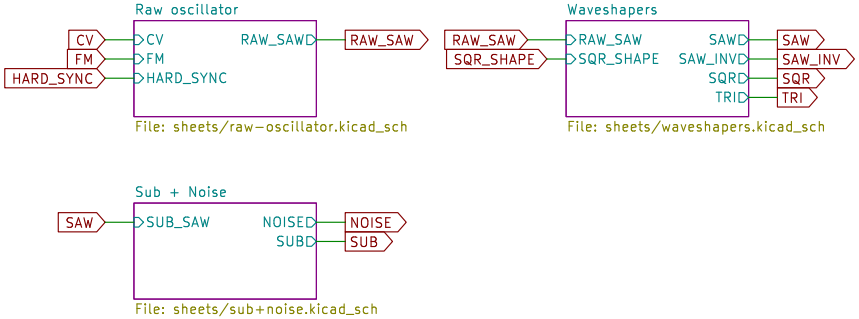
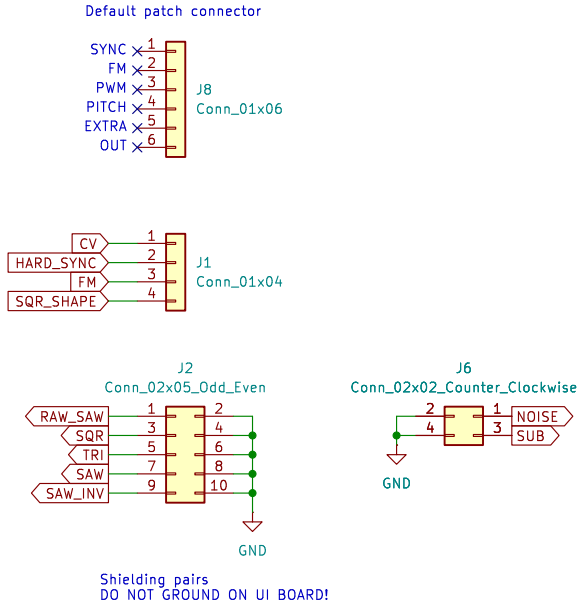
Raw oscillator & wave shaping



Power

I/O



H1 MountingHole
H2 MountingHole
H3 MountingHole
H4 MountingHole

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CV inputs can be anything summed passively with resistors.

ALL INPUTS MUST HAVE AN INPUT RESISTOR!
For 1V/oct, use 100k

#R1 100k — KEYBOARD PITCH
#R2 100k — TUNE POT
#R3 100k — FINETUNE POT

CV

C7 100p–1n — C205 only if stabilisation needed. Can cause unwanted portamento.

R3 See t.comp. table — R_FB — R_W1 — R_WIDTH1 See t.comp. table

TL072 U1A

R2 150k

HI_FREQ_COMP

+12V — R1 100k — R_BIAS1 100k (prec) — −12V

Set output to C0 with BIAS when no pitch CV is applied.

Thermistor(s) and BC847 has to be close to each other

R6 See t.comp. table — R_D1 — TH1 See t.comp. table

R7 See t.comp. table — R_D2

TP1 −18mV/V — I_REF

R10 1M

Q1B BC847BS — Q1A

R_D3 — R8 See t.comp. table

R_WIDTH2 See t.comp. table — R_W2

TH2 PTS120602B100RP100

R11 1.5k

ONLY ONE OF THESE J111's SHOULD BE SOLDERED.

Q215 is a THT footprint for J111 to provide alternative to SMD.

Q4 MMBFJ111

Q3 J111

C9 2.2nF (foil)

TL072 U2A

TP3 RAW_SAW

RAW_SAW

R16 22k

C10 22p

R19 330k

Reset OUT TP5

U3 LM311

Alternative for hard sync input

R20 2.2k

R17 150k — R18 100k — 4.8V

TP4 VCOVREF

R4 1M — FMD

C8 100p

100k R5

R9 1.5k

MMBT3906 Q2

TL072 U1B

TP2 HiFreq

R12 510

R_HIFREQ1 2k (prec)

−5V

+12V — U1C TL072 — U2C TL072 — C1 100n — C2 100n — C3 100n — C4 100n — C5 100n — C6 100n — GND −12V

U2B TL072

HARD_SYNC

R13 1M — R14 10k — R15 100k

C11 47p — 1N4148 D1

R21 100k — R22 47k

Q5 MMBT5551

The following temperature compensation setups are supported in the schematics.
V1 is a copy of Befaco's Even VCO compensation which uses a 1206 SMD component (PTS120602B100RP100). V2 is by Norht Coast Synthesis and it uses a THT NTC component (NTCLE203E3103FB0). Ref:
https://befaco.org/docs/Even_VCO/Even_VCO_V0_3_3_Schematic.pdf
https://northcoastsynthesis.com/news/temperature-compensation-with-ntc-thermistors/

X: don't place component
Short: short component
Use multi-turn precision trimmers.

