SOUND PARTICLES 1.1 Density Granular Harmonizer Plugin Audio Unit Instruction Manual

Contents

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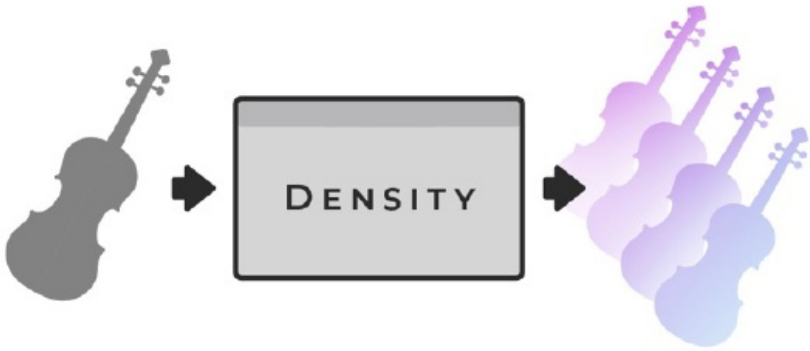
Welcome Note
Welcome to “Density”
I always liked the idea of having some sort of plugin that could simulate multiple voices – you would feed it with a solo voice or instrument, and in the output, you would get an ensemble. Even the traditional “Chorus” effect tries to accomplish that, using simple DSP techniques. With Density, we tried to create our take on the problem, by mixing different modules of our technologies – particles, granular synthesis, and 3D render. I hope you enjoy it.
And, as always, don’t hesitate to send us your feedback – we LOVE to hear from our users!
Nuno Fonseca, PhD
CEO
nuno.fonseca@soundparticles.com

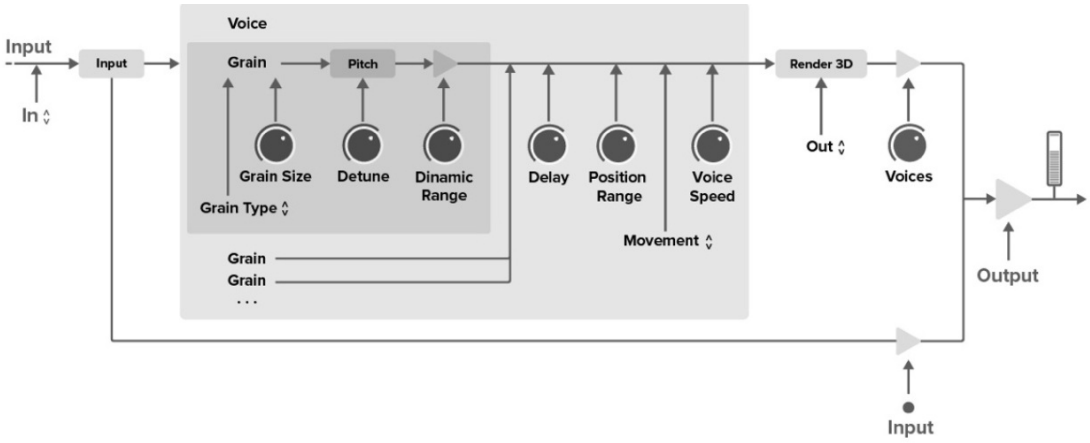
Density

Thank you very much for downloading Density audio plugin from Sound Particles.
Density is committed to change the way you create wider sounds in your mixes by increasing the density of voices in the sound field. This unique audio plugin uses granular synthesis, applying movement, pitch and timing differences to the grains, creating an “ensemble” effect, like multiple musicians playing together.
Designed to be simple and quick to use, Density has three different operation modes — Basic, Detune and Multipitch — enabling sound designers and music producers to control it with the level of complexity they desire.
Whether to add motion to sound effects or to creatively harmonize with multiple voices, this audio plugin will change the way you think about sound.
Density also allows you to output the sound of the multiple voices in a variety of reproduction formats — from stereo to surround 5.1 and 7.1, to Dolby Atmos 7.1.2, Ambisonics up to 6th order, and Binaural.
Go through this manual and get the best out of Density!



