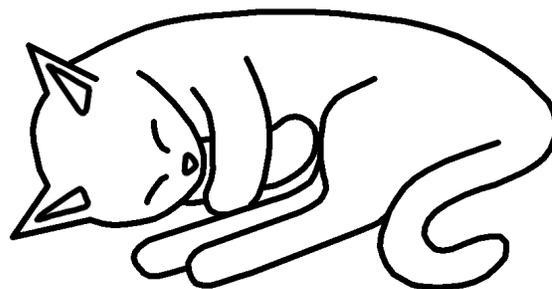


CRUSH

Crossover and
“test-tube” distortion



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CRUSH			
EDGE	ALIAS		FILT
PRE GAIN	BIAS	SLOPE	CUTOFF
			RESONANCE
DRY/WET			
sleepyCat			

CRUSH IS A VST/AU PLUG-IN THAT

algorithmically models a phenomenon common in class-B amplifiers called crossover distortion. This form of distortion produces a very unique, “crunchy” sound that has been noted as a characteristic of class-B tube amplifiers for years. In analog, the effect occurs because of a slight inaccuracy in the biasing of amplifier tubes, which leads to a lag in the tubes conducting signal to the output. The resultant signal is heavily attenuated around zero crossings, producing a waveform similar to the one shown below.



A sine wave distorted by crossover distortion.

An unexpected side effect of the method used to produce crossover distortion here is that, when a physically impossible bias value is given to the algorithm it produces a distortion much more similar to that of a 12-AX7 preamplifier tube. I have no mathematical explanation for this behavior, though it makes logical sense on examination of the algorithm.

Numeric values were intentionally left off of the GUI for Crush to encourage a more traditional, listening-based approach to use of the plug-in. The GUI design was inspired by Piet Mondrian's famous Tableau I.

Crush was programmed using the RackAFX development environment. The GUI was constructed in the RackAFX GUI Designer, with images edited in GIMP and KnobMan.

CONTROLS

ALIAS

In audio, aliasing is when a system attempts to sample a signal that is greater than a certain frequency known as the Nyquist frequency. This is a very common problem in digital distortion plug-ins, and one way to get around the problem is a process called oversampling. This technique is very processor intensive, and the non-harmonic distortion produced by aliasing can be a musical sound so the alias button allows the user to turn oversampling off.

BIAS

Bias controls the virtual biasing voltage for the plug-in. To produce a crossover distortion sound, keep it at or above the halfway point. To produce a test-tube style distortion, make sure that the edge control is off and keep the control below the halfway point. There is no limiter built into this plug-in, so this control *can* cause hard clipping.

CUTOFF

Cutoff controls the -3dB, or cutoff, frequency of the virtual analog filter that is built in to Crush.

DRY/WET

As the name of the control would suggest, dry/wet controls the mix of dry signal to processed signal in the output of the plug-in.

EDGE

This button toggles a parameter in the crossover distortion algorithm related to the attenuation of the input signal. Essentially, when edge is turned on the algorithm attenuates only the portion below the bias voltage, letting the signal jump directly to the point that it would be at if the plug-in were bypassed outside of that region.

FILT

Filt toggles the virtual analog filter in and out of the signal chain. It must be on in order for the cutoff and resonance controls to have any effect.

PRE - GAIN

Sometimes a signal is too weak to get past the bias voltage, so pre – gain allows the user to boost up the level of the signal at the input to the plug-in. As with bias, it is important to note that this *can produce hard clipping*, as there is no limiter in this plug-in.

RESONANCE

The resonance slider controls the level of resonance in the virtual analog filter.