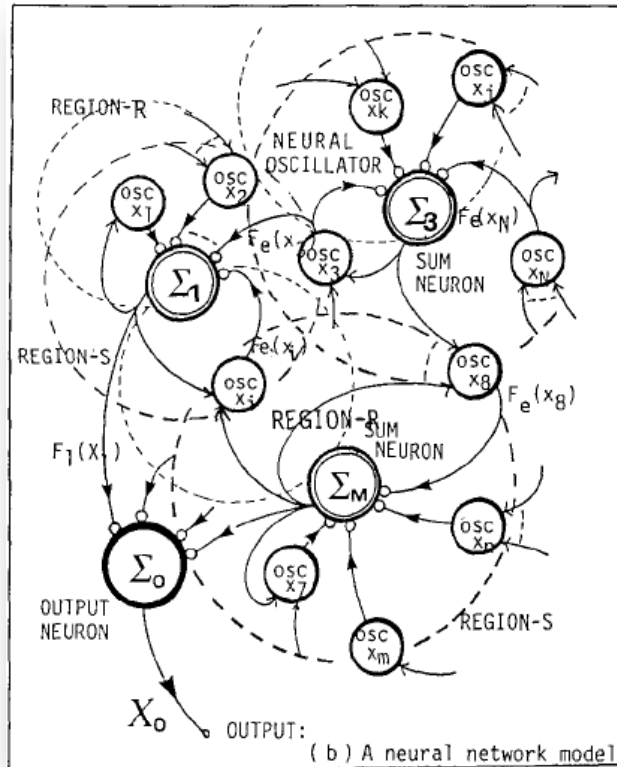


NONLINEAR CIRCUITS

Brain Custard Build Guide & BOM vers 1

Brain Custard was inspired by concepts discussed in a 1990 IEEE Conference Paper titled 'Neural network with interacting oscillators to generate low frequency rhythm' written by S. Endo & Y. Kinouchi.



source: 'Neural network with interacting oscillators to generate low frequency rhythm' IEEE 1990

Particularly this image in the paper gave impetus to the development of a module using multiple interacting chaotic audio rate signals with the view of finding unexpected patterns, beat frequencies and rhythms in the output signals.

In practise, it is mostly noise and lots of it. The noise can be modulated via the inputs and a great variety of tones can be had tweaking the pots as well. I have the best results feeding the outputs to VCFs and phasers, which work nicely to clean up the sounds and allow all sorts of harmonically rich waveforms to be heard.



The chaotic oscillators are similar to those in the Jerkoff chaos module but modified to run at audio rates. This, of course, means the module can be built as a kind of Jerkoff on steroids and be used as a source of ridiculously complex CVs. The PCB is labelled for the audio rate version, details for building the module as a CV generator will be given in the instructions.

Using the module:

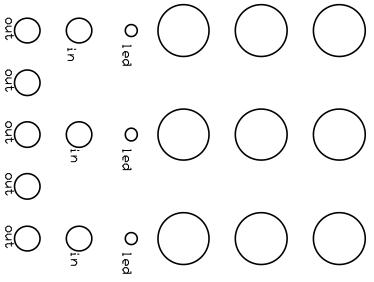
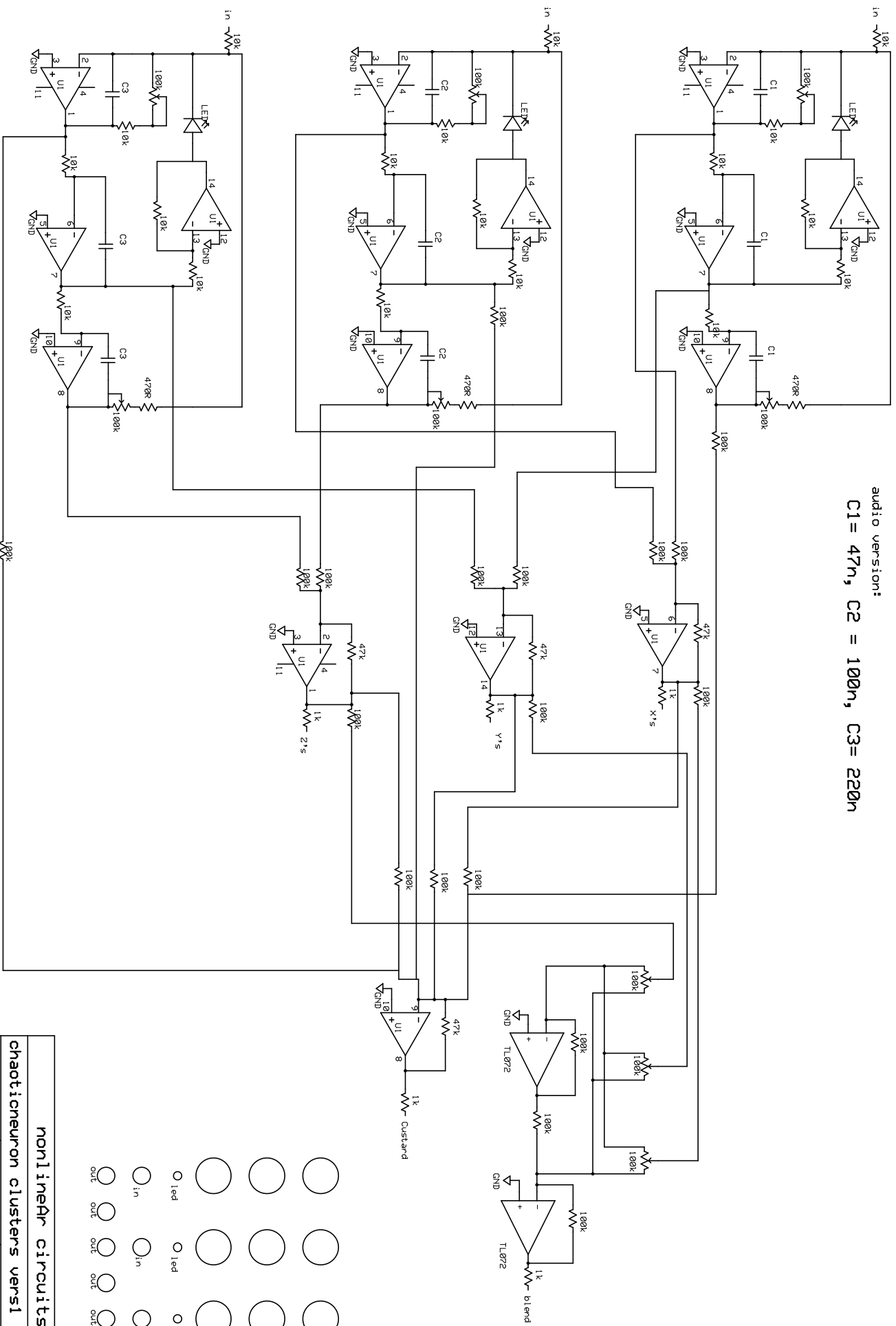
Inputs can be anything; audio, gates, triggers or CV. Depending upon the pot settings, the input signals may do a lot or do little. The X, Y & Z outputs are mixes from the same stages of different oscillators, consider them minor Σ (sum) neurons. Custard is just everything jammed in together, so the main output neuron. Blend is the X, Y & Z outputs mixed together via the Blend pots, these pots have +/-1 gain, meaning when the pot is at 0 the signal is inverted and if the pot is at its mid-point the signal is off.

BOM (get spares, you might drop something)

(...) indicates label on PCB

Component	audio rate version	CV version	notes
100k pot	9	9	Alpha style 
socket	8	8	Kobiconn style 
LED	3	3	3mm if using NLC panel
TL074	4	4	SOIC
TL072	1	1	SOIC
10 pin power connector	1	1	
10uF electro	2	2	2mm lead spacing, rated 25V or higher
10Ω resistor	2	2	thru-hole
47nF (473)	3	0	0805
100nF (104)	6	3	0805
220nF (224)	3	0	0805
1uF	0	9	0805 (see notes on building CV version)
1k (1)	8	8	0805
10k	18	12	0805
47k	4	10	0805 (see notes on building CV version)
100k (c)	18	18	0805

