Continua User's Guide
Audio Damage, Inc.
Release 1.0

6 January 2020

Credits

Software Design and Construction, Documentation
Chris Randall
Adam Schabtach

Additional Design, Data Wrangling
Simon-Claudius Wystrach

TUN utility code © 2009 Mark Henning http://www.mark-henning.de

Field Testing
Eric Beam
Jeremy Blake
Daed
Rich Deacon
Don Gunn
Chris Hahn
Steve Hamman
Steve Ignatius
Stuart Killbride
William Light
Allen Morgan
Nick Rothwell
Joshua Schnable

Made Possible By
Elle
Tracie

License Agreement

BY INSTALLING THE SOFTWARE, YOU ARE CONSENTING TO BE BOUND BY THIS AGREEMENT. IF YOU DO NOT AGREE TO ALL OF THE TERMS OF THIS AGREEMENT, THEN DELETE ALL COPIES OF THE PRODUCT AND CONTACT US FOR A FULL REFUND.

Single User License Grant: Audio Damage, Inc. ("Audio Damage") and its suppliers grant to Customer ("Customer") a nonexclusive and nontransferable license to use the Audio Damage software ("Software") in object code form solely on a single central processing unit owned or leased by Customer. Customer may make one (1) archival copy of the Software provided Customer affixes to such copy all copyright, confidentiality, and proprietary notices that appear on the original.

EXCEPT AS EXPRESSLY AUTHORIZED ABOVE, CUSTOMER SHALL NOT: COPY, IN WHOLE OR IN PART, SOFTWARE OR DOCUMENTATION; MODIFY THE SOFTWARE; REVERSE COMPILE OR REVERSE ASSEMBLE ALL OR ANY PORTION OF THE SOFTWARE; OR RENT, LEASE, DISTRIBUTE, SELL, OR CREATE DERIVATIVE WORKS OF THE SOFTWARE.

Customer agrees that aspects of the licensed materials, including the specific design and structure of individual programs, constitute trade secrets and/or copyrighted material of Audio Damage. Customer agrees not to disclose, provide, or otherwise make available such trade secrets or copyrighted material in any form to any third party without the prior written consent of Audio Damage. Customer agrees to implement reasonable security measures to protect such trade secrets and copyrighted material. Title to Software and documentation shall remain solely with Audio Damage.

LIMITED WARRANTY. Audio Damage warrants that for a period of ninety (90) days from the date of shipment from Audio Damage: (i) the media on which the Software is furnished will be free of defects in materials and workmanship under normal use; and (ii) the Software substantially conforms to its published specifications. Except for the foregoing, the Software is provided AS IS. This limited warranty extends only to Customer as the original licensee. Customer's exclusive remedy and the entire liability of Audio Damage and its suppliers under this limited warranty will be, at Audio Damage or its service center's option, repair, replacement, or refund of the Software if reported (or, upon request, returned) to the party supplying the Software to Customer. In no event does Audio Damage warrant that the Software is error free or that Customer will be able to operate the Software without problems or interruptions.

This warranty does not apply if the software (a) has been altered, except by Audio Damage, (b) has not been installed, operated, repaired, or maintained in accordance with instructions supplied by Audio Damage, (c) has been subjected to abnormal physical or electrical stress, misuse, negligence, or accident, or (d) is used in ultrahazardous activities.

DISCLAIMER. EXCEPT AS SPECIFIED IN THIS WARRANTY, ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS, AND WARRANTIES INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NONINFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE, ARE HEREBY EXCLUDED TO THE EXTENT ALLOWED BY APPLICABLE LAW.

IN NO EVENT WILL AUDIO DAMAGE OR ITS SUPPLIERS BE LIABLE FOR ANY LOST REVENUE, PROFIT, OR DATA, OR FOR SPECIAL, INDIRECT, CONSEQUENTIAL, INCIDENTAL, OR PUNITIVE DAMAGES HOWEVER CAUSED AND REGARDLESS OF THE THEORY OF LIABILITY ARISING OUT OF THE USE OF OR INABILITY TO USE THE SOFTWARE EVEN IF AUDIO DAMAGE OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. In no event shall Audio Damage's or its suppliers' liability to Customer, whether in contract, tort (including negligence), or otherwise, exceed the price paid by Customer. The foregoing limitations shall apply even if the above-stated warranty fails of its essential purpose. SOME STATES DO NOT ALLOW LIMITATION OR EXCLUSION OF LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES.

The above warranty DOES NOT apply to any beta software, any software made available for testing or demonstration purposes, any temporary software modules or any software for which Audio Damage does not receive a license fee. All such software products are provided AS IS without any warranty whatsoever.

This License is effective until terminated. Customer may terminate this License at any time by destroying all copies of Software including any documentation. This License will terminate immediately without notice from Audio Damage if Customer fails to comply with any provision of this License. Upon termination, Customer must destroy all copies of Software.

Software, including technical data, is subject to U.S. export control laws, including the U.S. Export Administration Act and its associated regulations, and may be subject to export or import regulations in other countries. Customer agrees to comply strictly with all such regulations and acknowledges that it has the responsibility to obtain licenses to export, re-export, or import Software.

This License shall be governed by and construed in accordance with the laws of the State of Colorado, United States of America, as if performed wholly within the state and without giving effect to the principles of conflict of law. If any portion hereof is found to be void or unenforceable, the remaining provisions of this License shall remain in full force and effect. This License constitutes the entire License between the parties with respect to the use of the Software.

Introduction

Continua embraces the continuous, ever-changing nature of sound, providing an unprecedented level of hands-on control to classic analog synthesis in virtual form. Continua goes beyond the capabilities of a traditional three-oscillator subtractive synthesizer with a "morph everything" design philosophy. The oscillators and LFOs generate a nearly infinite variety of wave shapes with multiple controls for bending the shape in different ways. The pair of analog-modeled filters seamlessly blend between the standard responses like low-pass and high-pass, creating in-between characteristics and unusual sweeps. Each time segment of the ADSR envelope generators bends between exponential, linear, and logarithmic movement, while the multi-point Flexible Envelope Generators can generate anything from short transients to long sequences. All modulation sources can connect to nearly any knob in Continua, providing modular-like flexibility without the jungle of patch cords. Stereo chorus, delay, and reverb effects provide the finishing polish to Continua's evolving sound.

Designed from the beginning for MIDI Polyphonic Expression, Continua takes full advantage of MPE controllers as well as traditional single-channel MIDI controllers. Continua provides handy macro knobs and XY pads for easy, custom access to multiple parameters and built-in gesture control on touch-enabled devices.

System Requirements

The following table summarizes the operating system requirements and provided formats for Continua:

Operating System	Minimum Version	Formats
macOS	10.11	AudioUnit, VST2, VST3 and AAX
Windows	8.1 x64	VST2, VST3 and AAX
iOS	iOS 11 or iPadOS 13	AUv3, standalone app with IAA

To use Continua, you'll need a host application such as Ableton Live, Steinberg Cubase, Apple Logic, Avid ProTools, etc[1]. We assume that you are familiar with using plugins with your host. If you have general questions about using plugins with your host, please refer to its documentation.

The iOS versions of Continua require an iPad; newer models will provide better performance. The maximum number of voices is limited to six in the iOS version; otherwise, it is identical to the desktop version.

Demonstration Version

We encourage you to download and try the demonstration version of Continua before purchasing it. The demo version of Continua is the same as the regular version, but has the following limitations:

- Presets cannot be saved, nor can parameter values or other settings. This includes the information usually stored by your host DAW. If you save a DAW session with an instance of the demo version of Continua, Continua will revert to its default state when you reload the session.
- Continua will cease to generate audio at all 20 minutes after you add it to your DAW session. You can remove it and add it again, but it will revert to its default state.

[1] Product names and plugin format names are copyrighted by their respective owners.

Overview

Before we dive into the details, we'll describe Continua's overall architecture. At heart, Continua is a three-oscillator subtractive synthesizer with a few interesting twists in its signal routing and modulation capabilities.

Polyphony

Continua is fully polyphonic, which is to say that it can play several notes simultaneously. The sound for each note is created by what we call a *voice*. The voices have a common set of controls and parameters, shown by Continua's window. As you'd expect, turning one of Continua's knobs changes that setting for all the voices. Continua has 15 voices, and hence can play up to 15 notes simultaneously. Continua also has a unison mode which causes some or all of the voices to play the same note, creating a thicker sound.

Sound Sources

Continua's sounds start with three identical oscillators with independent controls. The oscillators have continuously variable wave shapes for a wide variety of timbres, ranging from traditional analog-like sawtooth and rectangular waves to modern digital-sounding shapes.

Continua also has a noise source with sophisticated internal filtering for generating white, dark, and light noise.

Filters

Continua has two filters with independent controls. Rather than being restricted to the usual frequency-response characteristics described as low pass, high pass, band pass, and notch, Continua's filters can change smoothly between these shapes. Accompanying the filters is a saturation/clipping/shaping block for warmth and distortion.

Modulation

While Continua's sound sources and filters can create a very wide range of sounds, those sounds are largely motionless—they don't change. *Modulation*, which essentially means something changing something else, imparts shape and motion on the static sounds, making them short and sharply percussive, long and unpredictably evolving, or anything in between. Modulation always involves a *source*, that is, the something that's doing the changing; and a *destination*, the something that's being changed.

Modulation Sources

Essential for both basic note-shaping and complex timbres, Continua provides a large variety of modulation sources: two classic ADSR envelope generators, two multi-point flexible envelope generators (FEGs), four low-frequency oscillators (LFOs) with completely variable waveshapes, a sample-and-hold source fed by the EGs and LFOs as well as its own source of randomness, and a random source triggered at the beginning of each note. Unlike some simpler synthesizers, Continua's modulation sources are polyphonic, that is, each voice has its own set of envelope generators, LFOs, and so on. Each note within a chord can evolve independently of the others.

Continua maps several MIDI messages to modulation sources: velocity, aftertouch, pitch bend, modulation (Continuous Controller #1), and Continuous Controller #74. The last is commonly used by MPE controllers for timbral control. Continua can operate either as an MPE-aware synthesizer, treating MIDI controller data polyphonically, or as a legacy receiver in which MIDI controller messages affect all voices simultaneously.

Continua also has several panel controls for manually modulating parameters: two two-dimensional XY pads and eight knobs. These macro controls can each be routed to one or several destinations, allowing you to change several parameters of your choosing with one control.

Modulation Destinations

While many synthesizers have a small number of obvious modulation destinations like the filter's frequency, almost every parameter in Continua's voice can be modulated. If it has a knob on the panel, you can probably modulate it. This includes the controls for the modulators; they can modulate themselves or each other. Each destination can receive up to five modulation signals.

Effects

To create a finished, professional sound, Continua contains three effects processors: stereo chorus, dual delay, and stereo reverb. Drawing upon our years of experience with digital signal processing, we built these effects specifically for Continua.

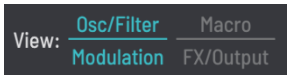
Signal Flow

Continua mostly follows the usual subtractive-synthesizer signal flow, with a few twists. Each oscillator, and the noise source, can be routed to either of the filters, or both. The filters can be arranged in series (one after the other) or in parallel with their outputs mixed, and the distortion section can be placed either before or after the filters. Also, the second and third oscillators can modulate the frequency of the first, dramatically widening its timbral palette.

User Interface

Continua uses knobs for most of its controls. Click and drag either vertically or horizontally to manipulate the knobs. Double-clicking a knob will return it to its default value, which will usually be the parameter's most neutral setting. You can move the knob by smaller amounts if you press the `OPTION` key on your macOS keyboard, or `ALT` key on a PC keyboard, after clicking on the knob.

There are several switches throughout Continua's window; turn them on/off simply by clicking them.



The plugin's window shows one of two views: one which displays the synthesizer's voice controls, and another which displays the effects, macro controls, and output controls. Change between the two views by clicking the View switch near the top left of the window. There are also secondary panes for accessing presets and auxiliary controls; invoke these panes by clicking the preset name and the word **Settings** at the top of the window.

Oscillators

Continua's sounds begin with its three oscillators. Rather than using fixed tables of waves, as is common in other software synthesizers, these oscillators mathematically calculate signals from scratch, in real time. This allows them to change shape smoothly or suddenly, morphing through a wide variety of sounds. Despite this power, Continua's oscillators are easy to use and explore, with just three knobs for controlling their shape. The oscillators also have controls for their pitch, output level, and routing. We'll describe all of them in this section.

Shape

The main oscillator control is the **Shape** knob. It is a bidirectional control; its center, 12 o'clock position is its neutral setting. Continua's oscillators have a dual personality, generating both classic analog wave shapes and overtly digital-sounding tones. The red line in the center of the knob shows the shape of the wave, but your ears will be a better guide than your eyes.

When the **Shape** knob is at its center position, the oscillator generates a sine wave—the purest, simplest sound, common to both analog and digital synthesizers. Rotating the knob clockwise morphs the wave from a sine wave to a rectangular wave, then a sawtooth. Rotating the knob anti-clockwise produces shapes which aren't readily described.

When the knob is rotated anti-clockwise, it acts as a sort of intensity control for the **Warp** and **Skew** knobs. This means that if the **Warp** and **Skew** are both set to zero, moving the **Shape** anti-clockwise won't change the oscillator's output; it will remain a sine wave. By contrast, the **Shape** knob itself changes the oscillator's tone when it is rotated clockwise from the center position.

Skew

The **Skew** knob has a different effect depending on the settings of the **Shape** and **Warp** knobs. If the **Shape** knob is set left of center, the **Skew** knob flattens the upper half of the sine wave and narrows the lower half. The resulting timbre is somewhat reminiscent of sweeping a resonant bandpass filter if **Warp** is set to zero. As you turn up the **Warp**, the skew's influence is less predictable, although moving the **Skew** knob towards either end of its range tends to make the oscillator sound brighter.

In the right-hand range of the **Shape** knob, the **Skew** knob affects the rectangular and sawtooth waves differently. If the **Shape** knob is set to a position corresponding to about 2:30 on a clock face, the oscillator generates a rectangular wave. The **Skew** knob changes the duty cycle, or pulse width, of the rectangle. Modulating the **Skew** parameter produces the "PWM" sound familiar from analog synths. If the **Shape** knob is at its maximum clockwise position, the oscillator's output is a sawtooth wave. The **Skew** knob bends the sawtooth, changing it into something sort of like a symmetric triangle wave. The audible effect is also somewhat like pulse-width modulation, but with the fuller, brighter spectrum of a sawtooth.

Warp

Like skew, the **Warp** knob behaves differently depending on where both the **Shape** and **Skew** knobs are set. If the **Shape** knob is in its left-hand range, and if the **Skew** knob is set to its center position, the **Warp** control bends the sine wave in a manner somewhat like a wave folder or wave multiplier. The result sounds somewhat like a bright wave like a sawtooth being swept by a resonant analog filter, although with a more "digital" quality. Rotating the **Skew** knob either direction from center changes the symmetry of the wave, making it brighter and buzzier.

In the right-hand range of the **Shape** knob, the **Warp** knob affects the rectangular and sawtooth waves in different ways. The **Warp** knob splits and narrows the rectangle, producing a tone somewhat like pulse-width modulation and somewhat like oscillator sync. When the **Shape** knob is fully clockwise and the oscillator generates a sawtooth, the **Warp** knob first curves the sloped portion of the sawtooth, then adds a sort of hump halfway through the wave. This has an overall effect of emphasizing the middle range of the tone, making the oscillator somewhat hollow sounding.

Transpose

Continua always sets the frequency of its oscillators based on the MIDI notes it receives in the manner you'd expect. For example, play A above middle C on your keyboard, and the oscillators will generate a signal with a frequency of 440Hz. The **Transpose** control offsets the tuning of the oscillators in semitones[2], with a range of -24 to +24. If you leave this control at zero for Oscillator 1 and set it to +12 for Oscillator 2, the second oscillator will play one octave above the first. Click and drag on the number to change the transposition interval.

