

**USER MANUAL**

**\_AUGMENTED STRINGS**

**ARTURIA**

\_The sound explorers

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## MANUAL

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**Product version: 1.7.2**

***Revision date: 24 February 2025***

# Thank you for purchasing Arturia Augmented STRINGS!

This manual covers the features and operation of Augmented STRINGS.

**Be sure to register your software as soon as possible!** When you purchased Augmented STRINGS you were sent a serial number and an unlock code by e-mail and/or the [Arturia Downloads & Manuals](#). These are required during the online registration process.

## Special Messages

### Specifications Subject to Change:

The information contained in this manual is believed to be correct at the time of printing. However, Arturia reserves the right to change or modify any of the specifications or features without notice or obligation.

### IMPORTANT:

The software, when used in combination with an amplifier, headphones, or speakers, may be able to produce sound levels that could cause permanent hearing loss. DO NOT operate for long periods of time at a high level or at a level that is uncomfortable. If you encounter any hearing loss or ringing in the ears, you should consult an audiologist.

# Introduction

## **Congratulations on your purchase of Arturia Augmented STRINGS**

Augmented STRINGS contains a large library of multi-sampled orchestral string instruments, as well as a state-of-the-art synthesis engine - combined within an approachable, exciting software instrument. This will give modern producers immediate access to a comprehensive range of authentic, abstract, and evocative string sounds in a variety of playing techniques, as well as an infinite variety of synthesized and hybrid timbres.

Be sure to visit the [www.arturia.com](http://www.arturia.com) website for information on all our other inspiring hardware and software instruments, effects, MIDI controllers, and more. They have become indispensable tools for many visionary artists around the globe.

Musically yours,

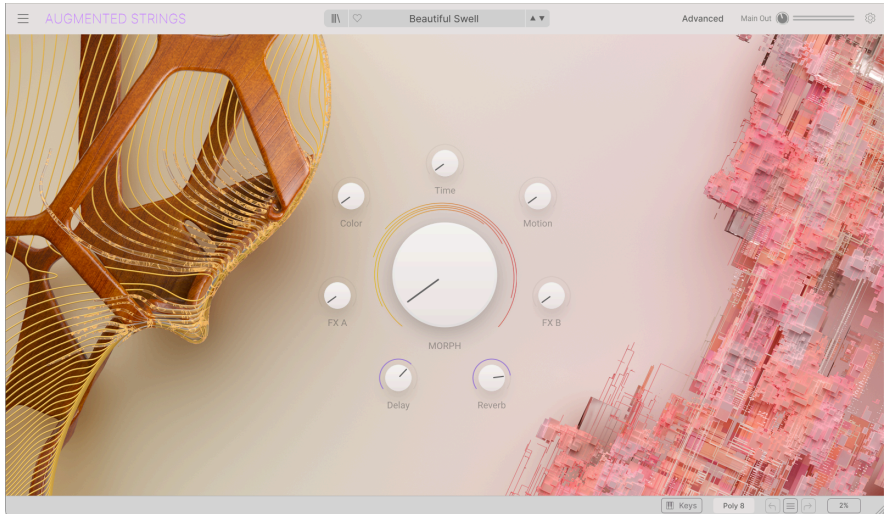
**The Arturia Team**

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# 1. WELCOME TO AUGMENTED STRINGS



Augmented STRINGS is a hybrid instrument unlike any other. Its sonic capabilities range from traditional classical string sounds to unique and inspiring hybrid textures. Check out what's on offer in the Preset Browser... and don't forget to play with the Macro knobs, and hear how they can tweak and twist your sounds with ease!

## 1.1. Augmented STRINGS sound engine

Every Preset in Augmented STRINGS combines two Layers, each of which has two sound sources (Engines) available. Each Engine can be either a versatile sample player (Sampler) or a powerful synthesizer engine (Synth).

The Sampler engines offer dozens of multi-sampled sounds from the four classical string instruments: the Bass, Cello, Viola, and Violin, as well as Ensemble Strings. There are also Processed Ensemble and Solo Strings and inspiring Additional Samples as well. The samples include traditional and unorthodox playing techniques for a wide sound palette. The Synth engines can have one of four synthesis types (Analog, Granular, Harmonic, and Wavetable), with an additional Simpler engine.

The basic interface is extremely simple to use, with eight Macro knobs and an optional onscreen keyboard. To dive deeper, open the Advanced features and obtain complete control over every aspect of your sound design. Your playing experience can be as simple or complex as you wish - with dozens of amazing factory Presets at your fingertips to get you started, and the potential to create many, many more.



## 1.2. Features

- Hybrid synthesizer featuring four separate sound sources (Engines).
- Each Layer contains two of these Engines, either a Sampler or a Synth.
- Sample categories include Bass, Cello, Viola, Violin, and Ensemble Strings, as well as additional samples and processed samples.
- Each Engine can be set to one of five types: Analog, Granular, Harmonic, Simpler, and Wavetable.
- Each patch supports up to two simultaneous Samplers or a Simpler.
- Blend Layers and modify various parameters using the Morph Macro.
- There are seven additional programmable Macro knobs, three for the sound engines and four for the FX.
- Each Layer in a patch contains two FX inserts.
- Each patch also includes a global Delay and Reverb on the output.
- Modulation routings allow for complex sound sculpting.
- Each Preset includes 2 LFOs, 2 Function generators, 2 Random signal sources, and 4 Keyboard modifiers.
- Easy MIDI Learn function for quick control setup.
- Built-in arpeggiator with multiple play modes, chord selection, random variations, and more.

## 2. ACTIVATION AND GETTING STARTED

Augmented STRINGS works on computers equipped with Windows 10 or later and macOS 11 or later. You can use the instrument in standalone mode or as an Audio Unit, AAX, VST2, or VST3 instrument inside your Digital Audio Workstation (DAW) software.



### 2.1. Activate the Augmented STRINGS license

Once Augmented STRINGS has been installed, the next step is to activate your license for the instrument. This is a simple process that is done through a separate program called the Arturia Software Center.

#### 2.1.1. The Arturia Software Center [ASC]

If you have not already installed the ASC, you can do so by going here: [Arturia Downloads & Manuals](#).

Look for the Arturia Software Center at the top of the page, and then download the version of the installer that you need for your system (macOS or Windows).

Once the software is installed:

- Launch the Arturia Software Center (ASC).
- Log into your Arturia account.
- Scroll down to the My Products section of the ASC.
- Click the Activate button and follow the instructions.

That's it!

### 2.2. Augmented STRINGS as a plug-in

Augmented STRINGS comes in VST2, VST3, Audio Unit (AU) and AAX plug-in formats for use in all major DAW software such as Ableton Live, Cubase, Logic, Pro Tools, Studio One, REAPER, Bitwig Studio, and many more. When using Augmented STRINGS as a plug-in, all audio and MIDI device settings are handled by the host music software. Please refer to your host music software's documentation if you have any questions about loading or using plug-ins.

Note that when you load Augmented STRINGS as a plug-in instrument inside your host software, its interface and settings work the same way as in standalone mode, with a few small differences:

- Augmented STRINGS will synchronize to your DAW's host tempo/BPM rate where appropriate
- You can automate numerous parameters using your DAW's automation system
- You can use more than one instance of Augmented STRINGS in a DAW project (in standalone mode, you can only launch one instance of Augmented STRINGS)
- You can run the output of Augmented STRINGS through any additional audio effects available to your DAW such as delay, chorus, filters, etc.
- You can route Augmented STRINGS's audio outputs more creatively inside your DAW using the DAW's own audio routing system.

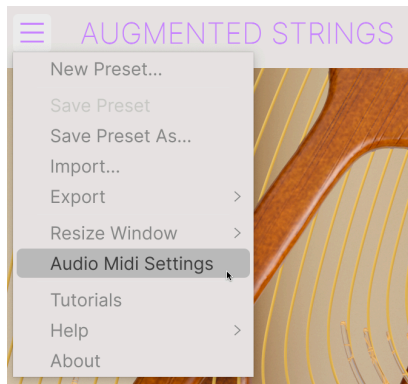
## 2.3. Initial setup for Standalone Use

If you would like to use Augmented STRINGS in standalone mode, you will need to set up your instrument and ensure that MIDI and audio signals are flowing properly through the software. You generally only need to do this one time unless you make major changes to your computer. The setup process is the same on both Windows and macOS computers.

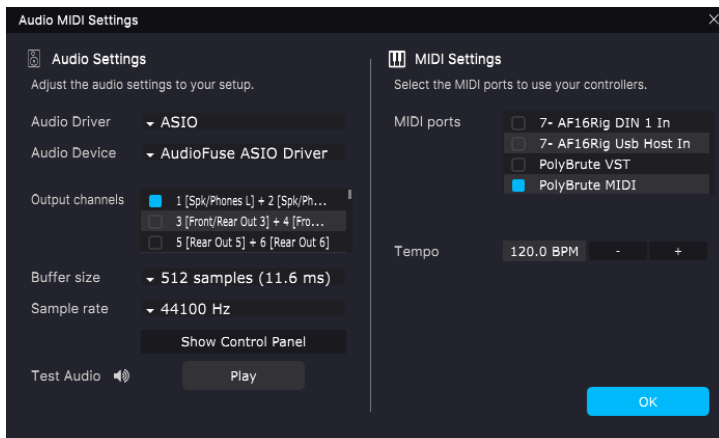
**i** ! This section only applies to readers that plan to use Augmented STRINGS in standalone mode. If you are only going to use Augmented STRINGS as a plug-in inside a DAW or other host music software, you can safely ignore this section.

### 2.3.1. Audio and MIDI settings

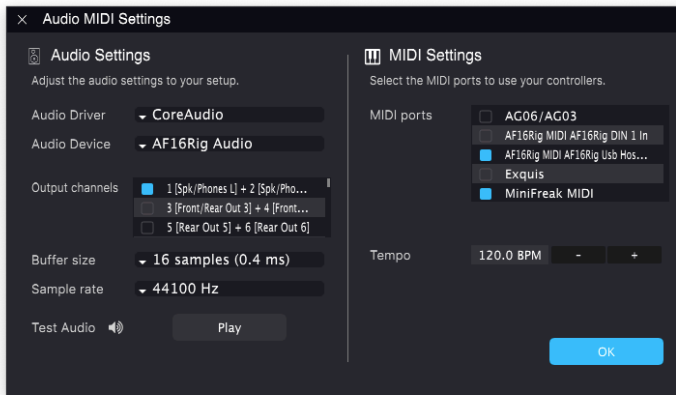
At the top left of Augmented STRINGS is a pull-down menu. Click it to reveal the following:



Select **Audio MIDI Settings** to bring up the following window. (This option will not be available on this menu when using Augmented STRINGS as a plug-in.)



*Audio MIDI Settings for Windows*



### Audio MIDI Settings for macOS

The **Audio Settings** section, on the left side of the window, contains the following settings:

- **Audio Driver** selects which audio driver will handle playback of Augmented STRINGS. This can be your computer's internal driver, or an external soundcard driver.



! On macOS devices, including external audio interfaces, use the built-in CoreAudio driver. The device can be selected from the second menu.

- **Audio Device** shows the name of your hardware interface, selected from a drop-down menu if you have more than one device connected to your computer.
- **Output Channels** lets you select which of the available device outputs will be used for playback. If your selected device only has one stereo output, then this setting will not appear. If your device has more than two outputs, you can select one or more here by checking the appropriate boxes.
- **Buffer Size** menu lets you select the size of the audio buffer your computer uses to calculate sound.



! If your computer is an older, slower model, or you're running a lot of CPU-heavy software, set a larger buffer size to lighten the CPU load. Be aware that this could result in significant *latency*: a time delay between pressing a key and hearing a sound, which can be problematic while performing. (The latency is shown in parentheses next to the buffer size setting.) If you have a relatively new and fast computer, you can use a much smaller buffer size to reduce latency. If you start to hear clicks, pops, or interruptions in your audio, then you should increase the buffer size a bit, and play with it until you have the smallest buffer that gives you click-free sound.

- **Sample Rate** menu lets you set the sample rate at which audio is sent out of the instrument. The options listed here will depend on the capability of your audio interface hardware.



↳ Virtually all audio hardware can operate at 44.1 or 48 kHz, which is perfectly fine for most applications, including Augmented STRINGS. Higher sample rates place greater loads on the CPU, so we recommend staying at 44.1 or 48 kHz unless you have a specific reason to work at high sample rates.

- **Show Control Panel** button will jump to the system control panel for whatever audio device is selected.



↳ Note that this button is only available in the Windows version. On the rare occasions when device control be needed in macOS and the interface maker has not provided a control panel app, you can work with your output device in the Audio MIDI Setup utility that comes with every Mac.

- **Play Test Tone** plays a simple test tone to help you troubleshoot audio issues. You can use this feature to confirm that the instrument is routed correctly through your audio interface and audio is playing back where you expect to hear it (your speakers or headphones, for example).

The **MIDI Settings** section, on the right side of the window, has the following options:

- Your connected MIDI devices will appear in the **MIDI Ports** menu. (Note that this menu is only displayed if at least one MIDI device is connected to your computer.) There will be a check box beside each connected MIDI device. You can use as many as you like to control Augmented STRINGS – simply click the check boxes for each device you want to use. (In the screenshot above, a keyboard and separate control surface are being used to control Augmented STRINGS together.)
- **Tempo** sets the tempo of the Augmented STRINGS arpeggiator and other clocked parameters like LFO rates. When using Augmented STRINGS inside a host music software as a plug-in, the instrument gets tempo information from your host software.

## 2.4. Taking Augmented STRINGS for a Test Drive

Now that you have Augmented STRINGS up and running, let's take it for a quick test drive!

If you haven't done so already, launch Augmented STRINGS as a plug-in or as a standalone instrument. If you have a MIDI controller set up, use it to play some notes on Augmented STRINGS.

The up and down arrows next to the patch name in the Upper Toolbar let you step through all of Augmented STRINGS's available Presets. Try playing a few, and when you find one that you like, try adjusting some of the other on-screen controls to see how they affect the sound.

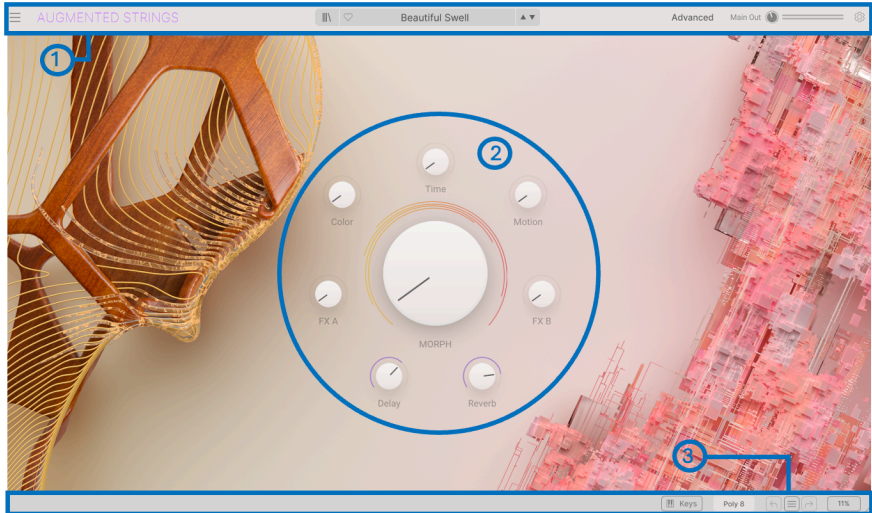
You don't have to worry about playing around with any of the controls – nothing you do will be saved unless you specifically save a Preset (we'll get to that later), so there is no chance of messing up any of Augmented STRINGS's factory Presets.

Now you're ready to dive in and start learning your way around Augmented STRINGS. The rest of this User Manual will help you work your way through all of the Augmented STRINGS features. You'll be creating and playing amazing sounds in no time!

## 3. THE USER INTERFACE

This chapter will give you an idea of how the Augmented STRINGS user interface is organized, and where to find its functions.

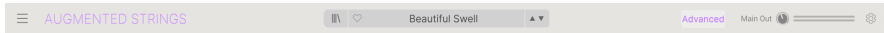
### 3.1. High-Level Overview



Augmented STRINGS is neatly subdivided into three sections, as shown in the illustration above.

1. **The Upper Toolbar [p.10]:** This is where you handle administrative tasks such as saving, loading and browsing Presets, editing various setup and configuration parameters, adjusting MIDI mappings and accessing the Advanced features of Augmented STRINGS. You'll get a guided tour [here \[p.10\]](#).
2. **The Main Panel:** This is where you access the Macro controls which allow you to edit your sounds. We will go over this panel in the [Main Panel \[p.36\]](#) section of this manual.
3. **The Lower Toolbar [p.15]:** This section provides quick access to a number of important parameters and useful bits of information such as CPU usage, Undo & Redo History. We will walk you through its features [here \[p.15\]](#).

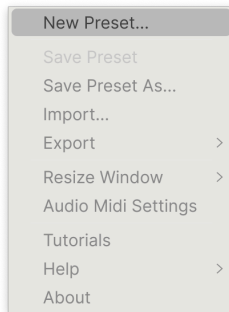
## 3.2. The Upper Toolbar



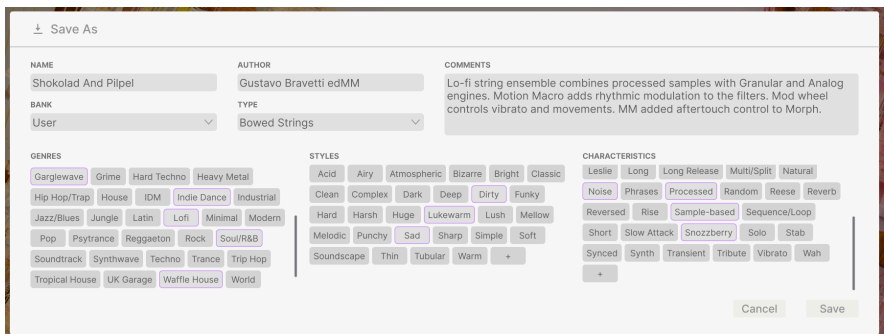
The toolbar that runs along the top of the instrument provides access to many useful features that impact Augmented STRINGS as a whole: the Augmented STRINGS pulldown menu, the Preset Browser, the Advanced button, The Main Out control and level meters, and the Side Panel gear icon.

### 3.2.1. The Augmented STRINGS menu

Clicking the 3-lines icon at the top left corner opens a pulldown menu for access to a number of important features.

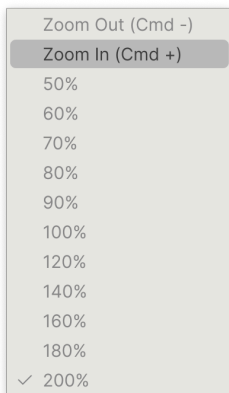


- **New Preset:** This option creates a new Preset with default settings on all parameters. It is a good place to start if you would like to create a new sound from scratch.
- **Save Preset:** This option will overwrite the currently loaded Preset with any changes you have made. If you would like to save the current Preset under a different name, use the "Save As..." option below.
- **Save Preset As...:** This lets you save your Preset under a different name. Clicking this option reveals a window where you can name your Preset and enter information about it.



**i** ↴ Arturia's powerful browsing system lets you save much more than just a Preset name. For example, you can enter the Author's name, select a Bank and Type, select tags that describe the sound, and even create your own Bank, Type, and Characteristics. This information can be read by the Preset Browser and is useful for searching the Preset banks later. You can also enter your own notes in the Comments field, which is handy for providing a more detailed description of a sound. This can help you remember how a sound works, or provide guidance to other Augmented STRINGS users with whom you're sharing the patch.

- **Import...:** This command lets you import a Preset file, which can be either a single Preset or an entire bank of Presets.
- **Export Menu:** You can export Presets in two ways: as a single Preset or as a bank.
  - **Export Preset:** Exporting a single Preset is handy when you want to share a Preset with someone else. The default path to these files will appear in the "save" window, but you can create a folder at another location if you like. The saved Preset can be reloaded using the **Import Preset** menu option.
  - **Export Bank:** This option can be used to export an entire bank of sounds from the instrument, which is useful for backing up or sharing Presets. Saved banks can be reloaded using the **Import Preset** menu option.
- **Resize Window:** The Augmented STRINGS window can be resized from 50% to 200% of its original size without any visual artifacts. On a smaller screen such as a laptop, you may wish to reduce the interface size so it doesn't dominate the display. On a larger screen or a second monitor, you can increase the size to get a better view of the controls. The controls work the same at any zoom level, but smaller controls can be easier to work with at higher magnification levels.



**i** ↴ While working with Augmented STRINGS, you can also use the keyboard shortcuts CTRL- / CTRL+ (Windows) or COMMAND- / COMMAND+ (macOS) to quickly adjust the window size by one step down or up. Dragging the lower right corner of the window will also size the interface up or down to the next window size up or down. ! Note that in some DAWs, the same key commands may be used for zoom control. In this case, the DAW will take priority.



- **Audio MIDI Settings (only available in standalone mode):** Here you manage the way the instrument transmits audio and receives MIDI. See the section on [Audio and MIDI settings \[p.6\]](#) for more information about this topic.

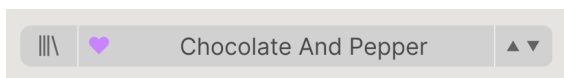


! The Audio MIDI Settings menu is only available when using Augmented STRINGS in Standalone mode. When using Augmented STRINGS as a plug-in, the host software handles all of the parameters in this menu, including audio and MIDI routing, buffer size settings, etc.

