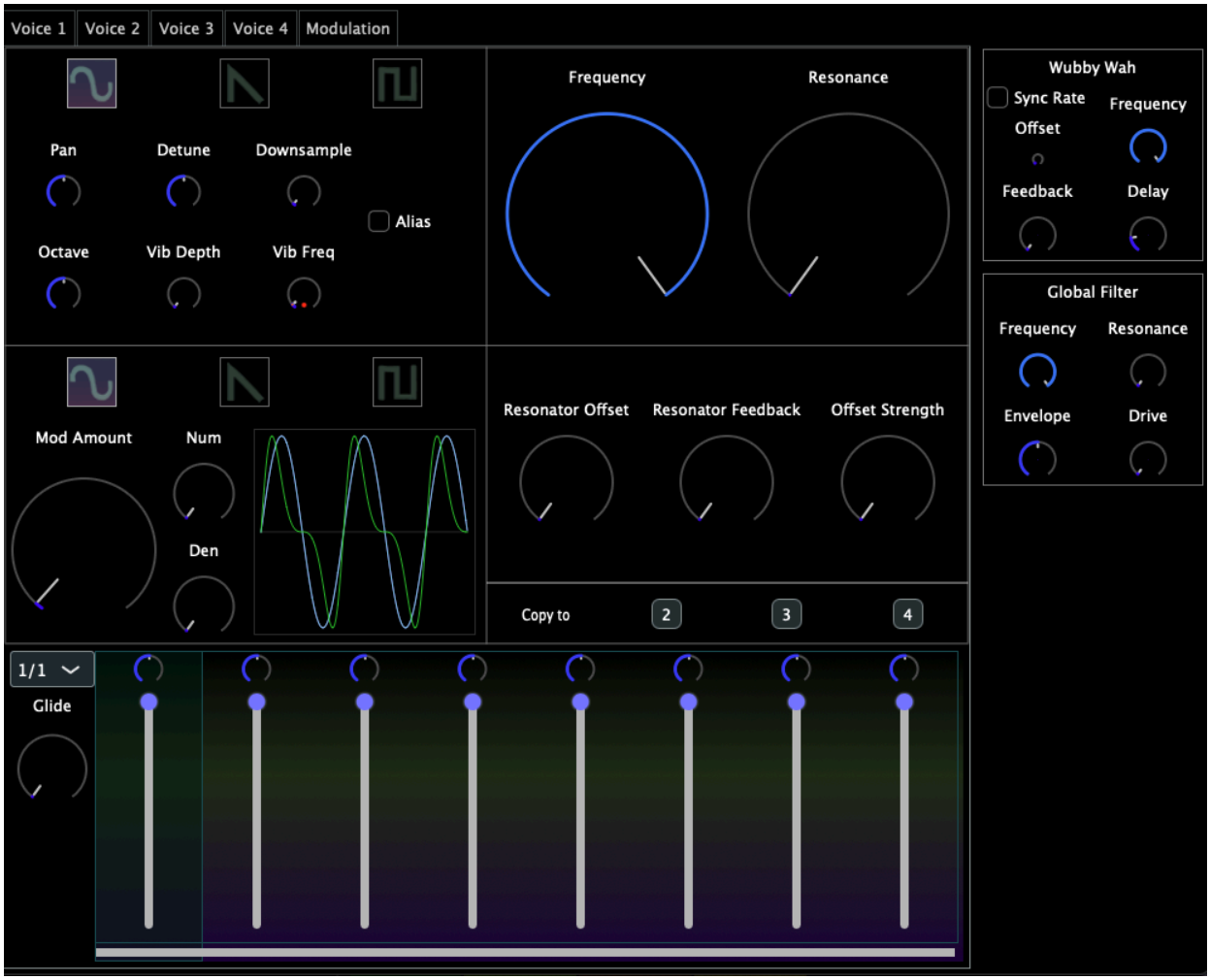
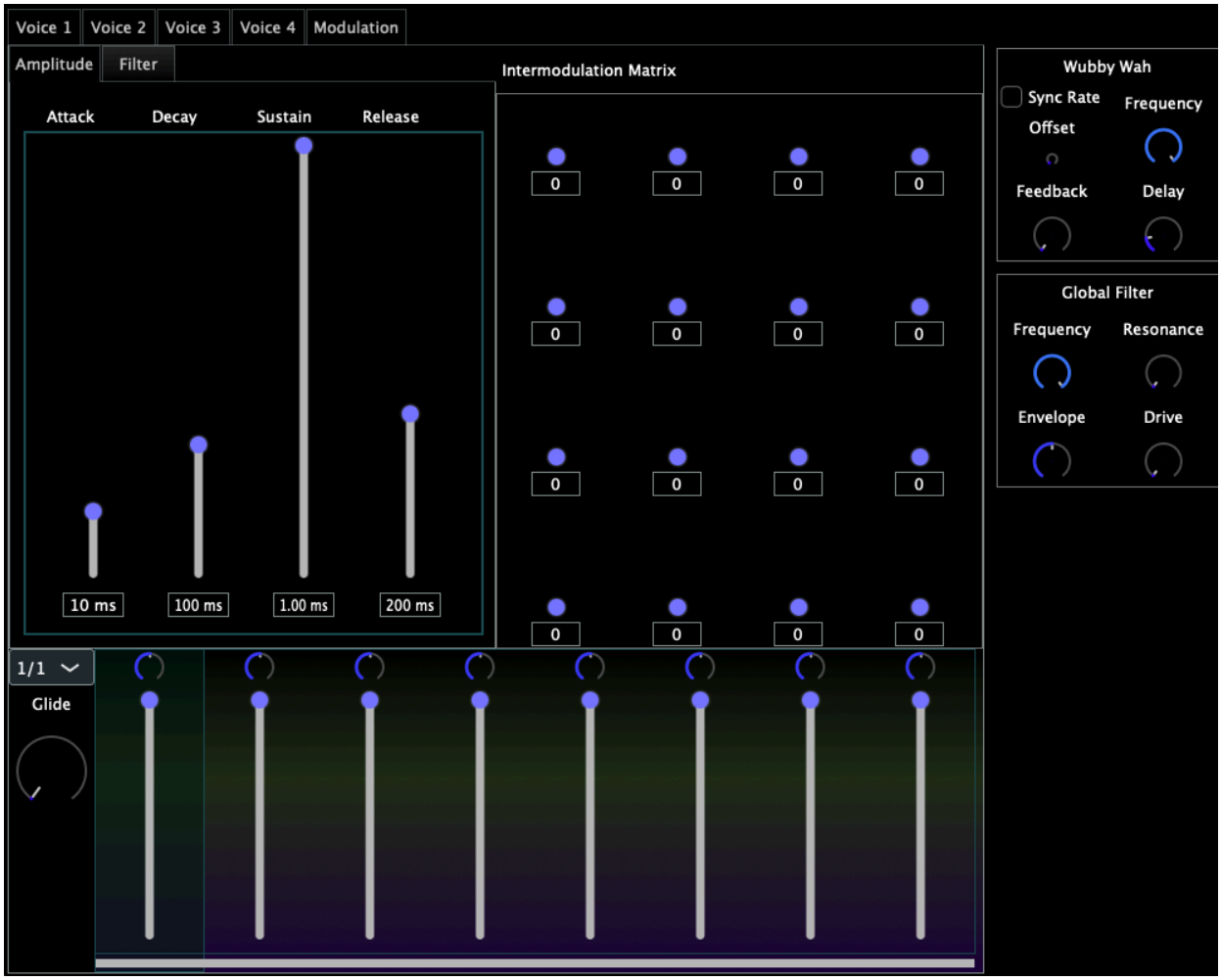
Quadraplex: FM Synthesizer

