

OSCILLARP - Build Document 1.2

This is a clone of the VCO-2 (4027-1) Oscillator used in ARP 2600.

Some substitutes needed to be done obviously, but other than that 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.

Even though the focus here was the VCO-2, I added the sync-input section from the Odyssey. Now, the Odyssey gets its sync-signal routed internally from the core of the "Master-VCO". This would mean only this particular sync-signal could be used, and even while it sounds amazing I decided to open up the possibilities to use other sync-signals to have even more fun! (Also, I could only fit one more jack on the panel as 2 x FM inputs felt more important for a more in-the-line 2600-VCO feeling)

This means the sync wont be identical to the Odyssey, but by using a Pulse with its PW fully CCW as a sync-signal you can get pretty darn close.

Some might find it a tad more "full" in sound.

One can get pretty experimental and/or nice results playing with different sync-signals.

For this to work, leave the middle leg (S) out from Q10. Do not solder it in.

Cut it off, or just make sure it doesn't touch anything.

The grounded pad is there in case you want to mod this thing to original specs.

Another option would be to solder the middle leg (S) in. But then you would need to offset or amp the incoming sync-signal for it to work.

It's a good idea to not only match the BJT's, but the JFET's as well. Especially for the Sine shaper (Q3-2 & Q3-3), the others are not as important.

ARP used a monolithic dual JFET (2N3954) for the Sine shaper, but as thats pretty rare and costly the matched JFET's works nicely as a substitute.

If you use parts from the same tape, chances are you don't need any matching however. (I haven't as of yet)

Possible replacements for the 2N5459's would be:

2N5457, 2N5458, 2N5485 or BF245A (pinout reversed).

Also, it's a good idea to install the spacers at the same time as the 8-pin headers. Make sure the PCB's line up as good as possible and tighten the spacers so it all sits firmly.

A similar setup is recommended when attaching the PCB to the Panel. Tighten the top potentiometer nut once you have made sure the PCB is lined up as good as possible with the panel. Then a lower/mid potentiometer nut for the final stability. There are a tiny bit of wiggleroom if you dont get it right the first time around.

→ Seems I read the old schematic wrong, and R118 should be 3K9 instead of 34K as printed on the Core-PCB. This change will make the Pulse waveform work and sound a bit more as expected.

BOM

Resistors		Capacitors		Transistors		IC & Diodes		Pots & Jacks		Etc.	
Part	Pcs	Part	Pcs	Part	Pcs	Part	Pcs	Part	Pcs	Part	Pcs
220ohm	1	5pF	1	2N3904	2	CA3046	1	100K Aud	2	8-pin Single Row Female Header	2
1K	7	30pF*	3	2N3906	2	LM301	4	100K Lin	4		
1.37K	1	100pF	2	2N4125	1	1N4148	1	Jacks	9		
1.5K	1	680pF	1	2N5459	4					8-pin Single Row Male Header	2
1.65K	1	100nF	2	2N5457**	1						
2.2K	3	10nF	2							10-pin Power Header	1
3.9K	2	10uF	2								
8.87K	1										
10K	1										
12K	2										
15K	4										
22K	1										
30.1K	4										
33K	2										
33.2K	1										
39K	1										
45.3K	1										
47K	1										
61.9K	2										
68K	2										
84.5K	1										
100K	4										
120K	1										
121K	2										
150K	3										
180K	1										
191K	1										
475K	1										
3.3M	2										
1.87K (TC)	1										
10K (Trim)	2										
25K (Trim)	1										
100K (Trim)	3										

*27pF works fine.

