

Getting Started



Harmonia is possibly the most unique Cherry Audio instrument thus far. Its multi-harmonic, interpolating scanned oscillators are really simple to understand, yet capable of creating wildly elaborate evolving soundscapes that recall the vector and wavesequencing-style sounds of the 80s and 90s, with a far simpler user interface.

Its two oscillators may look a little unfamiliar, but as you'll see, taking a few moments to familiarize yourself with their operation will open a vast array of possibilities... and to put it bluntly, Harmonia is a heck of a lot of fun.

At the risk of pointing out the obvious, we recommend thoroughly exploring the Oscillator 1 & 2 section of this guide. If you're experienced with classic analog synthesizers, the rest of Harmonia will be familiar and probably won't require reading the manual.

Pre-Purchase Demo Mode



If you haven't purchased the full version of Harmonia, it will run in demo mode. All functions will work, but inharmonic tones will occasionally sound (the LED next to *Demo* in the top toolbar will illuminate when the ugly tones are sounding). We've also added a handy button to make purchasing easy, so you've got no excuse! As you might expect, all this demo nonsense disappears once Harmonia is purchased.

Technical Assistance

Cherry Audio's unique online store and automatic updating should make operation a smooth experience, but if you run into any issues or have questions, you can discuss issues online at the Cherry Audio forums at:

<https://forums.cherryaudio.com/viewforum.php?f=37>

... or you can communicate directly with one of the grumpy old guys (or the genteel Canadian new guy) tech support staff at:

<https://cherryaudio.kayako.com/>

Instant Harmonia Sound Programming



Harmonia is pretty darn easy to use. In the programming example below, we'll quickly demonstrate how to use its awesome sweep-through-harmonics capabilities. Off we go!

- Click the *New* button in the top left corner to create an initialized patch.
- While holding a note, move Oscillator 1's *Center* slider back and forth. Neat, right?
- Now try adjusting the orange *Width* knob. Move the *Center* slider as well.
- Around now you're thinking, "This is swell, but it would be nice if the *Center* and *Width* knobs could move themselves, because mouse/trackpad movement is exhausting." We hear you.

Return the *Center* control to *1*, and make sure the *Width* knob is up a little bit.

Turn the LFO section *Bias* knob fully clockwise (notice the dashed line in

the *Wave* display moves to the bottom), then turn the *Center Mod* knob to the right. Beautiful morphing waves!

This is the crux of how Harmonia's interpolated scanning harmonic oscillators work. A **ton** of cool sounds can be created by simply selecting different *Waveform* samples and *Harmonics Presets*, and manipulating the LFO controls.

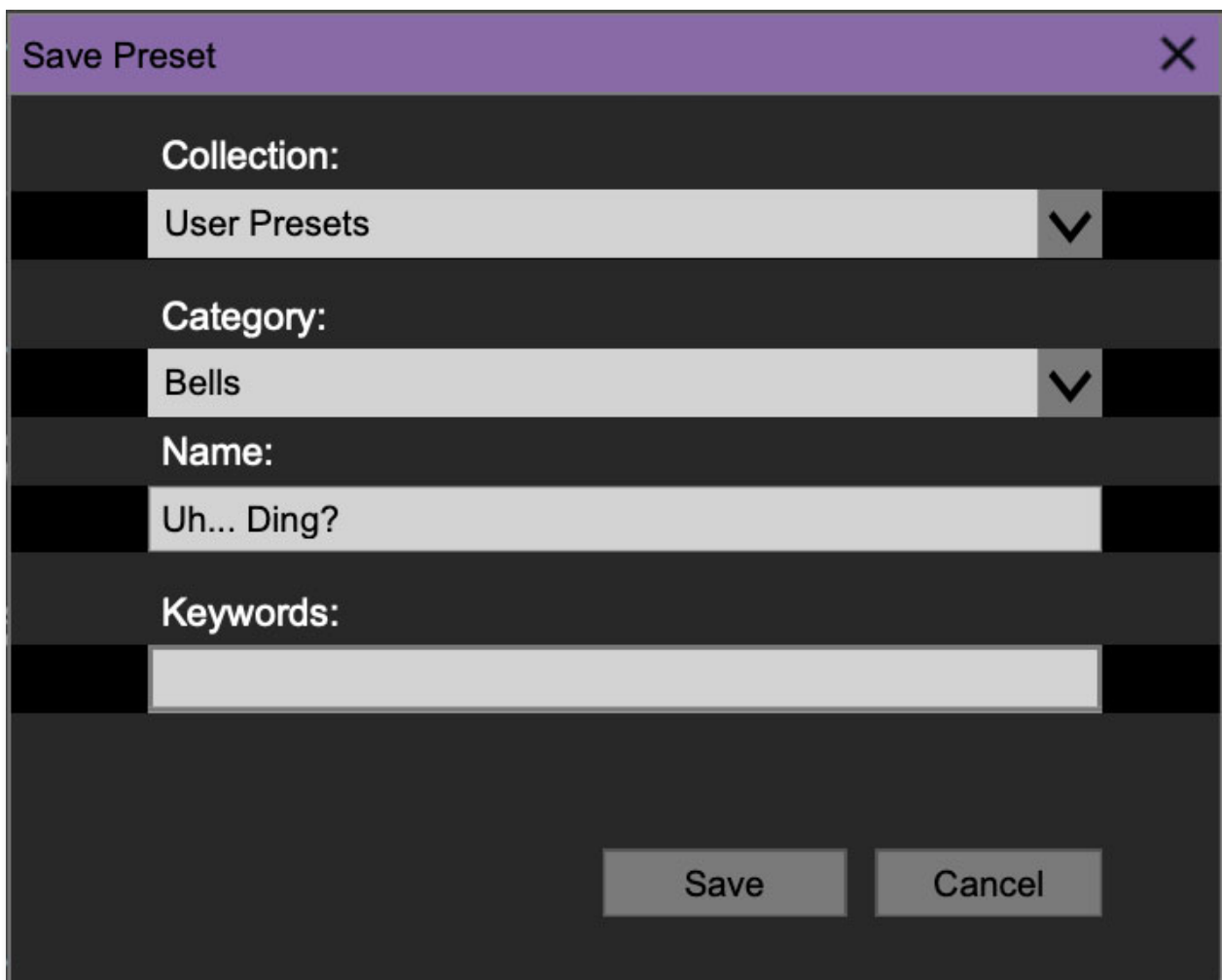
Check out the **Oscillator 1 & 2** section for a full breakdown of Harmonia oscillator functionality.

Top Toolbar and Preset Browser



The purple strip at the top of Harmonia's interface is where you'll load, save, and create sound presets. It also contains utility functions such as undo/redo, UI zoom and *Focus* controls, under-the-hood settings, and more. Let's go over them:

New- Opens a new blank patch preset. If an unsaved patch is currently open or you've modified an existing saved patch, a dialog asks if you'd like to save the patch in its current state. This greatly reduces the possibility of losing an edited unsaved patch.

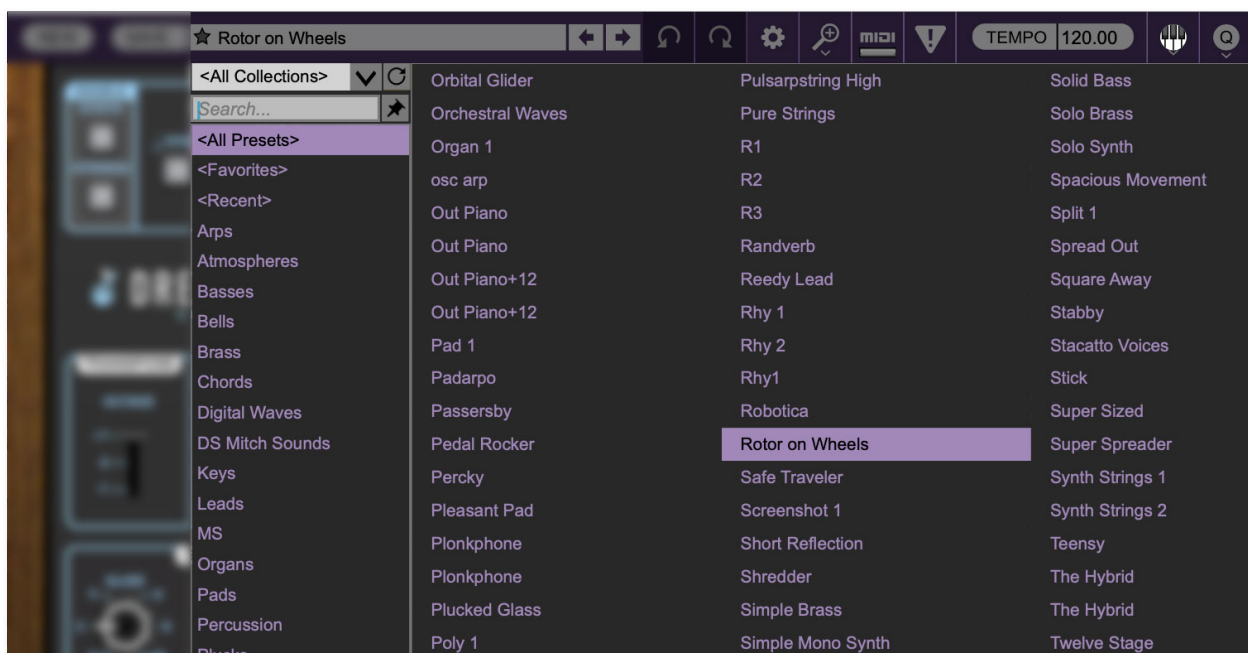


Save- Use this to save patches. There are a couple of levels of hierarchy:

- **Collection**- This is the top level of organization, and contains entire “sets” of presets. The *Harmonia Presets* are the main included collection.

We also include a *User Presets Collection* for storing your own presets, but you're free to create your own collections. To create a new collection, click in the *Collection* text field (where it says *User Presets* above) and type a name. User-created sounds can be freely saved to any collection; we like to keep 'em separated for organizational purposes.

- **Categories**- Within each *Collection* are a number of sound categories. As with collections, you're free to create as many categories as you like. To create a category, click in the *Category* text field of the *Save* dialog window and type a new category name.
- **Patch**- A patch is an individual sound. To save a patch, simply type the name in the *Name* field and click *Save*.
- **Keywords**- You can add descriptive words such as "stacks," "noisy," "stringy," etc., to patches to make them appear when terms are typed in the *Search* field. Use commas to separate multiple keywords entries.

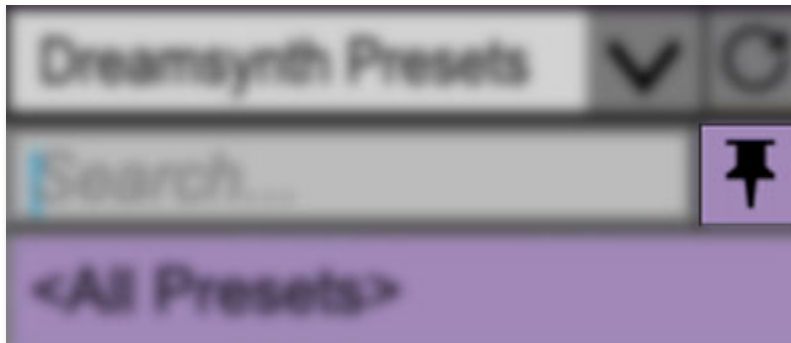


Browsing Patches- Patches can be browsed by clicking the *<Select Preset>* field. To select a preset collection, click in the area that says *<All Collections>* or on the downward-facing arrow next to it.

Clicking on the left-side categories narrows down which patches are displayed.

- **<All Presets>** will show presets from all collections and categories.
- **<Recent>** displays recently used presets.

- **Refresh**- This is the circular arrow button to the right of the downward arrow; clicking this checks the Cherry Audio server for new or updated presets.

