Vulpus Labs

Catkins (& Catkins Stereo)

Introduction

Catkins behaves a little like a tape echo unit with multiple read heads, except that it is wholly digital and makes no attempt to emulate the sonic character of tape. Its purpose is to isolate the "circular buffer" component of many other digital effects, such as vibrato/chorus/flanger and multi-tap delay, and make it available for other units to control, in true modular style.

The input signal is captured into a rolling buffer, with six read heads placed at controllable positions "behind" the write head. The position of each read head is set by a manual knob and modulated by a CV signal, up to a maximum of 20 seconds recording time away from the write head. For each read head there is a send/return loop, and the returns are summed into the "wet" signal which is added to the "dry" input and sent to the output. (It is also possible simply to take the delayed signals from the sends into other units, such as a mixer, without returning them to the unit).

The wet signal is also passed to a feedback circuit which feeds delayed signals back into the input. The feedback circuit applies DC bias correction, gentle low and high frequency shelving, and saturation to keep the feedback level under control - if driven, it will saturate rather than getting into a runaway amplification loop.

The range of the delay is set with a five-position switch, from 10ms (useful for chorus and flanger effects, where we typically don't want to move the read heads very far from the write head) to 10s (for longer delay loops). A "quality" switch selects between two algorithms for interpolating between samples for fractional delay values - "low" quality uses linear interpolation, "high" quality uses cubic Hermite interpolation.

Usage

Catkins comes in two flavours (provided as separate modules): a mono version, **Catkins**, and. a stereo version, **Catkins Stereo**. The mono version is shown on the left here.

The **IN** jack receives the signal which is written to Catkins's buffer. The **OUT** jack sends the sum of the signals received by the **RET** jacks, mixed with the input signal; the **MIX** knob controls the balance of the mix, while the **FBCK** knob controls how much of the "wet" signal is sent to the feedback circuit to be mixed together with the input signal. Both **MIX** and **FBCK** are CV-modulatable using the CV input jack and modulation amount knobs immediately below them.

Each of the six read heads has a single row of controls allocated to it. The **POS** knob controls the position of the read head relative to the write head (or, in other words, the amount of delay). The **MOD** input can add, but not subtract, further delay: signals in the range 0-5v add delay, signals below 0v are inverted into positive signals and, again, add delay. The **SEND** jack sends the delayed signal, and the **RET** jack receives a returned signal.

The simplest thing to do is to patch **SEND** directly into **RET** for each "tap" you want to add to the wet signal added to **OUT** and the **FBCK** circuit, but you can also route the send/return loop through further effects, or simply take the **SEND** signal directly without returning it.

The **RANGE** control sets the range of both the **POS** knob and the **MOD** input. For example, at 10ms, the **POS** knob ranges between 0 and 10ms of delay, and **MOD** can add a further 0ms (at 0v) to 10ms (at 5v) of delay.

The **QUALITY** control switches between two interpolation algorithms - **LOW** is less CPU-intensive, but may introduce artefacts; **HIGH** costs more CPU, but smoothes over four weighted samples to get a cleaner result (it's the same algorithm as that used by the Vulpus Labs **Spree** module).

Stereo Usage

Catkins Stereo is functionally the same as Catkins, except that the **IN**, **OUT**, **SEND** and **RET** jacks are all duplicated with “L” and “R” channels:

To obtain a “ping-pong” style delay with a mono input source, plug the input into **IN L**, and cross-wire the send/return loop on each delay tap so that **SND L** is returned to **RET R**, and vice versa.

Credits and Acknowledgements

Catkins and Catkins Stereo were written by Dominic Fox in March-April 2023.

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