VONGON
paragraphs

drive

output level

9V ⊙ DC

cv   midi

OUT   IN

rise
1 ms   10 s

fall
1 ms   10 s

amount
0   10

cutoff
20 hz   20 khz

multiplier
x1   x0.01

lin
exp

cycle
hold
once

res
0   10

BYPASS

paragraphs
resonant low pass filter
with waveform generator

TRIG

by VONGON

User Manual

Version 1.0

Contents

Thank you for supporting Vongon! We are a small operation based in Oakland, California. All products are hand assembled in our Oakland studio. We catalogue audio and video demos of this product on our website (www.vongon.com) and our instagram (@vongonelectronics). If you have questions, suggestions, or just want to say "hi", please email us at ryan@vongon.com

Thank you!
- Ryan

Overview

Paragraphs is a hi-fidelity circuit that applies an alternate structure to your sound. Through a smoothly evolving gradient of your instruments timbre, you will find new ways to re-animate your guitar, synthesizer, or drum machine.

Plainly, Paragraphs is an analog four-pole resonant low pass filter with an attack, decay (AD) envelope generator designed with focus on simplicity and flexibility.

Low Pass Filter
The heart of the filter circuit is the AS3320 analog chip — a modern replica of the same component used in analog classics like the Sequential Prophet 5, Pro-One mono-synth, Elka Synthex, and the LinnDrum. Cutoff spans the full audio spectrum and resonance starts to self-oscillate at about seventy percent.

Modulation
The envelope generator offers modulations in an uncommonly wide range of frequencies — starting as low as 0.05 *hz* for slowly evolving 20 second long cycles, and reaching up to (and past) the audio threshold at 300 *hz* for a wave shaping effect similar to sounds found on west coast style synthesizers ("think Buchla").

Flexible Gain Stages
Paragraphs accepts instrument and line level signals. Dedicated controls for input (drive) and output level make it easy to move between a crystal clear clean tone and and a clipping fuzz. A multi-color LED provides a visual representation of the signal level. Red indicates clipping. Orange flashes indicate the start of overload. Green indicates the presence of signal at or below the nominal level.

CV and MIDI
Inputs for Control Voltage (CV) and midi are available to remotely trigger the envelope generator. This enables your Paragraphs to stay in rhythmic synchronization with external systems like midi sequencers, euroracks, and digital audio workstations.

Front Panel
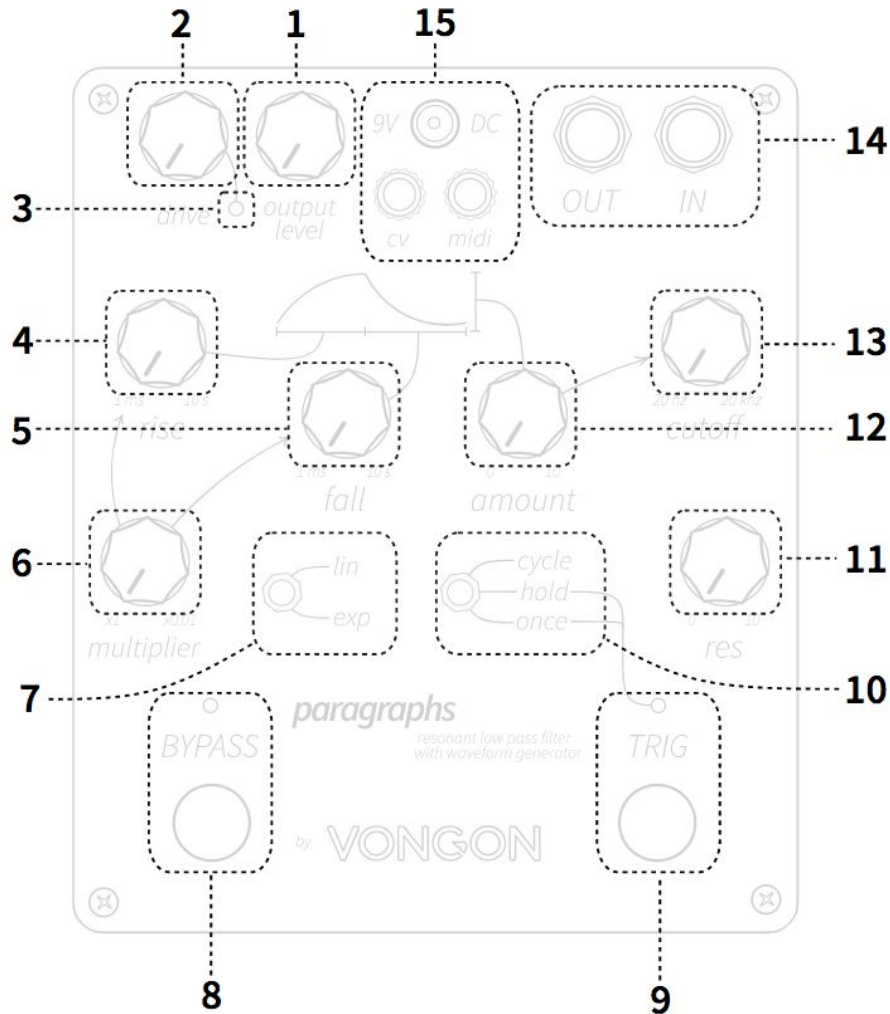
1) *Output Level -* Output gain.
2) *Drive -* Input gain.
3) *Drive LED* - Signal level LED, Three colors to indicate internal signal level (red, orange, green).
4) *Rise -* Length of time it takes for the envelope generator to rise to maximum level.
5) *Fall -* Length of time it takes for the envelope generator to fall to minimum level.

