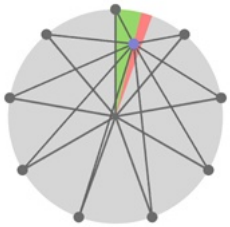
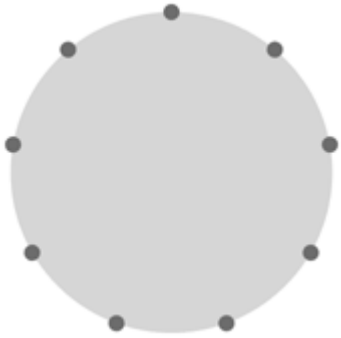
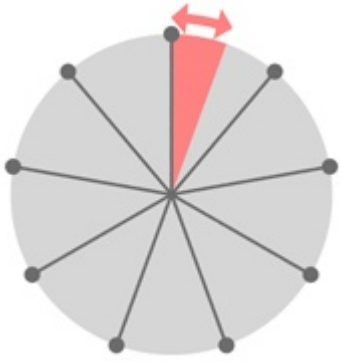


Star Cym VST

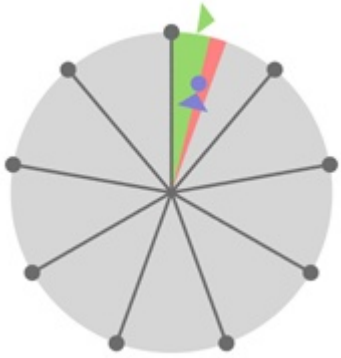
Star Cym VST is a multitimbral percussion instrument consisting of several filtered delay paths arranged in a circle with a single multiport junction. The waveguide network is configured so that a point may be specified within the circle and each delay will have a unique length.



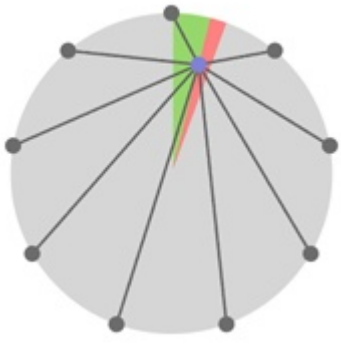
A number of points are specified from 5 to 25.



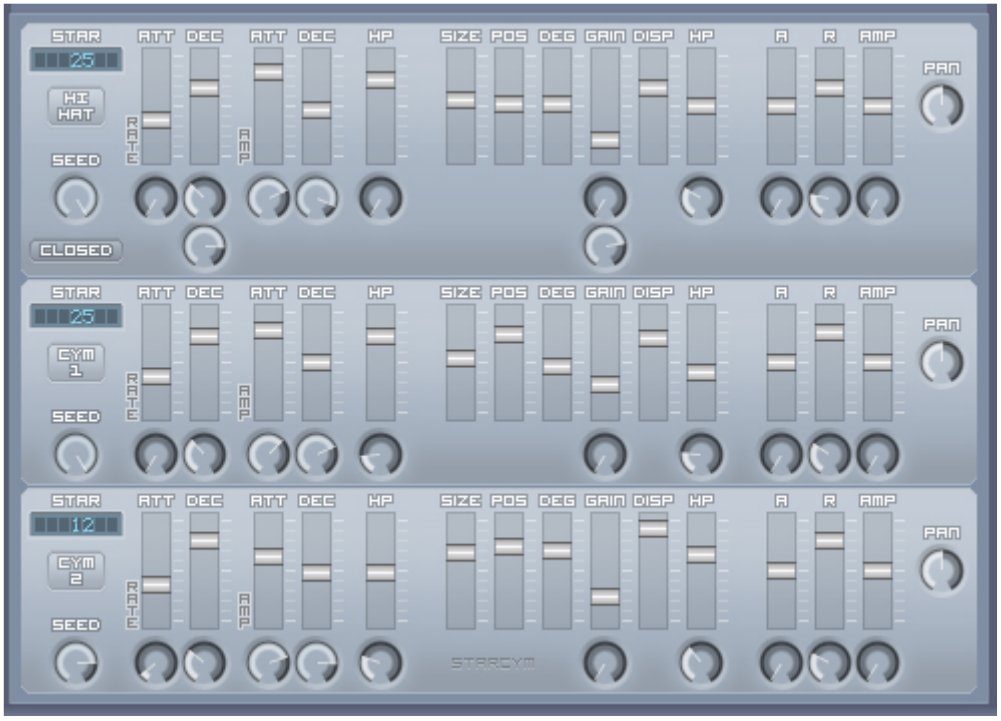
The angle of the point can range from 0 to 1/2 the angle between two points of the star. The angle of the point is set using the **DEGREE** slider.



