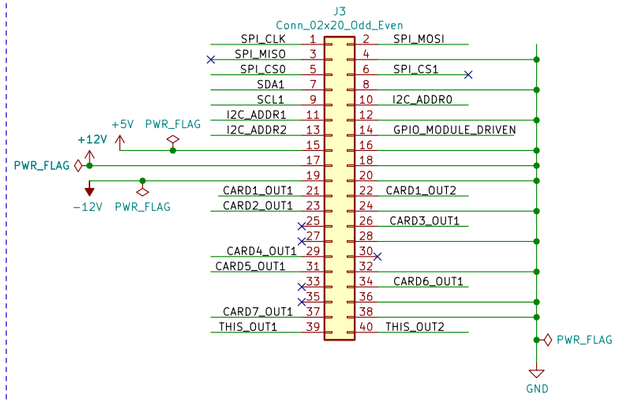
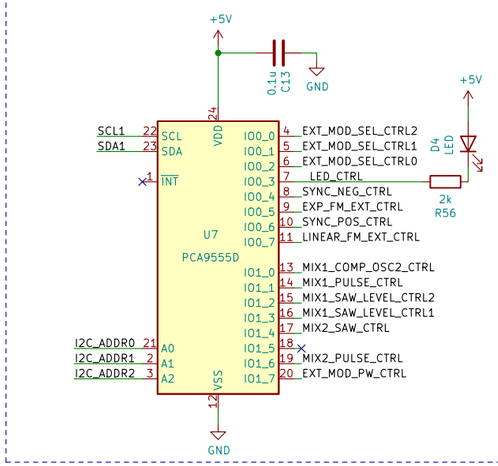
2x20 connection interface

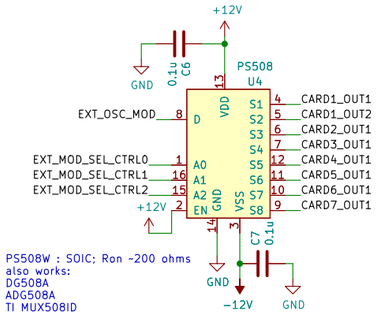


Interface: As Osc1, this module will drive:
OSC1_MIX1, OSC1_MIX2, and OSC1_CV
The GPIO_PI_DRIVER is used as a chip select.
The GPIO_MODULE_DRIVEN output is ours as well,
intended to be used for VCO tuning, if I get to it.
A module can tap into other lines for pulling signals in, but should not drive any other lines.

GPIO for switch control
I2C address 0100{addr2,addr1,addr0}

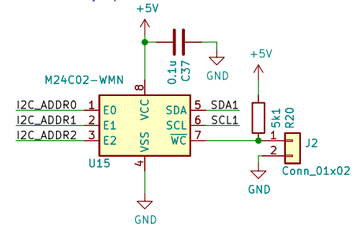


External Input Mod Select

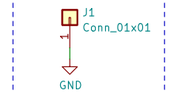


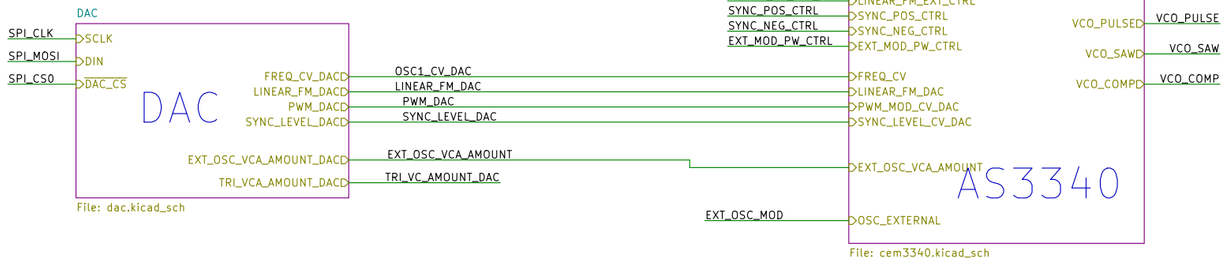
PS508W : SOIC; Ron ~200 ohms
also works:
DG508A
ADG508A
TI MUX508ID