Fine Tune

The **Fine** control adjusts the oscillator's frequency by a small amount. It has a range of -100 to +100 cents; a cent is $1/100^{th}$ of a semitone. Use the **Fine** control to detune the oscillators slightly to add thickness and motion to the sound. Click and drag on the number to change the amount of detuning.

Level

The overall loudness of each oscillator is controlled by the **Level** knobs. Turning the knob up makes the oscillator louder, turning it all the way down silences the oscillator.

---

[2] To put this to a fine point, the Transpose control works in MIDI notes. A transposition of one MIDI note usually corresponds to a semitone but could be a different interval depending upon the tuning table.

Filter Switches

Each oscillator's signal goes to either or both filters. Click the words **Filter 1** and **Filter 2** to send the oscillator to the corresponding filter. Note that if both switches are off (grey), you won't hear the oscillator at all.

FM

Despite their modest appearance, the two small knobs below Oscillator 1 labeled **FM** are powerful additions to Continua's sonic repertoire. Each knob causes the second and third oscillator to modulate the frequency of the first. Frequency modulation (FM) is a powerful synthesis technique in its own right; the Yamaha DX7 took the keyboard market by storm when it debuted as the first commercial product based entirely on FM synthesis. Continua's relatively simple routing of two oscillators controlling a third (that is, two modulators and one carrier in FM parlance) greatly increases the range of timbres that the oscillators create in isolation.

The Osc2 and Osc3 knobs simply control the level or amplitude of the signal sent to Oscillator 1 from the others. The resulting sound is affected by all the other oscillator controls. Bearing in mind that the DX7's oscillators generated only sine waves, start exploring Continua's FM features by leaving the **Shape** knobs at their center positions and **Warp** and **Skew** at zero and turn off both filter switches for Oscillators 2 and 3 so that only Oscillator 1 is audible. Then turn up the Osc2 FM knob and you'll hear the sound become brighter. From here, try changing Oscillator 2's **Transpose** control to +12; notice how the timbre changes because of the different frequency ratio between the two oscillators. (Also notice that the intermediate transposition values between zero and 12 often produce inharmonic and clangorous sounds.) Then try changing the **Shape** knob of either or both oscillators. You'll find that waves with any corners or sharp transitions can produce rather discordant tones with frequency modulation.

The FM knobs are excellent candidates for modulation. Try setting an envelope generator to a short blip and routing it to one or both FM knobs to add an interesting attack transient.

Noise Generator

In addition to the three oscillators, Continua has a noise source. Use noise for synthesizing percussion instruments, sound effects, or to add a subtle thickening.

The **Color** knob applies an elaborate filter to the noise, changing its controls the spectrum or tone. If you leave this knob at its center position of 0.5, you'll hear unfiltered noise with equal energy in all parts of the audio spectrum. Turning the knob to the right reduces the lower frequencies, producing noise that sounds thinner or more hissy. Turning the knob to the left reduces the higher frequencies, producing noise that sounds duller. If you're familiar with the nomenclature that uses the names of colors to describe noise spectra, a setting of 0.5 produces unfiltered white noise, 0.75 and 1.0 generate blue and violet noise, and 0.25 and 0.0 give you pink and Brown (or Brownian, or red) noise. Intermediate values produce intermediate frequency spectra, creating a continuously variable noise source.

The other controls are the same as for the oscillators. The **Level** knob sets the level of the noise generator's signal that is sent to the filters, and the **Filter 1** and **Filter 2** switches send the noise to either or both filters.

ADSR Envelope Generator

Continua's primary modulation sources are a pair of envelope generators with the time-honored design of four controls: Attack, Decay, Sustain, and Release. You're probably already familiar with the ubiquitous ADSR but take a quick tour to point out a couple of special features. The two ADSRs share a common set of controls and a graphical display. Click the words ADSR 1 and ADSR 2 to switch between the two.

Pressing a key on your keyboard triggers the two ADSRs. Their outputs then rise from zero to maximum in an interval of time determined by the **Attack** knob. Once the output reaches its maximum level, it starts to fall back towards zero with a duration set by the **Decay** knob. It stops falling when it reaches the level

set by the **Sustain** knob, which can range from zero to maximum. The envelope generator's output stays at this level until you release the key, whereupon it falls to zero, taking an amount of time set by the Release knob. The **Attack**, **Decay**, and **Release** knobs all have a range of zero to ten seconds.

While the *time* it takes for the ADSR to move from one level to the next, the *rate* at which it changes can be altered with the **Curve** knobs. Each of the ADSR time controls has an associated curvature control. If the **Curve** knob is at its center position, the ADSR's output varies linearly, that is, with a constant speed. Turning the **Curve** knob to the left of center makes the output change quickly at first and then slow down, while turning it to the right does the opposite. Changing the curvature of any or all of the ADSR's segments changes the "feel" of how the envelope generator controls other parameters. Most analog envelope generators do not have linear characteristics. You can approximate their behavior by setting the **Curve** knobs to around 0.2-0.3.

Finally, the **Level** knob sets the maximum level of the envelope generator's output, from zero to maximum.

In addition to the knobs, you can change the ADSR parameters by clicking and dragging the small circles in its display. Drag the handles horizontally to change the time parameters and drag the handle third from the left vertically to change the sustain level. (Note that the first, second, and fourth handles always stay anchored at the bottom and top of the display, since the ADSR's output always starts at zero, moves to the maximum, and then returns to zero.) You can also drag vertically between any two handles to change the curvature of the corresponding segment.

Flexible Envelope Generator (FEG)

In addition to the ADSRs, Continua has two Flexible Envelope Generators (FEGs). The two FEGs have identical features and controls but operate independently. They share a graphical display with the ADSRs. Click the words FEG 1 and FEG 2 to switch between the envelope generators.

Unlike the ADSR envelope generators, Continua's FEGs can create modulation signals of almost any shape and description. Each FEG has an arbitrary number of *breakpoints*, that is, points with a specific level and a specific time relative to the previous breakpoint. When you play a note, the FEGs start at the first breakpoint, which always has a level of zero, and move from one breakpoint to the next. The last breakpoint also always has a level of zero. You can add any number of breakpoints between the first and last. A single breakpoint produces a simple attack/release envelope; adding two breakpoints emulates an ADSR (one point for the initial peak, another after it to define the sustain level).

The breakpoints are represented by the small circles joined by lines. We refer to the lines as *segments*. Click and drag a breakpoint vertically to adjust its level; drag it horizontally to adjust the duration of the segment, that is, the time between the breakpoint and the previous breakpoint. As you move a breakpoint, the breakpoint's numeric index, level and the segment's duration appear below the FEG. Double-click a breakpoint to delete it. To add a new breakpoint, double-click on a segment. To change the curvature of a segment, click and drag vertically on or near the segment.

If you drag a breakpoint past the right edge of the window, the FEG's drawing will be rescaled so that it fits within the window. Conversely, if you make the envelope short enough, it will be expanded to fill the window. Note that the time scale is non-linear: a segment which appears twice the length of another segment will have an actual duration that's more than twice as long as the other. The actual duration is displayed at the bottom of the view. Segments have a maximum duration of ten seconds.

The FEGs can also be synchronized to the host DAW's tempo and transport; click the **Sync** button on the right to activate this synchronization. When sync is on, the segment durations are expressed in multiples of 1/32nd of a beat and can be as long as a full measure. Note that when sync is on, the time scale within Continua's window is linear.

The FEGs can loop over any number of adjacent breakpoints while the note sustains. A pair of vertical lines and a shaded rectangle indicate the start and end points of the loop. Move the loop points by clicking either of the vertical lines and dragging them horizontally. If you set the start and end points to the same breakpoint, the FEG will simply stay at that breakpoint while you hold the key down.

The FEGs have three different looping modes: one-shot (i.e., no looping), forward looping, and bidirectional looping. Click the arrow symbols near the lower-right corner of the FEG view to switch modes. The modes operate as follows:

One-shot: the FEG runs from start to finish, without looping or sustaining.