Signal Flow

The audio signal flows into Density, where it is processed according to the selected mode and controls. The output signal can be rendered in various formats.



Overview

Density is designed to be easy-to-use and straightforward while providing all the controls you need to attain the best out of the plugin. There are three modes of operation, with different levels of control and complexity, that can be select on the top of the window:

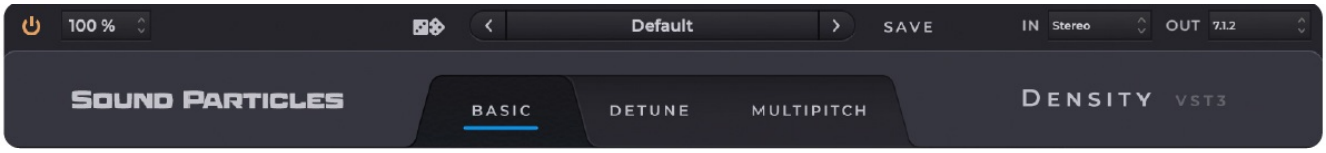
1. **Basic** – quick and easy controls for fast results.
2. **Detune** – custom controls for time, dynamics and the movement of the voices.
3. **Multipitch** – all the previous controls with custom pitch control for different voices groups.

All the three modes will create a defined number of new voices, generated through granular synthesis, that will be moving around in the sound field. With the Detune knob you will be able to control the pitch variation of the created voices and on the Detune and Multipitch modes, you can fine tune the movements of the voices and other parameters such as delay, grain size and dynamic range of the voices.

On the next section of this document, you'll find a detailed description of each mode and its specific controls.

Modes and Controls

One top of the plugin window, you have the Mode Selection section for shifting between the three operation modes. This is visible in all modes and allows the user to quickly switch between them. All the common settings are maintained when the mode is changed



All the three modes allow you to select the input and output formats as well as the input, voices and output level. That will be covered after each mode, in the Output Options section of this document.

Basic

The Basic mode allows you to use the plugin fast without needing any additional experience. In this mode you will have access to the following parameters:

1. **Small** / **Large Ensemble** – Defines the number of voices (Small Ensemble will create 4 voices, Large Ensemble will create 16 voices);
2. **Detune** – Controls the detune range with logarithmic behaviour (80% -> increases 1 step / semitone, 100% -> increases 12 steps / semitones = 1 octave);
3. **Add Bass** – Pressing this button will add voices 1 octave bellow (2 voices in Small Ensemble and 6 voices in Large Ensemble).

Detune

The Detune Mode has more advanced controls that allow you to fine tune some parameters related to the generation of grains and the movement of the voices, such as:

1. Detune – Controls the detune range of each grain with logarithmic behaviour (80% -> increases 1 step / semitone, 100% -> increases 12 steps / semitones = 1 octave);
2. Delay Range – Controls the maximum random delay to be added to voices with logarithmic behaviour (from 0 to 1 second);
3. Grain Size – Controls the duration range of each grain with logarithmic behaviour (from 0 to 1 second). Actual value of grain size will range between this value and 75%of this value.
4. Dynamic Range – Controls the maximum random attenuation applied to each grain (from 0 to 60 dB);
5. Position Divergence – Controls how far voices will be created regarding the original channel position (0% -> the grains are created on the same position as the original channel, 100% -> the grains are created far from the original channel);
6. Voice Speed – Controls the movement speed of all voices (from 0 to 1000 deg/s);
7. Movement – Pressing this button will open a pop-up menu with different options for the movement types (Random, Clockwise, Counter-Clockwise);
8. Grain Type – Pressing this button will open a pop-up menu with different options for the type of grains used (Regular, Reversed, Both);
9. Voices Nr – Controls the number of voices (from 0 to 100);
10. XY Pad – Controls two chosen parameters in a XY plane (Cartesian coordinate system);
11. Top View – Visualize the movement of the voices.

