Noise Engineering Virt Iter Legio Three-Algorithm Stereo Oscillator User Manual

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Noise Engineering
Virt Iter Legio

Three-algorithm stereo oscillator with phase modulation and a vintage-inspired chorus on a flexible oscillator/DSP platform.

Overview

Type	Stereo oscillator/ platform
Size	6 HP
Depth	.9 inches
Power	2×5 Eurorack
+12V	140mA
-12V	22mA
+5V	0mA

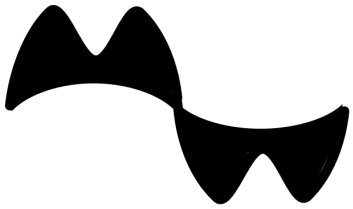
Virt Iter Legio is a three-algorithm stereo oscillator with stereo phase modulation inputs and a vintage-inspired chorus. Astute users may recognize the oscillator algorithms - Bass, Harm, and SawX - from our contributions to the Arturia Microfreak and from our Virt Vereor plugin.

Its simple interface and unique, immersive sound make it a staple for any style of sound design. Use the hard sync input to add an aggressive edge to sounds when synced to another oscillator, or try patching VIL's left and right phase modulation inputs independently for even further sonic exploration in the stereo field: trust us, stereo PM is something you'll want to hear. Turn on the beautiful, wide chorus and you'll have an endless supply of beautiful sounds.

Not only is Virt Iter Legio a fantastic oscillator, it's also a platform: head to the Customer Portal to swap the functionality of your module to a growing number of alternate firmwares, completely free.

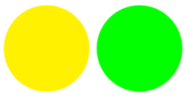
Etymology

Virt — from Latin: "strength"
Iter — Iteritas — from Latin: "repeat"
Legio — from Latin: "legion, army"
"Army of strong repetitions"

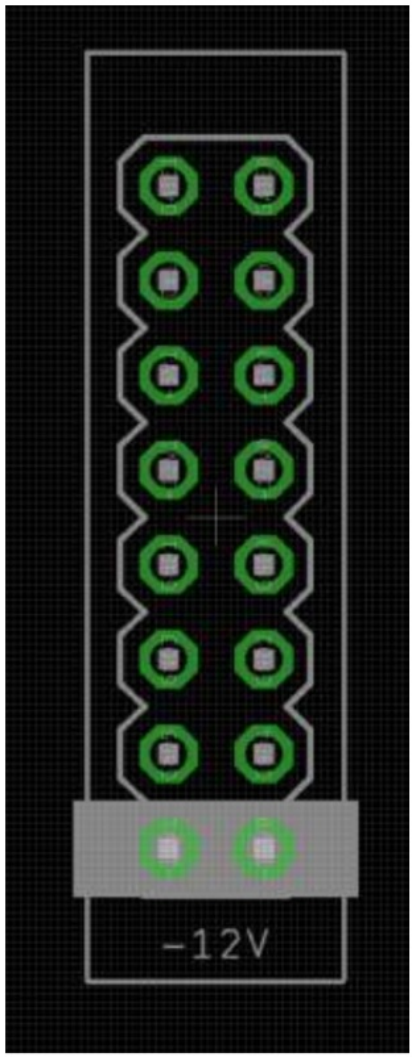


Color code

On boot, the VIL's LEDs will shine with this color pattern to indicate that it is running the current VIL firmware:



Power



To power your Noise Engineering module, turn off your case. Plug one end of your ribbon cable into your power board so that the red stripe on the ribbon cable is aligned to the side that says -12v and each pin on the power header is plugged into the connector on the ribbon. Make sure no pins are overhanging the connector! If they are, unplug it and realign.

Line up the red stripe on the ribbon cable so that it matches the white stripe and/or -12v indication on the board and plug in the connector.

Screw your module into your case BEFORE powering on the module. You risk bumping the module's PCB against something metallic and damaging it if it's not properly secured when powered on.

You should be good to go if you followed these instructions. Now go make some noise!

A final note. Some modules have other headers — they may have a different number of pins or may say NOT POWER. In general, unless a manual tells you otherwise, DO NOT CONNECT THOSE TO POWER.

Warranty

Noise Engineering backs all our products with a product warranty: we guarantee our products to be free from manufacturing defects (materials or workmanship) for one year from the date a new module is purchased from Noise Engineering or an authorized retailer (receipt or invoice required). The cost of shipping to Noise Engineering is paid by the user. Modules requiring warranty repair will either be repaired or replaced at Noise Engineering's discretion. If you believe you have a product that has a defect that is out of warranty, please contact us and we will work with you.

This warranty does not cover damage due to improper handling, storage, use, or abuse, modifications, or improper power or other voltage application.

All returns must be coordinated through Noise Engineering; returns without a Return Authorization will be refused and returned to sender.

Please contact us for the current rate and more information for repairs for modules that are not covered by our warranty.

Input and output voltages

Virt Iter Legio's CV-modulation inputs expect signals from 0v to +5v.
The Pitch input's range is -2v to +5v.
The Sync input responds to a rising edge around +1.6v.
The phase-modulation inputs are AC coupled and respond to any Eurorack audio signals.
The audio output can reach up to 16v peak-to-peak.

Interface

Pitch (encoder)
Sets the pitch of the oscillator. Turn for fine tuning, press and turn for coarse tuning.

