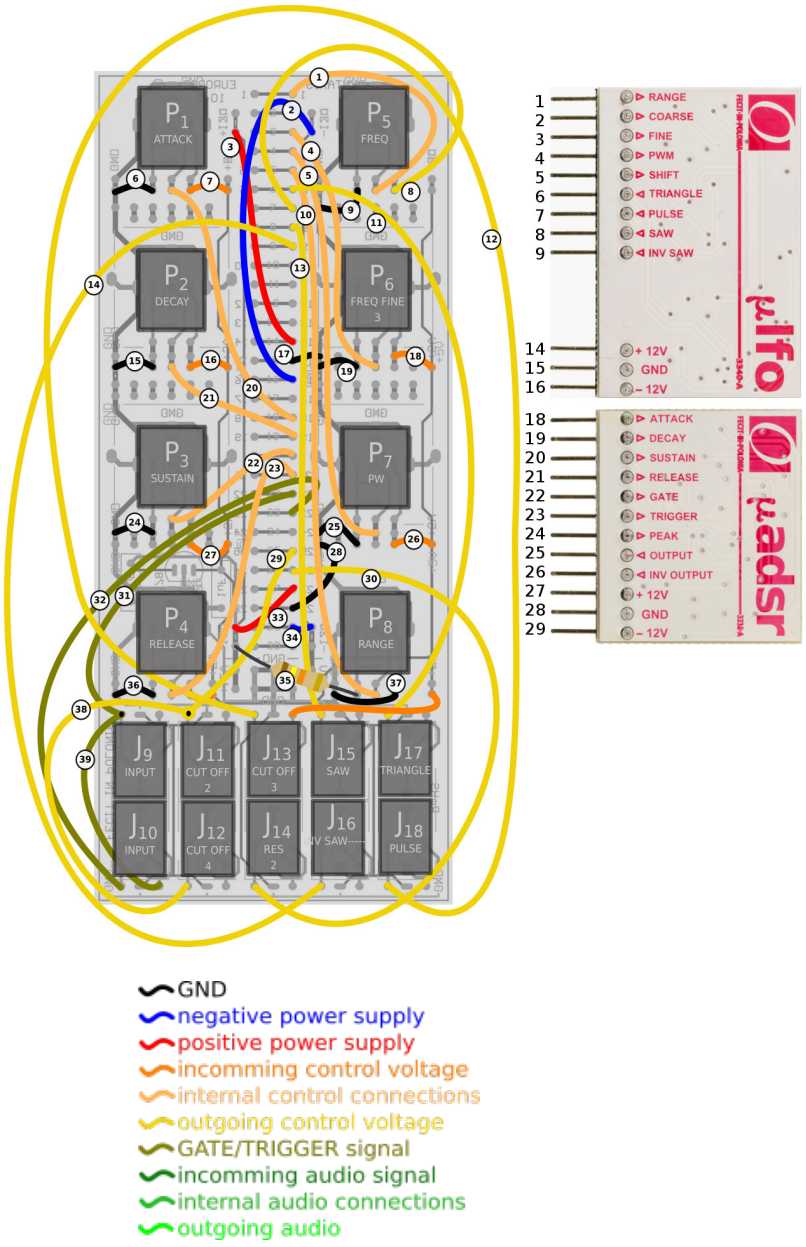
syntaxis

diy level 1

ENV/LFO

1.1

integrated modulation source



Features

- two independent modulation sources: ADSR envelope and LFO
- ADSR envelope with 5Vpp range
- RC envelope shape
- independent gate and trigger
- positive and negative envelope output
- 4 independently accessible LFO waveforms: triangle, saw, inverted saw, pulse
- 5Vpp LFO output signal with adjustable DC shift
- pulse width control for the pulse wave
- coarse and fine frequency control
- all outputs buffered and protected
- power supply −12V, GND, +12V
- on-board +5V regulator
- EURORACK compatible power supply connector 2x5 pins
- EURORACK dimensions: 10HP module width, 38mm module depth

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Components

EURORACK-10-A PCB	1
μLFO-3340-A	1
μADSR-3310-A	1
potentiometer 9mm Alpha, T18 shaft	8
jack socket Thonkiconn	10
79L05 regulator	1
1μF capacitor (PP or PA)	2
pin headers 2x5	1

Controls

ADSR

P1	ATTACK manual control
P2	DECAY manual control
P3	SUSTAIN manual control
P4	RELEASE manual control
J9	GATE input
J10	TRIGGER input; defaults to GATE when J10 not plugged
J11, J12	envelope output
J14	inverted envelope output

LFO

P5	LFO frequency manual control — coarse
P6	LFO frequency manual control — fine
P7	puls width manual control for LFO pulse wave
P8	range selector; CCW position: -5V÷0V, center: -2.5V÷+2.5V; CW: 0V÷+5V
J13	additional frequency voltage control; summed with P5 manual setting
J15	saw output
J16	inverted saw output
J17	triangle output
J18	pulse output

ad P8. The potentiometer provides control voltage for the SHIFT input of the μLFO. The voltage should be in the range from +10V in CCW position to 0V in CW position. This results in DC shift of the LFO output wave, as indicated above. The resistor value should be equal to $\frac{1}{5}$ of the pot value (2k for 10k pot, 20k for 100k pot).