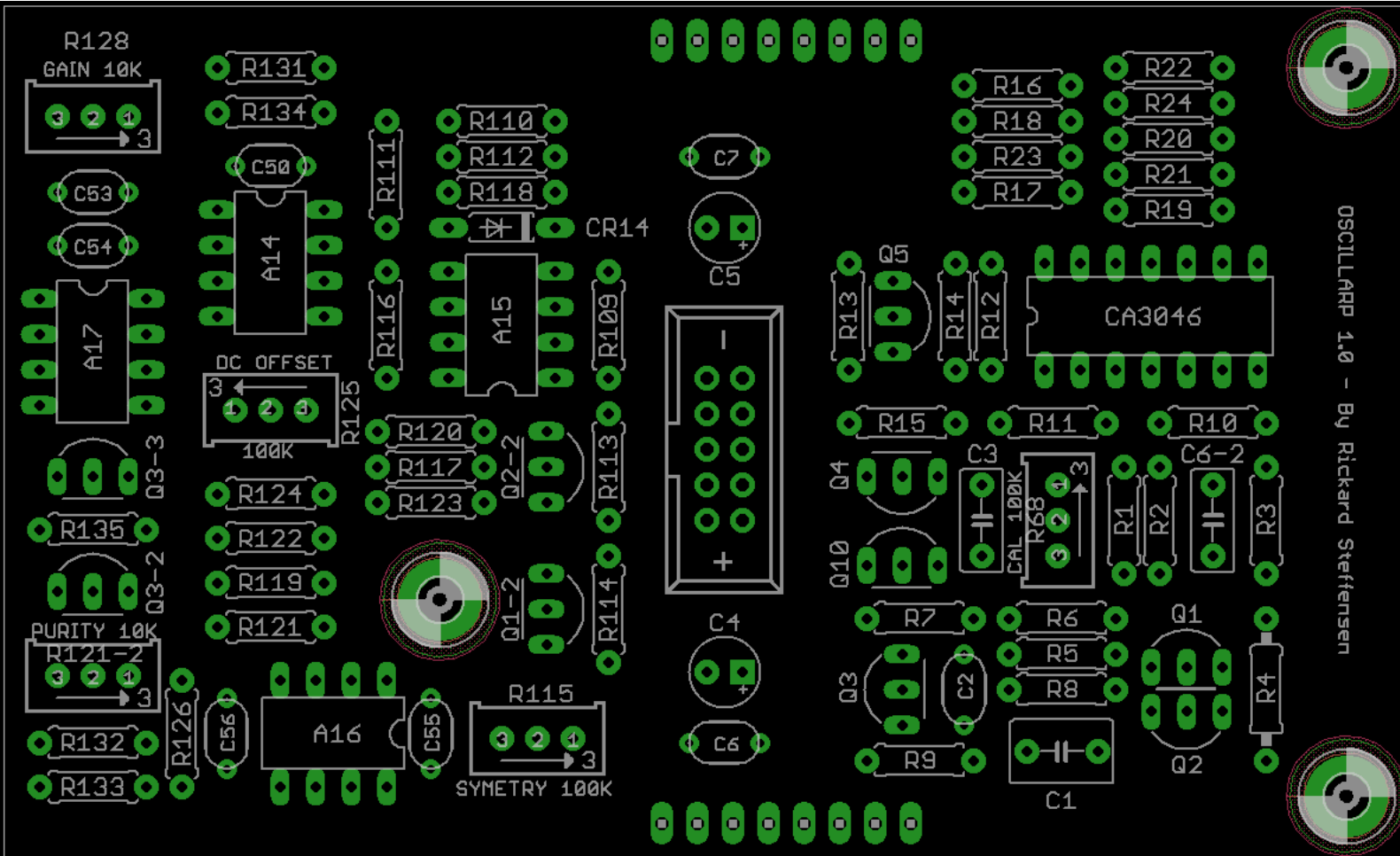
** Q10, Sync FET. 2N5459 works as well.

TRIMMING

Frequency Calibration	<ol style="list-style-type: none">1. Monitor the VCO output with a oscilloscope or a frequency counter.2. All FM potentiometers set to zero.3. Make sure nothing is plugged in to CV.4. Put FREQ pot to max – fully CW.5. Put FINE pot to a middle position.6. Adjust CAL R68 for 8.33KHz. (or as close as you can get)
Triangle Adjust	<ol style="list-style-type: none">1. Adjust SYMETRY R115 for best triangle waveform.2. Adjust DC OFFSET R125 so the peaks of the triangle are not flat at either end. (setting DC to 0 volts shouldn't cause any problems)
Sine Adjust	<ol style="list-style-type: none">1. Adjust PURITY R121-2 for best sine waveform.2. Adjust GAIN R128 for a preferred level to match the other waveforms.
1V/OCT	<ol style="list-style-type: none">1. Connect keyboard to CV input and depress low C. (0 volts)2. Adjust initial FREQ pot and FINE pot for 200Hz.3. Depress C three octaves higher and adjust V/OCT R78 for 1600Hz. (3 volts)4. Repeat steps 1-3 until low C remains at 200Hz, and C3 remains at 1600Hz.

