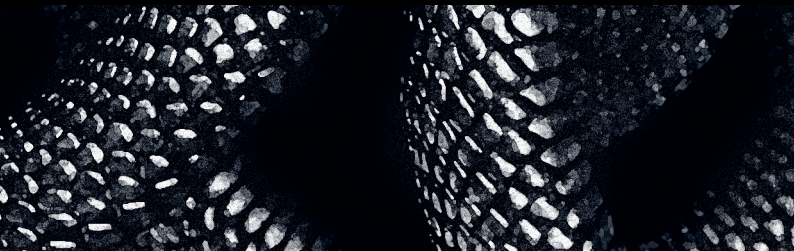
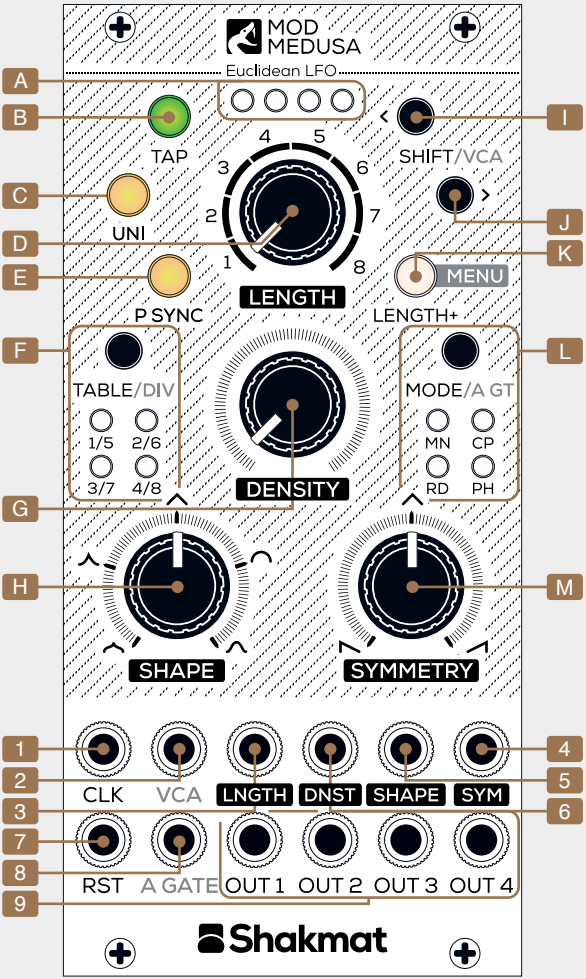
Shakmat
Mod Medusa

- 12HP Eurorack Module
- Built & designed in E.U.
- www.shakmat.com




MOD
MEDUSA
Euclidean LFO
A
B
TAP
I
SHIFT/VCA
C
UNI
J
D
K
E
MENU
P SYNC
LENGTH
LENGTH+
F
L
TABLE/DIV
MODE/A GT
1/5
2/6
3/7
4/8
MN
CP
RD
PH
G
DENSITY
H
M
SHAPE
SYMMETRY
1
2
3
4
5
6
7
8
9
CLK
VCA
LNGTH
DNST
SHAPE
SYM
RST
A GATE
OUT 1
OUT 2
OUT 3
OUT 4
Shakmat

Introduction

The Mod Medusa is an algorhythmic LFO. It delivers four correlated or independent modulation channels synced to a clock. Their timing fits rhythmic patterns, such as euclidean ones famously used in trigger sequencing.

You won't run out of modulation waveforms anytime soon, as the Mod Medusa has symmetry and waveshape controls. The assignable inputs can be used to control each channel's amplitude and mess with the wave sequencing using ratcheting and track & hold.

