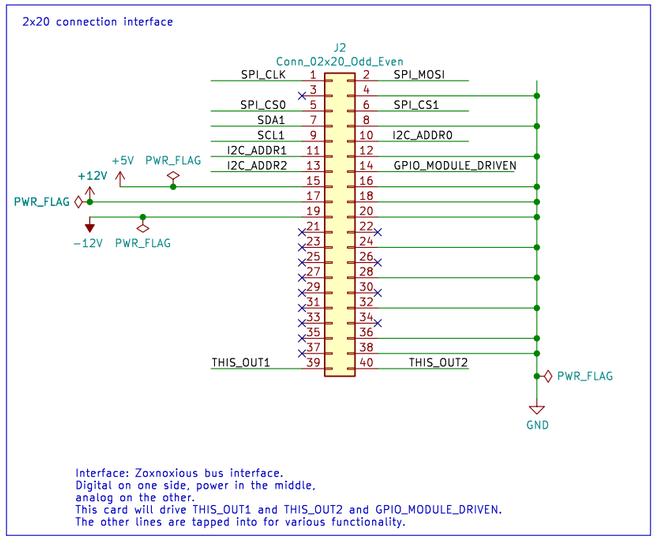
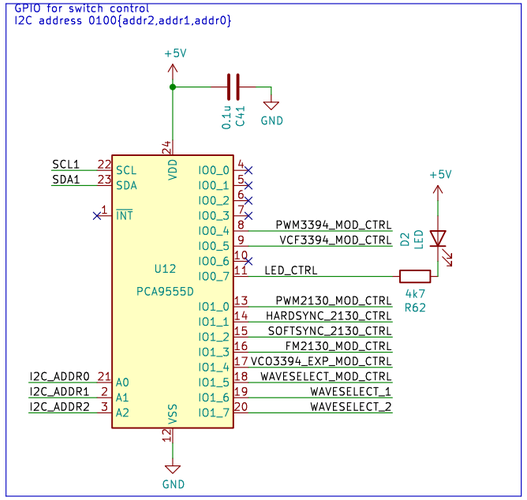
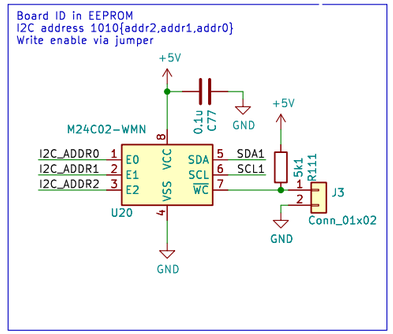
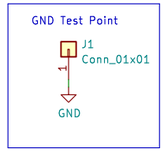
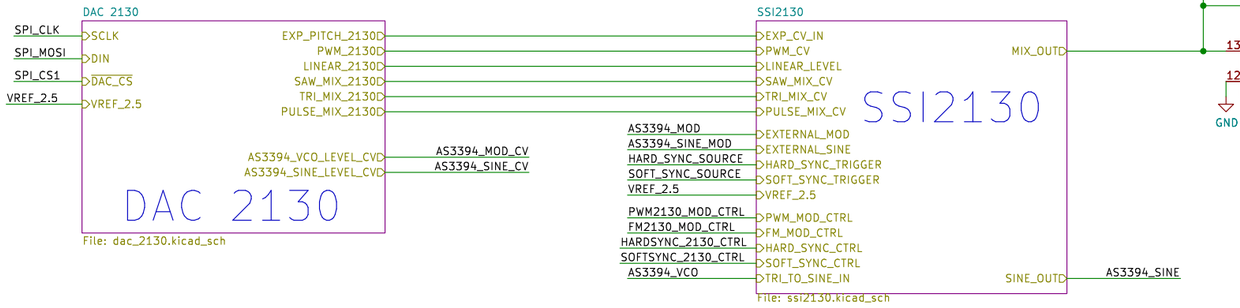
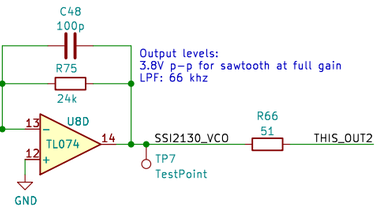