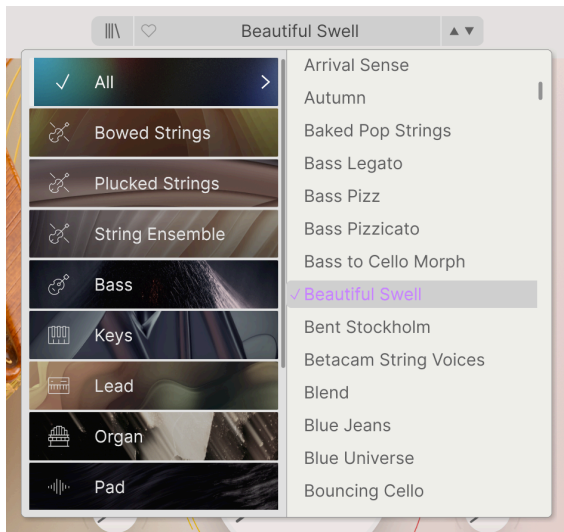
- **Tutorials:** Augmented STRINGS comes with tutorials that walk you through different features of the instrument. Select one of the tutorials to get step-by-step descriptions of how to make the most of the Augmented STRINGS features.
- **Help:** This section provides handy links to the Augmented STRINGS User Guide and the Augmented STRINGS Frequently Asked Questions page on Arturia's website. Note that accessing these pages will require an Internet connection.
- **About:** Here you can view the Augmented STRINGS software version and developer credits. Click the About window again to close it.

### 3.2.2. Browsing Presets

Augmented STRINGS comes with lots of great-sounding factory Presets. To help you search through large numbers of Presets, we have a powerful Preset Browser with a number of features to help you find sounds quickly. The Upper Toolbar has the following controls related to the Preset Browser:



1. The **Preset Browser** button (the icon with four lines that like books on a shelf) opens and closes the Preset Browser. This is covered in detail in the next chapter, [The Preset Browser \[p.26\]](#).
2. The **Like** button (the heart icon) lets you quickly tag Presets you like. Inside the Preset Browser, it's easy to sort and search for Liked Presets.
3. The **Preset Name** is listed next in the toolbar. Clicking on the name reveals a pull-down menu with other available Presets. Click on any name to load that Preset or click away from the menu to close it. Sound categories shown on the left side let you quickly jump into appropriate subgroups of Presets (called [Types \[p.30\]](#)) without having to dive into the Preset Browser itself.

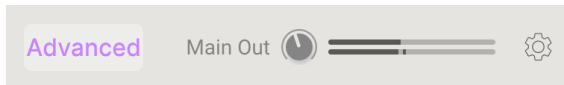


**i** Note that if you've set any search filters in the [Preset Browser \[p.26\]](#), pulling up any of these lists in this way ignores all of them. You will see all Presets of the appropriate Type.

4. The **Arrow icons** select the previous or next Preset in the filtered list. This is the same as clicking on the Preset name and selecting the next patch on the list, but does it with only one click.

**i** **♪** The Previous and Next arrows can be mapped to MIDI controls via the [MIDI Learn \[p.21\]](#) function. This means you can use buttons on your MIDI controller to easily step through the available Presets, without having to reach for the mouse.

### 3.2.3. Advanced Panel button



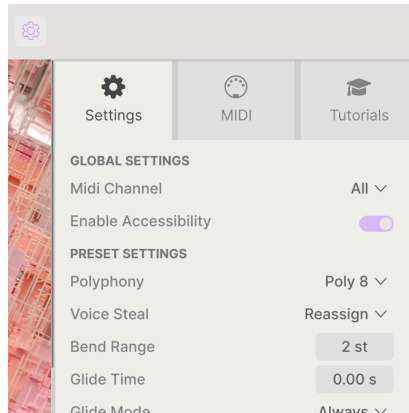
Clicking the **Advanced** button lifts the hood of Augmented STRINGS gives you tools to delve deeper into sound design. There is a whole lot to learn here, and you'll find it all in the [Advanced Panel \[p.39\]](#) chapter.

### 3.2.4. Main Out and meters, Side Panel gear

Next is a knob for the **Main Out**, the overall audio level coming out of the plug-in. Next to it are a pair of signal level meters.

At the far right of the Upper Toolbar, a gear-shaped icon opens up the **Side Panel**, which contains functions that are rarely changed and are therefore tucked out of the way until needed. We'll talk about those now.

### 3.2.5. Side Panel Settings



The Side Panel has three tabs:

- **Settings:** Global settings (MIDI receive channel) and Preset settings including number of polyphonic voices, voice assign, bend range, glide time & mode, and MPE settings.
- **MIDI:** MIDI Learn functions for use with external controllers.
- **Tutorials:** In-app interactive tutorials, also accessed from the main menu.

These topics are covered in the [Side Panel \[p.18\]](#) section later in this chapter.

### 3.3. The Lower Toolbar

The Lower Toolbar runs along the bottom of the Augmented STRINGS user interface and provides quick access to several important parameters and useful bits of information.

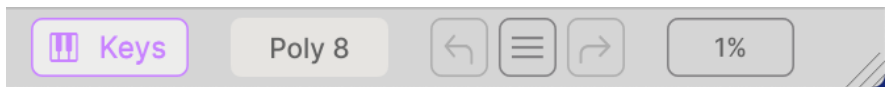


On the left, the **Parameter Name** area displays the name of a parameter (and often a description of what it does) when you hover your mouse over it or click on it do adjust its value. The control's current value pops up in a tool tip that appears next to the control.

Synth 2 Granular Density: Sets the rate at which new grains are generated, in hertz

**i** You'll often find that simply hovering over a control brings up enough information to clarify what it does immediately. That way, you can remind yourself of most or all of Augmented STRINGS's features without having to go back to the Tutorials.

The other features on the Lower Toolbar are grouped on the right side:

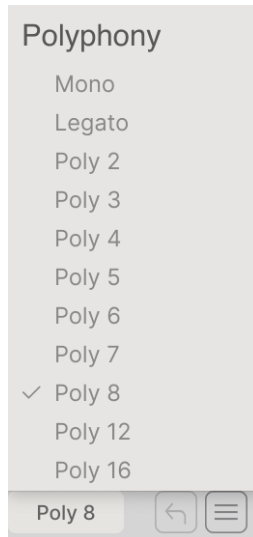


These have the following functions:

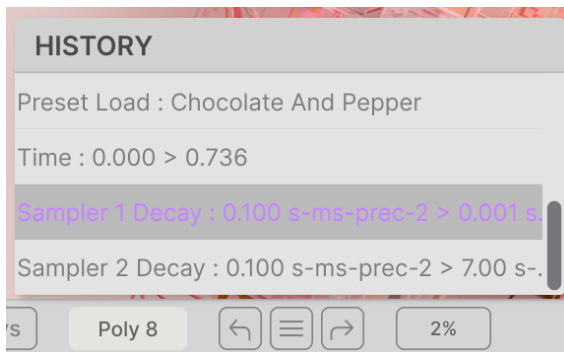
- **Keys:** Pops up an onscreen keyboard that displays the current note range of the sound engine in a colored overlay. You can click on the keys to play notes, click on the buttons to change octave (the key range remains the same), and drag the pitch and modulation wheels.



- **Polyphony:** opens a pop-up menu that lets you select the polyphony of the plug-in among the options shown below:



- **Undo/Redo:** Keeps track of your edits and changes.



- **Undo (left arrow):** Undoes the last change in Augmented STRINGS.
- **Redo (right arrow):** Redoes the last change in Augmented STRINGS.
- **Undo History (center menu icon):** Displays a list of recent changes. Click on a change to restore the patch to that state. This can be useful in the event you happened to go too far in your sound design and want to revert to an earlier version.

- **CPU Meter:** Displays the current CPU usage of the instrument. Hovering on the CPU Meter will change it into a **PANIC** button. Clicking on it will send a MIDI Panic message, silencing all notes and resetting other MIDI control values in the event of stuck notes or other issues.



- Finally, the diagonal lines in the corner allow you to quickly resize the plug-in window. When you stop dragging, the interface size will jump to the nearest option on the Resize menu.
- - Sometimes opening or closing a side panel or moving the interface on your monitor will cause it to take on dimensions that aren't supported. When this happens, the diagonal lines will become the two-arrow icon shown below. Click it to restore the interface size to the nearest option on the Resize menu.

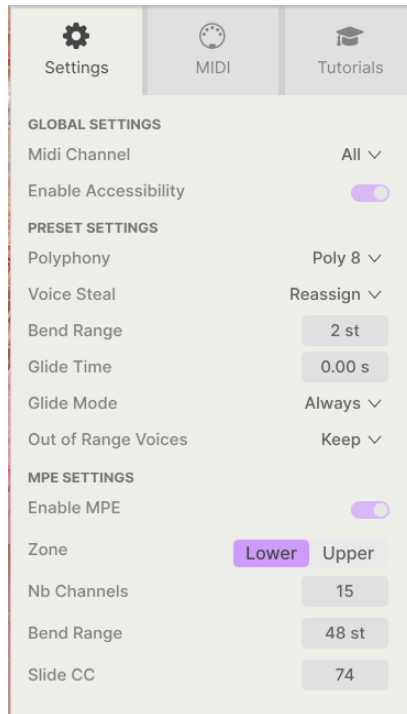


## 3.4. The Side Panel

The icon shaped like a gear at the upper right corner accesses global MIDI channel settings, a powerful MIDI Learn mode and Tutorials.

### 3.4.1. Settings Tab

Click **Settings** to access global settings like MIDI channel and MPE (MIDI Polyphonic Expression).



#### Global Settings

- **MIDI Channel:** Selects the MIDI channel(s) on which Augmented STRINGS will receive MIDI input. You can select ALL (omni) or channels 1-16.
- **Enable Accessibility:** Enables the voiceover for visually-impaired users. It is ON by default.

## Preset Settings

- **Polyphony** Select polyphony for the plug-in from monophonic all the way to 16 voices. This lets you control how much load the plug-in causes on your CPU, and in certain cases controls how the plug-in responds to various playing techniques.



This menu is identical to the one that pops up when you click on the Polyphony button in the Lower Toolbar.

- **Voice Steal:** Controls how the plug-in distributes voices if you play more notes than the polyphony setting allows. It has two modes: Reassign, where playing a particular note retriggers that note if it's been played already, or Rotate, where voices are retriggered in a fixed order.
- **Bend Range:** Selects the pitch bend range from 1 semitone to 36 semitones (3 octaves).
- **Glide Time:** Sets the time for a glide between notes to complete, from 0 to 10 seconds.
- **Glide Mode:** Can be set to glide only on legato playing, or always.
- **Out Of Range Voices:** This setting controls what happens to notes played outside the current patch's Sampler range(s). You can select Keep, which plays all notes anyway, or Kill, which ignores notes outside the Sampler range. This lets you set whether or not a sound that has a Synth engine plays notes just with the Synth when the Sampler is out of range.

**MIDI Polyphonic Expression:** Augmented STRINGS supports MIDI Polyphonic Expression (MPE). This exciting addition to the MIDI protocol allows a multi-dimensional controller to send polyphonic expressive controls (like pitch-bend, aftertouch, or your finger location on the Y axis of a key) on a per-note basis. This is done by using separate MIDI Channels to carry each note's expressive data separately, which can then be understood by synthesizers like Augmented STRINGS. When MPE is enabled, modulation is displayed in the strip at the bottom of the Advanced Panel, in the keyboard modulation settings.

The controls in the MPE menu let you set the following:

- **Enable MPE:** Turns MIDI Polyphonic Expression mode on and off.
- **Zone:** If an MPE-capable controller can be split into lower and upper zones, this selects which zone sends MPE messages.
- **No. Channels:** Sets the maximum number of MIDI sidechannels (and therefore simultaneous notes) on which MPE messages may be sent.
- **Bend Range:** Sets the maximum pitch bend range of each note, up to 96 semitones (48 by default). This should be set to the same value as what is used on your hardware MPE controller.
- **Slide CC:** Select the MIDI CC number used to send the slide information. By default, this is CC 74, a common choice among MPE controller settings. Note that when MPE is enabled, all controls that are currently set by MIDI Learn to listen to the selected CC will no longer receive it.



### 3.4.2. MIDI Tab

This is where Augmented STRINGS may be placed in MIDI Learn mode. In this mode, all MIDI-assignable parameters are highlighted and you can map physical controls on your MIDI Controller to them. A typical example might be to map a mod wheel to the vibrato, or a physical knob on the MIDI controller to control any of the Macro knobs.

Settings   MIDI   Tutorials

**MIDI CONTROL**

MIDI Controller   Generic MIDI Co... ▾

MIDI Config   **MiniFreak Map** ▾

**Learn**

Ch	CC	Control	Min	Max
1	16	Reverb	0.00	1.00
1	18	FXB	0.00	1.00
1	19	Delay	0.00	1.00
1	71	Morph	0.00	1.00
1	72	Sampler 1 Rel...	0.001s-m	20.0s-ms
1	73	Sampler 1 Atta...	0.00ms-s	20000ms
1	74	Color	0.00	1.00
1	75	Sampler 1 Dec...	0.001s-m	20.0s-ms
1	76	Time	0.00	1.00
1	77	Motion	0.00	1.00
1	79	Sampler 1 Sus...	0.00	1.00
1	80	Synth 1 VCA A...	0.00ms-s	20000ms
1	81	Synth 1 VCA D...	0.001s-m	20.0s-ms
1	82	Synth 1 VCA S...	0.00	1.00
1	83	Synth 1 VCA R...	0.001s-m	20.0s-ms
1	85	MasterVolume	-70.0dB	12.0dB
1	93	FXA	0.00	1.00

⊕ Add control

### 3.4.2.1. Assigning and Unassigning Controls

Click the **Learn** button in the MIDI tab to put Augmented STRINGS into Learn mode. Controls available for assignment are purple. Controls that are already assigned are red, but can be reassigned to new controls easily.



Click any purple control (or red control that you want to reassign) and its name will appear (or be highlighted) in the list. Now, move a control or operate a switch on your MIDI controller. The corresponding control onscreen will turn red and the assigned MIDI CC number will appear in the list to the left of the parameter name.

To unassign a control onscreen, CTRL-click or right-click it. Alternative methods of assignment are available in the [MIDI Parameter Menu \[p.22\]](#) described below.

This is an incredibly powerful feature, as nearly every function on the Advanced Panel can be controlled by MIDI. Just follow the same procedure as above, or simply right click **Add control** at the bottom of the MIDI tab to reveal the list of assignable controls.

### 3.4.2.2. Min and Max Values

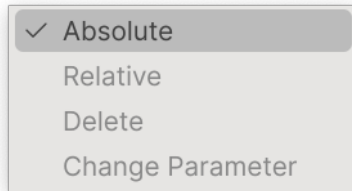
The **Min** and **Max** value columns for each parameter in the list let you scale the amount by which a parameter in Augmented STRINGS changes in response to a physical control movement. For example, you may wish to limit the range of a filter sweep, even though you're probably going to turn the knob all the way in live performance.

Drag up or down on a value to change it. Values are expressed as decimal fractions from 0 to 1. It is possible to set the maximum lower than the minimum. This reverses the polarity of the physical controller – so turning it up will turn the assigned parameter down.

In the case of switches which only have two positions (On or Off, etc.), those would normally be assigned to buttons on your controller. However, if you want to flip a switch when a fader or knob moves past a certain point, that's easy to set up.

### 3.4.2.3. MIDI Parameter Menu

CTRL-clicking or right-clicking on any item in the list of assigned parameters brings up a convenient menu with the following options, which can be different for each parameter.



- **Absolute:** The assigned parameter in Augmented STRINGS tracks the actual value that your physical controller is sending out. For example, if a parameter is set to something like 0.8 but the physical knob is currently at 0, turning the knob a tiny bit will make the parameter value instantly jump down to 0. This may result in a sudden change in the sound.
- **Relative:** The assigned parameter in Augmented STRINGS will go up or down from its current value in response to physical controller movements. This is often useful when using endless 360-degree encoders that don't have physical motion limits. It also prevents sudden parameter jumps on regular knobs or faders.

**i** ! If you use Relative mode on a knob or fader, it's possible, even likely, that either the parameter or the control will "run out of room". For example, suppose the current parameter is at 0.9, but the knob controlling it is at 0.2. If you turn the knob down to 0, the parameter value will go to 0.7 and then get stuck there because you can't turn the knob any farther. On the other hand, if you turn the knob up to 1, the parameter will hit 1.0 almost immediately, and the rest of the knob's travel won't do anything. Relative mode on controls with a fixed travel is best used for parameters that only require a small amount of adjustment.

- **Delete:** Removes the assignment and turns the corresponding onscreen control purple again.
- **Change Parameter:** Brings up a large submenu of every assignable parameter in Augmented STRINGS. This lets you change the assignment of the current CC/physical control manually and is useful when you know exactly the destination you're looking for.

#### 3.4.2.4. MIDI Controller Menu



At the top right of the MIDI tab is a drop-down menu where you can select templates for many Arturia MIDI controllers. These map physical controls to many “most wanted” parameters in Augmented STRINGS for a plug-and-play experience. A Generic template is also provided for third-party MIDI controllers.

### 3.4.2.5. MIDI Config Menu



Another drop-down lets you manage different sets of MIDI maps for controlling Augmented STRINGS from MIDI hardware. You can save/save as the current MIDI assignment setup, delete it, import a Configuration file, or export the currently active Configuration.

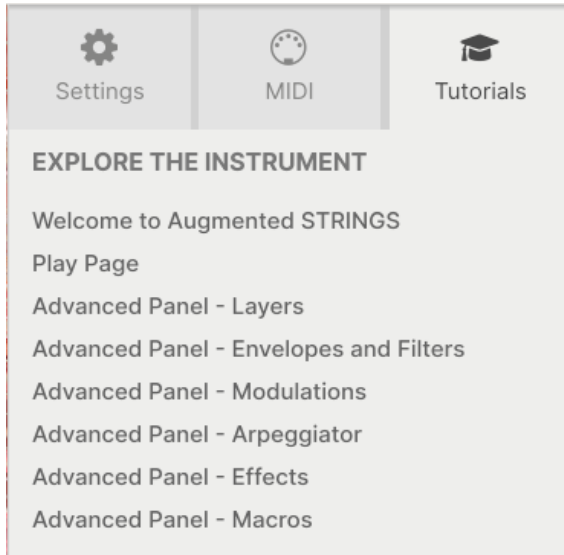
This is a quick way to set up different hardware MIDI keyboards or controllers with Augmented STRINGS without having to build all the assignments from scratch each time you swap hardware.

For example, if you have multiple hardware controllers (small live keyboard, large studio keyboard, pad controller, etc.), you can create a profile for each of them just once, and then quickly load it here. This saves you from having to redo the MIDI mapping assignments from scratch every time you swap hardware.

The final two options are handy, but erase all your current work, so be sure to save first.

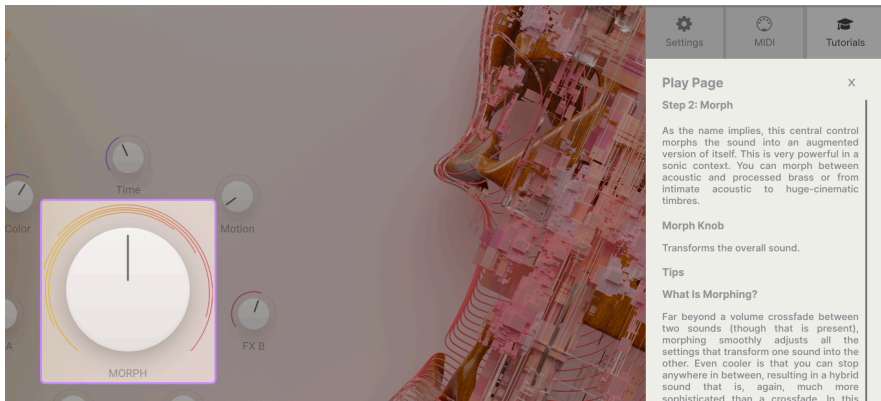
- **Default:** Gives you a starting point with predetermined controller assignments.
- **Empty:** Removes the assignments of all controls.

### 3.4.3. Tutorials Tab



In this tab, which can also be opened by selecting Tutorials from the [Main Menu \[p.10\]](#), you can click on titles for individual chapters, which in turn will take you through different areas of Augmented STRINGS in easy steps.

As you go through a tutorial, the parts of the panel to focus on are highlighted as you go:

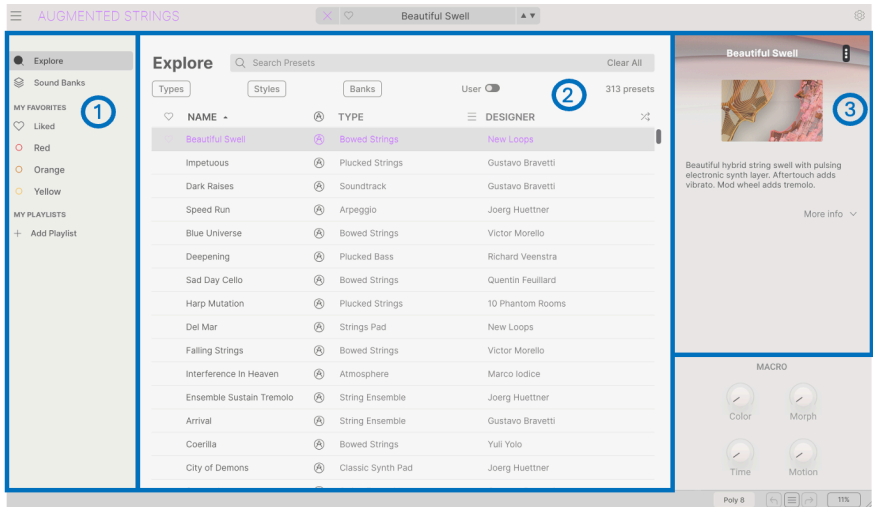


**i** ! If you're editing a Preset, make sure to save it before opening the Tutorials because doing so will load a new Preset and overwrite your changes. The Tutorials also take over the Side Panel space when in use.

## 4. THE PRESET BROWSER

The Preset Browser is how you search, load, and manage sounds in Augmented STRINGS. It has a couple of different views but they all access the same banks of Presets.

To access the search view, click on the Patch Browser button (the icon looks a bit like books on a library shelf).



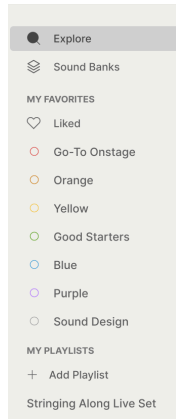
*The Preset Browser button*

Number	Area	Description
1.	<a href="#">Sidebar [p.27]</a>	Manage banks and Playlists.
2.	<a href="#">Search and Results [p.28]</a>	Search Presets by entering text, or using tags for Type and Style.
3.	<a href="#">Preset Info [p.33]</a>	Summary of Bank and Tags, Designer name, and description info for the selected Preset.

