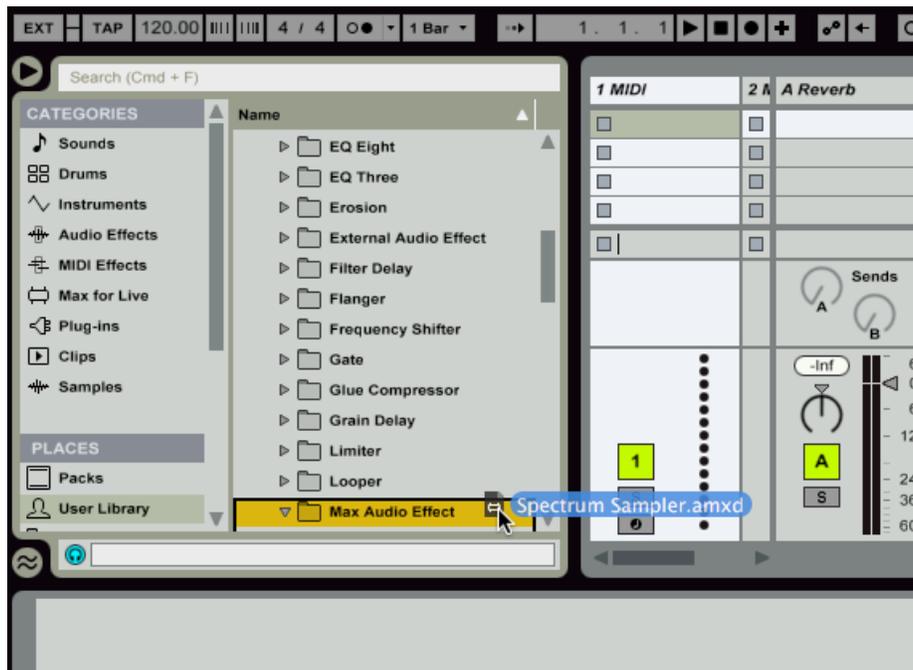# Grain Crusher

Grain Crusher is a Max for Live device which performs "Extreme Grain Manipulation". It is essentially a noise and glitch FSU audio effect: you can get a lot of strange and unique sounds from its 3 processing modules: the Delay Modulator, the Frequency Mangler and the External Loop.

The **Grain Crusher** runs in **Ableton Live 8 or 9** with **Max for Live** (both Max 5 and 6 are OK). Please note that you need both Ableton Live and Max for Live to use this device.
It is compatible with both Mac and Windows platforms.

To install it simply drag the "Grain Crusher.amxd" file on your Live Browser, into the "Audio Effects/Max Audio Effect" folder.

To see how the device works **check this video**.

Grain Crusher Demo Project
In the installation folder there is a Live Set showing some of the possible Grain Crusher effects. Use the device "Max Api DevicePreseter" to select among 41 great presets. Each row of presets is dedicated to a scene (first row, first scene, second row second scene, and so on).
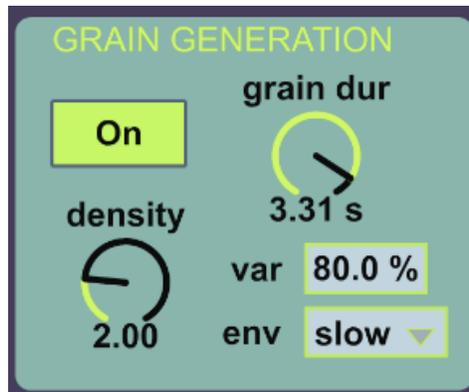
Grain Crusher parameters:

The device interface is divided in 5 sections: Main Volumes, Grain Generation, Delay Modulator, Frequency Mangler and External Loop.

MAIN VOLUMES

In the first section we have the volume control of the dry and wet signal.

GRAIN GENERATION

In this section you can activate and deactivate the grain generation, and set the grain density, duration and envelope.
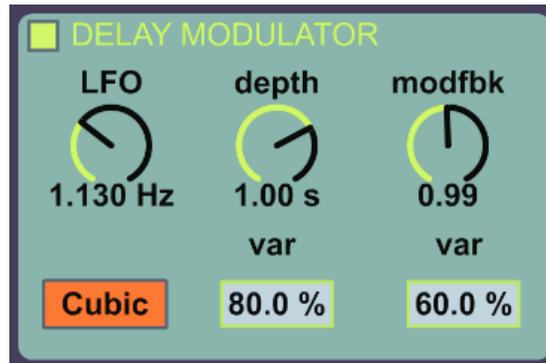
PARAMETERS

On/Off switch (upper left): to start and stop grain generation

density: this sets the average number of simultaneous grains produced.

grain dur: the duration of a single grain. The **var** parameter below specifies a random variation of the duration (in this case each grain can be 3.31 seconds long ± 80%, i.e any value from 0.662 to 5.858 seconds)

env: the shape of the grain envelope: *perc* is a percussive envelope with exponential decay, *slow* is a sinusoidal envelope, *rev* is the percussive envelope reversed.