Front Panel (continued)

6) Multiplier - A constant value multiplied by rise and fall time. This is effectively a "rate" knob that adjusts the overall speed of the envelope generator.

7) Lin, Exp - Lin (linear) and exp (exponential). Toggle the shape of the envelope generator to rise and fall linearly or exponentially.

8) BYPASS - True bypass latching foot switch.

9) TRIG - Soft touch footswitch used to manually trigger the envelope generator.

10) Cycle, Hold, Once - Toggle the mode of the envelope generator.

11) Res - Resonance amount, when the knob is at ~70% the filter will begin to self oscillate.

12) Amount - The amplitude of the modulation source, or how much the cutoff is affected by the envelope generator.

13) Cutoff - Base cutoff frequency of the low pass filter.

14a) IN - 1/4" mono audio input. Line level and instrument levels.

14b) OUT - 1/4" mono audio output. Line level and instrument levels.

15a) 9VDC - Standard power input for effects pedals, 9VDC center negative 2.1mm barrel jack. Consumes a maximum of 100mA.

15b) CV - 1/8" mono minijack input for voltage triggers with 5 Volt threshold.

15c) MIDI - 1/8" stereo minijack midi input wired for a "type b" midi adapter.

Specifications

- 1/4" mono input/output jacks
- 2.1mm DC Connector
- 5.7" x 4.7" x 1.5" enclosure dimensions
- true bypass
- input impedance: 1MΩ
- output impedance: <1kΩ
- power supply: 9 to 9.6 VDC
- current draw: 100mA max

