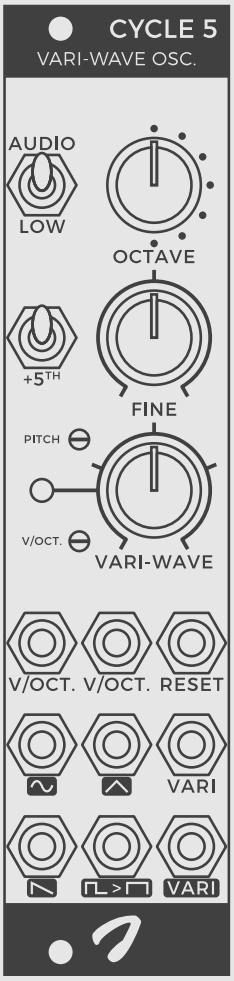
CYCLE 5

VARI-WAVE OSCILLATOR



USER MANUAL

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INTRODUCTION

A small oscillator that packs a punch: that's the best way to summarise Cycle 5.

At its heart lies a refined high-stability triangle core voltage controlled oscillator (VCO), with performance matching or exceeding that of much bigger and costly oscillator modules.

Instead of a coarse frequency knob, a 7-position octave switch is provided. This in combination with a perfect fifth transposition switch and factory pitch tuning, makes Cycle 5 an exceptionally straightforward and musical VCO to use: simply centre the fine tune knob, and the module will be instantly tuned to reference C.

Meanwhile, its dual precision volt per octave inputs add a great deal of versatility. For example, one could be used for pitch sequencing and the other as a generic exponential FM input, or both sequenced together for transposition effects—the dual inputs serving as a built-in precision adder.

Sporting all the classic waveforms, ranging from sine wave, triangle, saw and square/saw, as well as a hard sync input and low frequency oscillator (LFO) mode, Cycle 5 makes for a real workhorse VCO. The novel trigonometric waveshaper results in a very clean sine wave, ideal for sub bass duty.

Cycle 5's highlight however, is its vari-wave feature. By adjusting the vari-wave knob, the waveform on the matching output will smoothly morph from sine, to triangle, saw, square and finally a very narrow pulse. The vari-wave parameter can be CV controlled, up to audio frequencies for some intense timbres.

Equally at home as a modest modulation companion to big VCOs, as being in the spotlight in miniature or polyphonic systems, Cycle 5 might just be the most multi-talented tiny analogue oscillator yet.

CONTENTS

In the Cycle 5 box, you'll find:

- → Product card, stating serial number and production batch.
- → 16-to-10-pin Eurorack power cable.
- → Mounting hardware: two black M3 x 6 mm hex screws, two black nylon washers and a hex key.
- → The Cycle 5 module itself, in a protective, reusable cotton bag.

If any of these items are missing, please contact your dealer or support@joranalogue.com.

INSTALLATION

Before installation, make sure your Eurorack system has been powered down for at least 5 minutes and is placed horizontally on a stable surface.

Locate a suitable spot in your system in which to mount your module. First plug the included power cable between the module and a free output header on the power distribution board or cable.

Keep an eye on the polarity: the red stripe on the cable, denoting the -12 V power voltage, should always point towards the bottom of the module: 'red stripe down'. All our modules are equipped with keyed headers, aiding correct orientation.

Also pay attention to the polarity of the cable on the power distribution side. Contact the manufacturer of your rack in case you are uncertain.

Even if the polarity ends up reversed, this will not damage your module. However, this may not be true for modules of other brands.

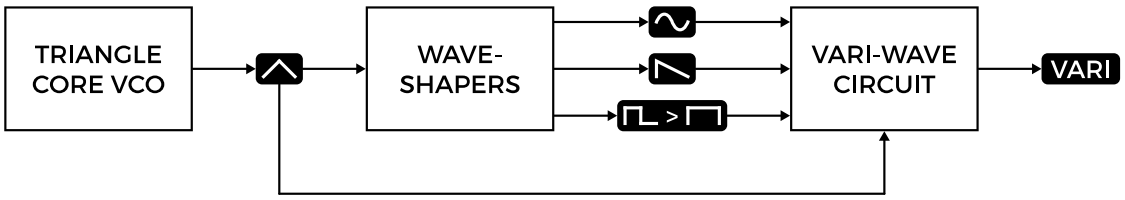
Next, it's time to screw your module in place. Included with your module, you'll find a set of M3 screws and nylon washers. Place the nylon washers onto the screw threads, and using the supplied 2.5 mm hex key, fasten the screw/washer combo onto the rack rails, through the module's front panel.