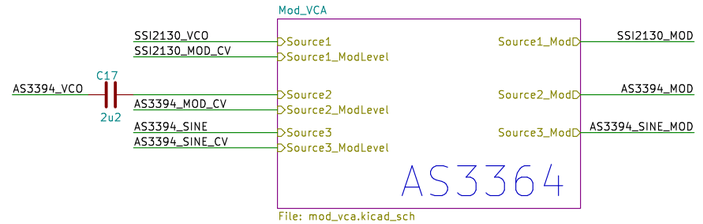


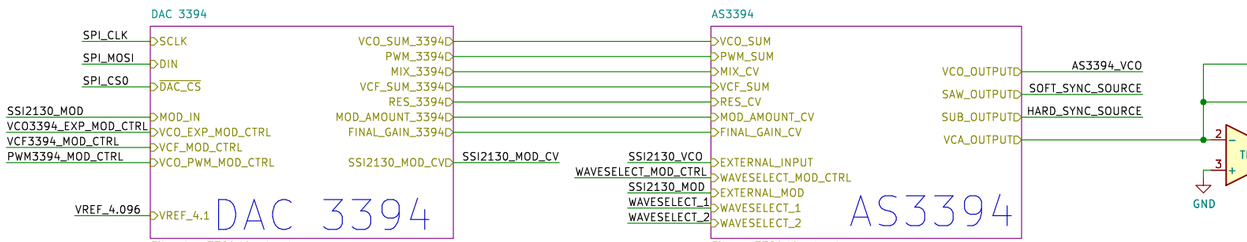


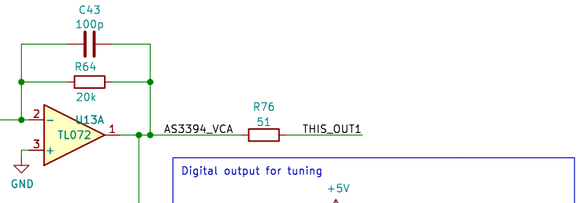


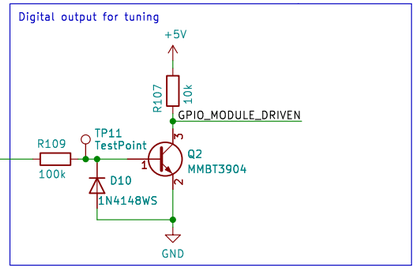


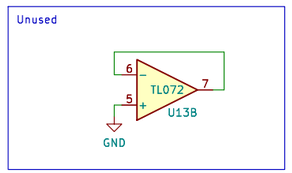


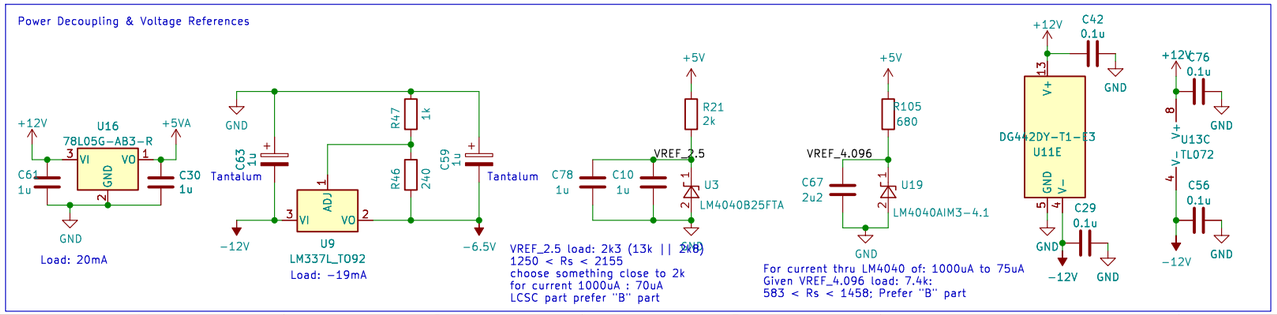








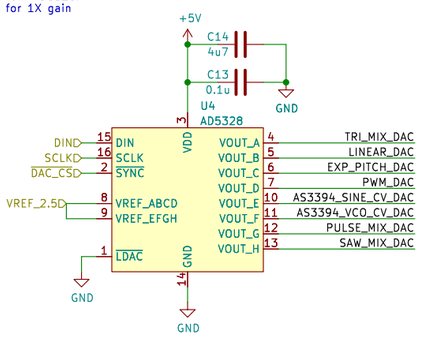




Zoxnoxious Engineering

Sheet: /		
File: z5524.kicad_sch		
Title: Zoxnoxious Z5524 (SSI2130/AS3394)		
Size: B	Date: 2025-02-17	**Rev: 0.5**
KiCad E.D.A. kicad 7.0.11		Id: 1/6

DAC: 2.5V Reference Voltage
Outputs at 1X gain from AD5328.
Vref impedance 45k for 1X gain



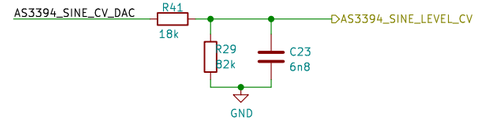
Sheet load:
Vref_2.5: 45k || 45k || 30k ==> 13k

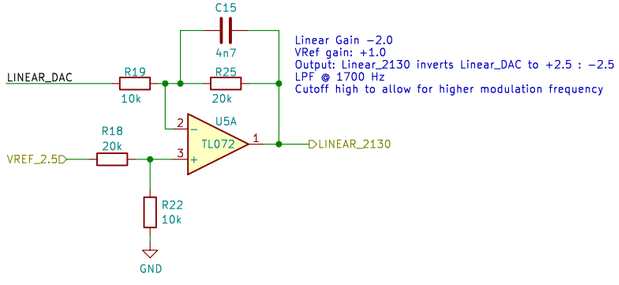
VCO Pitch:
From 2.5V source, a 20 uA/octave
