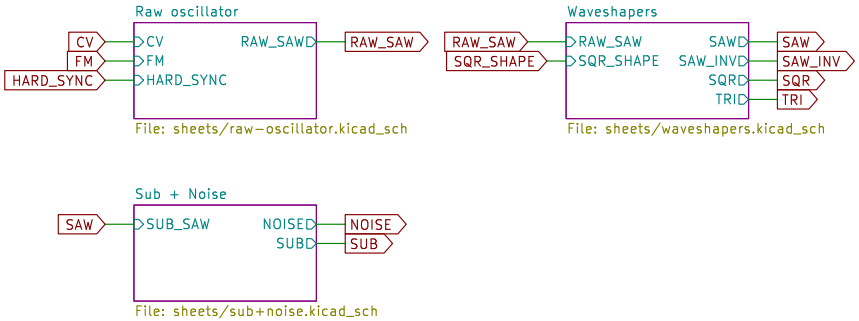
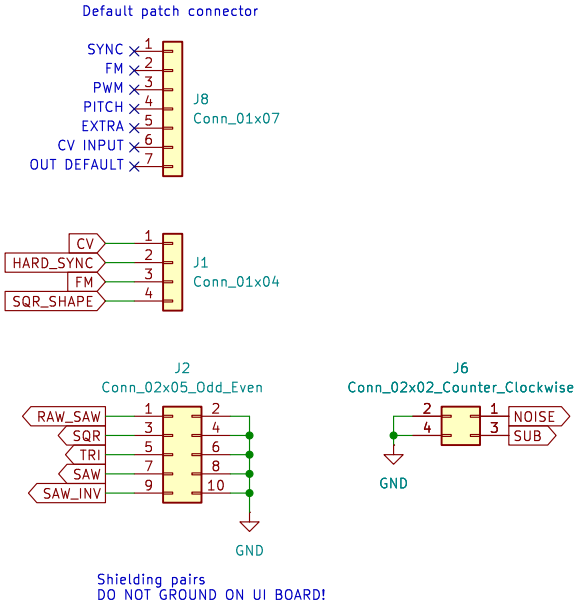
Raw oscillator & wave shaping



Power

I/O



Shmøergh

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Title: Moduleur VCO core

Size: A4	Date: 2025-12-11	**Rev: v1.0**
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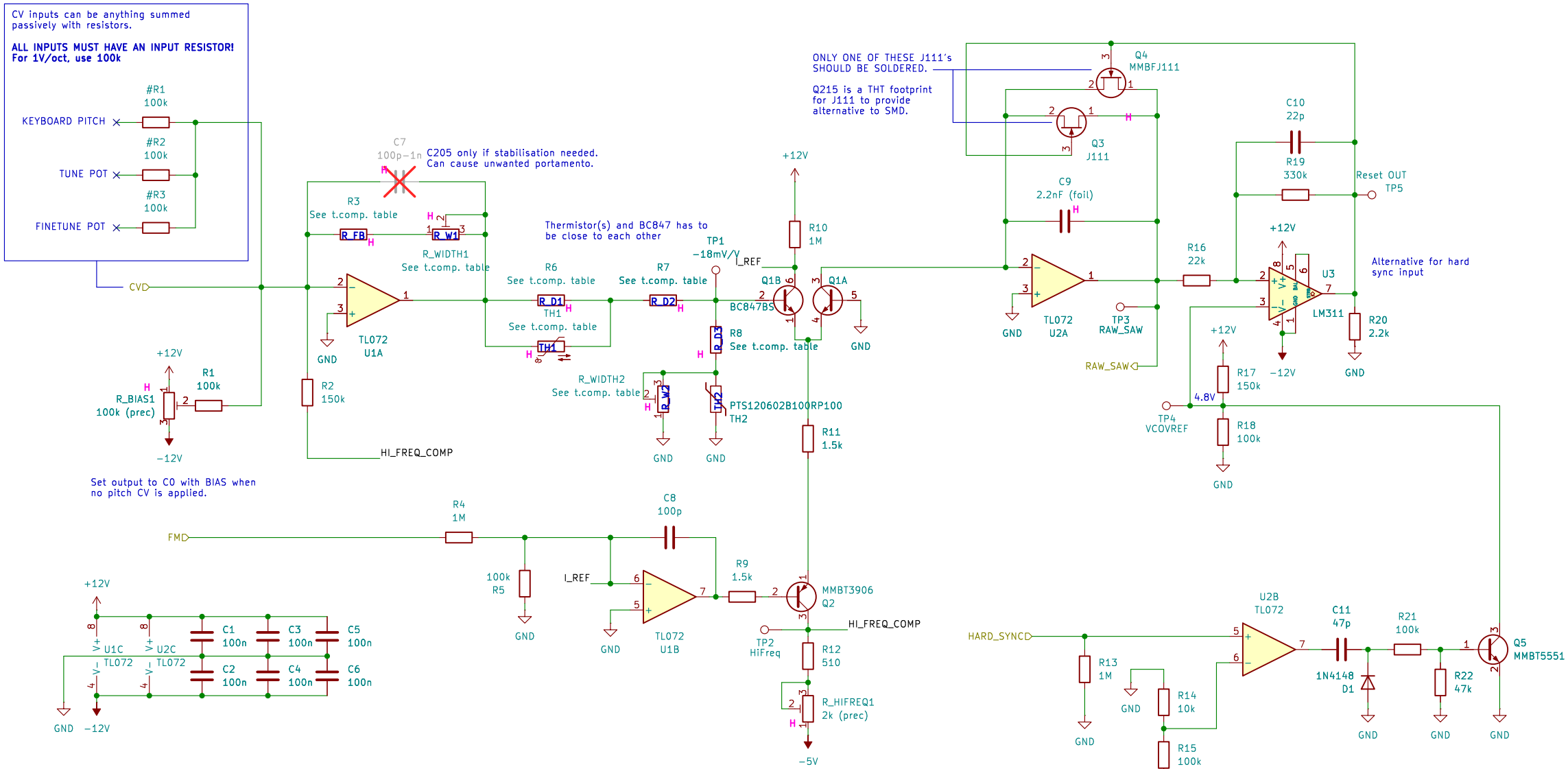

