
LDM Honeycomb v1.0

for Max For Live on Windows and Mac

Reference Manual by LDM Design



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This book has been inspired by the Ableton Live Reference Manual, with the aim of making it easier for Ableton Live users to read.

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Main information

1.1 Plugin Overview

Honeycomb is a Max for Live device designed for metallic sound design and hat sounds. The device is made from 16 parallel inharmonic comb filters, arranged into 4 groups. The filters can produce harmonic, odd-harmonic and inharmonic spectra and interpolate between them. There are extra options for frequency shifting, lowpass filtering and serial signal routing as well as the ability to link the frequencies within a group.

Main features:

- 16 unique inharmonic comb filters arranged in 4 groups
- Frequency shifting (global and group processing) and filtering for each comb
- 2 separate frequencies for each nested comb filter
- Nested comb filters can produce normal comb effects, harmonic or inharmonic frequencies
- Frequency linking per group to easily change multiple filters
- Solo option for editing a single group of filters
- Dry/wet control to allow some dry signal through and global gain to attenuate the output
- The device has a limiter to avoid blowing up your speakers

Each filter is an implementation of a unique nested comb filter, as described by Jae Hyun Ahn and Richard Dudas. One comb filter is nested within the feedback loop of another comb. This allows for the tuning of the outer and inner comb filter with separate frequencies. Using the 2 coefficients, the spectra can be tuned to produce harmonic, odd-harmonic and inharmonic resonances and can interpolate between them.

For a more detailed explanation of the comb filters, see the original paper - https://www.richarddudas.com/documents/ahn_dudas_icmc2013.pdf

1.2 How To Use

- Send an audio signal into the device, a short impulse with some white noise is effective for hat sounds. Some noise with a slow attack can also create riser effects.
The device can be used as an effect for any sounds, synthesized or samples.
- Turn on one of the filters and set the desired frequencies and coefficient values for the filter
- Experiment and use your ears! Many different frequencies and resonance values will give different results
- Tune the sound further with frequency shifting and attenuate the higher frequencies with the lowpass filter for each comb
- See below for more detailed instructions
- It is highly recommended to boost high frequencies with an EQ the next in your FX chain for effective metallic sounds.
- Also since the comb filters naturally increase resonances it may also be necessary to attenuate some specific frequency spikes

1.3 System Requirements

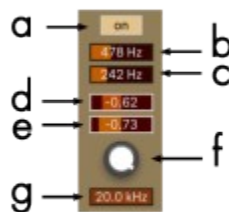
- Live Version: 11 / 12 with Max for Live
- Operating System: Windows, Mac

1.4 Installation Instructions

- Double-click the ALP file to install the Live Pack into Live.
- A warning will state the pack was made with an earlier version of Live, this is normal. Continue.
- The pack will now appear in your Live Browser in Packs.
- The amxd file for the device can now be found in the browser within the pack.
- Simply click the arrow, and then the arrow on Max Audio Effect to browse the folder.

Controls

2.1 Comb Controls



This is one of 16 individual nested comb filters. The complex relationship between coefficients *d* and *e* create interesting results.

- a) **On/Off.** To preserve CPU, only filters which are switched on will be processed.
- b) **Freq 1.** Set the frequency of the outer comb filter
- c) **Freq 2.** Set the frequency of the inner comb filter
- d) **Coefficient 1.** Set the value for the C coefficient for the filter. Positive values will produce a harmonic spectrum, negative values will produce an odd-harmonic spectrum of half that frequency.
- e) **Coefficient 2.** Set the value for the K coefficient for the filter. This acts as an interpolator for the peaks of the comb filter as a whole. Assuming coefficient C is positive, if the value of K is zero, the peaks are spaced at a frequency corresponding to the sum of the two delay times. When K is near 1, the peaks are spaced in a harmonic spectrum at a frequency corresponding to the delay time of the outer comb filter (b); when k is near -1, the peaks are spaced in an odd harmonic spectrum half that frequency. At values between (eg. 0.75), the peaks are interpolated from one spectrum to another, creating inharmonic spectra.
- f) **Gain** control for the filter output.
- g) **Lowpass.** A 2-pole lowpass filter to cut the high frequencies if necessary

2.2 Group Controls



The 16 comb filters are arranged into 4 groups of 4 filters. Each group gives further control of the routing and control of its 4 filters and further audio processing.



- Solo** the output of this group, muting all the other groups. This can help with editing by focusing on one group only.
- Routing**. By default, the 4 filters of a group are routed in parallel. Click here to switch to Serial mode, where the output of each filter is routed into the next, from left to right.
- Group Freq Shift**. Shift the frequency of the output for the group. This will also alter the relationship between the resonant peaks of the filters.
- Link**. When this is on, (see the 1st image above) The frequencies of the filters will be locked together. Then only the frequency of the first filter can be changed, which will affect the frequency of the other filters in the group. The offset of the frequency value between each filter is set with the Offset parameter (e).
- Offset**. When Link mode is enabled, this parameter sets the offset value in Hz between each filter in the group relative to the control frequency set on the first comb filter in the group.

2.3 Global Controls



These controls affect the entire output of the plugin.

- a) **Filter Bank.** Set which bank of filters are displayed on the device. Only 2 groups are visible at once.
- b) **Dry/Wet.** Mix between the dry audio input and the output of the device.
- c) **Global Freq Shift.** Shift the frequency of the entire output of all groups.
- d) **Gain.** Attenuate the volume of the total output from all combs.

Special thanks to Zion Jaymes. This device is heavily inspired by the physical modeling techniques shown on his youtube videos for cymbal design - <https://youtu.be/netcpYINyBQ>