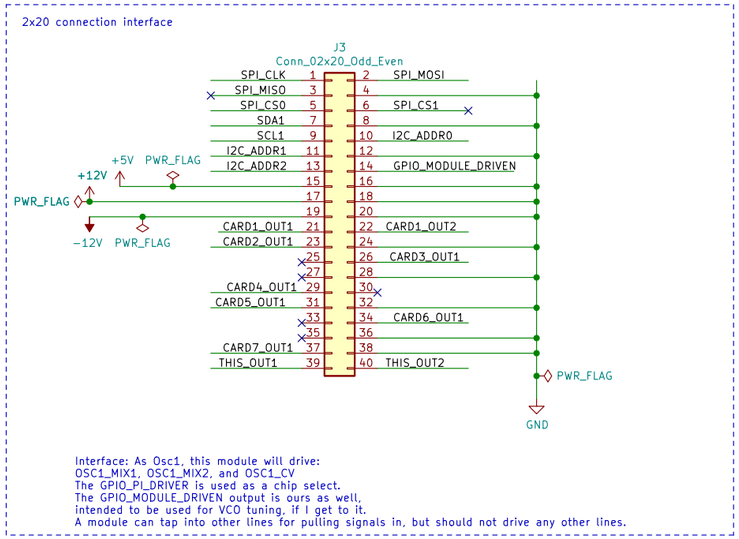
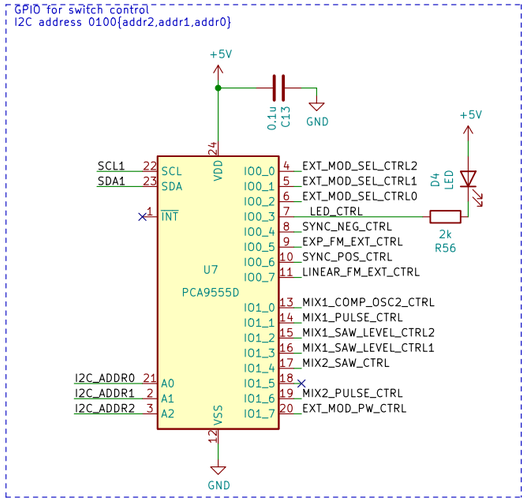
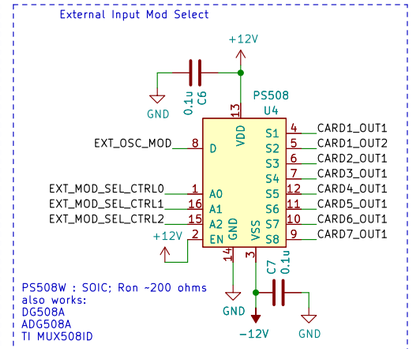
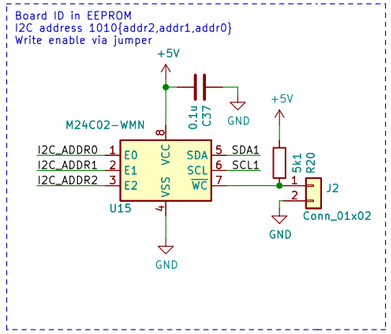
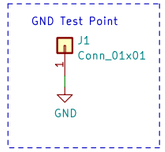
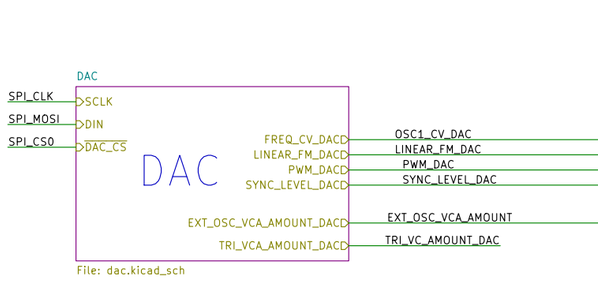


