PIANO COLORS

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2. Welcome to PIANO COLORS

A truly avant-garde instrument, PIANO COLORS delivers a stunning universe of tones that will ignite your creativity. It combines a rich variety of inventive playing techniques with a groundbreaking processing engine that intertwines dynamics, tonal shifts, and motion to push the sound of a piano into unimaginable spaces. Whether it's dramatic noir soundtracks, forward-thinking electronica, or straight-up pop productions, PIANO COLORS gives life to new and unexpected musical ideas.

The essence of PIANO COLORS lies in the synergy it creates between its deep pool of unique grand piano articulations, and the innovative modulation engines that include Motion, the Arpeggiator, and the newly extended Particles. Complex sounds transform in real-time to create expressive timbres, naturally pulsing grooves, and continuously evolving pads.

To record the extensive collection of source samples in PIANO COLORS, a variety of unorthodox tools and materials were used including mallets, drumsticks, rubber, screws, and multiple EBows. The strings and body of a grand piano were prepared and played in highly unusual ways, and the sonic results were meticulously captured using the most sought-after recording equipment to yield a breathtaking array of lively resonances, articulate harmonics and colorful overtones.

We hope you enjoy PIANO COLORS!

2.1. Document Conventions

In this document the following formatting is used to highlight useful information:

Italics	Indicates paths to locations on your hard disk or other storage devices
Bold	Highlights important names, concepts, and software interface elements.
[Brackets]	References keys on a computer's keyboard
►	Single item instructions are represented by a bullet icon.
→	Results in procedures are represented by an arrow icon.

The following three icons represent different types of information:

The **light bulb** icon indicates a useful tip, suggestion, or interesting fact.

The **information** icon highlights important information that is essential for the given context.

The **warning** icon alerts you of serious issues and potential risks that require your full attention.

3. Installation and Setup

Before you can make music with PIANO COLORS, you must install and setup the necessary software. Follow these instructions to get started:

Native Access

Native Access is where you will install the software for PIANO COLORS. If you are new to Native Instruments, you will first have to create your Native ID. To learn more about Native Access, visit our support page here.

1. Download and install Native Access here.
2. Create a Native ID, if you do not yet have one.
3. Login to Native Access using your Native ID.
4. Click the **Not installed** tab.
5. Click **INSTALL** for the following products:
    - KONTAKT or KONTAK PLAYER
    - PIANO COLORS

→ The software is installed automatically.

> (i) If the software is already installed, click the **Available updates** tab and check for new updates before proceeding.

PIANO COLORS via KONTAKT

Once installed, you can start using PIANO COLORS in KONTAKT. PIANO COLORS is not an independent plug-in, so you first need to open an instance of KONTAKT or KONTAKT PLAYER:

1. Open KONTAKT as a plug-in in your host software (DAW), or as a stand-alone application.
2. Locate PIANO COLORS in the Browser, on the left side of the user interface.
3. Click **Instruments** to open the product's content.
4. Double-click the **Piano Colors.nki** file to load the instrument.
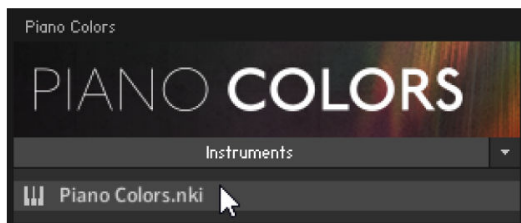
> 🔆 If you are new to KONTAKT and want more information, visit KONTAKT PLAYER and KONTAKT.

4. Basic Workflows

This chapter introduces the main concepts of PIANO COLORS and its interface. You will also learn how to quickly adjust the different modules, modulate your sound, use the Browsers to load various types of presets and samples, and save and load Snapshots.

4.1. Instrument Overview

When you first open PIANO COLORS, you see the main page of the interface:

The main page of PIANO COLORS

This page is split into four main parts:

1. **Snapshot**: The name of the loaded Snapshot is always visible. Snapshots are global presets containing values for all parameters of th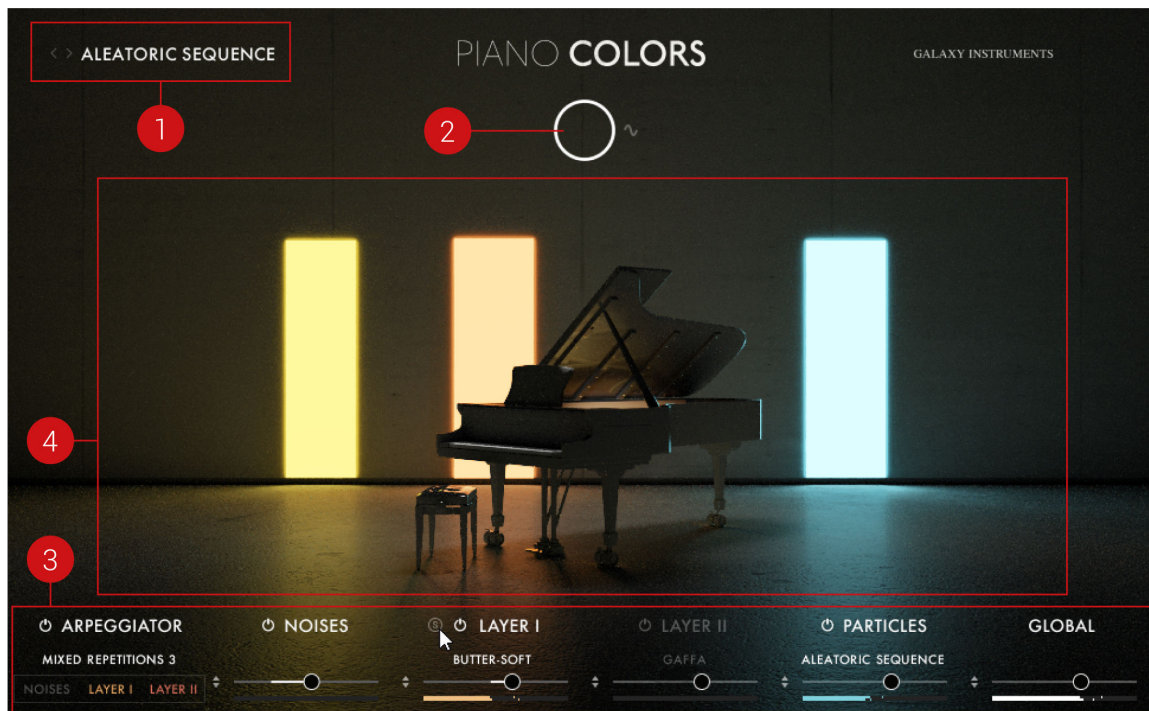e instrument. The name of the Snapshot currently loaded is displayed here. Click the left and right arrows to cycle through Snapshots, or click the name of the loaded Snapshot to open the Snapshot Browser and select another Snapshot from the PIANO COLORS factory library. For more information on the various Browsers found in PIANO COLORS, see Using the Browsers.

2. **Expression knob**: The Expression knob is always visible. You can assign the Expression knob to any number of parameters within PIANO COLORS, which allows you to control these parameters via the Expression knob. You can also modulate them all at once. For more information, see Modulating Your Sound.

3. **Module row**: The Module row is always visible. PIANO COLORS is based on four sound generators: the **Layer 1**, **Layer 2**, **Particles**, and **Noises** modules. In addition, the **Arpeggiator** module lets you create advanced sequences of notes playing automatically, and the **Global** module adjusts the overall sound of your instrument. The main parameters of all six modules are available at any time in the Module row, at the bottom of the instrument. For more information, see Module Basics.

4. **Central area**: This is the biggest part of the instrument and it can display various pages of parameters and Browsers. By default, it shows the main page: You see a picture of the grand piano in the recording room, illuminated by colored columns appearing on the wall behind. Each luminous column represents one of the four sound generators of PIANO COLORS: the Layer 1, Layer 2, Particles, and Noises modules, whose main controls are found under each column in the Module row (**3**). A column lights up only if the module underneath is active, and the column's width on the wall represents the volume level set for that module.

4.2. Module Basics

At the bottom of the PIANO COLORS interface, the **Module row** is always visible and lets you adjust at any time the main parameters of the **six modules** included in PIANO COLORS:
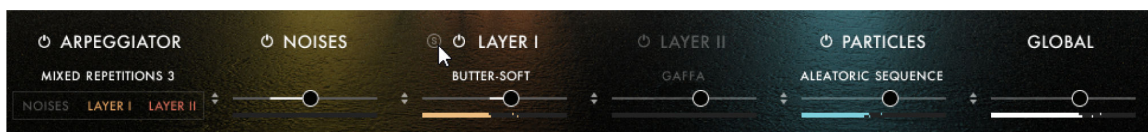
*The Module row at the bottom of the instrument*

The middle four modules are the sound generators:

- In the middle, the **Layer 1** and **Layer 2** modules both offer the full range of recordings of PIANO COLORS, allowing you to precisely adjust two distinct sample sets with their own effects and modulation, and play them together.

- On their left, the **Noises** module adds mechanical preparation or surrounding noises.

- On their right, the **Particles** module creates an additional cloud of notes based on a distinct sample set.

On the very left, the **Arpeggiator** module creates sequences of notes based on your playing. You can choose which of the Noises, Layer 1 and Layer 2 modules should play these sequences.

On the very right, the **Global** module controls a few general settings for your instrument.

The controls in the Module row are similar for most modules, with slight differences:
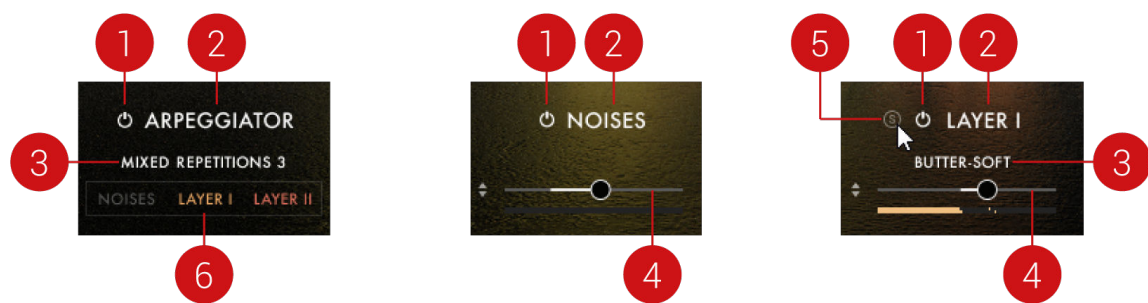
The controls in the Module row are similar for most modules

1. **Module On/Off** (all modules except Global): Click to switch the module on or off. When off, the other controls of the module are grayed out in the Module row.

2. **Module name**: Click to open or close the module page in the central area above. The module page contains many more parameters, allowing you to fine-tune the module behavior. The pages for all modules are described in detail in the following chapters of the manual.

3. **Preset name** (Arpeggiator, Layer 1 and 2, Particles): Shows the name of the loaded preset. The Arpeggiator, Layer 1 and Layer 2 modules offer numerous presets. Click the preset name to open the Preset Browser and select another preset for that module (for more information, see

Using the Browsers). When you hover over the preset name, two arrows appear on either side: Click them to quickly load the previous or next preset from the browser's result list without opening the browser.

4. **Volume** (all modules except Arpeggiator): Adjusts the volume level of the module. [Ctrl]-click (on Windows) or [Cmd]-click (on Mac) to set the slider back to its default level (this works for all sliders and knobs in the instrument). As you play, a pair of horizontal peak meters under the slider show you the current level. Left of the slider, the little up and down arrows are the **modulation icon**: Click and drag this icon vertically to assign the slider to the Expression knob and modulate the module's volume level (for more information, see Modulating Your Sound).

5. **Solo** (Noises, Layers 1 and 2, Particles): If you hover over the Module On/Off button (**1**), the Solo button shows up to solo the corresponding module.

6. **Target selector** (Arpeggiator): Selects which module(s) should play the sequence created in the Arpeggiator module. You can send the Arpeggiator sequence to the Noises, Layer 1 and Layer 2 modules. Click the desired labels to switch each target on or off. Active targets are lit, inactive targets are grayed out.

4.3. Modulating Your Sound

At the top of the PIANO COLORS interface, the Expression knob is always visible. It allows you to adjust at any time and in one go all parameters of PIANO COLORS assigned to it.
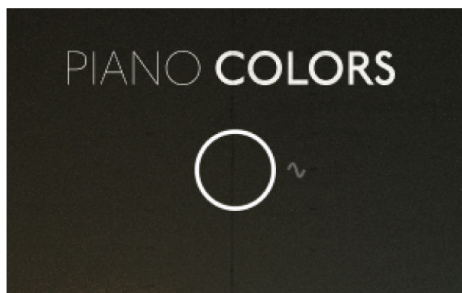
The Expression knob at the top of the instrument

▶ Click and drag the Expression knob vertically to adjust all linked parameters at once.

As with any knob or slider in PIANO COLORS, you can use [Ctrl]-click (on Windows) or [Cmd]-click (on Mac) to reset the knob to its default value.

By default, the Expression knob is assigned to MIDI CC1, which corresponds to the modulation wheel on your keyboard.

> 💡 You can remove the Expression knob's default MIDI assignment by right-clicking the Expression knob and selecting **Remove MIDI Automation: CC# 1**, and assign it to another MIDI CC message by selecting **Learn MIDI CC# Automation** in the menu. By the way, this is true for all parameters in PIANO COLORS. For more information on MIDI automation, see the KONTAKT manual.

4.3.1. Assigning Parameters to the Expression Knob

Any continuous control (slider or knob) of PIANO COLORS that can be assigned to the Expression knob will have a little **modulation icon** showing two little up and down arrows nearby:

The modulation icons next to a slider and a knob

▶ To modulate a control via the Expression knob, click the modulation icon near the control and drag your mouse vertically. The further you drag your mouse, the stronger the Expression knob will affect the parameter value.

The Expression knob affects parameter values relative to their original position, in other words, adjusting the Expression knob will modulate the parameter value in a range based on its original value. The modulation is bipolar: If you drag the modulation icon upwards, the modulation range will extend above the slider or knob position; if you drag the icon downwards, the modulation range will extend below the slider or knob position.

You can quickly see which parameters are modulated by the Expression knob:

• Sliders: When being modulated, the brighter part of the slider's span shows the modulation range.

• Knobs: If not modulated, knobs have a bright ring. When modulated, the ring becomes darker, with the brighter part showing the modulation range.

For all modulated controls, a small dot shows the current position set by the Expression knob.

Removing an Assignment from the Expression Knob

▶ To stop modulating a control via the Expression knob, [Ctrl]-click (on Windows) or [Cmd]-click (on Mac) the modulation icon near that control.

→ The control is released from the modulation and the visual indication of the modulation disappears.

4.3.2. Modulating the Expression Knob

In addition to adjusting the position of the Expression knob manually or via MIDI, you can modulate the position of the Expression knob itself via two modulation sources: the incoming velocities and an internal LFO. You can configure both sources in the **Expression Knob Modulation panel**:

▶ To show or hide the modulation settings for the Expression knob, click the Expression Knob Modulation button:
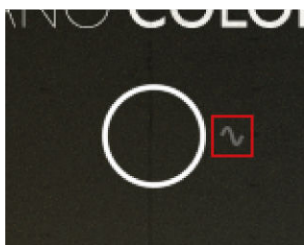
The Expression Knob Modulation panel contains the following controls:
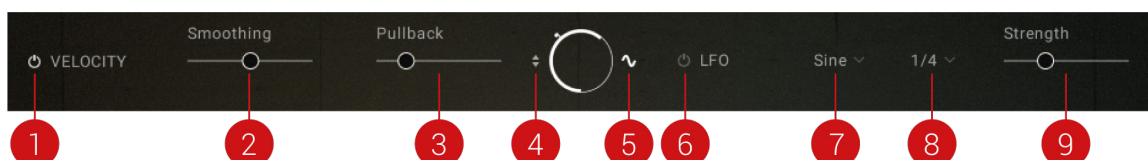
The Expression Knob Modulation panel

1. **Velocity On/Off**: Activates or deactivates the velocity control of the Expression knob. When active, the knob reacts to the incoming velocities, both played and created (the knob also reacts to the Arpeggiator). You can set the range of the dynamic velocity modulation via the modulation icon (**4**) that appears.

2. **Smoothing**: Sets the time it takes for the Expression knob to react once a key has been pressed.

3. **Pullback**: Sets the time it takes for the Expression knob to return to its original position.

4. **Modulation icon**: Appears only if the Velocity On/Off button (**1**) is switched on. As for other knobs, click and drag the modulation icon vertically to set the strength of the velocity modulation. A little mark on the knob's ring indicates the resulting modulation range.

5. **Expression Knob Modulation**: Shows or hides the Expression Knob Modulation panel.

6. **LFO On/Off**: Activates or deactivates the LFO modulation of the Expression knob.

7. **Shape**: Selects a waveform for the LFO.

8. **Rate**: Sets the LFO speed, in note values.

9. **Strength**: Adjusts the strength of the LFO modulation.

Note that both modulation sources can be used simultaneously: The position of the Expression knob will result from the incoming velocity, the LFO, and your manual adjustments.

If any of the modulation sources are active, a white dot on the knob's ring indicates the current value.

4.3.3. Other Modulations Available

In addition to the Expression knob, PIANO COLORS offers other ways of changing your sound dynamically, notably:

- The Arpeggiator module can create automated sequences of notes triggering the Noises, Layer 1 and Layer 2 modules. For more information, see Module Basics and Arpeggiator Page.

- The Layer 1 and 2 modules have their own internal modulation tool: the Motion module. For more information, see Motion Controls.

4.4. Using the Browsers

PIANO COLORS' factory library provides hundreds of presets and sample sets for use in various places and modules:

- **Sample sets** are used as sound sources in the Layer 1, Layer 2, and Particles modules.

- **Presets** store settings for specific parts of the instrument, for example, Arpeggiator presets, Layer presets, Mod FX presets and Motion Source presets within the Layer modules, etc. Some presets can even store settings for the entire instrument, in which case they are called **Snapshots**.

In order to make these presets, Snapshots, and sample sets easy to find, they are organized into categories and tagged with labels describing their content. In the relevant places, PIANO COLORS provides **Browsers** to navigate through the factory library and find the desired objects.

4.4.1. Generic Workflow: Example with the Snapshot Browser

Although dealing with different kinds of objects, all Browsers offer a similar workflow:

- In the PIANO COLORS interface, wherever a sample or preset name appears, click that name to open the relevant Browser.

- In the **left part** of the Browser, click the **tags** or the **category** describing the object(s) that you are looking for.

- In the **right part** of the Browser, the **result list**

As an example, here is the **Snapshot Browser**:

An example of a Browser: the Snapshot Browser

1. **Snapshot**, **Preset** , or **Sample Name**: Click this to open the Browser. This can appear in various places of the PIANO COLORS interface: Wherever a sample or preset name appears, click that name to open the relevant Browser.