Tuning:
0. Connect a tuner and a keyboard. Play the C1 note.
1. Turn Hi–Freq all the way down so there's no compenstaion:
Play a very high pitch note and start turning the trimpot
so that the pitch is going down. Once it doesn't go lower
then you "turned off" high freq compensation.
2. Use R_BIAS to 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.

The following temperature compensation setups are supported in the schematics.
V1 uses a 1206 SMD component (PTS120602B100RP100). V2 uses a THT NTC component
(NTCLE203E3103FB0). Both works pretty much the same, they're here as a fallback
for potential components shortage.

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

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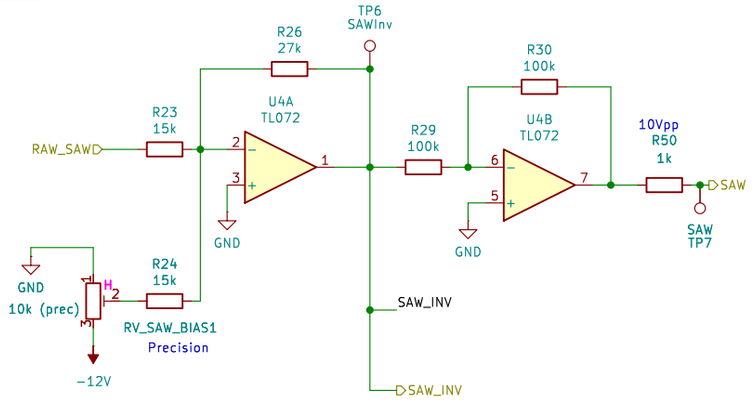
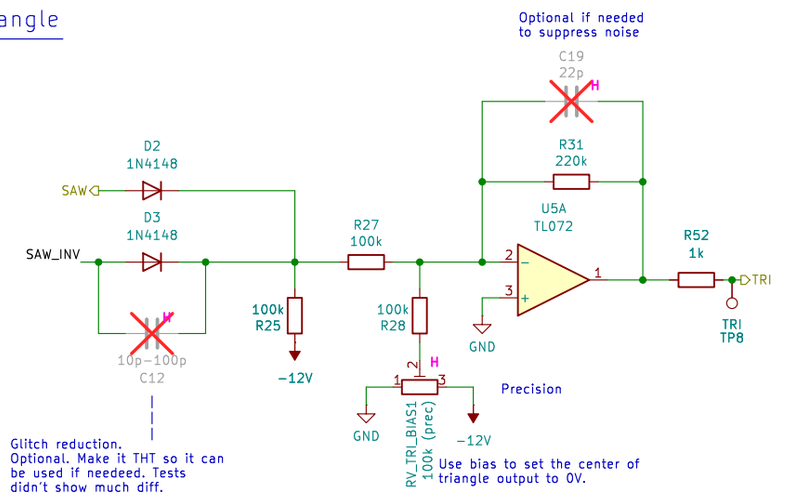
Sawtooth



