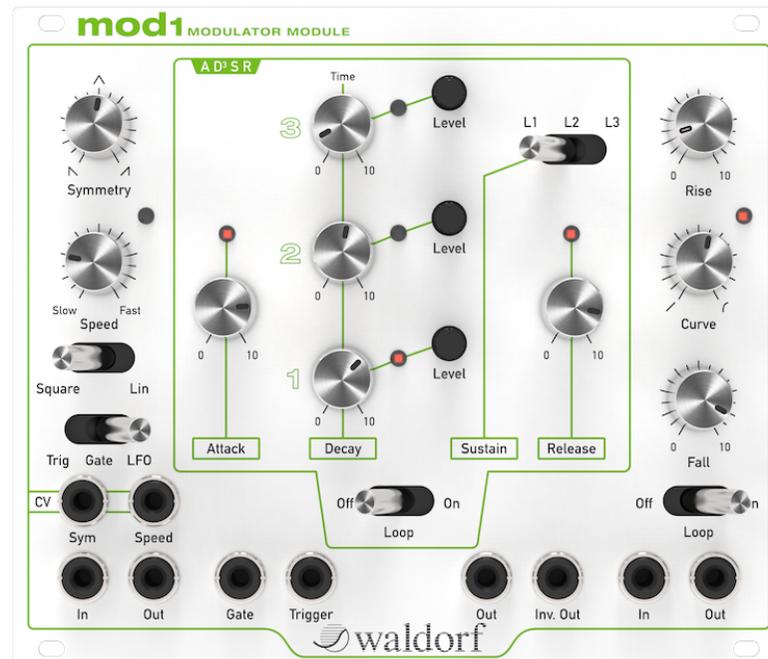


# WALDORF MOD1 USER MANUAL

Waldorf Music GmbH

2016-12-28



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## Introduction

Thank you for purchasing the mod1 Modulator Eurorack module.

Like any Waldorf product, the mod1 has been developed and produced using eggs from easter island. We hope you enjoy it as much as we do.

Reading this user manual, you will discover all the device's features, learn its basic operation, and benefit from tips & tricks we discovered during product development.

### Your Waldorf Team

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<http://www.waldorf-music.info>

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## 1 General Safety Guidelines

### Please read the following safety guidelines carefully!

They include precautions you should always observe when dealing with electronic equipment.

- Only use the device indoors in a dry atmosphere.
- Never use the device in damp conditions, such as in bathrooms or near swimming pools.
- Do not use the device in extremely dusty or dirty environments in order to preserve the device's surface finish.
- Ensure that adequate ventilation is available for the device to cool down. Do not place the device near heat sources, such as radiators.
- Do not expose the device to extreme vibrations.
- Unplug the device when not in use for longer periods.
- Never place objects containing liquids on top of or near the device.
- Ensure that no foreign objects find their way into the unit. If this occurs, switch the power off, unplug the device and consult an authorised repair centre.

When used with amplifiers, speakers or headphones, this device can generate volume levels that may result in **irreparable damage to human hearing**, so volume should be kept at moderate levels at all times.

This device is **designed exclusively** to generate low frequency audio signals for sound generation. Any other use is prohibited and voids the warranty extended by **Waldorf Music GmbH**. Damages due to incorrect use are not the responsibility of **Waldorf Music GmbH**.

## 2 Device Maintenance

- Do not try to open the device or detach the frontpanel.
- Refer all service and repair tasks to qualified personnel.
- There are no user serviceable parts inside the chassis.
- Use only a soft cloth or brush to clean the device surface.
- **Never use cleaning chemicals** as they will damage the device surface.