2. **Tag Filter**: Click the **tags** or the **category** describing the object(s) that you are looking for. Darker tags indicate that no object will match your selection, resulting in an empty Result list (**3**). At the top of the Tag Filter, a label (for example, **SNAPSHOT** in the picture above) reminds you which type of objects you are currently browsing.

3. **Result list**: Shows objects corresponding to the tags you have selected in the Tag Filter (**2**) on the left. You can further narrow the list using the Favorite feature (see below). Click an object in the list once to pre-listen to it (it is temporarily loaded and you can try it on your keyboard). Double-click an object to load it and close the Browser.

4. **Load**: Click this button to load the object selected in the Result list (**3**) and close the Browser. This is the same as double-clicking the object in the list.

5. **Close**: Closes the Browser without loading anything. The pre-listened object is unloaded from the memory and PIANO COLORS returns to its previous state.

Using Favorites

The Result list provides a useful Favorite feature:

Selecting Favorites in the left column of the Result list

▶ Click the little stars in front of the entries in the Result list to mark them as Favorites (lit stars) or remove them from the Favorites (unlit stars).

After doing this, you can switch the topmost star (near the **Presets** label) on or off to show all results or only your Favorites in the list:
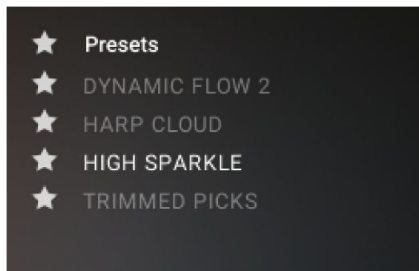
Displaying only the Favorites in the Result list

Combined with the pre-listening feature, the Favorites can be very useful to build a preselection of interesting presets, samples, etc., for later use.

4.4.2. Effect Browsers: Specific Feature

The Effect Browsers have the following particularity: Instead of lists of tags, the Tag Filter displays icons for the nine effect categories available:

The nine effect categories in the left part of the Effect Browsers
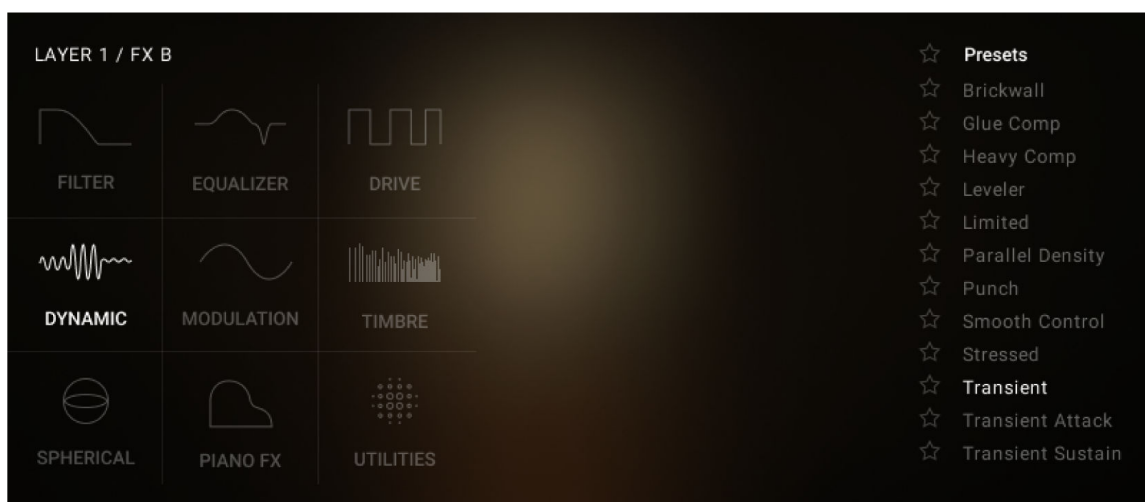
4.4.3. Source Browsers: Specific Feature

The Source Browsers have the following particularity: Between the Tag Filter on the left and the Result list on the right, an additional **Info area** provides information about the recording, preparation, or playing technique of the source selected in the Result list:
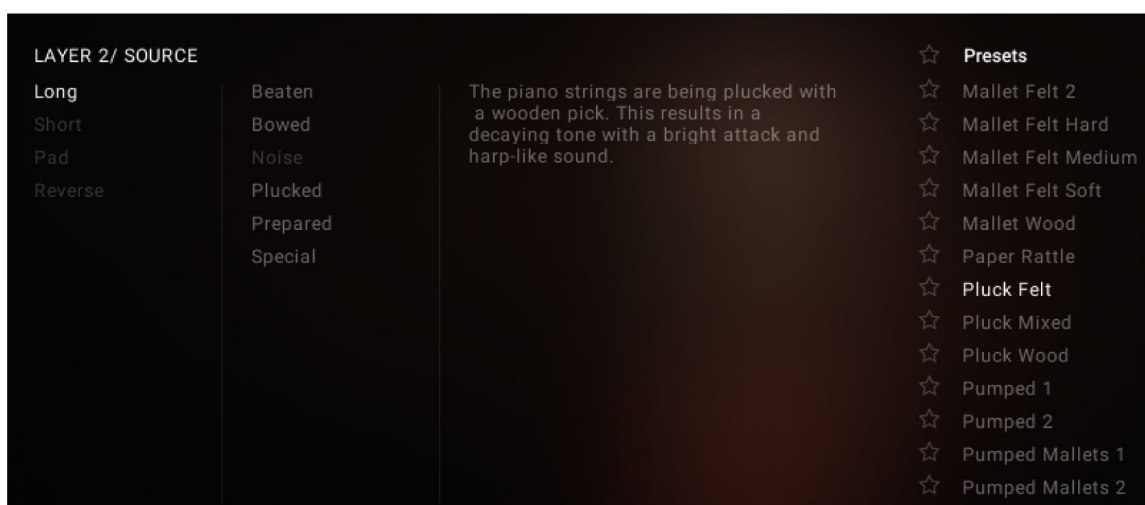
The Info area in the middle of the Source Browsers

4.4.4. Modulation Source Browsers: Specific Features

The Modulation Source Browsers have the following particularity: Between the Tag Filter on the left and the Result list on the right, an additional Modulation Display provides a graphical representation of the waveform or step sequence selected in the Result list:

The Modulation Display in the middle of the Modulation Source Browsers

Furthermore, if a step sequence is selected (**Steps** tag selected in the Tag Filter), you can edit the steps directly in the display with your mouse:

- Click a step and drag your mouse vertically to adjust the value for that step, and horizontally to adjust the values of the other steps.

- Right-click and drag your mouse across several steps to draw a line of values across these steps.

- Click the number under the display and drag your mouse vertically to adjust the number of steps in the sequence.

- If you want to cancel your edits, click the sequence again in the Result list.

If you have edited the sequence manually and want to use that modified sequence in your instrument, click the Load button in the top right corner of the Browser instead of double-clicking the sequence in the Result list, otherwise, your edits would be canceled before the sequence is loaded.

4.5. Using Snapshots

Snapshots are global presets containing values for all parameters of the instrument. They offer a quick and convenient way of browsing for new sounds and saving custom presets. Snapshots can have two origins:

- **Factory Snapshots** are included in the PIANO COLORS factory library.

- **User Snapshots** are created by you or other users.

4.5.1. Snapshots in the Instrument Header

You can access and manage both Factory and User Snapshots from the Instrument Header of PIANO COLORS in the KONTAKT or KONTAKT PLAYER window.

💡 If you have loaded PIANO COLORS in KOMPLETE KONTROL, the Instrument Header is not visible by default. To show it, select the Additional view in KOMPLETE KONTROL, for example by clicking the "**+**" button in the top row of the KOMPLETE KONTROL window or by typing [Ctrl]+[2] (on Windows) or [Cmd]+[2] (on Mac) on your computer keyboard.

*The Snapshot view in the Instrument Header*

1. **Snapshot menu**: Opens the Snapshot menu where you can load a Snapshot from the Factory or User library. For more information, see Loading a Snapshot.

2. **Snapshot Name**: Displays the name of the loaded Snapshot.

3. **Snapshot Previous/Next** (left and right arrows): Click these arrows to quickly load the previous or next Snapshot.

4. **Save Snapshot** (floppy disk icon): Allows you to save the current state of the instrument as a User Snapshot. When a User Snapshot is saved, all parameters of the instrument are stored within it. The exact state of the instrument can be recalled at any time by selecting this Snapshot from the User library. For more information, see Saving a User Snapshot.

5. **Delete Snapshot** (bin icon): Deletes the loaded Snapshot from the User library. You can only delete User Snapshots and not Factory Snapshots. For more information, see Deleting a User Snapshot.

6. **Snapshot View** (camera icon): Switches the Instrument Header to Snapshot view. This button must be switched on to see the Snapshot features described here.

4.5.2. Saving a User Snapshot

You can save User Snapshots at any time while you are working on your instrument.

To save a User Snapshot:

1. Click the Snapshot View button (camera icon) to open the Snapshot view.

2. Click the Save button (floppy disk icon).

3. Enter a name for your new Snapshot in the dialog box.

4. Click **Save** to finish the process and close the dialog box.
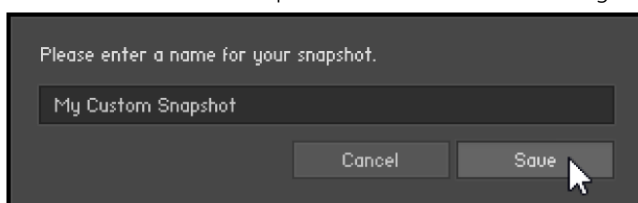
→ Your Snapshot .nksn file is saved to the User Snapshot Library. It appears in the **User** Snapshot list.

If a User Snapshot with the same name already exists, the dialog box offers you to overwrite it (click **Overwrite**) or to save it under another name (edit the name and click **Save as**):
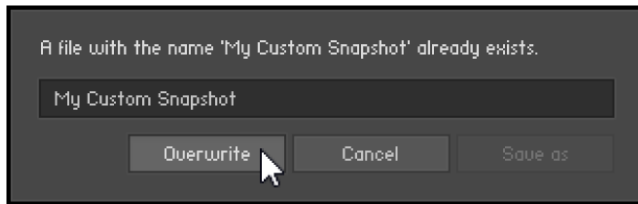
If the Snapshot name is already in use, you can overwrite the older Snapshot or type another name.

4.5.3. Loading a Snapshot

You can load Snapshots from the Snapshot menu in the Instrument Header. You can also use the arrows left of the floppy disk icon to load the previous or next Snapshot.

> 💡 You can browse and load Factory Snapshots more conveniently via PIANO COLORS' dedicated Snapshot Browser (see Generic Workflow: Example with the Snapshot Browser). On the other hand, User Snapshots are accessible only from KONTAKT's Instrument Header as described here.

Quickly Loading the Previous or Next Snapshot

To quickly load the previous or next Snapshot from the Snapshot list:

1. Click the Snapshot View button (camera icon) to open the Snapshot view.
2. Click the arrow buttons (**< >**):
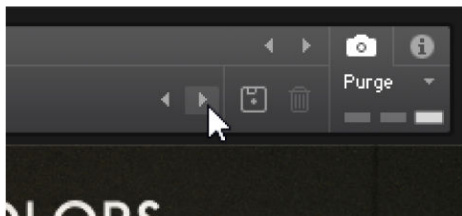
→ The previous or next Snapshot from the Snapshot list is directly loaded.

Loading a Snapshot via the Snapshot Menu

To load a Snapshot from the library via the Snapshot menu:

1. Click the Snapshot View button (camera icon) to open the Snapshot view.
2. Click the arrow icon next to the Snapshot name field to open the Snapshot menu.
3. Select the **Factory** category to load a Factory Snapshot, or select the **User** category to load one of your own Snapshots (if any).
4. Select an instrument category, if available.

5. Select a Snapshot to load it.
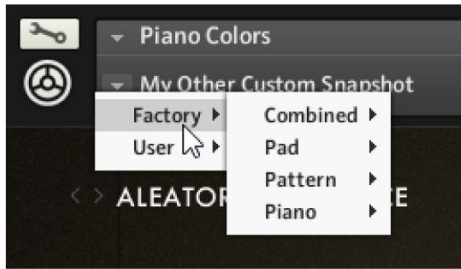
→ The Snapshot is loaded and its name appears in the Instrument Header.

💡 The **User** category will not appear until you have first saved a Snapshot.

4.5.4. Deleting a User Snapshot

User Snapshots can be deleted using the bin icon in the Instrument Header. To delete a User Snapshot:

1. Click the Snapshot View button (camera icon) to open the Snapshot view.
2. Load the User Snapshot you wish to delete.
3. Click the Delete button (bin icon).
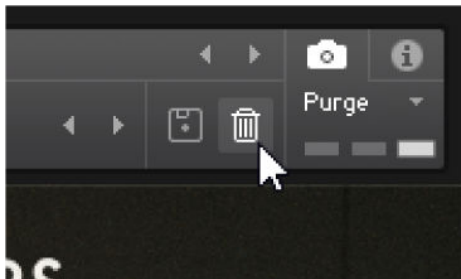
4. Confirm the deletion by clicking **Yes** in the dialog box.

→ The User Snapshot .nksn file is deleted from the User Snapshot Library.

5. Layers Page

On the Layers page, you can configure the sound generated by the Layer 1 and Layer 2 modules. Layer 1 and Layer 2 can be seen as the main two sound generators in PIANO COLORS, on which the Noises and Particles modules will add their own, distinctive features.

▶ Click **LAYER I** or **LAYER II** at the bottom of the instrument to open or close the Layers page:

The Layers page is split into three main parts:
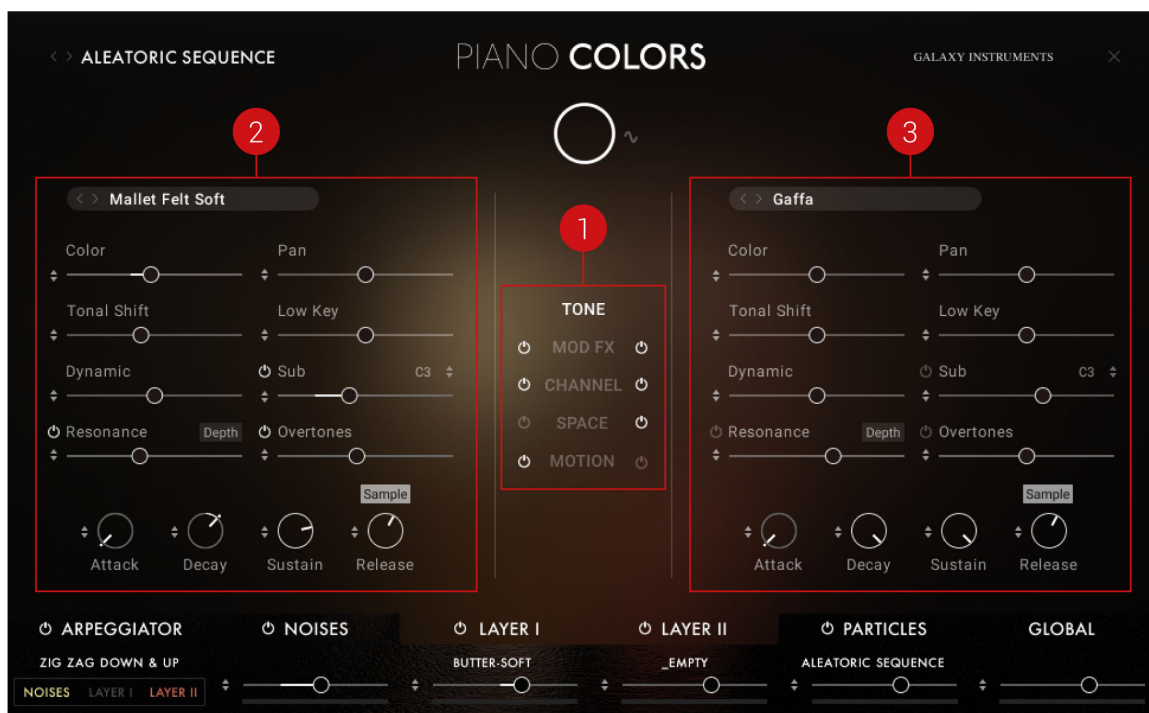
The Layers page showing the Tone module

1. **Module selector**: Click a module name to show its parameters for both Layers. An **On/Off switch** on either side of each module name lets you globally activate or deactivate that module for the corresponding Layer: Switches on the left are for Layer 1, switches on the right are for Layer 2.
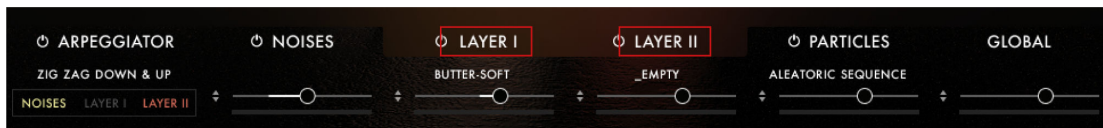2. **Layer 1 parameters**: All parameters of Layer 1 appear in the left part of the Layers page. The parameters displayed depend on the module selected in the middle of the page (**1**).
3. **Layer 2 parameters**: All parameters of Layer 2 appear in the right part of the Layers page. The parameters displayed depend on the module selected in the middle of the page (**1**).

The Layers provide the following modules:

• The Tone module takes care of the basic sample playback. For detailed information, see Tone Controls.

• The Mod FX module adds up to four creative effects. For detailed information, see Mod FX Controls.

- The Channel module controls an equalizer and a compressor. For detailed information, see Channel Controls.

- The Space module adds a reverb or delay. For detailed information, see Space Controls.

- The Motion module provides two internal modulation sources. For detailed information, see Motion Controls.

5.1. Tone Controls

The Tone module of the Layers page lets you select the sample sets used in both Layers and configure their playback, thus defining the basic tone of Layer 1 and Layer 2.

▶ To display the controls of the Tone module, click **TONE** in the middle column of the Layers page:
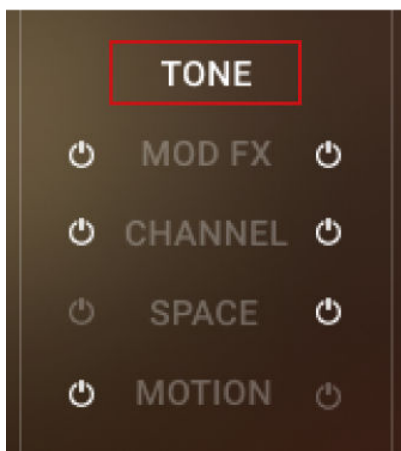
Selecting the Tone module

Parameters for Layer 1 and 2 are strictly the same. Controls for Layer 1 are in the left part of the page, controls for Layer 2 are in the right part. The controls for Layer 1 are described here, and they also apply to Layer 2.