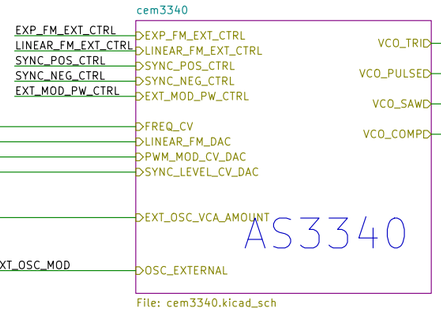


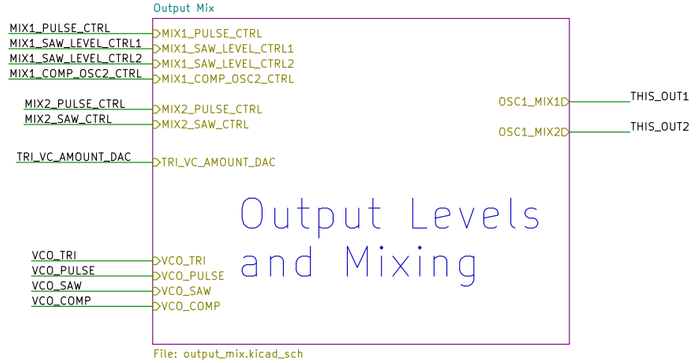


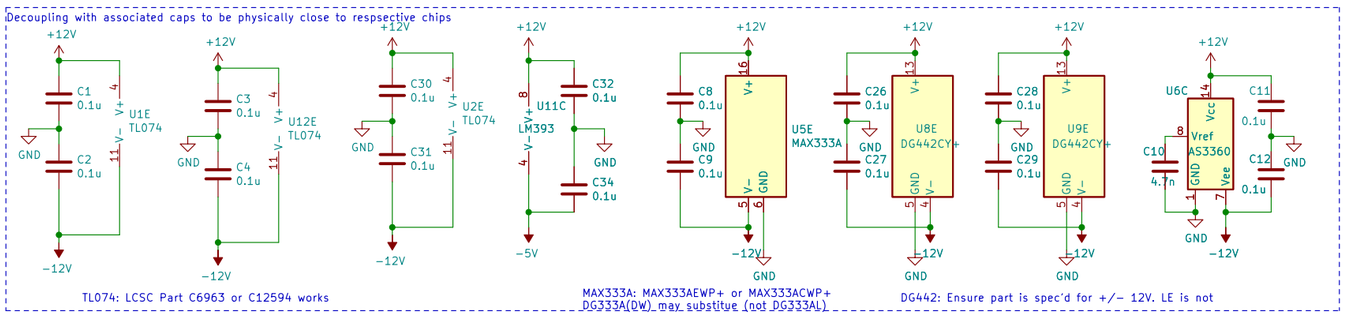


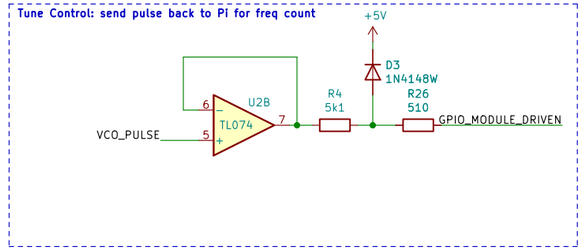


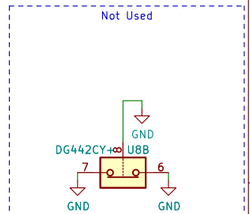


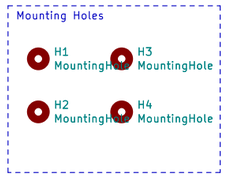












Zoxnoxious Engineering

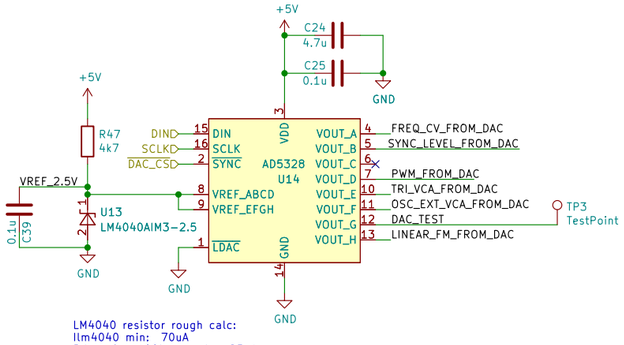
Sheet: /

File: as3340.kicad_sch

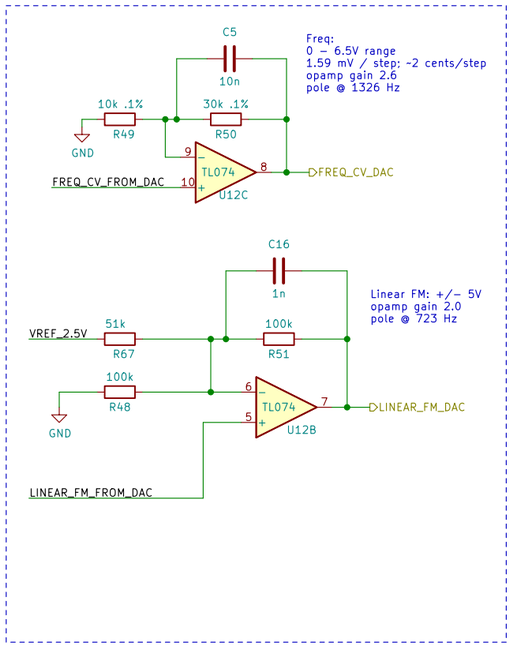
Title: Zoxnoxious 3340 Oscillator

Size: B	Date: 2022-09-07	Rev: 0.4
KiCad E.D.A. kicad (6.0.7-1)-1		Id: 1/4

DAC: 2.5V Reference Voltage
B, C, D grades of LM4040 are likely acceptable



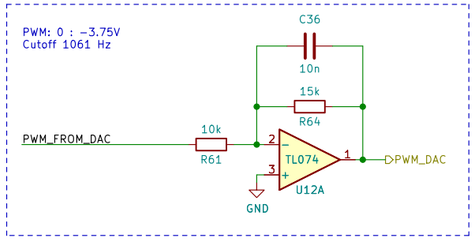
LM4040 resistor rough calc:
lm4040 min: 70uA
Rdacref = 100k ==> I = 25uA
opamp will swing about 0 50 uA
for roughly 150uA ==> 16kR min
Lower to 5k, call it good