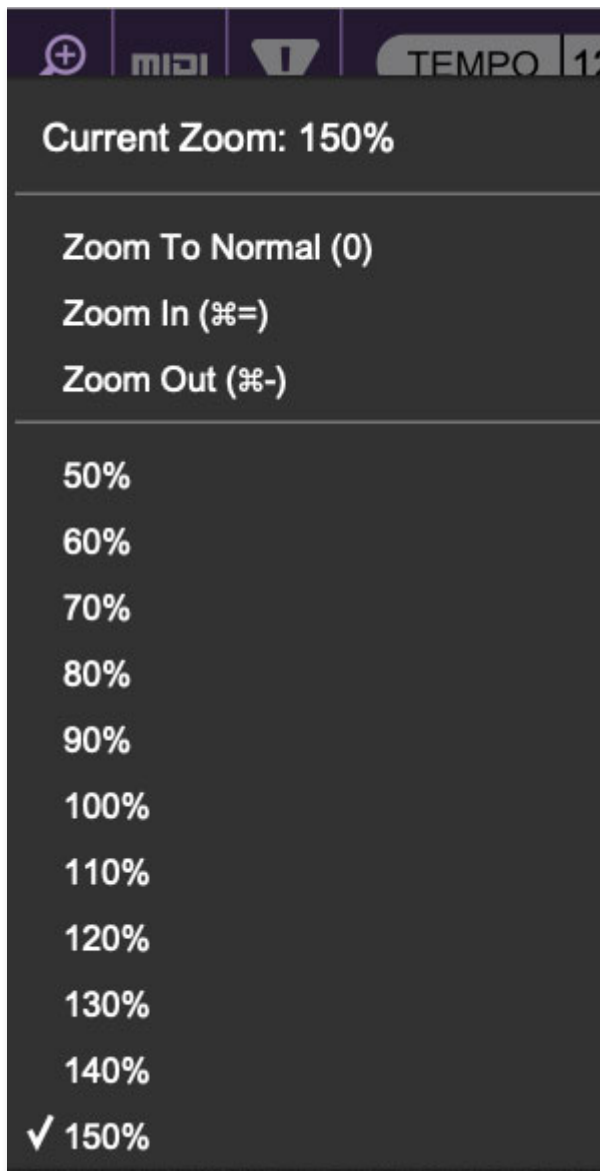


Pin- Clicking the push-pin icon locks the patch selection list open, allowing fast and easy browsing and auditioning of patches. Click the icon again to disable pin mode. when in pin mode, the up and down arrow keys can be used to select patches.

Preset- Step Back/Forward Arrows- These step to the previous or next preset. macOS [⌘+left/right arrow key] or Windows [CTRL+left/right arrow key] will navigate through presets back and forth in the currently selected collection/category.

Undo/Redo- These circular arrows will undo or redo the last action. It remembers many steps, so if you really loused something up, keep on clickin'...

Settings- This is where user preferences for user interface, audio interfaces, user account, and more are configured. See the **Settings** section for full information.



Importing Presets with drag-and-drop

Presets can be imported singly or en masse (as a single compressed ZIP file) simply by dragging and dropping from the desktop anywhere on the user interface.

If a single *.preset file is dragged and dropped, the sound is immediately loaded and the standard Save Preset dialog appears; this lets you save the sound to the instrument's preset browser. Note that you don't have to save the sound to preset browser; if you just want to hear and play the sound, click the Cancel button in the Save Preset dialog - the sound will still be loaded.

Compressed zip files containing multiple sounds can also be drag and dropped onto the UI. This works the same as with single sounds, but instead of the Save Preset dialog, you'll see the Import Preset Collection dialog. The

presets will be added as a new collection and available in the categories for which they were tagged.

Zoom Magnifying Glass- Click to resize the Harmonia interface. Selecting *100%* returns the user interface to native size.

MIDI Tab- Opens the MIDI controllers tab for configuring internal and hardware MIDI controls. See the **MIDI Controllers Setup and MIDI Tab** section for full information.

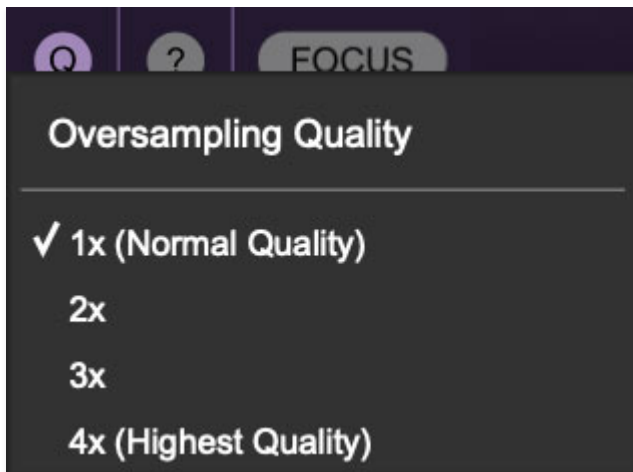
! (MIDI Panic) - Click to send an all-notes-off message in case of, "why won't this thing stop making noise?!?" stuck-note incidents.

Tempo (Standalone Version Only)- Displays Harmonia's current internal tempo setting. Harmonia's internal tempo affects the *LFO* and *Echo* sections when their corresponding *Sync* switches are enabled. The tempo setting can be changed by moving the mouse up and down anywhere in the tempo section, or by double-clicking the number and entering the desired BPM value.

The tempo display only appears in the standalone version of Harmonia. VST, AU, and AAX plug-in versions receive tempo data from their host DAW app.



QWERTY Musical Typing Keyboard- Opens an onscreen keyboard allowing a standard QWERTY computer keyboard to be used for playing music notes. For more information, see **QWERTY Musical Typing Keyboard (MTK)** section.

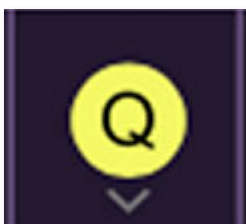


Oversampling Quality (Q)- The Q button sets Harmonia's internal oversampling rate; the higher the setting, the better audio fidelity will be, with the caveat that more computer processing power will be required.

Internal processing can be set to *1x* (same rate as the current sample rate of the host DAW or in the *Settings>Audio/MIDI* window for the standalone version) or to *2x*, *3x*, or *4x* the current sample rate. The sample rate is downsampled at the instrument output stage to match the current host sample rate.

For example, if the current DAW/instrument sample rate setting is 48 kHz, and oversampling is set to *2x*, Harmonia's internal processing runs at 96 kHz, and is then reduced back to 48kHz at the output stage.

If the current DAW/instrument sample rate setting is 192 kHz and oversampling is set to *4x*, Harmonia's internal processing will run at 768 kHz, and you will very briefly hear the most ameeeeezing synthesizer sound quality ever experienced by mankind before your computer instantaneously explodes in a fiery, white-hot supernova blaze. Ok, maybe not.



When oversampling is set to any multiple greater than *1x*, the Q button glows yellow.

Dependent on a number of factors (audio system D/A converter quality, monitor speakers, the nature of the current Harmonia patch, etc.), you may not hear a big difference with higher settings. Generally speaking, audible

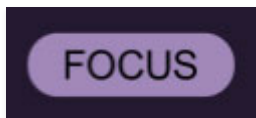
differences may be noticeable when using digital waves with a great deal of high harmonics (which is pretty much most them!).



Help- Clicking this launches your web browser and opens the help document you're currently reading, which is a really meta concept.

Cherry Audio and Harmonia logos- Clicking these displays "about" information, and shows the version number and current registered user ID.

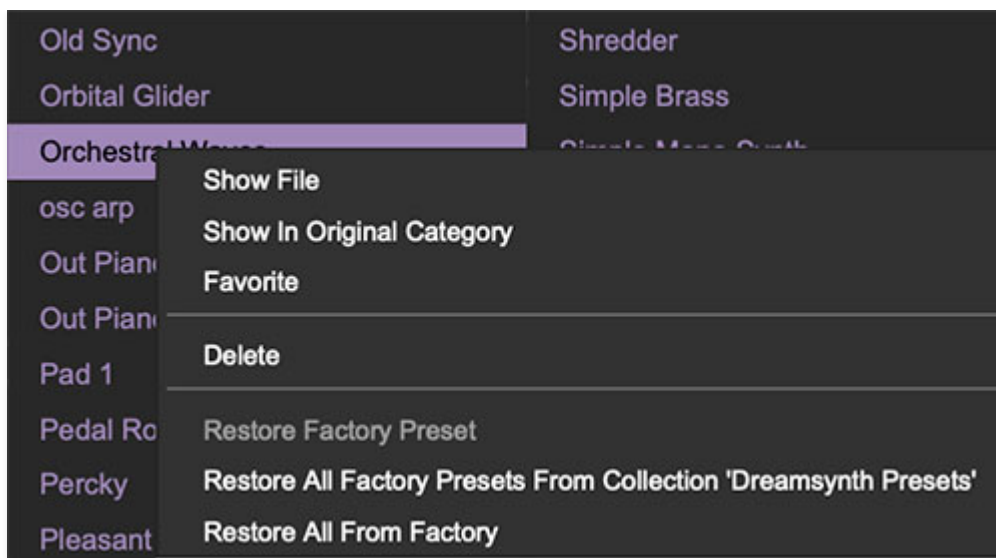
Focus Button



If you're using a tiny laptop, the user interface can potentially be hard to see. With this in mind, the *Focus* button conveniently blows up Harmonia's view to roughly twice its normal size within the current window size. Unlike the *Zoom* "magnifying glass" function, *Focus* doesn't affect the current window size. By default, the patch panel section fills the current window, but the view can be scrolled vertically and horizontally with a mouse wheel, track pad, or Apple Mighty Mouse finger-scrolling. Or if you're the last person on earth still using a single-button mouse, scroll bars will appear at the window edges when in *Focus* mode. (We have an AOL CD-ROM with your name on it...)

Using *Focus* mode couldn't be easier - just click the *Focus* button the top menu bar. To return to standard view, click *Reset*. **There's also a superfast key shortcut** - on Mac, hold the ⌘ [COMMAND] key and click the mouse; in Windows, hold the [OPTION] key and click the mouse. Focus can be reset with the same key shortcuts.

Preset List Right-Click Functions



Show File- This displays the selected preset in the Mac or Windows folder containing it. This is useful for backing up or sending a preset file to another user.

Show In Original Category- Selects the preset within its category, i.e. the category will highlight in the left preset menu. The *Show In Original Category* command only displays if the preset was selected within the *<All Presets>*, *<Favorites>*, or *<Recent>* categories.

Favorites- Favorited presets will show in when the *<Favorites>* category is selected. A star will display next to the preset name. Right-click on the preset and reselect *Favorite* to un-favorite it. (Or say something nasty about its mother.)

Delete- Deletes the selected preset.

Restore Factory Preset- If one of the factory (i.e. not user) patches is edited and saved, selecting this command restores the patch to its unaltered "factory" setting. This menu will be grayed-out for user bank patches.

Restore All Factory Presets From 'Harmonia Presets'- If any patches from the "factory" Harmonia bank are edited and saved, selecting this command restores *all* of them to their unaltered "factory" setting.

Restore All From Factory- If any patches from the "factory" banks are edited and saved, selecting this command restores *all* of them to their unaltered "factory" setting. At the time of writing, the Harmonia bank mentioned above is the only factory bank, so this function and the *Restore All Factory Presets From 'Harmonia Presets'* above have the same effect.

Oscillators 1 & 2

Harmonia's unique multi-harmonic, interpolated scanning oscillators are the stars of the show, so it pays to read this section carefully in order to get the most from Harmonia. The good news is that once you wrap your head around how the oscillators work, coaxing wild, evolving sounds is ridiculously fun and easy.

We've broken it up into smaller chunks, so you won't sprain your scrolling finger.

Basic Principles

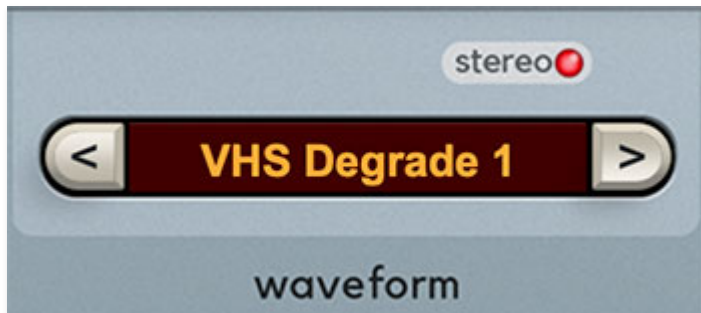
We'll give the thumbnail, how-it-works description here, and elaborate on the specifics when we explain the individual control parameters.

On a simple level, Harmonia is akin to a “ROMpler” sample-playback synth; that is, something like a Korg M1 where the oscillators play looped digital samples. But unlike a standard ROMpler oscillator that plays back a single sample when notes are played, each Harmonia oscillator plays back up to *eight* individual pitches simultaneously when notes are played. Each of these eight pitches can be independently tuned either to mathematic multiples (aka, the natural harmonic series), or to musical notes in half-step intervals.

The volumes of each harmonic can be set to static levels or dynamically modulated in a number of ways, or both methods can be combined.

Oscillator Waveforms and Amplitude Controls

We typically try to explain controls in a logical left-to-right, or top-to-bottom fashion, but in this case, we'll jump around in order to make things easiest to understand. Beginning at bottom left of the oscillator:



Waveform- Clicking either directly on the orange LED display or the up/down increment buttons selects the current oscillator waveform.

The majority of the waveform samples are stereo, so even with no processing, they sound rich and wide. In fact, Harmonia features a dual audio path under the hood to maintain stereo imaging. The *Stereo* LED above the *Waveform* display illuminates to indicate that a stereo sample is currently selected.

Harmonia includes the two different wave types:

- **Looped PCM Samples-** Other than the One-Shot samples below, all of Harmonia's included samples loop infinitely following their attack portion.
- **One-Shot-** These are also PCM samples, but they play briefly and end without looping. They're useful for drum, percussion, and transient sounds, but they often make pretty neat noises when tuned to low or high extremes.

Note that **only a single sample can be selected for an oscillator, but up to eight different harmonics (i.e. pitches) of that sample can sound simultaneously**. This may appear to be a limitation, but having separate samples for each harmonic would have made Harmonia way more complicated to use, and you'll quickly see that there are *tons* of timbral possibilities with a single sample and eight harmonics per oscillator.

Some of the samples include looped and one-shot versions, as they can be useful in different ways.

About Harmonia's onboard samples

As mentioned above, the vast majority of Harmonia's samples are stereo. This might not seem like a big deal, but it means that even simple one-oscillator, single-harmonic patches often sound super wide and awesome. As a result, you won't constantly need to turn on the chorus or other effects to create big sounds.

The result of "built-in" stereo imaging in the samples is twofold: it's less artificial and periodic than modulation effects, and because of Harmonia's inherent multiple harmonic tuning iterations, *movement in the stereo samples occurs at different rates for each harmonic*, resulting in an even more organic overall feel. (Sorry for overusing "organic," but it really applies here. Hey, did we mention that Harmonia sounds like, real organic?)

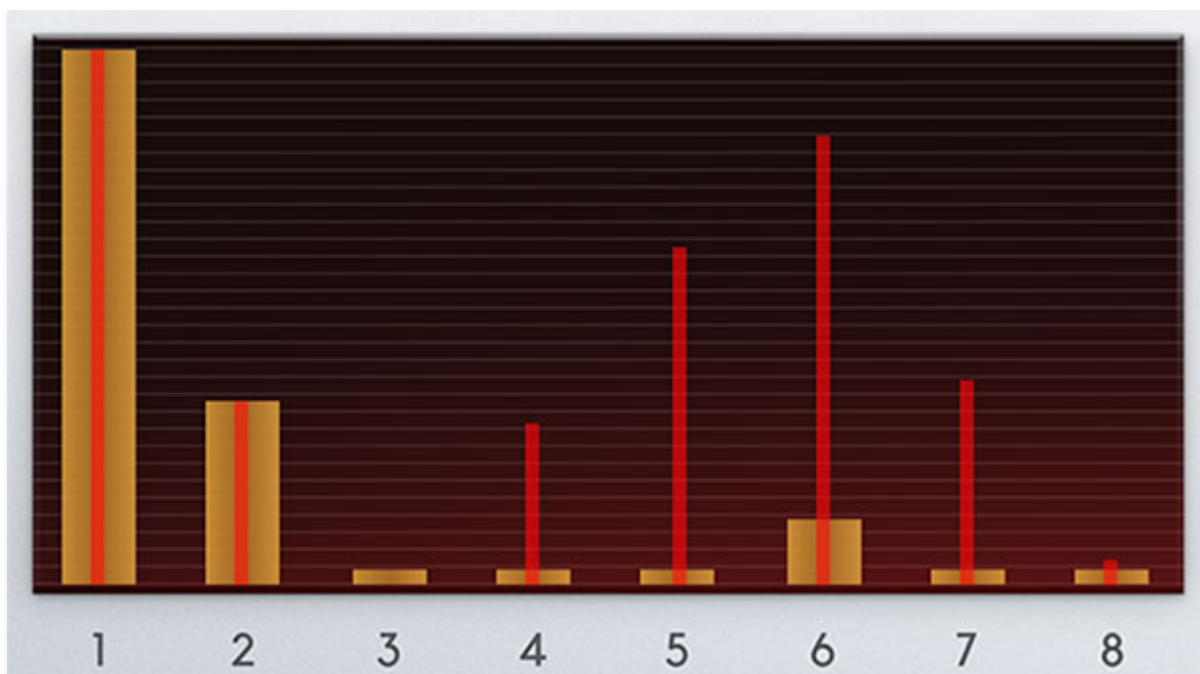
Also, **Harmonia's onboard samples aren't intended to be perfect.**

Generally speaking, the onboard samples are somewhat raunchier and more lofi than those in a garden-variety Japanese SuperDuperWorkstation. It should go without saying that Harmonia wasn't conceived for playing "*I Will Always Love You*" for someone's grandma at a wedding.

As such, our priority was to create quirky samples that made the most of Harmonia's unique evolving harmonic capabilities. Many of them include background noise, subtle clicks, a few weird overtones, etc. We hope you'll have as much fun with these as we have so far.

Why can't I load a different sample for each harmonic?

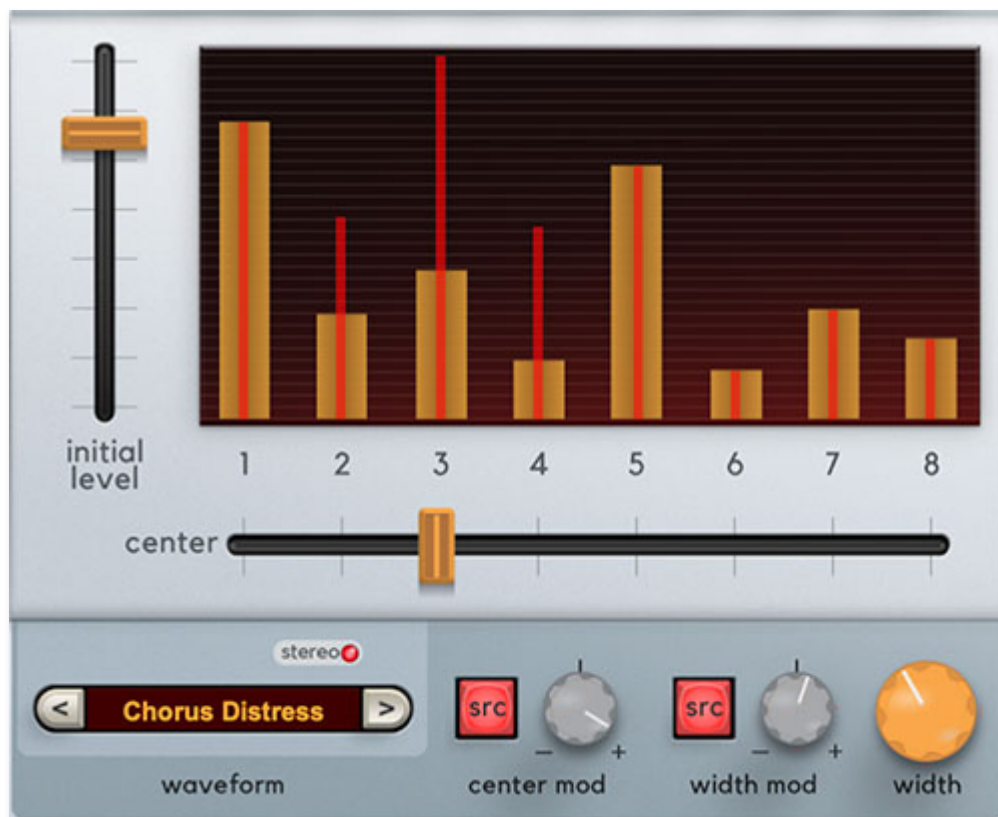
We've logged a whole lotta hours in the cockpit with all the classic vector and wavesequencing instruments over the years, and we love 'em, but to put it bluntly, sound programming can be a bear with these. A major Harmonia design objective was to deliver the kind of dramatic, evolving timbral movement of these synths in a **much** easier-to-use (and thus more fun and instantly gratifying) package. The one-sample-per-oscillator configuration may seem limiting, but once you start programming Harmonia, you'll see that it's capable of a ton of sounds.



Harmonic Level bars (orange and wide)- The wide bars set the static volume level for each of the eight harmonics. To set these, simply click in the harmonics level window above one of the harmonic numbers and drag up or down. By "static" volume, we mean the fixed volume of each harmonic. To experiment with these, we recommend setting the *Initial Level* slider to zero.

Harmonic Level Meters (red and skinny)- The narrow red lines atop the orange *Harmonic Level* bars aren't controls per se; they're simply meters that indicate the audible volume of each harmonic at any time, whether controlled by the *Harmonic Level Bars*, or via *Center* and *Width* controls, modulation, etc.

Harmonic Levels and Interpolating Scanner



Consisting of the *Center*, *Width*, and *Initial Level* sliders and their dedicated mod bus controls, you can think of the interpolating scanner as a powerful, highly modulatable eight-channel mixer for harmonics that operates like a DJ crossfader combined with a parametric equalizer. It's the key to creating Harmonia's signature radical timbral morphing, and despite its heady-sounding name, the interpolating scanner is super easy to use.

Center- Sets the overall mix position. We'll demonstrate by example:

- Click the *New* button at the top left of Harmonia's purple menu strip.
- Select a simple waveform - we'll use *Sine*.
- Set *Initial Level* to full, and *Width* to zero.

Now move the *Center* control while holding a key. As the *Center* control is moved, Harmonia sweeps through the first eight pitches of the harmonic series. You may notice that the harmonics abruptly shift from one to the next. This is because the *Width* control is at zero (i.e., no interpolation); at any setting greater than zero, harmonics will transition smoothly.

Center is the interpolating scanner's most important control. You'll likely find yourself swinging it back and forth like one does with an analog synth's filter cutoff control, and *Center* is an ideal candidate for a number of modulation sources - hence the dedicated mod bus.

Center Mod Source (SRC) and attenuverter- Allows modulation of the *Center* slider control from numerous sources. To set up modulation, click the *SRC* button, select a source, then set the amount of mod with the *Center Mod* attenuverter knob. The knob can be turned clockwise from center for positive modulation or counterclockwise from center for negative modulation. (Hence the *attenuverter* name: *attenuator+inverter*.)

Width and Width Mod controls- The *Width* knob sets the relative volume of neighboring harmonics, from a single harmonic up to all eight at once.