Circuit Diagram
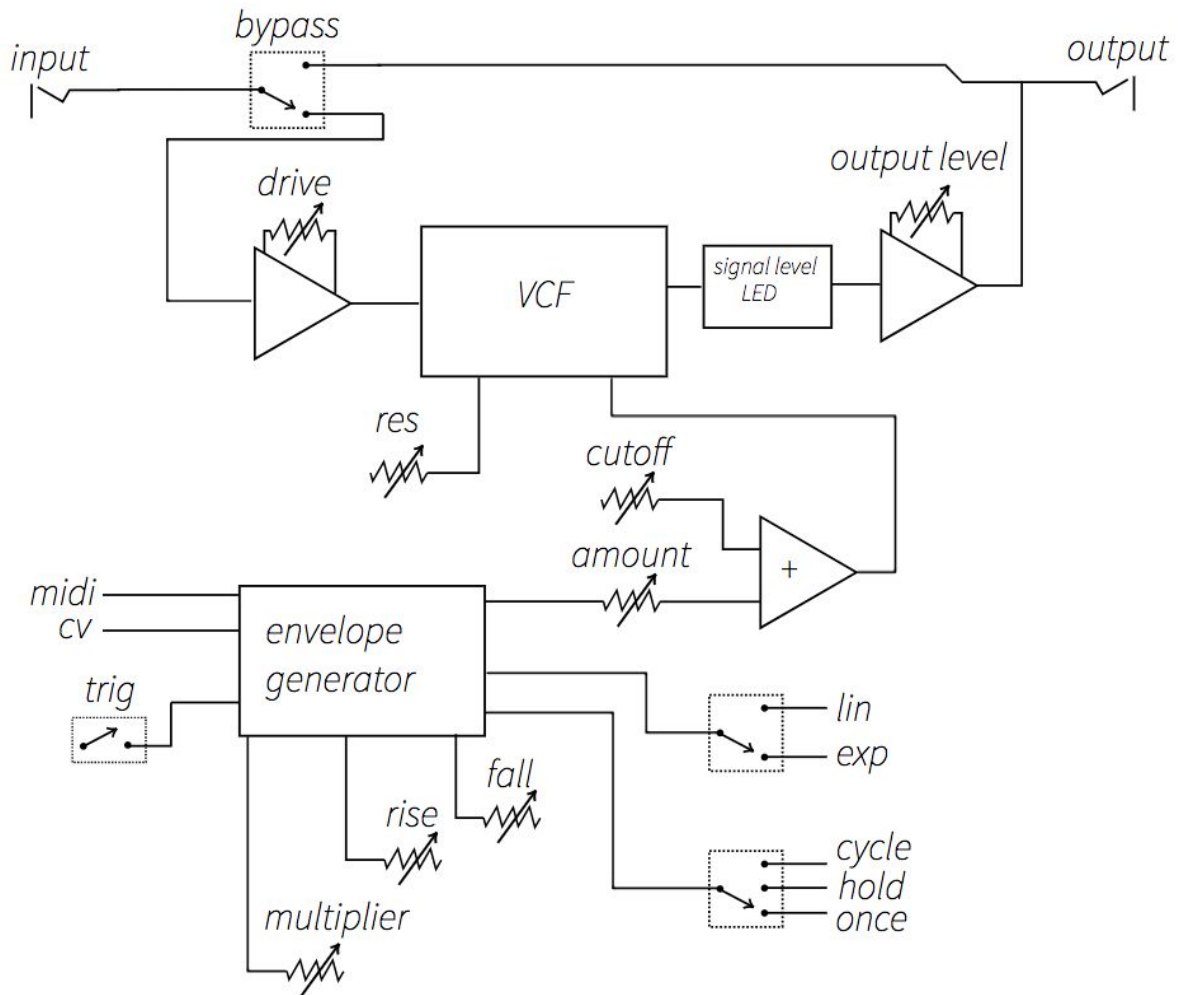
## Voltage Controlled Filter (VCF)

