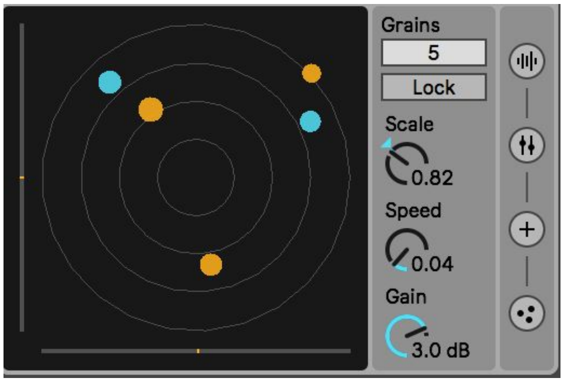
Vector Grain User Manual



Grains 5

Lock

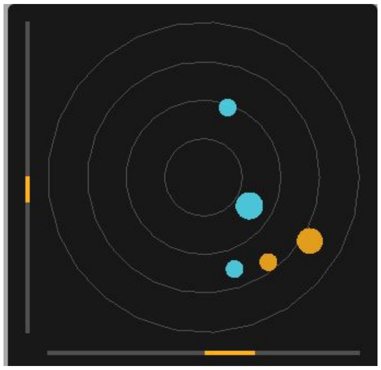
Scale 0.82

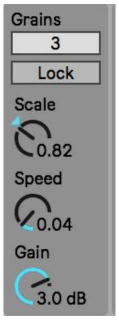
Speed 0.04

Gain 3.0 dB

Vector Grain is a Max for Live granular looper instrument and polyphonic sampler whose modulation is controlled by a 2D particle system. The device features a main display that shows the particle system and several menus for controlling parameters for the sample playback, forces that move the particles, and attributes of the particle system itself.

On the main display, the particles are visualized as colored circles. Each particle represents an independent sample playback (i.e. 3 particles equal to 3 grains). To the left and bottom of the main display are bipolar sliders which can offset the positions of the particles on the X-axis and Y-axis. As we will see later, the positions of the moving particles, as well as the size and speed, can control (offset) audio parameter values just like a modulation source such as an LFO.





Grains 3

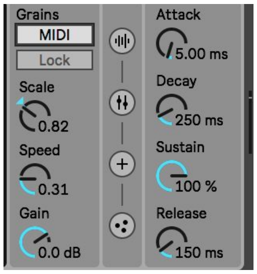
Lock

Scale 0.82

Speed 0.04

Gain 3.0 dB

Next to the main display is the main menu, which contains several primary parameters for the device. **Grains** designates the number of particles or grains. When **Lock** is enabled, playback will only occur when the Live transport is running. **Scale** scales the positions of the particles, i.e. a smaller scale will bring the particles closer to the center of the 2D space while a larger scale will push them out. **Speed** controls the overall speed of the physics simulation and thus how quickly the particles will move. **Gain** is the overall volume.



Grains MIDI

Lock

Scale 0.82

Speed 0.31

Gain 0.0 dB

Attack 5.00 ms

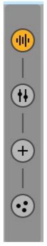
Decay 250 ms

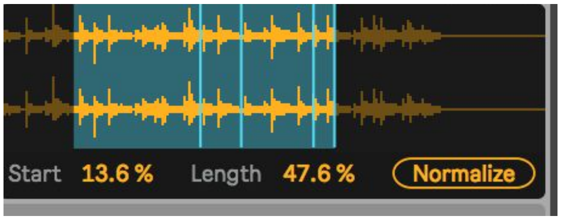
Sustain 100 %

Release 150 ms

If the number of **Grains** is set to zero, **MIDI Mode** will be enabled. In **MIDI Mode**, the instrument behaves like a polyphonic sampler instead of a granular looper, in which new voices/particles are created when a MIDI note is received and are re-pitched according to the note received. Additionally ADSR parameters for a volume envelope appear in the collapsed menu view.

On the far right side of the device is the display buttons for the different parameter menus. The top button displays the sample parameters. Below that is the parameters for the sample playback. The lower middle button displays the parameters for the forces that move the particles. The bottom button displays the particle system parameters as well as the emitter (the emitter creates and destroys particles on tempo, more about that later on!).

