Hampshire Electronics

ADSR Envelope Generator in Eurorack Format

Instructions and Details

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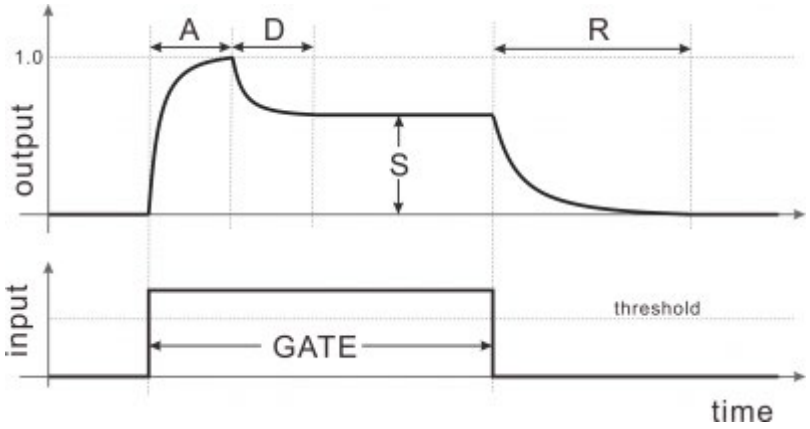
Overview

The Hampshire Electronics ADSR Envelope Generator is a 100% analogue envelope generator in the popular Eurorack format.

An envelope generator produces a voltage at its output which can be used for modulating a range of other functions, generally a Voltage Controlled Amplifier or Voltage Controlled Filter.

The shape of the envelope generated by the module then controls the volume of output by the VCA or the filter cut-off.

The ADSR envelope has four distinct phases: Attack, Decay, Sustain and Release. Together these phases make up the well-known ADSR shape:



The key details of the ADSR are:

- 14HP Wide Eurorack module with thin profile (20mm deep from faceplate)
- Controls designed and laid-out with performance in mind
- 100% analogue circuitry
- Short snappy fast attack
- Capable of very long attacks, decays and releases, especially when positive feedback is used
- Gate CV input and button
- Retriggering with trigger CV input and button
- A range of attenuated inverted and non-inverted outputs
- Voltage control of Attack, Decay, Sustain and Release
- Self-feedback from inverted and non-inverted inputs enables the shape of the Attack, Decay and Release phases to be customized
- 43ma @ +12v
- 43ma @ -12v

Installation

Power Availability

The ADSR Envelope Generator module draws the following current from your power supply:

43ma @ +12v

43ma @ -12v

You should first ensure that your power system has enough power capacity to drive the module before considering installation. If you are in doubt, please consult with your power supply manufacturer.

Connecting the Power

Refer to the writing on the back of the module next to the 16-pin power connector to ensure that you connect the power supply correctly. The +12v, -12v and ground (GND) pins will be clearly marked.

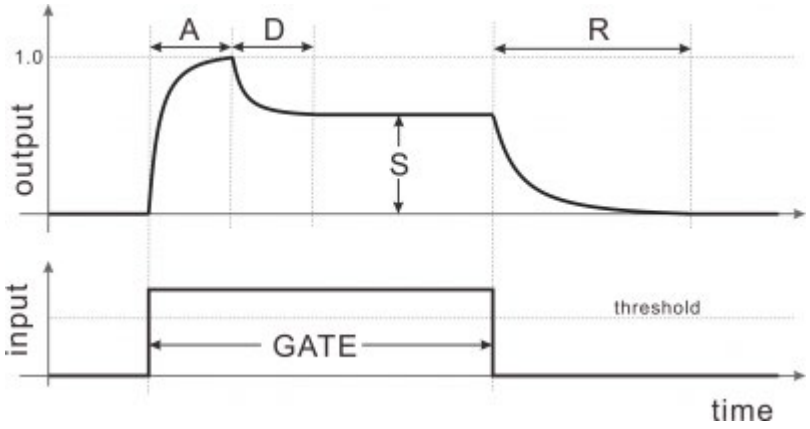
The power inputs are diode protected but damage may occur if the unit is connected incorrectly.

Fitment

Use the screws provided to firmly fit the module into your case. You should make sure that the module does not move when you insert and remove patch cables.

