Oscillator 1

Build #6, 2023-06-09

This module is a rather simple oscillator with only few functions. But even because input control voltages are neither limited nor internally clipped, **Oscillator 1** is a real multi purpose device.

- Hybrid analog-digital oscillator
- Fixed frequency adjustable matching note names without pitch CV
- Unlimited pitch input voltage
- Switchable fixed pitch offset for *Voltage/Moog* mode
- Huge frequency range from almost 0 Hz up to 20 kHz.
- Output signal bipolar or unipolar
- Unlimited volume CV with ring modulator capability

Function

In audio range 10 to 20,000 Hz an analog-style oscillator produces naturally sounding signals. Below 1 Hz a pure digital oscillator provides clean wave forms. Between 1 and 10 Hz both oscillator signals are smoothly blended from one to the other.
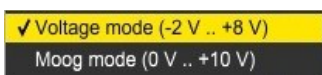
Controls and connectors

A voltage at the **pitch** input jack controls oscillator frequency with 1 V/octave. Basically any control voltage can be sent to this input jack. There is no limitation of value and frequency.

When mouse cursor is on pitch label, a red frame appears. It indicates a hidden function.

After a right click on the label a drop down menu lets you select a **pitch mode**. Actual pitch mode is marked with a hook sign. You can switch to the other mode by clicking on it. A click to anywhere else effects no mode change.

Within *Voltage Modular* pitch range is from -2 volts (tone "C0") up to +8 volts (tone "C10") while traditional hardware *Moog* synthesizer modules mostly work within a range from 0 volts ("C0") to +10 volts ("C10").

This means, that in Voltage mode all tones are two octaves higher than in Moog mode.

With **octave** knob oscillator pitch can be transposed from -15 to +5 octaves. Default is 0.

tune knob allows to transpose oscillator pitch from 0 to 13 half tone steps. When no cable is connected to pitch input or pitch voltage has an integer value, **tune** will set frequency according to note names.

tune

When oscillator pitch is controlled by CV, it might be better to see step numbers instead of notes. A click on the tune label with left mouse buttons changes step label format.

This knob can be used to adjust pitch with fine "cent" steps (1 cent = 1/100 halftone).

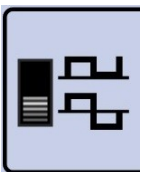Fine tuning is possible from -99 to +99 cent.

With these toggle buttons you can select one of five output signal wave forms:
- ramp
- triangle
- sine
- pulse

If pulse wave is selected, pulse width can be adjusted with the **width** knob within a range from 0.005 to 0.995.

Knob default value is 0.5 (square wave).

Audio signals are usually bipolar, that means, they do not contain a DC value.

Against with audio signals control voltages can also be unipolar, that means they are either only positive or negative. This slider switch lets you set output signal according to your needs.

CV at this input jack controls output signal level. It gets normalized by a factor of 1/5. That means, at 5 volts the output level will be multiplied by 1.

Negative CV will change signal polarity. So with this control voltage a real amplitude modulation is possible.

Because CV value is not limited, absolute values higher than 5 volts can increase absolute output level without any limitation.
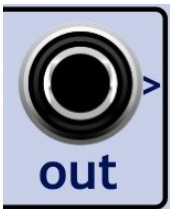
When no cable is connected to CV input, output signal level will be multiplied by 1.

With **vol** knob you can attenuate output signal level. Knob value overrides input CV.

Default volume is 0.5 (50 %).

Please note: Total signal level depends on product of **CV** and **vol** knob value.

Output jack provides oscillator output signal. When no cable is connected to CV input jack, output signal voltage is between -5 and +5 volts.

Schematic Block Diagram