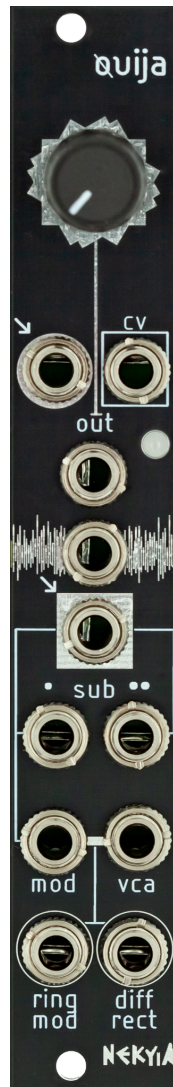# NEKYIA
C I R C U I T S

OUIJA
VCO/LFO Utility

User Manual

OVERVIEW

Ouija is a collection of analog utility circuits aiming at expanding the functionality of any VCO/LFO. It features a voltage controlled glide suitable for achieving portamento or smoothing signals like LFOs or envelopes, a white noise source, two frequency dividers able to create Sub -1 and Sub -2 octave oscillators as well as a great sounding Ring Modulator and a Difference Rectifier. The ring modulator circuit includes a VCA to control the modulator level. Packing all these great features in only 4hp, Ouija is an essential Audio/CV processor for any rack!

Tech Specs:

Depth: 25mm, Skiff Friendly!

Power: 30mA @+12V / 30mA @-12V

4hp

Installation

Before installing this module disconnect the power from your system! Double check the polarity of the ribbon cable! The red stripe should be aligned with the -12V rail, on both the module (white bold line) and on the bus board.

PANEL CONTROLS

ouija

A. Glide rate control.

B. Glide circuit input.

C. Glide CV input. +/- 5V.

D. Glide output.

E. Glide rate LED indicator.

A. White Noise output.

1. Signal input (Carrier).

A. Sub 1 outputs 1 octave below the Signal input.

B. Sub 2 outputs 2 octaves below the Signal input.

2. Modulator signal input.

3. VCA CV input for Modulator signal. 10V.

4. Ring Modulator output.

5. Difference Rectifier output.

NEKYIA

IN DEPTH

Glide

Known by different names such as slew, portamento and glissando, Glide is typically used to allow sliding from one note to another. However, as it is essentially a Slew Limiter, it can be used as a simple waveshaper to smooth LFOs and envelope signals or even as a rudimentary filter when audio is applied.

Glide rate (A) is voltage controlled through the Glide CV input (C). Both Glide knob and Glide CV are only affecting the rising stage of input voltages. As the Glide circuit is cycling by default it can be used as a triangle wave LFO/VCO with a max frequency of around 1khz (Rate (A) in zero position), its rate can also be voltage controlled through the Glide CV input (C).
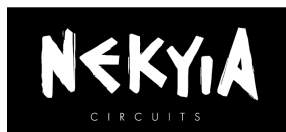
Ring Modulator

The Ring modulator , also called four-quadrant multiplier, takes two source waveforms {Carrier (1) & Modulator (2)} and generates a third waveform, which contains the multiplication of the two inputs. Ouija offers an additional VCA (3) in order to modulate the level of the Modulator signal (2) offering a voltage controlled Ring Modulation depth. However, as the resulting signal is the product of the two input signals multiplied together there is not a real distinction between the carrier and the modulator. They are being referred to as that for ease of explanation.

Difference Rectifier

Difference Rectifier takes two source waveforms {Carrier (1) & Modulator (2)} and generates a third waveform, which contains the subtraction of the two inputs {in+ (1) & in- (2)} with only positive values due to a full wave rectifier. Compared to the Ring Mod out (4), Difference Rectifier can result in unpredictable and complex unipolar 'edgy' waveforms when LFOs are mixed on the two inputs or different flavor waveshapes when audio signals are mixed.

Tips & Tricks

- VC Portamento can be achieved when sending a pitch sequencer CV in Glide input (B) and modulating Glide rate through Glide CV input (C). Also, smoothing the rising edge of a saw/square LFO or a fast attack envelope is possible when they are sent through Glide input (B). If an audio signal is sent in Glide input (B), it will result in a low pass filtering effect.

- White Noise circuit can be useful as an audio source, (e.g to layer it with an oscillator signal or FMing the Oscillator Pitch), signal input to S&H circuits or as a random CV signal source when filtered.

- Sub 1 & 2 outs are useful to create 2 square sub oscillators (-1 & -2 octaves) from any oscillator's waveshape. They can also be used as clock dividers (/2 & /4) when a clock is patched in Signal input (1).

- Ring Modulation section can be used with audio rate signals e.g oscillators to achieve interesting inharmonic metallic sounds or with slow rate voltage signals e.g LFOs to create interesting complex and never repeating waveforms. Along with the Ring Mod out (4) there is a simultaneous Difference Rectifier out (5) which will result in very different unipolar complex 'edgy' waveshapes instead of bipolar that appear on the Ring Mod out (4).

- Ring Modulator can also be used as a VCA. Usually with ring mods when only one signal is connected you can hear a bleed thru. You can get rid of the bleed in Ouija and be used as a VCA by patching the audio signal in Mod input (2) and the modulator in Signal input (1).