audio version:
 C1 = 47n, C2 = 100n, C3 = 220n



nonlinear circuits

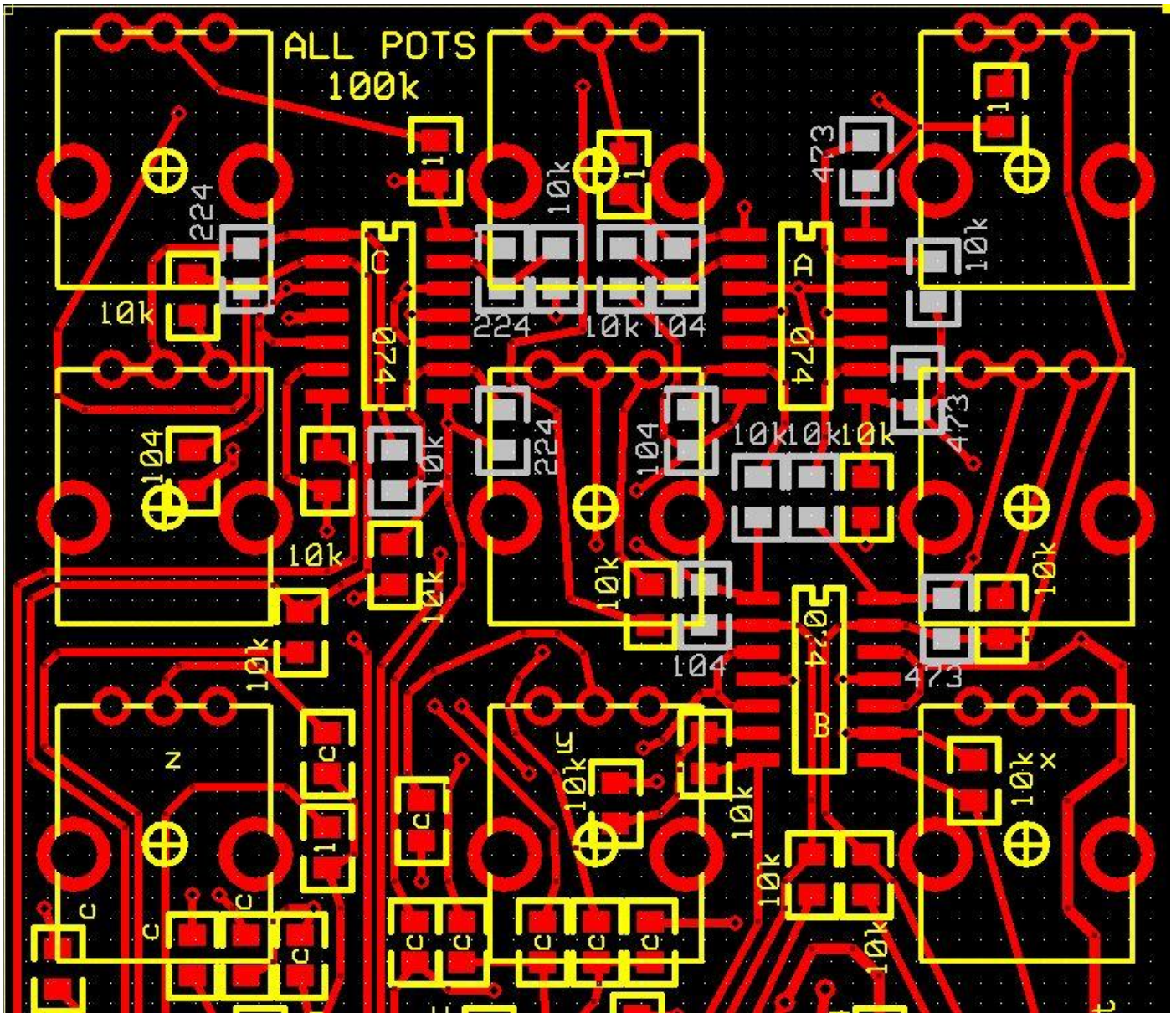
chaoticneuron clusters vers1

CV version:

Replace the 47nF (473), three of the 100nF (104) (see pic) and the 220nF (224) capacitors with 1uF capacitors.