Multipitch

The Multipitch Mode allows the user to control different groups of voices, having individual slots for each group with controls for pitch, number of voices and gain. This mode allows you to experiment with creative effects like harmonizing your original sounds by shifting the pitch of each group from -24 to 24 steps (2 octaves bellow and up).

1. **Detune** – Controls the detune range of each grain with logarithmic behaviour (80% -> increases 1 step / semitone, 100% -> increases 12 steps / semitones = 1 octave);
2. **Delay Range** – Controls the maximum random delay to be added to voices with logarithmic behaviour (from 0 to 1 second);
3. **Grain Size** – Controls the duration range of each grain with logarithmic behaviour (from 0 to 1 second). Actual value of grain size will range between this value and 75%of this value.
4. **Dynamic Range** – Controls the maximum random attenuation applied to each grain (from 0 to 60 dB);
5. **Position Divergence** – Controls how far voices will be created regarding the original channel position (0% -> the grains are created on the same position as the original channel, 100% -> the grains are created far from the original channel);
6. **Voice Speed** – Controls the movement speed of all voices (from 0 to 1000 deg/s);
7. **Movement** – Pressing this button will open a pop-up menu with different options for the movement types (Random, Clockwise, Counter-Clockwise);
8. **Grain Type** – Pressing this button will open a pop-up menu with different options for the type of grains used (Regular, Reversed, Both);
9. **XY Pad** – Controls two chosen parameters in a XY plane (Cartesian coordinate system);
10. **Top View** – Visualize the movement of the voices;

    The user can create up to 8 slots of voices groups, each controlling the following parameters:
11. Pitch – Controls the pitch of the voices' group (from –24 to 24 steps / semitones);
12. Voices Nr – Controls the number of voices created in the group (from 0 to 25 in each slot);
13. Gain – Controls the gain of the voices' group (from -inf to 12 dB).

Output Options

All three modes allow users to select the input and output formats as well as the input, voices, and output level. The outputoptions are available in the Output Section of the document.

1. IN – Pressing this button will open a pop-up menu with different options for the input format;
2. OUT – Pressing this button will open a pop-up menu with different options for the output format;
3. Input – Controls the level of the input signal send to the output (dry signal);
4. Output – Controls the output level of the plugin.
5. Voices – Controls the level of the voices signal send to the output (wet signal).

The current signal levels are visible in the VU meters available on the right-side of the interface. Users can access a pop-up menu by right clicking on the VU's. This essentially allow users to reset the VU's animation (e.g.: if they already clipped), as well as viewing the render format in use. When inserted into a multi-channel track, Density lets you switch the VU's channel order between Film and SMPTE formats.

Output Section

The output section of Density is dedicated to the parameters that change the already processed audio. The following parameters are available:

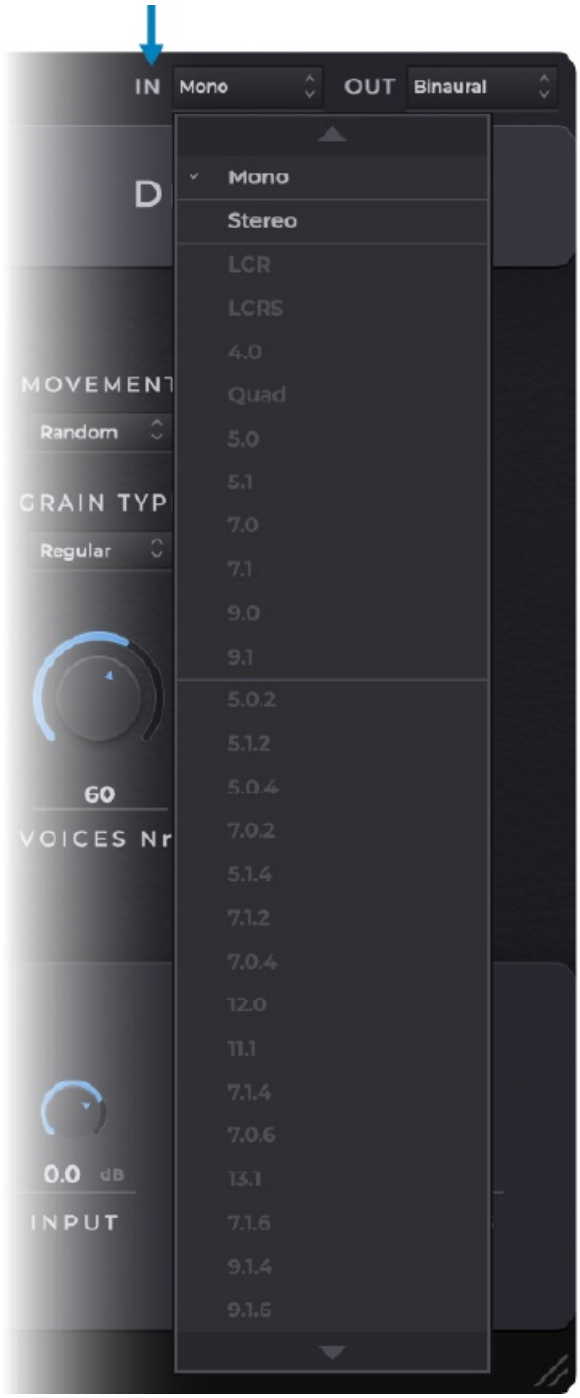
- **OUT:** Pressing this button will open a pop-up menu with different options for the output format.

The current signal levels are visible in the VU meters available on the right-side of the interface. Users can access a pop-up menu by right-clicking on the VU's. This essentially allows users to reset the VU's animation (e.g., if they already clipped), as well as viewing the render format in use. When inserted into a multi-channel track, Density lets you switch the VU's channel order between Film and SMPTE formats.

Input Formats

Density supports the following input formats:

- Mono
- Stereo
- LCR
- LCRS
- 4.0 Quad
- 5.0
- 5.1
- 7.0
- 7.1
- 9.0
- 9.1
- 5.0.2
- 5.1.2
- 5.0.4
- 5.1.4
- 7.0.2
- 7.1.2
- 7.0.4
- 7.1.4
- 7.0.6
- 7.1.6
- 9.1.4
- 9.1.6
- 9.0.8
- 9.1.8
- 11.1.8
- 11.1
- 12.0
- 13.1
- 22.2
- 1st Order Ambisonics
- 2nd Order Ambisonics
- 3rd Order Ambisonics
- 4th Order Ambisonics
- 5th Order Ambisonics
- 6th Order Ambisonics

