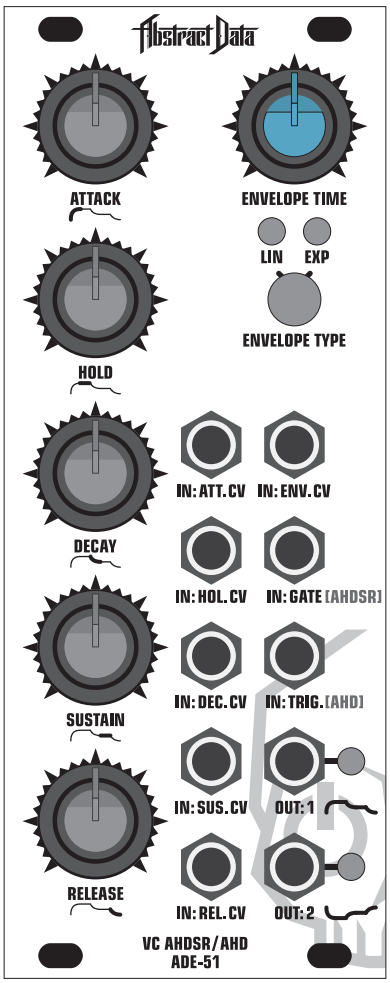
ADE-51 VC AHDSR/AHD

3 or 5-stage Envelope Generator with Linear & Exponential curves, Trigger & re-Trigger functionality, dual outputs & complete CV control.



USER GUIDE

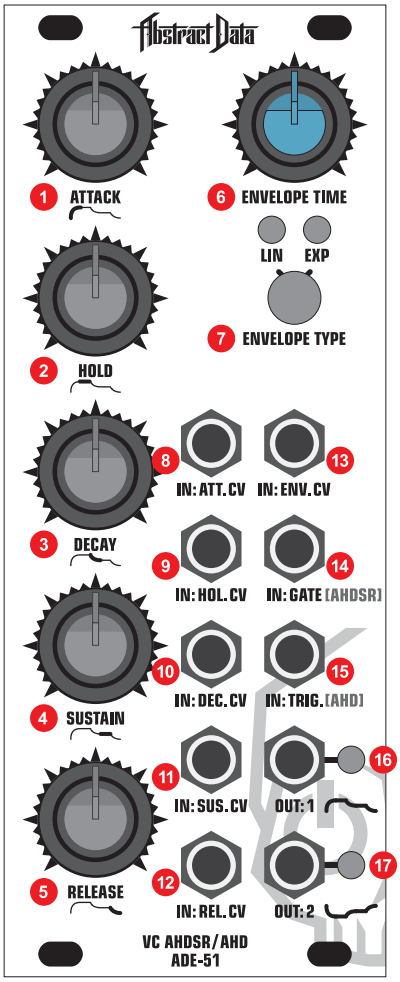
 http://www.abstractdata.biz info@abstractdata.biz Version 1.0 October 2017

Contents

1: Module Overview

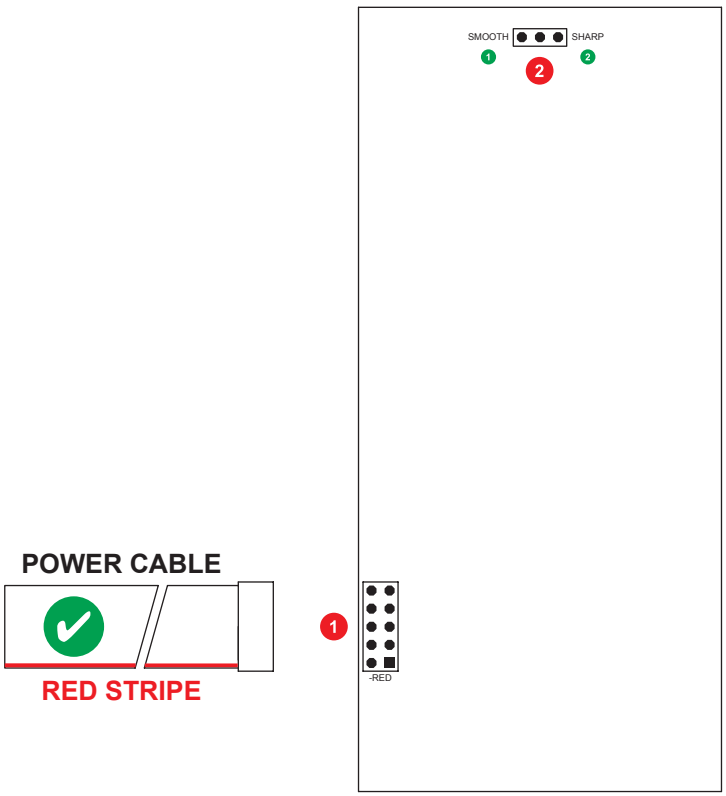
- The ADE-51 is a highly-specced Envelope Generator (EG) with a full Control Voltage (CV) implementation.
- Linear and exponential envelope types are easily selectable via a dedicated front panel button.
- 5-stage AHDSR envelopes (see Page 8) can be generated via the Gate input and 3-stage AHD Envelopes (see Page 8) can be generated via the Trigger input.
- 5-stage AHDSR envelopes offer both Trigger and re-Trigger functionality by combining the Gate and Trigger inputs.
- Two simultaneous outputs are available offering a standard ‘rising’ envelope and an inverted ‘falling’ envelope - with no need for additional inversion or biasing stages.
- The Envelope Time control allows manual or CV control over all envelope stages simultaneously.
- The ADE-51 is capable of fast, precise envelope stages - each with a rise/fall time minimum of 1 Millisecond and a maximum of 10 Seconds for the Attack, Decay and Release stages and a 2.5 Second maximum for the Hold stage.
- The pot responses are tapered to allow for greater precision when dialling in faster envelope times.
- There are two user-selectable pot taper responses - ‘Smooth’ and ‘Sharp’ - which are selected using a jumper connector on the rear PCB.
- The ADE-51 works with a standard 0-5V CV range on all CV inputs. CV outside of the 0-5V range will be blocked by the CV input conditioning - but please try to ensure that the CV signals used are generally within the Eurorack standard.
- The ADE-51 has reverse-voltage protection built in - but please pay attention to the power supply and connection guidelines on Page 3 of this manual.