## 4.1. Sidebar

The leftmost section of the Preset Browser determines what is displayed in the [Search and Results \[p.28\]](#) section.

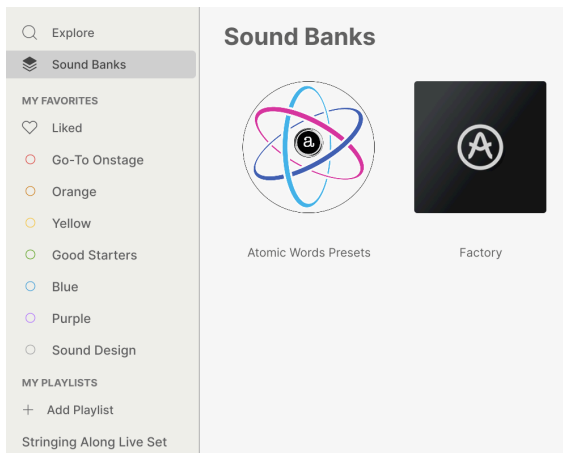
The topmost option is **Explore**:



The **Explore** section is the default, letting you search the current bank of Presets loaded into Augmented STRINGS. We'll cover those features below.

### 4.1.1. Sound Banks

This selection enables you to choose from the Factory and User banks currently available in Augmented STRINGS. Any new Banks you acquire will appear here, and a User bank will be created the first time you save a patch of your own. Clicking on a User Bank's icon will let you delete, rename, or export the bank, or import an image to represent the Bank visually. (These options aren't available for the Factory Bank.)



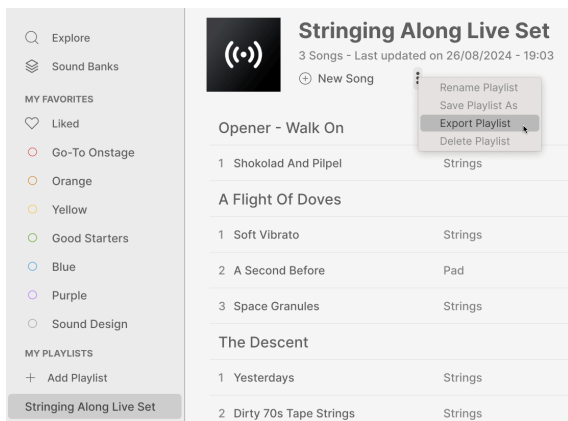


Below this are other options for quickly searching on groups of Presets:

- **Liked:** Presets you have liked using the heart icon. This appears in the leftmost column when you mouse over any item in a results list (see below).
- **Color codes:** Select from up to 7 colors to assign to any Preset, favorite or otherwise. This then allows for quick filtering of your Presets.

 As you can see in the figure above, you can right-click and rename each color code to customize the categories for your needs.

### 4.1.2. Playlists



A **Playlist** is a set of Presets that have been selected and placed in a certain order, divided up into sections called Songs. You can design a complete live set this way, with all of the Presets you'll need set up in the right order. All you'll need to do is click the arrow for the next Preset and it will move you through the Playlist automatically.

To create a Playlist, click **+ Add Playlist** in the Sidebar, and give it a name in the pop-up box that opens. Later on, you can right-click on its name to rename, duplicate, delete, or export it. Inside the Playlist window, you can add new Songs and name them, or use the 3-dot menu to rename, save, export, or delete the Playlist. Then simply drag and drop Presets from the Explore window into the Playlist, and reorder them by dragging and dropping. Right-click on Songs or Presets for options like rename, copy, paste, delete, duplicate, and so on.

## 4.2. Search and Results

Click on the Search field at the top and enter any search term. The browser will filter your search in two ways: First, by matching letters in the Preset name. Then, if your search term is close to that of a [Type or Style \[p.30\]](#) it will include results fitting those tags as well.

The Results list beneath shows all Presets that fit your search. Click the X icon at right to clear your search terms.

**Explore**  Clear All

Types **Styles** Banks User

**GENRES**  
 Ambient Cinematic Downtempo  
 Experimental Game Audio  
 Hip Hop/Trap Modern Pop  
 Soul/R&B Soundtrack Trance

**STYLES**  
 Airy **Atmospheric** Bizarre Bright  
 Classic Complex Dark Deep  
 Harsh Huge Mellow Simple  
 Soft Soundscape Thin Warm

**CHARACTERISTICS**  
 Ensemble Evolving Filtered Gated  
 Granular Long Noise Reverb  
 Sample-based Sequence/Loop  
 Slow Attack Synth

♡	NAME	Ⓐ	TYPE	≡	BANK	↔
	Broken Record		Strings Pad		Factory	
♡	<b>Butterfly Effect</b>		Strings Pad		Factory	
♡	Dark Chocolate		Strings Pad		Factory	
	Dark Realism		Strings Pad		Factory	
	Del Mar	Ⓐ	Strings Pad		Factory	
	Ethereal Journey		Strings Pad		Factory	
	Soul Seeker		Strings Pad		Factory	
	Space Plucker		Strings Pad		Factory	

*Filter by typing text in the Search field*

The columns in the search results are as follows:

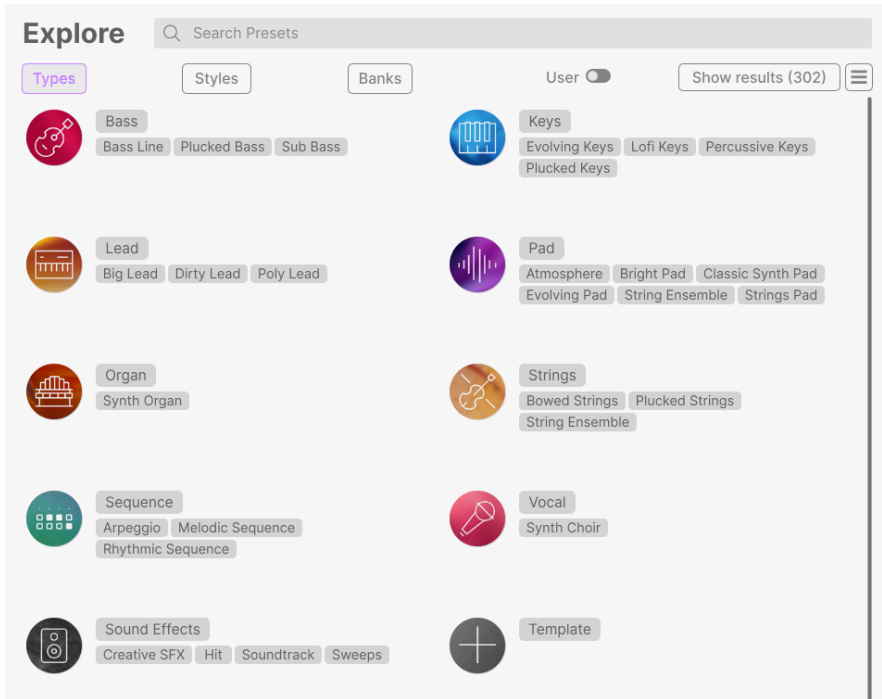
- **Likes:** Presets you have Liked will appear with a heart icon here. Click the heart icon to bring your liked Presets (that fulfill your current search criteria) to the top of the list.
- **NAME:** The Preset name. Click on NAME to order the list alphabetically by Name; click again to reverse the order.
- **Arturia logo:** Patches marked with the Arturia logo are featured sounds that we feel are worth special attention, especially for users new to Augmented STRINGS. Click on the logo icon to bring all those Presets (that fulfill your current search criteria) to the top of the list. Give them a try!
- **Type:** The Type/Subtype of Preset, which can be searched for (see below). Click TYPE to search by Type in alphabetical or reverse alphabetical order.
- **Designer/Bank:** Click the 3-line icon to change this column from Designer name to Bank name, according to whichever criterion you find most useful. Click on the word to sort alphabetically or reverse-alphabetically. Note the **User** switch above this column, which lets you isolate and search only for User Presets.
- **Shuffle:** This button randomizes the list order. Clicking it again removes the shuffle, and clicking again after that reshuffles the list in a different way.
- Finally, above the Shuffle icon, you'll see a number of Presets listed that satisfy the current search criteria. Next to that is an icon that can switch between a list view or Type icon view.

## 4.3. Using Tags as a Filter

You can narrow (and sometimes expand) your search using different tags. There are two kinds of tags: **Types** and **Styles**. You can filter by one, the other, or both.

### 4.3.1. Types

Types are categories of instruments and musical roles: Bowed Strings, Plucked Strings, String Ensemble, Bass, Keys, Lead, Organ, Pad, Sequence, Sound Effects, Template, and Vocal. With a clear search bar, click the **Types** button to bring up a list of types. Notice that most types also have one or more subtypes:



Click any one of them, and the results will show only Presets that match that tag. You can also select multiple Types using COMMAND-click (macOS) or CTRL-click (Windows). For example, if you aren't sure whether the Preset you're looking for was tagged with Keys or Pad, select both to broaden the search.

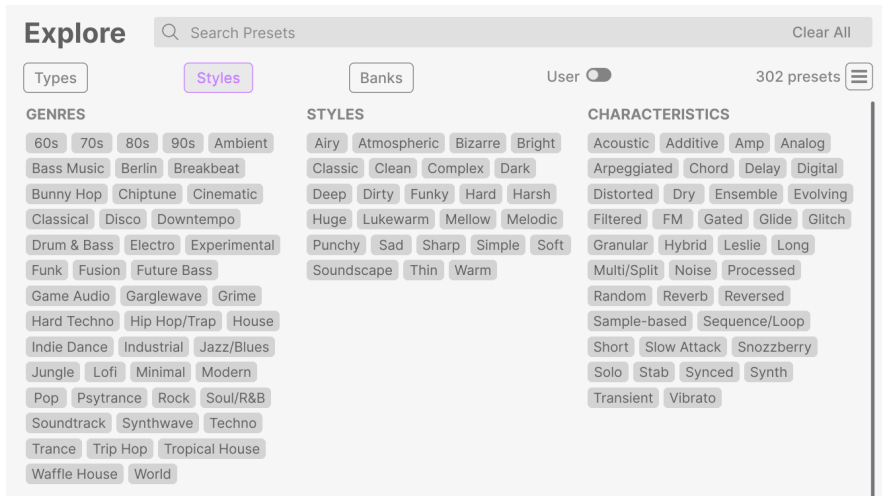
Results columns can be shown in reverse order by clicking the arrow buttons to the right of their titles (Name, Type, Designer).

### 4.3.2. Styles

Styles refine your search according to further musical attributes. Accessed by the **Styles** button, this area has three further subdivisions:

- **Genres:** Identifiable musical genres such as decades, Trance, Techno, Synthwave, Funk, etc.
- **Styles:** General “vibe” such as Atmospheric, Dirty, Clean, Complex, Mellow, etc.
- **Characteristics:** Sonic attributes such as Analog, Evolving, Distorted, Dry, Rise, etc.

Depending on your choice of view (the icon that shows either 3 lines or 4 boxes), you can see entire lists of styles without a list of results underneath...



...or you can view the results list, with the three style options shown as scrollable mini-menus.

**Explore**  Clear All

Types **Styles** Banks User  302 presets

**GENRES** 60s 70s 80s 90s Ambient Bass Music Berlin Breakbeat Bunny Hop Chiptune Cinematic Classical Disco Downtempo

**STYLES** Airy Atmospheric Bizarre Bright Classic Clean Complex Dark Deep Dirty Funky Hard Harsh Huge Lukewarm Mellow Melodic

**CHARACTERISTICS** Acoustic Additive Amp Analog Arpeggiated Chord Delay Digital Distorted Dry Ensemble Evolving Filtered FM Gated

♥ NAME ▾	Ⓐ TYPE	≡ DESIGNER	↔
Beautiful Swell	Ⓐ Bowed Strings	New Loops	
Impetuous	Ⓐ Plucked Strings	Gustavo Bravetti	
Dark Raises	Ⓐ Soundtrack	Gustavo Bravetti	
Speed Run	Ⓐ Arpeggio	Joerg Huettner	
Blue Universe	Ⓐ Bowed Strings	Victor Morello	
Deepening	Ⓐ Plucked Bass	Richard Veenstra	

Click on any tag to select it. Click again (or right-click) on any selected tag to de-select it. Notice that when you select a tag, several other tags usually disappear. This is because the browser is narrowing your search by a process of elimination. De-select any tag to remove that criterion and widen the search without having to start all over again.

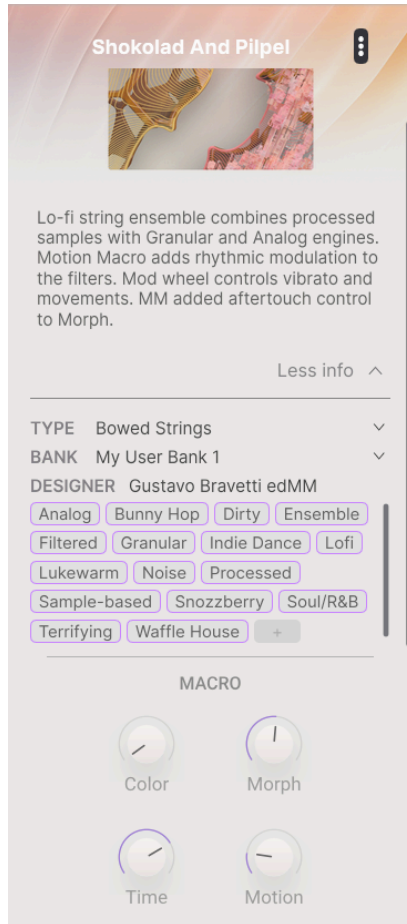
### 4.3.3. Banks

Next to the **Types** and **Styles** buttons is the **Banks** button, which lets you do your search (using all the methods above) within the Factory bank or User banks.

Use as many of the sorting and filtering features as you need and you will find the exact sound you want every time.

### 4.4. Preset Info Section

The right side of the browser window shows specific information about each Preset. The information for User Presets (but not Factory ones) may be changed here: Name, Type, Bank, Designer, and the various tags.



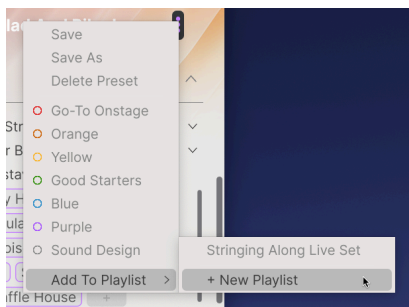
To make the desired changes, you can type in the text fields, use one of the pull-down menus to change the Bank, Type, and Designer, and click on Styles to remove them.

Types and Styles changes you make here are reflected in searches. For example, if you remove the “Cinematic” Genres tag and then save that Preset, it will not show up in future searches for Cinematic sounds.

Note that there is a + icon at the end of the tag list. If you click on that, it brings up a complete list of Style, Genre, and Characteristic tags. You can add new tags from this list, restore tags you accidentally removed... or click one of the + icons in this window to create your own tags for easier search filtering.



Clicking on the icon with 3 vertical colored dots at the top right provides you with a pull-down menu that lets you Save, Save As, add color labels, or add the Preset to a Playlist (or create a new one for it).



**i** The Save and Delete Preset options are not available for Factory Presets, which can't be overwritten or deleted. In that case, use the Save As option to create a User Preset that you can work with.

Finally, at the very bottom of the window are four Preset-related **Macro** knobs with their stored settings. You can play with these settings as you audition the patch and take notes.

### 4.4.1. Editing Info for Multiple Presets

If you'd like to move several Presets to a different bank while preparing for a performance, or enter a single comment for several Presets at the same time, it's easy to do. Simply hold command (macOS) or ctrl (Windows) and click the names of the Presets you want to change in the Results list. Then enter the comments, change the Bank or Type, etc., and save the Preset. By using the 3-vertical-blue-dot menu in the top right corner, you can also assign these one of the color codes or create/add to a playlist.

♥	NAME	Ⓐ	TYPE	☰	BANK	▼	↔
	Bass Legato		Bowed Strings		Factory		
⋮	Bass Pizz		Plucked Strings		Factory		
	Bass Pizzicato		Arpeggio		Factory		
	Bass to Cello Morph		Bowed Strings		Factory		
	Beautiful Swell	Ⓐ	Bowed Strings		Factory		
	Bent Stockholm		Classic Synth Pad		Factory		
	Betacam String Voices		Strings Pad		Factory		
	Blend		String Ensemble		Factory		
	Blue Jeans		Bowed Strings		Factory		
	Blue Universe	Ⓐ	Bowed Strings		Factory		

**i** If you want to alter the information for a Factory Preset you must first use the Save As command to re-save it as a User Preset. After this the Info section will gain Edit and Delete buttons at the bottom of the window.



## 5. THE MAIN PANEL



*The Main Page*

On the Main Panel, Augmented STRINGS has a very simple layout with eight Macro knobs. Seven knobs surround an eighth, oversized Morph control. These allow you to make changes to the sound very simply.

You can also access the deeper programming functions of Augmented STRINGS by clicking **Advanced** in the Upper Toolbar. This is covered in detail in the [Advanced Panel \[p.39\]](#) chapter.

Of the 8 controls, half of the Macros directly pertain to effects, whilst the remaining are designed to adjust various aspects of the sound. All Macros have the capacity to adjust several parameters at once.

## 5.1. Macro controls

### 5.1.1. Sound based controls



- **MORPH:** This oversized control allows you to morph from Layer A to Layer B and back. As part of this morphing, you can select up to 8 parameters, freely assignable between both Layers, to transform your sound even more as you turn the knob.
- **Color:** This Macro affects the color and harmonic content of the sound - in other words, the sound engine and filter parameters of each Layer. You can select up to 6 destinations to change the texture of your sound.
- **Time:** Changes the envelope of the Preset. Select up to 6 destinations to change the envelope parameters of each layer.
- **Motion** This Macro allows you to add movement to your sound. Select and assign up to 6 parameters from the Modulation and Arpeggiator Tabs.

### 5.1.2. Effects



With these Macro controls you can adjust the amount of effect added to your sound. Choose up to 4 parameters for each effect Macro.

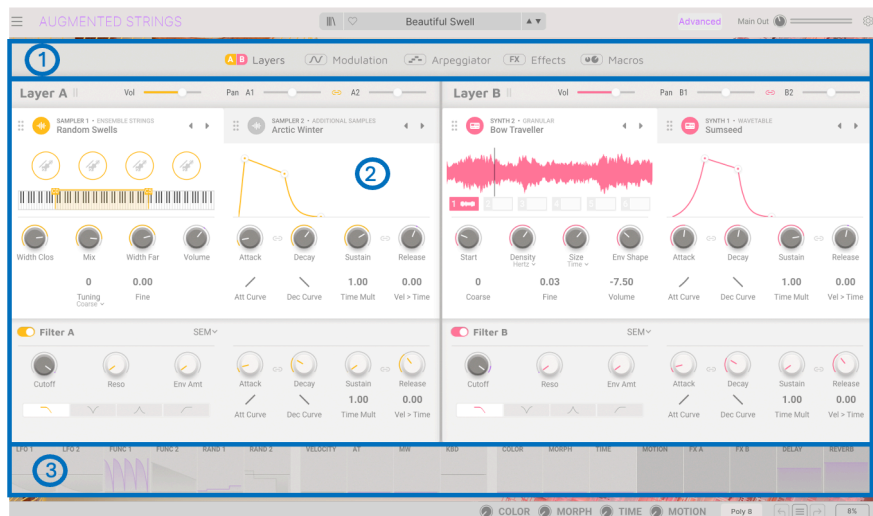
- **FX A:** This adjusts various parameters linked to the insert effect on Layer A.
- **FX B:** This adjusts various parameters linked to the insert effect on Layer B.
- **Delay:** Add movement to your sound with delay. This Macro can control any effect parameter on the Delay, including the wet/dry mix. Delay is an insert effect on the Master bus and the first FX in that chain.
- **Reverb:** Add space to your sound with reverb. This Macro can control any effect parameter on the Reverb, including the wet/dry mix. Reverb is an insert effect on the Master bus, which follows Delay in the FX chain.

### 5.2. Ready for the deep dive...

The Main Panel is deliberately designed to be quite simple. Assign MIDI controllers to these 8 knobs, and you can get through a whole lot of performing and tweaking without ever having to dive deeper. But to set up what those knobs actually *do* on every Preset, and craft your own sounds to enjoy and create music with, you'll be using the controls in the Advanced Panel, which we'll talk about next.

## 6. THE ADVANCED PANEL

Clicking the **Advanced** button in the Upper Toolbar opens the Advanced Panel, where you'll find all the controls for deep sound editing in Augmented STRINGS:



This panel can be divided into 3 parts:

- **1:** This navigation menu lets you choose from among the five Advanced pages: Layers, Modulation, Arpeggiator, Effects, and Macros.
- **2:** Here's where you'll find all of the parameters in any given Advanced page.
- **3:** These are scrolling displays of current modulator and Macro values. You can also use them to assign destinations to modulators and modify the amount sent to them.

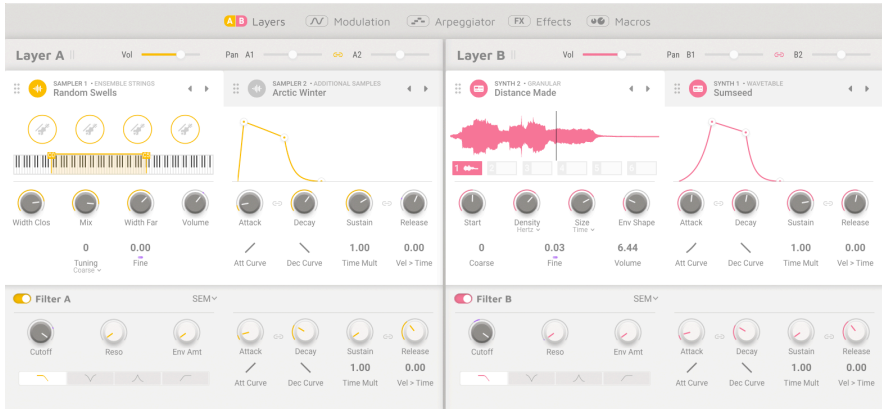


Note that while you're in Advanced mode, controls for the sound Macros appear in the Lower Toolbar.

At the top you can access 5 separate sections by clicking on the text.