The Tone module contains the following elements:

The Tone parameters in the Layers page (showing Layer 1)

1. **Source Name**: Displays the name of the sample used in that Layer. Click the name to open the Source Browser and select another sample for that Layer. For more information on using the browsers in PIANO COLORS, see Using the Browsers. You can also click the arrow icons (**<>**) near the sample name to quickly load the previous or next sample from the browser's result list without opening the browser.

2. **Color**: Adjusts the tone from soft to hard by readjusting the sample mapping. Dragging the slider right will make the instrument sound harder and crisper, with a more pronounced attack phase. Dragging the slider left will achieve a warmer and softer sound, and the attack phase will be less pronounced.

3. **Tonal Shift**: Adjusts the playback speed of each sample, resulting in formant or character changes. Dragging the slider right will make the instrument sound sharper, and dragging it to the left will result in a deeper, darker sound with a less defined attack.

4. **Dynamic**: Controls the dynamic range by adjusting the volume while still using all velocity samples. Drag left to shrink or drag right to expand the dynamic range.

5. **Resonance controls** (available only for certain sounds): Pressing the sustain pedal on a piano raises all the dampers at once, enabling all strings to resonate sympathetically. This adds a much fuller and deeper sound to the note. The **Resonance On/Off** switch activates or deactivates the samples for these string resonances (if any). The **Resonance** slider adjusts the volume of these string resonances. The **Depth** button controls when the resonance samples are triggered: When switched on, the resonance samples are always triggered; when switched off, they are triggered only when using the sustain pedal, which is indicated by a LED.

6. **Pan**: Adjusts the panoramic position of the Layer in the stereo field.

7. **Low Key**: Adjusts the volume of the keys below middle C. Moving the slider to the left decreases the volume of the lower keys. Moving the slider to the right will increase it. The lower the key, the stronger the effect.

8. **Sub controls**: The so-called Sub samples are additional samples that have been recorded with a reverse-wired NS10 speaker under the low keys of the grand piano. The **Sub On/Off** switch activates or deactivates these Sub samples. The **Sub Key** selector sets the split key below which the Sub samples are being triggered. The **Sub** slider adjusts the volume of the Sub microphone samples.

9. **Overtone controls** (available only for certain sounds): The **Overtones On/Off** switch activates or deactivates the overtone samples. When enabled, while you hold a key, the corresponding strings may resonate at their fundamental or overtone frequencies as you play other keys. These overtones add liveliness to the sound. This is also known as "sympathetic string resonance". The **Overtones** slider adjusts the volume of the overtone samples.

10. **Envelope controls**: The envelope controls let you adjust the various stages of the Layer's amplitude envelope: The **Attack** knob adjusts Layer's attack time, the **Decay** knob adjusts its decay time, the **Sustain** knob adjusts its sustain level, and the **Release** knob adjusts its release time. If the source sound features release samples, an additional **Sample** button appears: When you switch the **Sample** button on, the **Release** knob adjusts the level of these release samples instead of the release time.

Additional Tight Button for Plucked Sources

If you load a plucked source, an additional **Tight** button appears right of the source name:

*The **Tight** button appears for plucked sources*

Activating **Tight** shortens the attack by moving the playback start of the samples a little towards the center of the attack. This way, the samples are playable tightly. This is especially useful to avoid double attacks when two layers are being triggered by the arpeggiator simultaneously.

Additional Double Button for Pad Sources

If you load a pad source, an additional **Double** button appears right of the source name:
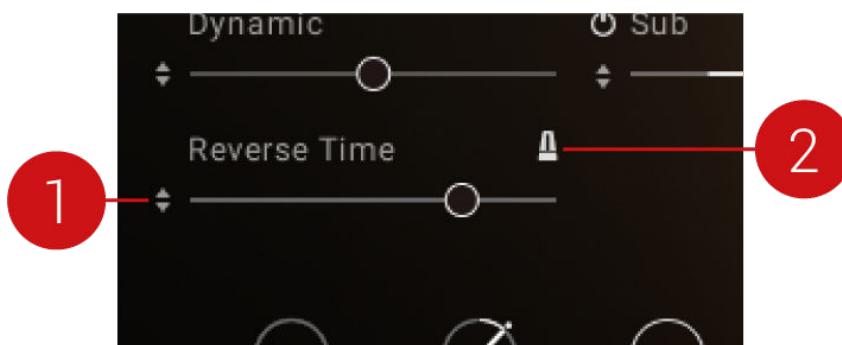

*The **Double** button appears for pad sources*

Activating **Double** doubles the sound for a wider stereo picture, similar to double-tracking a guitar.

Additional Reverse Time slider and Reverse Sync On/Off button for reverse sources

If you load a reverse source, two additional controls appear:

Additional controls for reverse sources

1. **Reverse Time**: Adjusts the length of the reverse samples in milliseconds or note values, depending on the state of the Reverse Sync button nearby (**2**).

2. **Reverse Sync On/Off**: When switched on, the length of the reverse samples is synced to the tempo. When switched off, the length of the reverse samples is freely adjustable.

5.2. Mod FX Controls

The Mod FX module of the Layers page lets you configure up to four modulatable effects for each Layer.

▶ To display the controls of the Mod FX module, click **MOD FX** in the middle column of the Layers page:
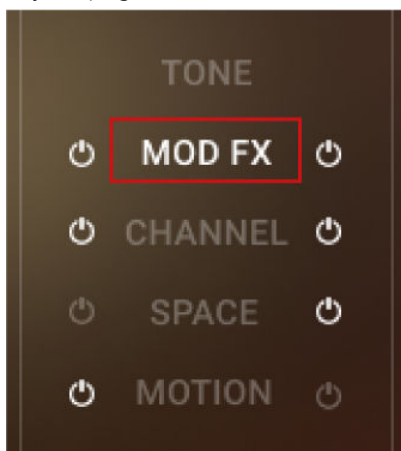
Selecting the Mod FX module

Parameters for Layer 1 and 2 are strictly the same. Controls for Layer 1 are in the left part of the page, controls for Layer 2 are in the right part. The controls for Layer 1 are described here, and they also apply to Layer 2.

The Mod FX module contains the following elements:

The Mod FX parameters in the Layers page (showing Layer 1)

1. **Effect Slot A**: Configures the first effect for that Layer.
2. **Effect Slot B**: Configures the second effect for that Layer.
3. **Effect Slot C**: Configures the third effect for that Layer.
4. **Effect Slot D**: Configures the fourth effect for that Layer.

Each Effect slot contains the following elements:
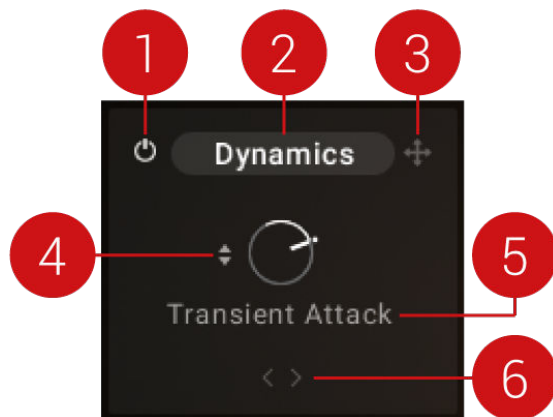
The parameters in each Effect slot

1. **Effect On/Off**: Switches the effect on or off.
2. **Effect Category**: Displays the category of the loaded effect. The particular preset of that effect is displayed under the knob (**5**). Click the category to open the Effect Browser and select another effect preset. For more information on using the Browsers, see Using the Browsers.
3. **Drag icon**: Drag this icon and drop it onto another effect slot to move the effect to that other slot. If the target effect slot was not empty, both effects are switched. Note that you can also drag an effect to the other Layer.

4. **Effect Strength**: Adjusts the strength of the effect. This knob can be modulated.

5. **Effect Preset**: Displays the name of the loaded preset from the Effect Category indicated at the top (**2**). Click the name to open the Effect Browser and select another effect preset. For more information on using the Browsers, see Using the Browsers.

6. **Previous/Next Preset**: Click these arrow icons (**< >**) to quickly load the previous or next effect preset from the browser's result list without opening the browser.

5.3. Channel Controls

The Channel module of the Layers page lets you configure an equalization and a compression stage for each Layer.

▶ To display the controls of the Channel module, click **CHANNEL** in the middle column of the Layers page:
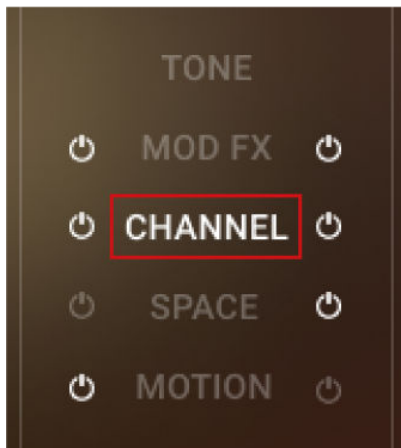
Selecting the Channel module

Parameters for Layer 1 and 2 are strictly the same. Controls for Layer 1 are in the left part of the page, controls for Layer 2 are in the right part. The controls for Layer 1 are described here, and they also apply to Layer 2.

The Channel module contains the following areas:
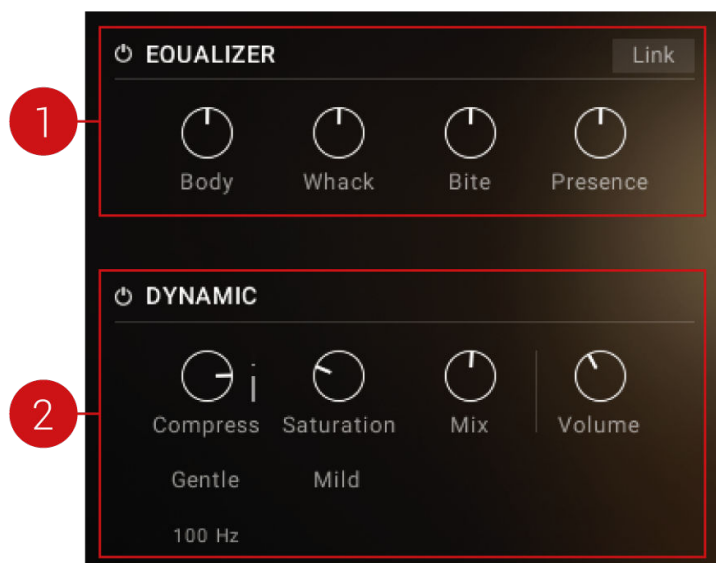
*The **EQUALIZER** and **DYNAMIC** areas in the Channel module of the Layers page*

1. **EQUALIZER**: Adjusts a four-band equalization applied to the Layer. For more information, see Channel Equalization.

2. **DYNAMIC**: Adjusts a compression applied to the Layer. For more information, see Channel Compression.

5.3.1. Channel Equalization

The **EQUALIZER** area of the Channel module in the Layers page allows you to apply a four-band equalization to each Layer.

The **EQUALIZER** area contains the following controls:

*The **EQUALIZER** area in the Channel module of the Layers page*

1. **EQUALIZER On/Off**: Turns the equalizer on or off.

2. **Gain knobs**: Adjust the levels of the four frequency bands. From left to right, the knobs control lower to higher frequency bands. The frequency bands are described in musical terms as 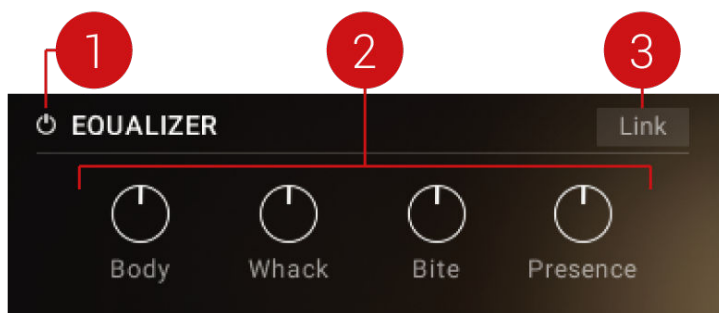shown by the labels under the knobs. You can customize the frequency band of each gain knob to your needs, see below for more information.

3. **Link**: If you have adjusted the gain knobs in a certain way and switch on **Link**, all gain knobs will change proportionally as you adjust one of them, keeping the sound or style of your custom EQ setting.

Adjusting the Frequency Bands and Response Curves

You can adjust the frequency band and response curve of each gain knob. To do this:

▶   Click the label under a gain knob.

→   A pop-up panel appears underneath with two parameters allowing you to adjust the knob's frequency response.

Adjusting the frequency band for the lowest gain knob (on the left) and a middle gain knob (on the right)

The two parameters in the popup panel depend on which gain knob you are configuring:

•   For all four knobs, the **Freq** slider controls the center frequency of the band. As you adjust the frequency, the musical term under the gain knob changes accordingly.

- For the two knobs in the middle, a **Q** slider controls the sharpness of the bandwidth: The higher **Q** is, the narrower the band is.

- For the outer two knobs, a Bell button lets you switch the frequency band between shelf (button off) and bell (button on).

5.3.2. Channel Compression

The **DYNAMIC** area in the Channel module of the Layers page allows you to apply compression to each Layer.

The **DYNAMIC** area contains the following controls:
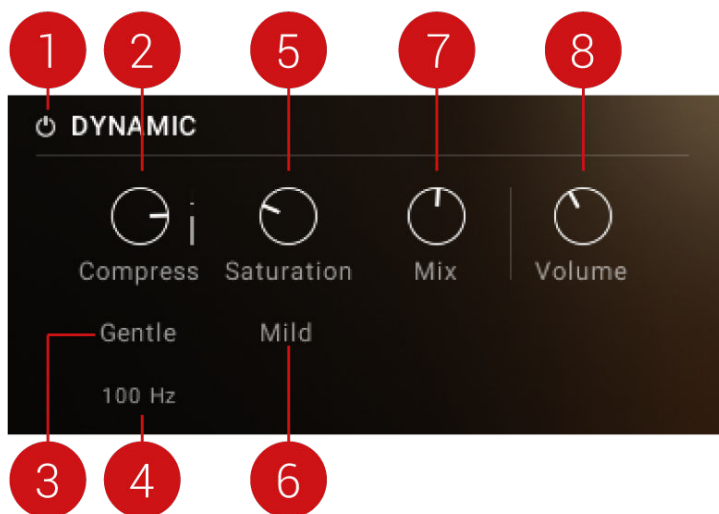
*The **DYNAMIC** area in the Channel module of the Layers page*

1. **DYNAMIC On/Off**: Turns the compressor on or off.

2. **Compress**: The more you turn the **Compress** knob clockwise, the more the compression will be applied to the input signal while retaining an even loudness level. As you play, the amount of compression applied is indicated in real-time by the vertical bar right of the **Compress** knob.

3. **Compression Preset**: Selects a preset combining predefined values both for the attack (how fast the compressor reacts to incoming signals) and the release (the time it takes for the compressor to return to its standby state).

4. **High-Pass Filter**: You can prevent the compressor from reacting primarily to low-frequency signal peaks by using the high-pass filter. When on, the high-pass filter will cut the internal detector signal below the selected frequency. Switch between the two cutoff frequencies (**100 Hz** or **300 Hz**) to figure out which one works best.

5. **Saturation**: Adjusts the amount of saturation. Increase the **Saturation** value to add dirt, warmth and loudness to your sound.

6. **Saturation Mode**: The compressor offers three different Saturation modes you can use to shape your signals. **Mild** mode is a nice way of coloring signals while retaining a clean sound, while **Moderate** mode will tastefully add more noticeable harmonics. Switch to **Hot** mode for maximum saturation and audible distortion.

7. **Mix**: Use the **Mix** knob to dial in parallel compression. The uncompressed (dry) signal will be mixed with a compressed version of the same signal. It gives the excitement of a compressed signal without losing the dynamics and transients of the original signal. With the **Mix** knob at full right, you only hear the compressed signal. With the **Mix** knob at full left, you only hear the dry signal. Every setting in-between is a mix of both signals.

8. **Volume**: Adjusts the overall level of the Layer. This knob is active even if the compressor's On/Off switch (**1**) is off. For instance, the **Volume** knob allows you also to compensate for extreme settings in the Equalizer area above (see Channel Equalization).

5.4. Space Controls

The Space module of the Layers page lets you configure a reverberation or a delay effect for each Layer.

▶ To display the controls of the Space module, click **SPACE** in the middle column of the Layers page:
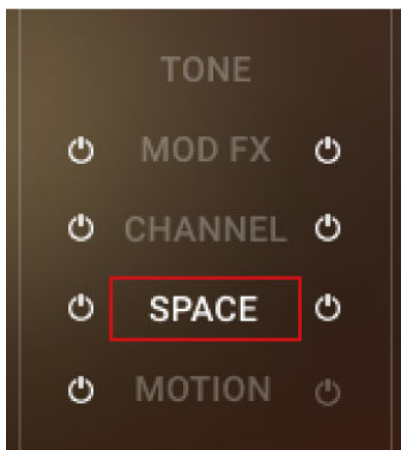
Selecting the Space module

Parameters for Layer 1 and 2 are strictly the same. Controls for Layer 1 are in the left part of the page, controls for Layer 2 are in the right part. The controls for Layer 1 are described here, and they also apply to Layer 2.

The Space module contains the following elements:
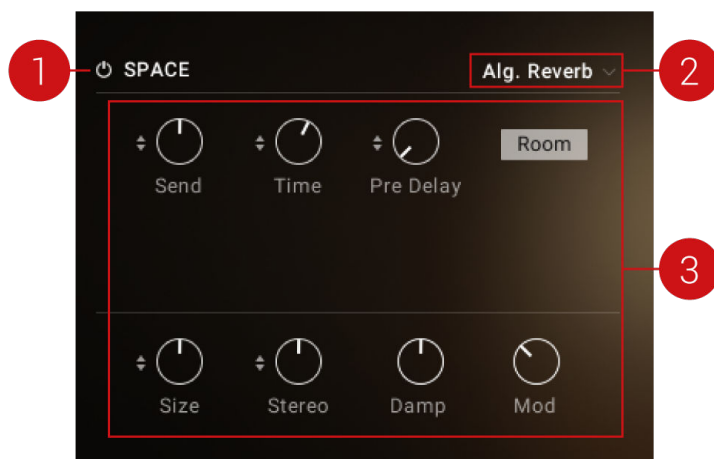
The Space module in the Layers page (showing Layer 1)

1. **SPACE On/Off**: Turns the Space module on or off. This button has the same effect as the On/Off switch near the Space selector in the middle column of the page.

2. **Space Engine**: Selects the Space engine to use from the four engines available: three reverberations (Convolution, Algorithm Reverb, and Plate) and one delay (Replika).

