SUPER SAWTOR
USER'S GUIDE

MODULE DESCRIPTION

Super Sawtor is the module designed to produce unison like waveforms from the incoming signal. The best results are achieved using sawtooth, triangle or sine waveforms as an input signal. Unison spread has been tuned to give almost the same type of harmonics smearing as the famous Roland jp80x0 supersaw oscillator. Thus feeding the Super Sawtor with a sawtooth waveform will result in a typical supersaw output.

Though having some common features with sawtooth animators, Super Sawtor gives that vivid tension of the supersaw waveform, which is different to imitation of the multiple oscillators sound most sawtooth animators capable of doing. The main difference is in the approach used: sawtooth animators tend to recreate continuously moving phase shift of the slightly detuned / drifting oscillators; Super Sawtor in its turn creates additional pitched shifted harmonics to the input signal, which gives a different sonic character compared to sawtooth animators.

It is also should be mentioned that Super Sawtor is a completely analog circuit free of aliasing.

No external modulation sources are required for proper operation of the module. However the user can add changes and modulation to the manually set "Spread" amount by using "CV" input and adjusting "CV" knob to the desired degree.

SPECIFICATIONS

input level: -5V … + 5V   (can also accept inputs ranging from [-2.5V… +2.5V] to [-12V…+12V] using onboard trimmer)

output level: averages around -5V … + 5V

**output impedance**: 1 kOhm

module depth: 3 cm or 1,5 inches

power consumption: +45 /-45 mA at +/-12 Vdc

CONTROLS DESCRIPTION

SPREAD – scale dial is from 0 to 10. This control sets frequency spread of the additional harmonics generated by the Super Sawtor in relation to the pitch of the incoming signal. By increasing the "Spread" amount the user shifts additional harmonics proportionally further from the central pitch, so the unison effect becomes more dramatic and the sonically perceived beating rate increases as well.
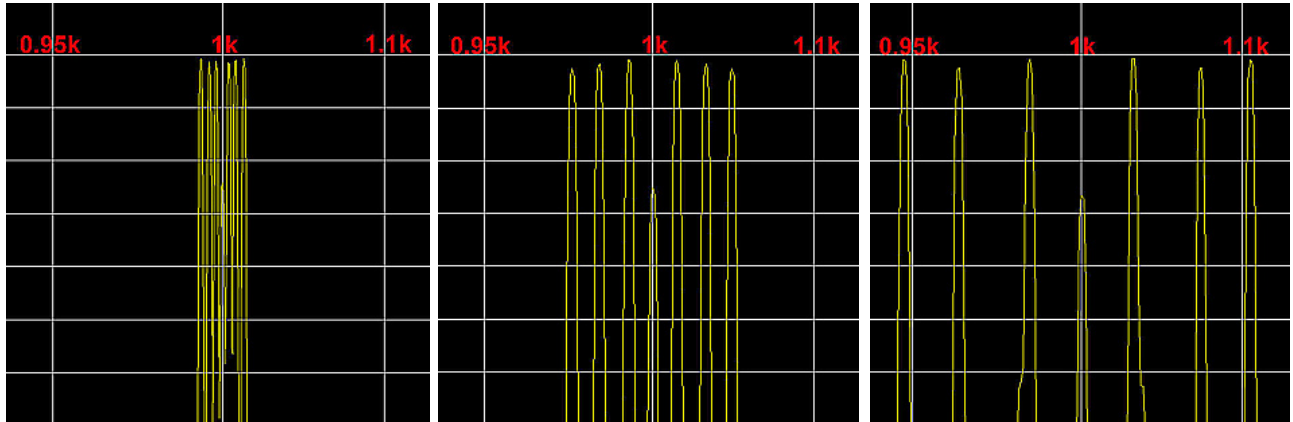
SPREAD amounts at 2, 5, 10 dial positions and their respective spectrums.

Please be informed regarding some peculiarities of our hearing:
1) our brain will get accustomed to quite large "spread" amounts in some time, so you may want to set it even more, though this raised value most probably will be considered higher than needed when you listen to the result with fresh ears next day;
2) supersaw waveform is perceived as less bright compared to a single saw oscillator due to a presence of much higher number of harmonics. This is treated by raising high frequencies by any dedicated equalizer in cases when a brighter sound is needed. That is why so many classic supersaw patches exhibit high frequencies boost.