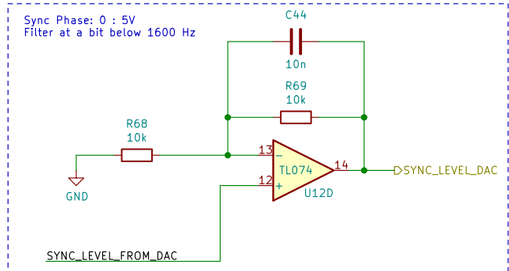
Freq:
0 – 6.5V range
1.59 mV / step: ~2 cents/step
opamp gain 2.6
pole @ 1326 Hz

Linear FM: +/– 5V
opamp gain 2.0
pole @ 723 Hz

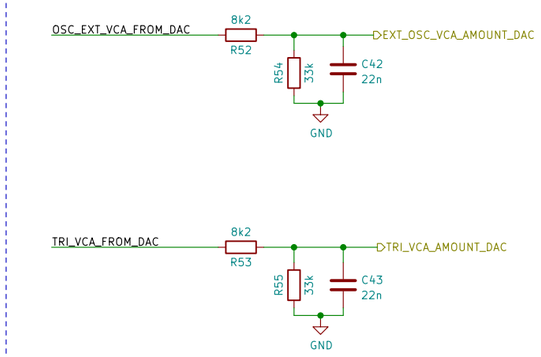
PWM: 0 : –3.75V
Cutoff 1061 Hz



Sync Phase: 0 : 5V
Filter at a bit below 1600 Hz



For both VCA lines:
Scaling for VCA of 0–2V
RC filter with cutoff 882 Hz



DAC Output Levels:

FREQ_CV_DAC: 0 : 10V
LINEAR_FM_DAC: +/– 5V
EXT_OSC_VCA_AMOUNT: 0 : 2V
PULSE_VCA_AMOUNT_DAC: 0 : 2V
PWM_DAC: 0 : –3.75V (inverted to positive downstream)
SYNC_LEVEL_DAC: 0 : 10V (sync phase)

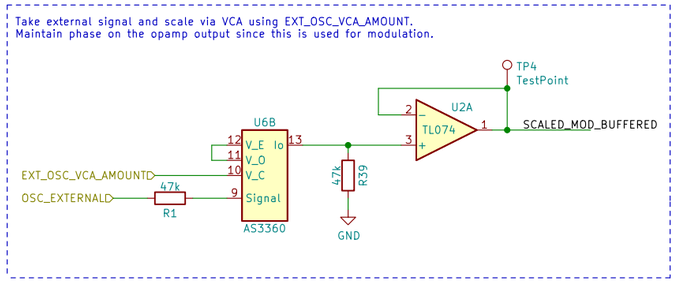
Filtering not very complex and some pretty fuzzy numbers on corner frequency. Expect a sampling rate around 4 kHz; a cutoff in the range of 500 Hz – 2 kHz is likely ok.

