fonitronik PCBs for the Thomas Henry CMOS ADSR REV3

INTRODUCTION

This document contains additional information for building Thomas Henry's CMOS ADSR using the fonitronik DIY PCBs, sold via THONK, ModularAddict and synthCube.
The actual documentation of the original circuit design could be found here:
CMOS ADSR with built-in light show (electro-music.com)

For functionality and usage refer to these original documents. You will find the schematics and BOM there, too.
The fonitronik DIY PCBs allow to build this ADSR according to Thomas' original documentation (schematics and BOM), however, they add additional circuitry to add gate outputs for the single stages and an end trigger pulse, and a footprint for a 3rd timing cap to get three rate ranges.
Also there is a 2nd PCB for PCB-mounted front panel components, which is in eurorack format to fit the machined/printed front panel. It provides an additional switch which routes the end trigger to the trigger input, making this ADSR an LFO with Attack and Decay control.

The Front Panel Components PCB can be mounted piggy back to the actual circuit PCB. To do this in a proper way single row connectors should be used (male and female). Both rows have 32 pins with a .1 spacing. The PCB asks for a standard miniature SPDT on-off switch for the mode (ADSR/LFO), and a standard miniature SPDT on-off-on switch for the three rate ranges (you could also just use another on-on to have just the two original ranges).
The Front Panel Components PCB offers footprints for 9mm potentiometers, PJ301-B jack sockets, and miniature switches. Almost any 9mm vertical mount Potentiometer should do. I like the Alpha Single-Gang 9mm Right-Angle PC Mount type.
The sockets are available from THONK(Europe) or ERTHENVAR (USA).

ADDITIONAL FUNCTIONALITY

1. Adding the 3rd rate range
The original schematic shows C8 and C11 as timing caps, with C8 always in circuit and C11 switched in in parallel. So C8 has to be the smaller value, C11 the larger value. One would use a SPDT on-on toggle to switch C11 on and off.
The PCB provides a footprint for an additional/optional 3rd timing cap. If you populate it, you will have to use a SPDT on-off-on toggle to switch on C11, the optional cap or leave them both off of the circuit, thus giving you the three ranges md, hi, lo.
The values are totally up to you. The caps don't have to be polarized anyways. I used 0.1uF (C8), 1uF (OPT), and 10uF (C11). Here is room for experimentation…

2. Stage-Gates and End-Trigger
These are created by feeding the LED-'On' signals into comparators. The additional circuitry is labeled with a leading 'A' to be easily distinguished from the original circuitry. On the PCB this circuitry can be found on one end, divided from the original circuitry by a white line.

NOTES

- The PCB provides footprints for "Ferrites", however, you could use 10R resistors (kind of crude fuses), or rectifier diodes (i.e. 2N4001) for reverse protection, or just a jumper.
- For manual wiring you could use MTA-100 headers (footprints on the PCB). When using the Eurorack adapter PCB you would use two 32pin single row headers and receptables.
- For a higher output level you should leave off R6 and change R5 to 1k.