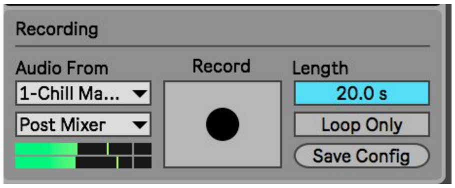




Start 13.6 %
Length 47.6 %
Normalize

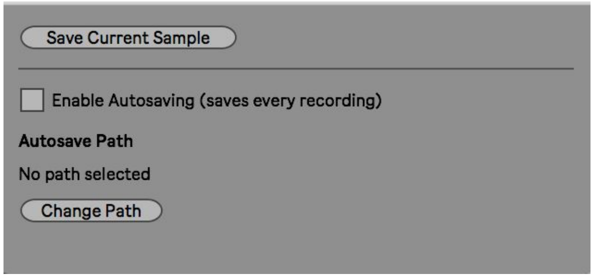
The top section of the sample parameter menu displays the dropped sample and playheads. **Start** and **Length** set the range of the sample where sample playback can occur (this can also be changed by clicking the range slider on the sample display).

Normalize will normalize the current sample.



Recording
Audio From: 1-Chill Ma... / Post Mixer
Record
Length: 20.0 s
Loop Only
Save Config

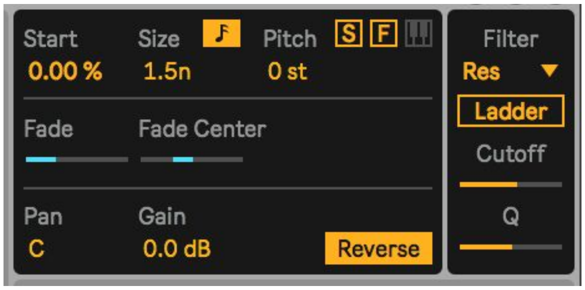
Below are parameters for recording audio into the buffer to be used for sample playback. This allows the device to work with live workflows or even as an effect. Select a source to record with **Audio From**. **Length** sets the length of the buffer to record audio in. If **Loop Only** is enabled, audio will only record in the selected range of the buffer designated by the **Start** and **Length** parameters. If you record audio in the buffer, it only exists locally in the buffer and not in any audio files (such as wav or aif). Therefore, the device cannot recall the recorded audio if loading a preset or Live set. **Save Config** opens a menu with options for saving the sound in your buffer if you desire to recall it. You can either do a one time save of the audio by clicking **Save Current Sample**, or you can **Enable Autosaving** which will save the audio in the buffer in a desired folder every time the **Record** button is pressed off (i.e. every time you are finished recording).



Save Current Sample

☐ Enable Autosaving (saves every recording)

Autosave Path
No path selected
Change Path



Start 0.00 %
Size 1.5n
Pitch 0 st
Fade
Fade Center
Pan C
Gain 0.0 dB
Reverse
Filter Res
Ladder
Cutoff
Q

This is the parameter menu for the sample playback. It contains conventional parameters for granular playback. **Start** sets what position in the selected range of the sample that a grain starts playing from. **Size** sets the grain size, which can be in milliseconds or synced note lengths. **Pitch** transposed the pitch of the sample by playing it quicker or slower. **S** reveals a dropdown menu with **Scales**. If the **Pitch** is being modulated by the particles (discussed below), then you can quantize the modulated **Pitch** to the **Scales** in the menu. Additionally, **Scala** files (.scl) can be dropped onto the **Scales** menu object itself to use custom tunings or scales such as microtonal ones! **F** reveals the fine-tuning for the **Pitch**. The **Piano Keys** button next to fine-tuning enables pitch-shifting according to MIDI notes when **MIDI Mode** is enabled. The middle section has parameters for the volume envelope of the grain playback. This is a volume envelope that occurs over the length of the grain size. **Fade** sets the amount of the volume envelope and **Fade Center** sets the center or shape of the envelope (to the left is ramp-down, middle is triangle, right is ramp-up). The bottom section has parameters for **Pan**, **Gain**, and **Reverse**, which allows for reversed sample playback.

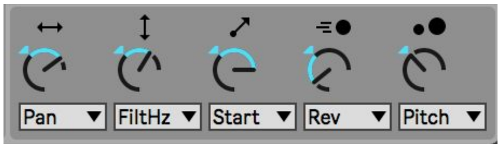
On the right side are parameters for a **Filter**. There are two types of filtering: a standard biquadratic filter and a **Ladder** filter. The **Ladder** filter takes more CPU, so it is not recommended to use it with too many voices (but it sure sounds nice!). The **Filter** has classic filter types that differ between **Ladder** mode and standard biquad mode.