source for 8 octaves gives 15625 for R.
Divide this to a low impedance LPF section
with a ~1063 Hz filter.
No R value needed on SSI2130 sheet.

PWM: 795 Hz cutoff freq
note output impedance for next stage

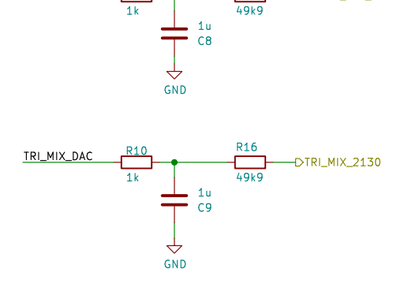
Mix DAC lines: ~159 Hz cutoff frequency.
Follow with current input control resistors

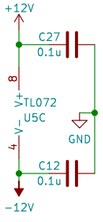
CV for AS3364 VCAs with max level 2.08V (or 1.93V typ)
Lowpass @ 1585 Hz





Linear Gain −2.0
VRef gain: +1.0
Output: Linear_2130 inverts Linear_DAC to +2.5 : −2.5
LPF @ 1700 Hz
Cutoff high to allow for higher modulation frequency





These lowpass RC numbers are off; they're a bit low.
Only took into account source side R in most calcs.
I'm not going to recalc them though; they're close enough.

