

Instruction Manual

Exponential ADSR (6)



Godlike Productions



Creating Art from Technology

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Godlike Productions Contact

All Customers:

Godlike Productions
PO Box 1520
Midland DC, WA, 6936, AUSTRALIA

Email: info@godlike.com.au

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Getting Started

This is a quick manual to the Exponential ADSR Envelope for the H9000.

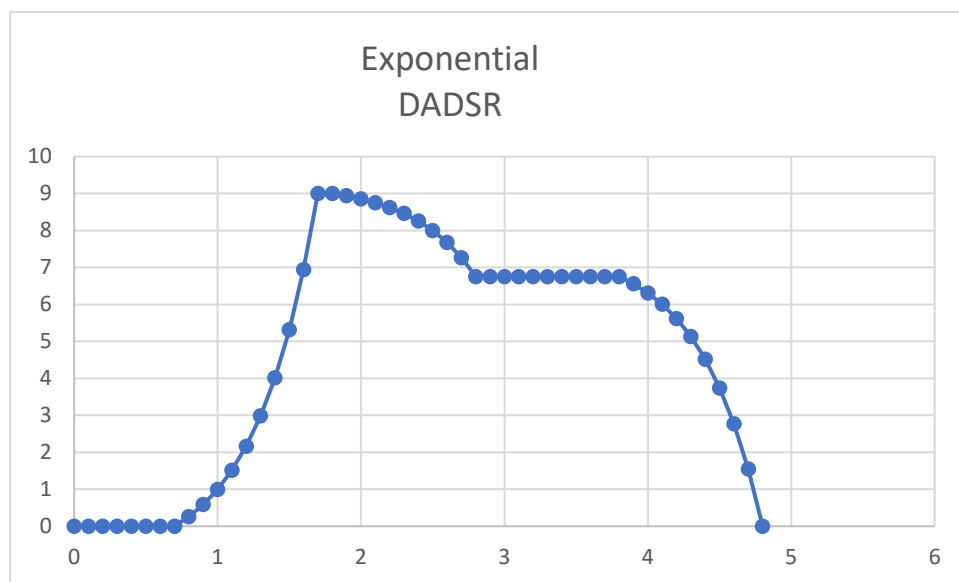
This is a proof of concept on how to build an exponential ADSR in VSIG, and this is not meant for beginners. It is expected you know how to use VSIG, and can at least build and load a functioning algorithm to your H9000.

This just has a few notes to remind myself why the heck I did stuff and how to make the most important changes for you to integrate this into your own project.

First up, the envelopes are built with control signals, not audio signals, as such the max speed is sampling rate/4.

The all important exponent base (or how aggressive the envelopes are) is in block 8 - base. The higher the number the deeper the curve.

This VSIG will build an envelope like this



Basically all the graphs at the bottom I used for bug testing. I left them there so you can see which bits of the envelope are working.

The Philosophy

Basically the trigger button triggers a few things.

Firstly the signal is passed through a delay for the Delay section of the envelope.

The Attack and Decay sections both use the linear attack section of the available ADSR envelopes. The Release section uses the release section of another VSIG ADSR. I've set attack and decay to the maximum rate for the release. The trigger enters a flip flop (down the bottom of the VSIG), which is latched with the state of the Attack envelope and the Trigger button. Basically this prevents the Release from triggering if we don't get past the decay section of the Envelope, while also silencing the attack and decay section of this envelope. This latch is released when the envelope enters release mode, which is when the release section of this envelope is triggered.

The output of each envelope is the exponent for a power equation (ie $\text{base}^{\text{envelope value}}$).

For the overall envelope the basic equation is. Attack - Decay - Release.

Attack always goes to full scale (unless you release early). In this case Decay is not triggered. Release takes the sustain value and basically multiplies it by the Release envelope value and subtracts it from the sustain level. While the trigger is engaged, the Envelope output is sampled and the value held when the trigger is released. This value is fed to the release envelope to work out where to start the release section from.

When the attack envelope ends, the ADSR State changes from 1 to 2. This is the trigger to start the Decay ADSR (we just use the Attack segment). We do the power function and then subtract this from the Attack segment (using a $\ast -1$), and multiply it by $(1 - \text{Sustain Level})$. This will mean the decay segment ends at the sustain level. When the decay section finishes, the envelope just waits. The release envelope is already in the sustain section awaiting the trigger to be released.

That's pretty much it.

I have wired the envelope to control the oscillator pitch, so it's easy to hear.

To implement this replace the trigger button with your signal. It expects the same trigger as the standard ADSR. 1 to trigger, 0 to enter release. Set your base to what you want.

The envelope output is a control signal from Block 41 EnvelopeOutput.

You can get rid of menu page 2 completely, but all the Envelope controls are on Menu Page 1