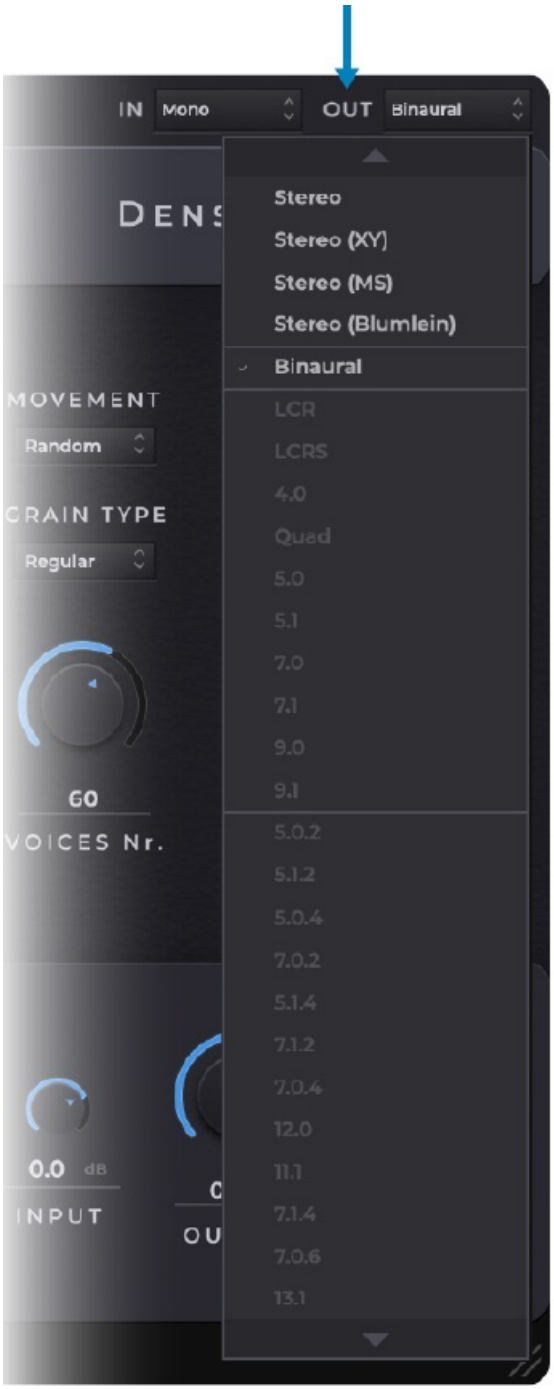


Output Render Formats
Density supports various output render formats, which can be selected from the OUT button in the Output Section.

- Stereo – A stereo render made of gains based on VBAP.
- Stereo (XY) – A stereo render made with a virtual XY microphone. Only available as Output format.
- Stereo (MS) – A stereo render made with a virtual MS microphone.
  Only available as Output format.
- Stereo (Blumlein) – A stereo render made with a virtual Blumlein microphone. Only available as Output format.
- Binaural – A binaural render based on the SADIE MINP KU100 dataset.
  Only available as Output format.
- LCR – An LCR VBAP multichannel render.
- LCRS – An LCRS VBAP multichannel render.
- 4.0 – A 4.0 VBAP multichannel render.

- Quad – A Quad VBAP multichannel render.
- 5.0 – A 5.0 VBAP multichannel render
- 5.1 – A 5.1 VBAP multichannel render.
- 7.0 – A 7.0 VBAP multichannel render.
- 7.1 – A 7.1 VBAP multichannel render.
- 9.0 – A 9.0 VBAP multichannel render.
- 9.1 – A 9.1 VBAP multichannel render.
- 5.0.2 – A 5.0.2 VBAP multichannel render.
- 5.1.2 – A 5.1.2 VBAP multichannel render.
- 5.0.4 – A 5.0.4 VBAP multichannel render.
- 5.1.4 – A 5.1.4 VBAP multichannel render.
- 7.0.2 – A 7.0.2 VBAP multichannel render.
- 7.1.2 – A 7.1.2 VBAP multichannel render.
- 7.0.4 – A 7.0.4 VBAP multichannel render.
- 7.1.4 – A 7.1.4 VBAP multichannel render.
- 7.0.6 – A 7.0.6 VBAP multichannel render.
- 7.1.6 – A 7.1.6 VBAP multichannel render.
- 9.1.4 – A 9.1.4 VBAP multichannel render.
- 9.1.6 – A 9.1.6 VBAP multichannel render.
- 9.0.8 – A 9.0.8 VBAP multichannel render.
- 9.1.8 – A 9.1.8 VBAP multichannel render.
- 11.1.8 – A 11.1.8 VBAP multichannel render.
- 11.1 – A 11.1 Auro-3D VBAP multichannel render.
- 12.0 – A 12.0 IMAX VBAP multichannel render.
- 13.1 – A 13.1 Auro-3D VBAP multichannel render.
- 22.2 – A 22.2 NHK VBAP multichannel render.

  Ambisonics (ACN/SN3D) – An Ambisonics render up to 6th order based on the Ambisonics input.