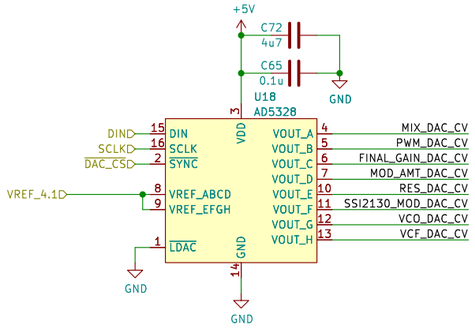
Zoxnoxious Engineering

Sheet: /DAC 2130/
File: dac_2130.kicad_sch

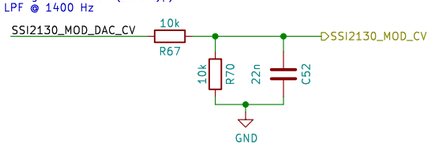
Title: Zoxnoxious Z5524 (SSI2130/AS3394)

Size: B	Date: 2025-02-17	**Rev: 0.5**
KiCad E.D.A. kicad 7.0.11		Id: 2/6

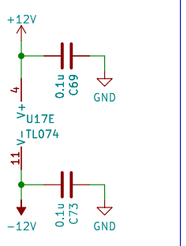
DAC: 4.096V Reference Voltage
B grade spec'd, C, D grades of LM4040 are good 'nuff
Programming: set to 1X gain, so DAC lines are 0 – 4.096V
VREF load: 45k



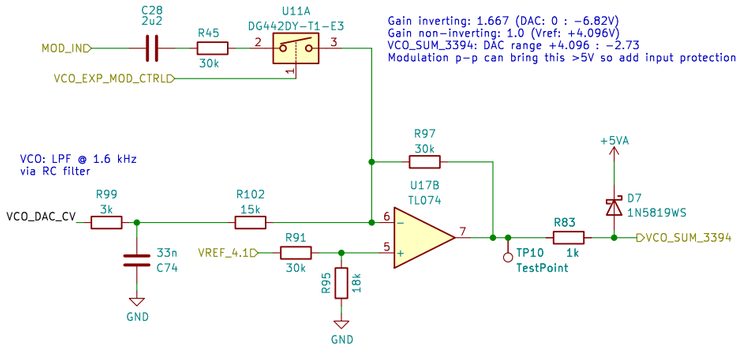
CV to AS3364 VCA:
Max gain at 2.08V (1.93 typ)
LPF @ 1400 Hz



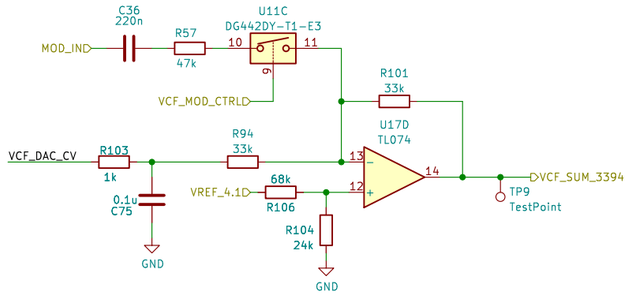
Decoupling caps close to pins



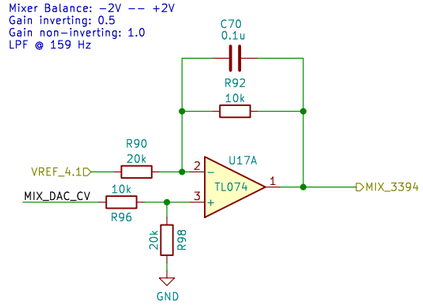
VCO: LPF @ 1.6 kHz
via RC filter
Gain inverting: 1.667 (DAC: 0 : −6.82V)
Gain non-inverting: 1.0 (Vref: +4.096V)
VCO_SUM_3394: DAC range +4.096 : −2.73
Modulation p-p can bring this >5V so add input protection



VCF: +2.1V : −1.9V
Gain inverting: 0.97
Gain non-inverting: 0.51
This should give ~10 octaves from +20kHz to 23Hz
LPF @ 1591 Hz.
Modulation resistor value: value shoudl give a wide mod range.
The modulator is AC coupled, the R value gives a very wide mod range