- **Layers [p.40]:** deals with the Layer content, including engine selection and all associated parameters. This is where you'll find your VCA, Filter, and envelope for each Layer.
- **Modulation [p.58]:** accesses all of the available modulation options.
- **Arpeggiator [p.70]:** lets you modify your arpeggiation sequence of up to 16 steps.
- **Effects [p.73]:** accesses FX A and FX B, letting you select up to 2 Effects per slot plus parameters for the master Delay and Reverb.
- **Macros [p.95]:** lets you set up the four Macro controls of Color, Morph, Time, and Motion, as well as the four Effects Macros of FX A, FX B, Delay, and Reverb.

## 6.1. Layers



The Layers page is the beating heart of Augmented STRINGS. As you can see, the user interface is split into Layers A and B, and each Layer has two Parts for sound Engines, labeled A1, A2, B1, B2.

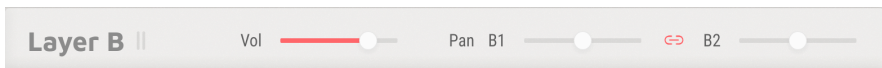
Each Preset has four Engines in all: Sampler 1, Sampler 2, Synth 1, and Synth 2. These can be dragged between Parts and Layers as desired.



Each part has a title tab with the following information and controls:

- The icon with six dots, at left, lets you click and drag the Engine to a different Part, including swapping them between Layers.
- The round icon can be clicked to deactivate that Part; the icon turns grey and the settings panel is greyed out.
- There are text labels to indicate which Engine you're working with, its subtype (e.g. a Bass Dizi Sampler or a Granular Synth), and the name of the program the engine is set to.
- Left and right arrows let you scroll through Programs for that Engine.

Above each Layer are Volume and Pan controls:



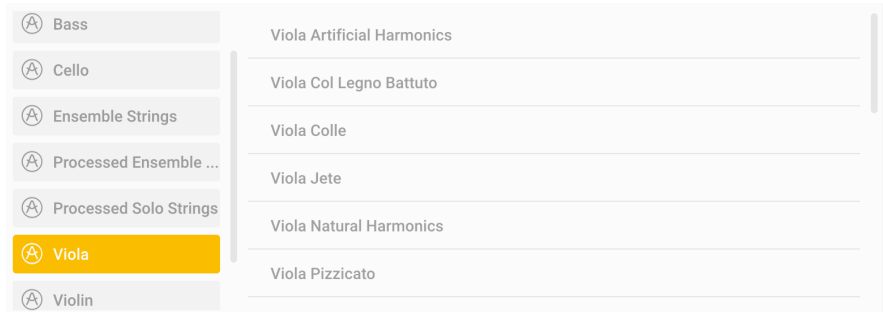
Each Part in a Layer can be panned independently from the other, or linked via the Link icon between the Pan sliders.

### 6.1.1.1. Sampler

This Engine is dedicated to sampled sound and contains beautifully multisampled sounds. Click the name of the Program in the title tab to switch between screens for sample selection and Engine controls.

#### 6.1.1.1.1. Sample selection

You can choose from Bass, Cello, Ensemble Strings, Viola, and Violin, as well as Processed Solo Strings, Processed Ensemble Strings, and Additional Samples – all from a pair of scrollable lists:



Augmented STRINGS provides a variety of samples from the four instruments found in a classical string section:

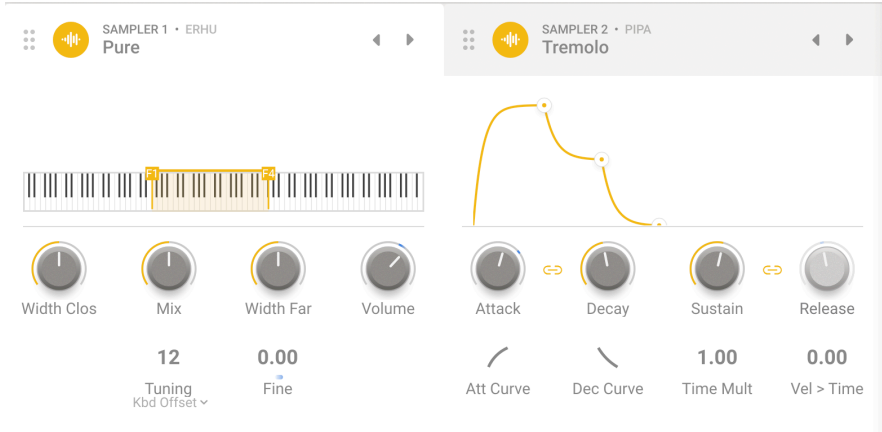
- The **Violin** is the highest-pitched of the bowed string instruments. It is tuned in fifths, G D A E from lowest to highest, and is the most commonly featured instrument for solo playing in a classical setting. It is played sitting or standing, tucked under the player's chin.
- The **Viola** is an instrument occupying the range between the violin and the cello. Traditionally its strings are tuned in fifths, C G D A from lowest to highest, one octave above the cello. Violas vary widely in scale length and shape, and are less well represented than the violin and cello in terms of music composed for them. Like the violin, it is played sitting or standing.
- The **Cello** is tuned in fifths, its four strings tuned C G D A from lowest to highest. It is played sitting down, braced against the floor and the player's legs.
- The **Bass** is the lowest voice in the traditional orchestra. Unlike its smaller siblings, it is tuned in fourths and traditionally has four strings tuned E A D G from low to high. Due to its very long scale length and large size, it is played standing up.

Some of the playing techniques represented here are:

- **Collé:** The player rests the bow on the string without moving it at first (the bow is often weighted). Moving the bow will produce a rough scratching attack.
- **Col Legno Battuto:** The bow is flipped upside down with the horsehair facing away from the strings, and the bow's wooden stick is used to strike the strings for a tonally rich percussive sound.
- **Jeté** or **Ricochet:** The player flicks the bow down upon the strings to make it bounce and produce a short series of notes.
- **Pizzicato:** The player plucks the strings with their fingers rather than using the bow, producing a short and percussive sound.
- **Spiccato:** The player bows very lightly, and the friction between the bow hair and the strings causes the bow to "bounce" ever so slightly as it moves across the strings. This creates a rapid series of notes with sharper attacks, with the combination of pitch and bow technique affecting how rapid the notes are.
- **Tip Spiccato:** Spiccato played with the very tip of the bow for a very percussive and thinner sound.
- **Staccato:** Notes are played with shortened lengths, with clear gaps between each note and the next. These are still played with the bow, so they have the usual string attack as opposed to more percussive techniques like spiccato or pizzicato.
- **Sustain:** Traditional playing with the bow drawn across the string to produce a steady tone.
- **Tremolo:** Rapid movement of the bow on the strings to produce a "trembling" effect of rapidly changing volume.
- **Harmonics:** The player bows while lightly resting a finger partway along the length of the string. This causes the string to vibrate as if it had a shorter length, producing clear and delicate tones. Harmonics can be *natural* (played on the string vibrating along its full length) or *artificial* (played on a string that is being fingered to produce a higher note).
- Many of these techniques are available in **Ghost** variants, meaning they are played on muted strings for a less distinct pitch and softer sound.
- The **Ensemble Strings** samples include various sets of combined sounds, some with randomized playing elements for a more varied sound.
- There is also a selection of **Processed Solo Strings**, **Processed Ensemble Strings**, and **Additional Samples** for unusual effects elements.

### 6.1.1.2. Sampler Engine Controls

The Sampler Engine provides the following controls:



First are controls relating to the two available recorded sounds for each sample. Each note or sound has been recorded with a mic close to the instrument, and a mic farther away for more ambient sound.

- **Width Clos:** controls the stereo width of the close-mic sound.
- **Mix:** balances the close and distant mic levels.
- **Width Far:** controls the stereo width of the far-mic sound.
- **Volume:** controls the overall level of the Sampler output.

Below these are two more controls related to the sample's tuning.

- **Tuning:** lets you alter the pitch of the sample playback in one of two ways, set by a pop-up menu for **Tuning Mode**.
  - **Coarse** lets you pitch-shift the sample by up to 24 semitones (2 octaves) sharp or flat.
  - **Kbd Offset** lets you shift the sample's playback range by a specific interval. Available intervals include a fourth, a fifth, one octave, an octave and a fourth, an octave and a fifth, or two octaves – either sharp or flat.

When you use Kbd Offset, the displayed range of the sample will shift in the keyboard diagram above the controls.

- **Fine:** lets you fine-tune the sample pitch by intervals of one cent (1/100 semitone).

An animated graphic shows the amount of fine tuning, with any pitch modulation reflected in its motion. Small variances in tuning can make a sampled instrument sound richer and more realistic.



## 6.1.2. Synth

The Synth "engine" is a collection of five different Engines, each designed to augment the Sampler with a wide variety of synthesized timbres.

Click the name of the Program in the title tab to switch between screens for Engine/Program selection and Engine controls.

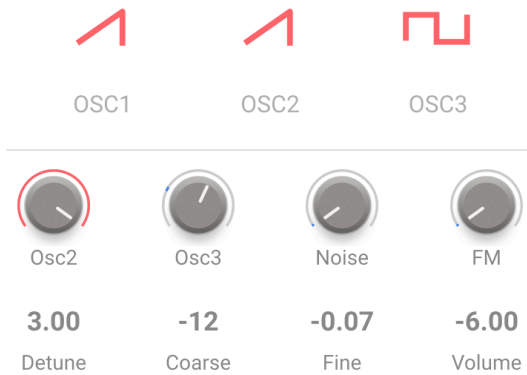
### 6.1.2.1. Synth Engine and Program selection

On this screen, you can choose among the five Synth Engines and a list of Programs for each one, all from a pair of scrollable lists:



Let's familiarize ourselves with the controls on these five very different and very capable Synth Engines.

### 6.1.2.2. Analog



#### *Analog*

The Analog Engine in Augmented STRINGS is a straightforward virtual analog synthesizer oscillator set, displaying the impeccable sonic quality that musicians have come to expect from Arturia.

- **OSC1, OSC2, OSC3:** set the waveforms for each of three oscillators. Click and drag to choose between sine, triangle, sawtooth, ramp (rising sawtooth), and square.
- **Osc2 and Osc3:** control the levels of OSC2 and OSC3 relative to OSC1. Range: -70.0 dB (muted) to 0.00 dB (unity gain).
- **Noise:** adjusts the level of the noise generator.
- **FM:** sets the amount of modulation coming from a source oscillator, affecting the frequency of OSC1 and/or OSC2.
- **Detune:** Sets the amount of detuning between unison voices. Range: 0.00 to 100.00 cents (1 semitone). The default value is 3.00 cents.
- **Coarse:** Adjusts the tuning of the oscillators in semitones. Range: 24 semitones (2 octaves) up or down
- **Fine:** Allows fine-tuning of the oscillators in cents. Range:  $\pm 1$  semitone (100 cents).
- **Volume:** Adjusts the output Volume of the overall sound. Range: -70 dB to +12 dB (default -6 dB)

### 6.1.2.3. Granular



#### Granular

Granular synthesis works by taking small pieces of a sample, called *grains*, and manipulating them to create complex textures. The viewer window displays the sample waveform with the Start time as a vertical line, and 6 sample slots as the basis for your sound.

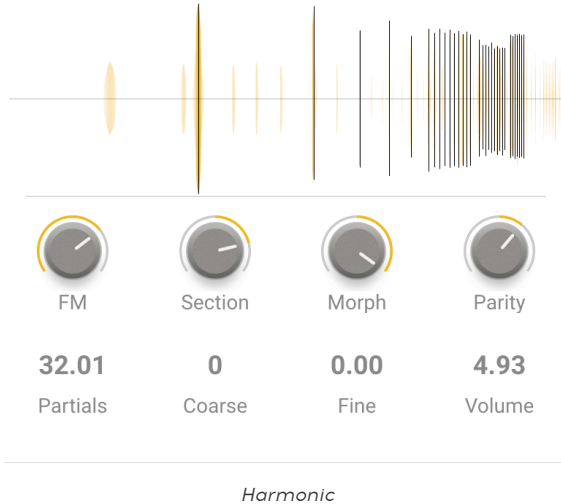


Some Granular Programs will only have one slot filled with a waveform, while others will have as many as six.

- **Start:** Determines the point at which the grain begins playback when triggered.
- **Density:** Sets how often grains are generated. Use the drop-down menu to specify how the grain generation rate is set:
  - **Hertz** (cycles per second, from 0.050 or 20 seconds per cycle all the way up to 250 Hz)
  - **Sync Straight, Sync Triplets, or Sync Dotted** (synchronized to the host software's tempo in bars, from 2 bars to 1/256 bar).
  - **Size:** Determines the size of each grain. The drop-down menu lets you select between
  - **Time** (1ms to one second)
  - **Sync (Straight, Triplets, or Dotted)** to host tempo in bars from 1/64 to 1/1
  - **Ratio** (a division of the current Density value that was calculated for the grain, from 1/16 to 4/1).
- **Env Shape:** Sets a window that alters the attack and release characteristics of the grains, which can produce results from "smooth" to "clicky." Range: 0.00 to 1.00 (default is 0.50)

- **Grain FX:** Adds frequency modulation to the pitch of the grains, creating more widely varying tonalities.
- **Coarse:** Adjusts the tuning of the oscillators in semitones. Range: 24 semitones (2 octaves) up or down.
- **Fine:** Allows fine-tuning of the oscillators in cents. Range:  $\pm 1$  semitone (100 cents).
- **Volume:** Adjusts the output Volume of the overall sound. Range: -70 dB to +12 dB (default -6 dB)

#### 6.1.2.4. Harmonic



Much of traditional synthesis is *subtractive* – that is, you start with a complex waveform full of harmonics and then filter out what you don’t want. *Additive* synthesis is the opposite: you add up individual sine waves (a pure sine wave has no harmonics) until you have a precise harmonic profile. This form of synthesis is excellent at producing clear and bright tones with lots of treble content.

Traditionally, additive synthesis is highly complex and detailed, but there are ways to simplify the process while retaining highly musical results. Augmented STRINGS lets you control a series of up to 512 harmonics via just a handful of settings.

The resulting spectrum is displayed in the Visualizer as it evolves over time, with the following controls below it:

- **FM:** Sets the amount of modulation coming from a source oscillator to the fundamental frequency of the harmonic oscillator. That leads to modulation of all of the harmonics in the series.
- **Section:** Sets a “window” in the harmonic series where the spectral filters (see Morph, below) will have an effect.

- **Morph:** Crossfades between 2 factory-programmed spectral filters that boost and cut parts of the harmonic series.



This parameter should not be confused with the main Morph knob!

- **Parity:** This changes the proportion of odd-numbered and even-numbered harmonics in the series, which have significantly different tonalities. With the Parity knob, you can dial in a mixture from all odd harmonics to all even harmonics, with any proportion in between.
- **Partials:** This control sets the number of partials in the harmonic series. The setting ranges from 1.00 (a sine wave) to 512, with a default at 256.



Experiment with this setting! You will discover that there are a lot of useful possibilities at both very small numbers (less than 64) and really large numbers (256 and higher), with the lower numbers having more identifiable components and the higher numbers offering a lot of treble 'sheen'.

- **Coarse:** Adjusts the tuning of the oscillators in semitones. Range: 24 semitones (2 octaves) up or down.
- **Fine:** Allows fine-tuning of the oscillators in cents. Range:  $\pm 1$  semitone (100 cents).
- **Volume:** Adjusts the output Volume of the overall sound. Range: -70 dB to +12 dB (default -6 dB)

### 6.1.2.5. Simpler

The screenshot displays the 'Simpler' control interface. At the top, there are three buttons: 'Key', 'Snap', and 'Loop'. Below them is a waveform visualization with a red signal and a grey shaded loop region. Under the waveform are six numbered buttons (1-6), with button 3 highlighted in red. Below the buttons are four control knobs and their corresponding values:

Start	Play Dir	Loop Dir	Loop Fade
0.45	-3	0.00	8.19
FM	Coarse	Fine	Volume

*In this example, the Start point, Play range, and Loop range (with Loop Fade) are all easy to see.*

The Simpler Engine is a streamlined sample playback engine that creates interesting textures with a lot of sonic character. Its samples are organized in the following categories: Drone, Field, Foley, Impact, Instrument, Noise, Pad, and SFX.



These categories are always given as the first part of any Simpler Program name (e.g. Foley - Glass Marimba), so you can quickly find what you're looking for by scrolling alphabetically through the Simpler Programs.

The Visualizer is an essential part of working with the Simpler Engine, as it allows easy interaction with how a sample plays back.

There are three buttons above the Visualizer:

- **Key:** When this is disabled, the keyboard will trigger samples without pitch shifting, i.e. always playing the same pitch. When enabled, the sample is played back at a pitch determined by the key being played. This option is global, and affects the different sample slots of the Preset.
- **Snap:** This helps you find zero crossing points when dragging the various sample markers, to help avoid clicks or pops at start or loop points. This option is global, and affects the different sample slots of the Preset.
- **Loop:** When enabled, the sample will contain a loop, which brings up two loop control parameters and adds loop controls to the Visualizer.

On the Visualizer, you can easily change the start and end position of the sample playback by moving the vertical markers with the arrows on top.

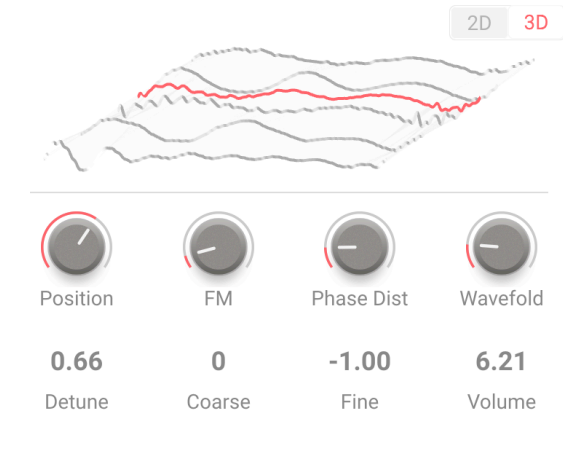
Likewise, when Loop is ON, you can easily change the start and end position of the loop by moving the vertical markers with the arrows at the bottom. The loop region is shaded in light grey so it's easy to see.

Below the Visualizer are Simpler's other parameters:

- **Start:** Sets the sample start position based on the Play head start position. In the picture above, the Play range has been restricted so the first part of the sample doesn't play back, and the Start point for playback is the black vertical line just after that.
- **Play Dir:** Lets you choose between Normal and Reverse, which plays the sample backwards.
- **Loop Dir (direction):** Lets you choose between Forward and Backward & Forward. This lets you repeat a sound as it loops, or create a loop that smoothly runs back and forth for more realistic sustain.
- **Loop Fade:** Sets the crossfade of the loop, to further smooth out transitions. In the picture above, the Loop Fades are shown as grey ramps on either side of the Loop markers.
- **FM:** Sets the amount of Frequency Modulation, just like in the [Granular \[p.46\]](#) synth.
- **Coarse:** Adjusts the tuning of the oscillators in semitones. Range: 24 semitones (2 octaves) up or down.

- **Fine:** Allows fine-tuning of the oscillators in cents. Range:  $\pm 1$  semitone (100 cents).
- **Volume:** Adjusts the output Volume of the overall sound. Range: -70 dB to +12 dB (default -6 dB)

#### 6.1.2.6. Wavetable



#### *Wavetable*

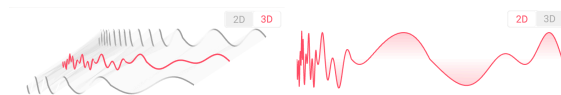
Wavetable synthesis offers a lot of interesting options that an ordinary oscillator can't deliver. First developed in the early years of digital synthesis as a way of creating complex and lively sounds from tiny amounts of sample memory, it has remained popular to the present day because of its unique tonality.

A *wavetable* is made up of several stored samples, each one of a single wave cycle. They can be slightly or radically different from one another. The stored waves are then placed at different points in a "table" that can be scanned as a note plays. As the table moves past one stored wave and goes to the next, the waveforms in between are calculated in real time, creating a smooth shift from one stored waveshape to the next one.

Because the wavetable can be scanned forward or backward using modulation, knob movements in real time, or Macros, the Wavetable Engine can produce a wide variety of radically evolving sounds.

The Wavetable Engine type contains a window that shows the wavetables in 2D or 3D, toggled by the buttons in the upper right corner.

Here are 2D and 3D views of a wave that's partway between a sawtooth and a square on a very simple wavetable:



*A snapshot of a wave in a wavetable in 3D (left) and 2D (right)*

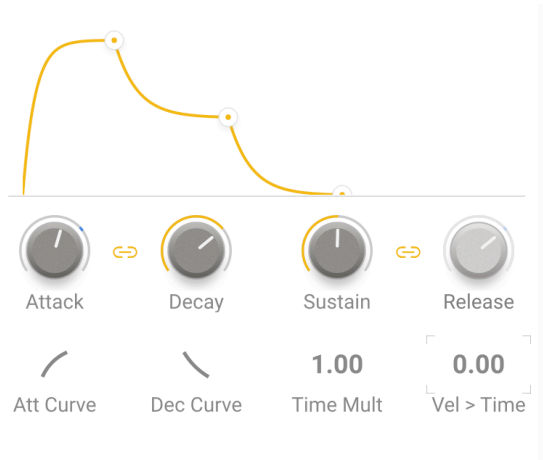
In 3D, the current wave (the red line) can be seen clearly as an "in-between" shape between the two waveforms on either end of the wavetable (the darker waveforms in the front and the back). The 2D display shows a more detailed view of the red waveform.

**i** HINT: This is much easier to see in action than describe. Open a Default Preset and set one of the Synths to Wavetable, then select the Program called Super Sine Sweeps (the one shown above). Watch the waveform in 2D and 3D as you play a note and manually turn the Position knob... you'll get the idea immediately!