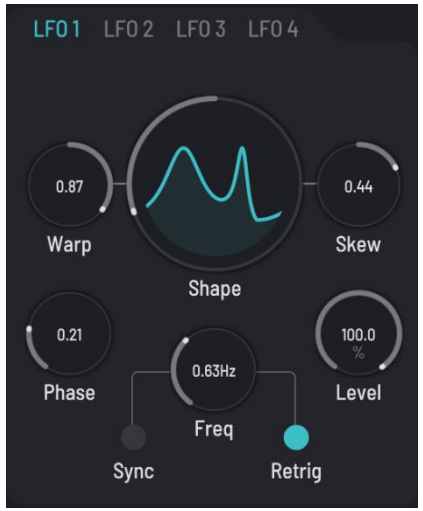
Forward: the FEG runs to the right-hand loop point, jumps back to the left-hand loop point, runs forward to the right, etc. until the note event ends. Upon note-off, the FEG runs from its current position to the end.

Bidirectional: same as Forward, except that the FEG runs backwards from the right-hand loop point to the left, rather than jumping, then forwards to the right, etc., looping back and forth until the note ends.

Note that the jump from the right-hand loop point back to the left will likely produce some sort of click or other discontinuity, depending on what the FEG is modulating. To avoid this click, you have two options: 1) set both loop points to the same level, so that the jump doesn't create a change in output level; 2) use the bidirectional looping mode—that's what it's there for.

The FEGs have a Level knob which sets the maximum level of the envelope generator's output, from zero to maximum.

Flexible Low-Frequency Oscillator (FLFO)



Continua sports four low-frequency oscillators. Unlike simpler LFOs found in many synthesizers, the output of these oscillators varies smoothly through an almost endless number of shapes. Hence we call the Flexible Low-Frequency Oscillators, or FLFOs. The four FLFOs have identical features and share one set of controls but operate independently. Click the words **LFO 1** through **LFO 4** to choose which of the four LFOs are connected to the onscreen controls.

Four knobs control the shape and behavior of the FLFO's output. The effects of these three knobs are related, and it's far easier to understand what they do by seeing them in action than by reading a description. To that end, the wiggly red line on the left displays one cycle of the FLFO, reflecting the combined effects of the **Shape**, **Phase**, **Skew**, and **Warp** knobs. We'll describe each of these in turn, but you may find it just as illuminating to twiddle them and watch what happens as to read about them.

The **Freq** (short for frequency) knob controls determine how fast the output of the FLFO varies over time. They operate either in units of frequency (Hertz, or cycles per second), or in metrical units (fractions of a measure). Click the **Sync** button to switch between the two modes. The FLFO's rate can be set from one cycle every 10 seconds (or 0.1 cycles per second, abbreviated 0.01 Hz) to 10 cycles every second (10 Hz). When **Sync** is turned on, the rate ranges from 2/1 (one cycle every two measures) to 1/32 (32 cycles per measure). A "D" or "T" after the number indicates dotted and triplet values.

The **Phase** knob positions the FLFO's wave relative to either the start of the note, or to the host DAW's transport position. The setting of the **Phase** knob corresponds to the left end of the wiggly red line. If **Retrig** is turned on, the FLFO will start its cycle at this point on the wave when a note starts. If **Sync** is

turned on, the FLFO's cycle will align with the DAW's transport such that the cycle always starts at this point (at metrical intervals set by the **Freq** knob). If neither **Sync** nor **Retrig** is turned on, the **Phase** control isn't particularly relevant because the wave's alignment will vary from one note to the next, since it will cycle independently of the notes. Sometimes you want modulation that varies predictably with each note, sometimes you want modulation that evolves independently of the notes. The **Retrig** switch gives you both.

The shape of the FLFO's output is controlled with the **Shape**, **Skew**, and **Warp** knobs. The **Shape** knob adjusts the basic shape of the signal, morphing it smoothly through four standard shapes: a double sine wave (i.e. a sine wave with twice the frequency set by the **Rate** knob), a sine wave, a triangle wave, and a square wave.

The **Skew** knob adjusts the horizontal symmetry of the wave, and has a different effect depending on the wave's initial shape. For example, if the **Shape** knob is set to produce a triangle wave, the **Skew** knob varies the wave from a downward-sloping ramp to a rising ramp. If the **Shape** is set to a square wave, the **Skew** knob varies the duty cycle of the wave.

The **Warp** knob applies an adjustable curvature to the wave, changing its vertical symmetry. It can bend a triangle wave into a sharp spike and change a sine wave into a rounded pulse.

Like the envelope generators, the FLFOs have a Level knob which sets the overall level of their output, from zero to maximum. Unlike the envelope generators, however, the output from the FLFOs is bipolar, that is, it oscillates between a negative value and an equal, positive value.

Here's a quick walkthrough: start by double-clicking both **Skew** and **Warp** to set them to their center (neutral) positions. Turn **Shape** all the way clockwise and you'll see a simple square wave. Turn **Shape** down slowly and you'll see the wave change into a triangle, then a sine, then a double sine. Set **Shape** back to 0.75 to get a triangle wave, then play with the **Skew** and Warp knobs to explore their effect.

Sample and Hold

The Sample and Hold modulator reproduces a classic feature of analog synthesizers. It acts like a simple memory for modulation signals. When triggered, it samples its input signal, and holds that value at its output until it is triggered again. It's something of an electronic sound-effects stereotype to feed a sample and hold module with a random signal (noise) and use its output to control the pitch of an oscillator, creating a series of random notes. Continua's sample and hold, like the other modulators, can control any of the modulation targets—filter frequencies, oscillator shape parameters, whatever.

The **Source** popup menu chooses the sample and hold's input signal, either a source of random numbers, or the outputs of any one of the four EGs or LFOs.

The **Rate** knob controls determine how often the sample and hold is triggered. It operates either in units of frequency (Hertz, or triggers per second), or in metrical units. Click the **Sync** button to switch between the two modes. The trigger rate can be set from once every 20 seconds (or 0.05 cycles per second, abbreviated 0.05 Hz) to 10 times every second (10 Hz). When **Sync** is turned on, the rate ranges from 2/1 (one trigger at the beginning of every two measures) to 1/32 (32 triggers per measure). A "D" or "T" after the number indicates dotted and triplet values.

If the **Retrig** button is turned on, the sample and hold triggers at the beginning of every note.

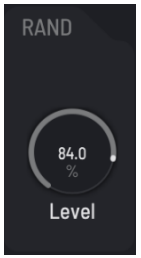
The **Smooth** knob applies an adjustable amount of smoothing to the sample and hold's output. If **Smooth** is set at zero, the output jumps from one value to the next. If you turn the knob all the way up, the output moves in a linear ramp between values. Intermediate settings provide a linear ramp followed by a flat spot until the next trigger, producing something one might call a ramp and hold.

The **Limit** knob reduces the amount that the sample and hold's output will change with each trigger. A setting of zero imposes no limit; the output can potentially jump from -1 to +1 with a single trigger. As you turn the **limit** knob up, the amount that the output will change from one sample to the next

decreases—regardless of the input signal. If you turn the limit all the way up, the sample and hold's output won't change at all. This which isn't very useful by itself, but you can then apply negative modulation to this knob, producing a modulation signal which sometimes changes and sometimes doesn't.

Finally, there is the usual **Level** knob for controlling the sample and hold's overall output level.

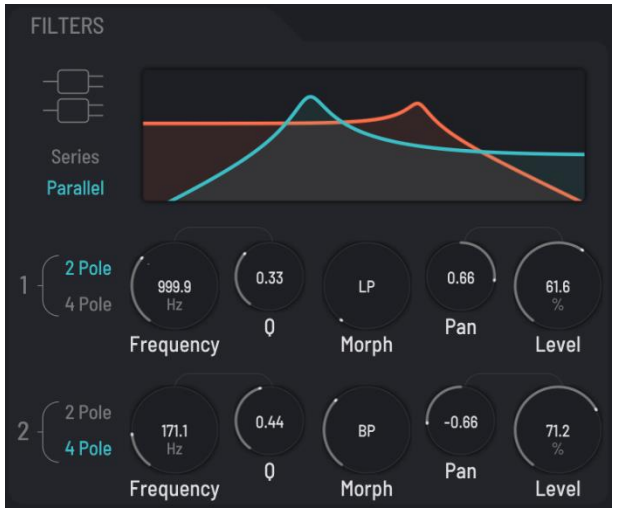
Random Source



Down in the lower-right corner of Continua's window you'll find a single knob with the heading **Rand**. One of Continua's modulation sources is a random-number generator which changes at the beginning of every note. Like the other modulation sources, the random source is fully polyphonic; every voice has its own random-number generator. Its single level knob controls its maximum value, from zero to 100%.