Use the same settings as the example above and set the *Center* slider to about 50% (between 4 and 5). Now hold a key down and slowly turn up the *Width* knob. Cool, right?

If the *Width* knob is set to zero, a single harmonic is heard, and harmonics instantly snap from one to the next; this allows creation of stepped sequencer-like melodies. At settings greater than zero, harmonics will smoothly transition from one to the next - that's the "interpolating" part of interpolating scanner (while "scanner" refers to the movement across the harmonics).

Width Mod Source (SRC) and attenuverter- Allows modulation of the *Width* knob from numerous sources. To set up modulation, click the *SRC* button, select a source, then set the amount of mod with the *Width Mod* attenuverter knob. The knob can be turned clockwise from center for positive modulation or counterclockwise from center for negative modulation.

The dedicated *Center Mod* and *Width Mod* sections are provided to make the creation of animated sounds fast and easy, but *Center* and *Width* are also included as mod destinations in the Mod Matrix section. This allows multiple sources to simultaneously modulate *Center* and *Mod*.

And finally... keep in mind that the fixed *Harmonic Level* bars are freely combinable with the *Center* and *Width* Interpolated Scanner controls. When combined with modulation, the results can often make one oscillator sound like two or even three independent oscillators. We'll further explore these kinds of programming tricks later on.

Initial Level- This one can be a little hard to wrap your head around, but the idea is that the *Center* control horizontally moves a fixed "wave" of voltage

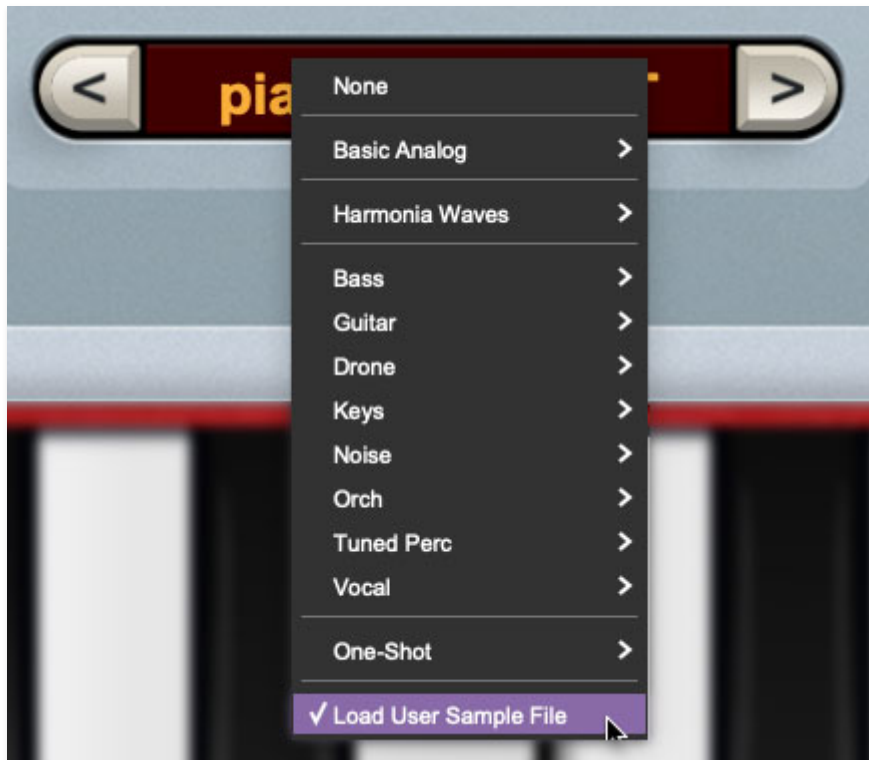
that pushes up the various harmonic levels (with the wave width set via the *Width* knob). With that in mind, *Initial Level* sets the height of the wave.

Depending on the type sound you'd like to make, you may or may not want to make use of the initial level "wave." For example, you might want to create a sound where each harmonic is at a different fixed level, set *Initial Level* to zero, and simply adjusting each *Harmonic Level Bar* to the desired volume. Incidentally, this is how basic additive synthesis is done, and there are plenty of interesting tones to be found this way.

Conversely, to create animated, moving tonalities by modulating the *Center* and *Width* controls, you'd want to set all *Harmonic Level* bars to zero, *Initial Level* to a high setting, and then set the *Center* and *Width* controls (and their mod sources) as desired.

Of course, both both methods can be combined to create endless combinations of fixed and dynamically modulating harmonic levels.

Loading User Samples



In addition to its onboard waveform sample library, Harmonia can also import user samples. To be clear, sample import is a basic implementation added during development to simplify testing samples. But it works fine and user samples will save within sound presets.

Harmonia can import uncompressed WAV files, mono or stereo, at any sample rate. We look for either a *Loop0Start* or *Cue0Offset* metadata value to determine the looping point of the WAV. If we cannot find either of these values, we treat the WAV file as a one-shot. Loops will always play to the end of the WAV file before returning to the loop point, so make sure that all sample data past the loop point is removed.

User sample import only supports a single one "zone" across the keyboard; there is no multi-sampling capability.

Tuning User Samples

Harmonia's user sample feature has a fixed base note of C3, so create samples using a C note if possible. If not, samples can be tuned to track the keyboard properly using the oscillator *Octave* and *Detune* knobs.

Sample Editing/Looping Apps

Though Harmonia can load and play "one-shot" (non-looping) samples, it's generally preferable to use looped samples so that notes can be held indefinitely. In order to create looped samples, you'll need to use a sample editing app that can create audio files with loops markers that get saved as metadata as outlined above.

The following sample editing apps will create samples that loop properly in Harmonia.:

SAMPLE EDITOR APP	PLATFORM
Steinberg Wavelab	cross platform
Bjoernbojahr Endless WAV	cross platform
Magix Sound Forge	Windows
Zynaptiq Loop Editor 2	macOS
SampleRobot Multi-X/Pro	macOS
Antares Infinity*	mac OS9 or earlier

* We included Antares Infinity, because it's the BOMB sample looping app, if you have an ancient OS9 Mac lying around or an emulation environment like **SheepSaver**. But it's a lot of trouble to get working, hasn't been officially supported for about 20 years, and makes for a finicky format mess. We only recommend it if you REALLY know what you're doing.

** Adobe Audition will let you open samples with loop metadata, and will retain the loop data on export, but it won't allow loop creation (or if it does, we couldn't figure out how). This is a shame, because it's probably the best current sample editor out there.

If you're using a sample editor that's not listed here, and it does loops, kindly **drop us a line here** and we'll add it to this doc.

Oscillator and Harmonics Tuning



Up to this point we've mainly discussed the various ways the amplitude (volume) of each harmonic can be manipulated. Below we'll explain the controls in the black upper section of Harmonia's oscillators, which (mostly) control global and individual harmonic tuning.

More theory, hooray!

By default, Harmonia samples simultaneously sound at the first eight pitches of the natural harmonic series (that is, positive multiples of the root note, for you mathletes). The harmonic series occurs in just about every acoustic instrument, and an instrument's timbre is the result of the relative volumes of these harmonics. In fact, just like large numbers can be broken down into prime numbers, any musical tone can be broken down to raw sine waves at various levels.

In turn, any instrumental sound can be recreated by combining sine waves, tuned to the harmonic series and set to the appropriate amplitude - this is known as additive synthesis. Additive synthesis is super powerful, and in theory, can recreate any audible sound. But in practice, additive synthesis is a complex and tedious way to make sounds, because you need a LOT of Boring Sine Waves™ to create rich sounds, *and* the relative volumes of those sine waves are constantly changing, which is hard to control. The reason you don't see a lot of additive synthesis-based instruments is that the inherently large number of necessary parameters are a total buzzkill to use. (Feel free to eBay yourself a 90s-era Kawai K5 or a Crumar GDS along with big bottle of Ibuprofen if you don't believe us.).

It's far easier to achieve rich tones by swapping out sine waves for more complex sound samples, and Harmonia's wave samples include everything from analog and digital synthesizer waves to natural instrument and colorful "lofi" sounds. Additionally (see what we did there?) it also happens to sound very nifty when the tuning of a single sample is swept through the pitches of the harmonic series, or if multiple pitches tuned to the harmonic series are combined. This is Harmonia's *raison d'être* (for you simpletons who don't speak Portuguese, we're told that's a delicious dessert involving raisins).

Since Harmonia enables easy sweeping across harmonic pitches, we thought it would also be neat to allow tuning to equal-tempered notes to create sequencer-like passages, so in addition to the *Harmonic* mode (i.e. tuning set via mathematical multiples), Harmonia also allows harmonic tuning in half-step *Semitone* mode to create conventional melodies (sweeping across single harmonics) or chords (at high *Width* knob settings).

And since setting the tuning of eight knobs can take a little time, Harmonia conveniently features a dedicated *Harmonics Preset* memory bank for saving and loading the settings of all eight Harmonics Tuning knobs.

Oscillator Tuning Section Controls



Octave- Sets the coarse pitch range in octave increments through five ranges.

Tune- Allows fine-tuning of pitch or creating intervals between Oscillator 1 and 2. Its range is a smidge over a fifth, up or down.

Keyboard Track- Shutting this off disconnects the keyboard's control voltage. This allows the oscillator frequency to remain constant regardless of keys played on the keyboard. This can be useful in a number of situations:

- When an oscillator is playing a percussive or transient sound, and you want the pitch to stay constant across the keyboard.

- The oscillator is being used as a "drone," that is, to play the same note.
- If an oscillator is being used as a mod source (via the Mod Matrix), and you don't want the mod rate to change as you play up and down the keyboard.

Filter Bypass- As its name implies, this removes the filter section from the oscillator audio path. This is useful if, for example, one oscillator is playing juicy synth waves with a pronounced filter sweep, but you'd like to layer in a plinky, crystalline bell without its high frequencies being squashed by the filter. *Filter Bypass* button is also useful for maintaining the impact of one-shot drum and percussion samples.

Utility- This popup menu offers the following nifty and useful capabilities:

- **Copy Oscillator 1 to Oscillator 2 / Copy Oscillator 2 to Oscillator 1**- Duplicates all settings of one oscillator to the other.
- **Swap Oscillator 1 and Oscillator 2 / Swap Oscillator 2 and Oscillator 1**- Reverses oscillator settings from one to the other.

Harmonics Tunings



Harmonics Tuning knobs (red) and Harmonic/Semitone button- The eight red knobs set the tuning for each harmonic. Unlike most tuning knobs, they don't go up and down - they only go up, because it wouldn't make sense to have negative harmonic multiples. (If overall pitch isn't low enough, use the *Octave* knob or *Octave Transpose* in the performance controls section.)

- **Harmonic mode**- Tuning increments conform to the harmonic series, that is, mathematical multiples of the root pitch. The number settings are simply the number the root pitch is multiplied by.

For example, if the base note pitch was 100 Hz, then the first eight harmonics would be as follows:

- If the harmonic was set to *31*, the pitch would be 3100 Hz (100 Hz x 31) ... and so on. Obviously, the frequencies are far more complicated when playing polyphonic notes all over the keyboard, but as our programmers around here say, That's What Computers Are For.

Turning a tuning knob all the way down shuts off the harmonic altogether. This can be useful for silent steps when sweeping across, fading in adjacent harmonics with envelope generators, etc. The LED number display will disappear when a harmonic is disabled.

- **Semitone mode-** Tuning increments conform to semitone half-steps, in other words, standard chromatic notes of the musical scale. Turning a tuning knob all the way down shuts off the harmonic altogether. This can be useful for silent steps when sweeping across, particular if you're creating sequencer-like note patterns with low *Width* settings. The LED number display will disappear when a harmonic is disabled.

Though they might seem similar, there's a big difference between harmonic series and semitone pitches: harmonic series intervals are inherently perfect mathematical multiples of the root note, whereas half-step semitones are inherently not perfectly in tune.

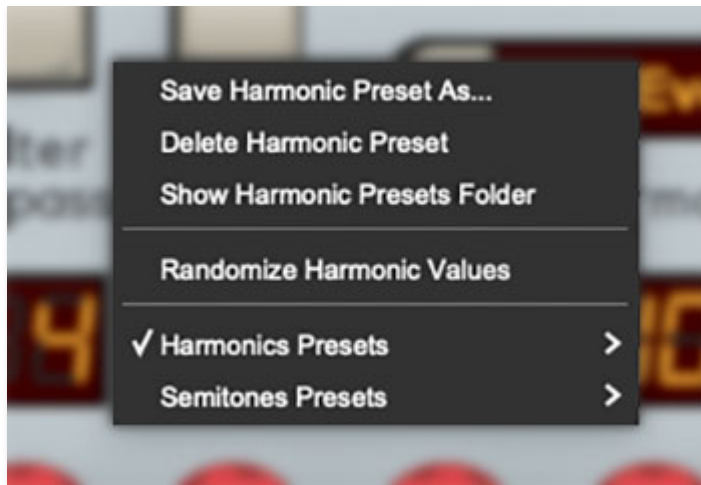
Historically speaking, the reason for this is that the half-step semitone tuning 12-step scale allows music to be played relatively in tune, in any key, with the caveat that certain intervals (most noticeably, thirds and sixths) are slightly out of tune. If tuning is optimized to be perfect in a particular key signature, other key signatures will sound unpleasantly out of tune.

Zeros and Ones: *You may notice that the root note setting in **Harmonic** mode is 1, whereas the same root note setting in **Semitone** mode is 0. This is because if you're using harmonic multiples, the root note is multiple is 1 - it can't be 0. Conversely, **Semitone** mode refers to 1/2 step intervals, so the root is zero, a half-step is 1, a whole-step is 2, etc. etc.*

Without boring you any further adding any more insightful tuning knowledge, the important thing you should know is that *Harmonic* mode is useful for either sweeping through harmonics for evolving tones or stacking multiple harmonics to create a composite tone (i.e. a single note), whereas *Semitone* mode is intended for creating sequencer-like melodies (low *Width* settings) or musical chords (high *Width* settings).

Harmonics Presets

Harmonia's oscillators include a dedicated harmonics preset memory bank that lets you save all eight harmonic knob tuning settings as well as the current *Harmonic* or *Semitone* mode selection.



To select a harmonics preset, click in the display window, scroll to either the *Harmonics Presets* or *Semitones Presets* sections, then select a preset from the submenus. Presets can also be scrolled through by clicking the buttons to the left and right of the display.

The Harmonics Presets section functions independently of saving an entire patch, but the current harmonics are always stored with the patch. Also note that harmonics presets are "shared" between the oscillators; that is, any harmonics preset saved for one oscillator shows in the popup list of the other oscillator.

Save Harmonic Preset As...- This saves the current settings of all eight harmonic tuning knobs as well as the current *Harmonic/Semitone* state. You'll be prompted to type in a name. Harmonic presets will automatically be saved to the correct Harmonics or Semitones category depending on the current state of the *Harmonic/Semitone* selector.

Delete Harmonic Preset- Deletes the currently selected harmonics preset. You'll see an, "are you sure?," popup window to prevent harmonics preset-related calamities.

Show Harmonic Presets Folder- Opens the folder containing harmonics presets in Windows Explorer/Mac finder/Amiga OS Environment (I made that one up).

depending on the current state of the *Harmonic/Semitone* selector.

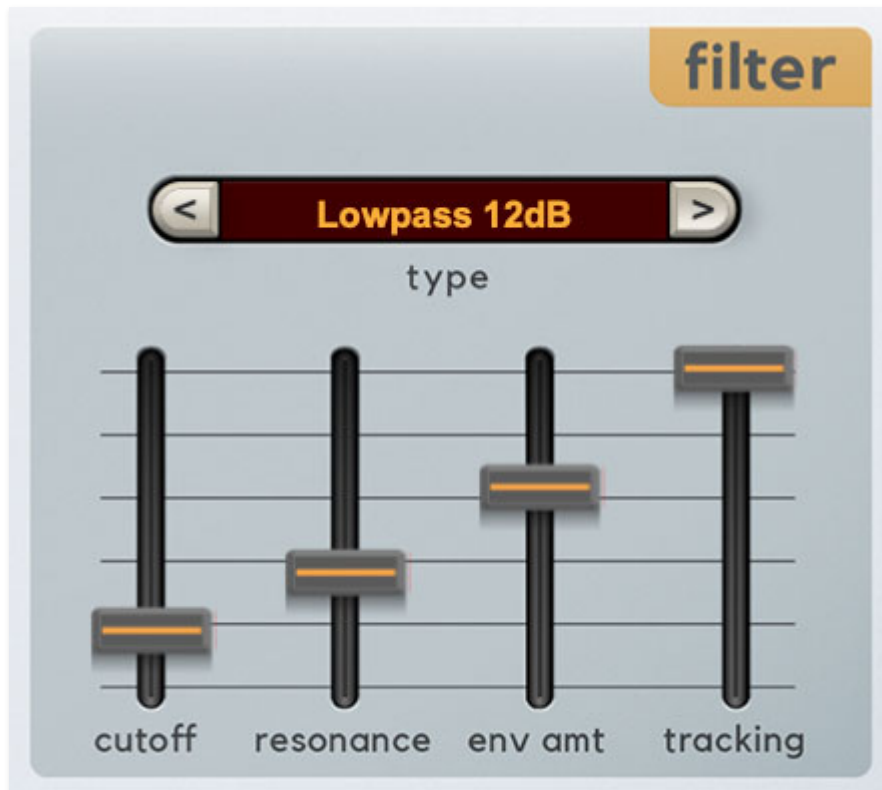
Randomize Harmonic Values- Chooses random values for all eight harmonics tuning knobs as well as the *Harmonic/Semitone* state.

Harmonics Presets- Contains all current harmonics presets.

Semitones Presets- Contains all current semitones presets.

modulated in a number of ways, or both methods can be combined.

Filter



Harmonia includes a resonant multimode filter, including four lowpass modes, highpass, bandpass, and notch modes for all manner of sound sculpting.

Controls

Type- Selects the overall filter curves. The popup menu can be opened by clicking on the alphanumeric display window, or filter types can be cycled by clicking the left/right arrow buttons.

- **Lowpass (24 dB/oct)**- Allows frequencies below the cutoff frequency to pass, but blocks frequencies above the cutoff frequency with a 24 dB/oct slope. The "4" refers to the number of filter poles and because of its steep cutoff, this the "darkest" of the filters. It also has the most pronounced resonance effect.
- **Lowpass (18 dB/oct)**- Allows frequencies below the cutoff frequency to pass, but blocks frequencies above the cutoff frequency with an 18 dB/oct slope. The "3" refers to the number of filter poles. The 18 dB/oct filter has a slightly brighter character than the 24 dB/oct filter.

- **Lowpass (12 dB/oct)**- Allows frequencies below the cutoff frequency to pass, but blocks frequencies above the cutoff frequency with an 12 dB/oct slope. The "2" refers to the number of filter poles. The 18 dB/oct filter has a slightly brighter character than the 24 or 18 dB filters.
- **Lowpass (6 dB/oct)**- Allows frequencies below the cutoff frequency to pass, but blocks frequencies above the cutoff frequency with an 6 dB/oct slope. The "1" refers to the number of filter poles. The 6 dB/oct filter has the brightest character of all four, but the least amount of resonance.
- **HP (Highpass)**- Allows frequencies above the cutoff frequency to pass, but blocks frequencies below the cutoff frequency with a 12 dB/oct slope. Because they dramatically remove low frequencies, the highpass setting is useful for nasally tones with exaggerated high frequencies.
- **BP (Bandpass)**- Allows a band of frequencies in the vicinity of the cutoff frequency to pass, with a 12 dB/oct slope.
- **Notch**- Removes a band of frequencies close to the cutoff frequency and allows all other frequencies to pass. Notch filters are useful for pseudo-phaser effects when their cutoff frequency is swept.

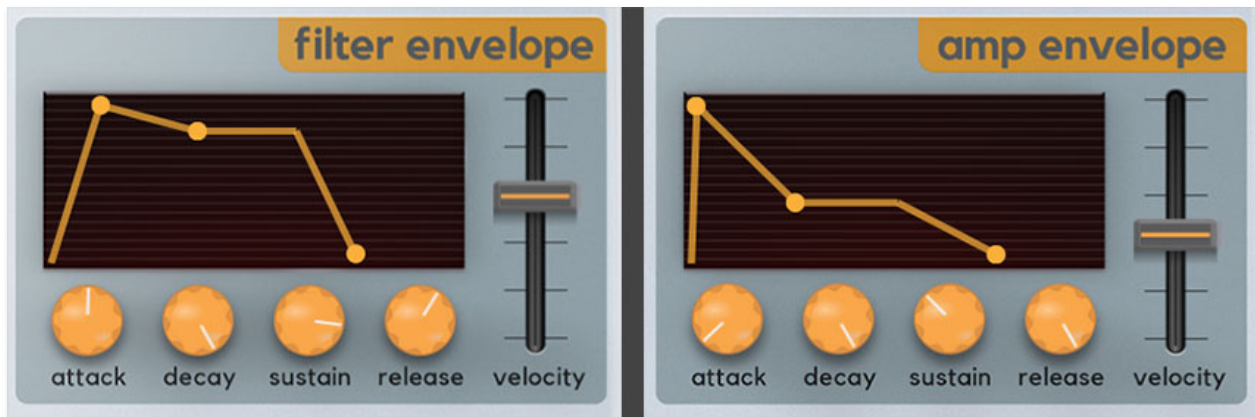
Cutoff- Sets the frequency where frequency attenuation begins, i.e. which frequencies are allowed to pass, dependent on the current *Type* setting.

Resonance- Resonance emphasizes sound energy at and around the current cutoff frequency by adding feedback from the filter's output back to its input. At lower settings, this can be used to create mild resonances such as those heard in acoustic instruments. At extreme settings, it can be used as a sine wave generator, but be careful as high resonance settings can result in loud, screamy, dog-spooking (and speaker blowing) occurrences.

Envelope Amount- The *Env Amt* control applies modulation from the Filter Envelope to the cutoff frequency. This allows familiar auto filter sweeps. When raising the *Envelope* control, you'll generally want to lower the *Cutoff* control, as these controls sum. Please see the **Envelope Generators** section for more info about the Filter Envelope.

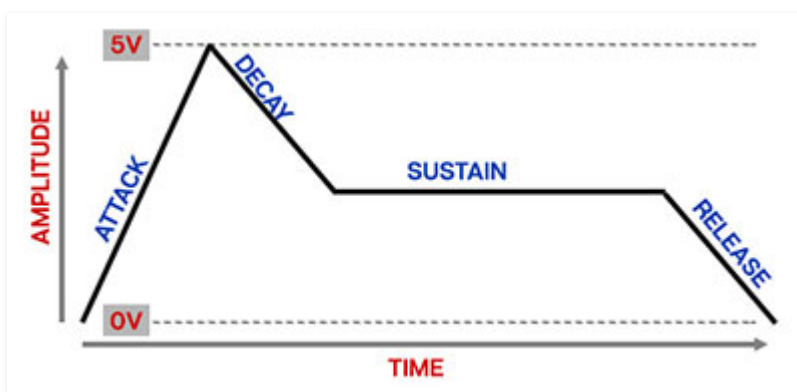
Tracking- This causes the cutoff frequency to increase as ascending notes are played on a keyboard. The idea behind this is that when set to positive values, the *Tracking* control applies a rising CV to the cutoff frequency in order to maintain the brightness of notes as higher pitches are played (because actual note frequencies rise as higher pitches are played). When turned counterclockwise from center, the *Tracking* control causes the cutoff frequency to get lower as higher keys are played.