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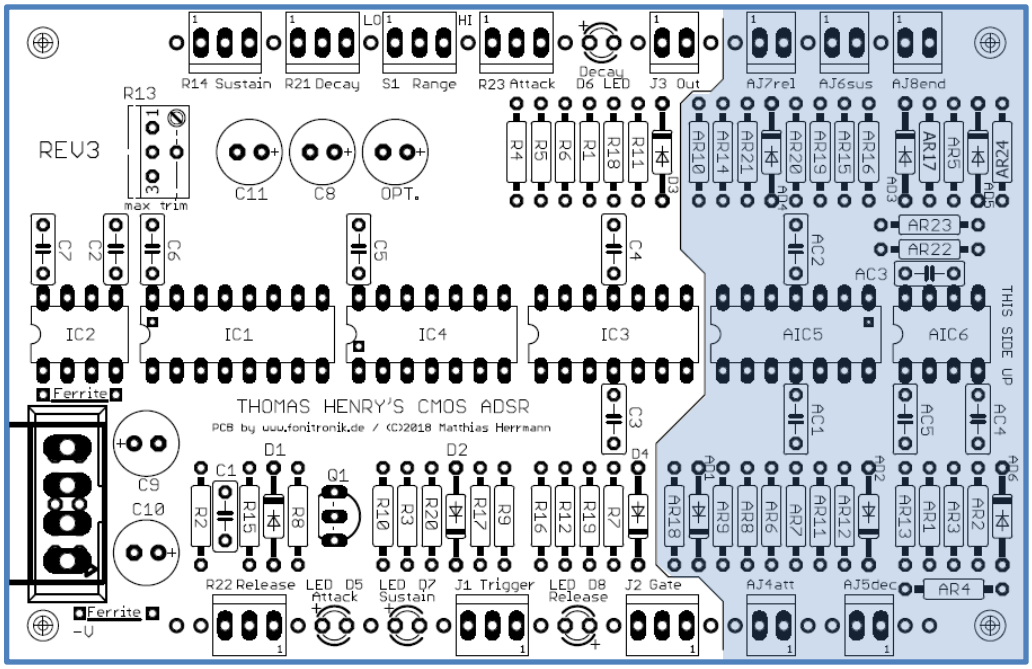
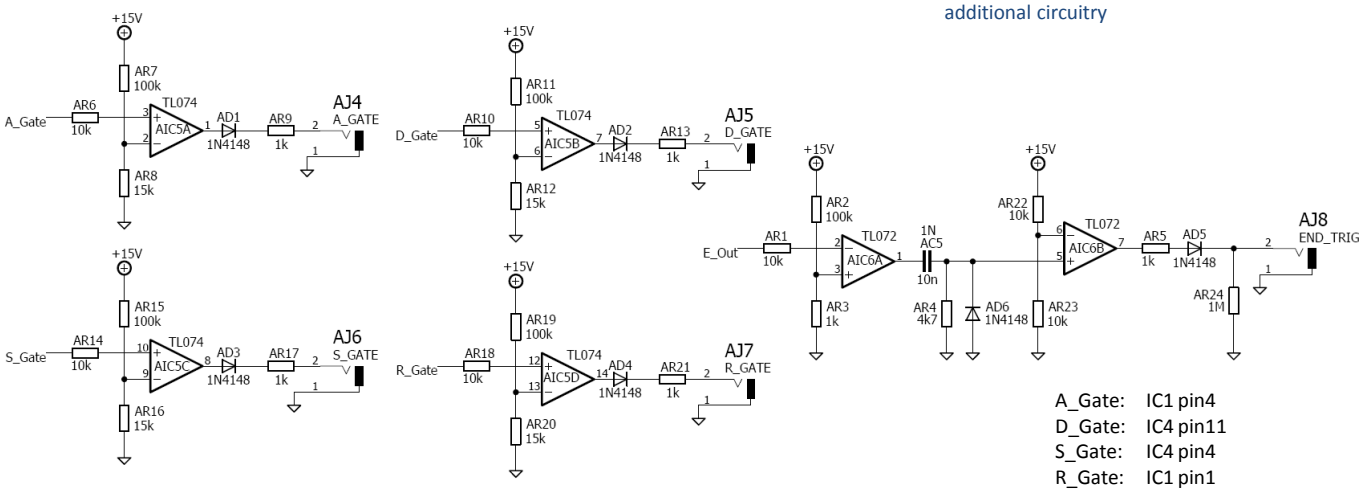


additional circuitry



A_Gate: IC1 pin4
D_Gate: IC4 pin11
S_Gate: IC4 pin4
R_Gate: IC1 pin1
E_Out: J3 (junction R5/R6)

QTY	Value	Parts (Footprint)
Resistors		
6	1k	AR3, AR5, AR9, AR13, AR17, AR21
1	4k7	AR4
7	10k	AR1, AR6, AR10, AR14, AR18, AR22, AR23
4	15k	AR8, AR12, AR16, AR20
5	100k	AR2, AR7, AR11, AR15, AR19
1	1M	AR24
Capacitors		
5	10n	AC1, AC2, AC3, AC4, AC5

QTY	Value	Parts (Footprint)
Semi"s		
6	1N4148	AD1, AD2, AD3, AD4, AD5, AD6
1	TL072	AIC6
1	TL074	AIC5
1	A_GATE	AJ4
1	D_GATE	AJ5
1	S_GATE	AJ6
1	R_GATE	AJ7
1	END_TRIG	AJ8