3. **Space parameters**: The parameters available depend on the engine selected in the Space Engine menu above (**2**).

The parameters available for each Space engine are described in the following sections.

Using the Same Space Settings for Layer 1 and Layer 2

When **SPACE** is selected in the middle of the Layers page, an additional **Link** button appears above:
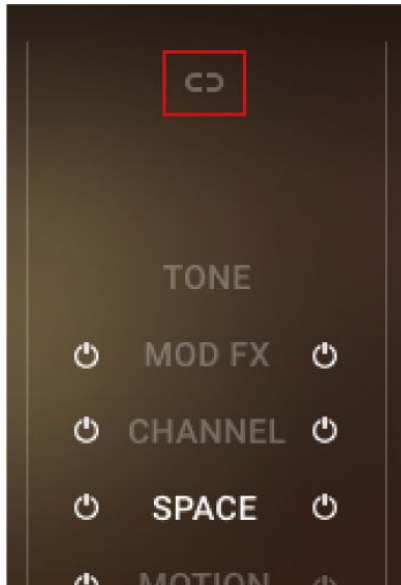
The Link button

▶   Click the Link button to turn on or off mirroring between the space settings of both Layers.

When you turn Link on, all space parameters of Layer 2 (right part of the page) jump to the values set for Layer 1 (left part of the page). As long as the Link button stays on, any adjustment you make on either side (Layer 1 or Layer 2) is mirrored on the other side, ensuring that both Layers always share the same reverb or delay settings.

5.4.1. Convolution Reverb

By selecting **Convolution** in the Space Engine menu, you can set up a convolution reverb. The convolution reverb uses impulse responses of various vintage reverb units and concert halls, churches and studio rooms to recreate those acoustic spaces. It also provides more creative sets of impulse responses, including, for example, reverse impulse responses.

When **Convolution** is selected in the Space Engine menu, the Space page provides the following parameters:
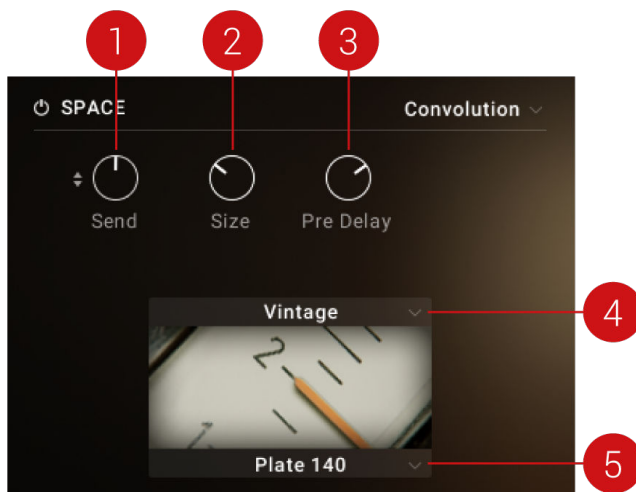
The Convolution Reverb in the Space module of the Layers page

1. **Send**: Adjusts the level of the signal sent to the reverb.
2. **Size**: Adjusts the size of the reverb effect by lengthening or shortening the selected impulse response. If selecting **Reverse** in the Impulse Response Category menu (**4**), the **Size** knob turns to a **Beat** knob and you can sync the size to the tempo (time adjustment in note values).
3. **Pre Delay**: Adjusts the delay before the reverb starts. If selecting **Reverse** in the Impulse Response Category menu (**4**), the **Pre Delay** knob is replaced with a **Ping Pong** button: When active, the reverb signal will alternate between the left and right stereo channel.
4. **Impulse Response Category**: Selects the category for the impulse response files. Available categories are Vintage, Room, Mystique, Piano and Reverse.
5. **Impulse Response**: Selects an impulse response from the category selected above (**4**).

5.4.2. Algorithmic Reverb

By selecting **Alg. Reverb** in the Space Engine menu, you can set up an algorithmic reverb. The Space page then provides the following parameters:
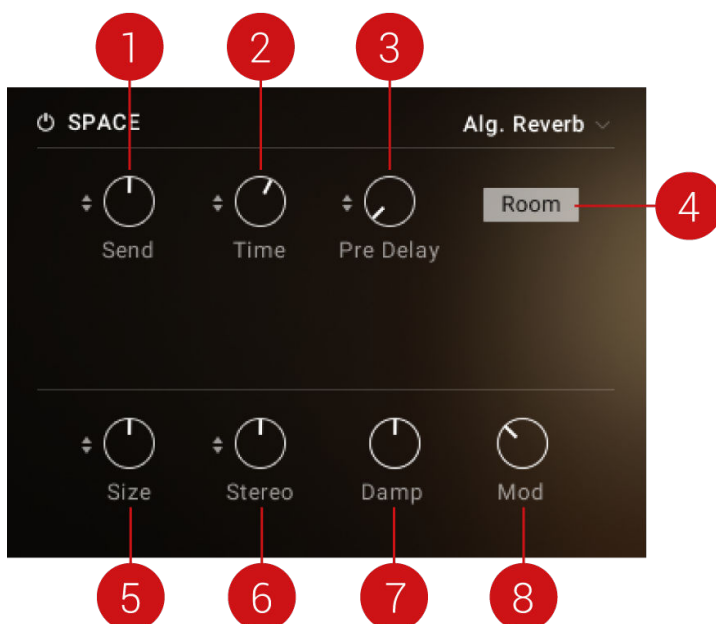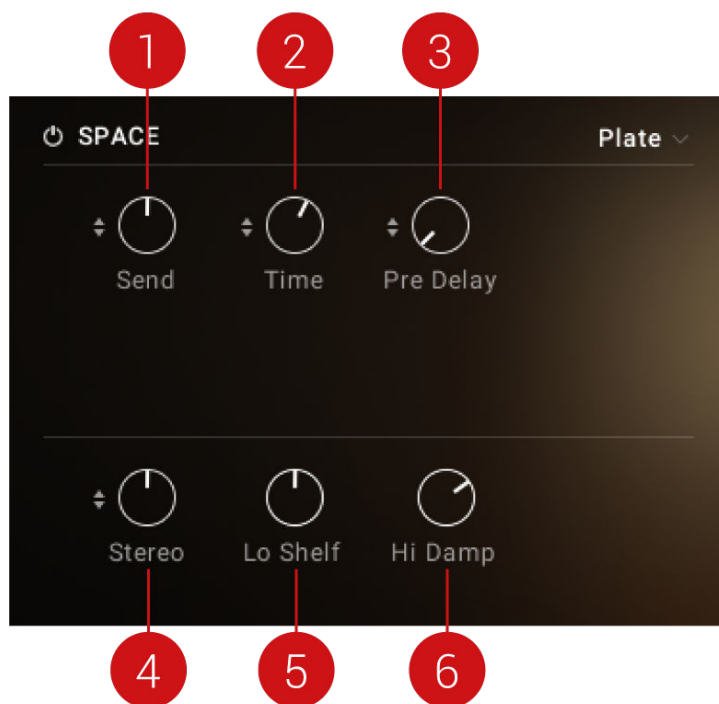
The Algorithmic Reverb in the Space module of the Layers page

1. **Send**: Adjusts the level of the signal sent to the reverb.
2. **Time**: Adjusts the duration of the reverb effect.
3. **Pre Delay**: Adjusts the delay before the reverb starts.
4. **Room**: Selects between two reverberation modes simulating the sound character of a reverberant hall (button off) or room (button on).
5. **Size**: Adjusts the size of the hall or room simulated by the reverb effect. Higher values replicate larger spaces.
6. **Stereo**: Controls the stereo image of the reverb effect. Higher values result in a wider stereo image.
7. **Damp**: Adjusts the amount of absorption in the room simulated by the reverb effect, which affects the tonal quality of the sound. Higher values result in more absorption and attenuate the reverb's high-frequency content, thus darkening the sound.
8. **Mod**: Adjusts the amount of movement added to the reverb sound by changing internal parameters of the reverb over time.

5.4.3. Plate Reverb

By selecting **Plate** in the Space Engine menu, you can set up a plate reverb. Plate reverb was developed as an early method of generating an artificial reverb effect: A vibrating sheet of metal is employed to simulate reflection patterns in acoustical spaces.

When **Plate** is selected in the Space Engine menu, the Space page provides the following parameters:

The Plate Reverb in the Space module

The plate reverb in the Space module of the Layers page.

1. **Send**: Adjusts the level of the signal sent to the reverb.

2. **Time**: Adjusts the duration of the reverb effect.

3. **Pre Delay**: Adjusts the delay before the reverb starts.

4. **Stereo**: Controls the stereo image of the reverb effect. Higher values result in a wider stereo image.

5. **Lo Shelf**: Attenuates or amplifies the low-frequency content of the reverb signal. Higher values result in softer low-frequency content.

6. **Hi Damp**: Attenuates or amplifies the high-frequency content of the reverb signal. Higher values result in softer high-frequency content.

5.4.4. Replika Delay

By selecting **Replika** in the Space Engine menu, you activate the Replika delay. The Replika delay is a full-featured delay unit based on the Native Instruments REPLIKA XT delay plug-in. Notably, it includes the **five delay styles** from REPLIKA XT: Modern, Analog, Vintage, Tape and Diffusion, each with its own unique sound and behavior.

Selecting a Delay Style

When **Replika** is selected in the Space Engine menu, you can choose the desired delay style from the **Delay Style menu** at the top center:
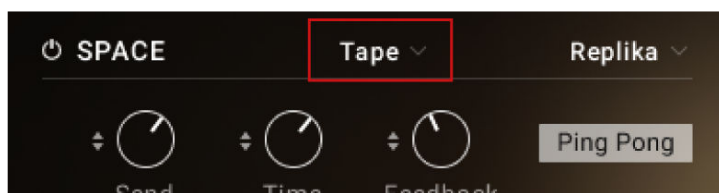
The Delay Style menu lets you choose from various delay algorithms

All styles share the same settings in the top and bottom rows, so you can switch between styles while keeping all your basic delay parameters intact. Each style has a set of additional parameters located in the middle row that allow you to further adjust the character of the delay.

The parameters for all delay styles are described in the following paragraphs.

Modern Style

The **Modern** style offers a clean and precise delay with an adjustable, tube-like saturation.

The built-in modulation (**Depth** and **Rate** controls) allows you to change the delay time periodically. This shifts the timing and pitch of the delay signal, adding depth and movement to the sound.

The **Modern** style contains the following controls:
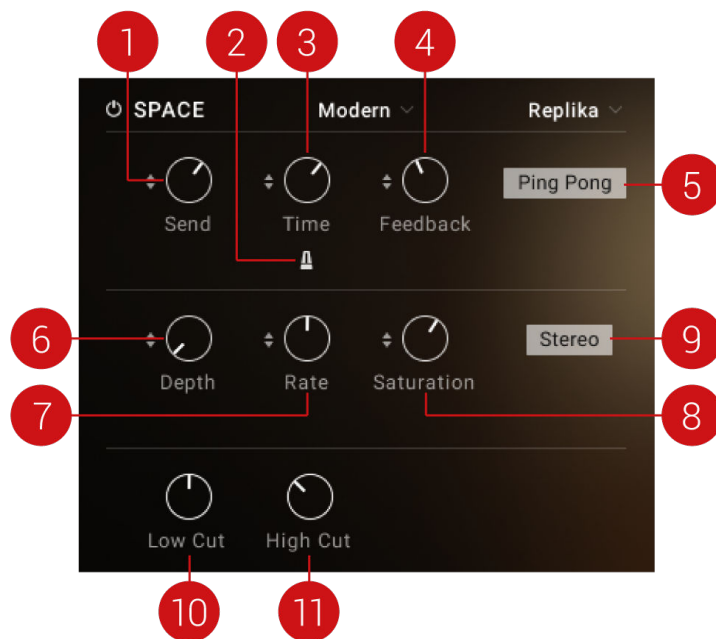
*The Replika delay with **Modern** style selected*

1. **Send**: Adjusts the level of the signal sent to the delay unit.
2. **Time Sync On/Off**: Turn this button on to synchronize the delay to the tempo.
3. **Time**: Controls the delay time. If the Time Sync button (**2**) is on, the delay time is tempo-synced and set in note values. Otherwise, you can freely adjust the delay time in milliseconds.
4. **Feedback**: Sets the level of the signal that is being fed back to the delay's input. Increasing the Feedback creates more delay repeats that decay over time. Feedback levels of 100 % and above are possible, allowing the delay repeats to build up and get louder over time (up to self-oscillation). If the signal levels get out of hand, turn the Feedback knob down.
5. **Ping Pong**: Turns Ping Pong mode on or off. In Ping Pong mode, the delay repeats are panned hard left and right in an alternating pattern.
6. **Depth**: Sets the amount of built-in modulation applied to the delay time.
7. **Rate**: Adjusts the speed of the built-in modulation.
8. **Saturation**: Adds tube-like saturation at the delay input. Turned all the way to the left, the knob bypasses saturation, turning it to the right pushes the sound from subtle warmth to overdrive.
9. **Stereo**: Switches between stereo and mono operation for the built-in modulation. When the Stereo button is off, the modulation affects both the left and the right stereo channels in the same way. When the Stereo button is on, the modulation between the left and the right stereo channels is offset in time, resulting in a wide stereo effect.
10. **Low Cut**: Cuts bass frequencies in the feedback path of the delay with a non-resonant filter. Turned all the way to the left, the filter is off. Turning it to the right raises the filter's cutoff frequency, resulting in a brighter tone of the delay.
11. **High Cut**: Cuts treble frequencies in the feedback path of the delay with a non-resonant filter. Turned all the way to the right, the filter is off. Turning it to the left lowers the filter's cutoff frequency, resulting in a darker tone of the delay.
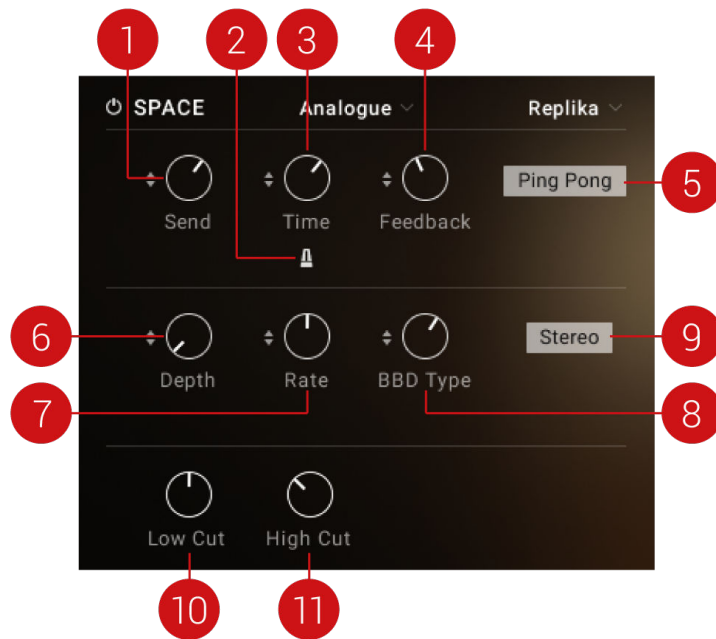
Analogue Style

The **Analogue** style emulates the dark and hazy sound of BBD (Bucket Brigade Device) delays, which include old analogue studio effects as well as many contemporary guitar pedals.

Four different BBD models are available (**BBD Type** control), giving you the full range of warm sounds associated with these delay effects.

The built-in modulation (**Depth** and **Rate** controls) allows you to change the delay time periodically. This shifts the timing and pitch of the delay signal, adding depth and movement to the sound.

The **Analogue** style contains the following controls:

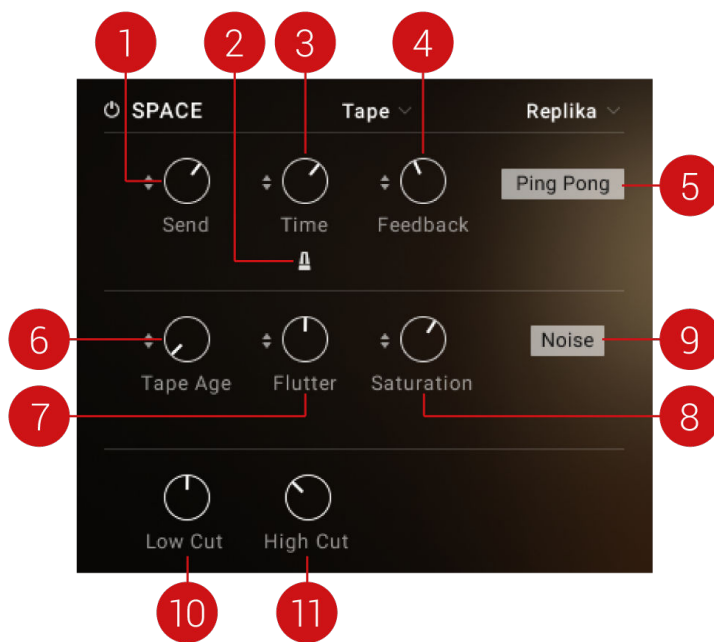*The Replika delay with **Analogue** style selected*

1. **Send**: Adjusts the level of the signal sent to the delay unit.
2. **Time Sync On/Off**: Turn this button on to synchronize the delay to the tempo.
3. **Time**: Controls the delay time. If the Time Sync button (**2**) is on, the delay time is tempo-synced and set in note values. Otherwise, you can freely adjust the delay time in milliseconds.
4. **Feedback**: Sets the level of the signal that is being fed back to the delay's input. Increasing the Feedback creates more delay repeats that decay over time. Feedback levels of 100 % and above are possible, allowing the delay repeats to build up and get louder over time (up to self-oscillation). If the signal levels get out of hand, turn the Feedback knob down.
5. **Ping Pong**: Turns Ping Pong mode on or off. In Ping Pong mode, the delay repeats are panned hard left and right in an alternating pattern.
6. **Depth**: Sets the amount of built-in modulation applied to the delay time.
7. **Rate**: Adjusts the speed of the built-in modulation.
8. **BBD Type**: Selects one of four BBD delay models (from right to left): **Clean** (default setting), **Warm**, **Dark**, **Grunge**. The character of the four models ranges from subtle filtering and distortion (Clean, Warm) to a highly degraded sound (Dark, Grunge).
9. **Stereo**: Switches between stereo and mono operation for the built-in modulation. When the Stereo button is off, the modulation affects both the left and the right stereo channels in the same way. When the Stereo button is on, the modulation between the left and the right stereo channels is offset in time, resulting in a wide stereo effect.
10. **Low Cut**: Cuts bass frequencies in the feedback path of the delay with a non-resonant filter. Turned all the way to the left, the filter is off. Turning it to the right raises the filter's cutoff frequency, resulting in a brighter tone of the delay.