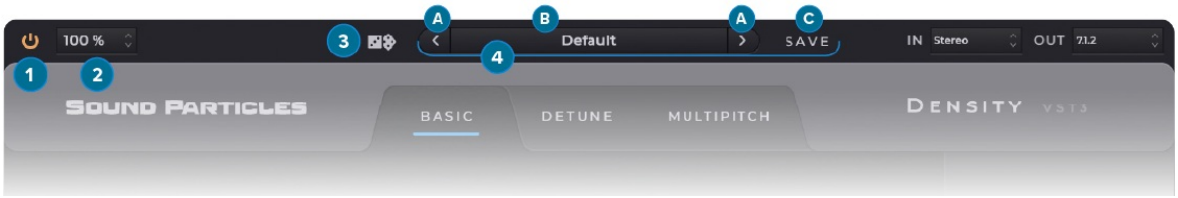
Toolbars

The Density toolbar incorporates a set of features that assist users while using the plugin. The upper tab allows users to save and manage presets quickly and intuitively. Additionally, the Smooth Bypass, Scaling, and Randomize features will help users improve the experience with the plugin. The bottom tab gives users access to all the help they need, with dynamic tooltips.

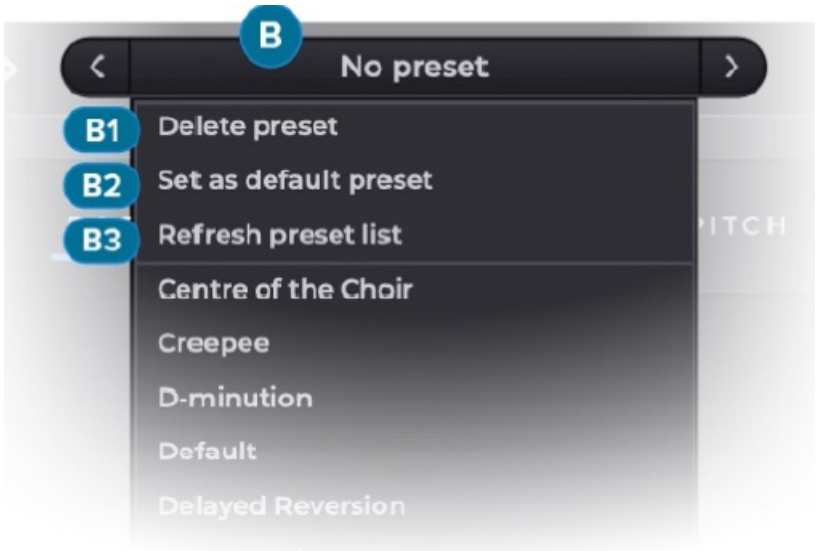
1. Smooth Bypass — noiseless plug-in activation/deactivation. Using this feature the Density is bypassed without any clipping, even if it’s processing audio.
2. GUI Zoom — the Density GUI can be resized. The pop-up available in the upper-left part of the interface let users choose a scaling value, from 25% to 400%. This action affects only the currently selected Density instance. New instances of the plugin will open with the default size factor (100%).
3. Randomize — This button will set new random positions for the sound sources
4. Internal Preset Saving System — The internal system for saving presets is a feature that allows the management of presets, enabling users to: create snapshots, alter presets, and access all of them (factory and

custom) across all DAWs. The plugin also supports a tree structure for better organisation of presets, allowing users to save presets within specific folders.

- A. Preset Navigator — allows users to navigate through the previous and next preset using the arrows placed on the left and right of the Preset pop-up menu.
- B. Preset Pop-up Menu — the preset pop-up displays the current preset in use. It initially appears with a preset called Default, used whenever the plugin is inserted into a track. Clicking the name of the preset brings up a menu with the options: Delete preset, Set as default preset, and Refresh preset list — followed by the complete list of presets (factory and custom).