Board ID in EEPROM
I2C address 1010{addr2,addr1,addr0}
Write enable via jumper

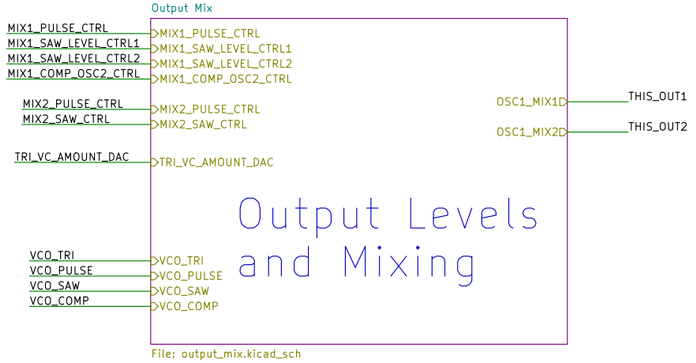


GND Test Point

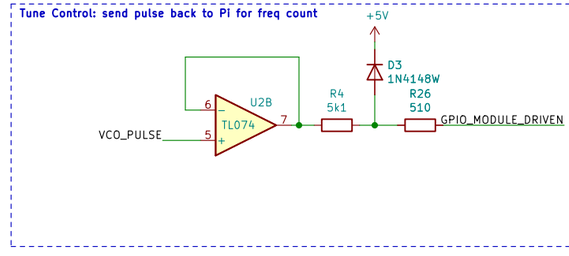




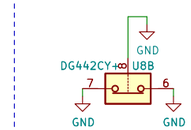
Output Mix



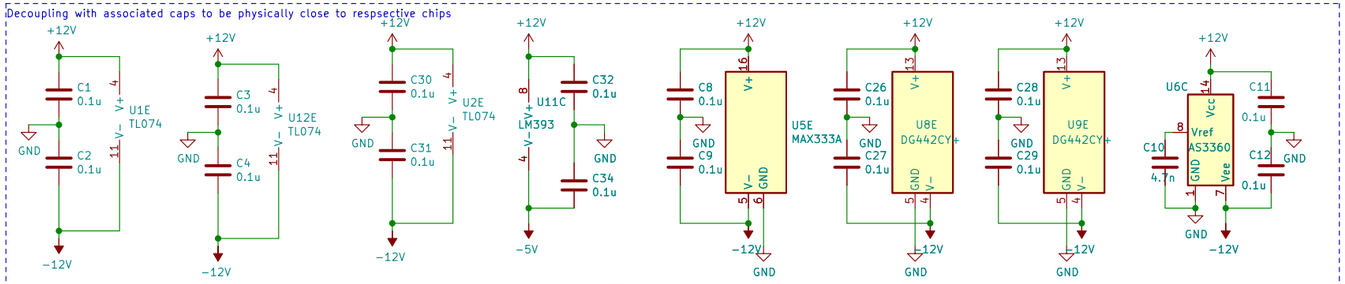
Tune Control: send pulse back to PI for freq count



Not Used



Decoupling with associated caps to be physically close to respsective chips



TL074: LCSC Part C6963 or C12594 works
MAX333A: MAX333AEWP+ or MAX333ACWP+
DG333A(DW) may substitue (not DG333AL)
DG442: Ensure part is spec'd for +/- 12V. LE is not

