ASR Envelope

Kassutronics

Board revision 1.1, documentation revision A

August 25, 2018

Description

The ASR envelope is a static envelope generator with loop feature. In envelope mode, it generates the same envelope shapes as a normal ADSR envelope, however, the Decay and Release rates are controlled by a single control named Release. The envelope has traditional RC charging/discharging (exponential decay) shapes, ideal for driving a linear VCA, modulating filter cutoff, etc. While it is not be the fastest envelope in the west, or in any cardinal direction for that matter, it is reasonably snappy with a 1.5ms minimum attack time.

In loop mode it becomes a basic LFO with rates ranging from 3 seconds up to 170 Hz governed by the Attack and Decay settings.

Please read this document through before starting, and especially check the notes in the bill of materials!

Features

- Traditional RC envelope shapes
- 7.5V peak output voltage
- Trigger threshold ∼1.5V.
- Looping / LFO mode
- 9mm pots, Thonkiconn jacks and all throughhole components on a single PCB
- 4hp Eurorack format
- Current usage (typical):
  +12V 15mA,
  −12V 15mA.

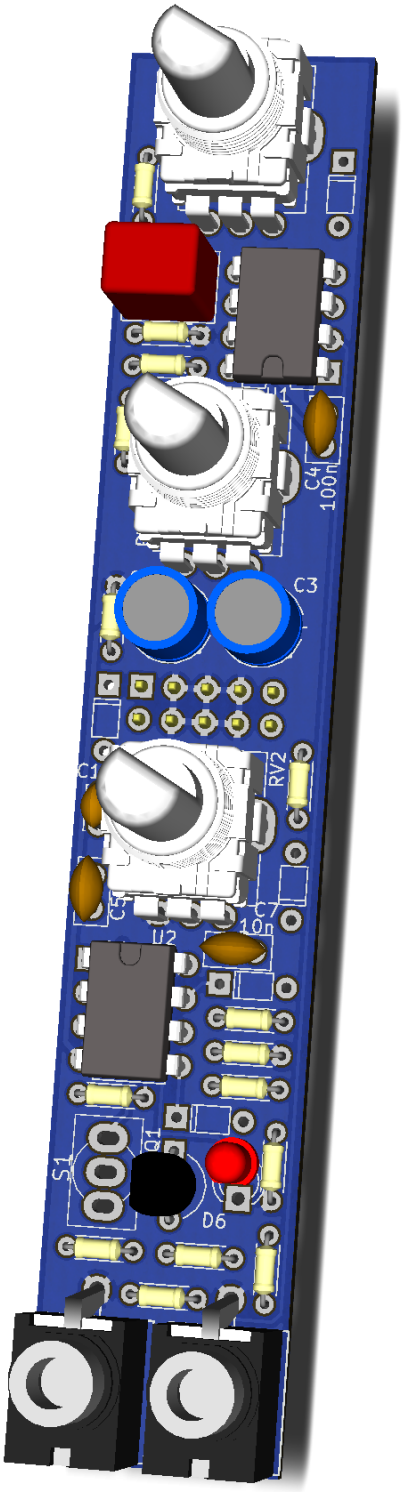
Schematics, PCB layout and documentation © 2018 Caspar Ockeloen-Korppi.

Build instructions

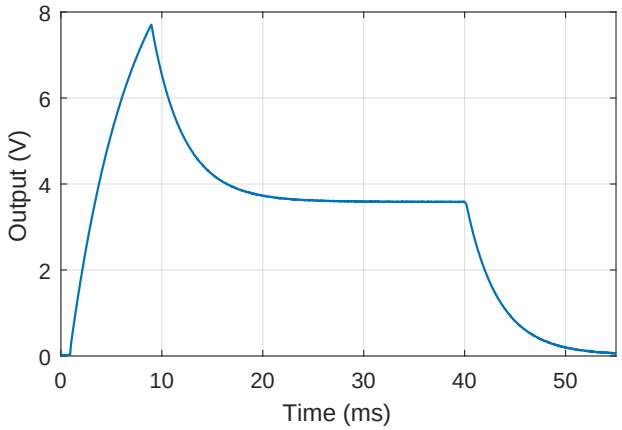
- The board is designed for small 0.4W-type metal film transistors, with 5.08mm (0.2Ť) hole spacing. Standard 0.6W metal film will fit if you place them vertically.
- Pots are standard ALPHA 9mm vertical type, available at e.g. Thonk or Tayda.
- Jacks are Thonkiconn.
- The 10uF caps should be 2.5mm lead spacing, max diameter 6.3mm and max height 9mm. I use Nichicon UST1H100MDD.
- The power header is a 5x2-pin 2.54mm unboxed header, and should be installed on the backside of the board.