The VCF is an analog four-pole resonant lowpass filter. The **cutoff** frequency control spans the entire audio spectrum. The **res** (resonance) amount control can range from none to self oscillation. The character of the filter reacts to the amount of **drive**. When the filter is in self oscillation the **drive** can be used to balance the input signal with the oscillation of the filter. It can be fun to try playing a duet with the drone of the filter while it is self oscillating.
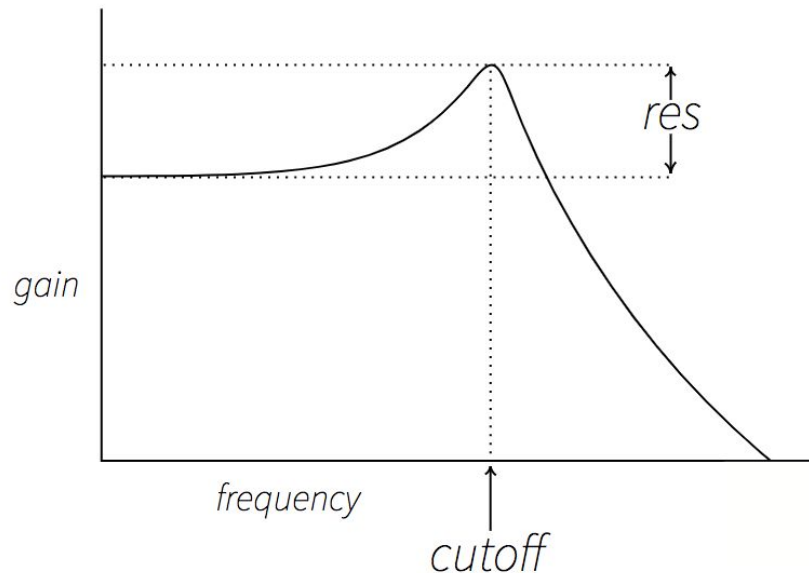
note on resonance: You may hear a slight drop in volume as the resonance is increased. This is expected because the filter is emphasizing the cutoff frequency, causing all other frequencies to drop in volume. The **output level** can be used to makeup for the volume drop.

Envelope Generator

The envelope generator is a rise, fall (also known as attack, decay) waveform generator. The **rise**, **fall**, and **multiplier** controls interact with each other to determine the rate of the envelope. **Rise** and **fall** have a range from 1 millisecond to 10 seconds.

amount

←*rise*→ ←—*fall*—→
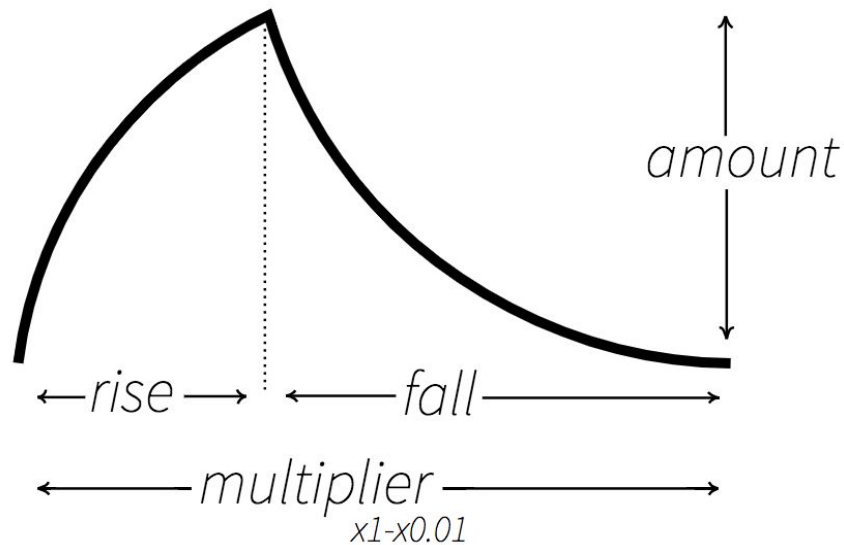
←———*multiplier*———→
x1-x0.01

Multiplier scales both the **rise** and **fall** time from x1 to x0.01, this can be used to change the overall rate of the envelope while maintaining the ratio of **rise** and **fall** times. The **amount** control determines how much of the envelope is sent to the VCF.