Mounting Holes

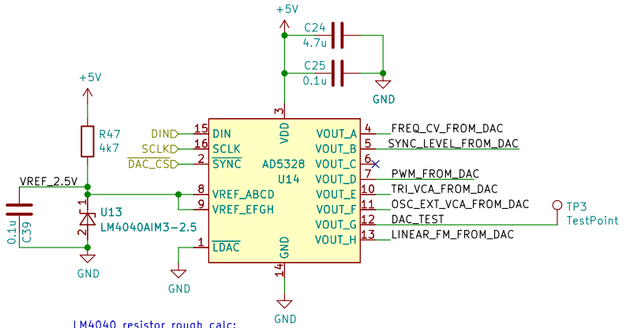
Zoxnoxious Engineering

Sheet: /
File: as3340.kicad_sch

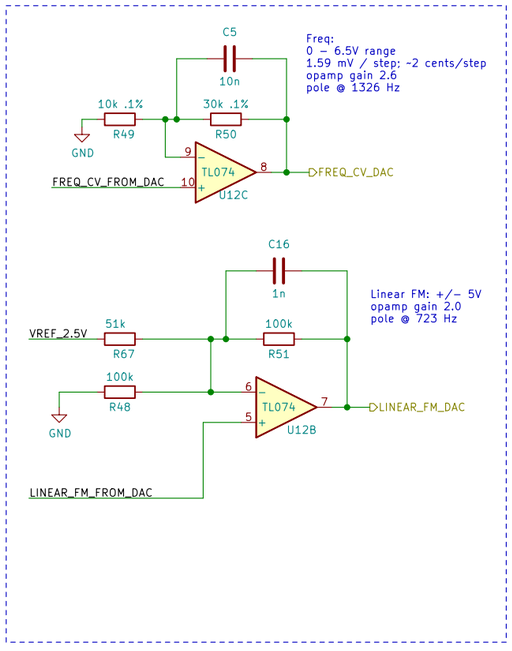
Title: Zoxnoxious 3340 Oscillator

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

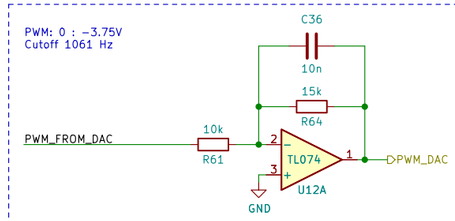
DAC: 2.5V Reference Voltage
B, C, D grades of LM4040 are likely good 'nuff



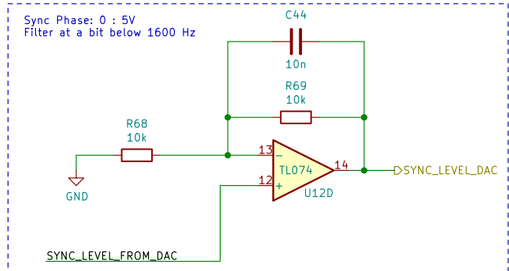
LM4040 resistor rough calc:
lm4040 min: 70uA
Rdacref = 100k ==> I = 25uA
opamp will swing about 0 50 uA
for roughly 150uA ==> 16kR min
Lower to 5k, call it good



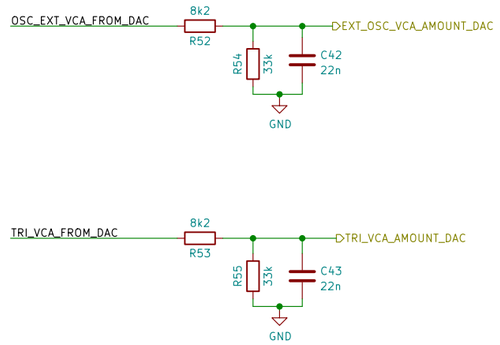
PWM: 0 : -3.75V
Cutoff 1061 Hz



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



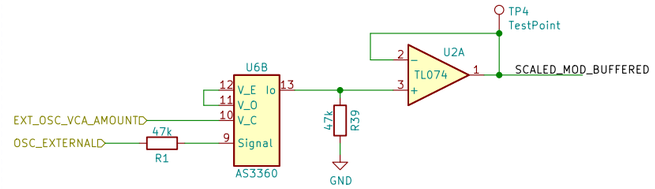
DAC Output Levels:

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)

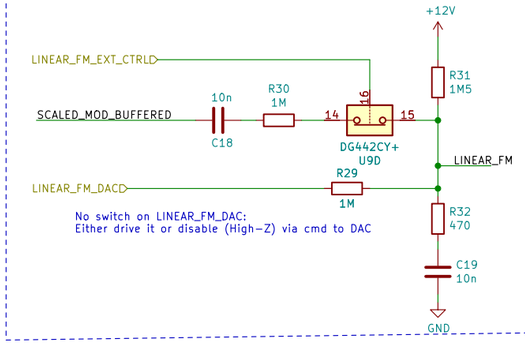
Filtering not very complex and some pretty fuzzy numbers on corner frequency. Expect a sampling rate around 4 kHz; a cutoff in the range of 500 Hz – 2 kHz is likely ok.

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

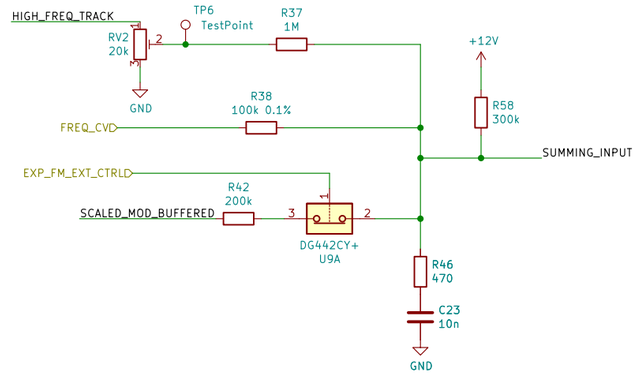
Take external signal and scale via VCA using EXT_OSC_VCA_AMOUNT.
Maintain phase on the opamp output since this is used for modulation.