One interesting use of this modulator is to apply a very small amount of random influence to the oscillator fine-tuning controls and/or the filter frequencies. This produces small detuning effects between each note. Analog hardware synthesizers necessarily have at least a small amount of variation between each voice (because they're built with components that aren't all exactly the same); the detuning caused by this variation may contribute to the "warmth" attributed to these instruments. Hence using the random source in Continua can reproduce some of this variation and characteristic.

Filters



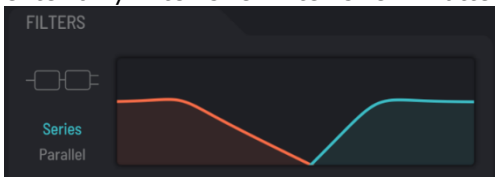
Each of Continua's voices has two filters. Each filter can operate in one of eight configurations or be turned off altogether. The filters can be arranged in series, so that the signal first passes through filter one and then through filter two; or in parallel, so that the signal passes through both filters and their outputs are mixed together.

A filter removes some frequencies from the signal passing through it while leaving others unchanged. In the context of synthesizers, filters bear standard names which describe which frequencies they pass or leave unchanged, such as low pass, band pass, etc. Many synthesizers have filters of only one type, usually low pass. Some offer different types with a switch to choose one of the several. Instead of fixed types, Continua's **Morph** knob smoothly modifies the filter through four different response types: low pass, band pass, high pass, band stop (or notch), and back to low pass. A pair of letters in the center of the knob indicates the closest response type, while the graphical display shows the actual frequency response. If you've ever yearned for a filter that sweeps differently than usual, or an asymmetric band pass filter, or other filters off the beaten path, you'll welcome Continua's filters.

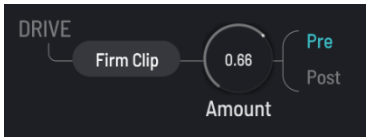
The buttons labeled **2 Pole** and **4 Pole** select the steepness of the filter. The four-pole response is steeper than the two-pole, but of course the Morph knob also affects the overall frequency behavior of the filters.

Finally, the buttons labeled **Serial** and **Parallel** change the filters between the serial routing and parallel routing. Filter Two follows Filter One when they are connected in series.

Note that it's entirely possible to configure the filters such that nothing passes through them at all, silencing Continua altogether. For example, consider the arrangement shown at the lower left corner of this page. If the routing mode is serial, you won't hear anything because the signal from the oscillators will enter only Filter One. Filter One will attenuate all the high frequencies, passing only low frequencies on to Filter Two. Filter Two attenuates the low frequencies, and then there's nothing left to hear. However, if you switch the routing mode to parallel, both filters receive the signal from the oscillator and/or granulator. The low frequencies from Filter One's output will be added to the high frequencies from Filter Two, and you'll hear highs and lows but nothing in the middle.



Drive



Continua's **Drive** controls a last touch of timbral manipulation within the voice. This simple but versatile block modifies the signal in different ways, creating saturation, distortion, and wave-shaping effects. Its controls are as follows:

The ovoid popup menu chooses one of several shaping modes, as follows:

-Off- - this bypasses the shaping block altogether.

Soft/Firm/Hard Clip – these three modes apply symmetric soft clipping to the signal, creating saturation or distortion effects. There is a choice of three different clipping curves, with increasingly sharp bends for increasingly aggressive clipping.

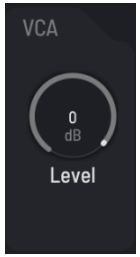
Asymmetric – this mode affects only the negative half of the signal, producing distortion that emphasizes even harmonics.

Sine Wrap – similar to the wave shapers found in other synthesizers, this mode uses a sine wave of increasing frequency to reshape the signal.

The Amount knob controls the overall effect of the Drive block. A setting of zero produces little or no change in the signal. Turning the knob up increases the intensity and distortion.

The Pre and Post switches choose whether the Drive block operates before or after the filters. This positioning can produce drastically different results, and there are no particular guidelines about which position is better, so try both.

VCA



The single knob under the "VCA" header is the last element in the synthesizer voice's signal path. The VCA, short for Voltage Controlled Amplifier, controls the overall loudness of the signal. You must have at least one modulation source routed to the VCA Level knob in order to hear anything. By default, ADSR1 is routed to the knob, so that this envelope generator shapes the volume of the sound. You can replace it with an FEG, or add other modulation sources, to create more complex loudness shapes.

The Level knob itself has a range of -60 to +3dB, which means it can nearly silence the signal or boost it slightly. The net effect of the modulators assigned to this knob is at most unity gain; you can use the knob to adjust the overall loudness of the synthesizer before the signal enters the effects section.

Effects

Every synthesizer sounds better with some added effects, so we've taken the liberty of adding a chorus, delay, and reverb processor to Continua. These processors receive all of the synthesizer voices mixed together, that is, they're outside of, or after, the synthesizer itself. The signal passes through them in the order they appear in the window: chorus first, then delay, then reverb. Each effect can be switched on or off individually.

Chorus

Chorus processors were among the first effects built directly into keyboard synthesizers, and with good reason: even a simple chorus can give a monophonic synthesizer a lusher, stereo sound. Our main sources of inspiration for Continua's chorus were the effects found in Roland's early polyphonic analog synths. Our version consists of a pair of delays with independent modulation low-frequency oscillators.

The **Rate** knob changes the speed of the chorus's LFOs, controlling how fast the chorus shimmers or wobbles. The **Depth** knob controls how much the LFOs affect the delays. High settings of the **Depth** knob can produce audible pitch changes, which may or may not be useful. You may find that adjusting the **Rate** and **Depth** in complementary directions produces the best results,

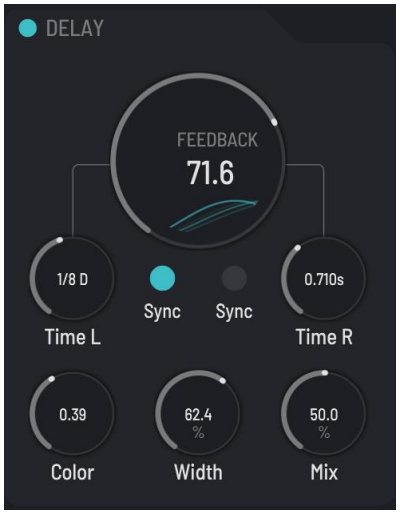
e.g. turning down the **Depth** after turning up the **Rate**.

The **Mode** switch selects one of two sets of operating conditions for the chorus. It changes the nominal delay times and ranges for the LFO rate and depth, producing two different flavors of chorusing.

The **Mix** knob sets the overall intensity of the chorusing by changing the blend between the unprocessed signal and the chorused signal. If you turn it down to zero you won't hear the chorus at all, while if you turn it up to 100%, you'll hear just the processed signal.

Finally, the dot next to the word Chorus is the on/off switch for this effect.

Delay



Next in Continua's effects chain is a stereo delay, with separate delay lines for each channel. Delays can be used for anything from short doubling effects to long, spacey echoes.

The **Time L** and **Time R** knobs set the delay times of the left and right delays, respectively. They have a range of one millisecond to two seconds. Turning on the corresponding **Sync** switch makes the delay times operate in metrical units, expressed as fractions of a measure. The letters **D** and **T** indicate dotted and triplet values, so for example a setting of **1/8 D** means a dotted eighth note. If the **Sync** switch is on the delay times will change to match the tempo of your host DAW.