Pitch (CV)
1v/8va calibrated pitch CV input.

Flavor and **Tang**
The main tonal parameters on VIL. Their functions change depending on the selected algorithm: learn more in the section below called "Tone Generation."

Harm/Sawx/Bass
Changes the oscillator algorithm. More info on each algorithm can be found in the section below called "Tone Generation."

II/I/0
Activates the vintage-inspired chorus. 0 is off, I is some, II is lots.

Sync
Hard-sync input.

PM L/PM R
Phase-modulation inputs. Intended for use with audio-rate signals for complex harmonic patches, similar in sound to FM.

Inputs can be used independently with separate signals, or with a single signal. Patching to the L input will normal to the right for easy modulation.

Out L/Out R
Main audio outputs.

Patch Tutorial

Drone

Virt Iter Legio can be used as a simple drone oscillator: simply monitor the L and R outputs, try out the different settings, and move the parameters by hand or with CV.

Voice

Patch the Virt Iter Legio's outputs to two VCAs. Mult the output of an envelope generator to the CV inputs of your VCAs. Patch a sequencer or keyboard's pitch CV to the Pitch input on VIL, and the gate output to your envelope generator. Monitor the output of the VCAs as a stereo pair.

Try using additional CV sources like envelopes and LFOs to modulate the Flavor and Tang CV inputs and vary your sound.

Phase Modulation

An additional oscillator can be added to this patch for PM. Try multing your pitch CV to a second oscillator, then patch its output through an attenuator and into the L PM input on VIL to create phase-modulated timbres.

Mono

VIL sounds best when used in stereo, but it will work in mono as well: simply create the initial voice or drone patch with a single VCA using VIL's L output.

Find more patches in the **Virt Iter Legio patchbook**.

Swapping firmware

Virt Iter Legio's firmware can be updated by the user via our firmware webapp on the **Customer Portal**. Alternate firmwares available now transform the VIL into completely different modules.

To update the firmware on your Legio:

1. Turn off the power to your case and unscrew the module.
2. Remove the power connector on the back of the module.
3. Plug a micro USB connector into the port on the back of the module, and the other end into your computer.
4. Follow the instructions in the webapp.

Tone Generation

Virt Vereor contains three different algorithms for sound creation: Bass, Sawx, and Harm. These algorithms were originally developed as oscillators for the Arturia Microfreak and our Virt Vereor plugin, and now they can be a part of your Eurorack patches, too.

Bass

Some years ago, Bernie Hutchins, retired professor of Electrical Engineering at Cornell University, wrote a great series called Electronotes . Electronotes #73 includes reference to an algorithm called Bass (named after a person, not the clef). It's a simple algorithm that uses nonlinearities combined with quadrature modulation to produce a variety of tones. The Bass oscillator is based off of this algorithm, with a few Noise Engineering touches (fold anyone?) for more edgy sounds. Flavor controls the saturation of the cos oscillator. Tang controls a two-stage asymmetric wavefolder, and at the top 1/6th of the knob noise is added that is mixed in between fold stages, and also phasemodulates both oscillators.

Sawx

The SawX algorithm starts with a simple super-saw oscillator, and adds some saw-mod that can be ethereal or metal. SawX surprised us with its versatility. Flavor controls the gain into a modulus stage. Tang determines the amount of chorus added to the oscillator, and at the top 1/6th of the knob adds in phase modulation from subsampled white noise.

Harm

The basic Harm oscillator is a sinusoidal additive synth with a slight distortion stage: this time, a digital implementation of something similar to our analog distortion module Pura Ruina. Flavor adjusts the relationship between the partials. At zero it is unison, at max it is octaves. The middle interpolates linearly in frequency. Tang controls an adjustable rectification of the individual partials, similar to half of a wavefolder. At the top 1/6th of the Tang knob, phase-modulated noise is mixed into the signal, too.

Design Notes

Virt Iter Legio was a long time coming. Announced in January of 2020 at NAMM, we were planning to launch soon after but… things happened. VIL has been in some stage of development ever since, and we regularly received questions about its release without being able to give any sort of definitive answer due to manufacturing and development hurdles, and parts shortages.

We were able to order a final prototype in May of 2022 - more than two years after we had hoped it would be released - and verified the hardware so we could complete the testing of our first two firmwares.

We appreciate each and every customer who asked about the Virt Iter Legio over the last couple of years, and we've shared your excitement: we're incredibly proud to launch the Legio platform, and we can't wait to share the other firmwares we've been working on.

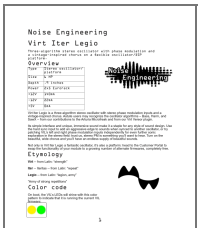
Calibration

Virt Iter Legio features extremely accurate pitch tracking and an autocalibration system. You'll never need to manually adjust pitch tracking: power the unit on with nothing patched to the pitch CV input and the module will calibrate itself during startup.

Special Thanks

Arturia, especially Seb and Baptiste
Jeffrey Horton
ElectroNotes
NAMM 2020
All of the patient people who have been waiting since then…

Documents / Resources

	Noise Engineering Virt Iter Legio Three-Algorithm Stereo Oscillator [pdf] User Manual Virt Iter Legio, Three-Algorithm Stereo Oscillator, Virt Iter Legio Three-Algorithm Stereo Oscillator

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