Linear FM

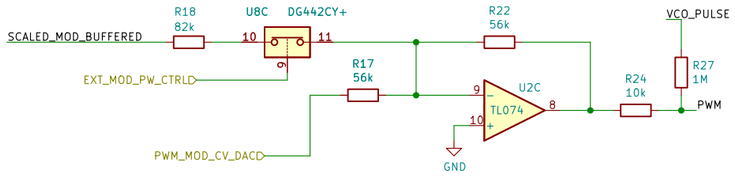


Summing Node / Exponential Frequency



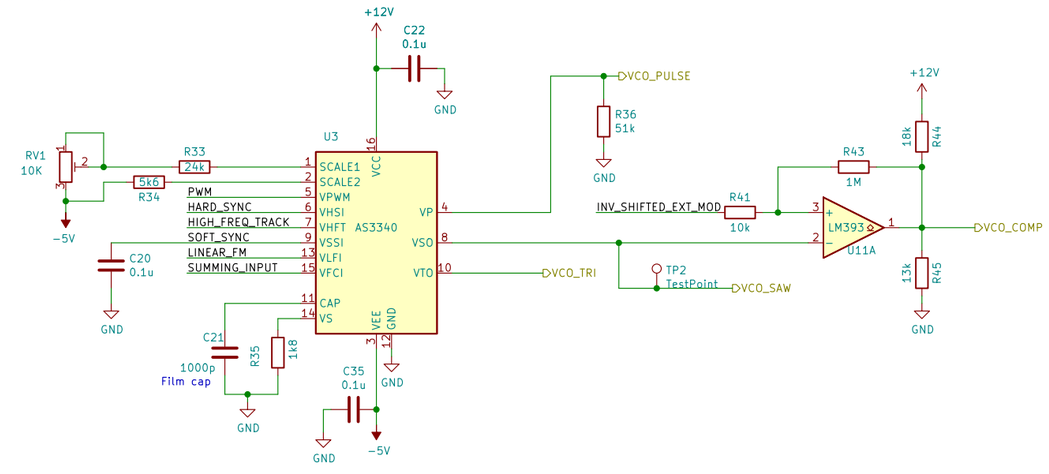
PWM Control: external signal biased by DAC since it's an inversion mess

1M from Pulse w/ 10k for hysteresis per datasheet

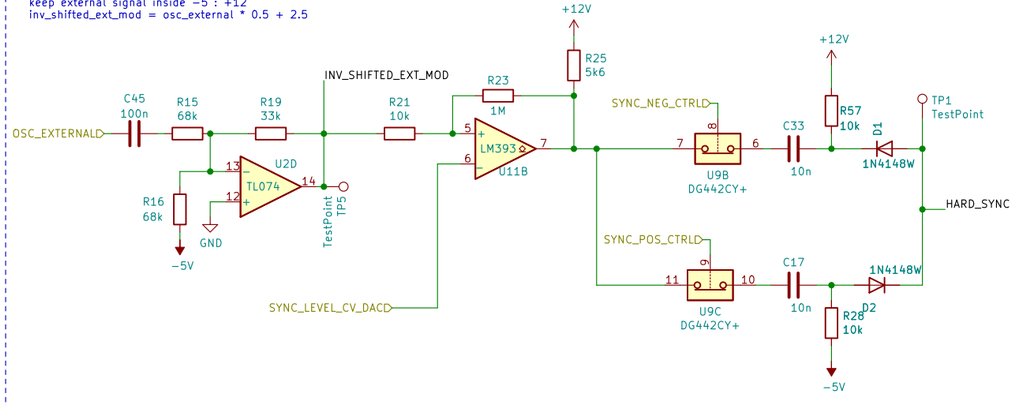


PWM control is 0 – 5V per datasheet at +15 V supply. Specifically, it's zero to Sawtooth level / 2; for +12V: 0 – 4V

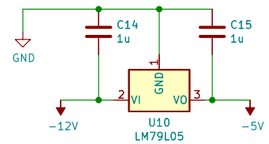
3340: Pulse pulldown per AS spec (51k): not CEM (10k)
Pulse: 0 : approx 10.5V
Saw: 0 : 8V
Tri: 0 : 4V
Comparator: -5 : 5V