Standard Biquad Mode:

LP - Lowpass
HP - Hipass
Res - Resonant Bandpass
BP - Bandpass
KN - Notch
LP-HP - First half of cutoff is LP and the rest is HP

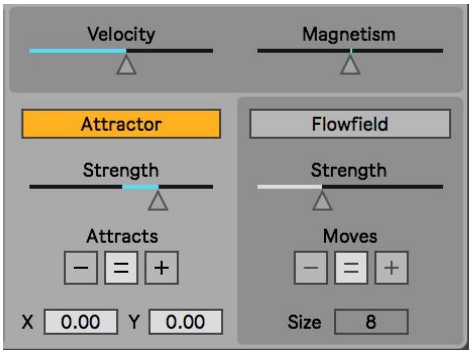
Ladder Mode:

LP24 - Lopass 24dB slope
HP12 - Hipass 12dB slope
KN - Notch
BP12 - Banpass 12dB slope
LP12 - Lopass 12dB slope
PK - Peaknotch



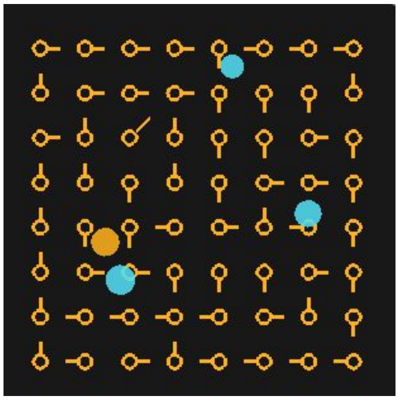
At the bottom of the sample playback parameters is the section for mapping particle attributes to audio parameters. This is similar to mapping an LFO to modulate an audio parameter. Above the knobs are symbols that represent a particle's attribute. The leftmost symbol signifies the X-axis (or left/right) position of the particles. To the right of that is one for the Y-axis (up/down) position. Next is the distance from the center, next to that is the speed of the particle and finally is the size or mass of the particle. The knobs are attenuators and apply how much of each particle attribute affects the audio parameter it is mapped to. Below each knob is a dropdown menu that assigns which audio parameter the particle attribute affects. For example, the leftmost knob in this picture tells how much the left/right position of the particle affects the panning of that particle's grain playback (remember that each individual particle controls an individual grain). Another example from the picture: the second knob from the left tells how much the up/down position of a particle modulates or offsets the filter cutoff frequency.

Something to note about the particle attribute for size or mass: All of the other attributes are continuously changing from the particle movements (for example, if a particle is moving, its left/right and top/down positions, speed, and distance from the center is always changing). However, the size or mass of a particle doesn't change after it has been created. Therefore, this attribute can provide a static, unchanging value that is different between particles. This could be useful if you want the different voices to have different values that don't change.

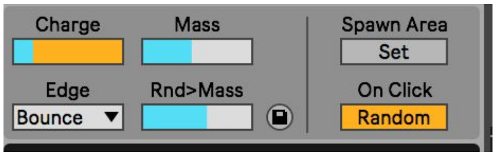


X 0.00 Y 0.00
Size 8

Here are the parameters for the forces that move the particles. There are 3 types of forces: a fixed point **Attractor**, a **Flowfield**, and **Magnetism**. All of the forces are affected by the **Velocity** limit. The **Velocity** parameter limits how much a particle can move on every frame. A low **Velocity** value causes the particles to move very little each frame, and not be able to move far from attracting forces such as **Magnetism** and the **Attractor**. A high **Velocity** value does the opposite. The **Attractor** is a fixed point force which means it stays in one spot (set by the **X** and **Y** parameters at the bottom) and pulls or repels particles using 2D classic gravitational attraction. The **Strength** sets how strongly it attracts (in the case of positive values) or repels (in the case of negative values) particles. Both the **Velocity** and **Strength** parameters set the overall dynamics of the forces. For example, with a lower **Velocity** and high **Strength**, the particles will move right to the attractor point and stay there, because the **Velocity** is too low for the particles to move very far from the attractor, and also the high **Strength** of the attractor keeps the particle at that point. Another example: a high **Velocity** value and lower **Strength** value would cause particles to keep moving or orbiting around the attraction point, but never settle on it. Below **Strength** is a parameter called **Attracts**, which determines what color or charge of particles that the **Attractor** pulls or repels (charge is set in the parameter menu discussed below). So if **Attracts** is set to “-”, it only attracts/repels negative particles (which are the yellow/orange color in the standard Live color theme). “+” is for attracting/repelling positive/blue particles, while “=” attracts/repels all particles. This allows you to have different forces for different particles!