11. **High Cut**: Cuts treble frequencies in the feedback path of the delay with a non-resonant filter. Turned all the way to the right, the filter is off. Turning it to the left lowers the filter's cutoff frequency, resulting in a darker tone of the delay.

Tape Style

The **Tape** style emulates the textured and lively sound of classic tape delays. You can fine-tune their unique properties, including the amount of **Saturation**, the **Tape Age**, and the intensity of **Flutter**.

The **Tape** style contains the following controls:

*The Replika delay with **Tape** style selected*

1. **Send**: Adjusts the level of the signal sent to the delay unit.
2. **Time Sync On/Off**: Turn this button on to synchronize the delay to the tempo.
3. **Time**: Controls the delay time. If the Time Sync button (**2**) is on, the delay time is tempo-synced and set in note values. Otherwise, you can freely adjust the delay time in milliseconds.
4. **Feedback**: Sets the level of the signal that is being fed back to the delay's input. Increasing the Feedback creates more delay repeats that decay over time. Feedback levels of 100 % and above are possible, allowing the delay repeats to build up and get louder over time (up to self-oscillation). If the signal levels get out of hand, turn the Feedback knob down.
5. **Ping Pong**: Turns Ping Pong mode on or off. In Ping Pong mode, the delay repeats are panned hard left and right in an alternating pattern.
6. **Tape Age**: Enhances the characteristics of an aging tape, like limited high-frequency response and hiss (depending on the **Noise** button's state (**9**)).
7. **Flutter**: Increases the effects introduced by mechanical imperfections of the tape delay's motor and tape transport, resulting in pitch variations over time.
8. **Saturation**: Sets the amount of tape saturation from a clean sound to overdrive.
9. **Noise**: Switches the tape hiss on or off. The amount of hiss depends on the **Tape Age** knob (**6**).
10. **Low Cut**: Cuts bass frequencies in the feedback path of the delay with a non-resonant filter. Turned all the way to the left, the filter is off. Turning it to the right raises the filter's cutoff frequency, resulting in a brighter tone of the delay.

11. High Cut: Cuts treble frequencies in the feedback path of the delay with a non-resonant filter. Turned all the way to the right, the filter is off. Turning it to the left lowers the filter's cutoff frequency, resulting in a darker tone of the delay.
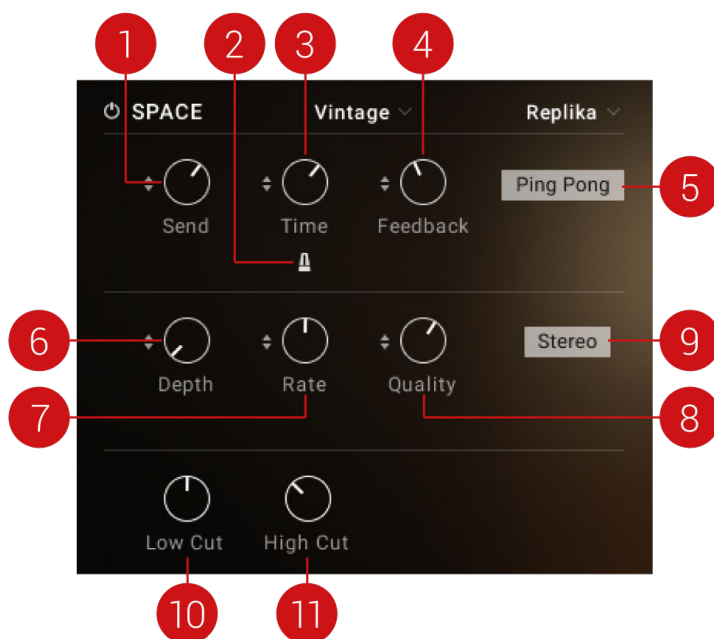
Vintage Style

The **Vintage** style emulates the warm and crunchy sound of early digital delay effects.

Four different **Quality** settings are available, ranging from a bright sound with subtle textures to strong digital artifacts.

The built-in modulation (**Depth** and **Rate** controls) allows you to change the delay time periodically. This shifts the timing and pitch of the delay signal, adding depth and movement to the sound.

The **Vintage** style contains the following controls:

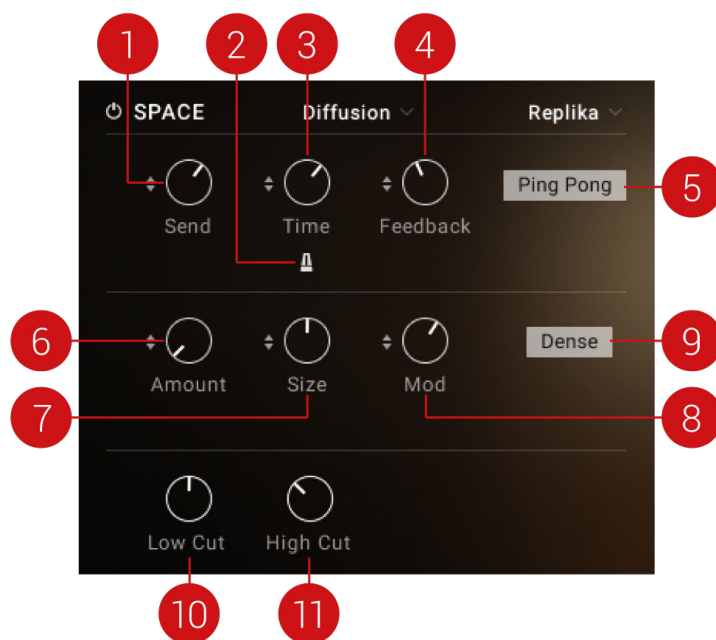*The Replika delay with **Vintage** style selected*

1. **Send**: Adjusts the level of the signal sent to the delay unit.
2. **Time Sync On/Off**: Turn this button on to synchronize the delay to the tempo.
3. **Time**: Controls the delay time. If the Time Sync button (**2**) is on, the delay time is tempo-synced and set in note values. Otherwise, you can freely adjust the delay time in milliseconds.
4. **Feedback**: Sets the level of the signal that is being fed back to the delay's input. Increasing the Feedback creates more delay repeats that decay over time. Feedback levels of 100 % and above are possible, allowing the delay repeats to build up and get louder over time (up to self-oscillation). If the signal levels get out of hand, turn the Feedback knob down.
5. **Ping Pong**: Turns Ping Pong mode on or off. In Ping Pong mode, the delay repeats are panned hard left and right in an alternating pattern.
6. **Depth**: Sets the amount of built-in modulation applied to the delay time.
7. **Rate**: Adjusts the speed of the built-in modulation.
8. **Quality**: Selects one of four quality settings for the delay (from right to left): **High** (default setting), **Medium**, **Low**, **Crunch**. The High setting has a bright, subtly textured sound. Medium and Low sound darker and grittier. Crunch has a bright sound but also introduces a lot of digital artifacts to the signal.

9. **Stereo**: Switches between stereo and mono operation for the built-in modulation. When the Stereo button is off, the modulation affects both the left and the right stereo channels in the same way. When the Stereo button is on, the modulation between the left and the right stereo channels is offset in time, resulting in a wide stereo effect.

10. **Low Cut**: Cuts bass frequencies in the feedback path of the delay with a non-resonant filter. Turned all the way to the left, the filter is off. Turning it to the right raises the filter's cutoff frequency, resulting in a brighter tone of the delay.

11. **High Cut**: Cuts treble frequencies in the feedback path of the delay with a non-resonant filter. Turned all the way to the right, the filter is off. Turning it to the left lowers the filter's cutoff frequency, resulting in a darker tone of the delay.

Diffusion Style

The **Diffusion** style links a clean delay to a unique reverb effect. It can be used to create a wide range of different ambiances, from tight and resonant to unnaturally vast spaces (**Size** control). The **Amount** of diffusion applied to the delay signal is freely adjustable, and the **Movement** control allows you to add modulation to the reverb effect.

The **Diffusion** style contains the following controls:

*The Replika delay with **Diffusion** style selected*

1. **Send**: Adjusts the level of the signal sent to the delay unit.

2. **Time Sync On/Off**: Turn this button on to synchronize the delay to the tempo.

3. **Time**: Controls the delay time. If the Time Sync button (**2**) is on, the delay time is tempo-synced and set in note values. Otherwise, you can freely adjust the delay time in milliseconds.

4. **Feedback**: Sets the level of the signal that is being fed back to the delay's input. Increasing the Feedback creates more delay repeats that decay over time. Feedback levels of 100 % and above are possible, allowing the delay repeats to build up and get louder over time (up to self-oscillation). If the signal levels get out of hand, turn the Feedback knob down.

5. **Ping Pong**: Turns Ping Pong mode on or off. In Ping Pong mode, the delay repeats are panned hard left and right in an alternating pattern.

6. **Amount**: Sets the amount of diffusion applied to the delay signal, resulting in a reverb effect. High settings make the delay appear out of sync, so low settings are recommended if the rhythmic timing of the delay is essential.

7. **Size**: Adjusts the swell, reflection pattern and decay of the reverb effect, giving the impression of differently sized spaces.

8. **Mod**: Sets the depth and speed of modulation applied to the diffusion, shifting the timing and pitch of the reflections for a wide reverb effect. Modulation speed starts fast, and reduces as the amount is increased.

9. **Dense**: Switches between two density settings for the reflection pattern of the reverb effect.

10. **Low Cut**: Cuts bass frequencies in the feedback path of the delay with a non-resonant filter. Turned all the way to the left, the filter is off. Turning it to the right raises the filter's cutoff frequency, resulting in a brighter tone of the delay.

11. **High Cut**: Cuts treble frequencies in the feedback path of the delay with a non-resonant filter. Turned all the way to the right, the filter is off. Turning it to the left lowers the filter's cutoff frequency, resulting in a darker tone of the delay.

5.5. Motion Controls

The Motion module of the Layers page lets you configure two internal modulation sources for each Layer. Each modulation source can control two different targets in that Layer.

▶ To display the controls of the Motion module, click **MOTION** in the middle column of the Layers page:


Selecting the Motion module

Parameters for Layer 1 and 2 are strictly the same. Controls for Layer 1 are in the left part of the page, controls for Layer 2 are in the right part. The controls for Layer 1 are described here, and they also apply to Layer 2.

The Motion module contains the following controls:
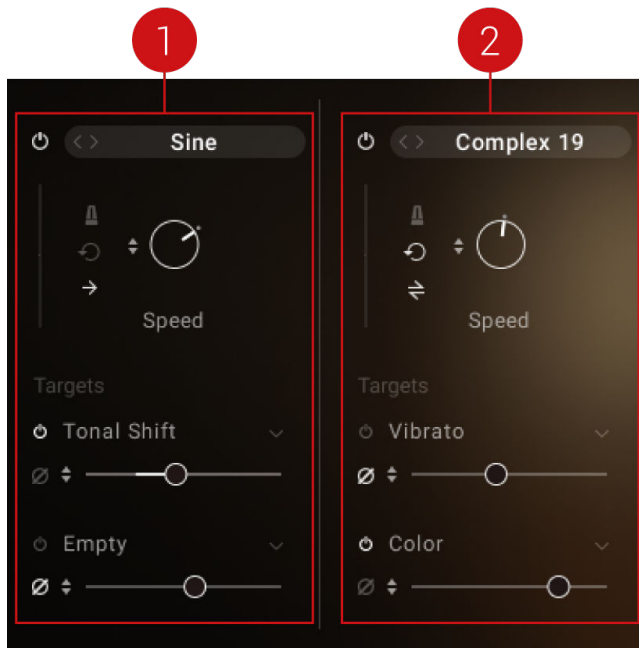
The Motion module on the Layers page (showing Layer 1)

1. **Modulation Source A**: Lets you configure the first modulation source for that Layer.
2. **Modulation Source B**: Lets you configure the second modulation source for that Layer.

Each modulation source contains the following controls:
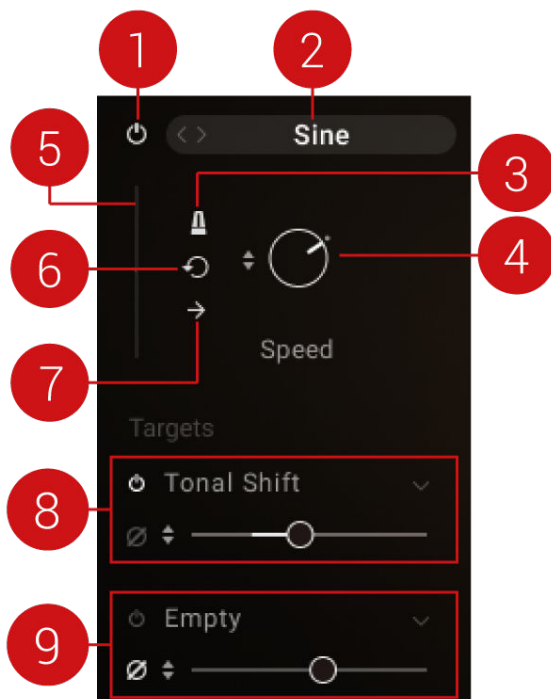
A modulation source on the Motion page

1. **Modulation On/Off**: Turns this modulation source on or off.
2. **Modulation Source Name**: Displays the name of the modulation source. A click on the name opens the Modulation Source Browser, which allows you to select another LFO or step sequencer pattern. For more information, see Using the Browsers.

3. **Modulation Sync On/Off**: Turn this switch on to sync the modulation speed to the tempo.

4. **Speed**: Adjusts the speed of the modulation source. When the Sync switch (**3**) is on, the Speed knob value is measured in note values, otherwise, it is measured in milliseconds.

5. **Modulation display**: Provides visual feedback of the current modulation value.

6. **Retrigger**: If this button is on, each new note will retrigger the modulation source from the beginning. If this button is off, the LFO or pattern of the modulation source will continue its cycle as long as notes are playing.

7. **Playback Direction**: Selects the direction in which the modulation is played back: Click the button to switch between the following directions: left to right, right to left, back and forth.

8. **Modulation Target 1 controls**: Configures the first target of the modulation source. See below for more information.

9. **Modulation Target 2 controls**: Configures the second target of the modulation source. See below for more information.

Configuring the Modulation Targets

You can set up two distinct targets for each modulation source. For both targets, the following parameters are available at the bottom of the source controls:
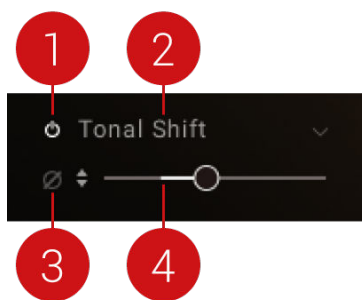

Configuring a modulation target

1. **Target On/Off**: Activates or deactivates this target.

2. **Target menu**: Displays the current target. Click the target to open the menu and select another target in the Layer. Available targets are: **Empty** (no target defined), **Volume** (from the Layer controls at the bottom of the pages), **Pan**, **Color** and **Tonal Shift** (from the Tone module in the Layers page), **Vibrato**, as well as the four **Effect Strength knobs** from the four Mod FX slots. In the menu, the labels for the Effect Strength knobs mirror the effect presets currently loaded in the slots. A target already assigned to a modulation source will appear between **brackets** in the menu; if you select it, the previous modulation source will be replaced with the new one.

3. **Invert**: Turn this switch on to invert the modulation LFO or pattern for this target. This allows you to modulate two targets against each other.

4. **Modulation Strength**: Adjusts how much the modulation source will affect that particular target. Note that you can drag the little modulation icon to modulate the Modulation Strength slider itself, thereby controlling the modulation strength via the Expression knob. For more information on modulation, see Modulating Your Sound.
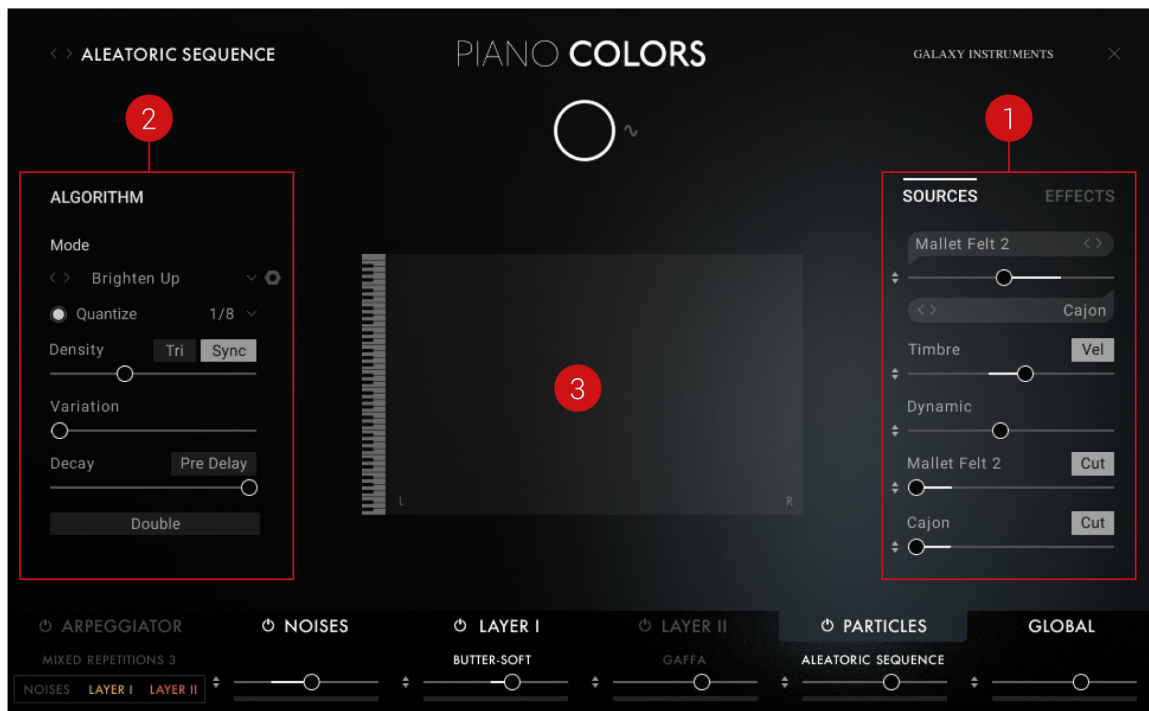
6. Particles Page

In the Particles page, you can adjust the behavior of the Particles engine. The Particles engine triggers and processes additional samples, called **particles**, in relation to the keys that you play on your keyboard. In doing so, it generates a sequence or **cloud** of notes. You can choose the samples triggered, shape their sound with effects, and modify the algorithm used to generate the cloud of particles. In the middle of the page, you can see the resulting cloud in real-time as you play.