Filter and Amp Envelopes

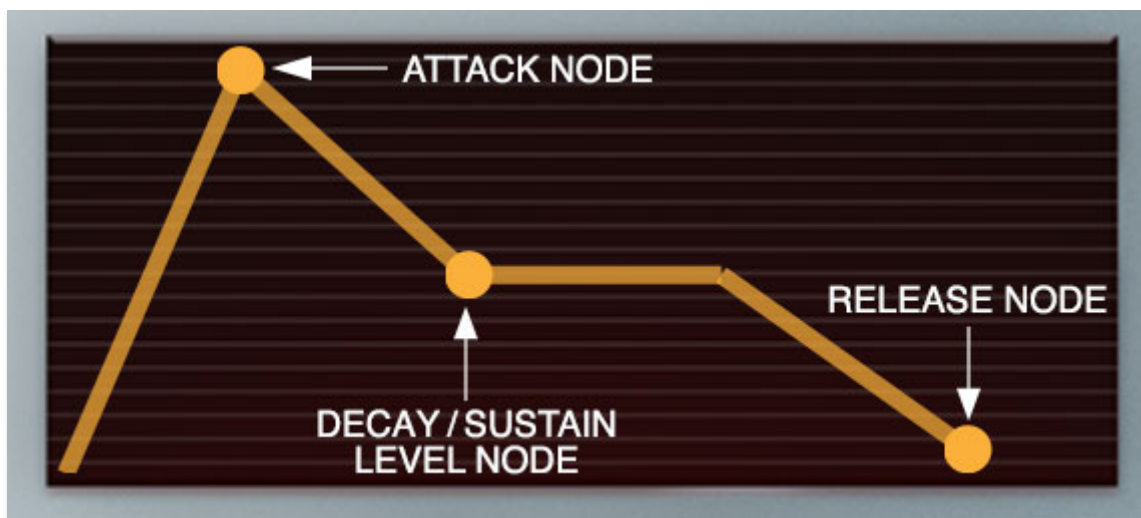


The filter and amplitude envelopes dynamically shape the sound's filter cutoff frequency and overall volume, respectively. Harmonia's envelopes feature knobs as well as graphic controls and either control can be used to set each stage.

How an ADSR Envelope Generator Works



When Harmonia sees a gate voltage from a note, the envelope generator outputs a dynamically changing voltage, according to the settings of its four stages. The attack stage defines how long it takes for the output voltage to rise from 0 to 5 volts. Once the attack stage reaches 5V, it moves to the decay phase, which defines how long it takes to fall from 5V to the setting of the sustain phase. Unlike the attack, decay, and release phases, which define times, sustain simply sets the held voltage level following the attack and decay phases - this equates to the envelope output level while holding down a key. Finally, the release slider defines the the length of time it takes for the voltage to fall back to 0V when the gate input voltage is removed, i.e. when the key is released.



Attack- Defines the length of time for voltage to rise from 0V to 5V when a key is played. Attack time can be set by either the *Attack* knob or by grabbing the graphic node and moving it left or right. The node will always stay at the top of the display, because the attack segment always goes from zero to max. Range is 0.02 - 10 seconds.

Decay- Defines the length of time for voltage to fall from the attack stage 5V peak to sustain stage setting. Decay time can be set by either the *Decay* knob or by grabbing the decay/sustain graphic node and moving it to the left or right. Range is 2 ms - 40 seconds.

Sustain- Sets the voltage level following attack and decay phases while a note is held. Sustain level can be set by either the *Sustain* knob or by grabbing the decay/sustain graphic node and moving it up or down.

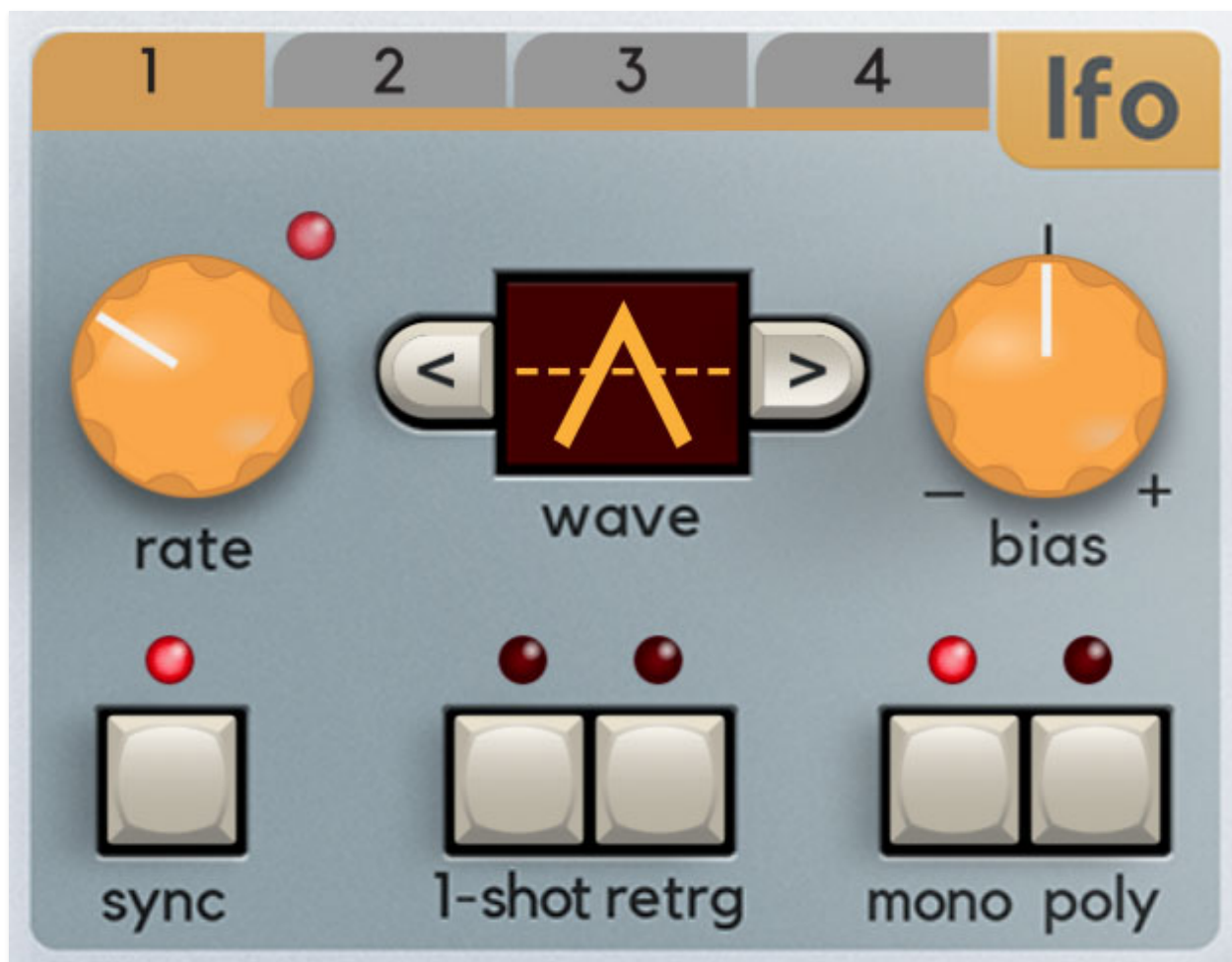
Release- Defines the length of time for voltage to fall from sustain level to 0V when a key is released. Release time can be set by either the *Release* knob or by grabbing the release graphic node and moving it to the left or right. The node will always stay at the bottom of the display, because the release segment always goes from sustain level to zero. Release range is 2 ms - 40 seconds.

Velocity- Defines how much the envelope affects the amplitude via keyboard velocity. When set to zero, keyboard velocity has no effect on amplitude; all the way up results in maximum control range.

The amp envelope affects overall volume of each note individually and is always active. The filter envelope affects filter cutoff frequency, with the amount set by the filter section *Envelope Amount* slider. At a setting of zero, the filter envelope has no effect on cutoff frequency; the higher the *Envelope Amount* slider setting, the more effect the filter envelope will have on the

cutoff frequency. We recommend reducing the *Cutoff* slider setting when using filter cutoff modulation.

LFO Section



LFO is short for "low-frequency oscillator." Harmonia's four onboard LFOs generate sub-audio range signals for modulation purposes. Each LFO is functionally identical and independent. To set and LFO's parameters, select the one you'd like to edit by clicking on one of the four numbered tabs along the top.

Rate knob and Sync button- The *Rate* knob defines the speed of the LFO, from 0.01 to 30 Hz (with *Sync* switch off) or from 8 beats up to 1/64th note triplets (*Sync* button enabled). The *Sync* button locks the LFO to host tempo when using Harmonia within DAW software, or to the current tempo in the top menu bar when using the standalone version. The LED above the *Rate* knob flashes at the current modulation rate.

Wave- Click the window to select a modulation waveform, or click on the arrow buttons on either side of the display to cycle through them. The mod waves include sine, triangle, ramp, exponential ramp, logarithmic ramp, saw,

exponential saw, logarithmic ramp, square, or sample and hold (i.e. stepped random).

1-Shot- LFOs typically are cycling constantly (that whole "oscillation" thing), but the engaging the *One Shot* button causes the LFO to move through its cycle a single time when a key is struck. For all intents and purposes, this converts the LFO to a simple envelope generator. This is especially useful when the saw and ramp waves are used to modulate the oscillator *Center* and *Width* controls.

Note that the *Rate* control defines the duration of the single LFO "envelope" cycle (lower setting = longer time), and also that the *Sync* button still works, which is useful for rhythmically locked envelopes.

Because One Shot mode uses a section of a wave that normally be endlessly repeating, and in order for them to be most useful, the individual waves have slightly varying behaviors. We'll do our best to explain how each of them function when in One Shot mode, with *Bias* set to *Bipolar*.

- **Sine**- CV begins at 0V, up to 5V, falls to -5V, returns to 0V and holds.
- **Triangle**- CV begins at -5V, up to 5V, falls to -5V and holds.
- **Ramp/Expo Ramp/Log Ramp**- CV begins at -5V, rises to +5V and holds.
- **Saw/Expo Saw/Log Saw**- CV begins at +5V, falls to -5V and holds.
- **Square**- CV begins at +5V, instantaneously falls to -5V and holds.
- **Sample and Hold**- CV begins at a random voltage and holds until note retrigger.

Bias- Bias defines the range of the LFO wave's swing. As the knob is turned, the dashed line in wave display moves to clarify the LFO range.

At center position, the voltage swings up and down equally. If the knob is turned all the way to the right, the CV swings from 0V to +5V back to 0V. If the knob is turned all the way to the left, the CV swings from -5V through 0V to +5V back through 0V to -5V, etc. The effect of LFO bias differs depending on mod depth and inversion settings (i.e. negative amounts of mod), as well as the parameter the LFO is modulating.

Retrigger (Retrg)- Defines LFO restart behavior when keys are struck.

In normal cycling mode (*1-Shot* disabled), enabling *Retrg* restarts the LFO cycle monophonically, that is, if no notes are currently on and a new note is struck, the LFO cycle restarts. If additional keys are played, the LFO won't

restart until all keys are released. This may seem counterintuitive, but it makes sense - imagine a polyphonic patch with square wave modulation applied to oscillator amplitude (i.e. OSC *Level* knob mod). If you played a chord, with each note struck at a (slightly) different time, the "on/off" mod of each note would be occurring at a different time, resulting in a sloppy-sounding mess. Having the modulation "synchronize" in this way generally has much more musical results.

Conversely, if both *1-Shot* and *Retrigger* are enabled, the LFO sweep restarts with every note played, regardless of previously held notes. This makes sense if you're using 1-Shot LFOs in the role of envelope generators controlling the oscillator *Center* or *Width* controls, filter cutoff frequency, etc.