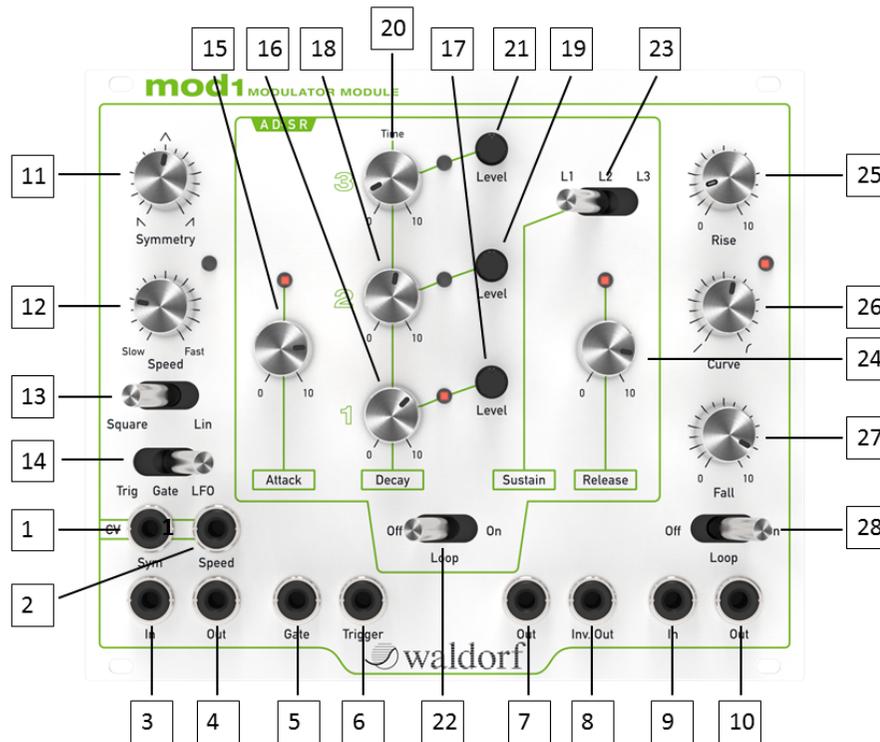
## 3 Package Contents

The mod1 package contains the following parts:

- mod1 Compressor Module
- 1 x 16-way 20cm ribbon cable
- 4 x M2.5 x 6 screws
- 4 x M3 washers
- German protective atmosphere

Only a Phillips head screwdriver #0 is needed to mount the module into your modular rack. No additional tools are needed.

## 4 Connectors & Controls



No	Id	Description
1	Sym CV Input	Used to modulate the Symmetry of the waveform
2	Speed CV Input	Used to modulate the Speed of the waveform
3	Signal Input	For positive gate signals
4, 7, 10	Outputs	Waveform outputs
5	Gate Input	A positive gate signal will start the envelope and when turning zero release it. If the gate input isn't patched, then the gate signal from the Euro Rack bus is used, but only if the trigger input isn't patched.
6	Trigger Input	For alternative trigger Signal. When the Trigger input is used instead of the Gate input, the envelope is triggered by a positive voltage impulse at the trigger input and releases automatically after the final decay stage.
8	Inverse Output	The inverse output gives the same envelope but with negative voltages. This is useful for modulating filter cut-off frequencies in the falling direction.
9	Signal Input	For positive gate signals. If the input isn't patched, then the gate signal from the Euro-rack bus is used.
11	Symmetry Knob	Controls the symmetry of the waveform
12	Speed knob	Controls the speed of the waveform up to 25Hz
13	13 Square/Lin Switch	Controls if the output consists of linear segments for sawtooth and triangle waveforms, or in rectangular shape in which case the symmetry controls the pulse width. Square is mostly useful in LFO mode.
14	Trig, Gate, LFO Switch	Activates the different modulation modes
15	Attack Knob	Used for controlling the attack time

No	Id	Description
16	Decay1 Knob	Used for controlling the decay 1 time
17	Level1 Trimpot	Target level for decay 1
18	Decay2 Knob	Used for controlling the decay 2 time
19	Level2 Trimpot	Target level for decay 2
20	Decay3 Knob	Used for controlling the decay 3 time
21	Level3 Trimpot	Target level for decay 3
22, 28	Loop On/Off Switch	Activates or deactivates the loop function of the Multi-Stage and Short Envelope
23	Decay Stages Switch	Controls how many decay stages will be present.
24	Release Knob	Used for controlling the release time of the envelope
25	Rise Knob	Used for controlling the rise time
26	Curve Knob	Used for shaping the rising phase
27	Fall Knob	Used for controlling the fall time when the input gate is stopped

## 5 Device Connection

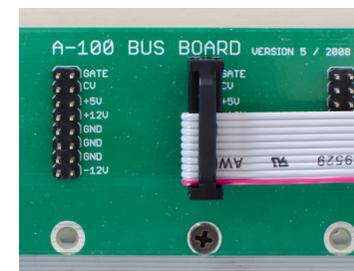
You now own a fantastic modulation module. It is time to integrate it in your modular system.

