

**NEWFANGLED AUDIO**

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Newfangled Audio

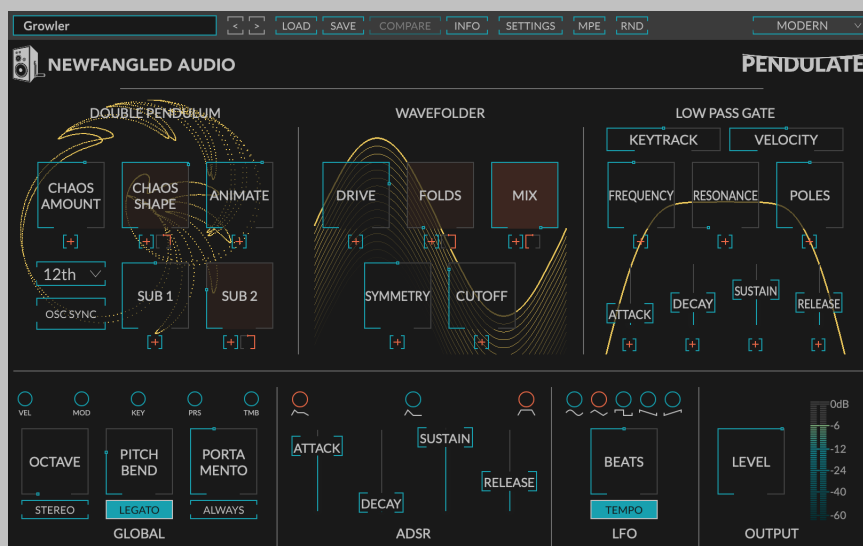
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# Chapter 1

## Newfangled Audio Pendulate



### cha-os

1. (Physics) behavior so unpredictable as to appear random, owing to great sensitivity to small changes in conditions. Pendulate is a synthesizer built on a chaotic oscillator.
2. the formless matter supposed to have existed before the creation of the universe.

Pendulate is a monosynth loosely based on a "West Coast" architecture (referring to synthesizers designed by Buchla and Serge), however, it uses a chaotic oscillator based on the physics of a double pendulum.

The double pendulum is chaotic in the mathematical sense: what initially looks like randomness contains underlying patterns, interconnect- edness, constant feedback loops, repetition, self-similarity, fractals, and self-organization. When designing the Pendulate oscillator we took great care to bring out these underlying patterns and create an oscillator that can smoothly fade from a sine wave to total chaos, with an expanse of territory to explore in between.

The output of the double pendulum oscillator is run through a wave- folder section, and followed by a low pass gate. Every parameter in all three sections can be modulated by an envelope generator, an LFO, and MIDI and MPE controllers.

The manual will break out each of these sections and give you some tips about how to get most out of this unique synth.

## Chapter 2

# Preset Bar

At the very top of the Pendulate plug-in is a preset bar which allows you to load and save preset, as well as a couple other features. These are the preset bar sections.



### 2.1 Preset Selector

On the far left is a drop-down menu which allows you to select preset from a tree structure. You shouldn't need to access these presets on your computer, however, if you do, on the Mac these presets are stored in your <User>/Music/Newfangled Audio/Pendulate/Presets folder. On Windows these presets are stored in your <Documents>/Newfangled Audio/Pendulate/Presets folder.

Next to the preset drop-down menu is a left and right arrow, which allow you to quickly scroll through presets.

### 2.2 Preset Load and Save Buttons

To the right of the preset selection arrows is a LOAD and SAVE button. LOAD will allow you to load a .tide preset from anywhere on your computer. Save will allow you to save a new preset to anywhere on your computer, however, we suggest that you place it somewhere in the presets folder so you can access it from the file dropdown.

## 2.3 Compare

The COMPARE button will allow you to toggle between the current settings and the last saved or loaded preset. If you have settings that you like, save them as a preset, and as you tweak you can always return to them using the COMPARE button.

## 2.4 Info

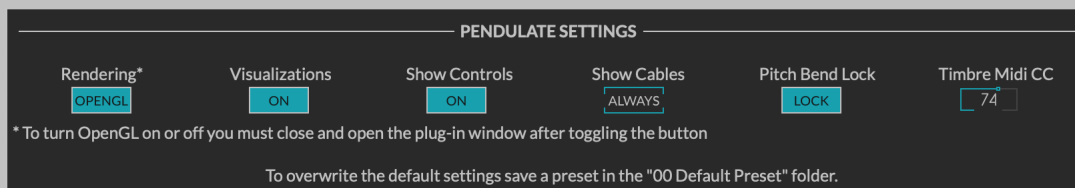
The INFO button will open this manual for you to read about the plug-in.

