

# V-Zero

## Monophonic Guitar Synthesizer

[www.opfxs.com](http://www.opfxs.com)

### User Manual

V-ZERO is a monophonic guitar synth based upon principles of subtractive synthesis. When a note is played the pedal senses the pitch of the note and drives the on board oscillators. The generated signals can be mixed and processed in various way by filtering and applying modulations.

#### Detailed description of every control

##### Oscillators:

- OSC1 Waveform (4P rotary switch): Sine, Saw, Square, Triangle
- OSC2 Waveform (4P rotary switch): Sine, Saw, PWM, Triangle
- OSC1 Octave (6P rotary switch): 6 octaves range
- OSC2 Octave (6P rotary switch): 6 octaves range
- OSC 1-2 mix (pot): mixes OSC1 and OSC2
- OSC 1 tune (pot): fine tunes OSC1 pitch

##### Mix and output:

- Mix (pot) : mixes dry guitar signal with synthesizer signal
- Volume (pot): output level
- Output jack: a standard TS jack plug can be used or TRS for splitting the output. TIP of the jack carries synth + dry guitar signal, RING carries dry signal. TIP signal is affected by MIX and VOLUME controls and can be bypassed while RING signal is not affected by MIX or VOLUME and can't be bypassed. Split function permits to drive two different amplifiers or routing the signal to different external devices.

##### Modulation:

- LFO rate (pot): speed of the LFO
- LFO depth (pot): depth of the LFO
- VCA mod (tactile switch with blinking LED):
  - short press: LFO modulates VCA
  - long press: instrument envelope modulates VCA
- LPF mod (tactile switch with blinking LED) :
  - short press: LFO modulates LPF
  - long press: instrument envelope modulates LPF
  - pressing CONTROL and LPF MOD together turns on or off "LPF frequency modulation from OSC2"
- Pitch mod (tactile switch with blinking LED):
  - short press: LFO modulates pitch of both OSC1 and OSC2 (Control LED = green)
  - long press: applies pitch portamento, portamento time can be set with LFO rate pot
  - pressing CONTROL and PITCH MOD together turns on or off LOW TRACKING FUNCTION
- LFO Wave (tactile switch with LED) : when off the LFO wave is a sine wave, when on the LFO wave is a square wave
  - pressing CONTROL and LFO Wave together switches between LFO groups (SINE/SQUARE or SQUARE/SAW)

## Footswitch:

- Control (footswitch with bicolor LED):
  - when off the sustain is in STANDARD mode.
  - a short press of the footswitch indicated by yellow LED turns on NOTE HOLD mode. When NOTE HOLD mode is on the last note picked will play indefinitely until a new note is played.
  - a long press (250 milliseconds) of the footswitch indicated by green LED turns on the LFO.
  - a longer press (1 second) indicated by yellow/green LED turns on both NOTE HOLD mode than LFO.
  - a very long press (5 seconds) will set and save GATE ON threshold based upon position of LFO rate pot.
  - pressing CONTROL and PITCH MOD together turns on or off LOW TRACKING FUNCTION
- Bypass: standard true-bypass switch

## Filter:

- LPF (pot): low-pass filter. When full clock-wise the filter is flat. Turning LPF pot anti clock-wise the filter start cutting high frequencies progressively.
- Resonance (pot): controls the amount of resonance (Q parameter) of the filter. When full anti clock-wise resonance is off.

## Other infos:

- V-ZERO works with any pick-up position but with some instruments open strings E tracks better with bridge pick-ups.
- V-Zero works with any type of guitar (6 strings, 7 strings etc). Different tunings of the instrument is also possible.

CONTROL LED	HOLD MODE	LFO	PITCH mod button		VCA mod button		LPF mod button	
			short press	long press	short press	long press	short press	long press
off	off	off	off	Portamento ON (portamento time set by LFO rate)	off	Envelope modulation	off	Envelope modulation
YELLOW (short press of CONTROL)	ON	off	off	Portamento ON (portamento time set by LFO rate)	off	Envelope modulation	off	Envelope modulation
GREEN (250ms long press of CONTROL)	off	ON	LFO modulation	Portamento ON + LFO modulation (portamento time set by LFO rate)	LFO modulation	Envelope + LFO modulation	LFO modulation	Envelope + LFO modulation
YELLOW/GREEN (1sec long press of CONTROL)	ON	ON	LFO modulation	Portamento ON + LFO modulation (portamento time set by LFO rate)	LFO modulation	Envelope + LFO modulation	LFO modulation	Envelope + LFO modulation
YELLOW/GREEN blinking (5sec long press of CONTROL)	LFO Rate sets GATE ON threshold and saves it							

## LOW TRACKING FUNCTION

When CONTROL and PITCH MOD are pressed at same time the LOW TRACKING FUNCTION is turned on or off. In LOW TRACKING mode the pedal will only track lowest notes on fretboard leaving highest ones to pass through unaffected.

*Pay attention that primary functions of CONTROL and PITCH MOD will be turned ON too, so you may need to press CONTROL and PITCH MOD again to go back at previous status.*

V-Zero memorizes the status of LOW TRACKING FUNCTION and will recall it at next power on. By default it's turned off.

## LPF frequency modulation from OSC2

When CONTROL and LPF MOD are pressed at same time the Low Pass Filter is frequency modulated by a pitched down version of OSC2. Basically this replaces LFO modulation (when LPF mod is short pressed). Modulation wave is fixed as TRIANGLE but the pitch range can be selected with OSC2 Octave rotary switch. Modulation is proportional to the note played (the lower the note pitch and lower frequency modulation will be).

*Pay attention that primary functions of CONTROL and LPF MOD will be turned ON too, so you may need to press CONTROL and PITCH MOD again to go back at previous status.*

V-Zero memorizes the status of LPF frequency modulation and will recall it at next power on. By default it's turned off.

## LFO groups

When CONTROL and LFO Wave are pressed at same time the LFO selection switches between Sine/Square and Square/Sawtooth. This simply means that by pushing LFO wave button it will either switch between Sine (LED off) / Square (LED on) or Square (LED off) / Sawtooth (LED on).

*Pay attention that primary functions of CONTROL and LFO WAVE will be turned ON too, so you may need to press CONTROL and LFO WAVE again to go back at previous status.*

V-Zero memorizes the status of LFO groups and will recall it at next power on. By default Sine/Square group is selected.

## HOW to set a new GATE ON threshold:


GATE ON threshold can be changed any time by setting LFO Rate pot in a desired position and pressing CONTROL footswitch for 5 seconds until CONTROL LED starts blinking. Blinking indicates new GATE ON threshold is set and saved.

Changing GATE ON threshold can be useful if your instrument has a high or low output level and you can't change level from source. With passive instruments like guitar it's best to set GATE ON threshold on V-Zero than setting lower volume from your guitar.

Pay attention that a low GATE ON setting will make V-Zero generate sound even if nothing is plugged in or make it too much sensitive to any light touch of the strings. If GATE ON is too high you may get not signal at all on the output or only when strumming hard.

Perhaps...what is GATE ON threshold after all?!

Simply put, GATE ON threshold is a volume/level point the signal needs to reach for starting the oscillators and generate sound.

GATE ON threshold is set by default at  $\frac{1}{4}$  position  and should suit most situations.

### Tech Specs:

- The pedal works with standard 9V DC PSU negative center.
- Current consumption at startup: 300 mA (all LEDs ON)
- Current consumption after a few hours: 350mA (all LEDs ON)
- Input Impedance: 1M ohm
- Output Impedance: 100 ohm