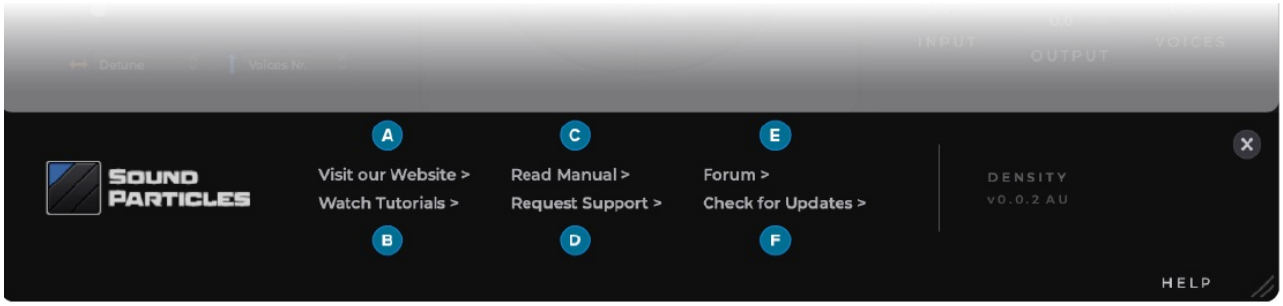
  - B1. Set as default preset — defines the current plugin settings as the default settings when the plugin is inserted into a new track. This action determines the default on all hosts and architectures.
  - B2. Refresh preset list — updates the presets list. If there is a new preset file in the presets folder, or a new preset has been created from a different Density instance, this option updates the preset list.
  - B3. Delete preset — deletes the current preset. This action is permanent and deletes the preset on all hosts.



- C. Save — Clicking the “Save” button saves the current state of Density parameters.
  An Operating System window will automatically appear in the required directory. Presets saved in different paths won’t be recognised in the preset menu of the plugin.

5. Tooltips’ section — Shows the definition for an element of the plugin when the parameter is hovered.
6. Update — If the plug-in is running on a computer with Internet access, it can detect if a newer update is available, informing the user of the existence of a new update, by showing a blinking phrase on the top of the display.
7. Help button — displays the Help menu that gives access to our Website, User Manual, Tutorials, Support Requests, Forum and Check for Updates.
8. Resize button — Users are allowed to use a custom scaling factor by dragging the cursor in the bottom-right of the plugin’s interface. Performing this makes the zoom pop-up display the custom value of the scaling. *Bare in mind that hosts may deal differently with plugin resizes.

- a. Visit our Website – Link to soundparticles.com
- b. Watch Tutorials – Link to Density tutorials
- c. Read Manual – Web version of this Manual.
- d. Request Support – This button will redirect users to the requested support page. This will automatically retrieve some data about your setup (OS, CPU, RAM, plugin version and host). Note that this request support is particular for Density topics.
- e. Forum – Link to our main Facebook group, Sound Particles Forum.
- f. Check for Updates – Pressing this button will access soundparticles.com to check if there are available updates.



Plugin Installation

Installing Density copies the plugin into appropriate plugin folders, and the hosts will automatically recognize them. It also allows Density users to choose a custom folder for the installation, in both operating systems — MacOS and WindowsOS.
On MacOS, the default paths for Density plugin architectures are the following:

- /Library/Audio/Plug-Ins/VST3
- /Library/Audio/Plug-Ins/Components
- /Library/Application Support/Sound Particles/Density
- /Library/Application Support/Avid/Audio/Plug-Ins

On WindowsOS, the default paths for Density plugin architectures are the following:

- C:\Program Files\Common Files\VST3
- C:\Program Files\Common Files\Avid\Audio\Plug-Ins

Presets locations

User presets should be stored in a .spp file in the following locations:
On MacOS, the path for Density User presets is the following:

- /Users/USERNAME*/Library/Application Support/Sound Particles/Density/Presets

On WindowsOS, the path for Density User presets is the following:

- C:\Users\USERNAME**\AppData\Roaming\Sound Particles\Density\Presets

*USERNAME is your login name. Your user Library folder may be hidden, in which case you can select the “Go To Folder” option in the Go menu of the Finder, enter “~/Library”, and click OK.
**USERNAME is your login name. AppData may be hidden; use the explorer view options to show system files.