If your case uses sliding nuts, you'll need to position them first. Repeat until all screws are in place; always use all the supplied screws to install a module.

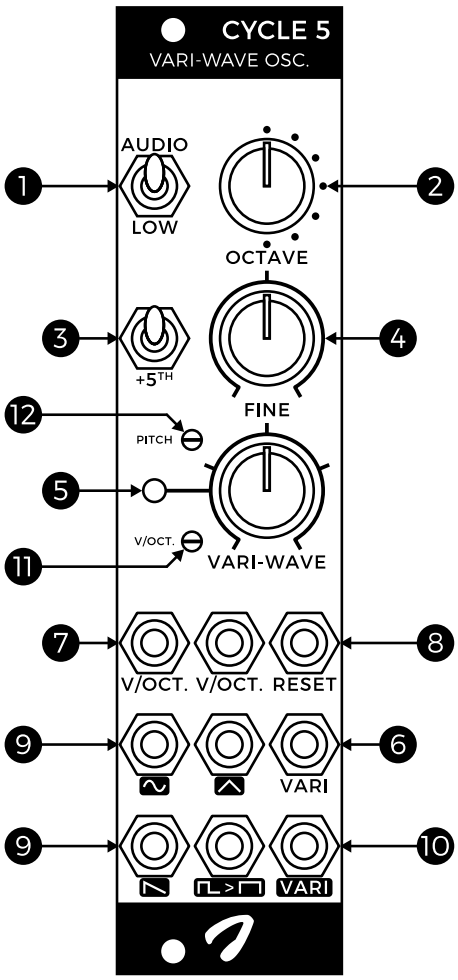
Note that some racks might use a different thread than the supplied M3 screws, or the rails might be recessed too deep for the supplied screws to fit. In this case, you'll need to source third-party screws matching your rack.

Now you can power up your rack and enjoy your new module!

SIGNAL FLOW



CONTROLS & CONNECTIONS



1 FREQUENCY RANGE SWITCH

This switch determines over which frequency range Cycle 5 will operate: low frequency (VCLFO) or audio frequency (VCO).

2 OCTAVE SWITCH

The rotary octave switch sets the oscillation frequency in octave steps: every time the knob is advanced one position clockwise, the frequency will be doubled.

In the audio frequency mode, the base frequencies range from C1 (33 Hz) to C7 (2.1 kHz), placing 'middle C' (C4) in the centre switch position. Using the additional frequency controls, the total range is A0 (27.5 Hz) to A#/Bb7 (3.7 kHz). Frequencies beyond this range may be reached using external CV.

In low frequency mode, the total frequency range without CV is 200 mHz (a period of 5 seconds) to 25.5 Hz.

3 FIFTH SWITCH

When switched down, the fifth switch adds 7 semitones to the current pitch. For example, C1 will be transposed up to G1, the interval between them forming a perfect fifth.

4 FINE FREQUENCY KNOB

The fine frequency knob adds the ability to fine-tune the pitch. It has a total range of 7 semitones.

Cycle 5 is tuned to C when this knob is centred and the fifth switch is disabled. However, by using the fine knob and fifth switch in conjunction, it can be set to play any pitch over the entire frequency range.

5 VARI-WAVE KNOB AND LED

Cycle 5's unique vari-wave ('variable waveform') feature combines waveform morphing and pulse-width modulation (PWM) into a single parameter.

As the vari-wave knob is turned from minimum to maximum, the waveform at the associated output will smoothly morph from sine, to triangle, to saw, to square, and finally to an increasingly wide pulse, reaching a maximum duty cycle of approximately 98 %. 'Pips' on the knob's scale denote the positions where these basic waveforms are found.

The LED next to the knob shows the real-time output voltage at the vari-wave socket, lighting up red for positive and blue for negative.

6 VARI-WAVE CV INPUT

The vari-wave function can be modulated via this CV input. The total CV range is 5 V, meaning that the basic waveforms are separated by 1.25 V intervals.