## 2.5 Update

If there is a software update available an UPDATE button will appear in the preset bar. Clicking it will bring you to a web page where you can download the new installers.

## 2.6 SETTINGS

The SETTINGS button pops down a page which contains settings for whether meter animations will be drawn, how they will be drawn, and parameter locks for preset loading.



The RENDERING button allows you to toggle between two different rendering engines. Most people will want to use OPENGL set to on, which will select a rendering engine that uses your computer's onboard GPU to do all graphics rendering for Pendulate. However, some computers do not have a separate GPU processor, or have a GPU that doesn't use the specific OpenGL features used by Pendulate. In these cases, having OPENGL set to "on" may cause graphics errors or an extreme load on your computer's CPU. To turn OpenGL rendering off, set the OPENGL button to "off", close the plug-in window, then open it again.

The VISUALIZATIONS button will turn on or off the animations behind each of the DOUBLE PENDULUM, WAVEFOLDER, and LOW PASS GATE sections.

Alternatively the SHOW CONTROLS button will turn the UI controls on or off. When the UI controls are off you can't modify the settings, but you can look at the visualizations.

The SHOW CABLES button will turn the modulations cables on all the time, rather than dynamically showing them while you're patching.

The PITCH BEND LOCK button allows you to lock the amount of PITCH BEND as you scroll through presets. Many people prefer a certain PITCH BEND amount on all presets, and many MPE controllers require this to have the same setting as the controller.

Finally, the TIMBRE MIDI CC knob allows you to override the MIDI controller message which is routed to the TIMBRE modulation output. By default this is set to MIDI CC #74, which is often set as the Y-Axis on MPE controllers, but you can change this to be any MIDI CC and use it to route your controller into the modulation engine.

## **2.7 MPE**

Pendulate supports a relatively new MIDI mode called Midi Polyphonic Expression, or MPE. If you're using an MPE compatible controller and an MPE compatible host, turning on the MPE button will allow you to have polyphonic pitch bend, pressure, and timbre controls. Pendulate is already amazing with a normal midi setup, but MPE allows you to add another level of expressiveness.

## **2.8 RND**

Pendulate also has a random preset generator. You can engage this by hitting the RND button.

## **2.9 Color Scheme**

On the far right is a drop-down labeled COLOR SCHEME. This will allow you to choose one of several different color schemes for your viewing pleasure.



# Chapter 3

## Parameters and Metering

### 3.1 Controls

Pendulate has several control types, including vertical sliders, rotary knobs, drop-down menus, and toggle and radio buttons, all of which have tooltips which will give you more information about their function if you hover your mouse above them.

In general, all sliders and knobs can be double clicked to type in a specific value, option-clicked (alt-click on windows) to return them to their default value, or command-clicked or control-clicked to enter a vernier mode for fine tuning.

### 3.2 Patching Modulation



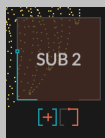
The large knobs in Pendulate allow you to patch up any of the Modulation Outputs to each control. There is no limit on the number of modula-

tion connections that can be created. When you click on a Modulation Output a small square knob appears below each modulatable control. When the Modulation Output is highlighted you can patch it to a control by clicking on the small square knob, or, turn the small square knob to dial in just a small amount of modulation. When the small square knob is set to top dead center, there is no modulation being applied. Turn to the right to add the modulation signal, or turn to the left to subtract it.

Alternatively, you can patch multiple Modulation Outputs to a knob by clicking the (+) button under a knob. Doing this will turn each Modulation Output into a knob which will control the amount of that modulation output routed to that control.

Clicking on an existing modulation knob will toggle it between its current value and off. Right clicking it will totally clear the modulation route. Moving your mouse off of a modulation route that's set to 0 will remove it from the UI.

If too many Modulation Outputs are routed to one knob the UI will display ellipses (...) to show that all the connections cannot be displayed, but you can still modify these connections by clicking the (+) button.



A parameter knob that is connected to a modulator will give visual feedback on the amount of modulation being applied to the signal as the orange glow becomes more saturated, the parameter is more strongly affected.