▶ Click **PARTICLES** at the bottom of the instrument to open or close the Particles page:
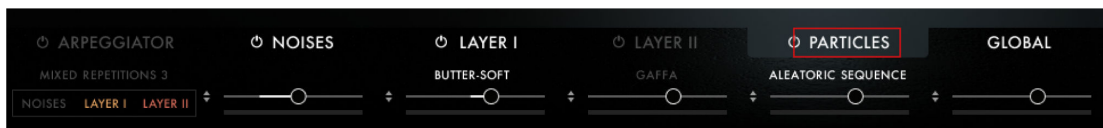
The Particles page contains the following areas:

The Particles page

1. **SOURCES** and **EFFECTS** panes: Click **SOURCES** or **EFFECTS** at the top to display the corresponding pane underneath. The **SOURCES** and **EFFECTS** panes let you define the sound of the particles. On the **SOURCES** pane, you can choose and adjust the two samples triggered by the Particles engine. For more information, see Source Settings. On the **EFFECTS** pane, you can set up and apply two effects to the particles. For more information, see Effect Settings.

2. **ALGORITHM** area: Lets you configure the algorithm used to generate the particles. This will affect the *moments* and the *pitches* at which the particles will be triggered. For more information, see Algorithm Settings.

3. **Particle display**: Displays a visual representation of the particles. As you play and hold notes on your keyboard, you can see the additional notes triggered by the Particles engine according to their pitch (vertical axis) and their panning in the stereo field (horizontal axis).

6.1. Source Settings

The Particles engine can blend two different samples as sources to generate the particles. You can set up these sources in the **SOURCES** pane of the Particles page:
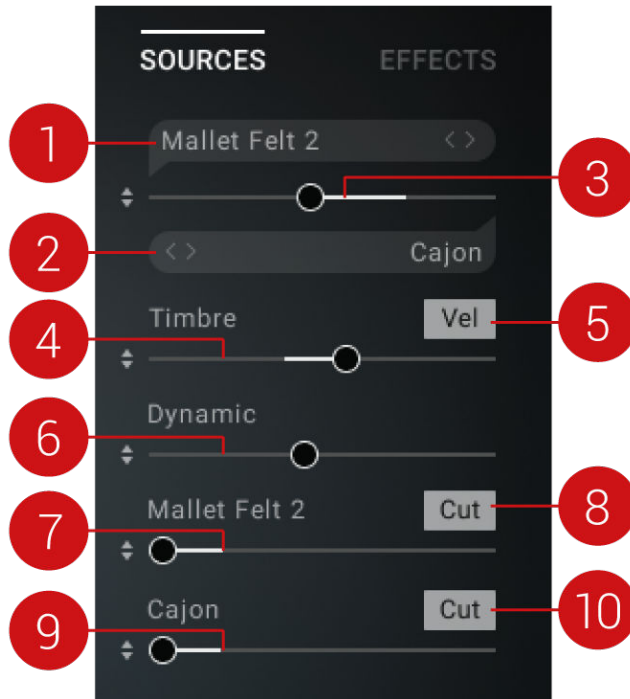
*The **SOURCES** pane on the Particles page*

1. **Source 1 Name**: Displays the name of the sample used as the first source. Click the name to open the Source 1 Browser and select another sample for the first source. For more information on using the Browsers, see Using the Browsers. You can also click the arrow icons (**< >**) near the sample name to quickly load the previous or next sample from the browser's result list without opening the browser.

2. **Source 2 Name**: Displays the name of the sample used as the second source. Click the name to open the Source 2 Browser and select another sample for the second source. For more information on using the Browsers, see Using the Browsers. You can also click the arrow icons (**< >**) near the sample name to quickly load the previous or next sample from the browser's result list without opening the browser.

3. **Source Mix**: Adjusts the mix between the first source (**1**) and the second source (**2**).

4. **Timbre**: Changes the timbre (or tone color) of the particles from soft to hard by readjusting the sample mapping. The particles will be triggered at random timbres within this range. The Timbre slider is *bipolar*: at the middle position, it allows all timbres. From the middle position, drag the slider to the right to progressively limit the particles to harder sounds, and drag it to the left to progressively limit the particles to softer sounds.

5. **Vel** (Velocity): When this button is switched on, the particles' timbre also reacts to the incoming MIDI velocities, making the Particles engine dynamically playable.

6. **Dynamic**: Adjusts the dynamic range of the particles by adjusting their volume while still using the same velocity samples (these are set by the **Timbre** slider (**4**)). The particles will be triggered at random velocities within this range. Drag left to shrink, or drag right to expand the dynamic range.

7. **Source 1 Envelope**: If the switch nearby (**8**) is set to **Atk** (Attack), this slider increases the attack time of the source as you drag it to the right. If the button nearby (**8**) is set to **Cut**, the

attack time is left untouched and the slider shortens the release of the source as you drag the slider to the right. The slider label reads the source name.

8. **Atk**/**Cut** (Source 1 Attack/Release): Switches the Source 1 Envelope slider (**7**) between attack and release control. If the button reads **Atk**, the Source 1 Envelope slider (**7**) controls the attack of source 1. If the button reads **Cut**, the Source 1 Envelope slider (**7**) controls the release of source 1.

9. **Source 2 Envelope**: If the switch nearby (**10**) is set to **Atk** (Attack), this slider increases the attack time of the source as you drag it to the right. If the button nearby (**10**) is set to **Cut**, the attack time is left untouched and the slider shortens the release of the source as you drag it to the right. The slider label reads the source name.

10. **Atk**/**Cut** (Source 2 Attack/Release): Switches the Source 2 Envelope slider (**9**) between attack and release control. If the button reads **Atk**, the Source 2 Envelope slider (**9**) controls the attack of source 2. If the button reads **Cut**, the Source 2 Envelope slider (**9**) controls the release of source 2.

6.2. Effect Settings

The Particles engine provides two freely assignable effect units to shape the sound of the particles, and a diffusion effect to add space to the particle cloud. You can set these up in the **EFFECTS** pane of the Particles page:

*The **EFFECTS** pane on the Particles page*

1. **Effect A On/Off**: Switches effect A on or off.

2. **Effect A Preset**: Shows the selected effect preset. Click the preset name to open the Effect Browser and select another effect preset. For more information on using the browsers in PIANO COLORS, see Using the Browsers. You can also click the arrow icons (**<>**) near the preset name to quickly load the previous or next effect preset from the browser's result list without opening the browser.

3. **Effect A Strength**: Adjusts the strength of the effect.

4. **Effect B On/Off**: Switches effect B on or off.

5. **Effect B Preset**: Shows the selected effect preset. Click the preset name to open the Effect Browser and select another effect preset. For more information on using the browsers in PIANO COLORS, see Using the Browsers. You can also click the arrow icons (**<>**) near the preset name to quickly load the previous or next effect preset from the browser's result list without opening the browser.

6. **Effect B Strength**: Adjusts the strength of the effect.

7. **Diffusion On/Off**: Turns the Diffusion effect on or off.

8. **Diffusion Preset**: Shows the selected Diffusion preset. Click to open the menu and choose any preset from the 15 delay presets and 6 reverb presets available. You can also click the arrow icons (**<>**) near the preset name to quickly load the previous or next preset from the menu.

9. **Diffusion Strength**: Adjusts the strength of the Diffusion effect.

10. **Diffusion Time**: Adjusts the delay or reverb time and thereby the perceived size of the diffusion space.

11. **Diffusion Sync**: This button appears only if a delay preset is selected in the Diffusion Preset menu (**8**). Turn on this **Sync** button to synchronize the diffusion delay with the tempo. With **Sync** on, the unit of the Diffusion Time slider (**10**) turns to note values.

6.3. Algorithm Settings

The **ALGORITHM** area of the Particles page lets you fine-tune the moments and pitches at which the particles will be triggered:
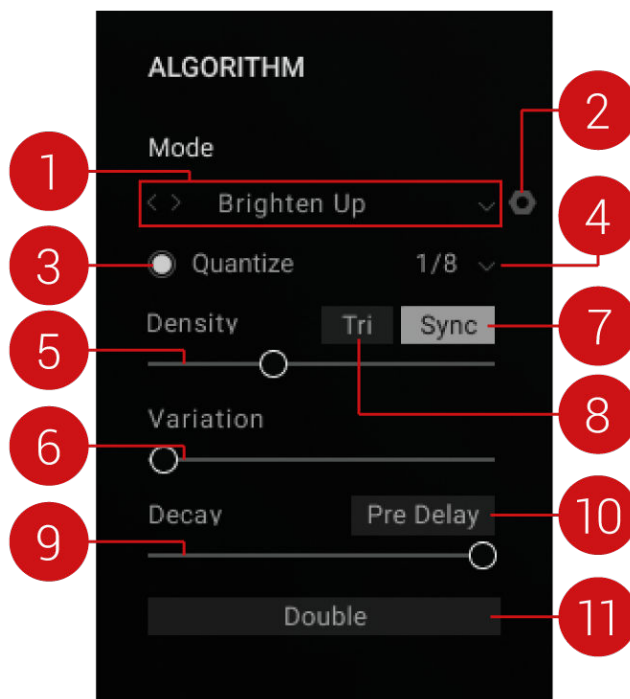
*The **ALGORITHM** area on the Particles page*

1. **Range Preset**: Selects predefined ranges for the pitches of the particles (the additional notes). The Particles algorithm uses both an *octave range* and a *tonal shift range*: The pitch of each particle is set randomly within these ranges. This menu provides a collection of predefined values for both ranges. You can also click the arrow icons (**<>**) near the preset name to quickly load the previous or next preset from the menu. Note that if you adjust the ranges via the

Range Settings icon nearby (**2**), your manual adjustments will override the settings from the selected preset.

2. **Range Settings**: Click this little nut icon to open a Range Settings panel in which you can manually adjust the octave range and the tonal shift range used to create the particles. For more information, see below.

3. **Quantize**: Switches the input quantization on or off. This feature works only if the **Sync** button (**7**) is switched on as well. When the **Quantize** button is on, the particles are triggered in sync with the tempo. Quantization is applied according to the note value set in the Quantize menu (**4**) nearby.

4. **Quantize menu**: Defines a quantization value to be used when the **Quantize** button (**3**) is on.

5. **Density**: Defines the shortest delay between two particles. The delay before triggering the next particle is randomly taken between this value and the value of the **Variation** slider (**6**). The value is measured in note values when **Sync** (**7**) is on, and in milliseconds otherwise.

6. **Variation**: Defines the longest delay between two particles. The delay before triggering the next particle is randomly taken between the value of the **Density** slider (**5**) and this value. The value is measured in note values when **Sync** (**7**) is on, and in milliseconds otherwise.

7. **Sync**: When **Sync** is switched on, the delays between particles depend on the tempo: the delay ranges set by the **Density** (**5**) and **Variation** (**6**) sliders switch to note values, and the delays between particles are random note values within that range.

8. **Tri**: Switches to triplets the random rhythmic pattern at which particles are triggered.

9. **Decay**: Adjusts the duration of the decaying cloud after a key is pressed. When set to **Infinite** (far right position), the cloud will continue until all keys are released.

10. **Pre Delay**: When **Pre Delay** is switched on, a delay is introduced between your original note and the resulting particles. When switched off, the particle cloud starts straight away as you press the key.

11. **Double**: Balances the particle cloud in the stereo field. When **Double** is switched off, the particles from both sources are randomly panned in the stereo field, which can affect the perceived stereo balance. If you want a more balanced picture regarding the panoramic position, switch on the **Double** button: It creates a kind of double-track effect with a more consistent stereo field.

Manually Adjusting the Octave Range and Tonal Shift Range

A click on the little nut icon at the top right of the Algorithm area opens the **Range Settings** panel, in which you can manually adjust the octave range and the tonal shift range used to create the particles:

The Range Settings panel

You can adjust either range via a pair of sliders defining the range's lowest and highest value.

You can also use the modulation icons near the sliders to modulate the ranges; this way you can modify the Particles algorithm in real-time using the Expression knob. For more information on modulation, see Modulating Your Sound.

When you are done, click the nut icon again to close the panel.

Note that your adjustments in the Range Settings panel will override the values of the preset selected in the Range Preset menu above. To return to the preset values, choose the same preset again from the menu.
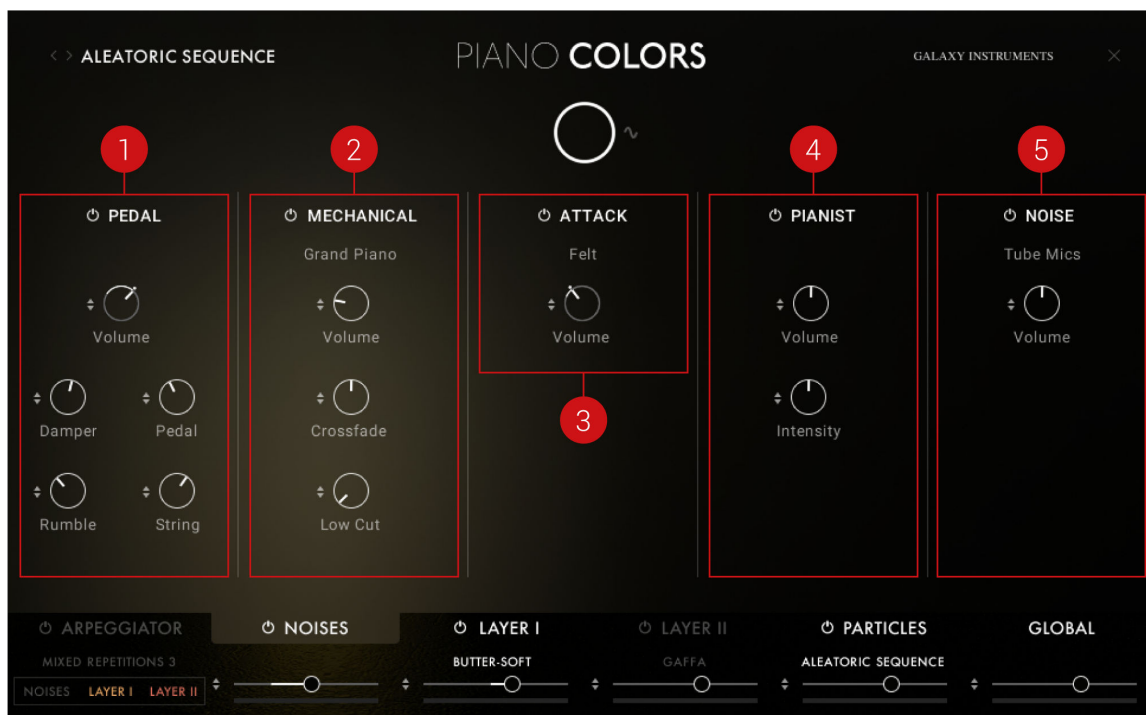
7. Noises Page

The Noises page allows you to configure various types of noises typical for a piano or a piano recording. These noises can greatly improve the realism of the sound.

▶ Click **NOISES** at the bottom of the instrument to open or close the Noises page:


The Noises page contains the following areas:

The Noises page

1. **PEDAL**: Adjusts the noises created by the sustain pedal. For more information, see Pedal Noises.
2. **MECHANICAL**: Adjusts the noises created when hitting or releasing the keys. For more information, see Mechanical Noises.
3. **ATTACK**: Adjusts the noise created by the hammers hitting the strings. For more information, see Attack Noises.
4. **PIANIST**: Adjusts the noises coming from the pianist and the piano such as squeaks, breathes, rumbles... For more information, see Pianist Noises.
5. **NOISE**: Adjusts the continuous ambient noise. For more information, see Ambient Noises.

7.1. Pedal Noises

The **PEDAL** area of the Noises page lets you adjust the pedal noises contained in your sound. The pedals in a piano transfer a considerable amount of energy to the whole piano body and the soundboard, resulting in some low-frequency resonance.

The area contains the following controls:
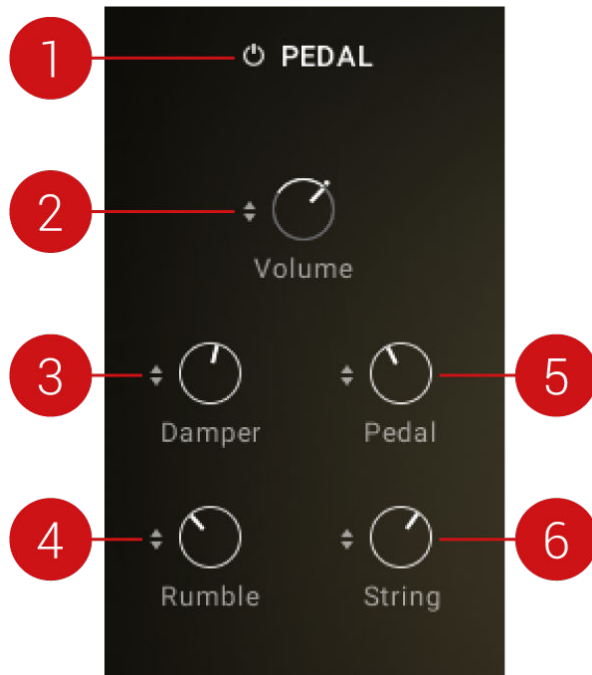
*The **PEDAL** area on the Noises page*

1. **PEDAL On/Off**: Switches the pedal noises on or off. When this switch is on, the pedal noises are triggered when using the sustain pedal. A LED next to the **PEDAL** label lights up whenever the pedal is depressed.
2. **Volume**: Adjusts the global level of all pedal noises.
3. **Damper**: Adjusts the level of the damper noises. The sustain pedal raises all dampers from the strings at once when pressed, and drops them back on the strings when released. Both of these actions result in a short damper noise.
4. **Rumble**: Adjusts the level of the rumble noise. Low-frequency rumble noise originates from the pedal's mechanics that consist of the damper rod and lever, the pedal itself and a number of other parts.
5. **Pedal**: Adjusts the level of the noise created by the pedal mechanism itself.
6. **String**: Adjusts the level of the string noise. When the dampers leave the strings after pressing the sustain pedal, each damper pulls its corresponding string a little bit, exciting the string so it resonates at its individual resonance frequency.

7.2. Mechanical Noises

The **MECHANICAL** area of the Noises page lets you adjust the mechanical noises generated when hitting and releasing the keys, for instance, by the hammers moving down or returning to their position.

