Cornflakes Granular Sampler

CV-controlled sampler/looper/granulator with harmonization features.

SD-card storage with 4 banks of 8 slots.

Audio format:
- Stereo
- 48khz, 24-bit sampling.
- >100dB dynamic range
- THD+N: –95dB
- =~ 40 sec. buffer

Power consumption (typical):
- 150mA @ +12v
- 40mA @ -12v

Size:
- 14HP (128.5mm x 70.8mm)

CV specifications:

1. **Speed**: –5v – +5v, 0x – 2x speed.
2. **Pitch**: –3v – +3v, 1v/oct. 6 oct. range
3. **Grain Size**: –5v – +5v, <10ms – full sample length
4. **Diffuse**: –5v – +5v. Randomizes grain position and length.
5. **Position**: –5v – +5v, Full range of buffer. Relative to playback position.
6. **Trim**: –5v – +5v. Grain-size – buffer length.
7. **Harm.**(Harmonization): –3v – +3v. 1v/oct. 6 oct. range.
8. **Distribute**: –5v – +5v. Distribution of harmonic voices.

Overview:

1. **Speed**: 0x - 2x speed.
2. **Pitch**: -2 oct to +2 oct.
3. **Grain Size**: <10ms - buffer length.
4. **Diffuse**: Randomizes sample position and grain lengths.
5. **Position**: Start position in buffer. Relative to playhead position.
6. **Trim**: Grain-length to buffer length.
7. **Harmonization**: Pitch of highest voice. -2 oct. to +2 oct.
8. **Distribute**: Distribution of harmonic voices.
9. **Gain**: -18dB - +6dB
10. **Input monitor LED**: Turns red when recommended input level is exceeded.
11. **Monitor switch**: Toggle input monitoring.
12. **Input channels** left and right.
13. **Output channels** left and right.
14. **Funtion** control button.
15. **Quantization** mode select button and scale select.
16. **Play** and **load** button. LED indicator and CV input.
17. **Record** and **Save** button, LED indicator and CV input.
18. **Function CV inputs**.–>

Getting started:
Press record to **record** a sample. Press **record** again to stop recording; Playback will start automatically and play in a loop.

Playback behaviour:
When record is pressed while playback is enabled; recording will start at the position of the playhead and progressively replace the recorded buffer.

If the play button is pressed during recording, the module will start playback of the recorded buffer in a constantly growing loop, increasing with the recording.

Controlling the module with gate signals:
The play- and rec-CV inputs follows same logic as the buttons, but changes function depending on the state of playback/recording.
When the playback/recording has **not** been enabled by buttons, the jack inputs works as logical gates, with a logical HIGH enabling the function and LOW disabling it.

When playback or recording is started by button press, a gate signal from the CV-inputs will work as triggers to reset the position of the play-head:
- A trigger on the play-CV will reset the play-head to the position determined by the position-knob.
- A trigger on the record-CV will reset the play-head to the position of the recording head.

A video about harmonization is available by scanning the QR-code found here:

Quantization:
The quantize-button toggles between three modes of operation:
- LED off: no quantization
- LED on: quantization enabled for the harmonizer.
- Flashing LED: quantization enabled for both harmonizer and master pitch.

Loading and saving:
A short press on the **funtion**-button toggles the upper LEDs and its corresponding storage slots.
(NB: The function-button responds on release!)
A longer press will toggle the lower LEDs and the corresponding storage bank.
To save the recorded buffer to SD-card: select desired slot and bank hold the **function**-button while short-pressing the **save**-button.
To load a sample from the SD-card: select the slot and bank to recall, and hold **function**-button while short-pressing the **load**-button.

Harmonization:
Cornflakes, being a granular effect, does not play its samles back conventionally, but split them into smaller bits called grains.
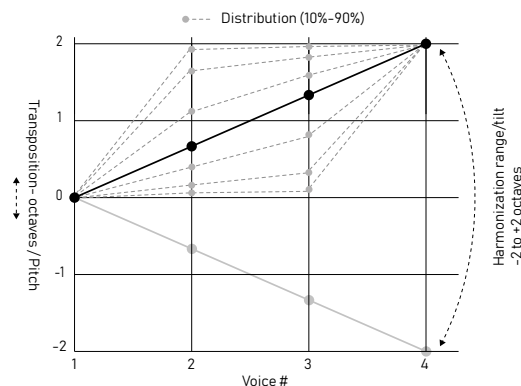Furthermore, the grains are divided into four simultanious voices to allow for polyphonic pitch control or harmonization.

There are two controls for the harmonization:
1. **Harm.**
   This controls the harmonic tilt of the voices.
   it also equals the harmonic position of the 4th voice.
   The range scales from –2 oct. to 2 oct.
2. **Distribute**
   This parameter controls the distribution of two voices between the fundamental and the 4th voice. At 12 o'clock the distribution is linear.

Scale:
By default, the pitch quantization is set to force the master pitch and the pitches of the harmonizer into the nearest note in a 12 tone equal temperament scale.
Other tunings can be stored and recalled from a SD-card.
The tunings are defined by the format of the Scala-file (visit www.huygens-fokker.org/scala/scl_format.html for more).
Scala files should be placed in a folder on the SD-card called "scala". The filename defines the bank (A–D) and slot (1–8) on the module e.g. " A1.scl".
To load a user scale from the SD-card: select the slot and bank to recall, and hold function-button while short-pressing the quantize-button.

Firmware update:
1. Download the new firmware and transfer it to SD-card.
2. Insert SD-card in module.
3. Press and hold quantize and record buttons while powering on the module. The record LED will turn on.
4. Press the play-button to start updating. The play LED will start blinking quickly. Press play-button again to confirm. The play-LED will stay on while flashing the firmware.
5. When the update is completed, the play-LED will turn off and the rec-LED will turn on. Press the rec-button to boot the module.