

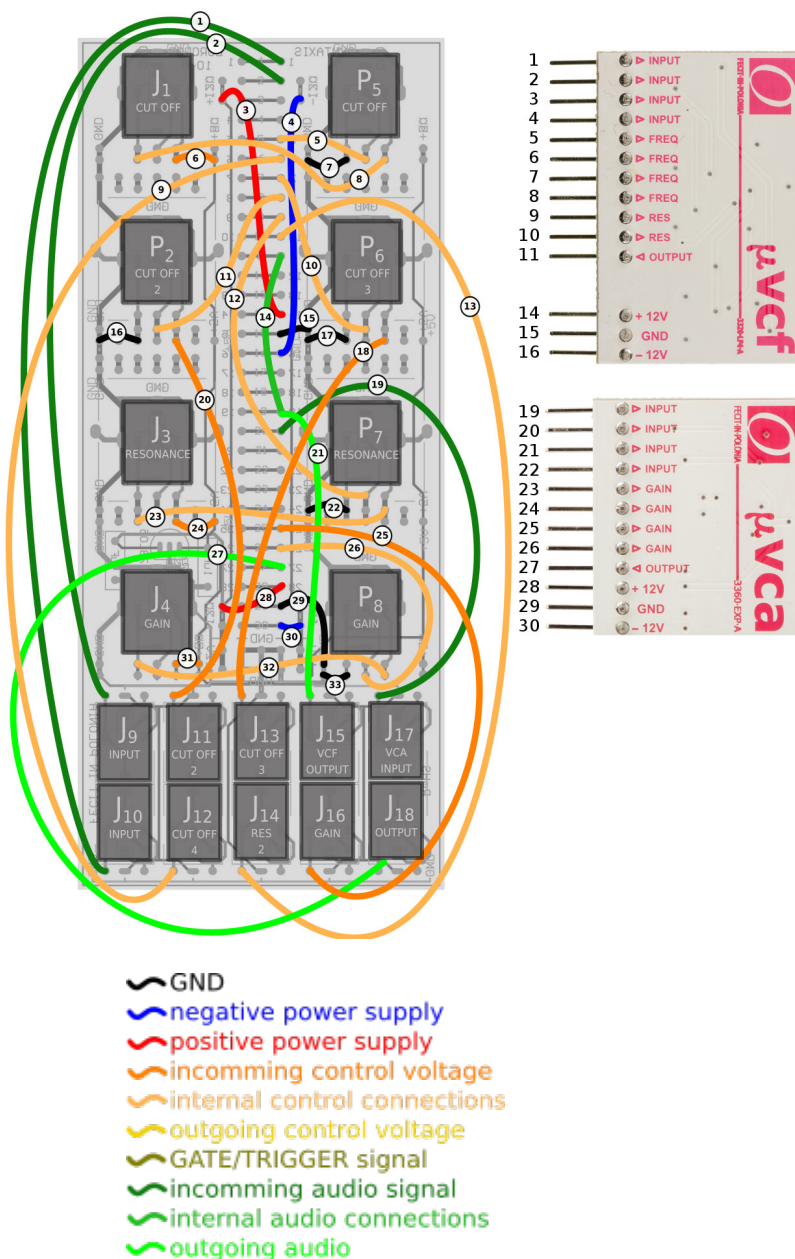
VCF

1.1

voltage controlled filter

Features

- two summed audio inputs
- manual and CV control of cut-off frequency and resonance
- four cut-off frequency CV inputs, three with attenuator
- two resonance CV inputs, one with attenuator
- control voltage range normalized to $0V \div +5V$ ($0V \div +10V$ with additional resistors)
- exponential control of cut-off frequency
- linear control of resonance
- integrated voltage controlled amplifier on audio output
- manual and CV control of gain
- two gain CV inputs, one with attenuator
- direct access to VCF output
- auxiliary VCA input
- all inputs protected
- 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



