

BMC055. Sallen-Key Voltage Controlled Filter

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If you have any questions, or need help trouble shooting, please e-mail
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I What The Knobs And Jacks Do

II Schematic

III Construction

A.Parts List

B.The PCB

C.Tweaks/Notes for non-Eurorack builds

D.Photos

III. Construction

A. Parts List

Semiconductors

Name	Quantity	Notes
TL072	1	
LM13700	1	Or 13600
1N4148	6	Or other small switching diode
2N3906	2	

All resistor values are listed for +/-12V builds, value changes for 15V builds are listed in section C

Resistors

Name/Value	Quantity	Notes
10 ohm	2	All resistors 1/4w metal Film for all resistors unless otherwise noted
470 ohm	4	
1K ohm	3	
1.8K ohm	2	
2.2K ohm	3	
3.3K	1	
10K	1	
33K	1	
56K	1	
82K	1	
100K ohm	6	
B100Kohm pot	3	16mm solder lugs linear taper, like these .

Capacitors

Name/Value	Quantity	Notes
.001uf	3	Polyester Film Box
.01uf	4	Ceramic disc. Value not critical
10uf	3	Electrolytic, at least 16V rating.

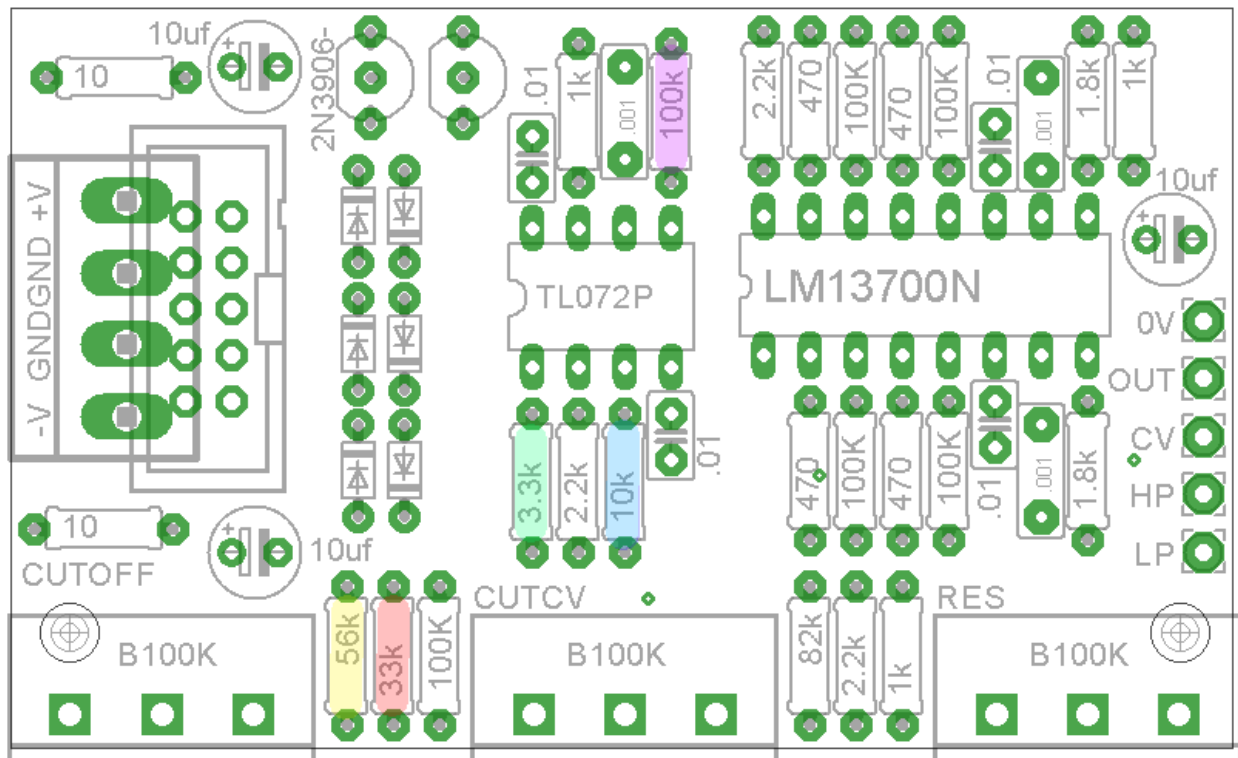
Other

Name/Value	Quantity	Notes
Power connector	1	Eurorack or MOTM
8 pin DIP socket	1	

16 pin DIP socket	1	
Mono jack	3	Whatever standard input/output jack you use in your synth system. Panel mounted, solder lugs.
Switching Jack	1	For HP in, can be replaced with a DPDT toggle for banana jack systems, see Section C
Knobs	3	

B. The PCB

The PCB is 67mm x 41mm. The mounting holes are spaced 61mm apart and the pots are spaced 25.4mm (1") apart. Below is an image of the PCB. The color coding is referenced in the next section.



C. Tweaks/Notes for non-eurorack builds

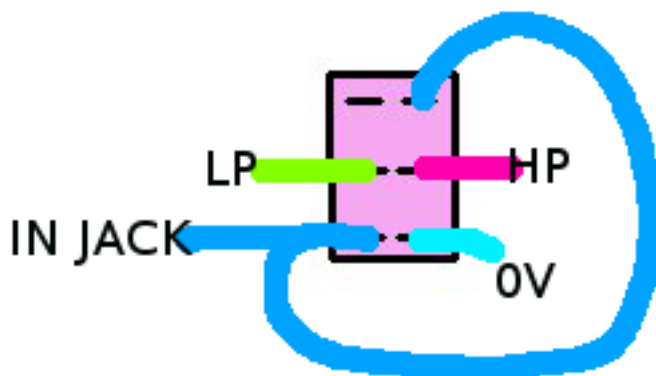
Several resistors are highlighted that a builder may want to change the value of after building to tweak their module. Usually going up/down a standard value will be all that's required.

- The Yellow 56K resistor controls the lowest cutoff frequency for the cutoff knob. Lowering it's value will lower the lowest cutoff frequency. **For 15V systems, try 68K.**