The area contains the following controls:
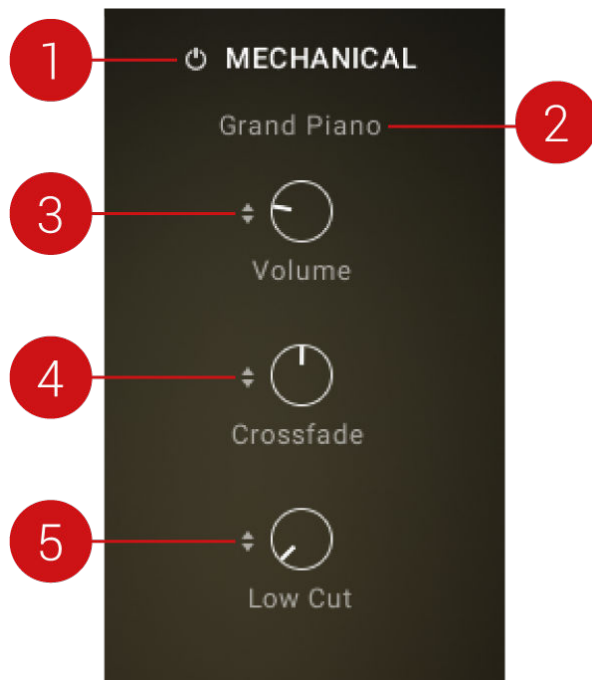
*The **MECHANICAL** area on the Noises page*

1. **MECHANICAL On/Off**: Switches the mechanical noises on or off.
2. **Piano Type**: Selects a sample set of mechanical noises from various instruments: grand piano, upright piano, keyboard (mono or stereo), or electric piano (mono or stereo).
3. **Volume**: Adjusts the level of the mechanical noises.
4. **Crossfade**: Adjusts the balance between the mechanical noises triggered when hitting and releasing the key (corresponding to MIDI Note On and Note Off events). Turning the knob counterclockwise will emphasize the noises triggered by hitting the key (Note On event), for example, the noises of the key going down and the hammer moving towards the string. Turning the knob clockwise will instead emphasize the noises triggered when releasing the key (Note Off event), typically the noise of the hammer returning to its position.
5. **Low Cut**: Adjusts the cutoff frequency of a low-cut filter applied to the mechanical noises. Turning the knob fully counterclockwise will allow noise samples to bypass the filter entirely. Turning the knob fully clockwise will allow only the topmost frequency band contained in the noise samples to pass the filter.

7.3. Attack Noises

The **ATTACK** area of the Noises page lets you adjust the attack noise created when the hammers hit the fabric strip positioned between the hammers and the strings.

The area contains the following controls:
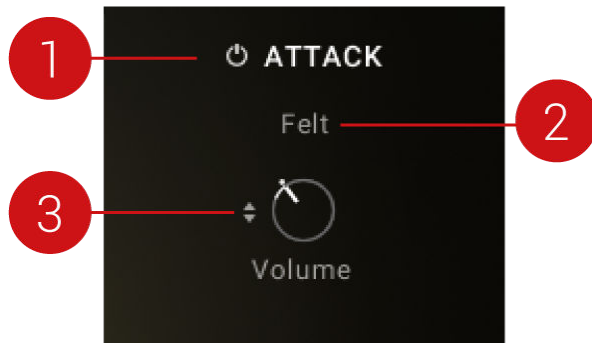
*The **ATTACK** area on the Noises page*

1. **ATTACK On/Off**: Switches the noise on or off.
2. **Fabric**: Selects an attack noise from a variety of fabrics and striking objects used for preparing the piano.
3. **Volume**: Adjusts the level of the attack noise.

7.4. Pianist Noises

The **PIANIST** area of the Noises page lets you adjust the noises generated by the pianist's breathing, the squeaks of the chair, etc.

The area contains the following controls:
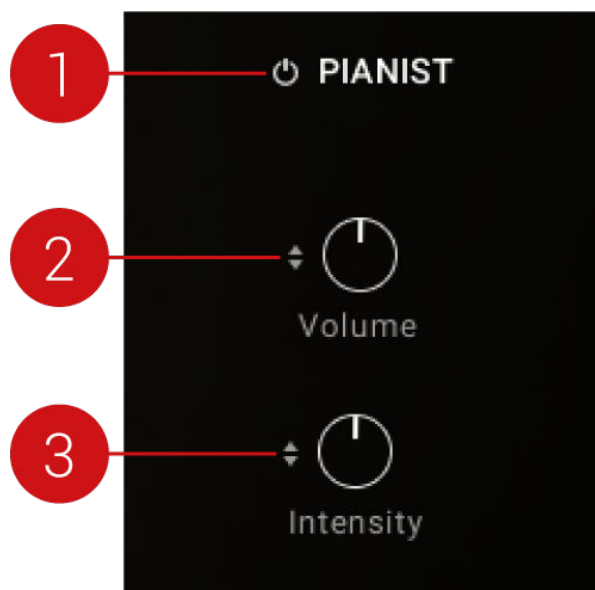
*The **PIANIST** area on the Noises page*

1. **PIANIST On/Off**: Switches the pianist's noises on or off.
2. **Volume**: Adjusts the level of the pianist's noises.
3. **Intensity**: Adjusts the rate at which the pianist's noises are played back. Turn the knob clockwise to hear the noises more often.

7.5. Ambient Noises

The **NOISE** area of the Noises page lets you select and adjust the continuous ambient noise.

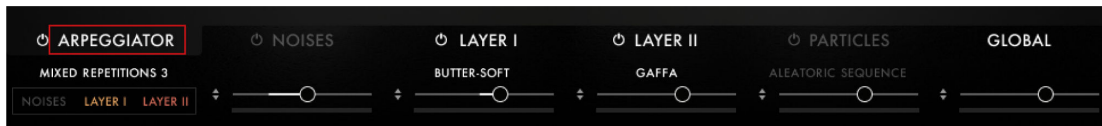The area contains the following controls:
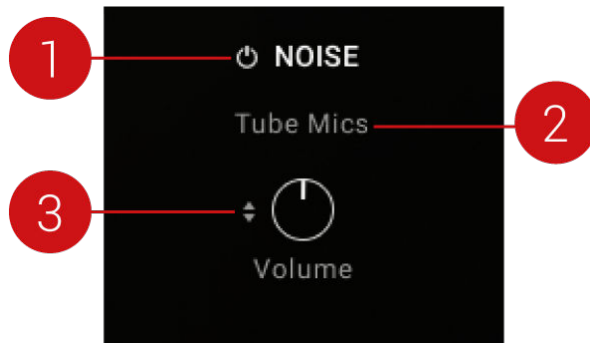
*The **NOISE** area on the Noises page*

1. **NOISE On/Off**: Switches the ambient noise on or off.
2. **Ambiance**: Selects an ambient noise from a collection of noise floors of recording spaces, reel-to-reel tape machines, vinyl records, and numerous other sources.
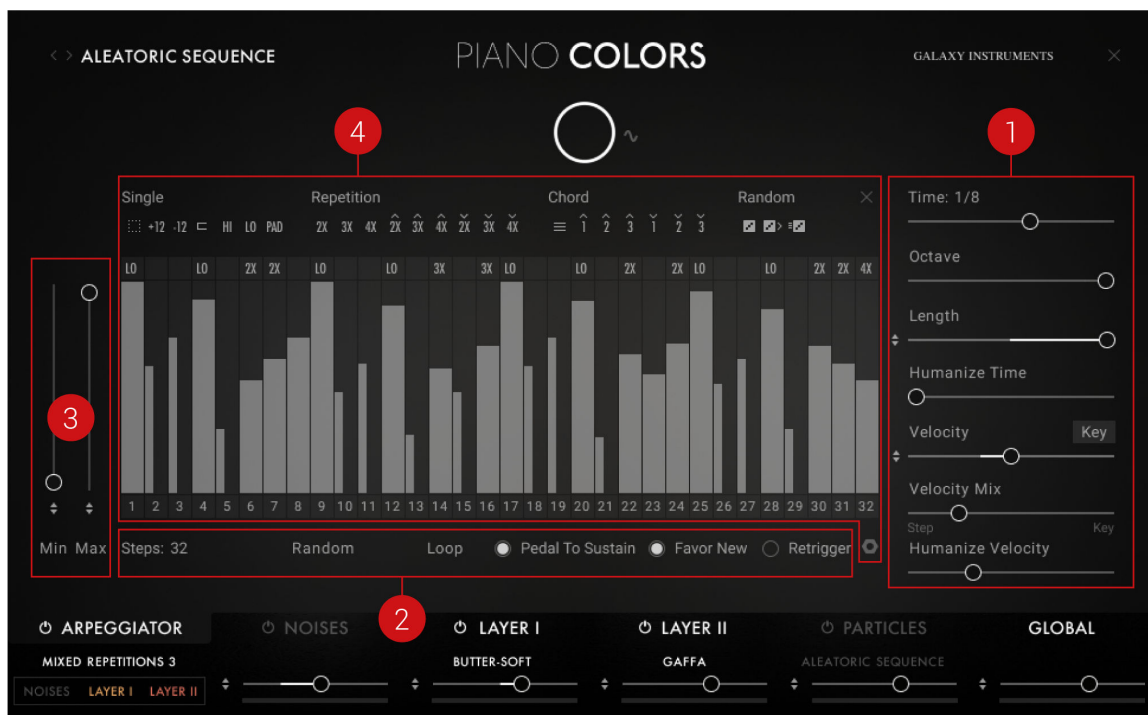3. **Volume**: Adjusts the level of the ambient noise.

8. Arpeggiator Page

The Arpeggiator page lets you create complex automated sequences with up to 32 steps based on the notes you hold on the keyboard.

▶ Click **ARPEGGIATOR** at the bottom of the instrument to open or close the Arpeggiator page:

The Arpeggiator page contains the following areas:

The Arpeggiator page

1. **Sequence settings**: Adjust global settings for your sequence like speed, note range, note length, velocities, etc. For more information, see Sequence Settings.
2. **Playback settings**: Customize playback settings for your sequence like pattern length, note order, playback mode, retrigger mode, etc. For more information, see Playback Settings.
3. **Velocity range settings**: Adjust the range of velocities available for your steps. For more information, see Velocity Range Settings.
4. **Step Editor**: Adjust each individual step directly on the sequence display: set the steps' velocity and length, mute or unmute them, and apply custom modes to them. Furthermore, the Edit menu provides you with useful commands to edit all steps at once. For more information, see Step Editor.

8.1. Sequence Settings

In the right part of the Arpeggiator page, you can adjust global settings for your sequence.

The area contains the following controls:
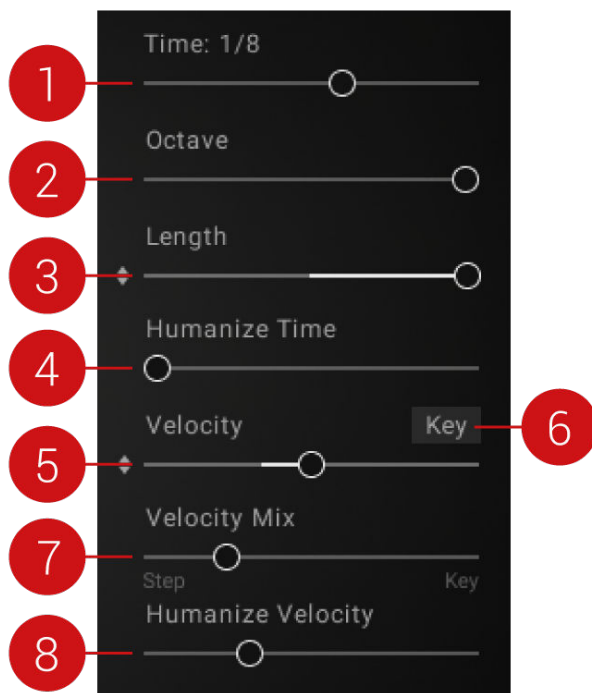
The sequence settings on the Arpeggiator page

1. **Time**: Adjusts the duration of each step in note values. This directly affects the speed at which the sequence is played.

2. **Octave**: Adjusts the octave range in which the sequence will be played: With **Octave** set to **0**, only the notes you hold are played in the sequence. With **Octave** set to **1**, the sequence includes the notes you hold and the same notes one octave higher. With **Octave** set to **2**, the sequence includes the notes you hold and the same notes in the two octaves above.

3. **Length**: Adjusts the length of all steps proportionally. As you adjust the **Length** slider, the display in the Step Editor on the left is updated accordingly. Note that you can adjust the length of each step individually in the Step Editor's display, as described in Step Editor.

4. **Humanize Time**: Adds random offsets to the timings of the steps, thereby giving a human feel to the sequence. Drag the slider to the right to emphasize the random offsets.

5. **Velocity**: Shrinks or expands the velocity range relative to the range values set by the **Min** and **Max** sliders left of the display (see Velocity Range Settings). This affects the velocities of all steps proportionally, as mirrored in the Step Editor's display on the left.

6. **Key**: When the Key button is off, the Velocity slider can be modulated by the Expression knob, as any other modulatable control of PIANO COLORS. When the Key button is on, the Velocity slider is instead modulated by the velocity of the notes you play: This way, you can dynamically control the velocities of the arpeggiator sequence by simply playing softer or louder.

7. **Velocity Mix**: With this slider at full left, the velocity of the steps only depends on the levels defined in the Step Editor on the left (the height of the bars in the display). As you drag the slider more to the right, the velocity of the steps takes into account the velocity at which you have played the notes. At full right, the steps use only the velocity at which you have played the notes, ignoring the velocities defined in the Step Editor.

8. **Humanize Velocity**: Adds random offsets to the velocities of the steps, thereby giving a human feel to the sequence. Drag the slider to the right to emphasize the random offsets.

8.2. Playback Settings

At the bottom of the Arpeggiator page, you can adjust the playback of your sequence.

The area contains the following controls:
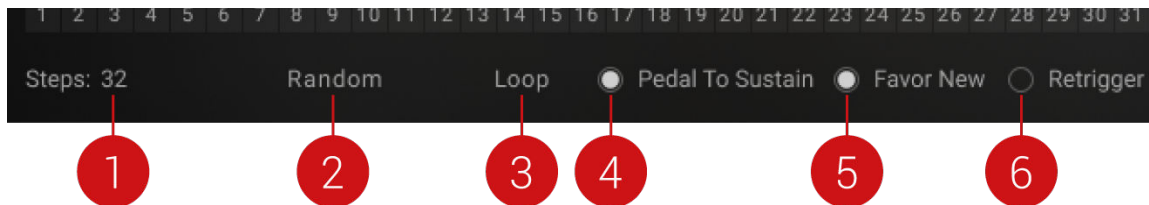
The playback settings in the Arpeggiator page

1. **Steps**: Sets the number of steps in your sequence. To change the number of steps, click and hold the displayed number and drag your mouse vertically. The display above is updated accordingly. You can have up to 32 steps in your sequence. Note that if you lower the number of steps then raise it again, the arpeggiator remembers the previous settings for the newly added steps.

2. **Note Order**: Defines the order in which the held keys will be played (the "pattern"). This menu offers numerous options, which are described below. If you press the sustain pedal, the pattern defined here goes on even if you release the keys; this is indicated by a little dot showing up above the Note Order menu.

3. **Playback Mode**: Selects how the sequence should be played. The sequence can be repeated (**Loop**), play once then stop (**One Shot**), play forward then backward in a loop (**Ping Pong**), or play the steps in a random order (**Random**).

4. **Pedal To Sustain**: When this is on, the sustain pedal also sustains the notes played by the arpeggiator.

5. **Favor New**: When this is on, newly held keys are played as soon as possible within the pattern.

6. **Retrigger**: When this is on, the sequence restarts from the beginning with every new key that you hold.

Note Order Options

The Note Order menu (see **2** in the picture above) offers the options listed below. As an example, we provide the corresponding pattern when holding five notes numbered from 1 to 5, where 1 is the lowest and 5 the highest note.

- **As Played**: The pattern follows the order in which you have pressed the keys.

- **Random**: Notes are played in random order.

- **2X Random**: Notes are repeated twice in random order.

- **Up**: Notes are played from the lowest to the highest note. Pattern example: 1-2-3-4-5.

- **Down**: Notes are played from the highest to the lowest note. Pattern example: 5-4-3-2-1.

- **Up & Down**: Notes are played from the lowest to the highest note, then the other way around. Pattern example: 1-2-3-4-5-5-4-3-2-1.

- **Down & Up**: Notes are played from the highest to the lowest note, then the other way around. Pattern example: 5-4-3-2-1-1-2-3-4-5.

- **Zigzag Up**: The pattern goes from the lowest to the highest note with back and forth movements. Pattern example: 1-2-3-2-3-4-3-4-5-4-5-1-5-1-2.

- **Zigzag Down**: The pattern goes from the highest to the lowest note with back and forth movements. Pattern example: 5-4-3-4-3-2-3-2-1-2-1-5-1-5-4.

- **Zigzag Up & Down**: The pattern goes from the lowest to the highest note with back and forth movements, then the other way around. Pattern example: 1-2-3-2-3-4-3-4-5-4-5-5-5-4-5-4-3-4-3-2-3-2-1-2-1-1.

- **Zigzag Down & Up**: The pattern goes from the highest to the lowest note with back and forth movements, then the other way around. Pattern example: 5-4-5-4-3-4-3-2-3-2-1-2-1-1-1-2-3-2-3-4-3-4-5-4-5-5.

- **Move In**: The pattern goes from the most distant notes (highest and lowest) to the middle note (in pitch). Pattern example: 1-5-2-4-3

- **Move Out**: The pattern goes from the middle note (in pitch) to the most distant notes (highest and lowest). Pattern example: 3-4-2-5-1.

- **Move In & Out**: The pattern goes from the most distant notes (highest and lowest) to the middle note (in pitch), then the other way around. Pattern example: 1-5-2-4-3-4-2-5.

- **Move Out & In**: The pattern goes from the middle note (in pitch) to the most distant notes (highest and lowest), then the other way around. Pattern example: 3-4-2-5-1-5-2-4.

- **Broken Up**: The pattern plays every second note from the lowest to the highest, then it plays the previously skipped notes from the lowest to the highest. Pattern example: 1-3-5-2-4.

- **Broken Down**: The pattern plays every second note from the highest to the lowest, then it plays the previously skipped notes from the highest to the lowest. Pattern example: 5-3-1-4-2.

- **Broken Up & Down**: The pattern plays every second note from the lowest to the highest, then it plays the previously skipped notes from the lowest to the highest. Pattern example: 1-3-5-2-4-5-3-1-4-2.

- **Broken Down & Up**: The pattern plays every second note from the lowest to the highest, then it plays the previously skipped notes from the lowest to the highest. Pattern example: 5-3-1-4-2-1-3-5-2-4.

8.3. Velocity Range Settings

In the left part of the Arpeggiator page, you can adjust the range of velocities available for your steps.

The area contains the following controls:
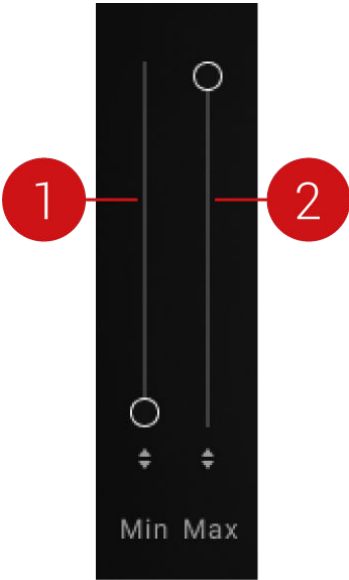
The velocity range settings in the Arpeggiator page

1. **Min** Velocity: Adjusts the minimum velocity of the steps.