Mono/Poly- This sets whether the LFO operates globally for all voices, or each voice has its own independent LFO. Mono operation is generally most desirable when the LFO is being used for standard pitch modulation (vibrato) or filter wah-wah effects. Mono LFO mod is also desirable if you're modulating the oscillator *Center* or *Width* controls, and you'd like all notes to receive the same modulation.

Poly LFO modulation is most useful when the LFO is *1-Shot* mode and being utilized like an envelope generator - for example, the LFO is being used to modulate the oscillator *Center* control, and you'd like each note played to swoop through its harmonics independently. This is similar to using the filter or amp envelope for the same purpose, but by using an LFO in *1-Shot* mode, you won't need to "waste" an envelope generator that you might want use elsewhere.

Mod Matrix

Harmonia's modulation routings are extensive and super easy to use. All eight mod slots have source, via, and destination popup menus and bipolar attenuators to adjust the amount of mod.

Mod Slot Select buttons 1-8 - To configure a mod routing choose which slot you'd like to use by clicking on one of the numbered buttons.

The buttons change color to indicate their status as follows:



The mod slot currently selected for editing is indicated by an orange button. In the above image, mod slot 1 is selected.

If the button is gray, the mod slot is not currently selected and no modulation source>destination path is currently configured (mod slots 2-8 in the image above).



If a mod source and a destination are configured for a slot but a different mod slot is currently selected, the button will turn red to indicate that mod is configured for that slot - this makes it easy to determine which mod slots are being used (but not currently visible) at a glance. In the above image, mod slot 1 is selected, and mod slots 4, 5, and 6 are configured, but not currently selected.

Source display- Clicking on the display screen opens a popup menu that selects the modulation source. Modulation sources are divided into type submenus.

Via display- The *Via* button allows a mod source to dynamically control *how much* modulation is occurring. When using a *Via* mod source, the *Amount* attenuverter sets the maximum mod amount.

Via is often used for mod wheel-controlled vibrato, but has numerous other uses, for example, *Keyboard CV* (how high or low a note is) could control the oscillator harmonics *Width* amount.

Amount attenuverter knob- Sets the amount of mod applied to the parameter for the currently chosen mod routing. The *Amount* knob is bipolar,

so center position is off; turning the knob to the right applies positive modulation, and turning to the left applies negative modulation.

Modulation from two or more sources can be routed to the same parameter by combining multiple Mod Matrix slots (or multiple mod sources can be combined from the Mod Matrix and the dedicated oscillator *Center* and *Width* mod boxes). All modulation is additively summed.

Mod Sources

Following is a list of mod sources. The Mod Sources list is identical for the Mod Matrix sources and oscillator *Center Mod/Width Mod* sections. The *Via* sources list is also identical. It's probably as fun to read this as it was to type it. Viva boring manuals!

MOD SOURCES	FUNCTION	M
LFO 1	PERIODIC OR ONE-SHOT MOD	M
LFO 2	PERIODIC OR ONE-SHOT MOD	M
LFO 3	PERIODIC OR ONE-SHOT MOD	M
LFO 4	PERIODIC OR ONE-SHOT MOD	M
FILTER ENVELOPE	FILTER ENVELOPE GENERATOR	PC
AMP ENVELOPE	AMPLITUDE ENVELOPE GENERATOR	PC
OSCILLATOR 1	COMBINED A/B OSCILLATOR OUTPUT	PC
OSCILLATOR 2	COMBINED A/B OSCILLATOR OUTPUT	PC
MOD WHEEL	MIDI/USB CONTROLLER MOD WHEEL	M
PITCH BEND	MIDI/USB CONTROLLER PITCH WHEEL	M
KEYBOARD CV	KEYBOARD NOTE - HIGHER NOTE = HIGHER CV	PC
MOD SOURCES	FUNCTION	M

VELOCITY	HOW HARD A KEY IS STRUCK	PC
CHANNEL PRESSURE	MIDI/USB CONTROLLER AFTERTOUCH	M
POLY AFTERTOUCH	KEY PRESSURE FOLLOWING INITIAL STRIKE	PC
WHITE NOISE	RANDOM WHITE NOISE MOD	M
PINK NOISE	RANDOM PINK NOISE MOD	M
MONO RANDOM DC	HELD RANDOM CV EACH TIME A NOTE IS STRUCK	M
POLY RANDOM DC	HELD RANDOM CV EACH TIME A NOTE IS STRUCK	PC
+10V DC	STEADY VOLTAGE SOURCE	M

Mod Destinations

DESTINATION CATEGORY	DESTINATION
LFO 1, LFO 2, LFO 3, LFO 4	RATE
LFO 1, LFO 2, LFO 3, LFO 4	BIAS
ALL OSCILLATORS, OSC 1, OSC 2	FREQUENCY
ALL OSCILLATORS, OSC 1, OSC 2	CENTER
ALL OSCILLATORS, OSC 1, OSC 2	WIDTH
ALL OSCILLATORS, OSC 1, OSC 2	HARMONIC 1, 2, 3, 4, 5, 6, 7, 8 LEVEL
MIXER/ OSC 1, OSC 2	LEVEL
MIXER/ OSC 1, OSC 2	PAN
DESTINATION CATEGORY	DESTINATION

FILTER	CUTOFF
FILTER	RESONANCE
FILTER ENVELOPE	ATTACK
FILTER ENVELOPE	DECAY
FILTER ENVELOPE	SUSTAIN
FILTER ENVELOPE	RELEASE
FILTER ENVELOPE	DELAY
FILTER ENVELOPE	VELOCITY
AMP ENVELOPE	ATTACK
AMP ENVELOPE	DECAY
AMP ENVELOPE	SUSTAIN
AMP ENVELOPE	RELEASE
AMP ENVELOPE	VELOCITY
DISTORTION	DRIVE
DISTORTION	LEVEL
DISTORTION	HIGHPASS
DISTORTION	LOWPASS
DISTORTION	MIX
DESTINATION CATEGORY MOD FX	DESTINATION RATE

MOD FX	DEPTH
MOD FX	FEEDBACK
MOD FX	SPREAD
ECHO	TIME
ECHO	FEEDBACK
ECHO	DAMPING
ECHO	SPREAD
ECHO	MIX
REVERB	DECAY
REVERB	PREDELAY
REVERB	HIGHPASS
REVERB	DAMPING

Master Controls

Here we'll go over the controls directly above the keyboard that govern master volume, tuning, voice assignment, and more.

Pitch, Bend Depth and Glide

Pitch- Sets the master tuning of the entire instrument up or down by 100 cents (i.e., a half-step).

Bend Depth- Sets the maximum amount of bend available via a MIDI/USB controller pitch wheel, up to an octave, in half-step increments.

Glide- Also known as "portamento," glide delays the voltage change between pitches for a sliding effect. *Poly 1* and *Poly 2* keyboard modes will behave a little differently when glide is used, so it's worth experimenting to determine which works better for the circumstance. Generally speaking, *Poly 2* mode tends to be more "glide friendly."

Voice Assign Modes

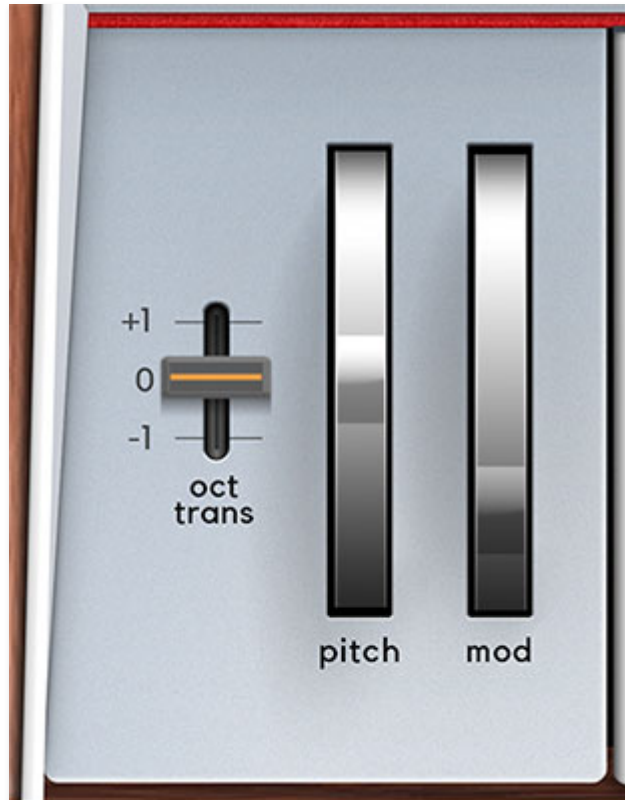
- **Mono** - One note can be played a time. Mono mode is always last-note priority; that is, the most recently played note will always sound. Note that Harmonia's waveform samples will retrigger from their start point with every note played. This may or may not be noticeable depending on the nature of the currently selected waveform sample.
- **Poly 1**- This is the standard polyphonic mode. If the number of notes played exceeds the current maximum setting, it uses a sophisticated allocation scheme to steal the most recently played notes. In use, this means if you're holding a bass note with your left hand, it won't disappear while playing chords and melodies with your right hand.
- **Poly 2**- Poly 2's allocation is optimized for Harmonia's glide function. Generally speaking, implementing polyphonic glide can be a tricky proposition (because our AI don't know whatcher gonna play next), but *Poly 2* mode does an impressively good job of "knowing" which notes to glide from and to when holding notes while playing melodies (regardless of whether notes are played legato or separately)

Max Voices- Sets the maximum number of notes that can sound simultaneously, from 2 to 16.

Limiters- The *Limiters* switch applies a transparent limiting effect to help prevent overloading.

Volume and output VU meter- We won't insult your intelligence by explaining what the volume knob does, but we will say it's a good idea to optimize the output level using the LED meters and stay out of the red.

Left-Hand Controls



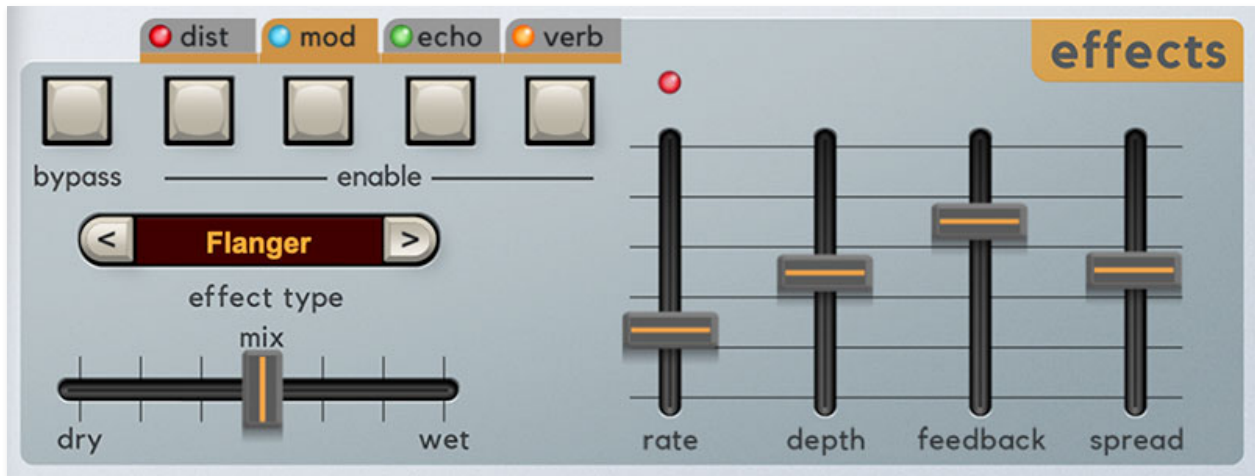
Oct Tranpose- Shifts the master tuning of the entire instrument up or down by one octave.

Pitch wheel- Standard pitch bender with a range specified by the *Bend Depth* knob above. The pitch wheel can be moved onscreen with a mouse or with a MIDI/USB pitch bend wheel or joystick.