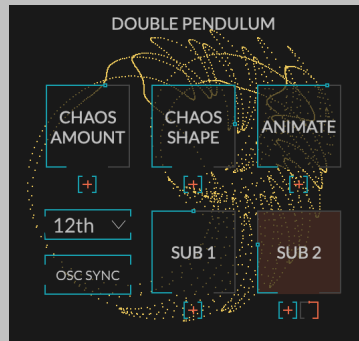
### 3.3 Main Voice

The top half of Pendulate is broken into three main synth voice sections, the DOUBLE PENDULUM, the WAVEFOLDER, and the LOW PASS GATE (LPG). The bottom half contains the Modulation Outputs, the Modulation Page buttons, the Effect Page buttons, the display area for the selected page, and the Output Level section.

#### 3.3.1 Double Pendulum

This section control the DOUBLE PENDULUM and associated oscillators. The DOUBLE PENDULUM page is actually comprised of 4 "oscillators": a sine wave oscillator at the keyed note - representing the first arm of the double pendulum, a chaotic "oscillator" called a generator which interacts with the sine wave oscillator - representing the second arm of the

double pendulum, and two sub oscillators 1 and 2 octaves below the keyed noted.



### Chaos Amount

The CHAOS AMOUNT knob blends between the keyed sinewave oscillator and the chaotic generator, you can think of it as a ratio between the length of the first pendulum arm and the second. The chaotic generator often has higher harmonics than the keyed oscillator, so it usually sounds brighter - but not always.

### Chaos Shape

The CHAOS SHAPE changes the shape of the chaotic generator. This is where the magic happens, turning it up usually means less predictability but not always. Small changes can sometimes make a big difference, but hey, it's a chaos generator.

### Animate

The ANIMATE knob detunes the chaotic generator from the keyed oscillator to add motion to the sound. It's a very unique effect.

### Interval

The INTERVAL dropdown sets the relative interval between the keyed oscillator and the chaotic generator. The effect of this is really only apparent when the Chaos Shape is at or near 0. When Chaos Shape is much higher than that there is a subtle effect, but it's mostly swamped by the chaotic system.

## Osc Sync

The OSC SYNC button syncs the chaotic generator to the keyed oscillator. This can drastically change the sound and often has the effect of dropping the apparent sound an octave and adding gritty harmonics.

## Sub 1

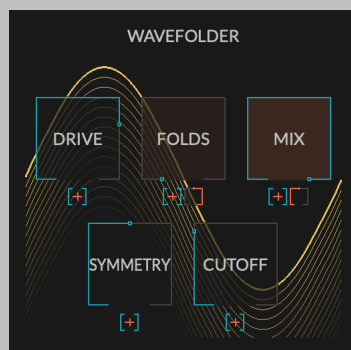
The SUB 1 knob controls the level of the 1-octave-down sub oscillator.

## Sub 2

The SUB 2 knob controls the level of the 2-octave-down sub oscillator.

### 3.3.2 Wavefolder

A wavefolder is a type of waveshaping that folds the wave back on itself several times. This creates a rich set of harmonics for the input signal and is a type of additive synthesis originated by Buchla and common in modular synthesis. The knobs control the shape of the waveshaping, and therefore, the harmonics generated. Modulating the wavefolder creates a set of moving harmonics that sound quite interesting and pleasant. The wavefolder in Pendulate is based loosely on the one in the Buchla 259 complex oscillator.



## Drive

The DRIVE knob sets the amount of drive going into the wavefolder.

## Folds

The FOLDS knob controls the number of folds the wavfolder is adding to the signal. More folds produces more harmonics. You may need to drive this wavfolder harder to see all the folds.

## Mix

The MIX knob controls the mix between the dry input and the wavfolder output.

## Symmetry

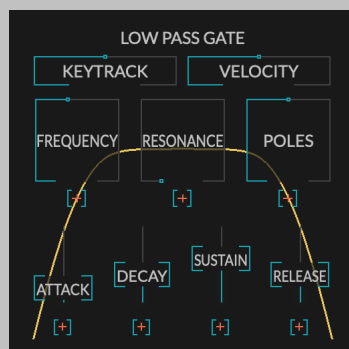
The SYMMETRY knob controls the DC offset into the wavfolder, by making the fold asymmetric it can add even harmonics to the output, instead of just odd harmonics. This can sound really great when modulated.

## Cutoff

The CUTOFF control modulates the cutoff frequency of a gentle (6dB/octave) low pass filter. The filter's cutoff defaults at 1.3kHz, the cutoff point used in the 259's output filter.