- **Position:** Scans through the currently selected wavetable. This can also be selected by dragging the red waveform back and forth in the viewer window. It may be helpful to switch between the 2D and 3D renderings of the waveforms to gain a better idea of what you're hearing.
- **FM:** Adds Frequency Modulation to the wavetable.
- **Phase Distortion:** Phase distortion is a method of warping a source waveform by a modulator wave. As the Phase Distortion is turned up, the amplitude positions within the source waveform are shifted in time, creating a warping of the sound.
- **Wavefolding:** Wavefolding "folds over" the high and low parts of the waveform, creating a much more complex wave.
- **Detune:** Sets the amount of detuning between unison voices. Range: 0.00 to 100.00 cents (1 semitone). The default value is 3.00 cents.
- **Coarse:** Adjusts the tuning of the oscillators in semitones. Range: 24 semitones (2 octaves) up or down.
- **Fine:** Allows fine-tuning of the oscillators in cents. Range:  $\pm 1$  semitone (100 cents).
- **Volume:** Adjusts the output Volume of the overall sound. Range: -70 dB to +12 dB (default -6 dB)



### 6.1.3. Envelope Controls



Both the Sampler and Synth Engines have an ADSR amplitude envelope. You can click and drag envelope points, or dial them in (and set modulations for them) by hand.

- **Attack** sets the attack time from 0 to 20 seconds.
- **Decay** sets the decay time from 1 millisecond to 20 seconds.
- **Sustain** sets the sustain level while a key is held, from 0.00 to 1.00.
- **Release** sets the release time from 1 millisecond to 20 seconds.

**i** Click either of the link icons between the stages to make the Release stage follow the settings for the Decay stage, including its time and curve. When the link is not selected, Release has its own time knob and is set to a smooth logarithmic curve down to 0.

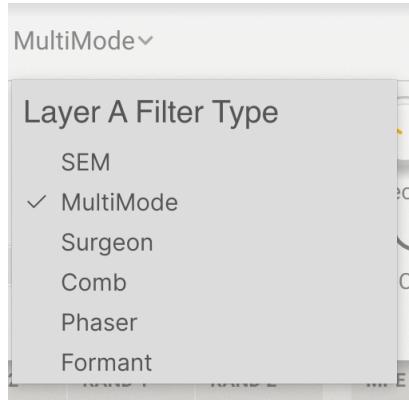
- **Att Curve** and **Dec Curve** let you control the envelope shape for the attack and decay. Drag the graphic up or down to change the shape from exponential to logarithmic; double-click to reset it to linear.

**i** Remember that double-clicking most parameters will reset them to their default values. You should memorize this handy shortcut immediately!

- **Time Mult** multiplies or divides the envelope times by a factor of 0.10 up to 10.00 (default is 1.00).
- **Vel > Time** adjusts the sensitivity of the attack and decay stages based on playing velocity. Turn it up for faster attack and decay for higher velocities. Values run from 0.00 to 1.00 (default is 0.00).

### 6.1.4. The Filter

Each of the two Layers has its own Filter for adjusting the frequency content of the sound created by the Engines.

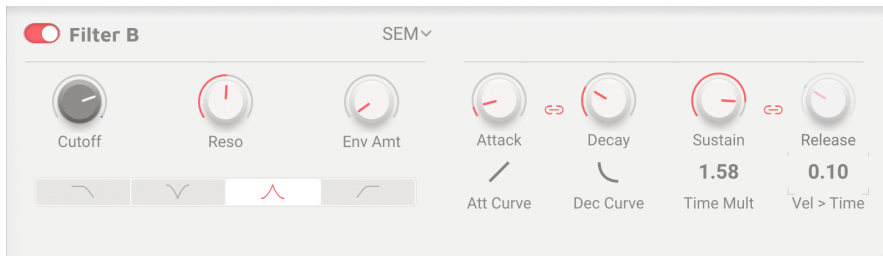


*Filter Types menu*

There are 6 types, selected by a drop-down menu and explained in detail below.

**i** Each filter other than the Formant has its own ADSR Filter Envelope. Aside from having no envelope shape visualizer, all of this envelope's controls and functions are identical to [those of the Amplitude Envelope \[p.52\]](#) described above.

#### 6.1.4.1. SEM

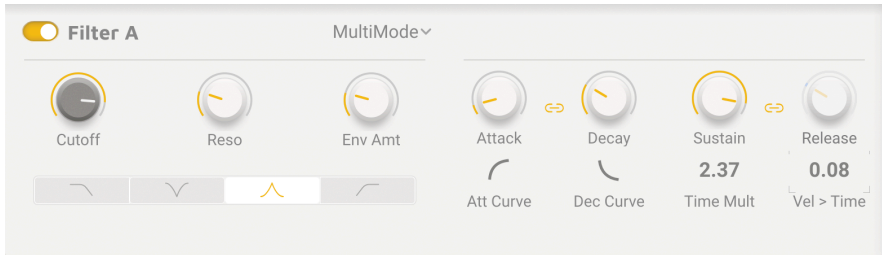


*SEM*

This Filter is based on the famous Oberheim state-variable filter circuit used in the iconic Synthesizer Expander Module (SEM). It has a gentle 12 dB/octave slope and a distinctive character.

- **Cutoff:** Sets the filter cutoff frequency, between 20 Hz and 20 kHz.
- **Resonance:** Sets the filter resonance or emphasis of the filter
- **Env Amt:** Adjusts the response of the Cutoff to the Filter Envelope.
- **Mode** buttons: Select low pass, notch, band pass, or high pass mode.

#### 6.1.4.2. MultiMode



*MultiMode*

This analog filter model is unique to Arturia. It has a more pronounced 24 dB/octave slope, and its controls are identical to those on the SEM:

- **Cutoff:** Sets the filter cutoff frequency, between 20 Hz and 20 kHz.
- **Resonance:** Sets the filter resonance or emphasis of the filter
- **Env Amt:** Adjusts the response of the Cutoff to the Filter Envelope.
- **Mode** buttons: Select low pass, notch, band pass, or high pass mode.

### 6.1.4.3. Surgeon

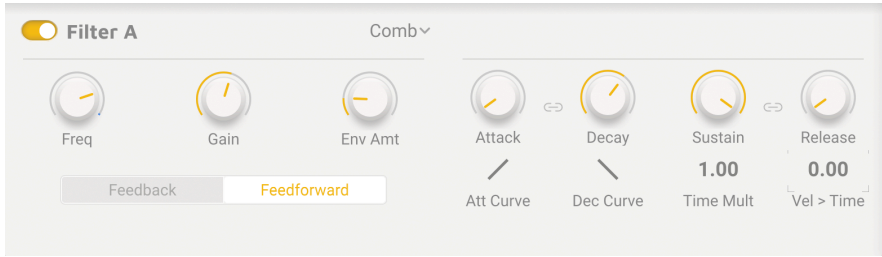


#### Surgeon

This is an extremely steep filter (64 dB/octave) with several Modes available.

- **Cutoff:** Sets the filter cutoff frequency, between 20 Hz and 20 kHz.
- **Spread:** Sets the bandwidth and depth of the filter effect when in notch or band pass mode. Higher values give a shallower, broader effect, and lower values produce a steep and narrow peak or notch. This control is greyed out and has no effect in low pass or high pass mode.
- **Env Amt:** Adjusts the response of the Cutoff to the Filter Envelope.
- **Mode** buttons: Select low pass, notch, band pass, or high pass mode.

#### 6.1.4.4. Comb

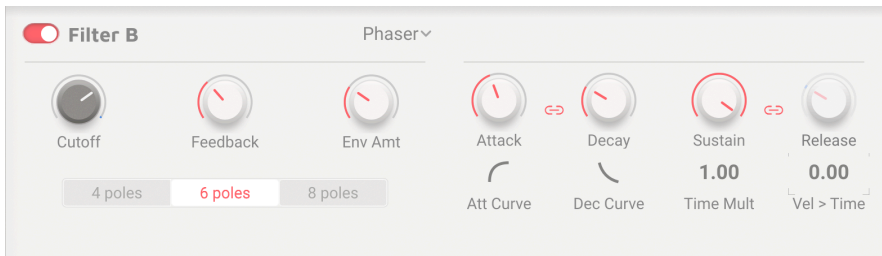


Comb

A *comb filter* is created by adding a delayed version of the input signal to itself, which results in a series of reinforced and cancelled harmonics that are heard as peaks and notches in the frequency response. The most common application for a comb filter is the *flanger*, which modulates the delay time to cause the peaks and notches to move. (This can be easily done here by modulating the Frequency control.) The Comb filter also includes a switch to send the delayed signal back to the input (feedback) or directly to the output (feedforward).

- **Frequency:** Sets the frequency range of the peaks and notches. Higher frequencies result from shorter delay times.
- **Gain:** Emphasizes the strength of the peaks and notches.
- **Env Amt:** Adjusts the response of the Frequency to the Filter Envelope.
- **Feedback / Feedforward:** Selects whether the delayed signal is fed back into the comb filter's input or forward into its output. This choice can create radically different tonalities depending on the other settings.

#### 6.1.4.5. Phaser Filter



Phaser

A phaser uses a set of all-pass filters on an input signal. These filters don't change the input's frequency content, but they do alter its phase, resulting in a series of peaks and notches like those of a comb filter but with a very different, almost "liquid" sonic character. As with the Comb Filter, modulate the Cutoff to create movement in the frequency peaks and notches.

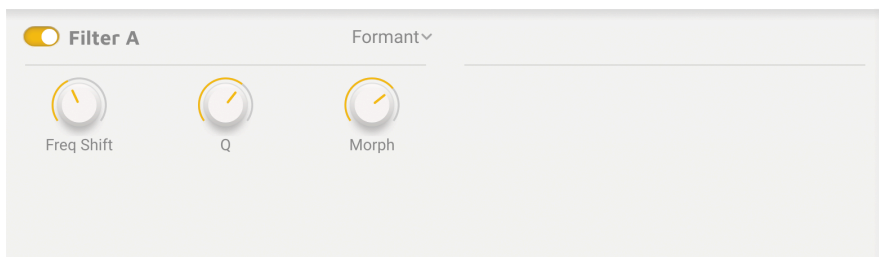
- **Cutoff:** Sets the frequency range of the peaks and notches.

- **Feedback:** Emphasizes the strength of the peaks and notches.
- **Env Amt:** Adjusts the response of the Cutoff to the Filter Envelope.
- **Poles** buttons: Select the number of *poles* (all pass filters) in the phaser. Each pair of poles produces one frequency notch, so the choice of 4, 6, or 8 poles gives you 1, 2, or 3 notches. This has a drastic effect on timbre, and is worth experimenting with carefully.



There is a much more powerful [Phaser \[p.82\]](#) in the [Layer FX \[p.74\]](#) discussed later on.

#### 6.1.4.6. Formant



*Formant*

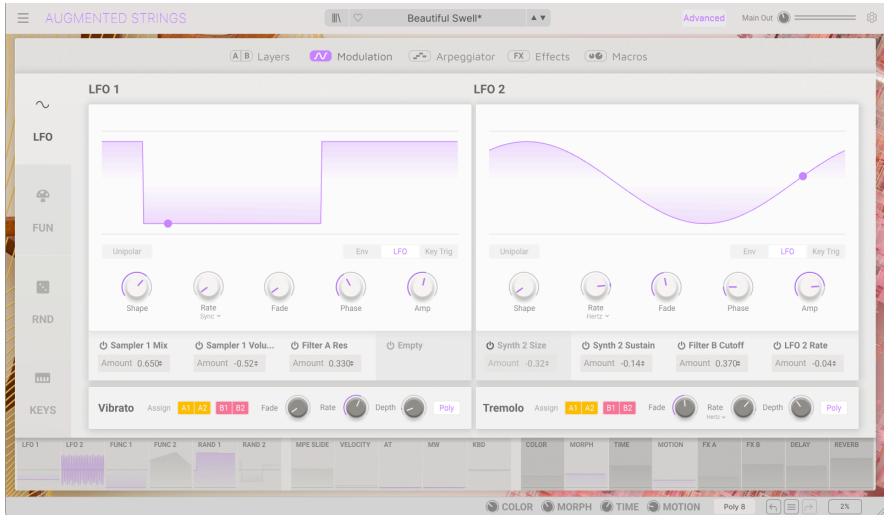
Human voices are recognizable as male, female, young, old, etc., thanks to fixed frequencies called *formants*. The Formant filter allows you to generate and modify a wide range of "vowel" sounds and then apply them to the input signal.

- **Freq Shift:** Sets the frequency range of the formant effect.
- **Q:** Emphasizes the strength of the resonant peaks.
- **Morph:** Shifts between different vowel sounds. This is a fun control to modulate!



This is the only Filter that has no Envelope.

## 6.2. Modulation



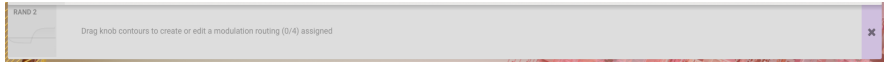
Augmented STRINGS offers a huge number of modulation options. These can be seen in the horizontal **Modulation Strip** below every Advanced page. Not only do the individual blocks in the Modulation Strip act as a visual display of what each source is doing in real time, but they can also be used to set up modulation routings.



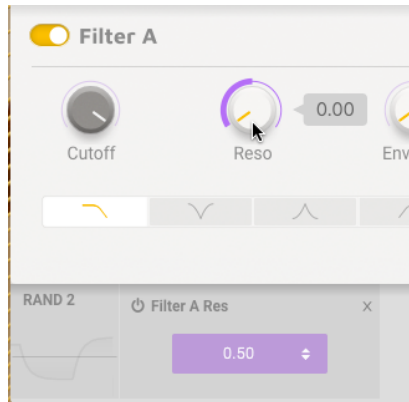
We'll start by explaining the two most direct ways to set up a modulation routing. Then we'll go through the Modulation subpages and explain the four types of modulators provided there: LFO (Low Frequency Oscillator), FUN (Function), RND (Random), and KEYS (Keyboard).

## 6.2.1. Assigning a modulation directly from the Modulation Strip

To assign a modulation routing from the Modulation Strip to a relevant parameter, follow these steps:



1. Click on the modulator you want to use in the Modulation Strip. It will show a list of all of the currently assigned modulation destinations, along with how many modulations are already used. Text messages in the box can help guide you on what to do next.



2. Hover your mouse over the ring surrounding the parameter knob you wish to modulate. Your cursor becomes an up/down arrow. Drag the cursor to set the range of the control, which will be shown as a thicker line. The amount of modulation will be shown in the Modulation Strip.

When you click away from the control, you will now see the ring around the knob reflecting the modulation setting.

To remove the modulation routing, select the modulator in the Modulation Strip to bring up its current assignments, and click the **X** on the one you want to remove.



## 6.2.2. Assigning a modulation from a parameter

To assign a modulation routing starting with the relevant parameter, follow these steps:

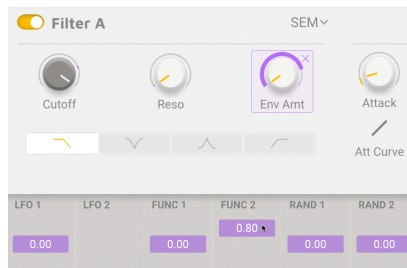
Hover your mouse over or near a parameter control, and a + symbol will appear. If you click on that symbol, the control will be surrounded by a colored box. (You can close the box without setting anything by clicking the X.)



Once you've done this, the Modulation Strip will show current modulation amounts for all modulation sources that are eligible to control that parameter. (For example, you can't use the FX A Macro knob to control anything that isn't part of FX A.)

Each eligible source will have a colored box inside it showing the current modulation amount.

Click and drag that box up or down to set the relevant modulation amount; it will be reflected in the ring around the knob.



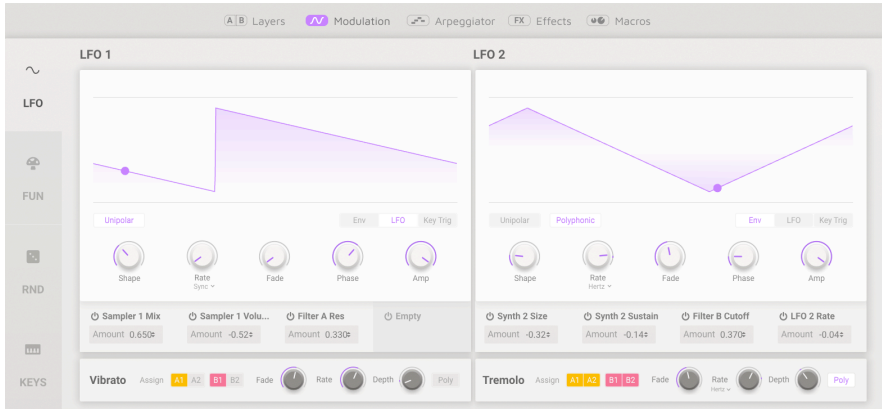
Click away from the parameter knob and you will see its ring showing the set modulation.

If you hover your mouse over any given parameter, the modulator display boxes in the Modulation Strip will turn different shades of grey:



- Light grey: this parameter has already been assigned to this modulator
- Medium grey: this parameter has not yet been assigned to this modulator, but could be if you wish
- Dark grey: you're not allowed to use this modulator on this parameter

## 6.2.3. LFO



The two LFOs (Low Frequency Oscillators) provide a source of repeating modulation for a variety of purposes. **LFO 1** and **LFO 2** are identical in their function sets, and offer the following controls underneath their Visualizers:

Clicking the **Unipolar** button causes the LFO to only send values above 0. Otherwise the LFO is *bipolar*, with values alternating above and below 0 (the start/endpoint). The shading of the Visualizer background subtly indicates whether unipolar or bipolar behavior is selected.

- Then there are the **Trigger Mode** buttons:
  - **Env** turns the LFO into a single-cycle envelope triggered when you press a key.
  - **LFO** is conventional free-running LFO behavior.
  - **Key Trig** causes the LFO to retrigger with every keypress.

Envelopes and Key Trig settings can be *monophonic* (any keypress causes the LFO to retrigger for all notes already held down) or *polyphonic* (new keypresses don't affect currently held notes). Select polyphonic triggering with the **Polyphonic** button.

The five parameter knobs are:

- **Shape**: selects the waveshape: Sine, Triangle, Saw, Ramp (rising saw), Square, SnH (Sample and Hold, a continuously changing random value), and Smooth SnH (sample and hold with more gentle transitions between values as they change).
- **Rate**: sets the LFO rate. A drop-down menu lets you select how (or if) the FUN is synchronized to your DAW:
  - **Hertz**: cycles per second, not tied to any sync clock. The rate range is 0.010 Hz (one cycle per 100 seconds) to 200 Hz.
  - **Sync**: time divisions indicated in bars and beats, from 8/1 dotted to 1/32 triplet.
  - **Sync Straight**: time divisions indicated in note lengths, from 8 whole notes to 1/32 note.
  - **Sync Triplets**: as above but in triplet values.
  - **Sync Dotted**: as above but in dotted values.



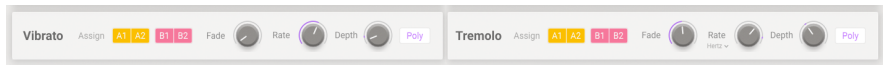
Splitting up the available sync options this way makes it much easier to find a particular sync value in the wide range covered by the knob.

- **Fade:** allows a slow fade-in of the LFO to its set amplitude after a key trigger. Range: 1 ms to 10 seconds.
- **Phase:** changes the phase of the waveform with respect to the cycle start. For example, the Square wave starts high and goes low, but changing the phase by  $180^\circ$  changes that to starting low and going high. The control has a full range of  $0^\circ$  to  $360^\circ$ .

Underneath these parameters, the current modulation routings for the LFO are displayed. Each has its own Amount display, with a range from -1.00 to 1.00. Double click the amount to set it to 0, and use the power buttons to temporarily turn off modulation routings without otherwise harming them.

### 6.2.3.1. Vibrato and Tremolo

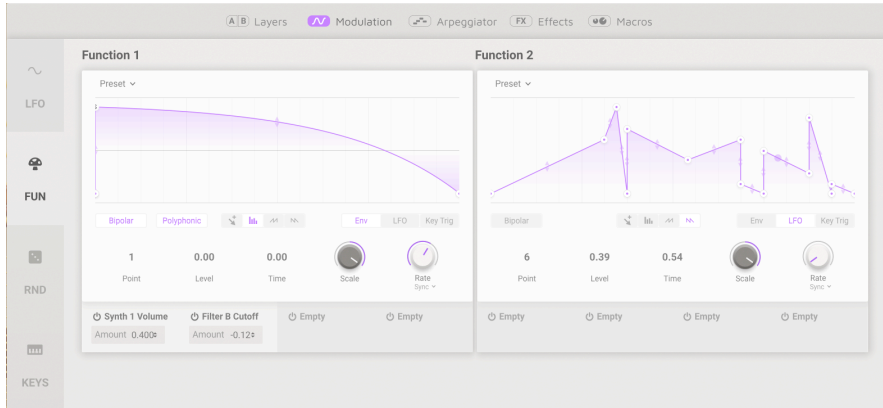
Augmented STRINGS also has two highly simplified LFOs that can handle common and basic tasks without wasting one of the full-featured LFOs. Both can be assigned to any or all Parts in both Layers, and both offer only a sine waveform and no tempo sync for their rates.



- **Fade:** Applies an adjustable fade-in each time a voice is triggered. Range: 1 ms to 10 seconds.
- **Rate:** Sets the speed of the Vibrato or Tremolo in Hz. Range: 0.010 Hz (one cycle per 100 seconds) to 200 Hz.
- **Depth:** Sets the amount of the Vibrato or Tremolo.
- When the **Poly** button is pressed, each voice gets its own independent Vibrato or Tremolo wave cycle start, as opposed to retriggering for all held notes whenever a new note is played.

## 6.2.4. FUN

Augmented STRINGS has two Functions available as modulation sources. These are similar to LFOs but have a user-defined waveshape.



FUN parameters are as follows:

Clicking the **Bipolar** button causes the LFO to send *bipolar* control values, which can have values above and below 0 (the start/endpoint). Otherwise the LFO is *unipolar*, with values only above 0. The position of a horizontal 0 reference line, and shading of the Visualizer background, both indicate whether unipolar or bipolar behavior is selected.

- The **Trigger Mode** buttons are identical to those on the LFO:
  - **Env** turns the FUN into a single-cycle envelope triggered when you press a key.
  - **LFO** is conventional free-running LFO behavior.
  - **Key Trig** causes the FUN to retrigger with every keypress.

Envelopes and Key Trig settings can be *monophonic* (any keypress causes the LFO to retrigger for all notes already held down) or *polyphonic* (new keypresses don't affect currently held notes). Select polyphonic triggering with the **Polyphonic** button.