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

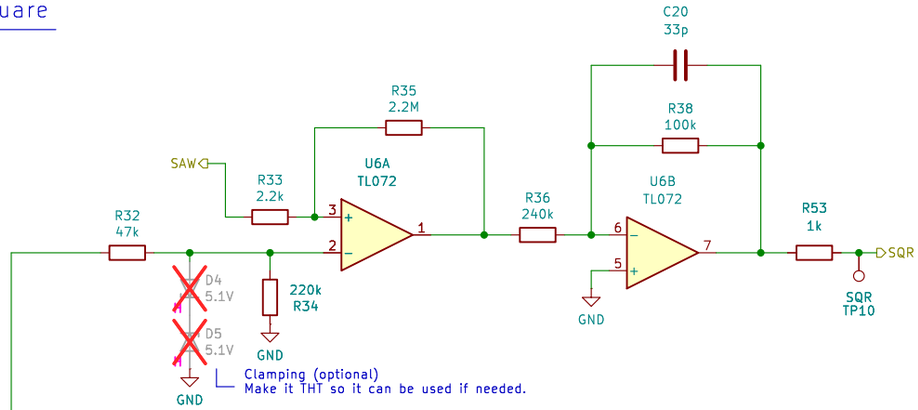
Triangle



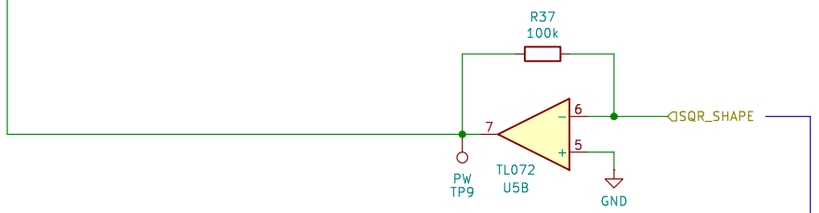
Glitch reduction.
Optional. Make it THT so it can be used if needeed. Tests didn't show much diff.

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

Square



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



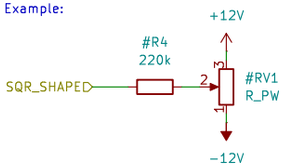
Square pulse width

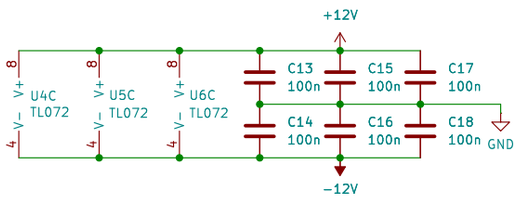
Connect any number of CV inputs through input resistors to set the pulse width with a CV on SQR_SHAPE. Use the following CV values:

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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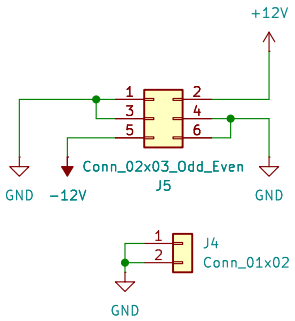
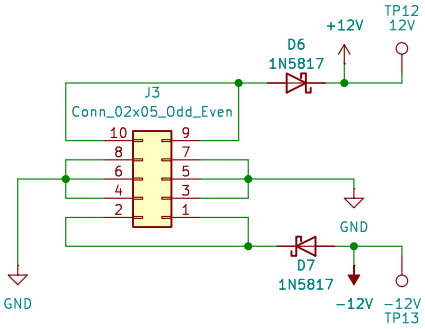
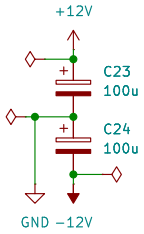
UI power connection