### 3.3.3 Low Pass Gate

A Low Pass Gate (LPG) is a combination of a VCA and Low Pass Filter which can create a very natural, pleasing sound. The one used in Pendulate is a modified version of one based on a design by Don Buchla.



## **Key Track**

KEY TRACK allows the cutoff frequency of the LPG to be set by the note you're playing. If KEYTRACK is 0% the cutoff frequency of the LPG is not effected by the note value and is set by the FREQUENCY knob only. If it's 100% it is modified by the FREQUENCY knob, but also scales with frequency so all notes will have the same timbre.

## **Frequency**

The FREQUENCY knob loosely controls the maximum cutoff of the filter. It's not exact because the underlying modeled circuit doesn't really map to frequency well.

## **Resonance**

The RESONANCE knob controls resonance of the LPG filter when the POLES control is turned greater than 1. This control is not active at all when POLES is at 1 and becomes more apparent the higher POLES is turned.

## **Poles**

The POLES knob morphs between a VCA style Low Pass Gate (one pole low pass filter) and a resonant (three pole) Low Pass Filter. Modulate it.

## **Attack**

The ATTACK slider controls the attack time of the ADSR which drives the LPG.

## **Decay**

The DECAY slider controls the decay time of the ADSR which drives the LPG.

## **Sustain**

The SUSTAIN slider controls the sustain level of the ADSR which drives the LPG.

## Release

The RELEASE slider controls the release time of the ADSR which drives the LPG.

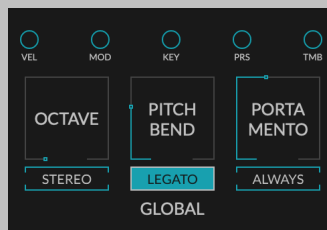
## 3.4 Modulators and Global Voice Settings

Pendulate contains several modulation sources that can be applied to the main voice.

### 3.4.1 Global Voice Settings

The Global Settings page allows you to set the main parameters for voice and pitch (TK). The modulation outputs situated above the GLOBAL parameter button allows you to map MIDI and MPE modulation sources to different parameters.

The Global Page contains modulation sources that come from the keyboard or midi sequencer and parameters which are global to Pendulate.



### Octave

The OCTAVE knob selects the base octave for the synth. This can be anywhere from -2 to +2 octaves.

### Stereo

The STEREO button allows you to select between STEREO and monaural output.

## Pitch Bend

The PITCH BEND knob controls the Pitch Bend amount. This is useful in general. When MPE is active this must be set to the same amount as the MPE controller to work correctly.

To prevent this setting being overwritten when a preset loads, enable Pitch Bend Lock in the Settings menu.

## Legato

The LEGATO button toggles a legato mode. When LEGATO is off, each note press will go through the entire ADSR cycle. However, when LEGATO is on, only staccato notes will trigger a new attack, legato notes will not.

## Portamento

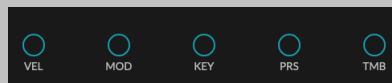
The PORTAMENTO knob controls the Portamento time in mS.

## Always

When ALWAYS is active, portamento will always be applied to all new notes. When inactive, portamento will only occur for notes that have been activated while another note is already playing. Great when combined with LEGATO!

## Global Modulation Outputs

These modulation outputs allow common MIDI and MPE controller signals to be mapped to parameters.



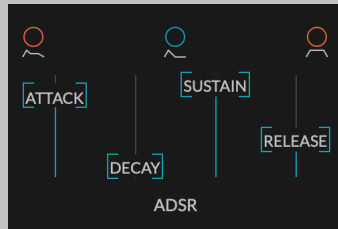
1. **VEL** maps the the current MIDI note's velocity to any Modulation Input.
2. **MOD** maps the MIDI Mod Wheel Output to any Modulation Input.
3. **KEY** maps the relative pitch from the currently pressed KEY to any Modulation Input. This can be used for adding key following to any parameter.
4. **PRS** maps the midi Pressure output to any Modulation Input. When MPE is active this is per note.



5. **TMB** is the MPE Timbre Modulation Output, also known as MIDI CC74. It's often mapped to the height along the key on several common MPE controllers. This is only available when MPE is enabled. Alternatively, TMB can be mapped to output any MIDI CC on the settings page, so you can use it to patch an expression pedal or other controller into Pendulate's modulation system.

### 3.4.2 ADSR

The ADSR creates three modulation signals when a note is pressed. These are a full ADSR envelope, an AD envelope, and an ASR envelope. All three of these envelopes can be used as modulators.