CV – scale dial is from 0 to 10. Any signal applied to the CV input will be internally added to the manually set "Spread" amount. So the "CV" knob changes the effect CV input signal has on the spread. Bipolar CV signal will allow to change the spread in both directions, while unipolar signal will change the spread only in one direction: positive signal will increase the spread and negative signal will decrease it.

Please note that internal spread value can not be below zero (0 VDC). Thus applying negative CV signal and raising CV knob to a relatively high setting may lead to some negative amounts of the internal spread values, which will have no sonic impact.
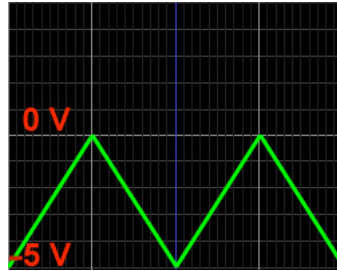
This is better illustrated on the below images:
Lets set Spread to its middle position; -5V … 0V triangle is applied to the CV input;
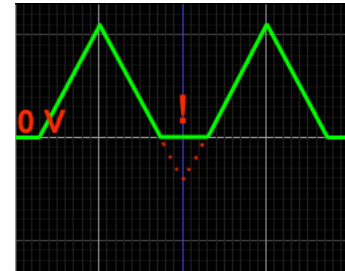CV amount is at max setting.
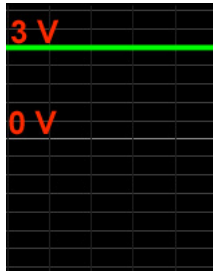
Manual spread
internal DC voltage

CV IN
tri input (negative)

Internally combined Spread
signal

As you can see from the scheme above, some combinations of the CV modulation
signal and manual Spread amounts will give "holes" in the combined internal spread
voltage. These "holes" may give the desired modulation of the spread, otherwise
should be avoided by proper selection of the CV INPUT signal and knobs values.

MIX – scale dial is from 0 to 10. Internal mix of the input signal (0 dial position) and the supersaw output.

IN – input to be processed. Any AC signal, preferably -5V … + 5V   (10 V pk-pk) with rising slope. Square wave will not work.

CV – control voltage input for Spread modulation. Can be either AC or DC. -5V … + 5V   input voltage range is welcome.

OUT – the resulting waveform output - varies in accordance with the MIX knob position.

POWER INPUT – male 10 pin PCB mount connector - a standard Eurorack power connector. To be plugged to a regulated +12Vdc and -12Vdc PSU only when the power supply is OFF. Mind the proper positioning on the pins.

USEFUL TIPS AND TRICKS

By routing Velocity voltage into CV input you can change the spread amount in relation to the notes velocity, that adds extra changes to the sound.

Pitch CV can be used to vary the Spread amount for different pitches. Positive pitch CV will raise the Spread for every higher pitched note. Inverting pitch CV will allow to decrease the spread for higher pitched notes.
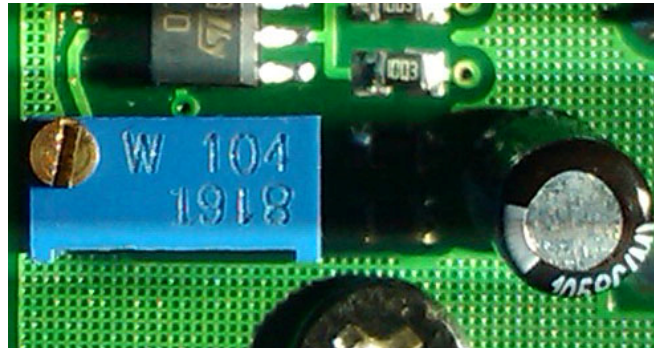
VCA can be used to mix the Super Sawtor's output in response to some CVs:
1) velocity CV – the harder the notes are played the louder the Super Sawtor's output;
2) pitch CV – Super Sawtor's level will be scaled by the pith being played;
3) LFO or ADSR – to modulate the Super Sawtor's level;

CALIBRATION

There is only one part of the Super Sawtor which may require the user's adjustments – onboard trimmer. By default Super Sawtor is tuned to be fed with -5V … + 5V (10 V pk-pk) waveforms, so do not change the trimmer setting unless you will be permanently sending signals of other levels.

If you need to use signals other than default -5V … + 5V, you have to adjust the trimmer to the setting which gives the least amount of audible distortion. It is better to use saw wave input signal of around 2 kHz. If you will have questions regarding the calibration – please contact hnerding@gmail.com

HAPPY NERDING!