KNOBI

macro controller

KNOBI is a multi-tool able to mix, attenuate, invert, display and multiply any kind of signal.

why

- To combine distinct cv sources into one and attenuate / invert the resulting signal.
- To display the value of any voltage within your modular system.
- To output a fixed and thermally stable 5-volt reference.
- To combine all the functions above for the ultimate CV and audio mangler.

with

- Sequences – alter them into the oblivion.
- Drums – use the dedicated 5-volt manual gate as a trigger.
- Audio and CV simultaneously – use the range switch to stretch complex waveforms and sweeps.
- Unknown signals – read the built in 3 digits meter to interpret their value and act accordingly.

how

Knobi can serve a wide range of purposes – *not only to pass butter* - and this is true thanks to its internal signal path that makes use of some of the most useful building blocks of analog synthesis: a 4-channel mixer, a three-range attenuator/offset, an attenuverter, a fixed manual gate and lastly a cascading multiple derived from the output stage of Agogô.

a, **b**, **c**, **d** are *Knobi*'s inputs while **r** is a fixed 5v reference output. The toggle switch next to **d** sets the range of the attenuator/offset[1] (the big knob below the meter):

- up: <u>5v **r** input</u> 0v ~ 10v | <u>else</u> x2 (amplify)
- middle: <u>5v **r** input</u> 0v ~ 5v | <u>else</u> x1 (unity)
- down: <u>5v **r** input</u> -5v ~ 5v. | <u>else</u> x2 -5v (amp+offset)

Connect a signal into one of the inputs to visualize its voltage value in the three digits meter[2]. Keep in mind that this reading happens post attenuator/offset + attenuverter (the smaller knob with (-) and (+) indications on top).

The pushbutton on the left of **x4** adds a gate of 5v to the mix: with no input connected it will act as a manual gate output. Autopatch the **r** reference output into one of the inputs to use Knobi as a macro controller thanks to the attenuator/offset knob and switch to set the range + the attenuverter.

x1, **x2**, **x3** and **x4** are all cascading copies of the final signal path. Plugging a cable will break the normalization and the multiplication will reset starting from the next output. Four cables plugged in will output a copy at the same factor x1 - unity gain – making Knobi a versatile buffered multiple.

Recap of the signal path:

> inputs (**a-d** and the button) ⤳ attenuator/offset ⤳ attenuverter ⤳ outputs (**x1-x4**) ⤳ meter

features

- Thermally compensated 5v voltage source with dedicated output.
- Four channel mixer with four buffered output.
- Built in 3 digits voltage meter post mix / attenuation / inversion.
- Attenuator/offset with a dedicated three positions range toggle.
- Manual gate button tied to the mix.
- Four cascading outputs in an open design configuration.
- Unique signal path: mix – attenuate – invert – add – visualize – multiplicate.
- "Whatever" power connector a.k.a. don't mind the polarity.

specs

- dimensions ⟹ width 6HP, depth 25mm.
- current draw ⟹ +12V 50ma, -12V 30ma

Demos and build documentation at *jolin.tech/knobi*

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[1] The knob attenuates the amplification range set by the switch – when the range switch is set at the bottom, the attenuation happens before the negative offset.

[2] The provided meter has an accuracy of ~±0.1v and it comes calibrated from the factory. The calibration was made using a high-quality power supply with clean and stable +12v / -12v lines. If you want to recalibrate it follow the procedure in the DIY documentation. The purpose of the meter is to give the user a general idea of the voltage that comes out of Knobi from the first output **x1**. Think of it as an extra beaming tool in a Swiss Army knife. It is not designed for scientific purposes.