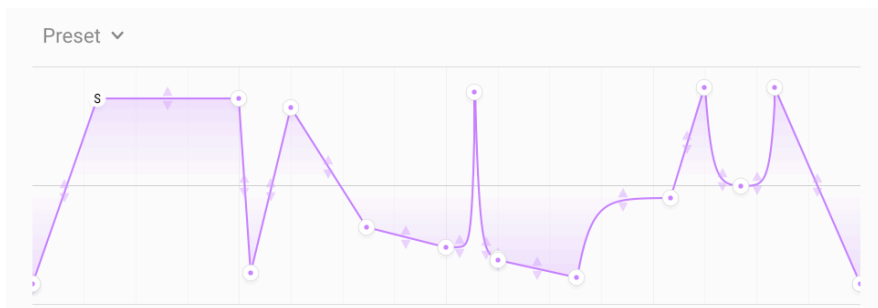
- **Scale**: lets you quickly scale the FUN to an appropriate amplitude. Turning this knob will make the curve grow, shrink, or invert. (Modulate it for some real craziness!)
- **Rate**: sets the rate at which the FUN cycles. As with the LFO, a drop-down menu lets you select how (or if) the FUN is synchronized to your DAW:
  - **Hertz**: cycles per second, not tied to any sync clock. The rate range is 0.010 Hz (one cycle per 100 seconds) to 200 Hz.
  - **Sync**: time divisions indicated in bars and beats, from 8/1 dotted to 1/32 triplet.
  - **Sync Straight**: time divisions indicated in note lengths, from 8 whole notes to 1/32 note.
  - **Sync Triplets**: as above but in triplet values.
  - **Sync Dotted**: as above but in dotted values.

The **Point**, **Level**, and **Time** settings all relate to individual points on the FUN curve:

- **Point:** is the point on the curve currently selected.
- **Level:** is the amplitude of the selected point.
- **Time:** is where in the cycle the point appears, with 0.00 being the start and 1.00 being the end.

#### 6.2.4.1. The Function Visualizer

The **Function Visualizer** is a graphical representation of the Function's behavior. The waveform or envelope shape can be changed directly with the mouse according to various Draw Modes, and individual stages can be altered at will.



The FUN can be shaped to taste using the mouse. Click and drag any of the white *breakpoints* to move it and reshape the wave; click anywhere on the curve to add another breakpoint. Right click on a breakpoint to delete it.

**i** Up to 64 breakpoints can be specified. All of them can be moved vertically or horizontally, with two limitations: the first breakpoint is locked to the start of the Function (the left edge of the display) and you can't move one breakpoint past another one in time (forward or backward).

A pair of vertical arrows appears in the middle of the curve between each pair of breakpoints; click and drag up and down to reshape the curve itself.

You can click and drag the Level and Time values for a point, if you wish to make precise settings. Note that the first and last points will always be at the same level so the waveform or envelope starts and stops at the same place.

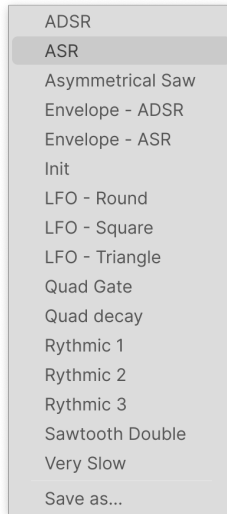
When you select **Env** mode, one stage is designated as Sustain and is shown with an **S** in its breakpoint.

The **Draw Mode** buttons let you quickly choose between four ways of drawing the FUN curve.

The first button operates as described above; the other three buttons let you quickly draw in periodic waveforms, with 16 levels per cycle, simply by drawing a line from left to right with the cursor. Your choices are square (Steps), upward sawtooth (Ramp Up), or downward sawtooth (Ramp Down). This is a great way to create rhythmic pulses or other shapes that follow your song's tempo.

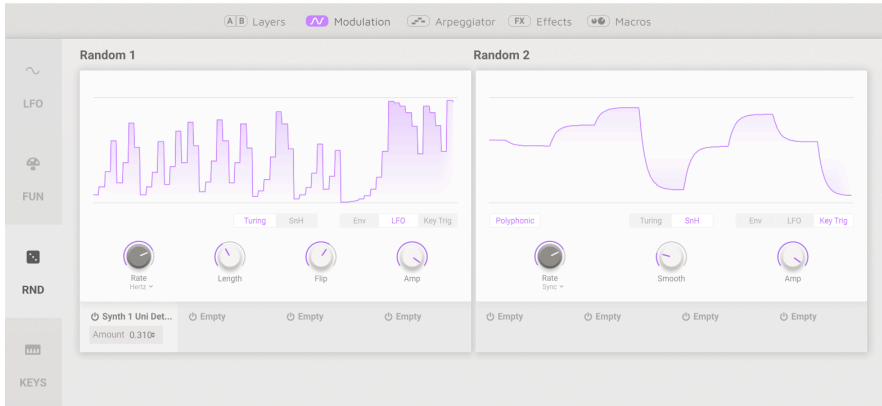
Once that's done, you can return to the first Draw Mode and edit each step by hand as usual.

If you want inspiration, check out the drop-down menu of Preset shapes in the top left corner:



This menu also gives you the option of saving a curve you've created for later use in other Presets.

## 6.2.5. RND



There are many applications where adding a bit of random variation can spice up a sound. The Random Modulator is designed to help you do that easily. It has a very wide rate range like the other modulators, making it capable of generating “noise” control signals in the audio range.

Augmented STRINGS comes with two Random modulators. Each Randomizer works as one of two types:

- **Turing** is named for the code-breaking mathematician Alan Turing. It creates “controlled chaos” as a modulation output.
- **SnH**: This is the common randomizer based on Sample and Hold that will be familiar to most electronic musicians.

The two types have many identical controls:

- The **Polyphonic** button creates new cycles for each note played. When it's turned off, the RND will retrigger on every keypress.
- The **Trigger Mode** buttons are identical to those we've seen on the LFO and FUN:
  - **Env** turns the RND into a single-cycle envelope triggered when you press a key.
  - **LFO** is conventional free-running LFO behavior.
  - **Key Trig** causes the RND to retrigger with every keypress. However, in Turing mode, legato playing will not retrigger, even with the **Polyphonic** button pressed.

- **Rate:** sets the rate at which the RND cycles. As with the LFO and FUN, a drop-down menu lets you select how (or if) the RND is synchronized to your DAW:
  - **Hertz:** cycles per second, not tied to any sync clock. The rate range is 0.010 Hz (one cycle per 100 seconds) to 200 Hz.
  - **Sync:** time divisions indicated in bars and beats, from 8/1 dotted to 1/32 triplet.
  - **Sync Straight:** time divisions indicated in note lengths, from 8 whole notes to 1/32 note.
  - **Sync Triplets:** as above but in triplet values.
  - **Sync Dotted:** as above but in dotted values.
- **Amp:** Sets the overall modulation output of the RND.

Turing Mode has controls for

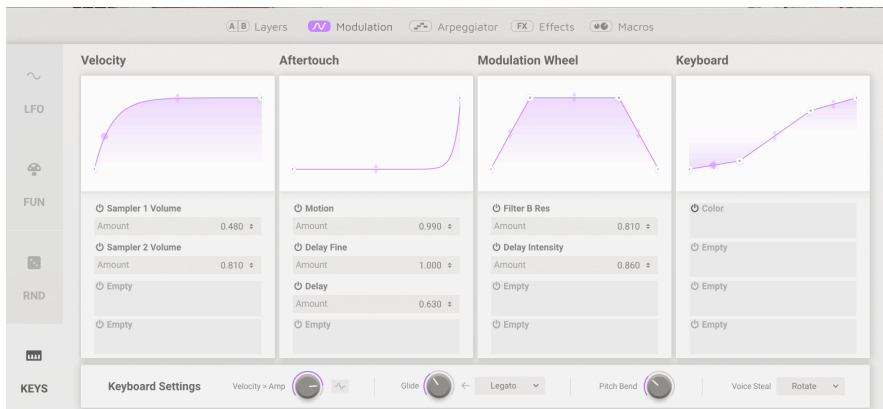
- **Length:** Sets the length of the sequence of modulation peaks.
- **Flip:** Adjusts the probability of modulation peaks being inverted.

SnH mode has a control called **Smooth**, which smooths the transitions between the modulation peaks. Setting Smooth to 0 will create the familiar random waveform with abrupt level changes.

as with the LFO and FUN, 4 modulation destination slots are displayed under each RND.

## 6.2.6. KEYS

Some of the most common modulations you'll want to perform are linked to the keyboard and its functions. The **KEYS** page offers four common keyboard modulations, via four windows: **Velocity**, **Aftertouch**, **Modulation Wheel**, and **Keyboard Tracking**. Each window has identical features and functions.



Each window has its own Visualizer, similar to the [Function Visualizer \[p.64\]](#). Up to four breakpoints can be placed by clicking with the mouse (right-click to remove a breakpoint), and they can be dragged to appropriate positions, with the small up/down arrows to change the curves between them.





NOTE: The breakpoints at the low and high ends of the curve can be moved vertically but not removed. After all, a modulation signal has to start and end *somewhere*, right?

Up to four modulation destinations can be set for each window, each with its own positive or negative Amount.

The four windows are:

### **6.2.6.1. Velocity**

This window tailors the chosen destinations' response to how hard you play the keyboard. In the example shown above, the velocity curve has been set to get louder more quickly at lower velocities, then slowly level out to a maximum output value that is slightly below the full range of MIDI velocity. You might use this to tame the response of a keyboard whose behavior at higher velocities isn't very smooth.

### **6.2.6.2. Aftertouch**

This window tailors the chosen Destinations' response to how hard you press into the keybed after playing a note. Keyboards' aftertouch response can vary widely from product to product, so getting a certain keyboard to play the way you want it to can be quite challenging - unless of course you have this window. Here, an overly-sensitive aftertouch response has been "dumbed down" to something more like an on/off switch: there is no response until the player presses hard, then it rises quickly to maximum just a bit before it would normally get there.

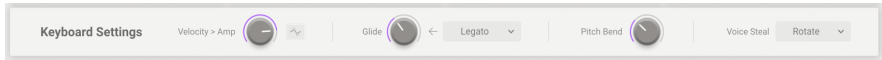
### **6.2.6.3. Mod Wheel**

The modulation wheel is the one hands-on controller that's closest to your hands when you play. It's good for gradual or set-and-forget modulations that aren't appropriate for the keyboard. Augmented STRINGS has MIDI mod wheel data (Control Change 1) as an assignable source. In this example, the mod wheel changes the Delay Intensity and Filter B Resonance quickly from zero to near maximum, then through a "dead zone" where the wheel doesn't change anything, and then a decrease back down to zero. This way, one movement of the wheel lets you sweep in and out of a "zone" of powerful feedback and resonance.

### **6.2.6.4. Keyboard Tracking**

Keyboard tracking is how a modulation responds to whether the note you're playing is high or low. This is most common in adding brightness to notes that are higher on the keyboard. When keyboard tracking is 100%, then a self-oscillating VCF's resonant tone will be pitch-accurate as you play. This window gives you the opportunity to finely tailor how your modulation is affected across the keyboard.

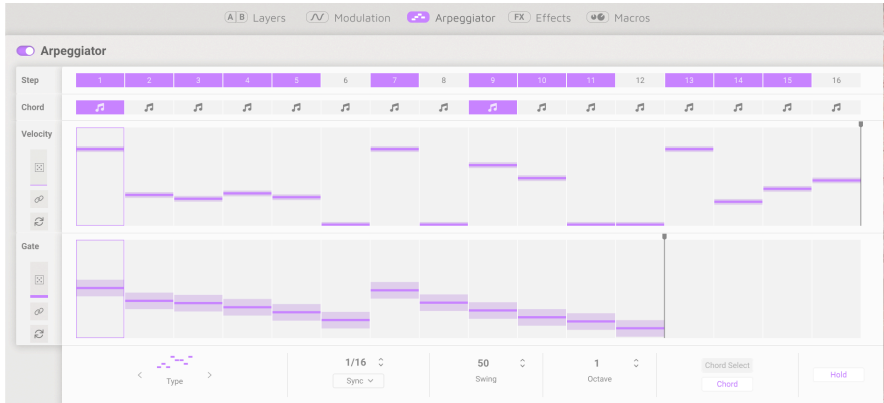
## 6.2.6.5. Keyboard Settings



The bottom of the KEYS page has some global settings for how Augmented STRINGS reacts to keyboard playing.

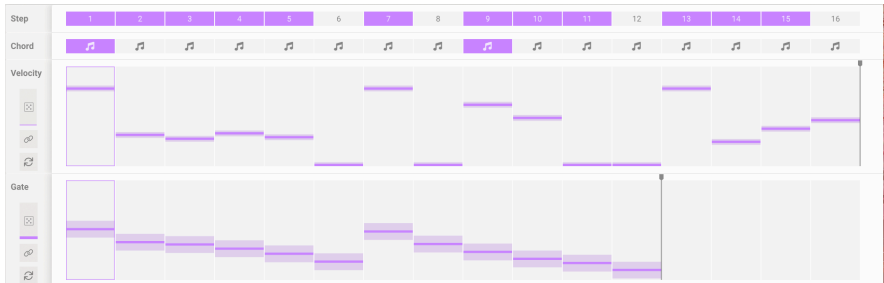
- **Velocity > Amp:** This quick routing maps velocity directly to VCA output volume (both Layers).
  - **Curve Switch:** When engaged, the velocity curve described in the previous Step is applied to Velocity > Amp.
- **Glide:** Sets the amount of glide time between notes.
  - **Glide Mode:**
  - **Portamento:** Glide always happens given any Glide knob setting above zero.
  - **Legato:** Glide only happens to notes played without fully releasing the keys.
- **Pitch Bend:** Determines the pitch-bend range in semitones, up to  $\pm 36$  semitones (3 octaves).
- **Voice Steal:** Determines how voices are reallocated if more keys are pressed than the Polyphony setting allows.
  - **Reassign:** The voice that was triggered earliest is reassigned to the next keypress when needed.
  - **Rotate:** Every new note played triggers the next available voice, even if the voice limit has not been reached.

## 6.3. Arpeggiator



The Augmented STRINGS Arpeggiator can operate just like the ones in many synthesizers, but its added features give it scope and creative breadth beyond the usual functions. Take control of pattern lengths, chord triggering and chord shapes, unusual timings, randomization, and more!

### 6.3.1. Step Controls



The Step Controls set the behavior of the Arpeggiator when it plays. There are up to 16 steps available in the arpeggiation, and each one has values for the following parameters:

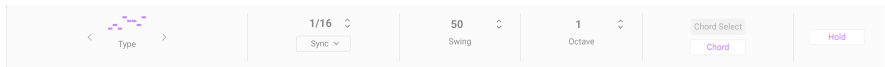
- **Step:** Chooses whether the corresponding step is active or silent. Click a numbered box to activate or deactivate that step.
- **Chord:** Any step selected in this row will play a chord when it's reached. It can be the notes you're holding, or a preselected chord shape created with the Chord Select pop-up.
- **Velocity Bars:** Set the velocity of the note sounded at each step. Simply drag over them to set them.

- **Gate Bars:** Set the gate length or “window” for each step. Gate lengths range from 5% of the step length (a very short pulse) through 100% (the note holds for the entire step) to 400% (the note holds for four steps). This allows for complex legato behavior in interesting ways.

On the left panel are three controls to control overall behavior of the Velocity and Gate steps:

- **Randomize:** Adds random variation to Velocity or Gate. Drag up or down on the dice icon to control the amount of variation, which will be displayed as a shaded bar above and below the set value in each step.
- **Polyrhythm:** When the link icon is turned off, the Velocity and Gate rows can have different step lengths (set with the vertical black bars at right, which can be dragged by clicking on the black square at the top of the bar). When the link icon is turned on, the two sets of steps have identical lengths.
- **Reset:** Clicking this icon will reset either the Velocity or Gate row to its default state.

### 6.3.2. Playback Controls



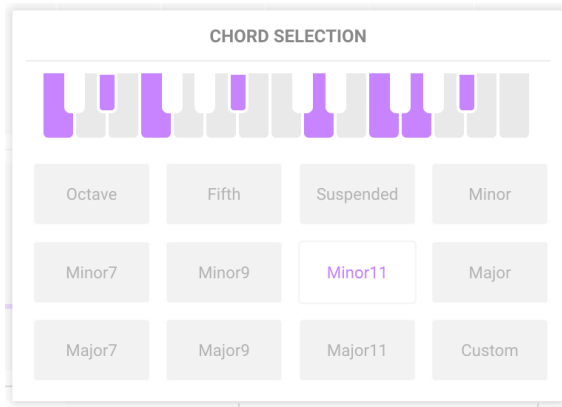
On the bottom of the Arpeggiator page you can select how the chosen notes and Step settings will play back.

- **Mode:** How the arpeggiator processes held keys: Up, Down, Up/Down Exc, Up/Down In, Random, or As played.

**i** For decades, hardware synth arpeggiators handled “Up And Down” in one of two ways: Up/Down Exclusive (where a C Major triad would play C E G E C E G E C) or Up/Down Inclusive (where a C Major triad would play C E G G E C E G G E C). Wars have been fought over which version was “correct”... but here you have *both* options, so you don’t have to take sides!

- **Division:** Note length for each step, set by clock tempo or host bars/beats.
- **Rate Type:** A drop-down menu selects whether the Arpeggiator free-runs at a certain BPM, or syncs to tempo with Straight, Dotted, or Triplet options. Drag up or down to adjust the Arpeggiator tempo or Sync division.
- **Swing:** Delays alternating notes to give a swinging feel to rhythms. Ranges from 50 (no swing) to 75 (very heavy swing); when experimenting with Swing, try 67 as a good starting point.
- **Octave:** Determines the octave range of the arpeggiated notes. (1 to 4 octaves)

- **Chord** and **Chord Select**: These controls allow you to set a particular chord shape to be played whenever the Arpeggiator reaches a step with the Chord icon selected. When the **Chord** button is on, the selected chord will play rather than what keys you're holding. Click on **Chord Select** to pop up a menu where you can choose from 11 common chord shapes or design your own.



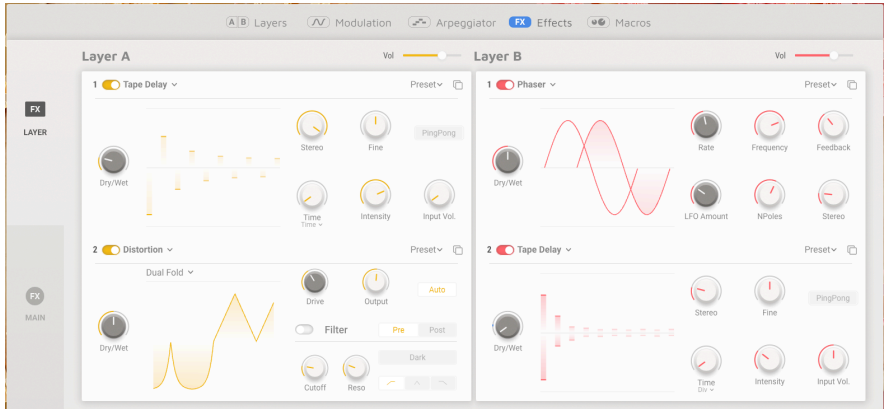
- **Hold**: As the name suggests, clicking this button holds the note or notes played after you release the keys.



Note that the Hold button works even if the Arpeggiator is turned off; it acts as a sort of "sustain pedal" button.

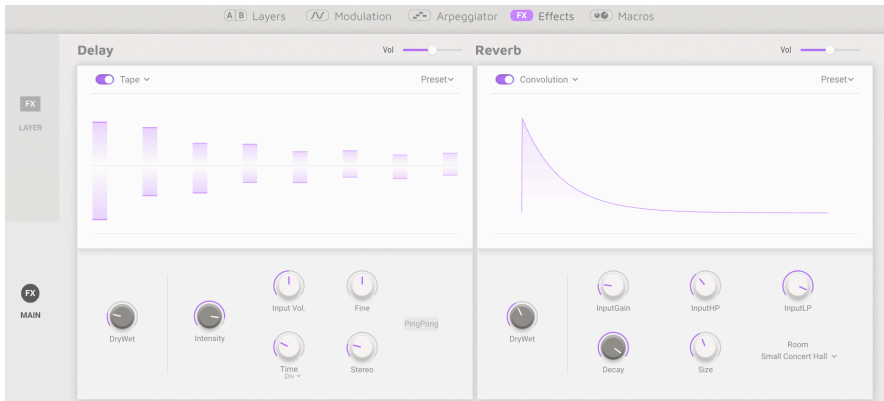
## 6.4. FX

The Effects tab gives access to the controls for both Layer and Main FX. Use the side panel to select between:



Effects page

- **Layer FX** (shown above). Choose from up to 14 Layer FX, with 2 FX per Layer.



Effects page

- **Main FX**, including a Delay and Reverb, with 3 Delay types and 2 Reverb types.

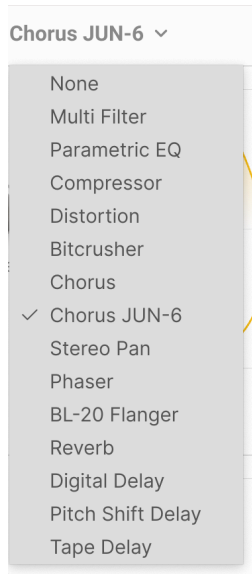
**i** On many of these effects, you can click and drag on the Visualizer to set one or two of the most important parameters interactively.

### 6.4.1. Layer FX

Each Layer has two FX slots, letting you insert one of 14 Effects into each slot, for 1 or 2 separate effects per Layer. FX A is linked to Layer A, and FX B is linked to Layer B.

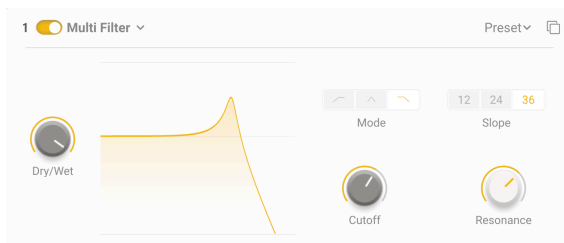
Each of the Layer FX has a pull-down menu of Presets at the top right corner. This is also where you can store your own settings as an FX Preset. Nearly all have a **Dry/Wet** mix knob at the far left.