Components

EURORACK-10-A	1
μ VCF-3320-LP4-A	1
μ VCA-3360-EXP-A	1
potentiometer 9mm Alpha, T18 shaft	5
jack socket Thonkiconn	13
79L05 regulator	1
1 μ F capacitor (PP or PA)	2
pin headers 2x5	1

Controls

J1	cut-off frequency control input 1; defaults to CV_{max} when unplugged
P2	attenuator for cut-off frequency input 2
J3	resonance control input 1; defaults to CV_{max} when unplugged
J4	gain control input 1; defaults to CV_{max} when unplugged
P5	attenuator for cut-off frequency control input 1; manual cut-off control when J1 unplugged
P6	attenuator for cut-off frequency control input 3
P7	attenuator for resonance control input 1; manual resonance control when J3 unplugged
P8	attenuator for gain control input 1; manual gain control when J4 unplugged
J9	audio input
J10	audio input
J11	cut-off frequency control input 2
J12	cut-off frequency control input 4
J13	cut-off frequency control input 3
J14	resonance control input 1
J15	gain control input 2
J16	direct VCF output; the signal does not pass through the VCA
J17	auxiliary VCA input; summed with VCF output
J18	audio output

Potentiometers

- P2, P4, P5, P6 taper: B
- value: 10k \div 100k

Potentiometer values

	pros	cons
10k Ω	<ul style="list-style-type: none">• lower sensitivity to disturbances• output voltage characteristic closer to linear	<ul style="list-style-type: none">• higher current consumption (0.5mA per pot)
100k Ω	<ul style="list-style-type: none">• lower current consumption (0.05mA per pot)	<ul style="list-style-type: none">• 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 B10k Ω pot, inserting a 5k Ω 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 \div +10 CV range

Control inputs may be adapted to accept voltage range 0V \div +10V by connecting control voltage to a μ module through 100k Ω 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, μ modules, 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 potentiometers,
- the μ modules.

Connections (checklist)

1	J10 ▶ LEFT	↔	μ VCF ▶ INPUT
2	J9 ▶ LEFT	↔	μ VCF ▶ INPUT
3	+12V	↔	μ VCF ▶ +12V
4	-12V	↔	μ VCF ▶ -12V
5	P5 ▶ CENTER	↔	μ VCF ▶ FREQ
6	J12 ▶ LEFT	↔	μ VCF ▶ FREQ
7	GND	↔	P5 ▶ LEFT
8	J1 ▶ LEFT	↔	P5 ▶ RIGHT
9	J12 ▶ LEFT	↔	μ VCF ▶ FREQ
10	P6 ▶ CENTER	↔	μ VCF ▶ FREQ
11	P2 ▶ CENTER	↔	μ VCF ▶ FREQ
12	P7 ▶ CENTER	↔	μ VCF ▶ RES
13	J14 ▶ LEFT	↔	μ VCF ▶ RES
14	μ VCF ▶ OUTPUT	↔	μ VCA ▶ INPUT
15	GND	↔	μ VCF ▶ GND
16	GND	↔	P2 ▶ LEFT
17	GND	↔	P6 ▶ LEFT
18	J13 ▶ LEFT	↔	P6 ▶ RIGHT
19	J17 ▶ LEFT	↔	μ VCA ▶ INPUT
20	J11 ▶ LEFT	↔	P2 ▶ RIGHT
21	μ VCF ▶ OUTPUT	↔	J15 ▶ LEFT
22	GND	↔	P7 ▶ LEFT
23	J3 ▶ LEFT	↔	P7 ▶ RIGHT
24	+5V	↔	J3 ▶ RIGHT
25	J16 ▶ LEFT	↔	μ VCA ▶ GAIN
26	P8 ▶ CENTER	↔	μ VCA ▶ GAIN
27	μ VCA ▶ OUTPUT	↔	J18 ▶ LEFT
28	+12V	↔	μ VCA ▶ +12V
29	GND	↔	μ VCA ▶ GND
30	-12V	↔	μ VCA ▶ -12V
31	+5V	↔	J4 ▶ RIGHT
32	J4 ▶ LEFT	↔	P8 ▶ RIGHT
33	GND	↔	P8 ▶ LEFT