Envelope Generator (continued)

There are three modes: *cycle*, *hold*, and *once*. *Cycle* loops infinitely regardless of the *TRIG* status. *Hold* starts rising when *TRIG* is pressed, and stays high until *TRIG* is released, which causes the envelope to start falling. *Once* will play only one cycle of the envelope waveform when the *TRIG* is pressed.
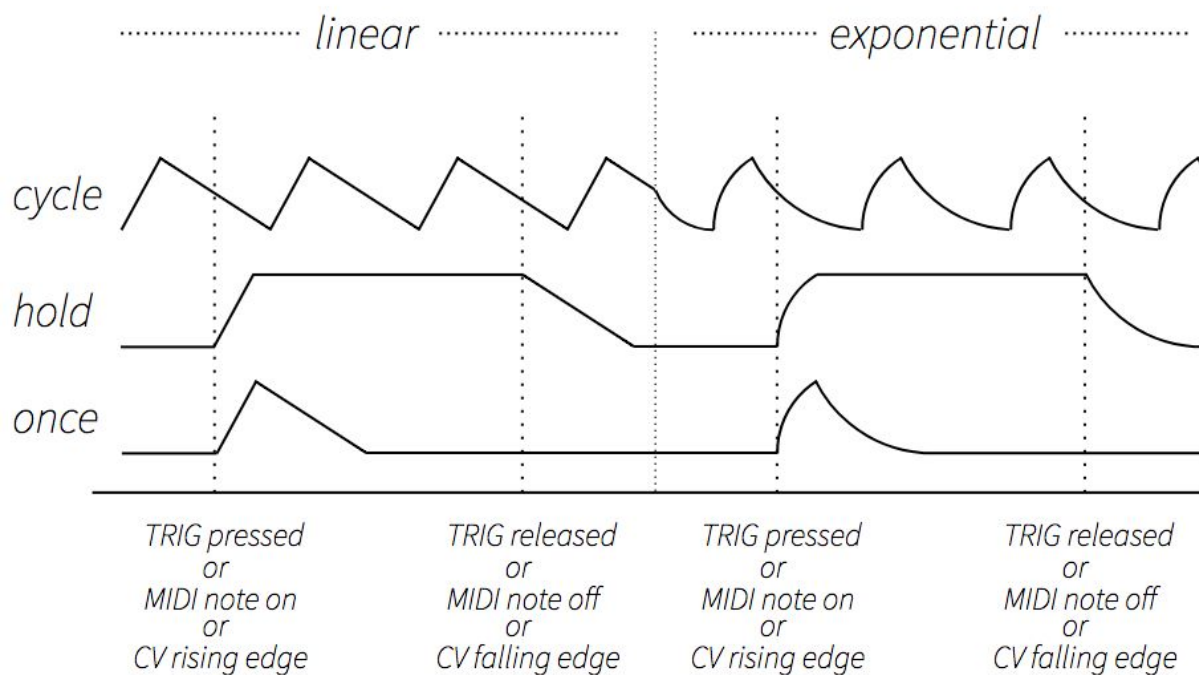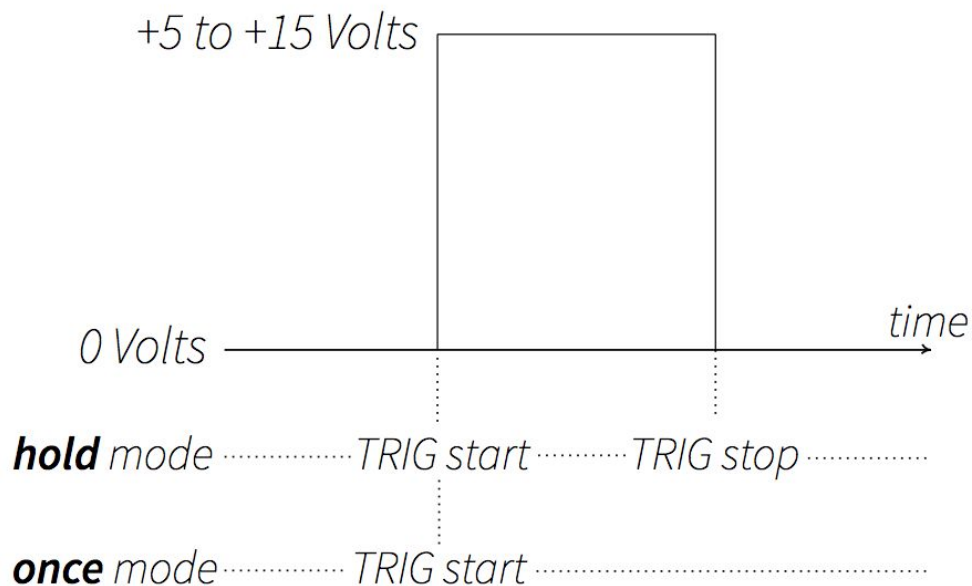

There are two envelope shapes, *lin* (linear) which is good for consistent looping cycles like classic tremolo sounds and *exp* (exponential) which sounds great when used rhythmically.

