

## Low Pass Gate

for music synthesizers.

This module is a variation on the Classic Buchla Low Pass Gate module developed by Peter Grenader and released here as his gift to the Serge DIY community.

From [Electronic Music Wiki](#):

A lowpass gate is essentially a low pass VCF configured to behave like a VCA. The lowpass gate accepts an audio input and a control signal, in the manner of a VCA. When there is no control signal present, the filter's cutoff frequency is in the subsonic range, well below the audio frequencies; therefore, no audio passes the filter. Applying a control voltage causes the cutoff frequency to rise significantly, into the upper end of the audio range, so that most of the audio at the input now passes. If the output of an envelope generator is presented to the control input, the lowpass gate will shape the note envelope as a VCA would, but with some characteristic differences.

The concept of the lowpass gate originated with the Buchla 200 series modular synthesizer series, which offered a lowpass gate as a module in the series. The Buchla design used a vactrol to process the control voltage input; the vactrol had certain non-linearities which made the lowpass gate a good module for imitating some tuned percussion sounds. By feeding in short bursts of noise, or just impulse spikes, the lowpass gate could be made to produce sounds that resembled hand drums, congas, steel drums, or marimba. The original Buchla module is highly sought after and has inspired a number of imitators over the years.

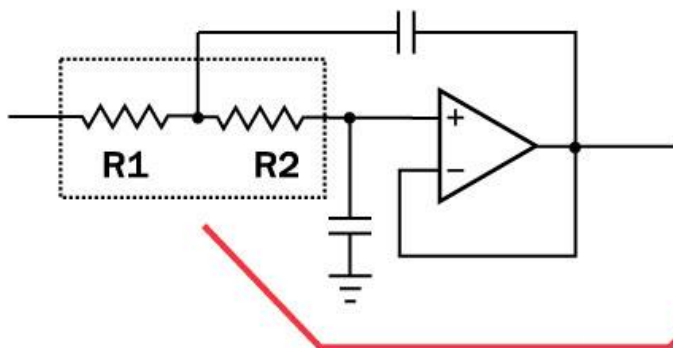
From Peter Grenader:

By design, the Low Pass Gate is a Sallen Key Filter. A Sallen Key is a two pole filter topology. It is sometimes called VCVS, or Voltage Controlled Voltage Source. The Sallen Key topology is often seen in a unity gain filter, although the addition of gain resistors is an obvious enhancement. The designer is cautioned, however, that changing the gain also changes other filter characteristics. Like the other single opamp topologies, changing gain will also affect frequency and filter type (Butterworth, Chebyshev, and Bessel).

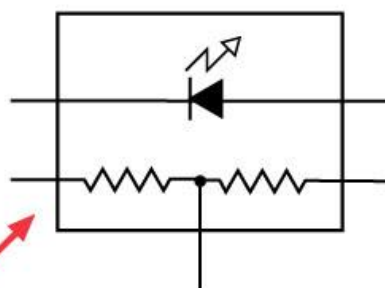
The Sallen Key topology is suited to operation from a single supply. Current feedback amplifiers can be used, with the restriction that the connection from the op amp output to inverting input must be the recommended feedback resistor value. This is true whether or not this resistor is part of a gain stage. The Sallen Key topology cannot be used with fully differential amplifiers.

Variable center frequency is obtained by changing the value of two resistors simultaneously - R1 and R2 in standard Sallen Key filter circuit applications. A quick look at the configuration of the VTL5C3/2 vactrol gives a clear analog to this and why it is ideally suited for this application.

### SALLEN KEY FILTER TOPOGRAPHY:

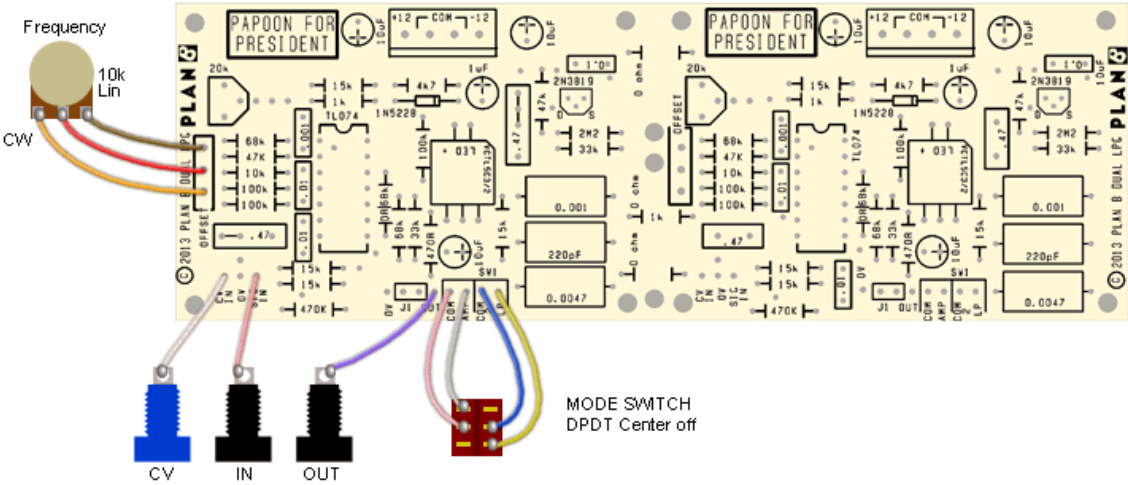


### VTL5C3/2 VACTROL:









Example wiring for the Low Pass Gate. The wiring for both parts is identical.

Set Up

Each unit has a trimmer that controls how much gain there is in the CV system. Adust them so you get adequate sweep with your system's CV levels.

Notes:

- 330R refers to 330 ohms. 100n = 0.1 uF.
- The module will work on +/-12 volts or +/-15 volts.
- **PCB info:** 6" x 2" with 3mm mounting holes 0.15" in from the edges.
- 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
<b>Capacitors</b>	
220pF styro	2
1n (0.001) styro	2
4n7 (0.0047) styro	2
1n (0.001)	2
10n (0.01)	4
100n (0.1)	2
470n (0.47)	4
1uF 25V	2
10uF 25V	6
<b>Resistors (1% metal film)</b>	
470R	2
1k	4
4k7	2
10k	2
15k	6
33k	4
47k	4
68k	4
100k	6
470k	2
2M2	2
20k trimmer	2
<b>Semi's</b>	
2N3819	2
TL074	2
VTL5C3/2 Vactrol	2
1N5228	2
<b>Misc.</b>	
Jacks	as needed
10k Lin pot	2
DPDT Ctr off switch	2
2 pin 0.1" header and jumper	2
0.156 4 pin connector	1
<a href="#">LPG PCB</a>	1

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