The **Feedback** knob sends some or all of the delayed signals back to the inputs of the delay lines. If the feedback is zero, you'll hear only a single delayed "copy" of the signal. Turn up the **Feedback** and you'll hear more copies which fade out with each repeat. A setting of 100 means that all of the delayed signal goes back to the inputs, sustaining the sound more or less indefinitely. A combination of a short delay time and a high feedback creates metallic, ringing sounds independent of the synthesizer voice itself.

A set of filters modifies the tone of the delayed signal. The **Color** knob controls these filters, brightening or darkening the sound of the delay. Turn it clockwise to reduce the low frequencies, making the sound thinner and brighter. Turn it anti-clockwise to reduce the highs, making the sound darker and warmer.

The two delay lines operate independently, potentially creating a wide stereo effect. Delays panned completely to the left and right sometimes sound *too* wide, so we've added a handy **Width** knob. At 100% the delays are entirely separate, creating the widest separation. Turn the knob down to move the delays towards the center. A setting of zero gives a mono output.

The **Mix** knob simply adjusts the balance between the original signal and the delayed signal. 50% gives you an equal amount of both, 100% gives you just the delayed signal, and zero gives you just the original.

Click the dot next to the word **Delay** to turn the delay on and off altogether.

Reverb

Reverberation, or reverb for short, is the reflections we hear when a sound bounces off the walls, floor, ceiling, and other objects around us. Artificial reverb can add realism to an electronic sound (like a synthesizer) or create unnatural effects. Continua's reverb draws upon our experience with Adverb and Eos, our dedicated reverb plugins, but is a new processor built specifically for enhancing synthesized sounds.

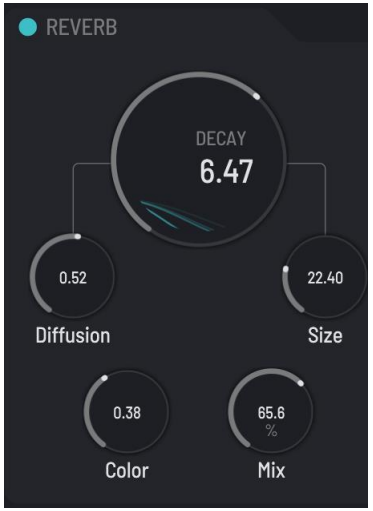
The **Diffusion** knob controls how much the initial density of echoes (often known as early reflections) builds up over time. Turning up the diffusion increases the build-up of echoes immediately following the original signal.

The **Decay** parameter controls how long it takes for the reverberated sound to fade out. This control has the greatest influence on the overall sound of the effect. The range of this control is 0.1 to 10 seconds, which is approximately the amount of time that it takes the reverb sound generated by a full-volume signal to fade to silence. The actual amount of time it takes the signal to fade out is also affected by the **Decay** control so the numeric value of decay should be considered a relative value.

The **Size** control varies the apparent size of the simulated acoustic space. As will be evident when you listen to it, rotating the **Size** knob changes the "bigness" of the reverberated sound.

The **Color** knob is a simple-to-use tone control. Turning it to the left makes the reverb's sound darker, turning it to the right makes the sound brighter.

The **Mix** knob adjusts the relative loudness of the processed signal and the original signal. If you set it at zero, you'll hear only the original, unprocessed signal. If you set it at 100%, you'll hear only the reverberation.

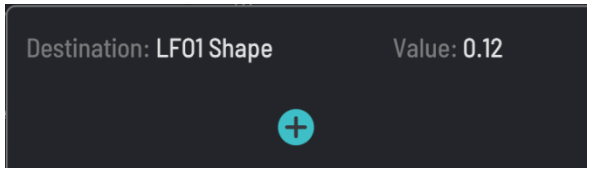


Modulation

We've talked about Continua's modulation sources: the ADSRs, FEGs, LFOs, sample and hold, and random generator. By now you're probably wondering how to use these sources—how to connect them to other things, and what these things might be. In Continua, almost all voice parameters are modulation destinations. If it has a knob on Continua's window, you can connect a modulator to it. You can also modulate the **Transpose** and **Fine Tune** parameters. Many effects parameters can also be modulated, but with a restricted set of sources. Since the effects exist outside of the synthesizer's voices, the effects parameters cannot be modulated by the voice modulation sources such as the envelope generators and LFOs.

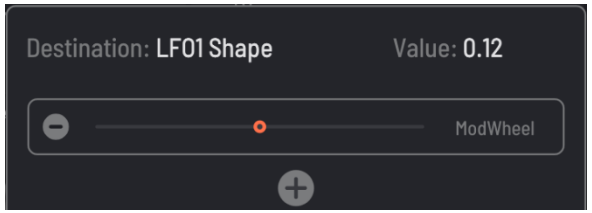
Connections

Instead of dangly simulated patch cords or a separate list of modulation routings, Continua's modulation connections exist at every knob. Right-clicking a knob (or double-tapping it on iOS) invokes a modulation routing pane, which looks like this:



Destination is the name of the parameter you just clicked, and **Value** is its current setting. You can click and drag the value number to change it, just like moving the knob. You'll see the knob moving in response. To add a modulation connection, click the ⊕ symbol, which expands the pane to show the modulation sources (see next page):

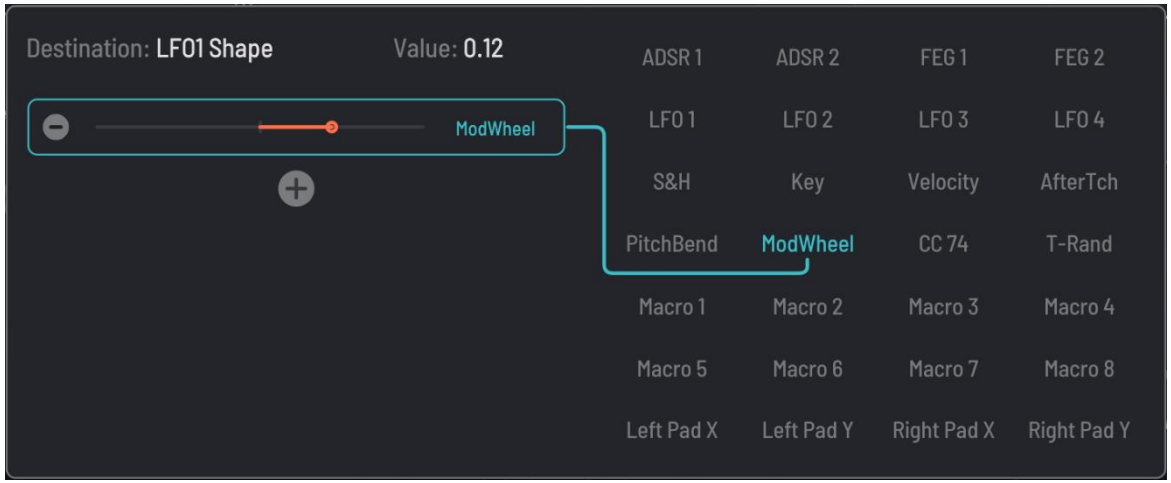
Then click one of the sources. The pane collapses again, but now shows the source you chose and a slider:



Moving the slider to the right increases the amount that the modulation source affects the destination, i.e. the parameter. Moving the slider to the left from its center position has the same effect but inverts the modulation signal.

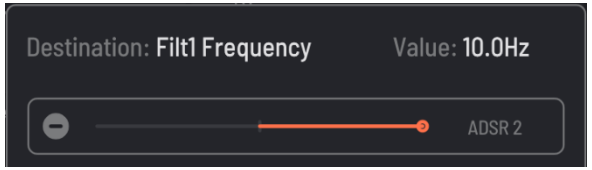
The envelope generators (both ADSRs and FEGs) produce unipolar modulation signals; that is, they move parameter that receives them in only one direction. The LFOs produce bipolar signals, or positive and negative signals. These signals increase and decrease the receiving parameter, relative to its knob's position.