The distance of the point from the center is set using the **POSITION** slider. A position of 0 indicates the center of the circle.



These two parameters set the relative length of the star's delay paths. As long as position isn't set to 0 and the the angle isn't 0 or at its maximum setting, all of the delay paths are likely to have unique lengths and be effectively dispersive.



The GUI

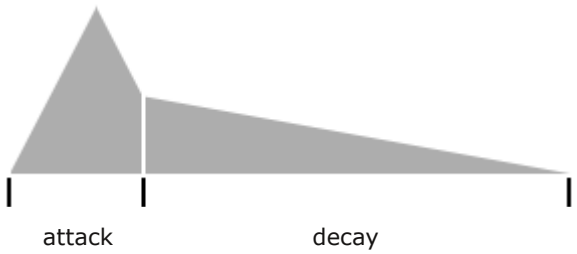
Each Star Cym VST patch includes three timbres, repeated across the keyboard as four keys starting on the C key. The first two keys trigger the closed and open hihat.

Each timbre's panel is divided into two parts: the impulse, on the left, and the resonator, to the right.

The Resonator

The number of points in the star are set at the left of the panel, by dragging the "LCD display" control vertically. Because of the voice structure, this GUI element only updates when the voice is active. Keep triggering the note as you adjust the control to see the correct value.

The other parameters for the waveguide should be very familiar - the **SIZE** slider sets the overall length of the delays. the **GAIN** slider sets the amount of feedback. The **DISP** sets the cutoff of an allpass filter. Higher values will create a greater delay for lower frequencies, modeling more rigid, dispersive material. The velocity response of the highpass filter **HP** lowers the cutoff with higher velocity.



The Impulse

The impulse to the resonator consists of high pass filtered seeded white noise. The amplitude contour includes an attack and decay phase as illustrated. Each stage has a rate and an amplitude coefficient. Rate for both stages is increased with higher velocity.

Amp Envelope

The release stage of the amp envelope is similar to the release stage on Radian VST, having an inverse exponential curve so that it has little effect on the amplification until the end of its stage, and mainly serving to shut the cpu of the voice off.

Note that the velocity response of the attack stage is inverse, so that higher velocity values produce faster attacks.

Patching

Star Cym VST was developed after coding the multiport junction for Elder Thing VST. Unfortunately the dispersive network doesn't support vibrational modes related to a circular membrane, but the general model is interesting for percussion sounds and reverbs because of the ease of creating dispersive settings.

The timbres produced by Star Cym may have a cursory resemblance to cymbals, in general they are too static to serve as a convincing emulation. This doesn't mean that the VST doesn't have desirable properties for synthetic percussion. Still, if you are like me, you will probably want to create sounds that are as close as possible to real cymbals.

The two phases of patching for me are first to find settings for the waveguide network that have preferable resonances, which takes experimentation. Finding a fortuitous seed value determines which resonances in the network are emphasised, as well as defining the timbre of the attack.

The next step is to find a balance between the delay network feedback and the white noise impulse. If only the white noise is heard, the timbre is obviously synthetic and generic. If only the delay feedback is heard, the timbre is too simple. Usually finding the best mix incorporates setting the impulse decay time against the feedback so that the patch tails smoothly into noise. Shaping the decay with the amp envelope can be useful in combination with high gain settings if a more resonant sound if preferred.

Some interesting cymbal-like timbres can be found at lower 'star' values - don't discount them because higher counts are more dispersive. Stars of 25 use more cpu than Radian VST with 256 partials.

I've gotten considerable mileage out of the mass-spring based 'Cymbal VST' since it was developed, especially for hihats. It offers dynamic timbral response and much lower cpu than this algorithm. Try it for 909 style hihats if you haven't, the presets can use a bit of tweaking.

If you are a developer interested in the properties of this circuit, I found that lowpass filtering wasn't very useful - filtering the radial delays produced rapid attentuation at all but the highest cutoffs, and filtering the sum used at the multiport junction had little effect on the overall timbre. Using an enveloped lowpass filter afterwards was moderately interesting. This application seemed to be the best instrumental use for the arrangement.

Fun manual, colours, diagrams! :)