- A Output activity LED
- B Tap tempo button
- C Unipolar button
- D Length potentiometer
- E Peak Sync button
- F Table / division button & LEDs
- G Density potentiometer
- H Shape potentiometer
- I Shift left button
- J Shift right button
- K Length+/Menu button
- L Mode / Assignable Gate button & LEDs
- M Symmetry potentiometer
- 1 Clock input
- 2 VCA CV input
- 3 Length CV input
- 4 Symmetry CV input
- 5 Shape CV input
- 6 Density CV input
- 7 Reset input
- 8 Assignable Gate input
- 9 Outputs

Installation

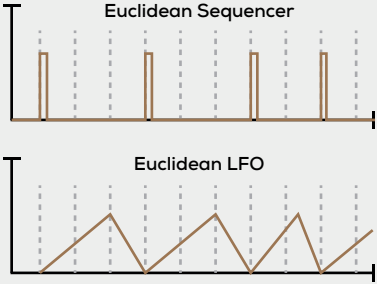
The Mod Medusa requires a standard 2x5 pin eurorack power cable. Make sure the red stripe on the cable matches the -12V side of the Mod Medusa power header.

Sequencer

In a traditional Euclidean sequencer, the density sets the number of pulses per cycle. Turned fully counterclockwise, it mutes the sequencer. Turned clockwise, the sequencer generates more and more triggers per cycle.

But Mod Medusa is not a trigger generator, so what is different? In the case of our algorhythmic LFO, simply replace the word trigger with waveform cycle, and you get the kind of modulation presented in Fig. 01:

Fig. 01 — Euclidean sequencer vs euclidean LFO



Note how each cycle adapts its timing to fit between two consecutive triggers.

Of course, the density parameter is CV controllable.

Clock the module by inserting a clock signal into the clock input [1] or by tapping the tap button [B]. Like a classic Euclidean sequencer, the Mod Medusa gives several controls on the source pattern: Length [D], Density [G], and Shift [I&J].

Pattern length can be set by the dedicated potentiometer [D] and CV input [3]. Available lengths are 1 to 8 step. Pressing the Length+ button [K] allows access from 9 to 16 step long patterns.

It is possible to shift the sequence forward or backward by a step using the two shift +/- buttons [I&J]. Holding the two buttons for two seconds will remove any shifting, and the 4 mode LEDs [L] will blink to confirm the shift reset. The reset input [7] causes the wave sequence to return to the first step.

Waveforms

The Mod Medusa accurately controls generated waveform symmetry [M] and waveshape [H]. Symmetry continuously balances the rise and fall time of the generated waveforms. Shape morphs the waveform continuously, scanning from a sigmoid, through exponential, logarithmic, and linear shapes, to a sinusoidal curve. Both parameters have a dedicated potentiometer and CV input.

Tables

Mod Medusa's heart relies on sequence tables originating in algorithms used in our Knight's Gallop and White Gallop modules. The current table can be changed using the button + LEDs menu [F].

Green LEDs :
1. As Straight As Possible
2. Classic Euclidean
3. Revised Euclidean
4. Anti-euclidean

Amber LEDs :
5. Descelerando
6. Accelerando
7. Divided Sequences
8. Fill Next

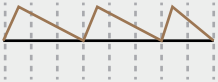
Polarity & Peak Sync

The uni button [C] switches between unipolar (0 – 5V) and bipolar (- 5/ +5V) LFOs. In unipolar mode, the button is lit.

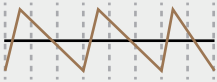
When the Peak Sync function [E] is off, the beginnings of the waves are synced to the incoming clock signal. Activating it synchronizes the peaks of the waves to the clock signal.

Fig. 02 — How Peak Sync changes synchronization

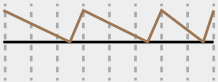
Unipolar wave, Peak Sync Off



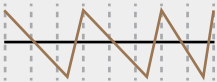
Bipolar wave, Peak Sync Off



Unipolar wave, Peak Sync On



Bipolar wave, Peak Sync On



Changing polarity and peak sync applies to all four channels when in correlated mode. In independent mode, each channel can have different polarity and peak sync status.