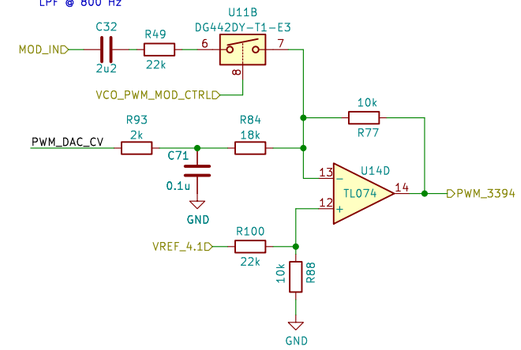
Mixer Balance: −2V –– +2V
Gain inverting: 0.5
Gain non-inverting: 1.0
LPF @ 159 Hz



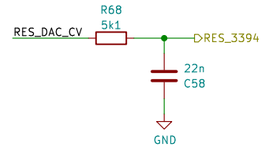
Sheet Load:
Vref 4.096: 45k || 20k || 92k || 48k || 32k ==> 7.4k

Filtering note:
AD5328 datasheet DC output impedance: 0.5 ohm
AS3394 input impedance: control inputs "high impedance", < 0.5 nA input current

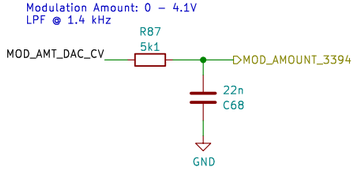
PWM Amount: datasheet is 0 : +2V for range
For DAC values this circuit gives 1.92V : −0.13 V
and yes, that's reverse where high DAC values give low width.
Reverse it in software.
The 22k value is used instead of a 20k to ensure a negative value for zero pulse.
LPF @ 800 Hz



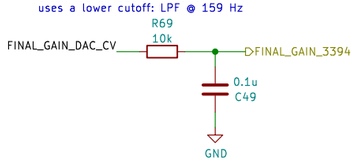
Resonance Amount: 0 –– 4.1V
LPF @ 1.4 kHz



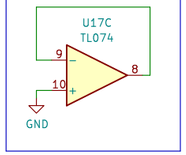
Modulation Amount: 0 – 4.1V
LPF @ 1.4 kHz



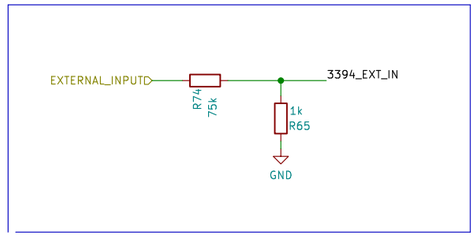
Final Gain: 0 – 4.1V
Given it's an audio VCA this
uses a lower cutoff: LPF @ 159 Hz

