THREE SISTERS

THREE LINKED FILTERS FOR SPECTRAL MIXING & RESONANT SCULPTING

THREE SISTERS related to, and reflections of, one another. Together carving spectral spaces, reorganising and deconstructing tones. A kaleidoscopic lens into your world of sound.

Envisaged as mixer as much as effector, combining sounds according their spectrum. THREE SISTERS carve sonic spaces for your instrument, giving air and breath to an overcrowded patch.

INPUT & OUTPUT

Each of the THREE SISTERS are independent multimode filters, accessed via the lower eight jacks. HIGH, CENTRE & LOW are separate filter paths, input into the left jack and output from the right surrounded by a black rectangle.

ALL provides additional mixed functionality for sending a single source to all three inputs, while the output provides a compressed mix of each. Any combination of input & output can be used including feedback patches sending outs back to ins.

Slopes are 24dB/octave for HIGH & LOW, while CENTRE has 12dB/octave on both the upper and lower bound. In *crossover* mode the CENTRE band has adjustable band size, while in *formant* mode all filters become bandpass filters with 12dB/octave slopes on top & bottom.

!QUALITY

Traditionally filters have control over the quality-factor, or resonance – an emphasis placed at the cutoff frequency for that **acid** sound. THREE SISTERS follows suit with a non-resonant sound pointing to 11:00, while emphasis increases turning clockwise.

Eventually this resonance starts to *ring* when sound is input, exciting the filter. Pushing QUALITY to the limit, each begins to oscillate at the cutoff frequency. The sine wave produced at all 3 outputs are tuned accurately to V/8 (1V / octave).

Note: The ALL output presents a mix of these sinewaves by squeezing them through a compressor to fit Eurorack's signal range. The outputs may be passively mult-ed together to facilitate a cleaner but quieter sound.

Conversely, rotating QUALITY counter-clockwise takes on a new character: blending an inversely processed sound into the output. The effect is of the broadband sound rising from silence. A phase cancellation will occur at the cutoff frequency as QUALITY nears minimum. Thus !Q can be used as a *dry/wet* mix, to create subtle *notch* responses, or *shelving eq* type filters.

FREQ & FM

Cutoff frequencies for each of the THREE SISTERS are controlled together with the FREQ knob. The range is chosen to allow each of the bands to approach silence at one extreme and full wideband response at the other.

Applying CV to the FREQ input will control all three filters together. This input is calibrated to V/8 for all three filters. Attach a sequencer or melody generator for pure tone motifs & equi-spaced chords.

Using the FM input & accompanying attenuverter, one can apply bipolar modulations to the FREQ parameter, from slow CV envelopes through to audio rate exaltations.

SPAN

Where FREQ shifts all three filters as one, SPAN pushes only LOW & HIGH. Turn clockwise to spread them further apart or counter-clockwise where the two outliers will pass through the CENTRE and slightly overlap. The range is wide for dramatic effects, responding well to slow undulations into the audio range.

CENTRE will respond differently in *crossover* mode, where SPAN sets the size of the passband between it's upper and lower boundaries.

SWITCH: crossover & formant

Atop it all, the filters include a modality. *crossover* provides full spectrum processing, LOW as lowpass, HIGH as highpass, and CENTRE fills the gap. Modulation of SPAN not only shifts the HPF & LPF cutoffs, but articulates the width of CENTRE. The resonant peaks are aligned giving two frequency boosts.

formant mode becomes a bank of three bandpass filters, well suited to vowel & percussion sounds, or mixing disparate sources into a new sonic space. Here all three resonant peaks are available (read: sine chords) while anti-quality inverts the HIGH & LOW into LPF & HPF respectively.

TRIMMING PROCEDURE

This new edition of Three Sisters has additional calibration points versus the original design.

There are 3 controls for volt-per-octave scaling "LOW V8", "CENTRE V8", and "HIGH V8" for the three filters as named.

"CENTRE OS" self-aligns CENTRE to cancel intermodulation when oscillating in formant.

"EDGE OS" shifts HIGH & LOW relative to CENTRE to align all three in formant.

See our wiki for more:
whimsicalraps.com/pages/wiki

SPECTRAL MIXING

Addressing each of the inputs separately, an ensemble of sounds can be combined giving each room to breathe in the mix.

Modulating FM & SPAN with subtle CVs the spectral range of each input can be sculpted, emphasizing or shading each. In particular the CENTRE band can be articulated with SPAN from hidden through to dominance.

VOWELS & RESONANT SCULPTURE

While not a sophisticated speech synthesizer, the SISTERS can impart many vowel like sounds, and other resonant sculpting effects.

Attaching a source to the ALL input and output from ALL while in *formant* mode will create a triple bandpass response. Use a medium amount of resonance (QUALITY) and articulate the resonance with FREQ & SPAN. Increasing SPAN will enlarge the resonant body.

2-OPERATOR FM SYNTHESIS

As CENTRE is immune to SPAN's control when in *formant* mode, self-patching of CENTRE to SPAN's CV input results in deep complimentary FM oscillations out LOW & HIGH.

Patch CENTRE to SPAN via a VCA to control FM depth and monitor LOW & HIGH in stereo for wild spatially unsettling bell tones.

CROSSOVER   FORMANT
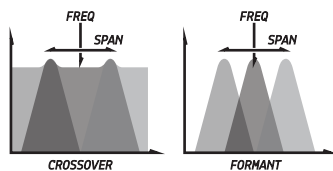
SUGGESTIONS

Spectral Gate: Crossover. Input & output from CENTRE. Set QUALITY at 12:00 and SPAN full CCW. Articulate the gate with a bipolar envelope / LFO into SPAN. Negative values fully close the gate, positive broadens spectrum.

Sine Chords: Formant. Self-oscillate with QUALITY at maximum. Output from ALL for glue, or passively mult HIGH, CENTRE & LOW outputs. Tune SPAN for detuned unison, diminished into augmented, and onward to octaves.

24dB Bandpass: Crossover. Patch a sound source into HIGH, Patch from HIGH into LOW, Output from LOW. Set SPAN close to minimum and QUALITY at 12:00. Articulate with FM.