CAUTION: The GATE and TRIGGER inputs of the μADSR-3010-A are not protected. Connecting negative voltage to those inputs may damage the μmodule.

Potentiometers

- P1 – P8 taper: B
- value: 10k ÷ 100k

Potentiometer values

	pros	cons
10kΩ	• lower sensitivity to disturbances • output voltage characteristic closer to linear	• higher current consumption (0.5mA per pot)
100kΩ	• lower current consumption (0.05mA per pot)	• higher sensitivity to disturbances • output voltage curve deformation (when connected to 0 and 5V, 2.5V is further from central pot position)

Adjusting potentiometer range

A potentiometer range may be adjusted with simple modification of the circuit.

If you do not need very small values of some parameter, the lower extreme of the CV range may be cut out by inserting a resistor between the left pad of the potentiometer controlling this parameter and the GND. E.g. in case of B10kΩ pot, inserting a 5kΩ resistor will cut $\frac{1}{3}$ of the CV range out, the minimal control voltage will be ca. 1.7V.

Similarly, the upper extreme of the CV range may be cut out by inserting a resistor between the right potentiometer pad and the +5V voltage.

+5V regulator

Please, refer to the EUROPCB-10-A datasheet.

0 ÷ +10 CV range

Control inputs may be adapted to accept voltage range 0V ÷ +10V by connecting control voltage to a μmodule through 100kΩ resistor. This works for all control inputs. Also, the 78L05 regulator should be replaced with 78L10.

Assembly hints

1. Solder the wire connections before, then the components (pots, regulator, μmodules, etc.).
2. Make short connections before the long ones.
3. Keep the connection wires loose enough to be able to structure them after mounting the components.
4. When making connections leave enough space for the components and for accessing their solder points.

5. Solder the components from the smallest to the biggest:
    - the +5V regulator and the capacitors,
    - the pin header 2x5,
    - the Thonkiconn jack sockets,
    - the 9mm potentiometeres,
    - the μmodules.

Connections (checklist)

1	P5 ▶ CENTER	⇝	μLFO ▶ RANGE	
2	-12V	⇝	μLFO ▶ -12V	
3	+12V	⇝	μLFO ▶ +12V	
4	P6 ▶ CENTER	⇝	μLFO ▶ FINE	
5	P7 ▶ CENTER	⇝	μLFO ▶ PWM	
6	GND	⇝	P1 ▶ LEFT	
7	+5V	⇝	P1 ▶ RIGHT	
8	J13 ▶ LEFT	⇝	P5 ▶ RIGHT	
9	GND	⇝	P5 ▶ LEFT	
10	P8 ▶ CENTER	⇝	μLFO ▶ SHIFT	
11	μLFO ▶ TRIANGLE	⇝	J17 ▶ LEFT	
12	μLFO ▶ PULSE	⇝	J18 ▶ LEFT	
13	μLFO ▶ SAW	⇝	J15 ▶ LEFT	
14	μLFO ▶ INV SAW	⇝	J16 ▶ LEFT	
15	GND	⇝	P2 ▶ LEFT	
16	+5V	⇝	P2 ▶ RIGHT	
17	GND	⇝	μLFO ▶ GND	
18	+5V	⇝	P6 ▶ RIGHT	
19	GND	⇝	P6 ▶ LEFT	
20	P1 ▶ CENTER	⇝	μADSR ▶ ATTACK	
21	P2 ▶ CENTER	⇝	μADSR ▶ DECAY	
22	P3 ▶ CENTER	⇝	μADSR ▶ SUSTAIN	
23	P4 ▶ CENTER	⇝	μADSR ▶ RELEASE	
24	GND	⇝	P3 ▶ LEFT	
25	GND	⇝	P7 ▶ LEFT	
26	+5V	⇝	P7 ▶ RIGHT	
27	+5V	⇝	P3 ▶ RIGHT	
28	GND	⇝	μADSR ▶ GND	
29	μADSR ▶ OUTPUT	⇝	J11 ▶ LEFT	
30	μADSR ▶ INV OUTPUT	⇝	J14 ▶ LEFT	
31	μADSR ▶ GATE	⇝	J9 ▶ LEFT	
32	μADSR ▶ TRIGGER	⇝	J10 ▶ LEFT	
33	+12V	⇝	μADSR ▶ +12V	
34	-12V	⇝	μADSR ▶ -12V	
35	+12V	⇝	P8 ▶ LEFT	through resistor
36	GND	⇝	P4 ▶ LEFT	
37	GND	⇝	P8 ▶ RIGHT	
38	J11 ▶ LEFT	⇝	J12 ▶ LEFT	
39	J9 ▶ LEFT	⇝	J10 ▶ RIGHT	TRIGGER defaults to GATE