ARPLIFIER - Build Document 1.0

This is a clone of the 4019 VCA used in ARP 2600.
Other than some part substitutes and a new trace layout adjusted mainly for eurorack I have stuck with keeping it as close to the original schems as possible. This means it will have its quirks, just as the original does.

That said, 2x 470nF capacitors have been added to give an option for AC filtering on the inputs. “+” marks the Normal input, and “–“ marks the Inverted.

Also, the original design couldn't really follow the expected results from the documented trimming-procedure, so if you want to follow the trimming by the book I suggest these changes:

- Input resistors R189/R190 changed from 100K (as by original) to something around 50-70K, depending on the strength of your signal coming in.
  This will affect the EXP/LIN Trimmers to be set to their expected values.

On a last note, its a good idea to match your BJT's to avoid the “thump” as much as possible. The main ones to take care of is: Q6/Q7, Q9/Q10, Q12/Q13.

- Rickard Steffensen

BOM

Resistors		Capacitors		Semiconductors		Pots & Jacks		Etc.	
Part	*Pcs*	*Part*	*Pcs*	*Part*	*Pcs*	*Part*	*Pcs*	*Part*	*Pcs*
220	2	10pF	1	2N3904	5	100K Aud 9MM	2	5-pin Single Row Male Header	2
470	1	27pF	1	2N3906	8	100K Lin 9MM	3	5-pin Single Row Female Header	2
1K	4	100pF	2	LM301	1	Jacks	5	10-pin Power Header	1
3K3	1	220pF	1	1N4148	10				
4K7	3	100nF*	2						
18K	1	470nF**	2						
33K	1	10uF	2						
47K	1								
54K9	1								
56K	2								
100K	4								
150K	1								
180K	1								
182K	1								
470K	1								
680K	1								
1M5	1								
10K (TRIM)	2								
100K (TRIM)	2								

*ceramic **AC capacitors

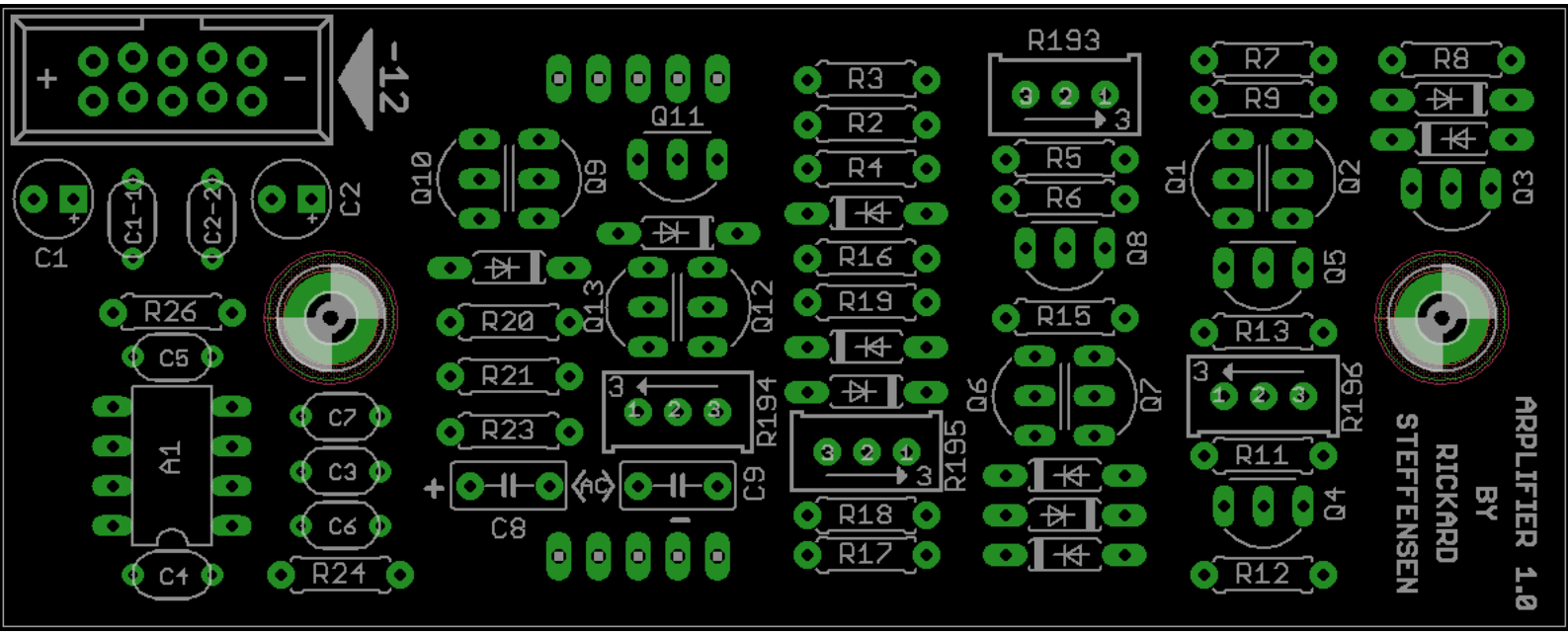
TRIMMING

Its important to leave the VCA powered up for at least 15 min before trimming.

R193 Control Rejection	1. Set all controls fully OFF/CCW. 2. Raise the Gain potentiometer fully CW. 3. Adjust R193 for minimum output offset. (within +/-5mV from 0V is fine)
R196 Linear Gain	1. Monitor the VCA output with a oscilloscope. 2. Patch a VCO signal to the Normal input. 3. Patch you control signal to the Lin CV input. (ADSR with Sustain at fully CW for example) 4. Set all controls fully OFF/CCW. 5. Raise Normal and Linear CV potentiometers fully CW. 6. Adjust R196 to match the voltage of the VCO signal before and after the VCA. (as close as you can anyway)
R195 Exp Gain	1. Repeat as above but with Exp CV input/potentiometer, or set it to fully CW.
R194 High Frequency Reject	No adjustment necessary according to ARP.

LAYOUTS

Core-PCB:



Control-PCB: