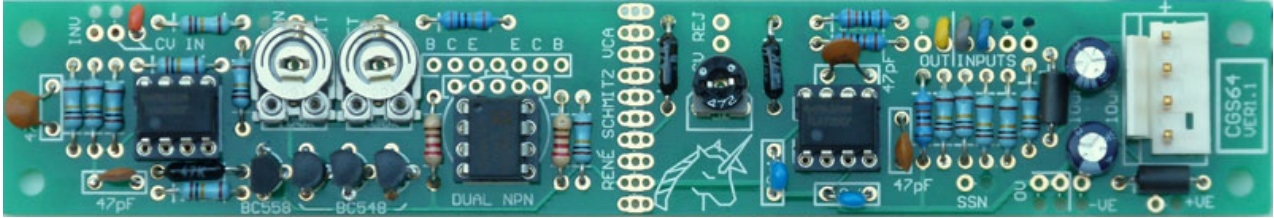
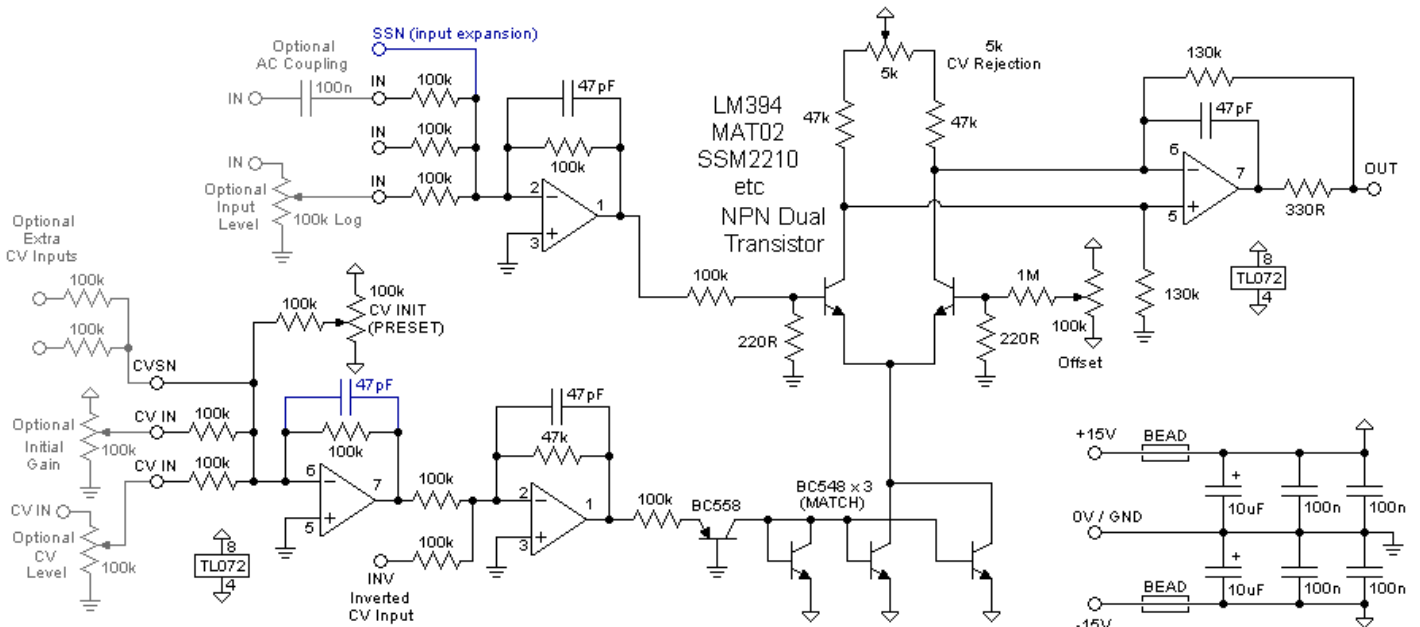


VCA

for music synthesizers.



This VCA (Voltage Controlled Amplifier) is suitable for both audio and control voltage modulation. Based on VCA3+ by [René Schmitz](#). Used with permission.