#### Attack

The ATTACK slider is the attack time of the envelope in mS.

#### Decay

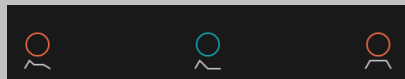
The DECAY slider is the decay time of the envelope in mS.

#### Sustain

The SUSTAIN slider is the sustain level of the envelope.

#### Release

The RELEASE is the release time of the envelope in mS.

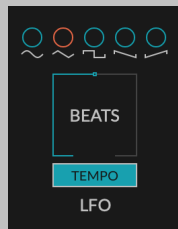


## ADSR Outputs

1. **ADSR** maps the envelope's ADSR output to a Modulation Destination.
2. **ADR** maps the envelope's ADR output to a Modulation Destination. This envelope will always return to zero when it has completed its decay phase, so the Sustain control will not affect its operation. If a note is released before the envelope has finished decaying, the signal will continue to decay using the Release time.
3. **ASR** maps the envelope's ASR output to a Modulation Destination. This envelope rises according to the Attack time and remains at the Sustain level until the note is release. The decay control does not affect its operation.

## 3.4.3 LFO

There is an LFO with a sine, triangle, pulse, sawtooth, and ramp output.



### BEATS

Use this knob to set the LFO Rate in Beats. This knob is only available when the the TEMPO button is on.

### FREQUENCY

Use this knob to set the LFO Rate in Hz. This knob is only available when the TEMPO button is off.

### TEMPO

The TEMPO button toggles whether the BEATS or FREQUENCY knob is active.



### LFO Outputs

1. **Sine** outputs a sine wave
2. **Triangle** outputs a triangle wave.
3. **Pulse** outputs a pulse wave, also known as a square wave.
4. **Saw** outputs a down-going sawtooth wave.
5. **Ramp** outputs an upward-going ramp wave.

### LFO Sync

Pendulate's LFO is designed to synchronize with your DAW's playhead. To take advantage of this feature, make sure the playhead is on the first beat of a measure and press Play—the LFO will now run in time with the session. When Play is not engaged, the LFO will retrigger on a key press depending on the legato setting.

### 3.4.4 Output

This is the final output of the effects section and the level control for the whole instrument. This control is before the output limiter, so you can turn it up as much as you'd like, if you'd like to overdrive the limiter. Turning this knob down to -100dB will mute the output.



The output level meter shows the final output level of the plug-in from -60dB to 0dB.

## Chapter 4

# Installation and Instantiation

Newfangled Audio Pendulate is free and contains no licensing. Simply fill out the form to get a download link to download and install the plug-in. Once you do you can instantiate it in any supported DAW.

### 4.1 Installing Your Plug-In

Once you've launched the plug-in installer, it will take you through several pages of options. We have tried to choose defaults for these options which will best serve the majority of users, but it is worth a minute to make sure you understand these options before clicking through to the next page. A common issue with Windows VST plug-ins is choosing the correct VST directory, which can be different on each system. Please pay special attention to this setting. Once you have followed through the installer, your plug-ins and presets should be in your chosen locations, and you can hit finish to end the installer application.

At this point, you should be ready to use your Pendulate Plug-In.

## Chapter 5

# Conclusion

We hope you enjoy Newfangled Audio's Pendulate plug-in. If you have any questions, comments, or concerns please write us at [support@newfangledaudio.com](mailto:support@newfangledaudio.com)

## Chapter 6

# About Newfangled Audio

The Oxford English Dictionary defines Newfangled as "objectionably new".

Music technology can sometimes be a backward looking pursuit. This is understandable, the purpose of music technology should be to help musicians make great music. There have been many great pieces of gear in the past and we should seek to keep these pieces and make them available to people who want to use them, and the time and dedication required to master a musical instrument means that changes in their design are often evolutionary rather than revolutionary.

However, the great pieces of gear from yesteryear are more often than not those that contained new ideas in their time. The reverence we have for these pieces can sometimes turn into fetishism, and mindless re-creation of classic gear can fail to inspire musicians and artists to take new risks. It's important to make sure artists and engineers have access to good tools that inspire them and don't stand in their way, but these tools should never be used as a security blanket to stand in the way of an artist or engineers ears and taste.

Newfangled Audio seeks to only make gear that incorporates new ideas. We want to make gear that is great, but only using ideas that others are not. We realize that deviation from the norm might sometimes be objectionable. The Oxford English Dictionary defines Newfangled as "objectionably new".