https://github.com/moblau/Quadraplex





Features

- 4 voice FM synthesizer
- Per-note modulation settings including panning, detuning, octave, downsampling, aliasing, FM modulation, low-pass filter, and resonator
- Sequencer with routable modulation and visual feedback
- Inter-modulation matrix for cross-voice FM routing
- Wah effect to emphasize formant frequencies

Description

Quadraplex is an FM synthesizer I have been developing. I was inspired to incorporate my production practices into a plugin to make it easier to achieve and

share my workflow. Each note in a chord gets its own modulation setting, which allows spatial depth and harmonic complexity to be easily achieved, even by beginner sound designers.

The frequency modulation happens at 4X oversampling, which means that there's more clarity for the harmonics to develop in the wider frequency range. The downsampling works via sample-and-hold decimation. The waveform is BLEP limited, to prevent aliasing from occurring. This is especially important for FM synthesis where high-frequency content can build quickly. The BLEP smoothness can optionally be removed so the user can introduce aliasing. I've found this makes a subtle but noticeable difference in the timbre with high amounts of FM modulation. Each voice has its own moog-ladder filter. There is also a global moog-ladder filter with overdrive.

The FM modulation section has a viewer that shows the waveform after modulation. The ratio of the modulation is specified via a numerator and denominator.

The sequencer was designed to allow quick modulation changes. The selectable modulation for the sequencer is controlled by right-clicking any parameter. The length of the sequencer is between 1-8 steps, and each step can be offset to occur before or after the allocated timing. The transitions of the sequencer can be interpolated via a glide parameter.

The Modulation page includes envelopes for the global amplitude and filter. The intermodulation-matrix allows the user to specify how to cross-modulate each voice.

The user interface was designed to match the colors of my other plugin, Tourniquet. It features an intuitive layout of parameters, as well as useful visual

feedback. It displays the amount of sequencer modulation on the knob of each parameter. Each knob also glows when it is clicked. The inter-modulation matrix is a 4×4 grid of sliders.

I've found this plugin architecture to be very useful and able to produce interesting sounds that I can't create easily with other software. I have put this project on hold because I think the core idea is strong, and I want to take the time to consider how to refine it further.