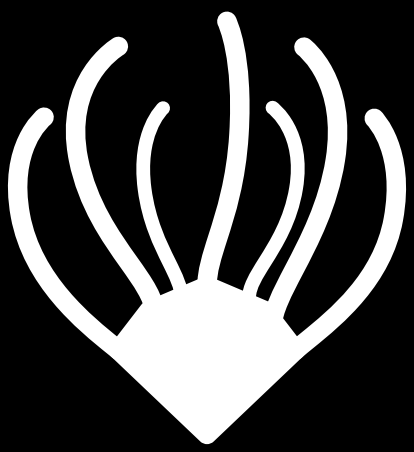
Hydra



Hydra Multi-tap delay card for Z-DSP

The eight programs on this card use various configurations of delay lines to produce a range of rhythmic and spatial effects. Many of the programs can produce both types with different settings of the parameters. Some of the programs bridge the span between single delays and reverbs (using diffusion) while others use the taps to create rhythmic patterns.

The basic algorithm sums the inputs to mono and writes the signal to a single delay line. Multiple output 'taps' are taken from the delay line and spread across the stereo outputs. Each program adds some additional feature like panning, filtering, pitch shifting and/or diffusion to create unique sounds.

The Left and Right Inputs are summed into mono on these programs. The outputs are fully stereo.

The Spread control sets the distance between the multiple taps. At zero (counter-clockwise) all of the taps have the almost same delay time effectively making a mono delay. As the Spread control increases, the delay time for each tap changes, and at the maximum amount the times are set to rhythmic ratios (1:2, 1:4, triplets, etc).

Setting the Spread to a lower amount will sound like a smeared single echo similar to a tape echo. Using the maximum Spread and little to no feedback will give precise rhythmic repeats for polyrhythms. A short delay time and high spread can produce reverb-like effects particularly if the program includes Diffusion.

Diffusion is a set of short all-pass delays used to smear the sound in time. Diffusion in these programs also modulates these all-pass delays to produce a Chorus type sound. The Chorus parameter in a program changes the amount of modulation used. Note that Diffusion adds gain to the signal, so applying feedback to any program with Diffusion can get out of control.

Clocking:

The middle CV input on Programs 7 and 8 is used for the Clock signal, and accepts a quarter note pulse in the range of 60-180 BPM. Other note lengths and tempos are also possible, for example: 8th notes under 60 BPM and Half or Whole notes above 120 BPM.

When using regular intervals as the clock source in the ranges outlined above, these delay programs will sync after a few clocks are input, and can track changes in Tempo provided they stay in range.

A suitable pulse width length is needed for the programs to track the rising and falling edges. In general, triggers are too short and pulse width duty cycles of 25-50% work well. Notes for specific devices are listed in the 'Device Compatibility' section of this manual.

Device Compatibility:

Trigger Riot:

The Clock output from the Trigger Riot cannot be used with these programs, so one of the 8 Trigger outs must be used.

In the range of 60 to 180 BPM, divisions from 3 to 7 can be used if the Speed setting is 16ths (the default). Above 120 BPM, a division of 8 will provide much longer times which is very useful for longer delays on the programs.

Adjusting the pulse width to 50% on shorter divisions may also work for slower tempos.

Circadian Rhythms:

The Clock output from the Circadian Rhythms cannot be used with these programs, so one of the 8 Trigger outs must be used.

Use consistent 4th note intervals on the CR for the best sync. The output needs to be a GATE with at least 2 steps length for the Z-DSP to track. Try a Gate one steps 1 and 2 and 5 and 6 to send 4th notes. Above 120bpm, just a gate on steps 1 and 2 (half note) will give longer delay times..

Pamela's Workout:

The default Gate length is too short for these programs, so use the following:

-65 BPM: Gate set to >11 (this number is a division 96/pulse)

-100 BPM: Gate set to >15
-140 BPM: Gate set to > 20
-180 BPM: Gate set to > 24

1> Diffuse Band Delays

A mono delay line with multiple taps each with their own bandpass filter. The filters are spread throughout the audio range. The taps have integer rations (1:2, 1:3, 1:4, etc) at maximum spread setting. The signal passes through allpass diffusion which is also in the internal feedback path so the repeats turn into a reverberant wash as they decay.

P1 - Delay Time.
P2 - Spread of the taps. Clockwise increases the distance between them
P3 - Feedback

2> 6 Bandpass Delays

A mono delay line with 6 taps each with their own bandpass filter. The filters are spread throughout the audio range. An internal feedback path is provided and all of the taps feedback using this control

P1 - Delay Time. 1000ms max
P2 - Spread of the taps. Clockwise increases the distance between them
P3 - Feedback

3> Spread Taps Detune

A mono delay line with multiple taps each with a an integer ratio of the delay time. A pair of pitch shifters have slight up and down tuning are in the internal feedback so the pitch glides up and down as the repeats decay.

P1 - Delay Time. 750ms max
P2 - Spread of the taps. Clockwise increases the distance between them
P3 - Feedback

4> Band Taps Chorus

A mono delay line with multiple taps each with their own chorus modulation. The chorused tap outputs are bandpass filtered and spread in the stereo field and the chorus is in the internal feedback path. At low delay times this program is similar to the 6 Voice program on the Chorus card.

P1 - Delay Time. 600ms max
P2 - Spread of the taps. Clockwise increases the distance between them
P3 - Feedback

5> Spread Prime Taps HPF

Multiple taps with non-integer prime number ratio for each tap making for a more spatial rather than rhythmic effect. The high pass filter is in the internal feedback path and the cutoff frequency increases with the feedback level.

P1 - Time - longest tap delay time
P2 - Spread of the taps. Clockwise increases the distance between them
P3 - Feedback and HPF cutoff. Frequency rises with the feedback level.

6> Band Tap FB Select

A variation on Program #7, but without the external clock, features four bandpass taps. The Tap control selects which of the taps is used for the feedback tap making it well suited for rhythmic effects.

P1 - Time - longest tap delay time
P2 - FbkTap - Selects the tap to feedback into the delay line (1:1, 3:4, 2:3, 1:2 ratios)
P3 - Feedback

7> Clocked Band Delays

Similar to the other Band Delay programs, the input is summed into a single delay line with multiple taps off the delay feeding the output. The middle CV input is used for a quarter note clock input (see section on Clocking). The first control sets which of the output taps is sent to the feedback. All of the output taps receive the same feedback, so the rhythms change based on this setting.

P1 - FbkTap - Selects the tap to feedback into the delay line (1:1, 3:4, 2:3, 1:2 ratios)
P2 - Clock - CV input for external clock
P3 - Fdback - feedback amount for tap set by P1

8> Clocked Multi Tap

Similar to Programs 7, this uses the same Clock CV input to set the delay time. The Filter is a low pass on the input and feedback path that removes high frequencies on the repeats. All of the taps are in the feedback path here.

P1 - FIlter - Low Pass Filter Cutoff
P2 - Clock - CV input for external clock
P3 - Fdback - feedback amount for all of the taps

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