2: Front Panel



1	**ATTACK**	Sets the time of the Attack stage from 1 Millisecond to 10 Seconds
2	**HOLD**	Sets the time of the Hold stage from 1 Millisecond to 2.5 Seconds
3	**DECAY**	Sets the time of the Decay stage from 1 Millisecond to 10 Seconds
4	**SUSTAIN**	Sets the level of the Sustain stage from 0 to +5V
5	**RELEASE**	Sets the time of the Release stage from 1 Millisecond to 10 Seconds
6	**ENVELOPE TIME**	Adjusts the overall time of the entire envelope
7	**ENVELOPE TYPE**	Selects between Linear and Exponential envelope response
8	**IN: ATT. CV**	CV input for modulating the time of the Attack stage
9	**IN: HOL. CV**	CV input for modulating the time of the Hold stage
10	**IN: DEC. CV**	CV input for modulating the time of the Decay stage
11	**IN: SUS. CV**	CV input for modulating the level of the Sustain stage
12	**IN: REL. CV**	CV input for modulating the time of the Release stage
13	**IN: ENV. CV**	CV input for modulating the time of the entire envelope
14	**IN: GATE [AHDSR]**	Gate input to Trigger AHDSR envelopes
15	**IN: TRIG [AHD]**	Trigger Input for AHDSR re-Triggering and generating AHD envelopes
16	**OUT: 1**	Standard ‘rising’ envelope output from 0 to +5V
17	**OUT: 2**	Inverted ‘falling’ envelope output from +5 to 0V

3: Rear Connections



1 **POWER CONNECTION:** 10-16 pin Eurorack power connection

2 **POT CURVE TYPE:** Jumper connection selects 1) Smooth or 2) Sharp Pot curves

PRECAUTIONS: Only connect the power cable to the power connection as shown.

DO NOT CONNECT THE POWER CABLE TO ANY OTHER PORT!

The ADE-51 uses the Doepfer standard for power connection and cable orientation.

The RED stripe on the supplied power cable connects to the NEGATIVE (-12V) rail on the ADE-51 with the RED stripe facing DOWN. This is marked on the back of the ADE-51 PCB as “– RED”.

The ADE-51 has diode and polyfuse protection built in but an incorrectly connected cable may still cause permanent damage to the module or the power supply.

The rear panel of the ADE-51 has exposed parts and connections. Please ensure when handling the ADE-51 that the unit is held by the sides of the front panel or the sides of the Printed Circuit Board (PCB).

4: Quick Start

1) GATE INPUT

Use a Gate, Trigger or Clock Signal as a Gate input to IN:GATE

2) ENVELOPE OUTPUT

Connect OUT:1 to the Control Voltage (CV) input of a Voltage Controlled Amplifier (VCA) or to some other CV modulation input.

3) ENVELOPE CONTROLS

Set the ENVELOPE TIME knob to fully counter-clockwise (shortest envelope time) and all other knobs to approximately 09:00 (pointing left).

The LED at OUT:1 should now be showing that the envelope is triggering.

Adjust the individual controls for each stage of the envelope to achieve the desired envelope time, shape and sound.