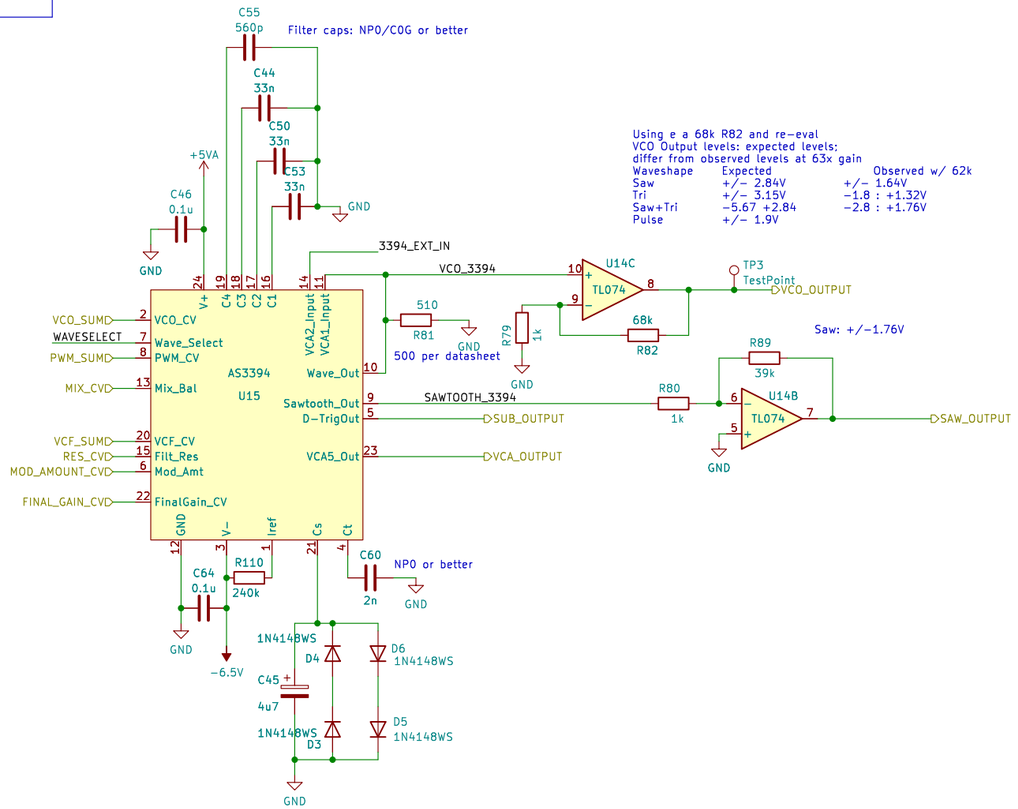


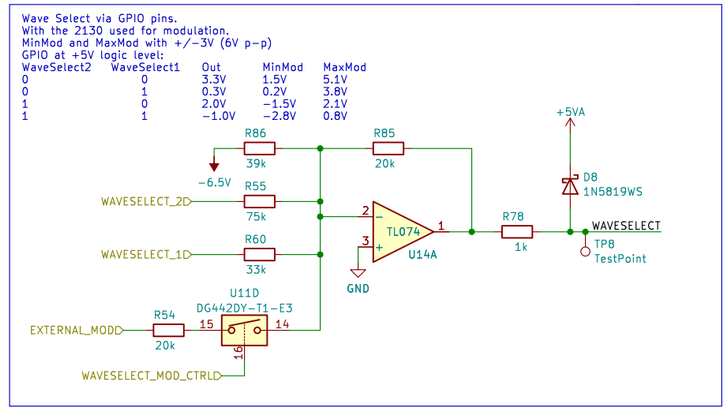
Unused



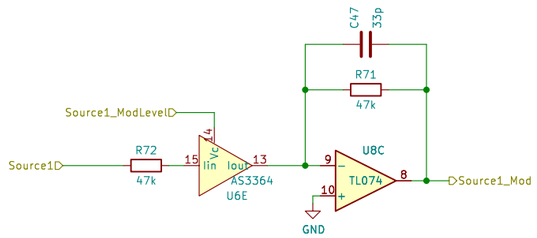
Zoxnoxious Engineering
Sheet: /DAC 3394/
File: dac_3394.kicad_sch
Title: Zoxnoxious Z5524 (SSI2130/AS3394)
Size: B | Date: 2025-02-17 | Rev: 0.5
KiCad E.D.A. kicad 7.0.11 | Id: 3/6