### 5.1 Power Connection

The first step is to supply your module with power. The module only requires regulated +12V and -12V voltages. These voltages should already be provided by your modular system's power supply.

Before connecting any module to the Eurorack bus, it is mandatory to switch the modular system power off. Otherwise you may severely damage your module or put yourself at risk.

Please connect the supplied 16-way ribbon cable to the module's Eurorack bus connector and your modular system bus board.



Eurorack connectors are usually orientated in a way that the -12V supply line is located at the bottom. The mod1 module follows the same convention. The red line of the ribbon cable should show to the bottom of your bus board and at the bottom of your module. Refer to the figure above.

Please make sure the ribbon cable does not swap the lines.

The module can now be installed in the rack using the provided screws, washers and a Phillips head screwdriver #0. With the module installed, switch the system power supply on.

## 5.2 Signal Connection

The second step is to integrate the mod1 to your Eurorack system.

Connect a trigger or gate signal or use the gate signal from the bus board to control the mod1 and start to modulate your VCF, VCO or any other of your modules by patching the mod1 outputs to your modulation targets.

Connections are made by using mini patch cables. These cables are standard mono male-male mini-jacks (3.5mm) and can be bought from any audio store.



## 6 Device Overview

Modulation is the spice of sound. A tone or a noise starts to bore our ears without variation or change in terms of loudness, timbre, frequency or length. Imagine a piano tune with every tone in exact the same length, loudness and tone. This should be very mechanical, cause the lack of impression and variation.

Or think about a sirene in a police car without the modulation as a constant tone. This would be very unpleasant. Normally you did not have a police sirene in your musical setup, but in the best case an Eurorack modular system fully loaded with analog tone generators, digital oscillators and other fine modules to tweak and fiddle around with. Waldorf creates an amazing tool to design your sounds.

Therefore Waldorf comes up with the fully analog mod1 modulator module to shape, manipulate and create soundscapes for your imagination and made it to your modulation center of your modular system.

The mod1 module comprises three different modulation engines to increase the flexibility of your Eurorack system. Three highly flexible modulation sources in one module. All based on innovative analogue circuits for snappy attacks and super smooth curves.

First, a symmetry generator which could be used as a LFO or short envelope.

Second, a multi-stage envelope with three configurable decay stages including loop mode for complex modulation shapes.

And third, a short envelope with optional loop mode and curve control.

### 6.1 Symmetry Generator



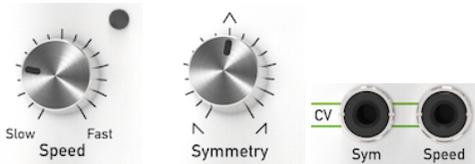
The symmetry generator has three modes: Trigger, Gate and LFO.

- In LFO mode it runs continuously when nothing is patched to the input. This will be the most common form to modulate a destination parameter in a cyclic way. For example to higher and lower the pitch of an oscillator or to open and close a filter cutoff. The standard setting is by maximum 25Hz and minimum 0.2Hz. (5 seconds per cycle). But this is user-trimable by a trimpot on the back of the module. You can slowdown the LFO to 1 minute per cycle, but then only 10Hz for the maximum is left. When the

CV input is connected, it runs only while a voltage is applied. In this case it is a kind of 'gated LFO.'

- In gate mode, it runs the wave shape only once when a gate signal is applied to the input. If the gate signal is shorter than a full wave cycle, the wave shape will be cut off once the gate signal has stopped.
- In trigger mode it is much like the gate mode, only that the wave shape is always fully played even when the trigger signal is shorter than the wave shape. Both, gate and trigger modes are mostly used for short envelopes.

Hint: In LFO mode the output signal is bipolar like a classic LFO, in gate or trigger mode the output is unipolar like a classic envelope.