Temperature compenstion options:

	R_FB	R_W1	R_D1	TH1	R_D2	R_D3	TH2	R_W2
V1:	91k	20k	Short	X	6.2k(50ppm)	4.22(50ppm)	PTS120602B100RP100	X
V2:	22k	Short	11k	NTCLE203E3103FB0	27k	2.7k	X	500ohm

Tuning:
0. Connect a tuner and a keyboard. Play the C1 note.
1. Turn Hi-Freq all the way down so there's no compenstaion: Play a very high pitch note and start turning the trimpot so that the pitch is going down. Once it doesn't go lower then you "turned off" high freq compensation.
2. Use R_BIAS to set the frequency to C1 (32.703Hz)
3. Play C4 and use R_BIAS to set the frequency to C4 (261.63Hz)
4. Play C1 and use R_WIDTH to tune it to 32.703Hz)
LOOP 3 + 4
5. When C1 and C4 are in tune, play higher octave C's and use R_HIFREQ to adjust tuning for them.

If needed, repeat steps 3 and 4 for other note pairs.

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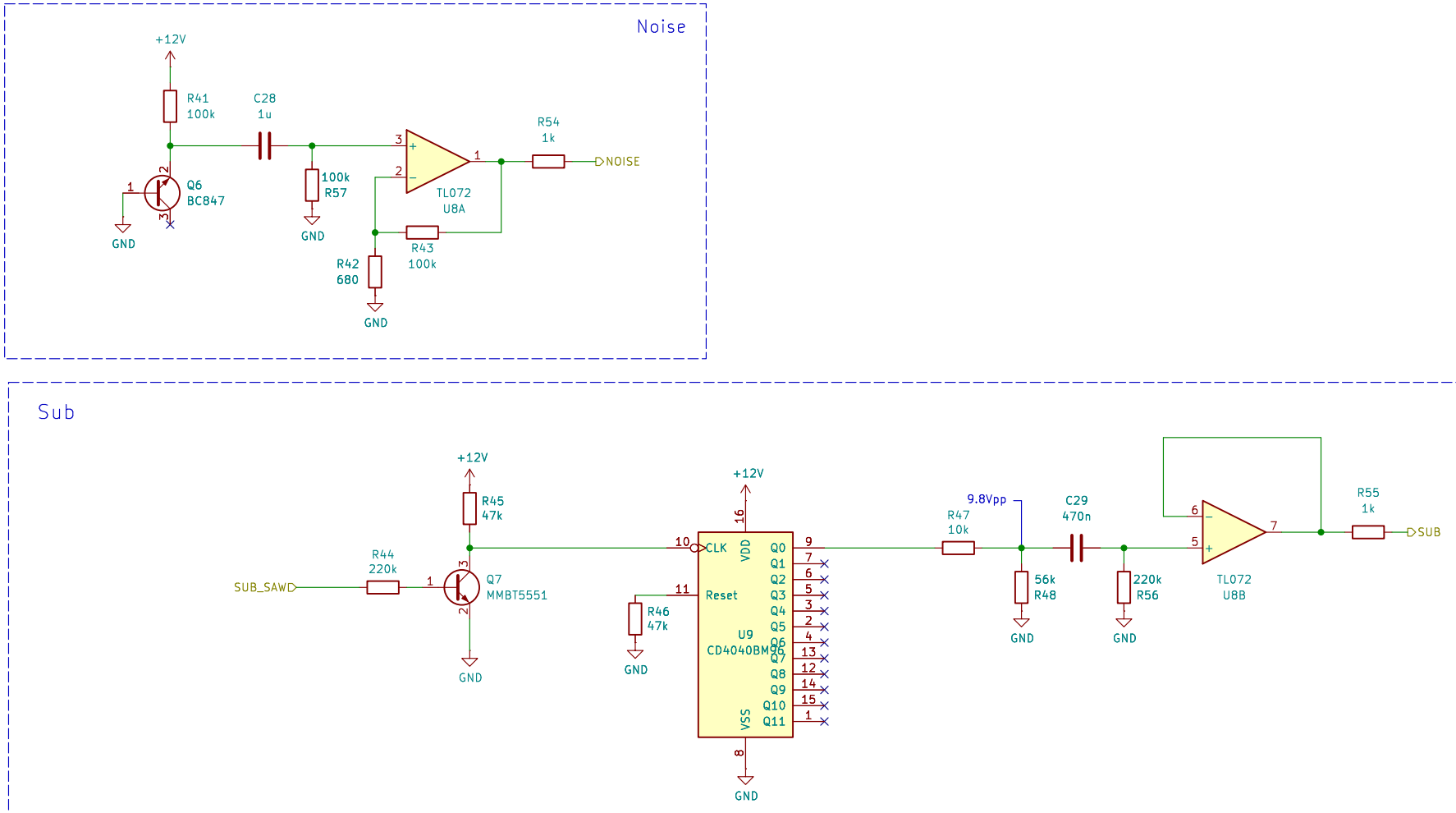
Noise
+12V
R41
100k
C28
1u
Q6
BC847
100k
R57
GND
TL072
U8A
R54
1k
NOISE
R43
100k
R42
680
GND
Sub
+12V
R45
47k
R44
220k
SUB_SAW
Q7
MMBT5551
GND
+12V
R46
47k
GND
U9
CD4040BM96
CLK
Reset
VDD
VSS
Q0
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
9.8Vpp
R47
10k
56k
R48
GND
C29
470n
220k
R56
GND
TL072
U8B
R55
1k
SUB
+12V
C26
100n
C27
100n
GND
U8C
TL072
−12V
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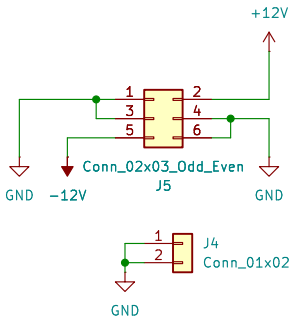
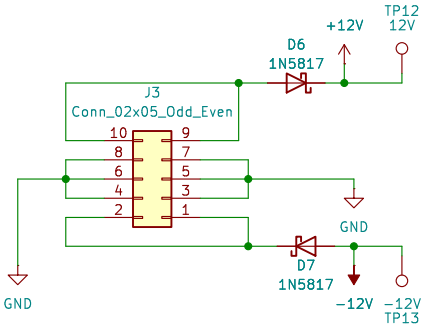
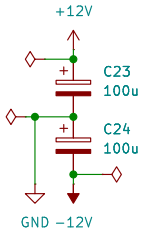
UI power connection