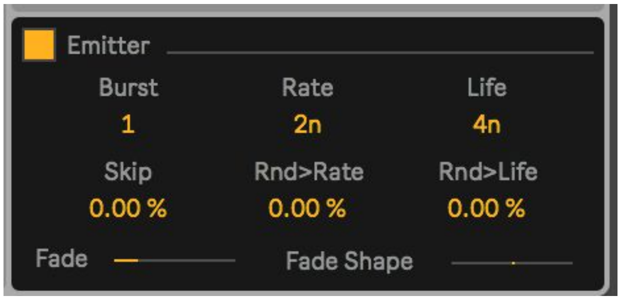
Flowfield presents a 2D field of directional forces that move the particles based on what direction each arrow on the field is pointing. The direction of the arrows/forces can be changed by dragging the mouse around the display of the flowfield. This allows you to send the particles in specific directions. The flowfield also has parameters for **Strength** (a high strength causes particles to follow the directions tightly, while a low strength may cause a more loose/sloppy movement), and for which charge/color particles the flowfield **Moves**. At the bottom is an option for setting the **Size** or resolution of the flowfield. Lastly is the **Magnetism** force, which works depending on the charge/colors of the particles. It applies a force of pseudo-magnetism, which is actually just attracting/repelling particles to each other based on their charge/color. When the value is to the right, opposite charges/colors attract each other while the same charges/colors repel at increasing strength with a higher value. When the value is to the left, the opposite occurs (like colors attract and opposites repel), and in the center, there is no **Magnetism** force applied.



Edge Bounce

On Click Random

The final menu displays the particle system attributes and the emitter. At the top, there are parameters for controlling aspects of the particles. **Charge** controls the probability that a new particle will be positively or negatively charged. To the left, there will be more negatively charged particles, and to the right more positively charged ones. In the standard Live color theme, negative particles are a yellow/orange color while positive particles are a blue color. A particle's charge may affect the forces applied to it as discussed in the previous section. **Edge** denotes what behavior occurs when a particle hits the edge of the 2D space: **Bounce** causes it to bounce off the edge, **Clip** causes the particle to stop at the edge, and **Wrap** causes it to wrap around to the other side. **Mass** sets the size of the particles. The circles will appear bigger or smaller depending on their mass, and this also affects the dynamics of the forces applied to the particles just like with objects in real life. **Rnd>Mass** sets how much random variety is applied to the mass attribute between particles (higher values of this will cause a higher variety of mass between particles). The save disk symbol next to this parameter causes the current masses, charges, positions, and velocities of all of the particles currently existing to be saved. This is useful for recalling presets or live sets and retaining the same particles/dynamics at a certain point to recreate an effect. When particles are created, they start from a random point on the 2D space. However, **Spawn Area** allows you to set the area in which the particles are created. **On Click** sets the behavior that occurs if you click on the particle simulation (the main display). **Random** causes a new set of random particles to be created and resets their velocities, **Freeze** causes the simulation to freeze in its place.



Burst 1

Rate 2n

Life 4n

Skip 0.00 %

Rnd>Rate 0.00 %

Rnd>Life 0.00 %

At the bottom of this section are the **Emitter** parameters. By default, the **Emitter** is off, and particles exist indefinitely based on the number of voices. However, if **Emitter** is enabled, particles are created and destroyed on synced beat notes. This is useful for creating rhythmic effects. The maximum number of particles the **Emitter** can create at any time is set by the **Voices** parameter in the main parameters section. **Burst** sets how many particles are created at each interval, while **Rate** sets the time interval for creating particles. **Life** sets the time interval that a particle exists for. Below these are parameters for adding more variety to the timing. **Skip** sets the probability that the emitter will skip creating particles for an interval. **Rnd>Rate** randomly spreads the time interval for emitting. **Rnd>Life** randomly spreads the time interval for the particle lifetimes. At the bottom are parameters for volume fading over the course of a particle's **Life**. **Fade** sets the amount of the fade window and **Fade Shape** sets the shape (left is ramp-down, middle is triangle, right is ramp-up).