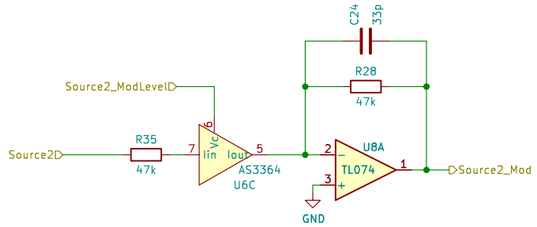


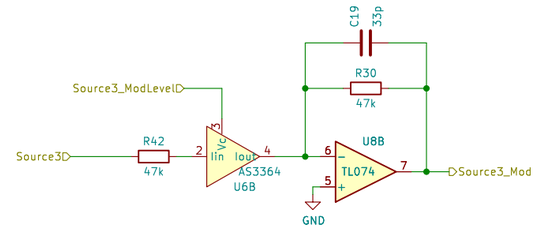


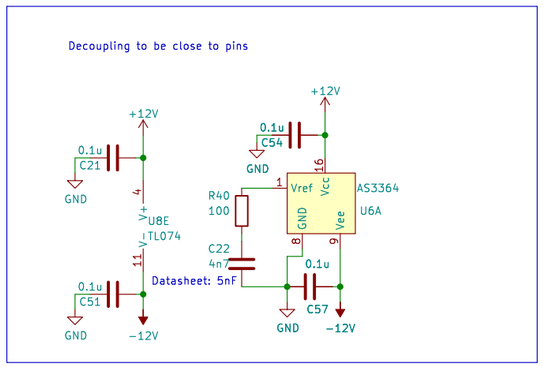


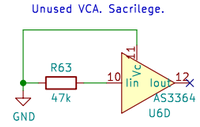
Zoxnoxious Engineering		
Sheet: /AS3394/		
File: as3394.kicad_sch		
Title: Zoxnoxious Z5524 (SSI2130/AS3394)		
Size: B	Date: 2025-02-17	**Rev: 0.5**
KiCad E.D.A. kicad 7.0.11		Id: 4/6









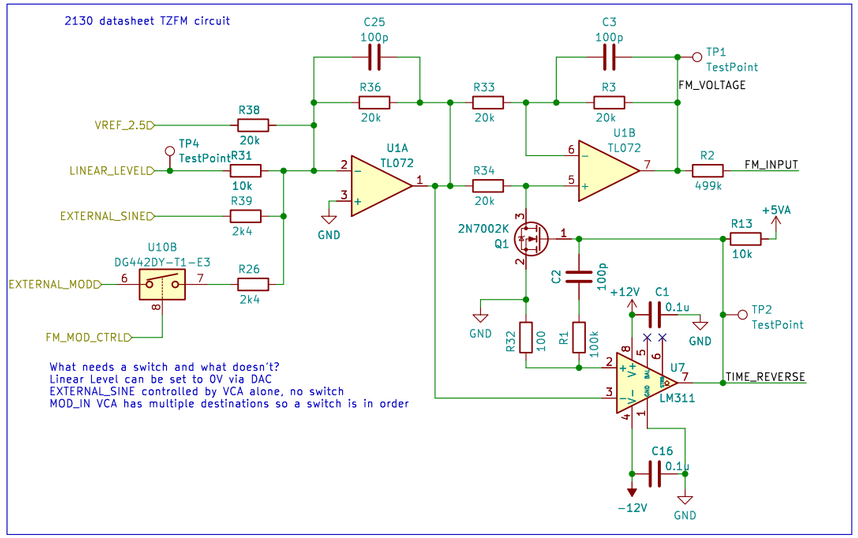


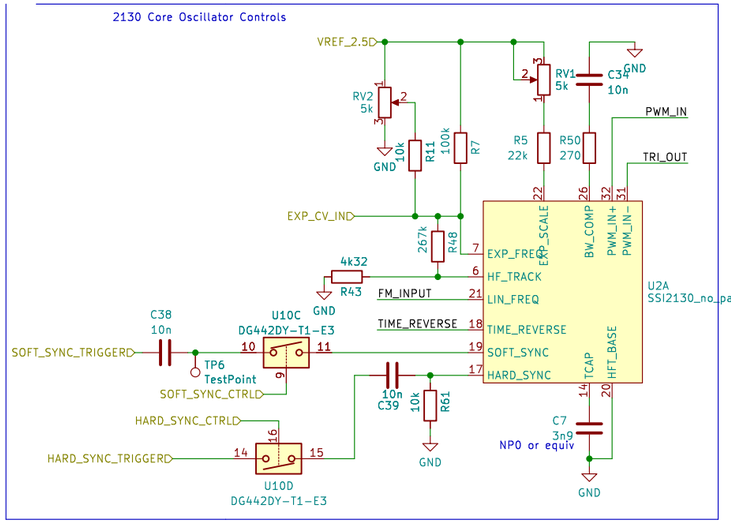
Zoxnoxious Engineering

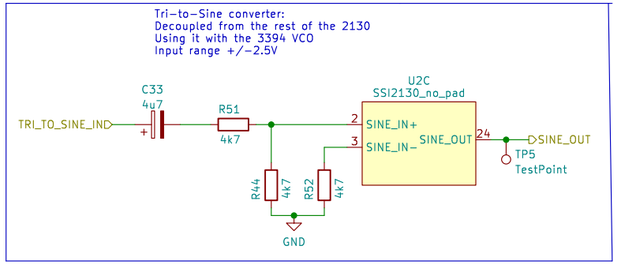
Sheet: /Mod_VCA/
File: mod_vca.kicad_sch

