Dragonfly 2

Delay for Tiptop Audio ZDSP

TIPTOPaudio

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The Dragonfly 2 card is an update of the original card included with the Tiptop Audio Z-DSP. Dragonfly 2 covers many of the digital delay functions essential to electronic music production.

Dragonfly has two main algorithms:

Mono - In 1 and 2 are summed mono and fed into a single delay line. This delay line is one second (1000ms) long, and the two output taps can be at any time from 0 to 1000ms. One tap feeds Out 1 and the other Out2.

Each of the Mono programs has different sets of controls in addition to tap time such as Low and High Pass filters and feedback control. Feedback in these programs recirculates to the same delay line, so overlapping repeats of the two times occur. This can create interesting multiple rhythmic patterns.

Note the one exception to the above is the Mono Ping-Pong program which sums the input to mono, but uses two 500ms delay lines to achieve the side to side bouncing effect.

Dual - In1 and In2 each have separate 500ms delay lines, and the output of each is fed into Out1 and Out 2. This allows for completely different effects on each side with no mingling of the feedback between the two (although that can be patched externally).

Feedback

All of these programs have controls for the internal feedback path of the delays, but the Z-DSP also has panel controls for creating analog feedback. There are a number of reasons to use one or the other or even both. Some differences are listed below:

- Analog feedback runs through the entire Digital to Analog and Analog to Digital process.
  This adds latency due to the necessary delays required for DSP, and it can make repeats move back in time slightly each time this delay is added. For precisely tempo matched repeats, the internal delay is more precise; however, the slight slipping in time of the analog can create subtle combing, flanging and chorusing as well. Experiment with both!

- Analog to Digital conversion is not a perfect process so each repeat fed back through this process with degrade slightly. This was a major feature of early digital delays that used analog filters since DSP was no possible, but the conversion on the Z-DSP is good enough that even multiple repeats are not noticeably altered. The slight softening of a large number of repeats can be a nice sonic addition as well.

- External feedback can be a little touchy to dial in using the control knobs. The range between a good number of audible repeats and runaway feedback can be pretty small.

- External feedback does allow patching of other devices into the feedback path. Filters, distortion, compression and other dynamics can all add richness to the repeats.

- Combining the internal and external feedback can create effects not possible using either path alone.

Programs:

1> Mono L/R Taps

A basic Mono algorithm with controls for Left and Right output Tap times.

TimeL - Delay time for the Tap feeding Out 1
Fdback - Amount of both taps fed back into the delay line
TimeR - Delay time for the Tap feeding Out 2

2> Mono LowPass + Fdback

This adds a low pass filter to the same algorithm as Program #1. The cutoff for the filter is tied to the feedback control, and the higher the amount of feedback, the lower the filter cutoff. With no or low feedback the repeats are nearly full range, while long repeats have highly attenuated high frequencies. At maximum for each the delay becomes more like an old analog bucket-brigade (BBD) unit.

TimeL - Delay time for the Tap feeding Out 1
Fdback - Amount of both taps fed back into the delay line and filter cutoff
TimeR - Delay time for the Tap feeding Out 2

3> Mono HighPass + Fdback

This substitutes a high pass filter to the same algorithm as Program #2. The cutoff for the filter is tied to the feedback control, and the higher the amount of feedback, the higher the filter cutoff. With no or low feedback the repeats are nearly full range, while long repeats have highly attenuated low frequencies. There is a bit of gain on the feedback so the repeats at high feedback can run away like the hi-hats on any good King Tubby record!

TimeL - Delay time for the Tap feeding Out 1
Fdback - Amount of both taps fed back into the delay line and filter cutoff
TimeR - Delay time for the Tap feeding Out 2

4> Mono Right Ratio

Like the basic Mono algorithm found in Program #1, but the delay time setting for the Right is a ratio of the left. This makes setting rhythmic delays easier since only the left has to be matched to the tempo. This program is optimized for matching Tempo so the overall delay range is constrained to 100ms to 1000ms to make dialing in values easier with the Left knob. The 8 ratios are easily selected with the Right control and the times are listed below.

TimeL - Delay time for the Tap feeding Out 1
Fdback - Amount of both taps fed back into the delay line
Ratio - A ratio of the Delay time set on the Left feeding Out2

Ratios (Left is 1:1 and assuming 4th note setting):

1:6	0.16667	16th triplet
3:16	0.1875	32n dotted
1:4	0.25	16th
1:3	0.333	8th triplet
6:16	0.375	16th dotted
1:2	0.5	8th
2:3	0.6667	4th triplet
3:4	0.75	8th dotted

5> Mono Ping Pong

Ping-pong differs from the other Mono programs in that it uses two separate delay lines of 500ms, but also sums the input to mono so it is not a Dual program either. The Summed input goes into the Left delay line first and Out 1, and the output feeds the input of the Right delay line which is Out 2. Feedback is taken from the Right delay line and fed back into the Left delay. Both delay lines use the exact same delay time for a synchronized Left to Right ping pong effect. There is also a Low Pass Filter (LPF) to reduce the high end for each repeat. The Delay time is constrained from 100 to 500ms to make tempo matching easier.

TimeL - Delay time for both Left and Right delays
Fdback - Amount of both Right fed back into the Left delay line
LPF - cutoff for the low pass filter

6> Dual L R Delay

A basic Dual algorithm with controls for Left and Right delay lines, and a combined Feedback control for each. The feedback can be set independently by using the analog feedback on the Z-DSP panel for each side.

TimeL - Delay time for the Left delay line
Fdback - Amount of both taps fed back into the delay line
TimeR - Delay time for the Right delay line

7> Dual Delay HPF+Fdback

This adds a High Pass Filter (HPF) to the feedback control. The structure and Left and Right delay line controls are the same as Program #6.

TimeL - Delay time for the Left delay line
HP+Fdbk - Amount of both taps fed back into the delay line and cutoff for HPF
TimeR - Delay time for the Right delay line

8> Dual Ratio + Low Pass

Like the basic Dual algorithm found in Program #6, but the delay time setting for the Right is a ratio of the left. This makes setting rhythmic delays easier since only the left has to be matched to the tempo. This program is optimized for matching Tempo so the overall delay range is constrained to 100ms to 500ms to make dialing in values easier with the Left knob. The 8 ratios are easily selected with the Right control and the times are listed below.

A Low Pass Filter (LPF) reduces the high frequencies of the repeats and the cutoff lowers as the feedback is increased. Low feedback makes for full range single repeats while high feedback makes for lower fidelity long repeats similar to an analog or tape delay.

TimeL - Delay time for the Left Delay line
LP+Fdbk - Amount fed back into the delay lines and the filter cutoff
RatioR - A ratio of the Delay time set on the Left feeding Right Delay line

Ratios (Left is 1:1 and assuming 4th note setting):

1:6	0.16667	16th triplet
3:16	0.1875	32n dotted
1:4	0.25	16th
1:3	0.333	8th triplet
6:16	0.375	16th dotted
1:2	0.5	8th
2:3	0.6667	4th triplet
3:4	0.75	8th dotted