DELAY MODULATOR

This section shows the parameter for the Delay Modulator effect. The audio input is routed in an LFO controlled variable delay. The upper left switch activates and deactivates the module.

LFO: the frequency of the random LFO, which controls the delay time of the grain.

Linear/Cubic switch: when *Linear* is selected, the random LFO generates a linear interpolated waveform; this gives a fixed variation of the grain pitch. When *Cubic* is selected, the random LFO generates a cubic interpolated waveform; this gives a conitnuous glissando of the grain pitch.

depth: the maximum delay controlled by the LFO. The **var** parameter below specifies a random variation of both the maximum delay and the LFO frequency.

modfbk: Feedback value for the delay. The **var** parameter below specifies a random variation of the feedback parameter.

FREQUENCY MANGLER
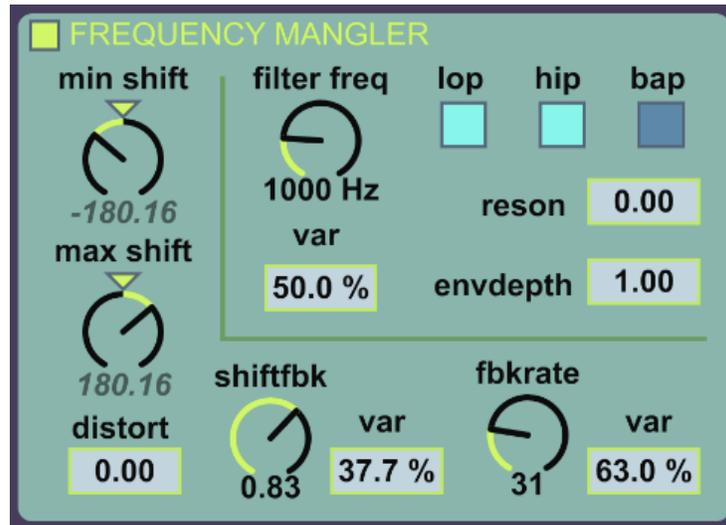
In this circuit we have a frequency shifter with distortion, filter and feedback. The upper left switch activates and deactivates the module.

min shif, max shift: sets the minimum and maximum frequency shifting for the grains: i.e. each grain frequency is randomly shifted between the minimum and maximum values.

distort: sets the amount of non-linear distortion for the grains.

shiftfbk: a feedback factor for this module. The **var** parameter to the right specifies a random variation of the feedback parameter.

fbkrate: how many times the audio is feed back during the grain generation. F. i. if the grain length is 1 second and this parameter is 10, the audio is feed back 10 times in 1 second, once every 1/10 of second. The **var** parameter to the right specifies a random variation of the feedback-rate parameter.

- The upper right frame contains the filter parameters:

filter freq: cutoff frequency of the filter. The **var** parameter below specifies a random variation of the cutoff parameter.

lop, hip, bap switches: select a low pass, high pass or band pass filter. When two or three switches are on, a different filter is randomly used for each grain.

reson: resonance (Q) factor fot the filter (from 0 to 1).

envdepth: the actual cutoff frequency can be modulated by an anvelope follower. With positive values (up to 1) the frequency **increases** when the amplitude rises, with negative values (down to -1) the frequency **decreases** when the amplitude rises.

EXTERNAL LOOP

This circuit is not "inside" the grains, like the other two, but "outside": the audio produced by the grains is delayed and feed back into the effect input.

loop dur: this is the delay length. The **var** parameter to the right specifies a random variation of the delay. The rate of the variation is given by the parameter itself: i.e. if the duration is 2 seconds and the variation is 50%, the actual duration varies between 1 and 3 seconds, at a random rate between 1 and 3 seconds.

loopfbk: the feedback amount in the delay circuit.

loopslide: this parameter sets a slide factor in the transition between delay durations: when the parameter is 0 the change is instantaneous, when it is 1 is continuous.

var mode: two different effects for the delay variation. *Break* mode occasionaly stops the audio in the circuit, *Smooth* mode does not stop the audio.

varispeed: when on, the delay variation changes the audio pitch, when off the pitch is not modified.

Grain Crusher

Requirements

Platform: Mac / Windows

Software: Ableton Live 8 or 9 with Max for Live