A Layer FX can be bypassed with the power slider at the top left corner of its window. Alternatively, if you're sure you don't need anything in a particular slot, you can select **None** from the pop-up menu of available effects:



Of course, even though "none" might sometimes be the right choice for a certain preset, it's not very much fun. So let's learn about your 14 other options: the Layer FX.

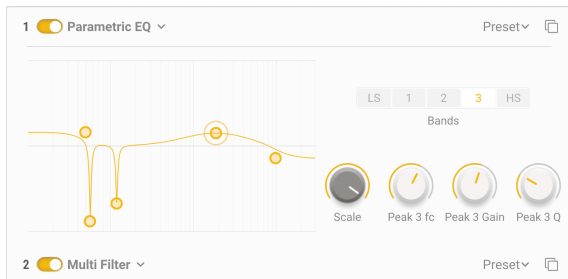
#### 6.4.1.1. Multi Filter



Sometimes it's nice to have an extra filter handy for tweaking your tone before it gets to the output. The **Multi Filter** FX gives you three to choose from!

- **Mode** buttons select the filter type: low pass, band pass, or high pass
- **Slope** selects the filter slope: 12, 24, or 36 dB/octave.
- **Cutoff**: sets the cutoff frequency from 20.0 Hz to 20000 Hz.
- **Resonance**: sets the resonance of the filter. (0.500 to 15.0)

#### 6.4.1.2. Parametric EQ



A **Parametric Equalizer** lets you sculpt your sound very precisely, as opposed to the very broad tonal strokes you get from a graphic equalizer or the tone controls on a guitar or amp. It can be used to gently or surgically boost or cut certain frequencies to alter a track's overall sound or remove problem frequencies.

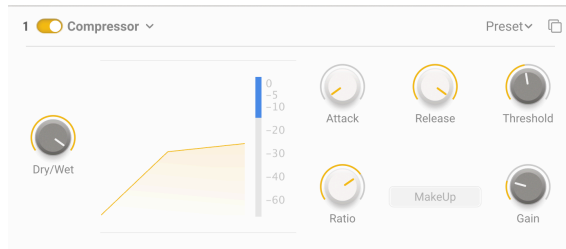
Each of the five bands has its own controls for the center frequency (**fc**), amount of boost or cut (**Gain**), and bandwidth (**Q**). These can be dialed in on the knobs for the selected band. Frequency and gain for each band can also be set by clicking and dragging the mouse.

- **Scale**: Rather than Dry/Wet mix, this FX type has a Scale control for the overall effect.
- **Bands** buttons: Selects the band being adjusted. The Parametric EQ has five bands: **LS** (a *low shelf*, where every frequency below the set one is raised or lowered by a certain amount), three *peaking* bands with full control over all parameters, and **HS** (a *high shelf* that works in the same way as the low shelf).
- **fc** sets the center frequency of each band: 50.0-500 Hz for LS, 40.0-20000 Hz for the three peaking bands, and 1000-10000 Hz for HS.
- **Gain** sets the amount of boost or cut. (-15.0 to 15.0 dB)
- **Q** sets the bandwidth of the peak or steepness of the shelf. (0.100 to 2.00 for LS and HS, 0.100 to 15.0 for the three peaking bands)

**i** In the screenshot above, the Parametric EQ has been set to tightly notch out hum at 60 and 120 Hz, gently boost the lows and lower the highs, and provide a broad bump in the upper mids.



### 6.4.1.3. Compressor



The **Compressor** is used to control the dynamic range of a sound: it reduces the difference between the softest and loudest levels a sound can have.

Audio that goes above a certain **Threshold** is automatically turned down a bit; the amount it's turned down is the **Ratio**. Ratio of what? If a sound would have gone 6 dB above the threshold but the compressor only lets it rise 2 dB, that's a 3:1 ratio. If a sound would have gone 20 dB above the threshold but it can only go up 1 dB, that's a 20:1 ratio.

While this does lower *dynamic range*, it also lowers the overall level of the signal. The compressor then adds *makeup gain* to bring the average level of the signal up to where it was before the processing. The loudest sounds stay about where they were, but the softest ones are all louder.

Sometimes it's practically or musically useful for compression to not start or end immediately when a signal passes the threshold. For instance, it might be nice to let the snappy attack of a drum come through before the compressor controls the rest of its sound, or to have the compressor not turn on and off rapidly as new notes are played. In these cases, the compressor will have controls for **Attack** and **Release** to delay the onset or finish of compression.

It can be useful to blend the dry sound with the compressed sound, making the compression an added effect rather than a 100% control of dynamics. This effect is called *parallel compression*, and you can make use of it with the **Dry/Wet** knob.

- **Attack** controls the onset of the compression. (0.010 to 1000 ms)
- **Release** controls how quickly the compression 'lets go' of the audio. (1.00 to 2000 ms)
- **Threshold** controls the level at which compression begins. (-60 to +20 dB)
- **Ratio** The ratio of uncompressed to compressed level changes. (1.00 to 100)

**i** At 1.00, no compression occurs. Most of the range of the **Ratio** knob happens between 1.00 and 20.0; this covers everything from very light and musical to more forceful compression. Above 20, compression becomes *limiting*, where the idea is to prevent a signal from never going above a certain amount. Hard limiting can have a strong effect on the sound, which might or might not be useful. The top of the range is 100 to 1, which is effectively *brickwall limiting*, where no signal is ever allowed to go above a certain level. This is sometimes used in digital mastering to prevent clipping.

- **Gain** controls how much gain will be added or removed from the output. (-36 to +36 dB)

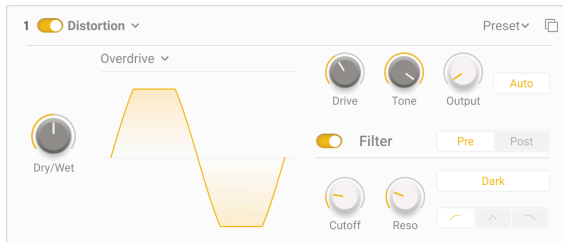
- **MakeUp** button turns on an automatic makeup gain function that can be handy for getting levels under control quickly.

**i** At any given time, the amount of Gain Reduction is shown by a meter on the right of the display. For this meter, 0 is at the *top* of the range and the meter reads downward with more gain reduction. In the screenshot above, the meter shows about 15 dB of gain reduction.

#### 6.4.1.4. Distortion

**Distortion** offers the most options of any Layer FX type. It might seem strange to you that all this effort should be put into a 'fuzzbox', but electronic musicians have known for years that there are many different kinds of signal distortion, each with its unique sonic signature – and they can transform sounds in ways ranging from subtle warmth to all-out audio destruction!

This effect can be supplemented by a multimode filter that can be applied either before (**Pre**) or after (**Post**) the distortion.




Nearly all of the FX parameters are common to all 16 distortion types:

- **Drive** controls the amount of overdrive pushing the input signal through the processor. It has a very wide range, from slight saturation to massive boost. (0.00 to 48.0 dB)
- **TONE**: This knob is only available in the **Overdrive** type, and is displayed next to Drive. It adjusts the frequency response of the overdrive from mellow to bright. (0.00 to 1.00)
- The **Auto** button engages automatic gain compensation to prevent *unintended* overload peaks. (Yes, those happen, even when you're using distortion.)
- **Output** sets the output gain of the distorted sound, either lower (to prevent clipping) or higher (to add power) than the input level. (-24.0 to 3.00 dB)

The filter controls are:

- The **Mode** buttons drop-down sets the filter to Low Pass, Band Pass, or High Pass.
- **Cutoff** sets the filter cutoff frequency. (20.0-20000 Hz)
- **Reso** controls the filter's resonant peak. (0.500 to 15.0)
- The **Pre/Post** buttons control whether the filtering takes place before or after the distortion.

- **Dark** tames the extreme high-end content that some of the distortion types can produce.

 Try using an FX Macro to control the cutoff of the Distortion's filter and the cutoff of a [Multi Filter \[p.74\]](#) in another FX slot.

A pop-up menu lets you select from among 16 different types of distortion.

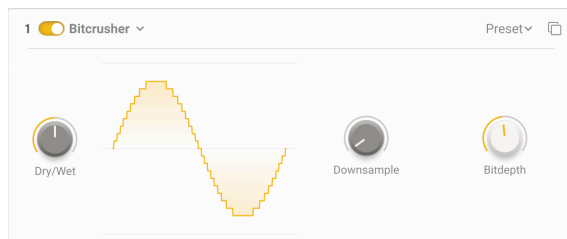


Some of these algorithms come from familiar types of analog distortion - examples include gradually increasing amounts of gain (**Overdrive**, **Exponential**, **Soft Clip**, **Distortion**, **Hard Clip**), **Tape** saturation, and **Germanium** transistor preamp tone.

Other distortions are more digital in character - in addition to **Wavefolder** and **Dual Fold**, which 'fold over' the peaks of waveforms to create more harmonics, there are unusual types such as **Asymmetrical**, **Wiggle**, **Stairs**, **Howl**, **Core**, **Push**, and **Climb**.

Want to know how all these funky shapes sound? Try them for yourself!

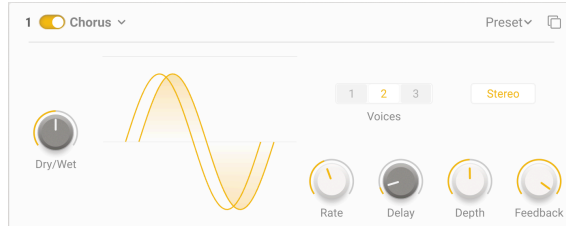
#### 6.4.1.5. Bitcrusher



A bitcrusher does what it sounds like: it crushes bits! This FX simulates the 'dirty' audio of old digital converters, whose bit depth and sample rate were limited by the power of current processors. It gives you anything from a slight lo-fi haze to utter destruction of your precious sound.

- **Downsample:** sets the ratio by which the instrument's internal sample rate is divided, from 1.00 x (highest quality) to 80.0 x (trashed). The more downsampling, the more *aliasing* affects the sound, with inharmonic frequencies 'folding down' below the highest frequency the bitcrusher can deliver.
- **Bitdepth:** Sets the resolution of the output from 16 bits (CD quality) down to 1.5 bits (barely recognizable as audio).

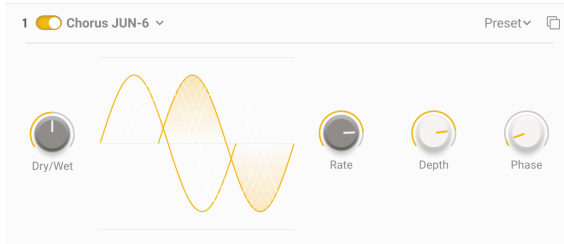
#### 6.4.1.6. Chorus



**Chorus** is an effect first developed in the mid-1970s by Roland for the Jazz Chorus amplifier and CE-1 pedal. In a chorus, the dry signal is mixed with one or more slightly delayed copies of itself (called *voices*), whose amount of delay is gently varied by an LFO to create a sense of thickness.


- **Rate** controls the speed of the LFO, which is the most important parameter when adjusting the sound of the chorus. Several famous chorus pedals have had nothing more than a Rate control! (0.1 to 5.0 Hz)
- **Delay** is the length of the basic delay, which is modulated by the LFO and spread out by the Depth knob. It changes the character of the sound, and is a relatively recent addition to chorus pedal designs. (0.600 to 20.0 ms)
- **Depth** controls the relative spacing of the delayed voices, with longer delays leading to thicker, more detuned sounds. (0.00 to 10.0 ms)
- **Feedback**, as the name implies, feeds back some of the delayed signal to be delayed again. This creates a noticeable metallic 'ringing' tone that makes the chorus sound more like a flanger. (0.00 to 0.900)
- The **Stereo** button chooses whether or not the delay voices are output on the far left and right sides of the stereo field.
- The **Voices** buttons choose whether the dry signal is followed by one, two, or three delayed copies. This is an important setting, because the overall power of the chorus effect needs to be adjusted to the preset and the song. Sometimes one voice is all you need for a tiny bit of thickening or vibrato, but three voices is overwhelming. (Of course, getting overwhelmed can be fun, too.)

### 6.4.1.7. Chorus JUN-6

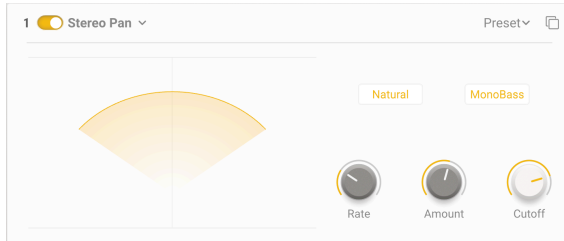


One of the most famous chorus effects is the one built into the Roland JUNO-6 synthesizer and its successors. Designed to thicken the sound of the single VCO, this 2-voice stereo chorus' controls were kept extremely simple: just three buttons for three presets, I, II, and I+II. This version provides a bit more control while saving the rich timbre of the original.

- **Rate** is the speed of the LFO that varies the delay time. (0.05 to 15 Hz)
- **Depth** is the amount of variance in the set delay time. (0.00 to 10.0 ms)
- **Phase** allows the phase of one voice to be offset from the other by up to 180°. The two voices are sent to the left and right sides of the stereo field for a wider effect.

 Note that if a stereo patch where Phase is turned all the way up is mixed to mono, the two sides will cancel each other out and the chorus will disappear - a common and annoying discovery for guitarists whose stereo chorus pedals always worked this way!

### 6.4.1.8. Stereo Pan



**Stereo Pan** lets you automatically control and move the stereo position of each voice, to provide motion and breadth.

- **Rate** controls the movement of sounds in the stereo field. (0.100 to 20.0 Hz)
- **Amount:** Rather than wet/dry mix, this FX type has an Amount control to control the width of the panning effect. (0.00% to 100%)
- The **Natural** button lets you choose a different kind of pan motion. Either this or the default (linear) setting might sound better with any particular Preset. Use your ears!
- **MonoBass** and **Cutoff:** Sometimes, autopanning very low sounds can cause a mix to feel seasick and unbalanced. Clicking MonoBass keeps low frequencies centered, and Cutoff controls the highest frequency that's mono. (50.0 to 200 Hz)

### 6.4.1.9. Phaser



The **Phaser** is not a time-delay effect, although it can sound like one. The dry signal is mixed with copies of itself that have been sent through a set of *all-pass filters*. Why would anyone need a filter that doesn't filter anything? Because another property of filtering is that regardless of what frequencies you do or don't remove, filters introduce a *phase shift* with respect to the original input. Each pair of these filters (called *poles* or *stages*) will create a notch in the frequency spectrum, whose relative movement to other notches can be varied with an LFO. The resulting effect has many fewer notches than flanging, and a much different sonic character.

- **Rate** is the speed of the LFO that varies the delay time. (0.10 to 10 Hz)
- **Frequency** varies the overall position of the cluster of notch filters. Best heard with Stereo turned down, Frequency causes the overall tonality of the phasing to go from fairly dark to quite bright. (30 to 15000 Hz)
- **Feedback** controls how much of the phase-shifted audio is fed back into the input to be phased again, intensifying the effect and giving it a resonant character. (0.00 to 0.99)
- **LFO Amount** sets the depth of the LFO's modulation control. Turn it down for a more subtle movement and up for more dramatic effects. (0.00 to 1.00)
- **NPoles** controls how many poles the circuit will have. Each two poles adds another notch to the frequency response, letting you design simpler or more dramatic sounds. (2 to 12, for 1 to 6 notches)
- **Stereo** spreads out the effect with a slight time delay between the left and right sides. It can go from very slight spread to a ping-pong effect. (0.00 to 180)

### 6.4.1.10. BL-20 Flanger

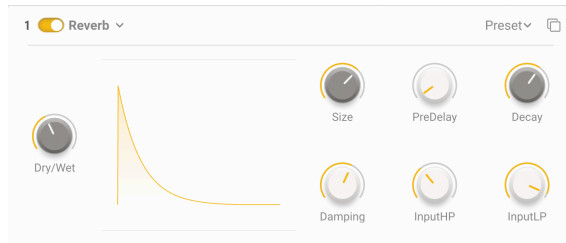


The **BL-20 Flanger** is based on the sound of Arturia's Flanger BL-20 plug-in, which is in turn based on the sound of a rare but beautiful-sounding hardware flanger from the 1970s. It doesn't provide all of the BL-20's capabilities, but it still sounds amazing!

- **Rate** is the speed of the LFO that varies the delay time. It can be set without sync or with different types of sync (0.017 to 5.00 Hz, or 1/32 bar to 8 bars).
- **Depth** sets how much the internal LFO modulates the delay time. (0.00 to 1.00)
- **Feedback** controls the amount of delayed sound fed back into the input to be delayed again. Unlike chorus, where feedback is an unusual added control that's best used sparingly, Feedback on a flanger is essential to creating its distinctive resonant timbre. (0.00 to 100%)
- The **Wide** button flips the LFO modulation in the right channel, making the flange sound wider and more three-dimensional... but beware of summing the two sides to mono, or the flanging will cancel itself out!



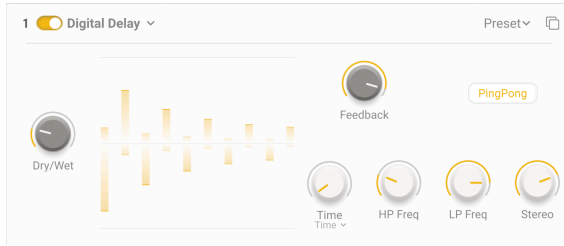
### 6.4.1.11. Reverb



**Reverb** (or *reverberation*) is the sound of a space – a recording studio, a concert hall, a stairwell, a tiled bathroom, the inside of an empty oil tanker, you name it. There's a Main FX Reverb, of course, but sometimes it will be handy to put a little space on your Layers.

- **Dry/Wet** is the blend of dry signal with the reverb output. (0.00% to 100%)
- **Size** is the overall size of the space, a general sense of how open it is. (0.100 to 1.90)
- **PreDelay** is how long it takes for the first reflected sound to come back to our ears. Longer predelays imply a larger space. (0.00 to 0.20 seconds)
- **Decay** is how long the reverb takes to decay to silence. It interacts with Size to define the shape of the ambience. (0.00 to 0.925)
- **Damping** is how quickly high-frequency sounds roll off before low-frequency sounds in the space. More damping implies a space full of objects or materials that absorb highs first: carpets, ornate wood, even people. Less damping implies a more 'ringy' space with concrete or tile walls. (0.00 to 1.00)
- **InputHP** rolls off the low frequencies of the input before it hits the reverb. This takes out low-end mud and makes the reverb brighter-sounding. Like any high-pass filter, this one has a cutoff frequency setting: 30 Hz to 10000 Hz.
- **InputLP** rolls off the high frequencies of the input before it hits the reverb. This softens the overall sound and removes overly tinny treble effects. Its cutoff frequency ranges from 100 Hz to 20000 Hz.

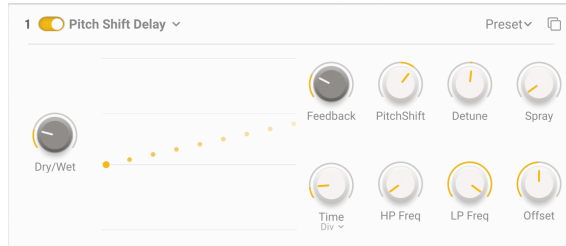
### 6.4.1.12. Digital Delay



**Delay** is a generic term for any effect that makes a copy of an input sound and repeats it a short time later. There are three delay Layer FX in Augmented STRINGS, and this first one is a good-sounding digital delay for all kinds of applications.

- **Time** is the time between echoes. It can be set without sync or with different types of sync: Straight, Triplets, and Dotted. (2 ms to 2 seconds, or 1/32 bar to 8 bars)
- **Feedback** is how much of the delayed sound gets fed back to the input. This produces repeating echoes that fade away, rather than a single delayed copy of the input sound (called *slapback*, useful for some cases). High feedback settings lead to longer trails of echo. (0.00 to 1.00)
- **HP Freq** and **LP Freq** control two filters that shape the tone of the delayed sound. Darker echoes die away with less 'clutter' in the audio, and brighter echoes carry a lingering sense of presence. (HP Freq 20 Hz to 10000 Hz, LP Freq 250 Hz to 20000 Hz)
- **Stereo** controls how much the echoes spread out in the stereo soundstage, from full mono to massive panning. (0.00 to 1.00)
- The **PingPong** button activates an effect where echoes alternate between the left and right sides of the stereo field. This effect is easy to overuse, and can cause listener fatigue, but when combined with very subtle echoes it can produce a beautiful sense of extra space.

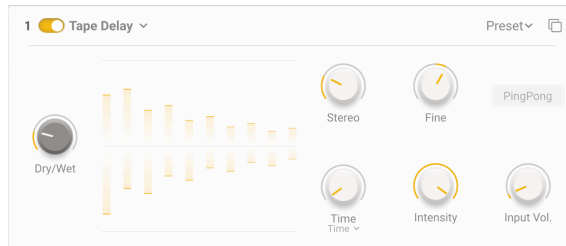
### 6.4.1.13. Pitch Shift Delay



**Pitch Shift Delay** is a classic effect dating back to the early years of digital audio processing, popularized by the Eventide Harmonizer. It works like a conventional delay, but in addition to being fed back to create echoes, the delayed audio signals are subjected to a pitch shift, either up or down.