Tips

Knobs:

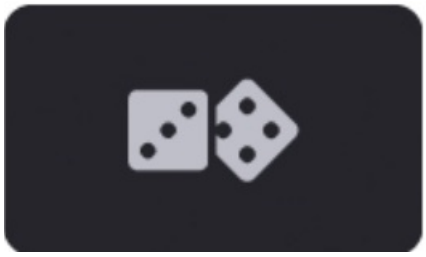
- Double click or Option/Alt-click resets to the default value;
- Command, Ctrl or Shift while dragging enables fine-tune.

VU meter:

- Click on any channel clears all clipping LEDs;
- Left click on any channel and select “reset” clears all clipping LEDs;
- In multichannel scenarios it is possible to choose the VU’s channel order (SMPTE/Film) with a mouse right-click inside the VU’s area.

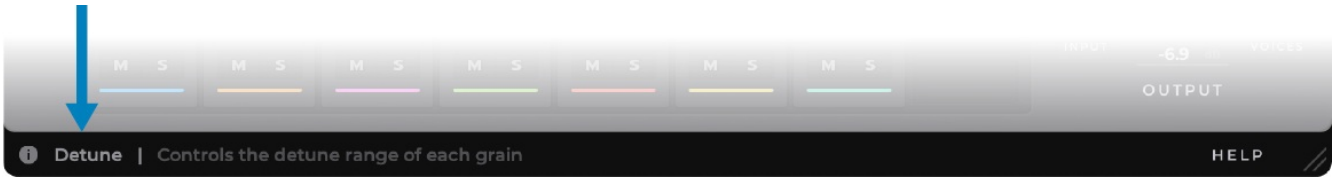
Randomize:

- This button will set new random values to the parameters and the plugin effect mode buttons/pop-ups.



Tooltip’s bar:

- This version of Density has a bar at the bottom of the interface that shows short definitions for each element of the plugin.



Additional Notes

Avid S6 Support
Density (AAX) can have its parameters controlled through various control surfaces, including AVID S6.
Check for updates
If the plug-in is running on a computer with internet access, it is able to detect if a newer update is available, informing the user of the existence of a new update, by showing a blinking phrase on the top of the display.
To achieve that, Sound Particles Density plugin tries to access a simple XML file located at **https://www.soundparticles.com**.
SOUND PARTICLES DENSITY DOES NOT SEND ANY INFORMATION FROM THE USER OVER THE INTERNET.
Support
If you detect a bug, if you got a crash, if you believe something is not perfect, or even if you have ideas for future versions, don't hesitate, and email us at support@soundparticles.com. We REALLY want to hear from you. Sometimes a bug lives on for too much time, simply because we haven't detected ourselves and we didn't receive any feedback from the affected users. Besides that, your feedback is very important for us.
"Help us help you"

Credits

The credits section lists all the contributors and sources of inspiration for Density.
Produced by
Nuno Fonseca
Developer
Guilherme Krull
QA and Testers
João Dionisio, João Franco, Luís Rodrigues e Salvador Miranda
Graphic Designer
Marco Afonso

EULA

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Product Usage Instructions

1. Select the appropriate input format for your audio signal.
2. Select one of the three modes: Basic, Detune, or Multipitch.
3. Adjust the controls in the selected mode to manipulate your audio signal as desired.
4. Select an output format from the OUT button in the Output Section.

5. Use the VU meters to monitor the signal levels and adjust as necessary.
6. Save and manage presets using the upper tab in the toolbar.
7. Use the Smooth Bypass, Scaling, and Randomize features in the toolbar to improve your experience with the plugin.
8. Refer to the Additional Notes section for any further information or tips on using Density.

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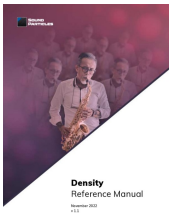
Documents / Resources

	SOUND PARTICLES 1.1 Density Granular Harmonizer Plugin Audio Unit [pdf] Instruction Manual 1.1, 1.1 Density Granular Harmonizer Plugin Audio Unit, Density Granular Harmonizer Plugin Audio Unit, Granular Harmonizer Plugin Audio Unit, Harmonizer Plugin Audio Unit, Plugin Audio Unit, Audio Unit, Unit

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- FFmpeg
- Sound Particles