- The Red 33K resistor controls the highest cutoff frequency for the cutoff knob. Lowering it's value will raise the highest cutoff frequency. **For 15V systems, try 47K.**
- The Blue 10K resistor is in series with the diodes in the resonance amplifier's feedback path. When self-oscillating it sets the amplitude of the sine-wave. If your module is getting obnoxiously loud when the resonance is turned up, lowering the value of this resistor should even the volume, or if you barely hear any resonance, try raising the value.
- The Green 3.3K resistor runs parallel to the 10K/diodes in the resonance amplifier's feedback path. If you're getting self-oscillation very quickly as you turn up the resonance knob, lower the value of this resistor.

-The Purple 100K resistor biases a transistor in the voltage-to-current converter. You shouldn't need to tweak it for 12V builds. For 15V systems, try 120K.

As of October 6th, 2018 this build is untested on a +/-15V system. The values in red listed above are estimates. If you tweak your 15V build more and find values you like better, please let me know Michael@Bartonmusicalcircuits.com so I can update this document with tested values.

If building with banana jacks or another system where switching jacks can't be used, you can use a single input jack and a DPDT switch to select whether the filter will act as low-pass or high-pass. The diagram on the right shows how the DPDT should be wired, so that the HP wirepad is connected to ground in LP mode.



D.Wiring/Photos

The PCB has five wirepads, they should be connected as follows:

- 1.LP → Tip of Low-pass input jack
- 2.HP → Tip of High-pass input jack
- 3.CV → Tip of CV input jack
- 4.OUT → Tip of output jack
- 5.0V → Switch of High-pass input jack AND sleeve of any jack. If using a non-conductive panel or jacks with sleeves that are isolated from the panel, you should also connect the sleeves of all jacks together.

On the next page are a pair of photos showing a completed build.