2. **Max** Velocity: Adjusts the maximum velocity of the steps.

As you move either slider, the velocities of all steps are adjusted proportionally, which is mirrored in the display on the right.

Note that the velocities are also affected by the Velocity and Velocity Mix sliders in the sequence settings. For more information, see Sequence Settings.

Note that both **Min** and **Max** sliders can be modulated, thus you can dynamically control the velocity range and even invert it completely with the Expression knob. For more information on modulation, see Modulating Your Sound.

8.4. Step Editor

In the center of the Arpeggiator page, the Step Editor visualizes the arpeggiator sequence and lets you adjust each step with the mouse.

The area contains the following controls:
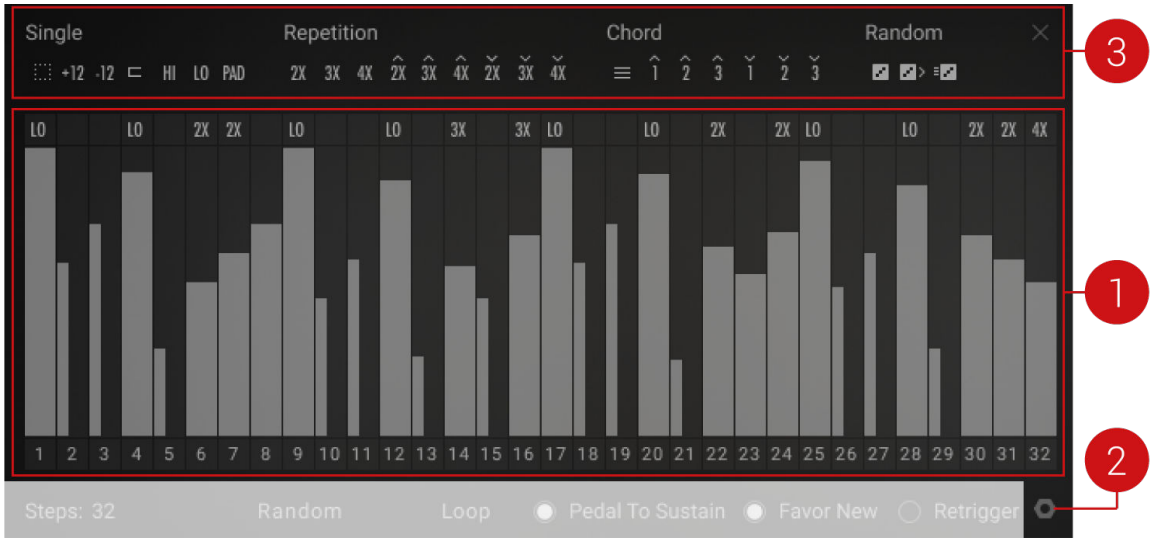
The Step Editor on the Arpeggiator page

1. **Display**: Represents the velocity and length of each step in your sequence. You can adjust various parameters for each step. For more information, see Using the Step Editor Display.

2. **Edit menu**: Lets you select various editing commands that will affect all your steps. For more information, see Editing Commands.

3. **Step Mode selector**: Lets you choose different playback modes for the steps. For more information, see Selecting Step Modes.

8.4.1. Using the Step Editor Display

In the display of the Step Editor, each bar represents a step: the bar height represents the velocity of the note or notes in that step, and the bar width represents their length. Following actions are available:

- Click a bar and drag your mouse vertically to adjust the step velocity.

- [Alt]+click a bar and drag your mouse horizontally to adjust the length of the notes in that step. By doing so, if you drag your mouse horizontally over the next step, this next step is muted to make room for the longer note(s) from the previous step. When you shorten such a long step again, as soon as you drag your mouse away from the next step, this next step is unmuted and takes back its previous settings.

- Click the numbers under the bars to mute or unmute the steps.

The pitch of the note(s) played in each step is not indicated in the display. This pitch depends on various factors: the keys you are holding on your keyboard, the playback mode selected for that step (see Selecting Step Modes), the value of the **Octave** slider right of the display (see Sequence Settings), and the pattern selected in the Note Order menu under the display (see Playback Settings).

8.4.2. Editing Commands

At the lower right of the display, a click on the little nut icon opens an Edit menu with a set of editing commands to modify all your steps at once:

- **Copy**: Duplicates all steps. This extends the sequence (in the limit of 32 steps).

- **Mirror**: Duplicates all steps but appends the copies in the reverse order. This extends the sequence (in the limit of 32 steps).

- **Flip**: Revert the order of the steps. Note that this command takes all 32 steps into account, even if your current sequence is shorter.

- **Invert Velocity**: Replace all velocities with their complementary ones in the velocity range. High velocities turn to low velocities and vice versa.

- **Nudge +1**: Shifts the sequence one step to the right. The last step is sent back to the first position.

- **Nudge -1**: Shifts the sequence one step to the left. The first step is sent back to the last position.

- **Shuffle**: Reorders the steps randomly.

- **Random All**: Sets all step parameters to random values: velocities, lengths, modes, and mute states.

- **Random Modes**: Selects random modes for all steps.

- **Random Velocity**: Sets random velocities for all steps.

- **Init**: Resets all steps to maximum velocity and length, and removes all modes.

8.4.3. Selecting Step Modes

For each step in the sequence, you can select a particular **step mode**, which specifies what should be played in that step. By default, each step plays one note (the particular note played depends, for example, on the keys you are holding and the selected pattern). By selecting another step mode for that step, you can change the playback behavior of the step: For example, it could trigger the note twice, or another note, or a chord, etc. This greatly extends the flexibility of the arpeggiator.

To select a step mode, do the following:

1. Click the "**+**" sign in the upper right corner above the display to open the Step Mode selector:
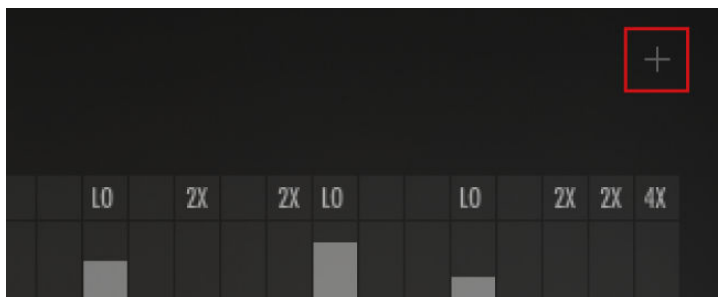
→   The   Step   Mode   selector   shows   up   above   the   display:
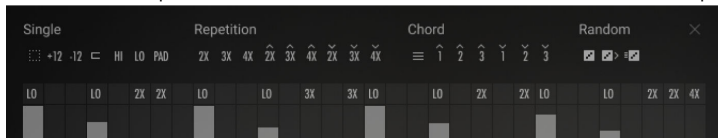
2. With your mouse, drag a step mode icon (for example, the icon reading **PAD**) onto the cell above the desired step.

→   The step mode icon appears above the step, and this mode is now active for that step.

You can also drag a mode icon from one step onto another to duplicate the mode.

In the Step Mode selector, modes are organized into four categories: **Single**, **Repetition**, **Chord**, and **Random**. The following paragraphs describe the various modes available.

Single Modes
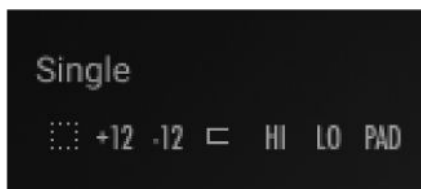
*The step mode icons in the **Single** category*

The **Single** category includes the following modes, from left to right:

- Empty: No specific playback mode: The step simply plays the expected note in the pattern. Drag this icon to remove the mode currently on a step.

- Octave Up (**+12**): Adds an octave higher.

- Octave Down (**-12**): Adds an octave lower.

- Interval: Adds the next note in the pattern order.

- Highest Note (**HI**): Plays the highest note of the pattern.

- Lowest Note (**LO**): Plays the lowest note of the pattern.

- Velocity Pad (**PAD**): Reduces the note velocity by a random amount.

Repetition Modes
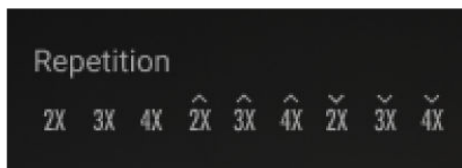
*The step mode icons in the **Repetition** category*

The **Repetition** category includes the following modes, from left to right:

- Double (**2X**): Repeats the note two times.

- Triple (**3X**): Repeats the note three times.

- Quadruple (**4X**): Repeats the note four times.

- Rise Double: Repeats the note two times with increasing velocity.

- Rise Triple: Repeats the note three times with increasing velocity.

- Rise Quadruple: Repeats the note four times with increasing velocity.

- Fall Double: Repeats the note two times with decreasing velocity.

- Fall Triple: Repeats the note three times with decreasing velocity.

- Fall Quadruple: Repeats the note four times with decreasing velocity.
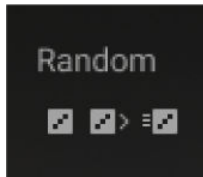
Chord Modes
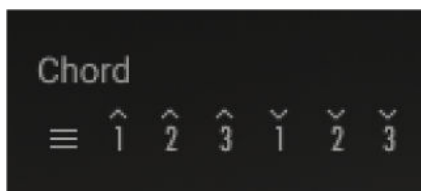
*The step mode icons in the **Chord** category*

The **Chord** category includes the following modes, from left to right:

- Chord: Plays the chord consisting of all held notes.

- First Inversion Up: Plays the first upper inversion of the chord consisting of all held notes.

- Second Inversion Up: Plays the second upper inversion of the chord consisting of all held notes.

- Third Inversion Up: Plays the third upper inversion of the chord consisting of all held notes.

- First Inversion Down: Plays the first lower inversion of the chord consisting of all held notes.

- Second Inversion Down: Plays the second lower inversion of the chord consisting of all held notes.

- Third Inversion Down: Plays the third lower inversion of the chord consisting of all held notes.

Random Modes

*The step mode icons in the **Random** category*

The **Random** category includes the following modes, from left to right:

- Random Note: Plays a random note of the pattern instead of sticking to the pattern order.

- Random Step: Jumps to a random step in the sequence.

- Random Chord: Plays the chord consisting of all held notes or a random inversion of this chord.

9. Global Page

The Global page lets you adjust global settings regarding the sound and the control of your instrument.

▶ Click **GLOBAL** at the bottom of the instrument to open or close the Global page:

The Global page contains the following areas:

The Global page

1. **EQUALIZER**: Applies equalization to the overall sound of your instrument. For more information, see Equalizer.

2. **DYNAMICS**: Applies compression to the overall sound of your instrument. For more information, see Dynamics.

3. **SETTINGS**: Adjusts the behavior of the instrument in reaction to your playing on the keyboard. For more information, see Settings.

9.1. Equalizer

The **EQUALIZER** area of the Global page allows you to apply a 4-band equalization to the audio output of your instrument.

The **EQUALIZER** area contains the following controls:
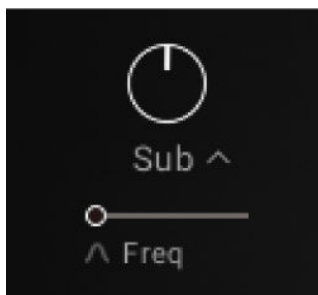
*The **EQUALIZER** area on the Global page*

1. **EQUALIZER On/Off**: Turns the equalizer on or off.
2. **Gain knobs**: Adjust the levels of the four frequency bands. From left to right, the knobs control lower to higher frequency bands. The frequency bands are described in musical terms, as shown by the labels under the knobs. You can customize the frequency band of each gain knob to your needs, see below for more information.
3. **Link**: If you have adjusted the gain knobs in a certain way and switch on **Link**, all gain knobs will change proportionally as you adjust one of them, keeping the sound or style of your custom EQ setting.

Adjusting the Frequency Bands and Response Curves

You can adjust the frequency band and response curve of each gain knob. To do this:

▶   Click the label under a gain knob.

A pop-up panel appears underneath with two parameters allowing you to adjust the knob's frequency response.

Adjusting the frequency band for the left gain knob (on the left) and a middle gain knob (on the right).

The two parameters in the popup panel depend on which gain knob you are configuring:

- For all four knobs, the **Freq** slider controls the center frequency of the band. As you adjust the frequency, the musical term under the gain knob changes accordingly.

- For the two knobs in the middle, a **Q** slider controls the sharpness of the bandwidth: The higher **Q** is, the narrower the band is.

- For the outer two knobs, a Bell button lets you switch the frequency band between shelf (button off) and bell (button on).

9.2. Dynamics

The **DYNAMICS** area of the Global page allows you to apply compression to the audio output of your instrument.

The **DYNAMICS** area contains the following controls:
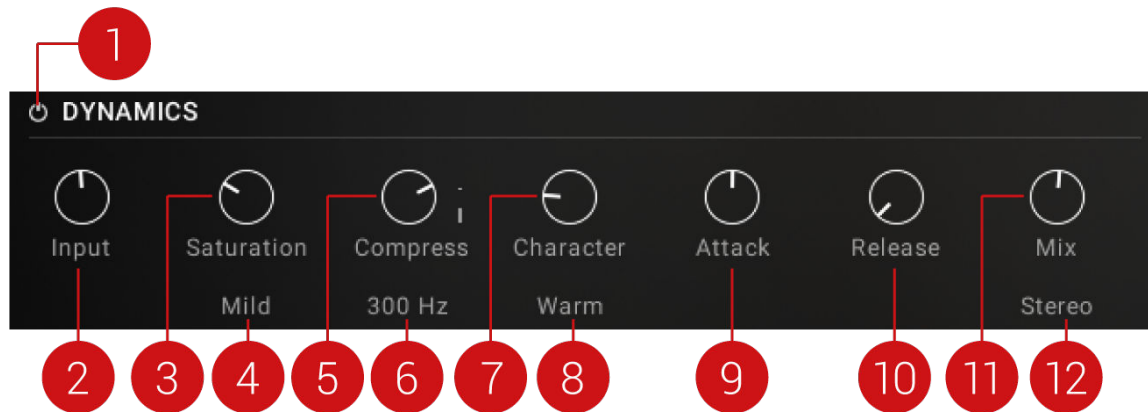
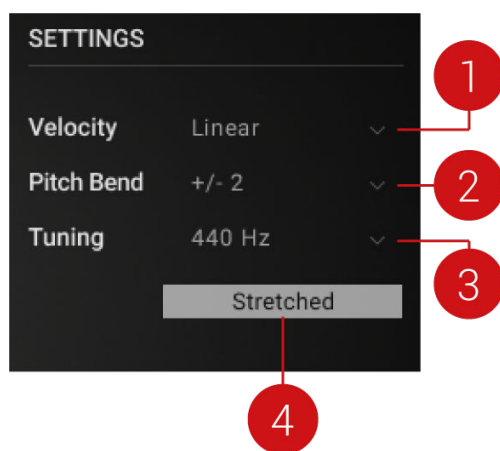*The **DYNAMICS** area on the Global page*

1. **DYNAMICS On/Off**: Turns the compressor on or off.
2. **Input**: Adjusts the level of the input signal entering the compressor.
3. **Saturation**: Adjusts the amount of saturation. Increase the **Saturation** value to add dirt, warmth and loudness to your sound.
4. **Saturation Mode**: The compressor offers three different Saturation modes you can use to shape your signals. **Mild** mode is a nice way of coloring signals while retaining a clean sound, while **Moderate** mode will tastefully add more noticeable harmonics. Switch to **Hot** mode for maximum saturation and audible distortion.
5. **Compress**: The more you turn the **Compress** knob clockwise, the more the compression will be applied to the input signal while retaining an even loudness level. Note that in order to make this work you need to set the input level correctly by adjusting the **Input** knob (**2**). The amount of applied compression is indicated in real-time by the vertical bar right of the **Compress** knob.
6. **High-Pass Filter**: You can prevent the compressor from reacting primarily to low-frequency signal peaks by using the high-pass filter. When on, the high-pass filter will cut the internal detector signal below the selected frequency. Switch between the two cutoff frequencies (**100 Hz** or **300 Hz**) to figure out which one works best.
7. **Character**: Use the equalizer controlled by the **Character** knob to fatten signals lacking substance or smoothen signals too aggressive due to heavy saturation.
8. **Character Mode**: Provides access to three character modes, with **Fat** mode emphasizing low and high frequencies, and **Warm** mode rolling off some highs while enhancing the lower frequency spectrum. **Bright** mode enhances the top end and attenuates the bottom end of the signal, which is great for making boomy instruments stand out in the mix.
9. **Attack**: Adjusts how fast the compressor reacts to incoming signals.
10. **Release**: Adjusts the length of the compressor's release phase, that is, the time it takes for the compressor to return to its standby state.
11. **Mix**: Adjusts parallel compression. The uncompressed (dry) signal will be mixed with a compressed version of the same signal. It gives the excitement of a compressed signal without losing its dynamic and transients. If the **Mix** knob is at full right, you only hear the compressed signal. With the **Mix** knob at full left, you only hear the dry signal. Every setting in-between is a mix of both signals.

12. **Channel Link**: Use this menu to select one of three stereo modes. **Stereo** will apply the same amount of gain reduction to both the left and right channels. **Stereo** is the most common mode because it eliminates the risk of image shifting. In **Dual Mono** mode, both channels will be compressed individually, which helps to widen the sound. In **MS** mode, the input signal will not be split into a left and right channel, but processed as Mid and Side signals instead. **MS** mode enhances the side signal to a certain extent, so signals processed using this mode will sound wider.

9.3. Settings

The **SETTINGS** area of the Global page lets you adjust how PIANO COLORS reacts to your playing.

The **SETTINGS** area contains the following controls:

*The **SETTINGS** area on the Global page*

1. **Velocity**: Selects from a list of velocity curves in order to customize the instrument's velocity response to your keyboard and your way of playing.
2. **Pitch Bend**: Selects the pitch range available on the Pitchbend wheel, in semitones.
3. **Tuning**: Selects the instrument's basic pitch, also called "concert pitch," from 436 Hz to 444 Hz.
4. **Stretched** / **Equal**: Switches the tuning system (or temperament) of PIANO COLORS between **Stretched** and **Equal**. The default setting is **Stretched**, which is the way the piano was tuned for sampling. Stretched tuning accommodates the natural "inharmonicity" of metal strings, which stretch harmonics beyond the strings' ideal frequencies. Therefore, to make the instrument sound more harmonically pleasing (or "musical"), higher notes are stretched upwards. You can otherwise switch to **Equal** temperament, which is the most common tuning system used in Western music.

10. Credits

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