Using the ADSR Envelope Generator Module

The ADSR Envelope Generator module is used to generate the classic ADSR envelope curve. This is a four-stage envelope as follows:



The Attack, Decay and Sustain sections of the envelope occur during the time the gate CV input of button is high (+5v). When the gate goes low, the Release phase starts, regardless of which state the envelope is currently in.

Re-triggering the module either via the trigger button or trigger CV input (+5v) will re-start the Attack phase from whichever state the envelope is currently in.

Attack

The Attack phase begins when a +5v voltage source is fed into the gate CV input or the gate button is pressed. At this point the envelope output rises in a log shape to reach its peak of +5v at the main out output.

As soon as the +5v level is reached the Attack phase is complete.

The length of the Attack phase can be controlled via the ATTACK knob or via one of the two A (attack) CV inputs. The range of voltage accepted by the A CV input is 0v to +5v.

Decay

The Decay phase begins when the Attack phase is complete and the main out has reached +5v. The Decay phase will only be active as long as a +5v input continues to be present at the gate CV input or the gate button is pressed. During the Decay stage the voltage will fall in an inverse exponential shape until it reaches the voltage level set by the SUSTAIN knob or the value at the sustain CV input.

As soon as the envelope decays to the sustain level, the decay phase is complete and the envelope will move to the Sustain phase.

The length of the Decay phase can be controlled via the DECAY knob or via one of the two D (decay) CV inputs. The range of voltage accepted by the D CV input is 0v to +5v.

Sustain

The Sustain phase begins when the decay phase is complete and the envelope falls to the sustain level. The sustain level is then held, without the envelope rising or falling, as long as +5v is present at the gate CV input or the gate button is pressed.

The length of the Sustain phase can be controlled via the SUSTAIN knob or via one of the two S (sustain) CV inputs. The range of voltage accepted by the S CV input is 0v to +5v.

Once the voltage at the gate CV input falls to 0v or the gate button is no longer depressed, the Sustain phase is complete and the envelope moves into the Release phase.

Release

The Release phase begins when there is no longer +5v voltage source fed into the gate CV input or the gate button is released. At this point the envelope falls in an inverse exponential shape until it reaches 0v at the main out output.

As soon as the 0v level is reached the Release phase is complete and the ADSR envelope is complete.

The length of the Release phase can be controlled via the RELEASE knob or via one of the two R (release) CV inputs. The range of voltage accepted by the R CV input is 0v to +5v.

Outputs

The ADSR Envelope module has seven outputs which have a maximum range from 0v to +5v.

Main Output

There is one main output named main out. This will always output the full envelope voltage and should be generally used as the main output where a normal ADSR envelope profile is required.

Attenuated Outputs

In addition to the main out, the module also provides three pairs of inverted and non-inverted outputs. Each of these pairs has its own attenuator knob which is used to change the output level of the pair of outputs.

These outputs can be used as normal envelope outs if you wish to have additional outputs other than main out. The inverting outputs produce a mirror image of the non-inverted with the voltage being negative rather than positive.

The other main use for the attenuated outputs is to manipulate the envelope. There are three pairs of attenuated outputs so that they can be used as feedbacks into the A, D and R CV inputs.

While the information below gives some idea of the kind of effects that can be created, experimentation here is the name of the game!

Using the Non-Inverted Attenuated Outputs

The non-inverted outputs can be used to change the shape of the Attack, Decay and Release curves.

Patching from a positive attenuated output back into the A (attack) CV will cause the curve to take on a more flattened curve. Using this technique, you can achieve very long attack times.

Using the same technique on the D (decay) and R (release) CV inputs can straighten the curve or push it into a more rounded, downward shape, depending on the attenuation level.

Using the Inverted Attenuated Outputs

The inverted outputs can also be used to change the shape of the Attack, Decay and Release curves.

Patching from an inverted attenuated output back into the A (attack) CV will cause the curve to take on a more exponential look. Depending on the attenuation level, this will range from a straightening of the curve to an extreme upward curve. At higher feedback levels it may be necessary to feed additional positive voltage into the second A (attack) CV input in order to achieve longer attack times with the exponential shape.

Using the same technique on the D (decay) and R (release) CV inputs will also change the shape to help achieve a range of envelope profiles.