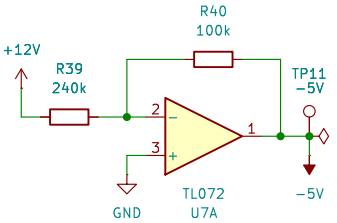


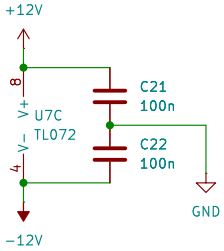
Eurorack PSU connection

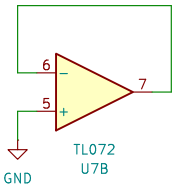




Used for VCO current source







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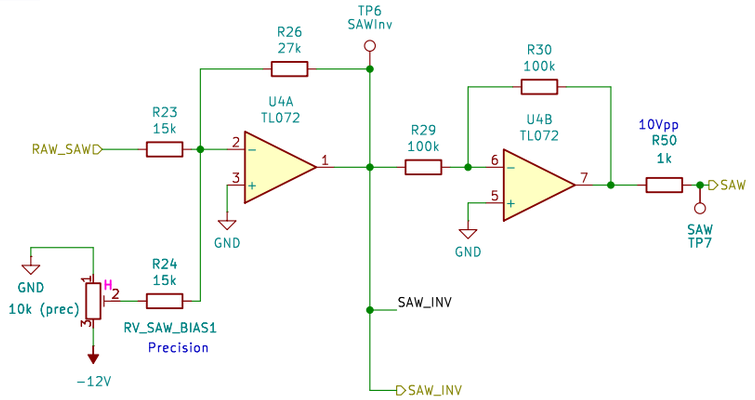
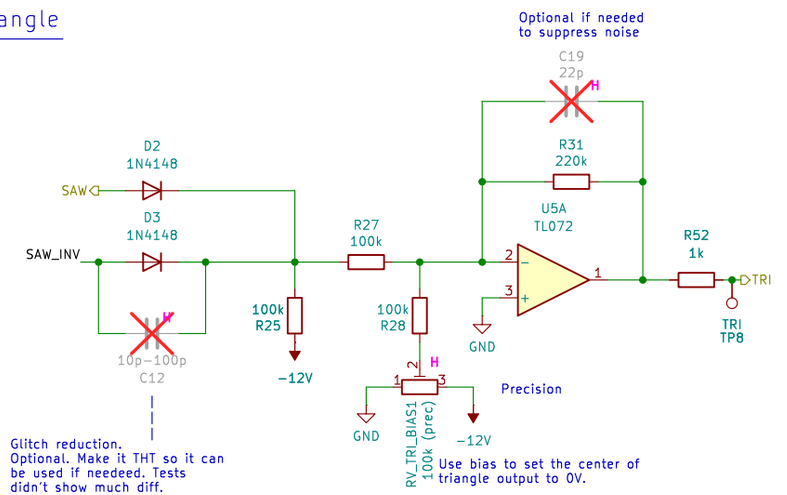
Sawtooth



Use BIAS to set the sawtooth output exactly to oscillate around 0V. This is critical for a nice triangle wave.

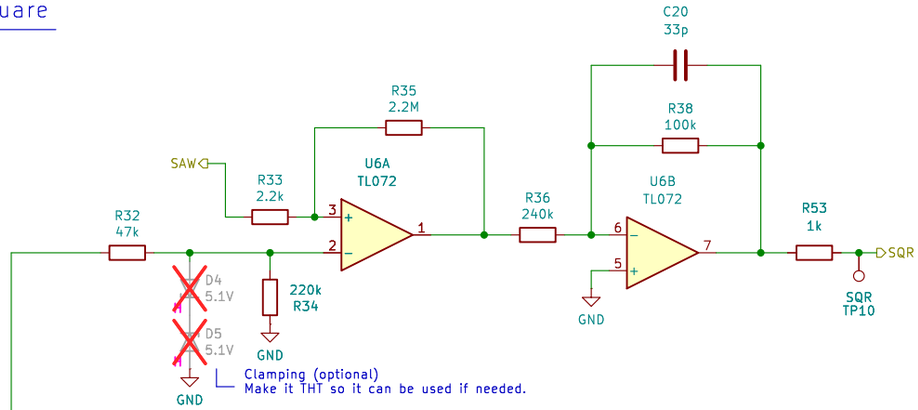
Triangle



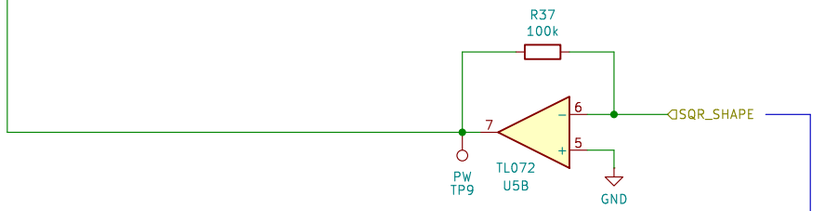
Glitch reduction.
Optional. Make it THT so it can be used if needeed. Tests didn't show much diff.

Use bias to set the center of triangle output to 0V.

Square



Clamping (optional)
Make it THT so it can be used if needed.



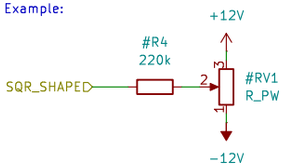
Square pulse width

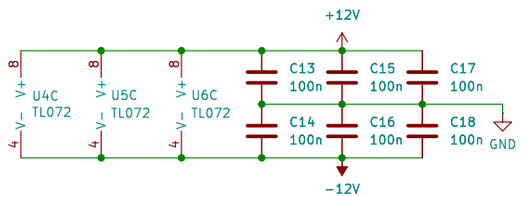
Connect any number of CV inputs through input resistors to set the pulse width with a CV on SQR_SHAPE. Use the following CV values:

0V/GND:	50%
−5.5V:	5%
+5.5V:	95%

Set the input resistors so that the CV mixer's output value is between −/+5.5.

Example:





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