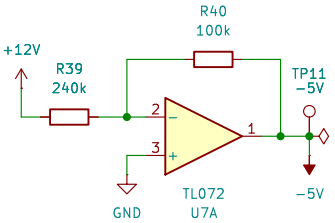


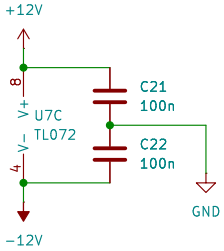
Eurorack PSU connection

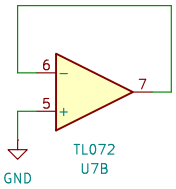




Used for VCO current source







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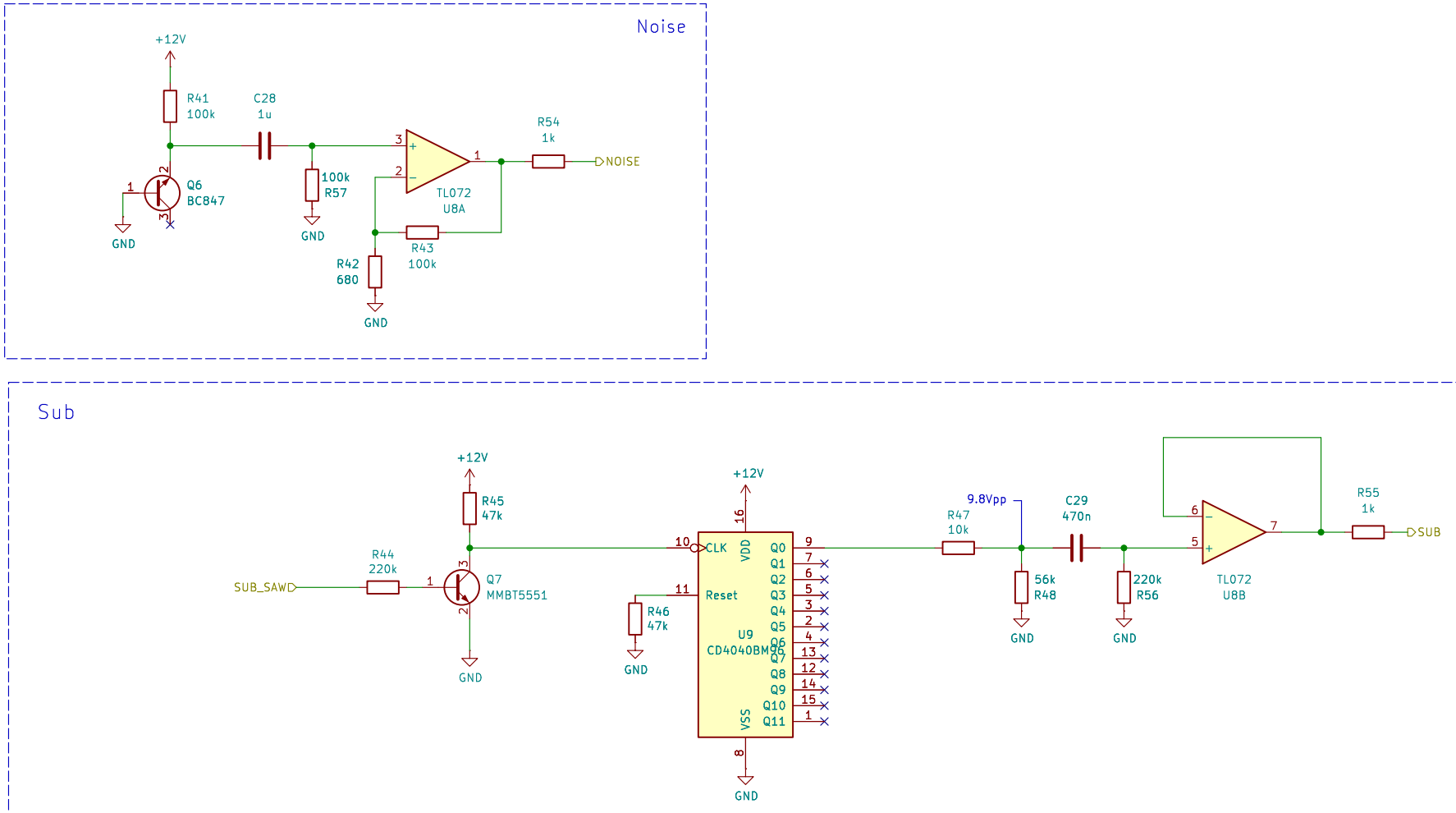
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+12V
R41
100k
C28
1u
Q6
BC847
100k
R57
GND
TL072
U8A
R54
1k
NOISE
R43
100k
R42
680
Sub
+12V
R45
47k
R44
220k
SUB_SAW
Q7
MMBT5551
R46
47k
U9
CD4040BM96
CLK
Reset
VDD
VSS
Q0
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
9.8Vpp
R47
10k
C29
470n
56k
R48
220k
R56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