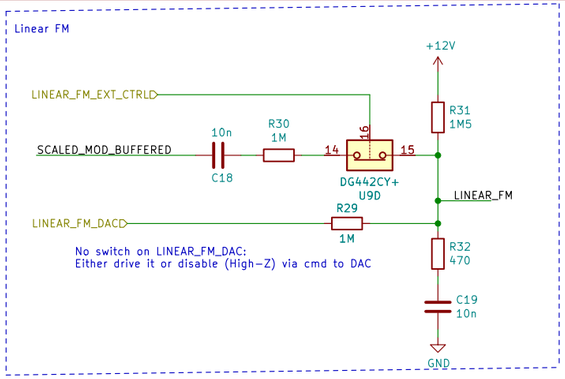
Zoxnoxious Engineering

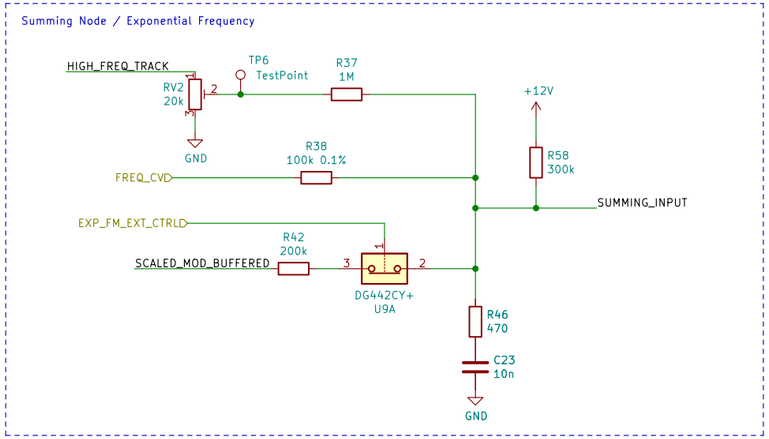
Sheet: /DAC/
File: dac.kicad_sch

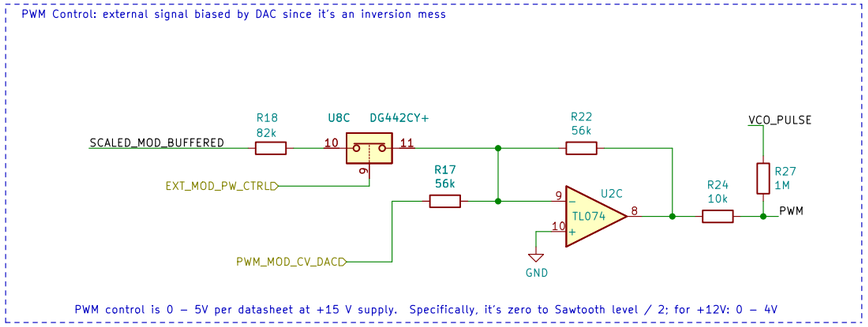
Title: Zoxnoxious 3340 Oscillator

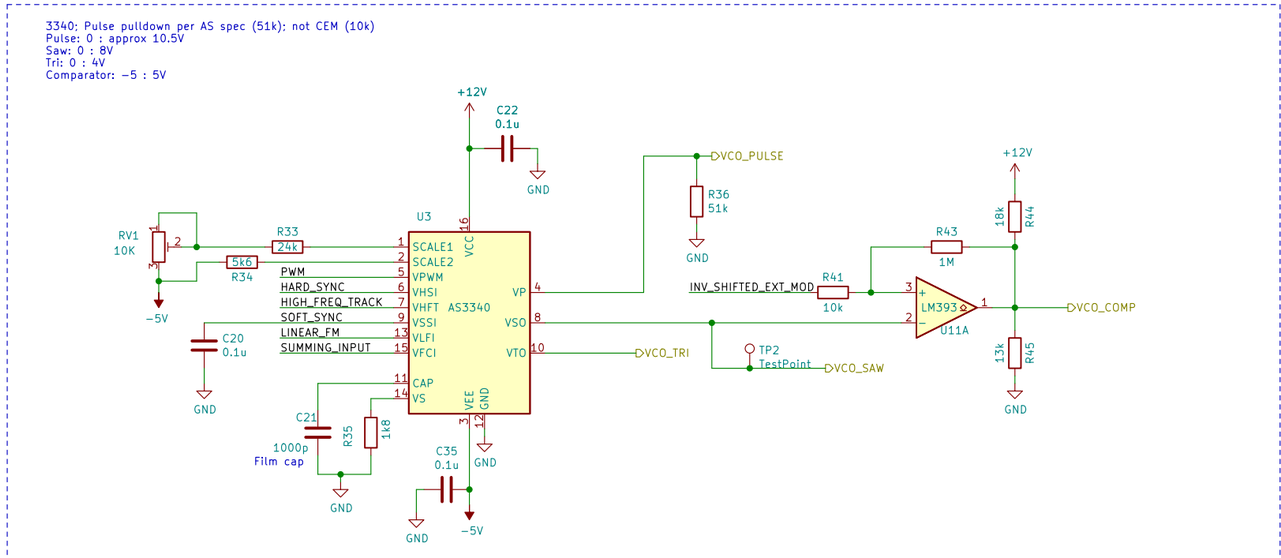
Size: B	Date:	**Rev: 0.4**
KiCad E.D.A. kicad (6.0.7–1)–1		Id: 2/4