Since the waveforms are distributed according to their harmonic interrelationships, vari-wave modulation can create timbres reminiscent of both filtering and PWM.

Note that through the CV input, it is possible to modulate the pulse waveform beyond the 99 % point, resulting in silence.

7 VOLT PER OCTAVE FM INPUTS

These inputs are used to modulate the frequency in an exponential fashion, with a standard 1 volt per octave response, to create accurate pitches.

Both inputs can be used simultaneously, for transposition effects or for combined pitch sequencing and audio-rate FM.

8 RESET INPUT

A rising edge on the reset input causes the triangle core VCO to instantaneously go to 0 V, affecting all outputs. Oscillation will then resume as before.

This is known as 'hard sync', as the instantaneous resets create high harmonic content. It is useful when patching up an audio-rate FM oscillator pair, as it synchronizes one oscillator's frequency with another, keeping the perceived pitch in tune.

9 WAVEFORM OUTPUTS

All basic waveforms are available simultaneously at a standard amplitude of 10 V_{pp} via these output sockets: sine, triangle, saw and pulse.

These outputs are independent of the vari-wave feature, except for the pulse, which will be continuously modulated back and forth between 50 % (square wave) and 99 % pulse-width (near-silence) as the vari-wave parameter is adjusted. Each 'pip' on the vari-wave knob scale corresponds to a 50 % or 99 % pulse-width position.

The front panel graphics accurately depict the phase relationships that exist between Cycle 5's multiple waveform outputs.

10 VARI-WAVE OUTPUT

The vari-wave output signal consists of a combination of two basic waveforms, as determined by the current value of the vari-wave parameter.

11 VOLT PER OCTAVE TRIMMER

This trim potentiometer is used to calibrate the module's pitch tracking. Since it is accessible from the front panel, calibration can be easily performed without removing the module from the system. Each module is individually calibrated during production; do not adjust this trimmer if not needed.

Should you find your Cycle 5's scaling to be out of tune, set the range switch to the audio range, the octave switch to the second position and the fine knob in the centre position. Make sure that the fifth switch is disabled (set upwards).

Make sure Cycle 5 has been powered for at least 20 minutes at a stable ambient temperature. Now connect the triangle output to a calibrated digital tuner.

During the tuning process, the leftmost volt per octave input should be continually switched between 0 V and a precision +5 V source, toggled automatically or by hand. Leave all other inputs unpatched.

Using a dedicated trimming tool or standard 2.5 mm flat screwdriver, adjust the trimmer until the interval between both states is exactly 5 octaves. For example, if 0 V corresponds to a pitch of C2 + 23 cents, +5 V should yield C7 + 23 cents.

12 PITCH TRIMMER

Next, after the scaling has been adjusted, the pitch trim potentiometer is used to set the offset, so that Cycle 5 is tuned to C exactly.

While still monitoring the pitch of the triangle output, remove the precision +5 V source from the volt per octave input and adjust the pitch trimmer until the tuner reads as close as possible to C2 (65.4 Hz).

SPECIFICATIONS

MODULE FORMAT

Doepfer A-100 ‘Eurorack’ compatible
3 U, 20 HP, 30 mm deep (including power cable)
Milled 2 mm aluminium front panel with non-erasable graphics.

MAXIMUM CURRENT DRAW

+12 V: 75 mA
–12 V: 70 mA

POWER PROTECTION

Reverse polarity (MOSFET)

I/O IMPEDANCE

All inputs: 100 kΩ
All outputs: 0 Ω (impedance compensated)

OUTER DIMENSIONS

128.5 x 30 x 52 mm (H x W x D)

MASS

Module: 95 g
Inc. packaging and accessories: 180 g

SUPPORT

As all Joranalogue Audio Design products, Cycle 5 is designed, manufactured and tested with the highest standards, to provide the performance and reliability music professionals expect.

In case your module isn’t functioning as it should, make sure to check your Eurorack power supply and all connections first.

If the problem persists, contact your dealer or send an email to support@joranalogue.com. Please mention your serial number, which can be found on the product card or on the module’s rear side.

ACKNOWLEDGEMENTS

With compliments to the following fine people,
who helped to make Cycle 5 a reality!

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