## General

The LOOP ADSR module is a CV-controllable envelope with loop function and adjustable control characteristic. The envelope offers four phases: attack, decay, sustain and release. In loop-mode, the module can alternatively be used as LFO. The control characteristic can continuously be changed from linear to logarithmic, making this envelope particularly suited for percussive sounds and for the modulation of fast sequencer-lines.

## Operation

The LOOP ADSR module is compatible to Doepfer's A-100 modular system in design, bus-power-supply and CV/gate-voltages. The 10-pin connector-cable has to be connected to the 16-pin bus-circuit-board. The required voltage supply is specified to 12 volts. A separate voltage of 5 volts is not needed.
The device's power consumption is approximately 30mA. The module's width measures 10 HP.

**ATTENTION:** Please carefully pay attention to correct polarity! The colored lead of the ribbon cable must point downwards, i.e.: The cable must not be twisted.

## ADSR-mode

When powering on the module, it defaults to ADSR-mode. The controls **Attack**, **Decay**, **Sustain** and **Release** adjust the shape/progress of the envelope. The value ranges are:

Attack approx. 1 to 5.000ms
Decay approx. 2 to 10.000ms
Release approx. 2 to 10.000ms

The envelope is triggered by a signal being received at the **Gate** input . To be carried out correctly, the voltage needs to be at least 2 volts and should not exceed a maximum of 15 volts.
In addition, the gate-input is connected to the system-bus. This way, the envelope can be addressed without additional patch cords from the front via a bus-access-module or a suited MIDI/CV-interface (which routes the gate-signal to the system-bus). Depending on the setting for the **Sustain** control, the envelope is held for the duration a gate is being applied to the **Gate** input.
Whenever a gate-signal is received at the input, the LED will light up red and visualize the progress of the envelope including the sustain level and the release time.

## Loop-mode

By pressing the **Loop** button, the module changes into loop-mode. Here, a continuous CV-signal is being generated which virtually equals a LFO waveform. However, in difference to a LFO, the signal always remains in the positive voltage range.
The loop is build by the phases attack and decay, whereas sustain and release are inoperable in this mode. At the same time, the positions of the **Attack** and **Decay** controls define the waveform and the speed of the CV-signal.

**Examples:**
With **Attack** set fully left and **Decay** to a value between 1 and 7, the result is a descending saw tooth. The higher the decay-value, the slower the waveform.
With **Decay** set fully left and **Attack** to a value between 1 and 7, the result is an ascending saw tooth.
With **Attack** and **Decay** being set to equal values, the result is a triangle waveform.

By using different settings for **Attack** and **Decay** as well as for the **Envelope** control (see below), numerous waveform variations can be created.

In loop-mode, the LED changes between red and green phases.

## Envelope

By using the **Envelope** control it is possible to continuously modify the signal control characteristic for the phases attack, decay and release between linear and logarithmic.
The effect of this control is clearly noticeable in ADSR-mode, especially with short control times. When set to logarithmic characteristic, the decay seems to act even faster. Therefore, this setting is best-suited to create percussive sounds and fast sequence figures. On the other hand, attack seems to have a shorter course when being used with a linear control characteristic. This perception is related to the way human hearing works.
In loop-mode, almost ideal waveforms can be generated by using a linear control characteristic. By using a logarithmic control characteristic, the resulting waveforms are pretty unusual for standard LFOs.

## CONNECTIONS

## Gate

A gate- respectively trigger-signal at the **Gate** input will trigger the envelope. Acceptable signal voltages need to be within 2 and 10 volts with positive slope.
In loop-mode, the waveform can be restarted by a gate- or trigger-signal, which equals the reset-function of a typical LFO.

## Attack - Decay - Release

A CV-voltage applied to these inputs will be added to the current value of the corresponding control. Therefore, higher control voltages will result in longer durations of the corresponding phase. The ideal voltages to be used here range from 0 to +5 volts.

## Out

This jack outputs the CV-signal being generated by the module (ADSR resp. loop) within a range of 0 to +5 volts.

## /Out

This jack outputs the CV-signal being generated by the module with inverted polarity (0 to -5 volts).

## Operating Manual

# Module LOOP ADSR