Bill of materials

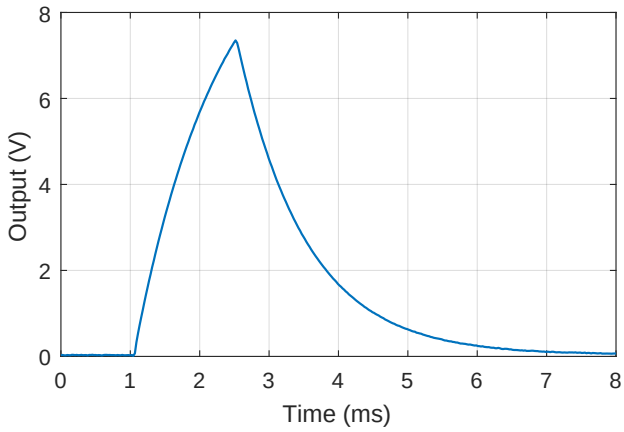
Qty	Designator	Value	Note
1	C1	1n	Ceramic, X7R or NP0, 2.5mm lead spacing
1	C7	10n	Ceramic, X7R, 2.5mm spacing
2	C4, C5	100n	Ceramic, X7R, 2.5mm spacing
1	C2	1u	Film, see schematic for details
2	C3, C6	10u	Min. 25V, 2.5mm pitch, max dia. 6.3mm, max height 9mm. Example: Nichicon UST1H100MDD
5	D1,D2,D3,D4,D5	1N4148	
1	D6		3mm red LED, high brightness
2	J1, J2		Thonkiconn
1	J3		2x5 pin unboxed male header, 2.54mm pitch
1	Q1	2N3904	BC547 etc can be used but has reversed pinout!
2	R1,R14	10k	All resistors 1% metal film small type (1/8 W or 0.4W).
1	R15	2.2k	
1	R13	4.7k	
4	R4,R5,R10,R11	1k	
1	R9	22k	
2	R3,R8	100k	
1	R7	220k	
3	R2,R6,R12	1M	
2	RV1,RV3	A1M	Alpha 9mm vertical
1	RV2	B100K	Alpha 9mm vertical
1	S1	SPDT switch	TS-01 or SMTS-102 (see schematic)
2	U1,U2	TL072	DIP8