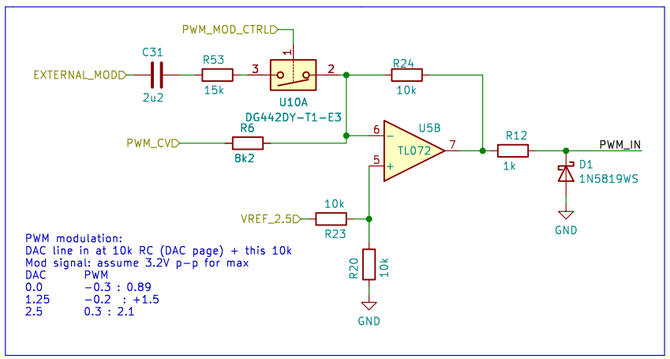
Title: Zoxnoxious Z5524 (SSI2130/AS3394)

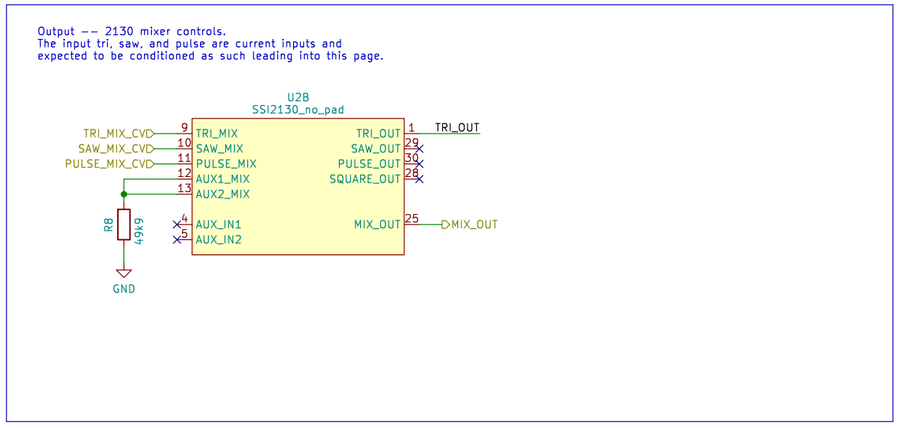
Size: B	Date: 2025-02-17	**Rev: 0.5**
KiCad E.D.A. kicad 7.0.11		Id: 5/6

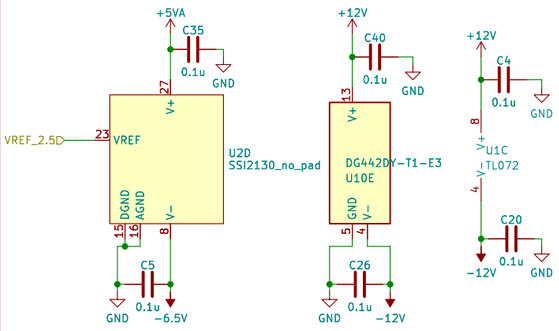












Sheet Load:
Vref 2.5: 25k (100uA per SSI2130 datasheet) || 20k || 20k || 5k || 100k ==> 2k8
LM7805: 3.75mA + 0.5mA
LM337: −2.90mA

Zoxnoxious Engineering		
Sheet: /SSI2130/		
File: ssi2130.kicad_sch		
Title: Zoxnoxious Z5524 (SSI2130/AS3394)		
Size: B	Date: 2025−02−17	**Rev: 0.5**
KiCad E.D.A. kicad 7.0.11		Id: 6/6