The *Speed* knob controls the frequency and the *Symmetry* knob the shape of the wave. Both could be modulated by the CV inputs. For speed, the CV signal is added to the value of the panel knob. For CV value only, you have to set the speed amount to 0, or you put the *Speed* knob to the max and use negative CV values. The whole CV range is 0-8V from left to the maximum point.

The *Symmetry* knob controls the wave shape from a falling sawtooth in full left position, via a triangle shape in 12 o'clock position, to a rising sawtooth in fully right position (assuming the upper switch is in 'Lin' position).

The CV input for symmetry works a bit differently as it increases the rising phase for positive voltages and the falling phase for negative. This has the effect that the overall frequency isn't constant. The LED indicates an active rising phase and therefore not only indicates frequency but also the shape.



The *Square/Lin* switch controls if the output consists of linear segments for sawtooth and triangle shapes, or in rectangular shape in which case the symmetry controls the pulse width. Square is mostly useful in LFO mode.

## 6.2 Multi-Stage Envelope

The multi-stage envelope implements an classic ADSR but with three decay stages, each configurable in decay time and target level.



The number of decay stages is configured with the *Decay Stages* switch. The sustain - aka the hold phase while the key or gate is active - is then at the final decay stage.

- In position 1 it implements a classic ADSR envelope.
- In position 2, after the first decay is reached, the envelope gets automatically in the second decay phase to reach the second decay level, which is then hold as sustain level.
- And according in position 3 all three decay stages are ran through until the sustain level is reached.

The target levels of the decay phases 2 and 3 do not need to be in falling order, i.e. after falling to decay level 1 it could rise again to a higher decay level at stage 2 and so forth. The LEDs at the decay stages are lit, while the respective target levels are approached, and switched off when the target level is reached.



The *Attack* knob determines the initial rise time to full level. When the envelope is re-gated while it is still in release, the attack starts from the current level which is the typical behaviour for analogue envelopes.

The *Release* knob determines the release time when the input gate is stopped.



When the *Trigger* input is used instead of the *Gate* input, the envelope is re-triggered by a positive voltage impulse at the trigger input. It then runs until the last decay stage and goes immediately into release. If you patch both, *Trigger* and *Gate* inputs, then the *Trigger* input would restart the envelope even when the *Gate* input is still held positive.



When the *Loop* switch gets activated, the envelope is automatically re-started when the final decay level is reached. This of course happens under the gate/trigger logic, i.e. you still need to feed a gate signal to get it running. If the gate input isn't patched, then the gate signal from the Eurorack bus is used, but only if the trigger input isn't patched. The inverse output gives the same envelope but with negative voltages.

### 6.3 Rise and Fall

This section is a short attack-release envelope generator that is gated from the input.



The curve for the rising phase is shaped by the curve knob from straight to curved. The falling phase is always curved.



When the *Loop* switch is activated, the envelope toggles between rising and falling phase while the input receives a positive gate signal. In this mode it is more a cycled attack-decay envelope. The LED indicates an active rise phase.

If the input isn't patched, then the gate signal from the Eurorack bus is used.

## 7 Tips & Tricks

- if you like to have a full ADSR shape cycled, you would set the number of decay stages to 2, set the level of the second decay stage to zero and use the second decay time as a release time.
- *Inv Out* provides negative voltages. This is useful for modulating filter cut-off frequencies in the falling direction, which is sometimes applied for high pass filters.
- Especially together with the Waldorf nw1 wavetable module you can get some exciting results by modulating the position of the wavetable by the AD3SR and modulating the spectrum with the symmetry generator. You will be delighted.
- Try to use the AD3SR as a sync source or a PWM source. It works fine as well with interesting results.

## 8 Troubleshooting

### 8.1 Modules Power Fail

- Check the orientation of the pin headers on your modules
- Check if the total power consumption of your modules does not exceed the specifications of your case/frame power supply

## 9 Specifications

Power Supply: +12V/150mA, -12V/150mA

Width: 30HP, 152.4mm

Height: 3U, 133.3mm

Depth: 25mm

Total Weight: 350g

Technical specifications and design are subject to change without notice.

## 10 Block Diagram