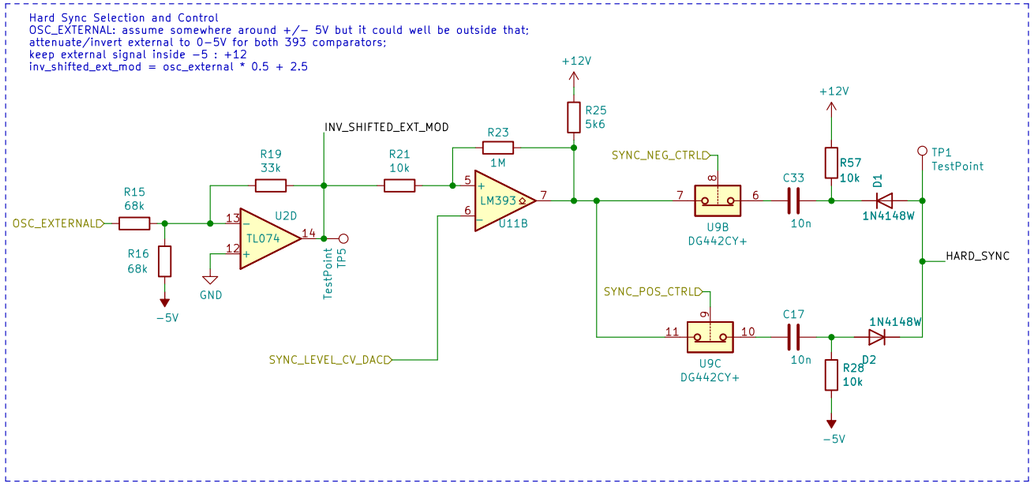


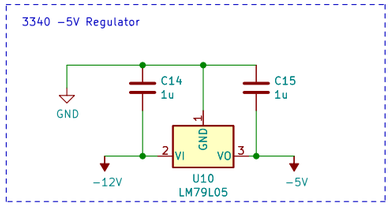












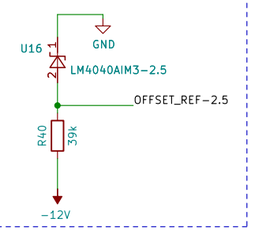
Zoxnoxious Engineering

Sheet: /cem3340/
File: cem3340.kicad_sch

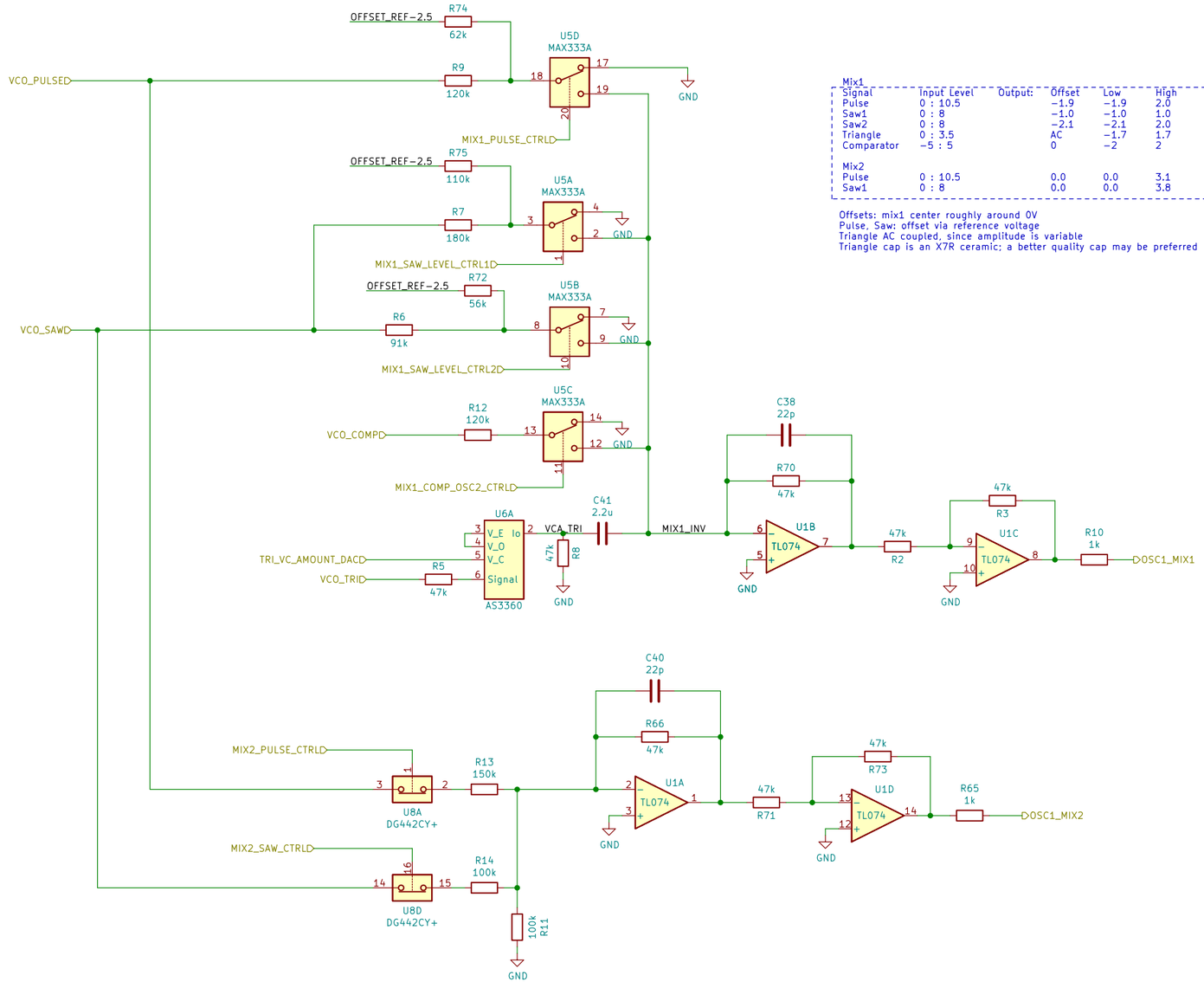
Title: Zoxnoxious 3340 Oscillator

Size: B	Date:	**Rev: 0.4**
KiCad E.D.A. kicad (6.0.7-1)-1		Id: 3/4

Any grade of LM4040 is fine–
just provide something more stable than
the rails for an offset voltage



-16k in load to OFFSET_REF-2.5 ==> 150 uA
LM4040 requires 65 uA
total 215 uA
44k calculated ==> 39k resistor, allowing for power supply wierdness
Changing offsets to waveforms will change this value



Mix1						
Signal	Input Level	Output:	Offset	Low	High	Peak-to-Peak
Pulse	0 : 10.5		-1.9	-1.9	2.0	4.0
Saw1	0 : 8		-1.0	-1.0	1.0	2
Saw2	0 : 8		-2.1	-2.1	2.0	4.0
Triangle	0 : 3.5		AC	-1.7	1.7	3.5
Comparator	-5 : 5		0	-2	2	4
Mix2						
Pulse	0 : 10.5		0.0	0.0	3.1	3.1
Saw1	0 : 8		0.0	0.0	3.8	3.8

Offsets: mix1 center roughly around 0V
Pulse, Saw: offset via reference voltage
Triangle AC coupled, since amplitude is variable
Triangle cap is an X7R ceramic; a better quality cap may be preferred

Zoxnoxious Engineering		
Sheet: /Output Mix/		
File: output_mix.kicad_sch		
Title: Zoxnoxious 3340 Oscillator		
Size: B	Date:	**Rev: 0.4**
KiCad E.D.A. kicad (6.0.7-1)-1		Id: 4/4