- **Feedback** is how much of the delayed sound gets fed back to the input. Settings range from 0.00 (slapback) to 1.00 (infinite repeats without runaway).
- **PitchShift** is the base amount that echoes are shifted by. As they repeat, they will be shifted repeatedly, producing an endless spiral upward or downward in pitch. Very subtle amounts can produce a feeling of anticipation (up) or relaxation (down); larger amounts can produce strange, inharmonic results or smoother and more musical 'boom' or 'shimmer' (try setting it to octaves). Pitch shift can be set to 24 semitones (2 octaves) up or down.
- **Detune** controls how different the left and right channels' pitches are. (-100 to +100 cents, where 100 cents equals one semitone)
- **Spray** sets up a 'scattering' effect across the soundstage for each successive echo, with slightly randomized echo times. It's especially noticeable at higher amounts of pitch shift. (0.00 to 500 ms)
- **Time** is the time between echoes. It can be set without sync or with different types of sync: Straight, Triplets, and Dotted. (2 ms to 2 seconds, or 1/32 bar to 8 bars)
- **HP Freq** and **LP Freq** control two filters that shape the tone of the delayed sound. Darker echoes die away with less 'clutter' in the audio, and brighter echoes carry a lingering sense of presence. (HP Freq 20 Hz to 10000 Hz, LP Freq 250 Hz to 20000 Hz)
- **Offset** is a positive or negative time difference between the left and right Time settings. This produces a realistic widening of the sound due to a psychoacoustic phenomenon called the *Haas Effect*. (-20 to +20 ms)

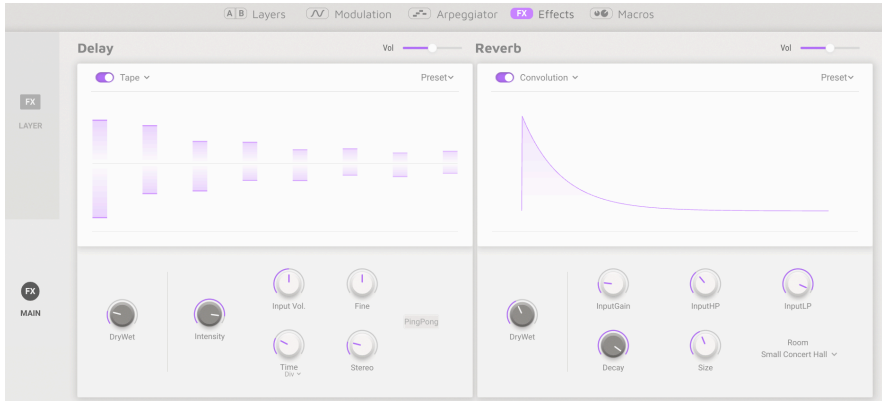
#### 6.4.1.14. Tape Delay



**Tape Delay** (or *tape echo*) is a type of delay characteristic of early tape-based delay machines such as the Maestro Echoplex and Roland Space Echo. Input sounds are recorded to a loop of tape with one or more playback heads to create the echoes. Because tape loops can be unstable and shift in pitch and timbre, they produce an effect that is warmer and less 'precise' than a conventional digital delay.

- **Stereo** provides a sense of spaciousness by having one side of the stereo image have a slightly different delay time than the other. (0.00 to 0.20)
- **Fine** is a fine-tuning of the basic Time. Sometimes, having a time just slightly off other synchronized effects can give a sense of richness to the overall sound. (-50 to +50 ms)
- The **PingPong** button activates an effect where echoes alternate between the left and right sides of the stereo field. As with the Digital Delay effect, be careful not to overuse this function.
- **Time** is the time between echoes, which has a narrower range than the Delay FX because of the limitations of tape. It can be set without sync or with different types of sync: Straight, Triplets, and Dotted. (10 ms to 1 second, or 1/32 bar to 8 bars)
- **Intensity** is another word for feedback - the intensity and persistence of the echoes. The parameter ranges from 0.00 (slapback) to 1.20. Settings above 1.00 will cause the echoes to be louder than the input. This phenomenon is called *runaway* and leads to an ever-increasing audio level that will eventually overload, then distort, then clip... and will keep getting louder until it eventually destroys your headphones, your speakers, and your ears. Please use it responsibly and be ready to turn it down.
- **Input Vol.** is an adjustment of the input gain, not only to make the sound louder or softer, but to gently saturate the tape and produce a warm character at higher settings. (-12 dB to +12 dB)

## 6.4.2. Main FX



*Main FX*

The Main FX stage is the final piece of Augmented STRINGS's audio chain before output. These affect both Layers globally. There are three types of Delay to choose from, followed by two types of Reverb.

All Main Effects share these controls:

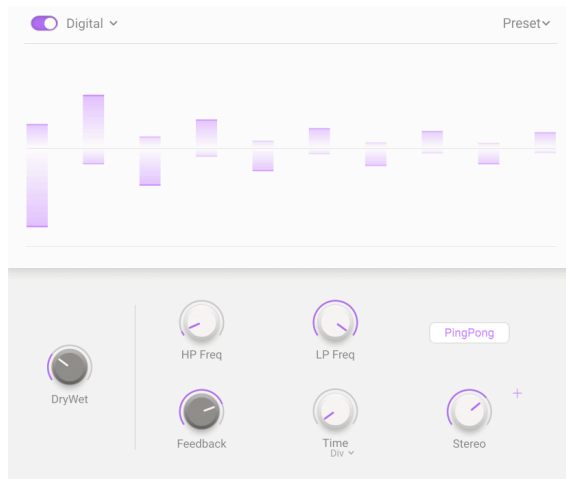
- **Type:** Choose the type of effect.
- **Volume:** Sets the overall output level of the delay.
- **On/Off:** Enable/disable the effect.
- **Dry/Wet Mix:** Set the blend of dry signal with the effect.

### 6.4.2.1. Delay

The three Main Delay algorithms are identical to those in the Layer FX with corresponding names, just with larger displays and reordered controls. We'll repeat their descriptions here for convenience.

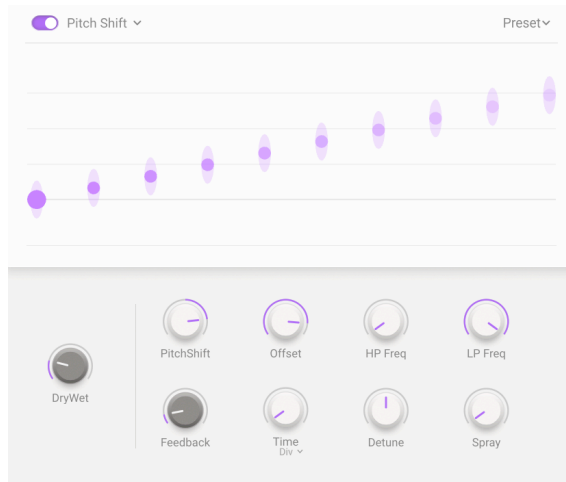
 Remember that certain parameters for these FX can be changed interactively by dragging on their Visualizer graphics, as with the corresponding Layer FX.

### 6.4.2.2. Digital



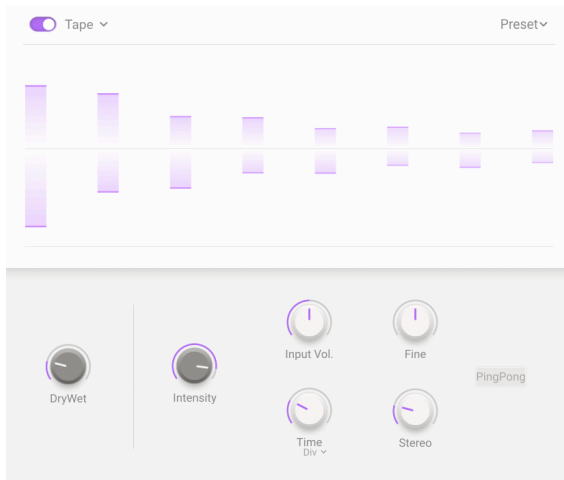
- **HP Freq** and **LP Freq** control two filters that shape the tone of the delayed sound. Darker echoes die away with less 'clutter' in the audio, and brighter echoes carry a lingering sense of presence. (HP Freq 20 Hz to 10000 Hz, LP Freq 250 Hz to 20000 Hz)
- **Feedback** is how much of the delayed sound gets fed back to the input. This produces repeating echoes that fade away, rather than a single delayed copy of the input sound (called *slapback*, useful for some cases). High feedback settings lead to longer trails of echo. (0.00 to 1.00)
- **Time** is the time between echoes. It can be set without sync or with different types of sync: Straight, Triplets, and Dotted. (2 ms to 2 seconds, or 1/32 bar to 8 bars)
- **Stereo** controls how much the echoes spread out in the stereo soundstage, from full mono to massive panning. (0.00 to 1.00)
- The **PingPong** button activates an effect where echoes alternate between the left and right sides of the stereo field. This effect is easy to overuse, and can cause listener fatigue, but when combined with very subtle echoes it can produce a beautiful sense of extra space.

### 6.4.2.3. Pitch Shift



- **PitchShift** is the base amount that echoes are shifted by. As they repeat, they will be shifted repeatedly, producing an endless spiral upward or downward in pitch. Very subtle amounts can produce a feeling of anticipation (up) or relaxation (down); larger amounts can produce strange, inharmonic results or smoother and more musical 'boom' or 'shimmer' (try setting it to octaves). Pitch shift can be set to 24 semitones (2 octaves) up or down.
- **Offset** is a positive or negative time difference between the left and right Time settings. This produces a realistic widening of the sound due to a psychoacoustic phenomenon called the *Haas Effect*. (-20 to +20 ms)
- **HP Freq** and **LP Freq** control two filters that shape the tone of the delayed sound. Darker echoes die away with less 'clutter' in the audio, and brighter echoes carry a lingering sense of presence. (HP Freq 20 Hz to 10000 Hz, LP Freq 250 Hz to 20000 Hz)
- **Feedback** is how much of the delayed sound gets fed back to the input. Settings range from 0.00 (slapback) to 1.00 (infinite repeats without runaway).
- **Time** is the time between echoes. It can be set without sync or with different types of sync: Straight, Triplets, and Dotted. (2 ms to 2 seconds, or 1/32 bar to 8 bars)
- **Detune** controls how different the left and right channels' pitches are. (-100 to +100 cents, where 100 cents equals one semitone)
- **Spray** sets up a 'scattering' effect across the soundstage for each successive echo, with slightly randomized echo times. It's especially noticeable at higher amounts of pitch shift. (0.00 to 500 ms)

#### 6.4.2.4. Tape



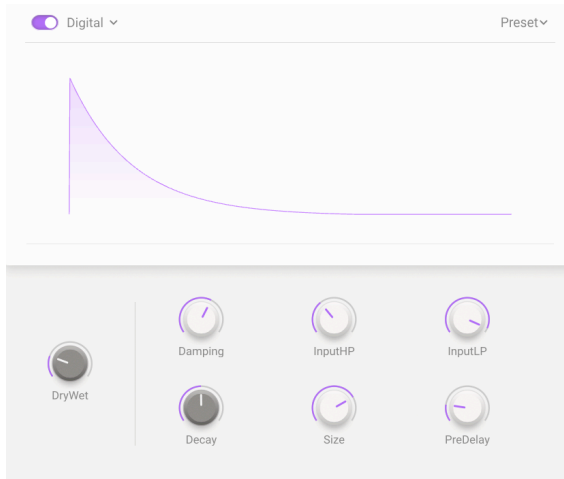
**Tape Delay** (or *tape echo*) is a type of delay characteristic of early tape-based delay machines such as the Maestro Echoplex and Roland Space Echo. Input sounds are recorded to a loop of tape with one or more playback heads to create the echoes. Because tape loops can be unstable and shift in pitch and timbre, they produce an effect that is warmer and less 'precise' than a conventional digital delay.

- **Intensity** is another word for feedback - the intensity and persistence of the echoes. The parameter ranges from 0.00 (slapback) to 1.20. Settings above 1.00 will cause the echoes to be louder than the input.
- **Input Vol.** is an adjustment of the input gain, not only to make the sound louder or softer, but to gently saturate the tape and produce a warm character at higher settings. (-12 dB to +12 dB)
- **Fine** is a fine-tuning of the basic Time. Sometimes, having a time just slightly off other synchronized effects can give a sense of richness to the overall sound. (-50 to +50 ms)
- **Time** is the time between echoes, which has a narrower range than the Delay FX because of the limitations of tape. It can be set without sync or with different types of sync: Straight, Triplets, and Dotted. (10 ms to 1 second, or 1/32 bar to 8 bars)
- **Stereo** provides a sense of spaciousness by having one side of the stereo image have a slightly different delay time than the other. (0.00 to 0.20)
- The **PingPong** button activates an effect where echoes alternate between the left and right sides of the stereo field. As with the Digital Delay effect, be careful not to overuse this function.



### 6.4.2.5. Reverb

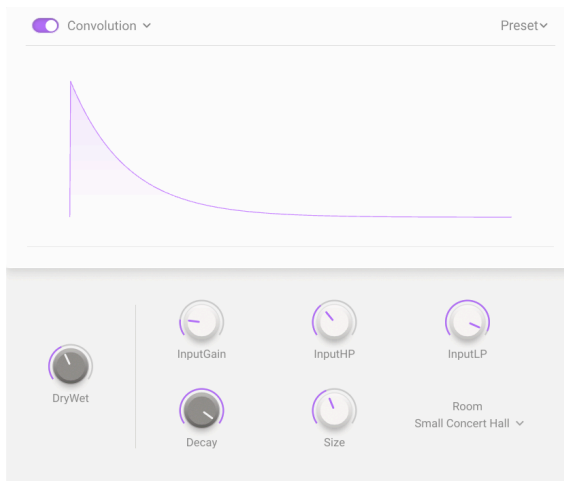
There are two very different Reverb algorithms available for the Main FX. One is the Digital Reverb, which is functionally identical to the Layer FX Reverb; the other is a Convolution Reverb to produce uniquely realistic environments as well as otherworldly spaces.



The Main FX Digital Reverb, like the Layer FX Reverb, is an *algorithmic* reverb. That means that reverb sounds are calculated based on the mathematics of sound waves in acoustic spaces. With a wide range of parameter tweaks, this reverb type can produce everything from cramped closets to enormous cathedrals.

While the controls are rearranged, the parameters and their ranges are identical to those in the Layer FX Reverb:

- **Dry/Wet** is the blend of dry signal with the reverb output. (0.00% to 100%)
- **Damping** is how quickly high-frequency sounds roll off before low-frequency sounds in the space. More damping implies a space full of objects or materials that absorb highs first: carpets, ornate wood, even people. Less damping implies a more 'ringy' space with concrete or tile walls. (0.00 to 1.00)
- **InputHP** rolls off the low frequencies of the input before it hits the reverb. This takes out low-end mud and makes the reverb brighter-sounding. Like any high-pass filter, this one has a cutoff frequency setting: 30 Hz to 10000 Hz.
- **InputLP** rolls off the high frequencies of the input before it hits the reverb. This softens the overall sound and removes overly tinny treble effects. Its cutoff frequency ranges from 100 Hz to 20000 Hz.
- **Decay** is how long the reverb takes to decay to silence. It interacts with Size to define the shape of the ambience. (0.00 to 0.925)
- **Size** is the overall size of the space, a general sense of how open it is. (0.100 to 1.90)
- **PreDelay** is how long it takes for the first reflected sound to come back to our ears. Longer predelays imply a larger space. (0.00 to 0.20 seconds)



The Main FX Convolution Reverb is another animal entirely. The idea of *convolution* is remarkably simple: you create a well-understood sound (such as a starter pistol shot, a burst of white noise, or a sine wave sweeping up in frequency) in an acoustic space, record it, then mathematically remove the original sound.

What's left is an *impulse response*: a sonic "fingerprint" of the space itself, which can be applied to any input signal to place it in that space. Pretty cool, huh?

The parameters are slightly different than those of the Digital Reverb, with different ranges:

- **InputGain** controls the level of the signal into the reverb for optimal performance. (-24 dB to +24 dB)
- **InputHP** rolls off the low frequencies of the input before it hits the reverb. (30 Hz to 10000 Hz)
- **InputLP** rolls off the high frequencies of the input before it hits the reverb. (100 Hz to 20000 Hz)
- **Decay** is how long the reverb takes to decay to silence. (0.00 to 1.00)
- **Size** is the overall size of the space. (0.300 to 2.00)
- **Room** opens a drop-down menu with a list of 29 available rooms for you to play with:

- Big Hall
- Bright Room
- Bright Space
- Cathedral Ghost
- Church Morph
- Clean Wave
- Concert Hall
- Dark Cathedral
- Echo Plate
- Endless Heaven
- Factory Hall
- Flight To Mars
- Forgotten Church
- Future Cathedral
- Jazz Club
- Large Church
- Large Concert Hall
- Large Studio
- My Lovely Room
- Robot Space**
- Small Concert Hall
- Small Piano Room
- Small Studio
- Soft Room
- Space Eruption
- Vintage Chamber
- Vintage Plate
- Warm Chamber
- Water Drive

*Convolution Reverb list*

Setting up a convolution reverb is as simple as choosing your Room and tweaking the parameters to taste. You'll find a lot of inspiration here, whether you're in a space that's shockingly real... or a space that's totally *unreal!*

## 6.5. Macros



*Macros Tab*

**Macros** are a way for you to simultaneously control multiple interacting parameters in Augmented STRINGS with a single knob. The Main Panel of the plug-in has eight MIDI-mappable knobs, four for the Layers (Sound) and four for the Effects.

The four Sound Macros are:

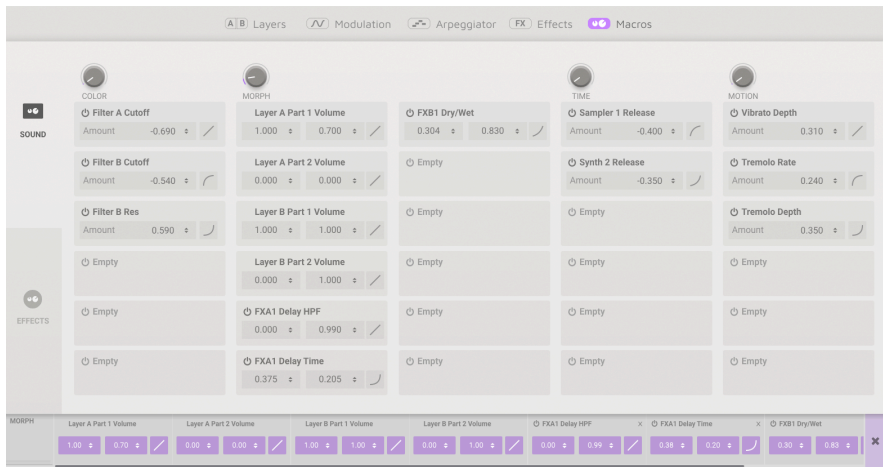
- **Color:** This Macro affects the color and harmonic content of the sound - in other words, Engine and Filter parameters on the Layers page. You can select up to 6 such parameters to the Color knob.
- **Morph:** This large knob allows for extremely complex parameter changes across an entire Preset as it morphs from the settings in Layer A to those in Layer B. It always controls the relative levels of Layers A and B, Parts 1 and 2. You can select up to 8 other parameters, freely assignable between both Layers.
- **Time:** Changes the time (Envelope) parameters of the Preset. Select up to 6 parameters from the two Amplitude and two Filter envelopes.
- **Motion:** This Macro allows you to add movement to your sound. Assign up to 6 parameters from the Modulation and Arpeggiator pages.

The four Effects Macros are:

- **FXA:** This adjusts up to 4 parameters in the Layer FX for Layer A.
- **FXB:** This adjusts up to 4 parameters in the Layer FX for Layer B.
- **Delay:** This Macro can control any 4 parameters in the Main FX Delay, including the Dry/Wet mix.
- **Reverb:** This Macro can control any 4 parameters in the Main FX Reverb, including the Dry/Wet mix.

To assign a parameter to a Macro, click one of the panes in the visual strip that runs along the bottom. Text will appear with information on which parameters you can route. These will then be highlighted in purple on the relevant tab, allowing you to assign to the selected Macro, Modulator or Keyboard setting.


## 6.5.1. SOUND Macros



On the SOUND Macro page we can assign up to 6 parameters to be controlled by the associated control above, although the Morph Macro has 8 (in addition to the 4 Part Volumes, which are always assigned).

Once you have selected the parameter, within each slot you have the following settings:

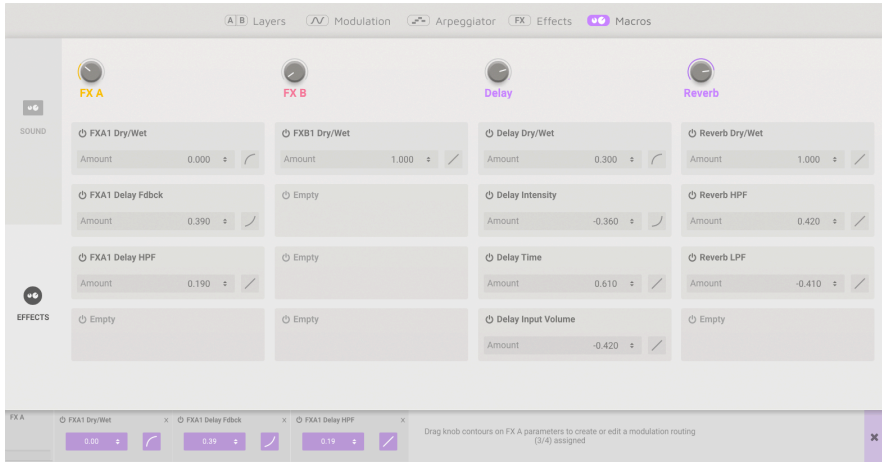
- **On/Off:** Enables and disables the Macro's routing to the destination - without removing it entirely.
- **Amount:** Drag up or down on the number field to set the amount of the Macro's effect on the destination.

 Note that Morph parameters have starting and ending amounts, so you can also precisely restrict the Morph knob's range of effect.

- **Curve:** Drag on the adjacent curve icon to adjust the curve of the Macro's effect on the destination.

The Sound Macros can in turn be modulation destinations, allowing for very expressive playing. Velocity, aftertouch, the modulation wheel, and keyboard tracking are all eligible sources.

## 6.5.2. EFFECTS Macros



On the EFFECTS Macro page we can assign up to 4 parameters to be controlled by the knob shown at the top of each column. Once you have selected the parameter, within each slot you have the following settings:

- **On/Off:** Enables and disables the Macro's routing to the destination - without removing it entirely.
- **Amount:** Drag up or down on the number field to set the amount of the Macro's effect on the destination.
- **Curve:** Drag on the adjacent curve icon to adjust the curve of the Macro's effect on the destination.

To set the amount of parameter of the Macro to a destination, hold your mouse over its numeric amount, this will then turn your cursor into up/down arrows which then allows you to increase or decrease the value.

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