Hard Sync Selection and Control
OSC_EXTERNAL: assume somewhere around +/- 5V;
attenuate/invert external to 0-5V for both 393 comparators;
keep external signal inside -5 : +12
inv_shifted_ext_mod = osc_external * 0.5 + 2.5



3340 -5V Regulator



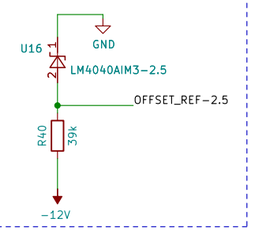
Zoxnoxious Engineering

Sheet: /cem3340/
File: cem3340.kicad_sch

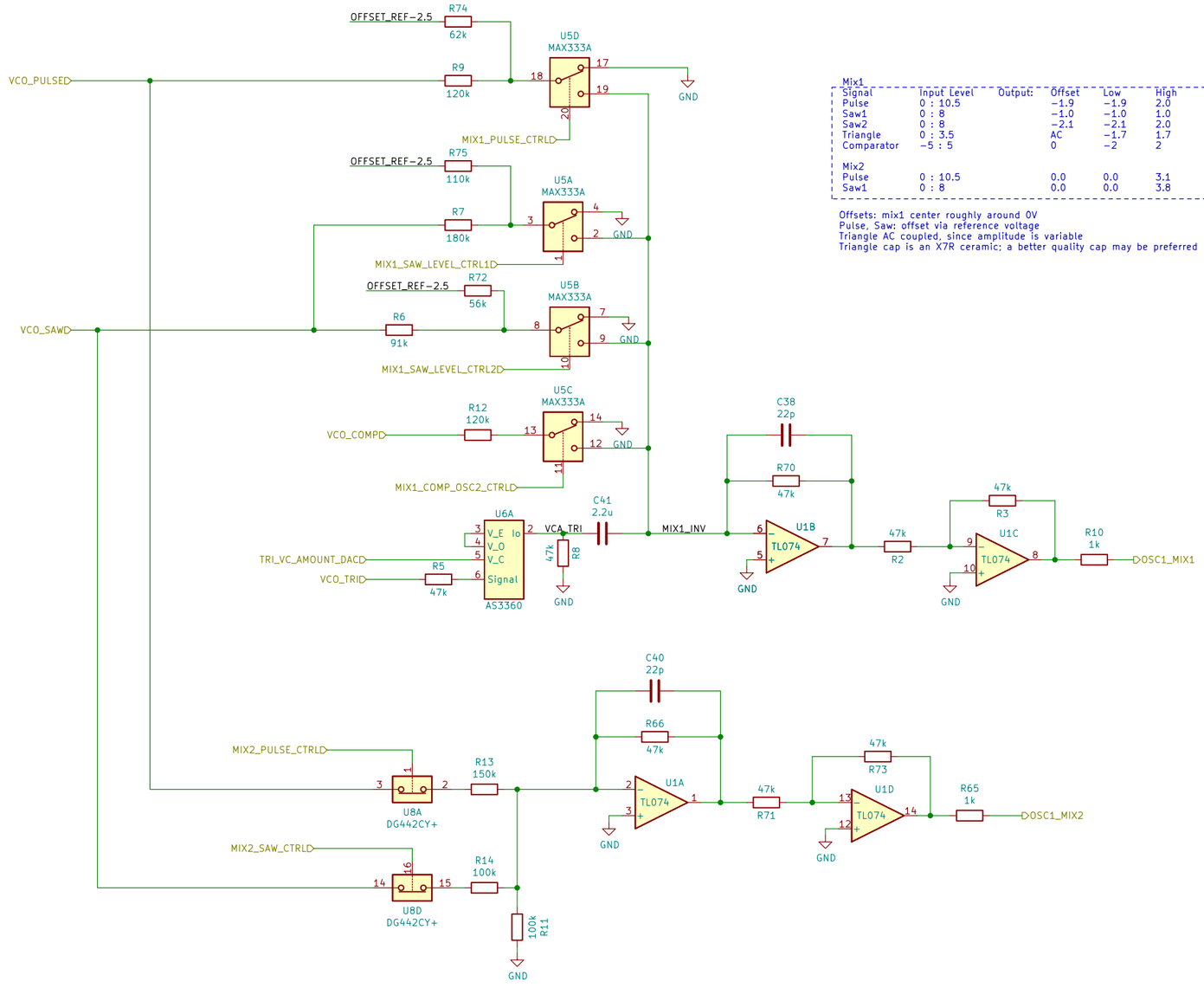
Title: Zoxnoxious 3340 Oscillator

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