Modulation signals are added together for each destination; you can connect as many as five modulation sources to one (or more) destinations, with varying weights. To add additional modulation signals, click the ⊕ symbol again. To change an existing connection, first click on the name of the source, expanding the panel, then click a new source:

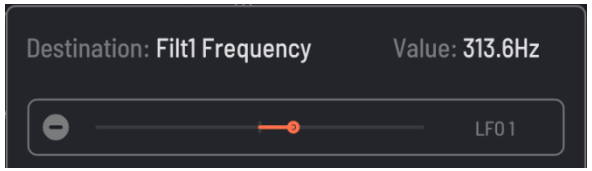


To delete a modulation connection altogether, click the ⊖ symbol to the left of the connection's slider.

Most modulation destinations are scaled such that if you set the connection to its maximum setting, the source can change the parameter across its entire range. So, for example, if you want an ADSR to sweep the filter from its lowest frequency to its highest, turn the filter's frequency knob all the way anti-clockwise and set the connection gain of the ADSR source to its maximum, like this:



On the other hand, if you want an LFO to vary the filter cutoff just a little bit around a particular frequency, set the frequency knob to that value, and set the modulation connection a little bit right of center:



Finally, click anywhere outside of the modulation panel to dismiss it.

MIDI Sources

The modulation source list contains several items that represent MIDI messages, as follows:

Key - a modulation value representing the MIDI note number, i.e., which note you're playing on your keyboard. The **Key** value is bipolar, centered on MIDI note C3, so that playing up from C3 means the mod value increases above zero, and playing down from C3 means the value decreases below zero. Note that the oscillators are hardwired to the MIDI note number; you don't have to add a modulation connection to make the oscillators track the keyboard.

Velocity - this signal represents how hard you initially hit your keyboard, drum pad, whatever. Connect this signal to the filter frequencies to make notes sound brighter when you play harder.

AfterTch - an abbreviation of Aftertouch, this signal is generated by pressure on your keyboard as you hold down notes.

PitchBend - the signal for the MIDI pitch-bend wheel. This signal is bipolar; pulling the wheel towards you generates negative values. Connecting this source to either the oscillator Transpose or Fine Tune will give Continua the normal pitch-bend behavior, but you can connect it to anything else to use your pitch wheel for timbral control.

ModWheel - the signal for MIDI Continuous Controller #1 messages. These messages are usually transmitted when you move the mod wheel on your keyboard.

CC 74 - the signal for MIDI Continuous Controller #74 messages. Originally these messages were somewhat hazily defined as "Brightness" in the MIDI specification, but now they are commonly used by MPE controllers to transmit position information.

Indicators

Knobs have a small, colored arc that indicates the total value of any modulation signals they receive. Since mod signals always affect parameters relative to the current position of their knobs, the arcs always originate at that position. The modulation arcs move in the direction you expect: positive signals extend the arc clockwise, negative signals extend it counter-clockwise.

Level Controls and Modulation

Worth noting in the context of modulation are the level controls present on the output of every signal source, filter, and modulator. Modulating these levels is a powerful technique for creating subtle or radical changes in timbre, for example by varying the relative loudness of the three oscillators and/or the two filters. Level controls are also useful MIDI targets. For example, to create the common configuration of your keyboard's mod wheel controlling vibrato: connect an LFO to the **Transpose** controls of the oscillators, set the LFO's **Level** control to zero, then modulate it with the **ModWheel** source.

Macro Controls

Continua's macro controls provide a handy means to control important parameters of your choosing from a central location. There are eight macro knobs and two two-dimensional macro control pads. Each of these acts as a modulation source, so you can assign any macro to one or more parameters, and any parameter can receive the signal from one or more macros. Also, each of macro knobs can itself be modulated, although be careful of feedback loops which usually result in a wrestling match between you and the plugin.

Macros appear as parameters in your host DAW. Since they're particularly useful as automation targets, or as targets for external MIDI controllers, they will appear first in your DAW's list of Continua's parameters. If you have an Ableton Push, for example, you will find that the macros appear on the first page of parameters on the Push's display.

Each macro can be given a name to remind you of its function. Click in the small rectangle, type in a name, and press Enter. Names are stored within presets, so each preset can have different macro names.

Output

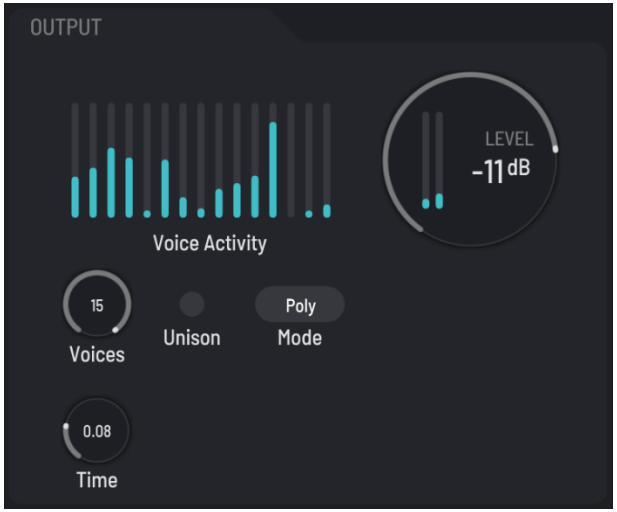
The section at the lower-right corner of Continua's window has a few controls for Continua's overall output. They work as follows:

The popup menu ovoid named **Mode** chooses between one of three voice-allocation modes, that is, how the voices respond to MIDI notes, particularly two or more simultaneous notes.

Poly – Continua plays as many notes as you press on your keyboard; each note plays one voice. This is the default mode and probably the one you'll use the most.

Mono – Continua plays only one note at a time. If you play a second note while holding the first, Continua will change to the second note's pitch but will *not* restart the envelope generators. This is sometimes known as legato mode.

Retrig – Same as Mono mode, but the envelope generators restart every time you press another key while holding others.



The **Unison** switch turns the unison mode on and off. When it's illuminated, and when the **Mode** switch is set to Mono or Retrig, Continua's voices play simultaneously for each note. Turn this switch on to create thick sounds. (You might find it useful to use the **T-Rand** modulation source, routed to the oscillator **Fine Tune**, to create a touch of random detuning between the voices for an even thicker sound.) The number of voices that play at once is set by the **Voices** knob to the left of the **Unison** switch.

The **Time** knob also affects only the Mono and Retrig modes. It controls a glide effect, a smooth change in pitch between notes. As you turn the knob up, it takes longer for the oscillators to move from the pitch of one note to the next.

The **Voices** knob lets you set the number of voices, with a maximum of 15 (six when using the iOS version), that play simultaneously. Besides setting the number of voices that play in Unison mode, you can use this control to reduce the maximum CPU load of the plugin. This knob cannot be modulated.

The **Voice Activity** meters show you which voices are currently playing notes and provide a rough indication of their output levels. The meters display the sum of modulation signals reaching the VCA and thus may not accurately reflect the audible output of the voices. For one obvious example, if you don't have any of the filter-routing switches for the oscillators turned on, you won't hear anything come out of the plugin no matter what the **Voice Activity** meters seem to be showing you.

The **Level** control acts like a volume knob, setting the overall loudness of the plugin. Click on it and drag vertically to change the output level. A pair of meters inside the control shows the relative signal strengths of the left and right channels. If these meters are regularly hitting the top of their range and staying there, you probably want to pull the **Level** control down a little. The **Level** control cannot be modulated—use the Level knob in the VCA section instead.

Presets

Continua includes a number of presets to serve as a demonstration of its capabilities and inspirations for your own creations. To access the presets, click the name of the current preset (to the right of the word **Preset** at the top of the window) to open the preset browser. Click anywhere outside the preset browser to dismiss it.

The browser displays presets within a list of folders. Double-click a folder to reveal its contents and click a preset name to load the preset. Yes, this irretrievably erases Continua's current settings, so if you have created a sound that you want to use again, save it as a new preset before loading another preset. To save your own presets, click the **Save** button. Continua will prompt you to enter a name for the preset with a standard system file dialog box.

The folders and presets in the browser correspond to folders and files within Continua's own folder on your storage device (i.e. your computer's hard drive or SSD). This folder is located at `C:\ProgramData\Audio Damage\Continua\` on Windows, and `~/Music/Audio Damage/Continua/` on macOS. Theoretically you can save your presets anywhere you like, but in order for them to show up in Continua's User list they must be placed in the User folder within Continua's folder. Any folders you create within this folder will show up as folders in the User list.