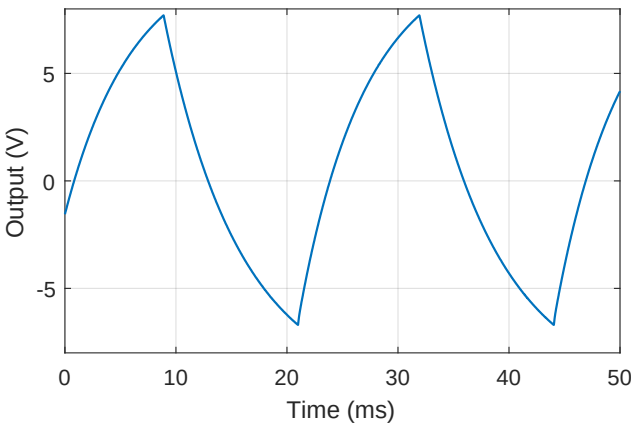
Board view



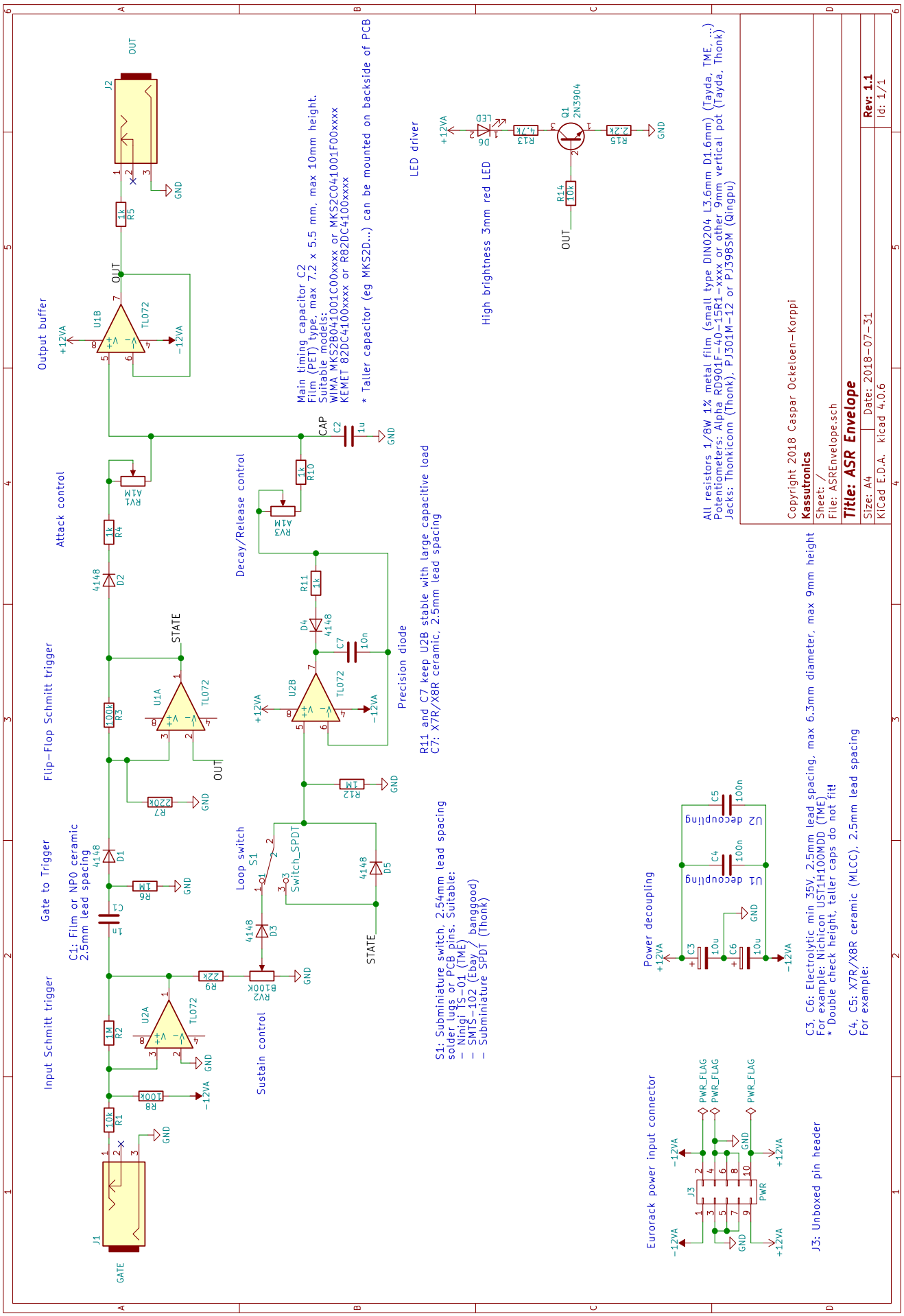
Typical envelope output



Fastest envelope (all knobs CCW)



Typical loop output


Output buffer
Attack control
Flip-Flop Schmitt trigger
Gate to Trigger
Input Schmitt trigger
Sustain control
Loop switch
Decay/Release control
Precision diode
LED driver
Power decoupling
Eurorack power input connector
Main timing capacitor C2
Film (PET) type, max 7.2 x 5.5 mm, max 10mm height.
Suitable models:
WIMA MKS2B041001C00xxxx or MKS2C041001F00xxxx
KEMET 82DC4100Xxxxx or R82DC4100Xxxxx
* Taller capacitor (eg MKS2D...) can be mounted on backside of PCB
High brightness 3mm red LED
All resistors 1/8W 1% metal film (small type DIN0204 L3.6mm D1.6mm) (Tayda, TME, ...)
Potentiometers: Alpha RD901F-40-15R1-xxxx or other 9mm vertical pot (Tayda, Thonk)
Jacks: Thonkiconn (Thonk), PJ301M-12 or PJ398SM (Qingpu)
C1: Film or NP0 ceramic
2.5mm lead spacing
R11 and C7 keep U2B stable with large capacitive load
C7: X7R/X8R ceramic, 2.5mm lead spacing
S1: Subminiature switch, 2.54mm lead spacing
solder lugs or PCB pins. Suitable:
- Ninigi TS-01 (TME)
- SMTS-102 (Ebay / banggood)
- Subminiature SPDT (Thonk)
C3, C6: Electrolytic min 35V, 2.5mm lead spacing, max 6.3mm diameter, max 9mm height
For example: Nichicon UST1H100MDD (TME)
* Double check height, taller caps do not fit!
C4, C5: X7R/X8R ceramic (MLCC), 2.5mm lead spacing
For example:
J3: Unboxed pin header
Copyright 2018 Caspar Ockeloen-Korppi
Kassutronics
Sheet: /
File: ASREnvelope.sch
Title: ASR Envelope
Size: A4
Date: 2018-07-31
Rev: 1.1
KiCad E.D.A. kicad 4.0.6
Id: 1/1

Revision history

Board revisions

1.0 Prototype

1.1 First release

Documentation revisions

A Initial documentation for board revision 1.1

Contact

Check for updated documentation and other information on my blog at kassu2000.blogspot.com. I am always happy to answer questions and receive feedback at kassutronics@gmail.com.