Modes

A. Correlated Outputs

The controls on the panel always set the parameters of the first output. The other three outputs are correlated to the first channel, giving different modulation signals with a “polyrhythmic” feeling.

This correlation changes based on the mode selected.

Fig. 03 — Correlated outputs modes

	OUT 2	OUT 3	OUT 4
MN Main	Backward	Inverted	1 cycle per length
CP Compute	L/2 & C/2	2xL/3 & 2xC/3	L-C
RD Random	Soft Fill	Hard Fill	Random
PH Phase	L/4 shift	L/2 shift	3L/4 shift

MN (main)
The sequences of channels 2, 3, and 4 are logically derived from the channel 1 sequence.

CP (compute)
The sequences of channels 2, 3, and 4 are mathematically associated with those of channel 1. For example, in L/2 & C/2, if the channel 1 sequence is 12 steps long with 4 cycles, the associated sequence has 12/2 = 6 steps length with 4/2 = 2 cycles.

RD (random)
Channel 2 and 3 randomly switch to the L/2 & C/2 pattern with a low and high probability, respectively, while the channel 4 sequence is fully random.

PH (phase)
Each channel is shifted by L/4. With certain settings, this gives a feeling of quadrature modulation.

B. Independent Outputs

In independent mode, you can individually set each channel's parameters: length, density, shift, shape, symmetry, table, polarity, and peak syncing.

Press the Mode button [L] for two seconds. A mode LED [L] starts blinking, indicating which channel is edited. Use the Mode button to switch between channels. Use the controls to set the channel parameters. Press the Mode button for two seconds to exit.

INFO **In independent mode, CV inputs only act on channel 1.**

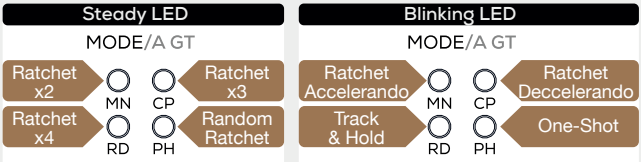
Menu

The options menu allows to divide the incoming clock, assign a function to the Assignable Gate input [8], and assign which channels are impacted by the VCA input [2].

To enter, press the Length+/Menu button [K] for two seconds. The Uni and Peak Sync buttons [C&E] start blinking. To exit, press the Length+/Menu button for two seconds.

A. Assignable Gate Input

The Gate Input [8] can be assigned to perform one of eight different options. You can toggle between them while in options menu, using the Assignable Gate button [L] and LEDs:



When assigned to a rachet, receiving a gate at the beginning of an LFO cycle will cause the cycle rate to be multiplied by the ratchet ratio.

When assigned to Track & Hold, the outputs track the LFO cycles normally while the incoming gate is high, and hold their value when the gate is low. Using triggers instead of gates will give a Sample & Hold feeling, better suited to create stepped values. When assigned to One-Shot, the LFO cycles will only start when a gate is received at the beginning of the cycle.

You can use the tap button [B] to replicate a gate received at the A Gate input [8]. In the options menu, simultaneously press the mode button [K] and the tap button [B] to change between having the tap button acting as a tap tempo (green) or a manual gate (red).

B. VCAs

While in the options menu, you can use the shift buttons [I&J] and the activity LEDs [A] to assign which channels the VCA input [2] controls. The input is unipolar (0-5V) and normalized to 5V.

C. Clock Divider

While in the options menu, you can use the table button [F] and LEDs to apply a division of the incoming clock signal (1 to 8).

Current State Storing

The module's current state can be stored by pressing and holding the unipolar button [C] for two seconds. This stores both the correlated or independent mode settings.

Specifications

Size	CV inputs
12 HP	-5 to +5V
Depth	**VCA CV input**
21 mm	0 to +5V
Current Draw	**CV outputs**
55 mA @ +12V	-5 to +5V
30 mA @ -12V	**Assignable gate input**
	0 to +5V