5: Inputs & Outputs

1) IN: ATT. CV

A CV signal at this input enables external control over the time of the Attack stage of the envelope.

ADE-51 CV inputs are designed to take a 0-5V CV signal. CV signals outside of the 0-5V range (<0V and >5V) will be blocked by the final output of the CV circuit - but please try to ensure that the CV signals used are generally within the Eurorack standard.

ADE-51 CV inputs work with their associated pot to provide an initial CV bias level. Positive CV signals are added to and negative signals are subtracted from the initial CV bias level allowing the use of attenuated, AC and (Low Frequency Oscillator) LFO signals to provide a full range of modulation.

2) IN: HOL. CV

A CV signal at this input enables external control over the time of the Hold stage of the envelope.

3) IN: DEC. CV

A CV signal at this input enables external control over the time of the Decay stage of the envelope.

4) IN: SUS. CV

A CV signal at this input enables external control over the level of the Sustain stage of the envelope.

5) IN: REL. CV

A CV signal at this input enables external control over the time of the Release stage of the envelope.

6) IN: ENV. CV

A CV signal at this input enables external control of the overall time of the entire envelope.

7) IN: GATE [AHDSR]

The Gate input will accept a Gate, Trigger, Pulse, Clock or any positive-going signal with a fast, rising edge. Any signal of this type at this input will cause the 5-stage AHDSR envelope to generate.

The ADE-51 Gate input uses the standard envelope generation method where the Release stage is triggered as soon as the input signal goes low.

8) IN: TRIG [AHD]

The ADE-51 Trigger input has dual functionality. When used in conjunction with Gate triggering of 5-stage AHDSR envelopes - it acts as a re-Trigger input, causing the envelope to start generating again from the Attack stage (see Page 8).

Any re-Trigger signal received after the Attack and Hold stages have completed while the Gate signal is still ‘High’ will cause the Envelope to re-Trigger from the CV level the envelope was at when the re-Trigger was received (see Page 8).

Used by itself - it will Trigger a 3-stage AHD envelope that operates independently of the Trigger length. Here - the Attack time operates normally, the length of the ‘Sustain’ stage is determined by the Hold control at a full +5V and the ‘Release’ stage of the envelope is set by the Decay control (see Page 8).

9) OUT: 1

Standard envelope output in a 0-5V range.

10) OUT: 2

Inverted envelope output in a 5-0V range.

6: Knobs

1) ATTACK

Provides manual control over the time of the Attack stage of the envelope.

2) HOLD

Provides manual control over the time of the Hold stage of the envelope.

3) DECAY

Provides manual control over the time of the Decay stage of the envelope.

4) SUSTAIN

Provides manual control over the level of the Sustain stage of the envelope.

5) RELEASE

Provides manual control over the time of the Release stage of the envelope.

6) ENVELOPE TIME

Provides manual control of the overall time of the entire envelope.

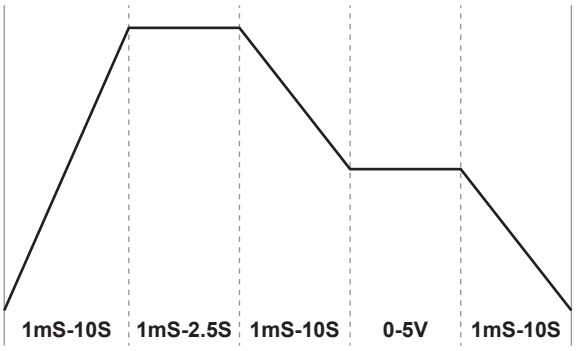
7: Buttons

1) ENVELOPE TYPE

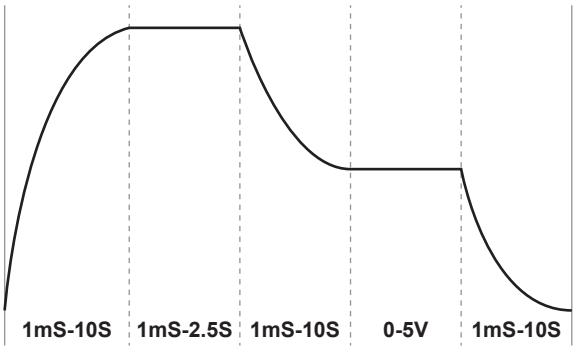
Selects between an output with an Exponential response and an output with a Linear response.