Six of the 10k resistors need to be replaced with 47k resistors, see pic.

All the components that need to be changed from what is printed on the PCB are marked in white:

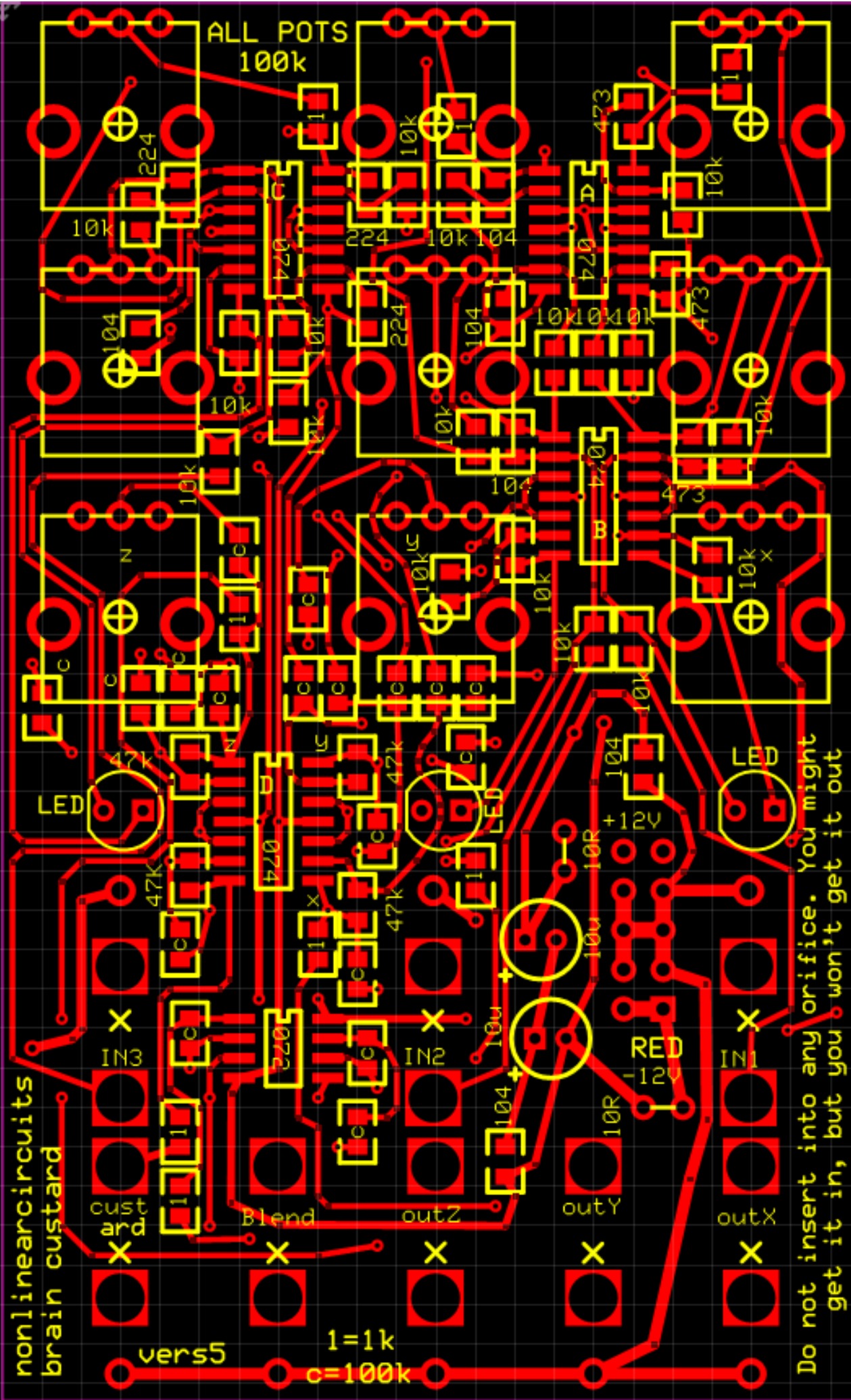


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1=1k

c=100k



Do not insert into any orifice. You might get it in, but you won't get it out