Drive

The **drive** knob adjusts the amount of amplification on the input signal. Paragraphs is designed to work with instrument to line-level signals. The 3-color LED can be used to make sure you are operating in the desired range. Red indicates clipping. Orange flashes indicate the start of overload. Green indicates the presence of signal at or below the nominal level.

CV (Control Voltage)

The **CV** connection is a voltage trigger that can be used to activate the **TRIG** switch when the Paragraphs is in **hold** or **once** mode. A voltage pulse at or above 5 Volts will cause a **TRIG** start, if the Paragraphs is in **hold**, the **TRIG** will remain as long as the voltage pulse is present.

+5 to +15 Volts

0 Volts   *time*

hold *mode* ·········· *TRIG start* ·········· *TRIG stop* ··········

once *mode* ·········· *TRIG start* ·····································

MIDI

The **MIDI** connection can be used to activate the **TRIG** switch when the Paragraphs is in **hold** or **once** mode. The paragraphs listens for a "Note On" and "Note Off" event on all midi channels (1-16), key numbers (0-127), and velocity values (0-127).
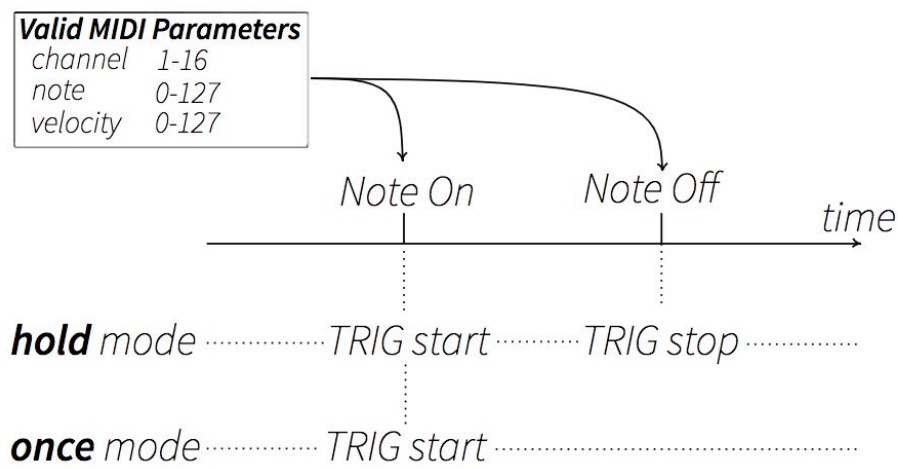
The MIDI input is a 1/8" stereo jack that is wired for a **Type B** midi adapter. If you are unsure what type of adapter to use, you can purchase one directly from Vongon on our website.

MIDI Signal	MIDI Connector	Stereo Minijack
Current Source	Pin 4	Tip
Current Sink	Pin 5	Ring
Shield	Pin 2	Sleeve

Powering

Paragraphs was designed to operate using your typical center negative, regulated 9-9.6 VDC power supply. The pedal is protected against reversed polarity and overvoltage conditions. Always check your power supply for proper voltage and polarity before connecting. There is no battery connection inside the pedal.

Extended Warranty

Vongon will repair or replace any malfunctioning product for a period of 1 year after purchase date. Problems resulting from modifications or misuse may cancel this warranty. The owner will cover all shipping expenses. This warranty applies only to the original owner of the product. Proof of purchase might be required.

In general, the best thing to do is to contact us as soon as possible with a description of the symptoms, even if the warranty is expired.

Contact

For all inquiries, please email ryan@vongon.com