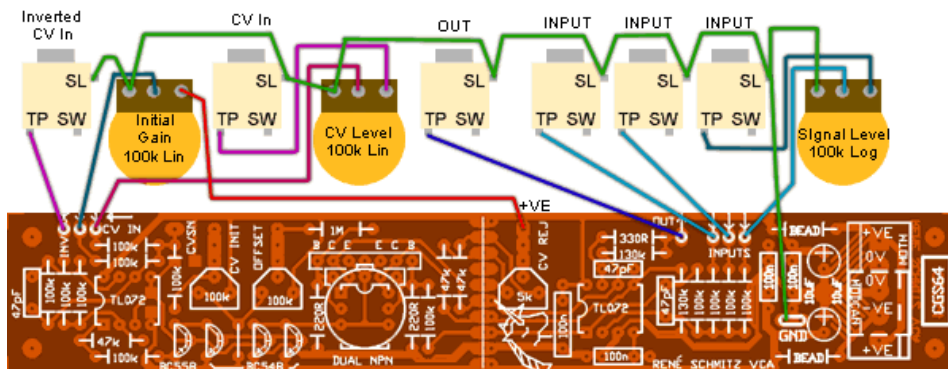


CGS64 VCA based on VCA3+ by René Schmitz
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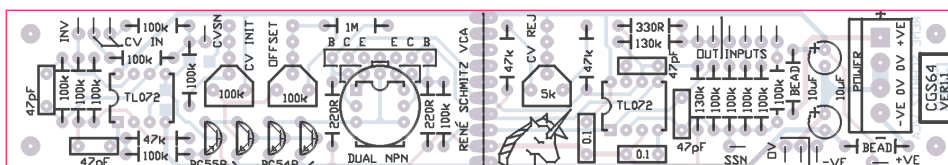
10V pp signals
0-5V Control Voltage

Changes for VER1.1
shown in blue

Construction



The component overlay and basic wiring for the single sided version of the VCA PCB. The pots are viewed from the rear. Although the Ver 1.1 PCB does differ from that shown above, the wiring is essentially the same with the exception that a +VE pad is now provided for the initial gain pot.



The component overlay for the VER1.1 PCB. [Click here for an enlarged, printable version.](#) Print at 300dpi.

The CV sensitivity is controlled by the resistor between pins 1 and 2 of the CV processing TL072. The specified 47k resistor reduces sensitivity. In order to get unity gain with around a 5V signal, this resistor needs to be increased to around 200k to 220k. The 100k resistor used as the input for the optional initial gain will need to be increased to 330k to 390k to compensate. Alternatively a 200k to 220k resistor could be placed in series with the CW end of the pot.

Before you start assembly, check the board for etching faults. Look for any shorts between tracks, or open circuits due to over etching. Take this opportunity to sand the edges of the board if needed, removing any splinters or rough edges. (With the boards supplied by me, the edges are already milled, and etching faults are very rare.)

When you are happy with the printed circuit board, construction can proceed as normal, starting with the resistors first, followed by the IC socket if used, then moving onto the taller components.

Take particular care with the orientation of the polarized components such as electrolytics, diodes, transistors and ICs.

When inserting ICs into sockets, take care not to accidentally bend any of the pins under the chip. Also, make sure the notch on the chip is aligned with the notch marked on the PCB overlay.

Match the BC548 transistors for the same voltage drop across base emitter junction.

On the rear of the PCB are four small square pads, near the TL072 at one end of the PCB. These are for two 100n 1206 (or even 805) SMD capacitors. Put a little solder on one pad. Move the capacitor into position, and re-heat the solder. The capacitor will now be held in place. Solder the opposite end, then go back and tidy up the first joint if needed.

The board is designed to take a variety of dual transistors, including 2SC3381, 2SC1583, MAT02, LM394, SSM2210 etc.

Set Up

Setting up involves adjusting three trimmers.

Offset is used to set the DC offset of the output to zero. CV Reject is used to null out the effect of the control voltage on the output.

Set initial gain to 0V (fully CCW).

Connect a varying waveform of low frequency (triangle wave from an LFO is ideal) into the CV input of the VCA, and turn the associated CV level pot to maximum. Connect the output of the VCA to a control voltage input of a VCO. Monitor the output of the VCO. You should now be able to adjust these trimmers so that there is no modulation present on the output, and the output is at zero volts. Note that these trimmers interact to some extent, so you will need to alternately adjust them until the best result is obtained. On the prototype, CV bleed through was totally eliminated.

CV Init is used to set the VCA to zero gain at 0 volts CV input. Feed an audio signal into an input, and monitor the output. With no CV at any of the inputs, and the optional external Initial Gain pot, if used, set to its zero position, adjust this until no signal is heard.

Notes:

- **PCB info:** 1" x 6" with four 3mm mounting holes 0.15" in from the edges.
- The board is designed so it may be cut in half and jumpered with a 0.1" header or wire links, so it can be fit behind smaller panels.
- Please [email me](#) if you find any errors.

Parts list

This is a guide only. Parts needed will vary with individual constructor's needs.

If anyone is interested in buying these boards, please check the [PCBs for Sale](#) page to see if I have any in stock.

Can't find the parts? See the [parts FAQ](#) to see if I've already answered the question. Also see the [CGS Synth discussion group](#).

Part	Quantity
Capacitors	
47pF	3 (4 in VER1.1)
100nF/0.1 mono. ceramic	4 (2 in VER1.1)
100nF 1206 SMD/SMT	2 (VER1.1 only)
10uF 25V	2
Resistors	
220R	2
330R	1
47k	3
100k	13
130k	2
1M	1
5k trimmer	1
100k trimmer	2

Semi's	
Dual Transistor (see text)	1
BC548	3
BC558	1
TL072	2
Misc.	
Ferrite Bead (or 10R resistor)	2
0.156 4 pin connector	1
CGS64 PCB	1

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