8: Operation

1.1) LINEAR RESPONSE

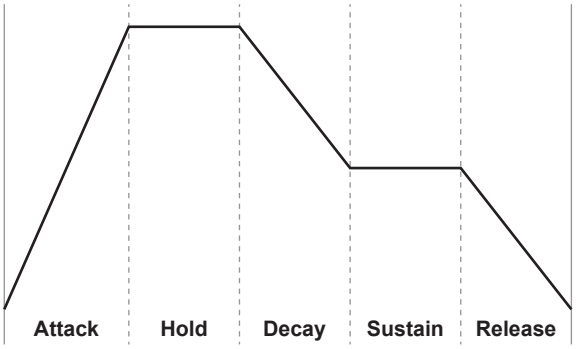


1.2) EXPONENTIAL RESPONSE

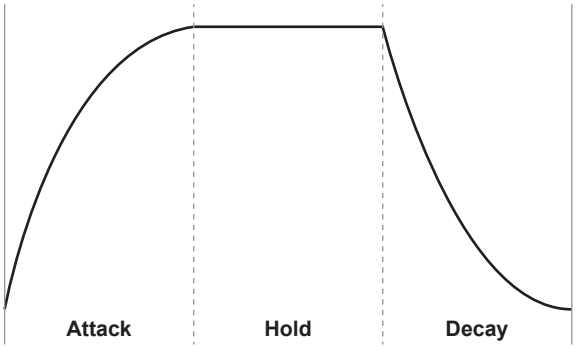


Linear envelope response is characterised by smooth, even rise and fall times and Exponential envelope response is characterised by a curved response that ‘speeds up’ over time.

2.1) AHDSR TYPE (*LIN/EXP)

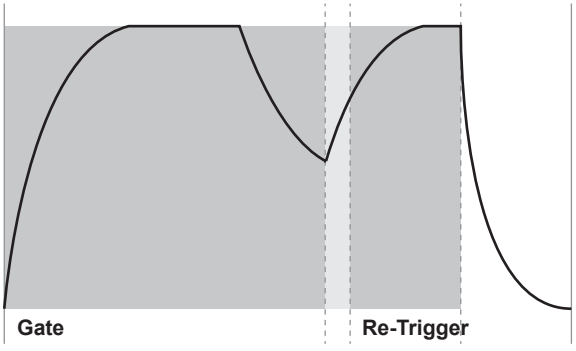


2.2) AHD TYPE (LIN/*EXP)

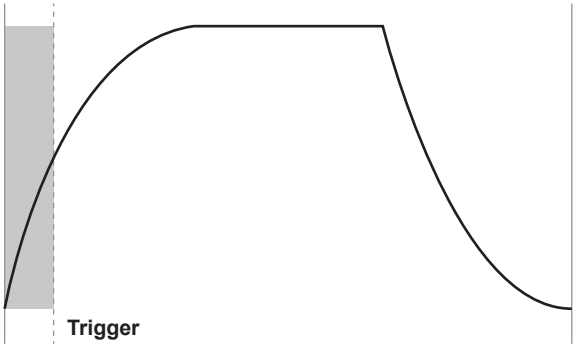


AHDSR is the ADE-51s standard, 5-stage envelope type, generated by a gate signal. A 3-stage AHD envelope can also be generated using the Trigger input where the time of the total envelope is set by the length of each stage and is independant of the Trigger/Gate length.

3.1) GATE/RE-TRIGGER (AHDSR)



3.2) TRIGGER (AHD)



The AHDSR envelope type can be re-Triggered at any stage after Hold. The envelope stages start again from the Attack stage at whatever level the envelope it is at when re-Triggered. When the initial Gate signal ends - the envelope enters the Release stage as normal. The AHD envelope type operates independently of Trigger/Gate length with all stage times set by the relative front panel controls.

9: Specs

HARDWARE:	**Controls (Knobs):**	Attack:	1mS to 10 Seconds
		Hold:	1mS to 2.5 Seconds
		Decay:	1mS to 10 Seconds
		Sustain:	0 to 5V
		Release:	1mS to 10 Seconds
		Envelope Time:	1mS to 10 Seconds
	Controls (Buttons):	Envelope Type:	Linear/Exponential
	Inputs (CV):	Attack:	0 to +5V CV
		Hold:	0 to +5V CV
		Decay:	0 to +5V CV
		Sustain:	0 to +5V CV
		Release:	0 to +5V CV
		Envelope Time:	0 to +5V CV
	Inputs (Gate/Trigger):	Gate:	AHDSR
		Re/Trigger:	AHDSR re-Trigger and AHD
	Outputs (Signal):	Output 1:	Standard envelope @ 0 to +5V
		Output 2:	Inverted envelope @ +5 to 0V
	Power Requirements:	+/-12V:	10-16-pin IDC connector
	Current Draw:	+12V:	Approx. 95mA average
		-12V:	Approx. 75mA average
		+5V:	NA
	Dimensions:	Width:	10HP
		Depth:	28mm [Panel to IDC connector]
	Supplied Accessories:	Cable:	1x 10-16-pin, IDC cable
		Screws:	4x M3

CREDITS:	**Firmware Development:**	Tom Wiltshire
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