Preset files are plain-text XML files so that you can exchange them online in forums, copy them between a Windows computer and a Macintosh, email them to your friends, etc.

You can delete presets from the User list by clicking their name and then clicking the **Delete** button. Continua will give you a chance to confirm this action or cancel it. If you confirm, the preset's file will be removed from your storage system and is gone for good.

The **Copy** and **Paste** buttons copy the current settings to the system clipboard and paste settings from the clipboard. You can use the copy and paste commands to transfer settings between two instances of Continua or paste the settings into an email message or text editor. When copied to the clipboard, presets are presented in the same XML text as used in preset files.

The **Import** button provides a way to add presets to Continua without manually moving them into the appropriate folders in your file system. Clicking this button produces a file-browser window wherein you can select either a single preset file or a .zip file containing one or more presets. After you select the file, Continua copies the preset(s) into whichever folder you've selected in Continua's preset list, unzipping the file first if necessary.

The **Export** button performs the complementary functions of the **Import** button. First select either a preset or a folder in Continua's list, then click Export. A file-save window appears; choose a location in your file system, give the file a name, and click Save. If you've chosen a folder in Continua's preset list, the plugin places it and all of the presets it contains in a .zip file.

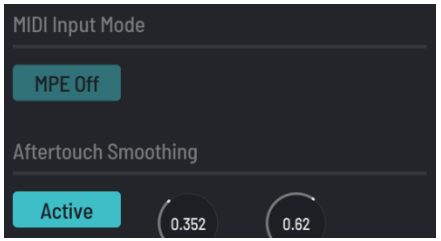
Default Preset

If you save a preset with the special name "Default" in the User folder, new instances of Continua will load it automatically when you add it to your DAW session. You can use a default preset file to give you the same starting point with Continua, maybe with a few modulation settings that you always use, maybe a complete sound that you find yourself using on every new song in your current project.

Settings

The Settings panel contains controls for tailoring Continua to your MIDI controller and playing preferences. You'll also find controls for manipulating Continua's pitch standard and tuning. The settings in this panel are stored within your host DAW's session files, rather than within presets. Hence, they do not change when you load a preset file. These settings apply to individual instances of Continua; two or more instances within one DAW session can have different settings.

MIDI Input Mode



The **MPE** switch, under the heading **MIDI Input Mode**, affects how Continua handles MIDI notes and controller messages. If you have a MPE controller such as a Linnstrument or Roli Seaboard, turn this switch on. Continua will then process pressure, pitch bend, and position information independently for each note, providing the expressivity that you expect from your controller. If you don't have a MPE controller, leave this switch turned off and ignore it.

As you're probably already aware, you also need a host program that can correctly transmit multi-channel MIDI information from your MPE controller to Continua for Continua to respond accordingly.

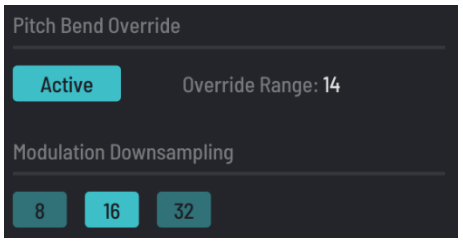
Aftertouch Smoothing

We used a variety of MPE-equipped controllers while developing and testing Continua. Most (maybe all) MPE controllers on the market provide their own software for adjusting and scaling their response to touch, pressure, position, and so on. We did not see a compelling reason to attempt to supplement or replace this functionality. However, we did find that it is often useful to smooth out the aftertouch (i.e. pressure) data originating from some controllers.

The **Active** button turns on a simple smoothing filter with a response rather like a lag processor module found in some analog synthesizers. The **Attack** and **Decay** knobs control the amount of smoothing: a higher setting produces more smoothing, that is, a slower change in output for a given change in input. The **Attack** knob affects increasing changes in value (more pressure) while the **Decay** knob affects decreasing changes (less pressure).

Some controllers do not send a zero aftertouch value when you remove your finger from the key or pad. If Continua's aftertouch smoother is active, the **AT** modulation source will always return to zero after a note ends. How quickly it fades to zero from its current value depends on the setting of the **Decay** knob.

Pitch Bend Override



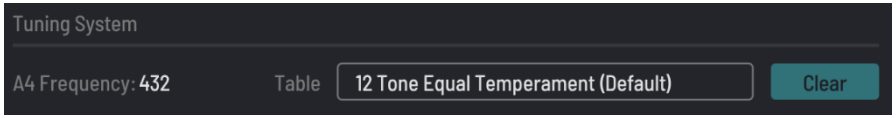
Continua's modulation system allows MIDI pitch bend messages to control any parameter with any range of effect. If you turn on the **Active** switch, the pitch-bend range is set by the number shown as **Override Range**. This value is in semitones; click and drag vertically to change it or double-click it to type a value. The amount slider of any modulation connection which uses MIDI pitch bend will be overridden by this value.

Modulation Downsampling

To reduce Continua's overall CPU load, its modulators operate more slowly than the rest of the signal processing, doing the math to generate and route the modulation signals less often than every audio sample. This reduction in the number-crunching load means a slight reduction in the smoothness of the modulation, which can sometimes affect the audio signal. The three buttons labeled **8**, **16**, and **32** let you choose how often modulation is updated, with the number representing how many audio samples are calculated before the next modulation calculation happens. In other words, clicking the 16 button means that Continua's modulators will be updated every 16 samples. Usually this setting won't have much effect and you can leave it at 32, which provides the lowest CPU load. Try the other settings and let your ears be your guide. You may hear a difference in bass sounds with their relatively slow audio waveforms, or if you're using one modulator to affect another or itself.

Global Tuning

Continua provides facilities for non-standard tuning and intonation. First, the **A4 Frequency** control simply adjusts Continua's overall pitch. Standard tuning uses 440Hz for A above middle C. If you need to adjust Continua's pitch slightly to match other instruments or recordings, or if you use a different pitch standard in your music, simply change the number in the text box, either by clicking and dragging vertically or double-clicking and typing a number.



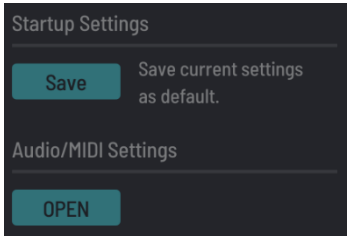
Second, Continua's pitch reference, intonation, and/or keyboard mapping can be completely changed with TUN files. TUN files use a standard file format for providing tuning information. If you're interested in microtonal music or non-Western musical instruments, you've probably already heard of them. If you're familiar with Scala but not TUN files, Scala can export TUN files. One TUN file contains the information that Scala places in separate SCL and KBM files. A web search will reveal plenty of information about creating TUN files.

To load a TUN file, click on the text field to the right of the word **Table**. Continua will prompt you with a standard file dialog box; choose your file and Continua will adopt the tuning and mapping found in that file. Once a file is loaded, Continua keeps a reference to that file within its settings. If you move the TUN file, you'll have to re-load it into Continua.

Once a TUN file is loaded, the **A4 Frequency** control is disabled and cannot be changed. The pitch reference in the TUN file always overrides the A4 frequency setting.

To revert to the usual 12-note equal-tempered tuning, click the **Clear** button.

Startup Settings



Once you've tuned the settings to your liking, clicking the **Save** button under Startup Settings. Continua will save the current settings in its preset folder in a new file named `globals.cont`. Every new instance of Continua will load its settings from this file.

Audio/MIDI Settings

On iOS only, clicking this button invokes a window for setting the audio I/O and MIDI options for the standalone version of Continua.

Automation

Most of Continua's controls can be automated using your host's automation features. The most notable exceptions are the FEG breakpoints and modulation connection amounts. The number of either of these can change, and host DAWs generally don't permit plugins to have a changing number of parameters, so there's no viable means for us to make these settings available for automation. Consult your host's documentation for information on how to use its automation features.

And Finally...

Thank you for purchasing Continua. We make every effort to ensure your satisfaction with our products and want you to be happy with your purchase. Please write to info@audiodamage.com if you have any questions or comments.