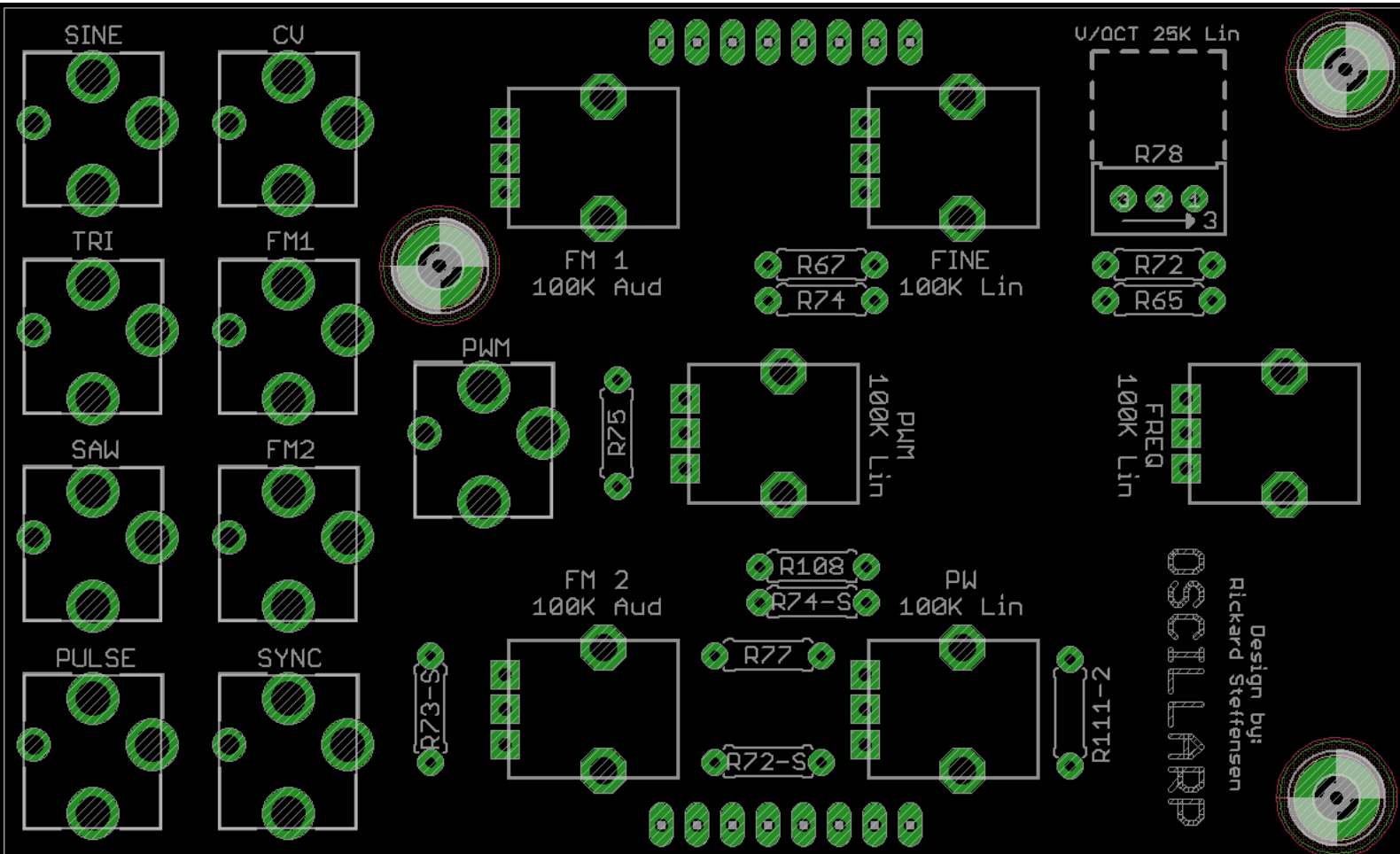
LAYOUTS

Core-PCB:



OSCILLARP 1.0 - By Rickard Steffensen

Control-PCB:



Design by:
Rickard Steffensen
OSCILLARP

*9mm pots are used for the Control-PCB