Mod wheel- The mod wheel can be moved onscreen or with a MIDI/USB mod wheel or joystick. It outputs a constant control signal that can be used by selecting *Keyboard>Mod Wheel* in the Mod Matrix section *Source* or *Via* menus.

Effects

Harmonia includes four simultaneous effects: Distortion, Mod, Echo, and Reverb, usable in any combination. There's also a global bypass button for easy control over all effects.



Tab Selection and Effect Activation

Each of the four effects resides in its own tab. Individual effects are enabled or disabled using the square buttons beneath each tab; the LED in the tab will illuminate when an effect is enabled. All effects can be disabled with the *Bypass* button.

To edit an effect, click on the appropriate tab. The effect currently selected for editing will turn orange.

The *Effect Type* and *Mix* controls as well as the four sliders change function depending on which effect is selected for editing. The slider labels will change to reflect the current parameter. If *Echo* is currently selected for editing, a *Time / Sync* button appears as well.

Distortion



Enable- Enables and disables distortion effect. The LED in the tab additionally indicates current enabled or disabled status.

Effect Type-

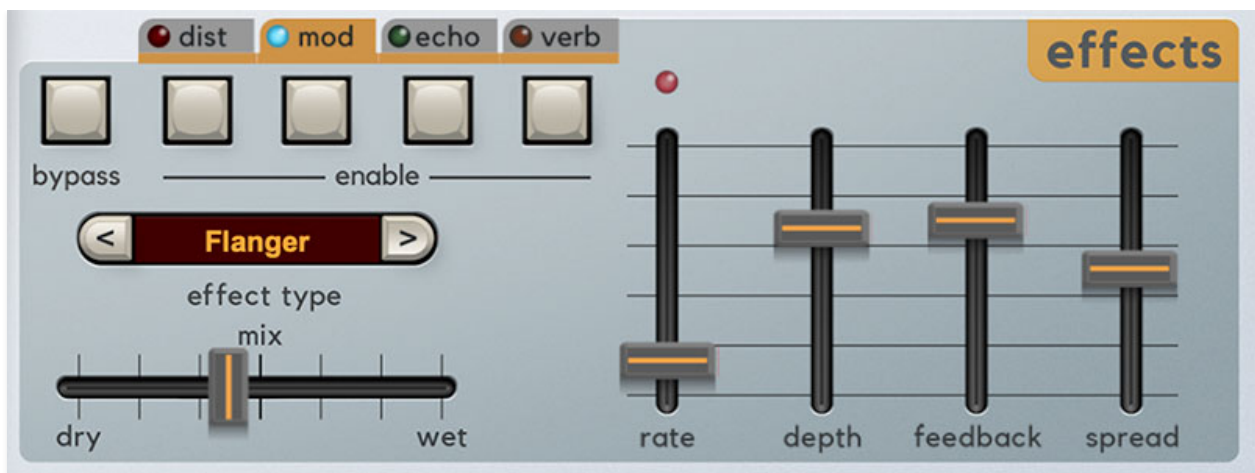
- **Tube-** This is the mellowest distortion mode. Use it to add just little bit of vintage hair to sounds.
- **Grunge-** Loud, aggressive, and raunchy. Like Screaming Tree.
- **Fuzz-** Also aggressive and raunchy, but in more fizzy and vintage. (Describing distortion in words is absolutely silly. I could never work for a guitar magazine.)
- **Sample Crush-** This actually changes the sample playback rate - going all the way down to 500 Hz (not kHz, but Hz!), so it can make a real mess.
- **Tone & Level-** Not a distortion effect at all - in fact the *Drive* slider is disabled in this mode, and the *Highpass* and *Lowpass* filters make a handy EQ, particularly in situations where the low harmonics get to be overpowering.

Drive- Amount of distortion.

Tone- Relative brightness of tone.

Level- Overall volume; this doesn't affect the amount of distortion. Increasing drive will cause an overall volume increase, *Level* can used to balance things out.

Modulation (Mod)



Mod features chorus, flanger, phaser, and rotary speaker modes. Mod effects operate in stereo, that is, incoming mono audio will be stereoized, but dry panned audio will maintain its pan position.

Effect Type-

- **Chorus**- The familiar stereo "doubling" chorale sound made famous by a million blue guitar pedals (and Roland Juno synths). Note that chorus tones don't make use of feedback, so the slider will be disabled in chorus mode.
- **Flanger**- Chorus and flanger are closely related, with the general difference being that flangers use a shorter time range and some amount of feedback (which intensifies the "jet-flyby" effect), whereas choruses utilize a comparatively longer delay, and no feedback.
- **Phaser**- Harmonia's phaser uses six stages of allpass filters to create its familiar swirly modulation.
- **Rotary Speaker**- A replication of the classic mechanical rotating organ speaker sound.

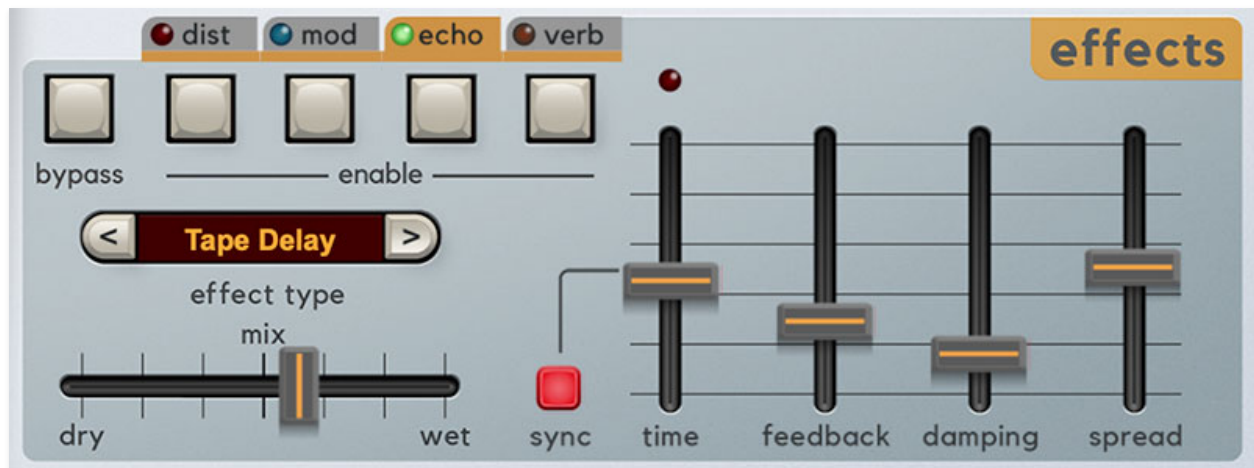
Rate- Sets the modulation speed from 0.01- 8 Hz. The LED above the sliders flashes to show the current rate. When in rotary speaker mode, the *Rate* slider acts as a two-position slow/fast switch. Settings from 0-50% will be slow, and 50% to 100% will be fast. When the rate is changed, the rotary effect accelerates and decelerates just like a real rotary speaker. The mod wheel or other mod sources can be assigned to alternate the speed setting using the Mod Matrix.

Depth- Sets effect depth, i.e. the amount of modulation. The *Depth* is disabled in Rotary Speaker Mode.

Feedback- Sets the amount of internal feedback when in flanger and phaser mode. Because chorusing and rotary speakers doesn't make use of feedback, the *Feedback* control is disabled when in chorus or rotary speaker modes.

Spread- Alters the delay time for increased stereo effect in flanger and chorus modes. *Spread* is disabled in phaser and rotary speaker modes.

Echo



Effect Type-

- **Stereo Delay**- A pristine sounding stereo digital delay.
- **Tape**- Reproduces the effect of a vintage "space echo" tape delay.
- **Ping-Pong**- Echoes alternate between audio channels.

Sync- Engaging the *Sync* button locks the delay time to master tempo. When engaged, the *Time* slider snaps to note values ranging from 1/64th note triplet to 8 beats. *Sync* mode locks to the tempo in the top toolbar when using the Harmonia standalone version or the current project tempo when the plug-in version is used in a DAW.

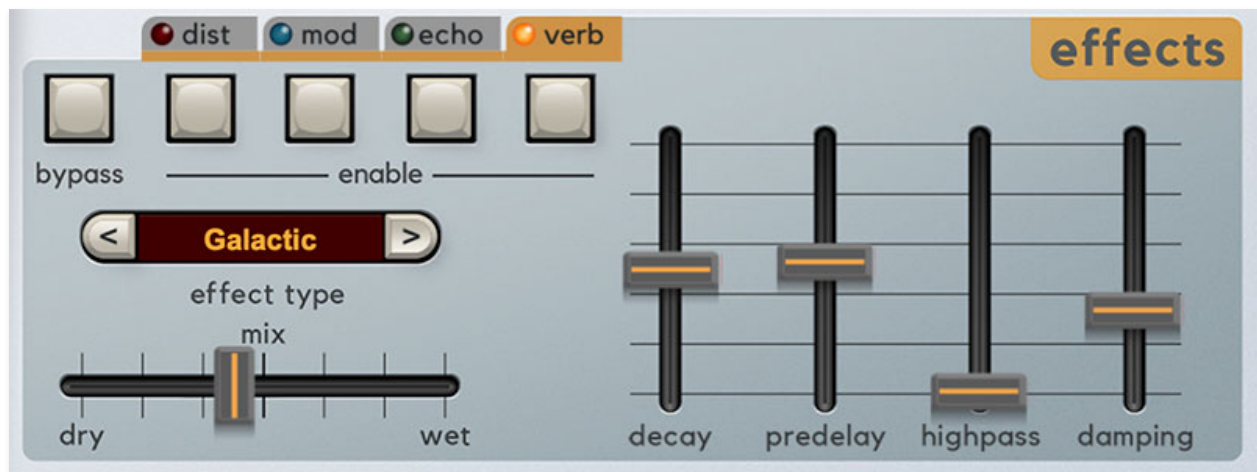
Time- Sets delay time, from 1 to 2000 ms. If the *Sync* button is enabled, time settings snap to synchronized note values.

Feedback- Routes the output to the input for additional repeats. Be careful at high settings as this can result in runaway feedback madness.

Damping- Attenuates high-frequencies as the slider amount is increased. Not only does this create more natural sounding decays, it also reduces the "stacking" effect that occurs with high feedback levels.

Spread- Alters the left and right channel delay times creating a stereoizing effect. Greater amounts of spread increase the delay time differential and thus the stereo separation.

Verb (Reverb)



Enable- Enables and disables reverb effect. The LED in the tab additionally indicates current enabled or disabled status.

Effect Type-

- **Spring**- Emulates the spring reverb tone used in classic guitar amps.
- **Room**- Recreates a vintage algorithmic-style medium room verb.
- **Plate**- A medium-to-large studio plate-style algorithm.
- **Hall**- A large, hall-style reverb.
- **Galactic**- Cherry Audio's exclusive giant, spacey reverb.

Decay- Sets the length of reverb release time/size of room.

Predelay- Delays the onset of reverb. It also alters pitch when the slider is moved, so this is a fun one to modulate.

HP- A highpass filter. Low frequencies are increasingly attenuated as the slider setting is increased. The dry signal is unaffected.

Damping- Attenuates high frequencies as the slider amount is increased.

Harmonia Programming Techniques

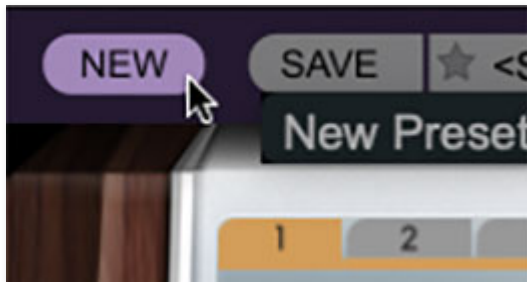
In the course of creating Harmonia, we discovered a few fun and interesting approaches to sound creation. They're certainly not necessary to read, but we hope they'll help you to get the most out of Harmonia!

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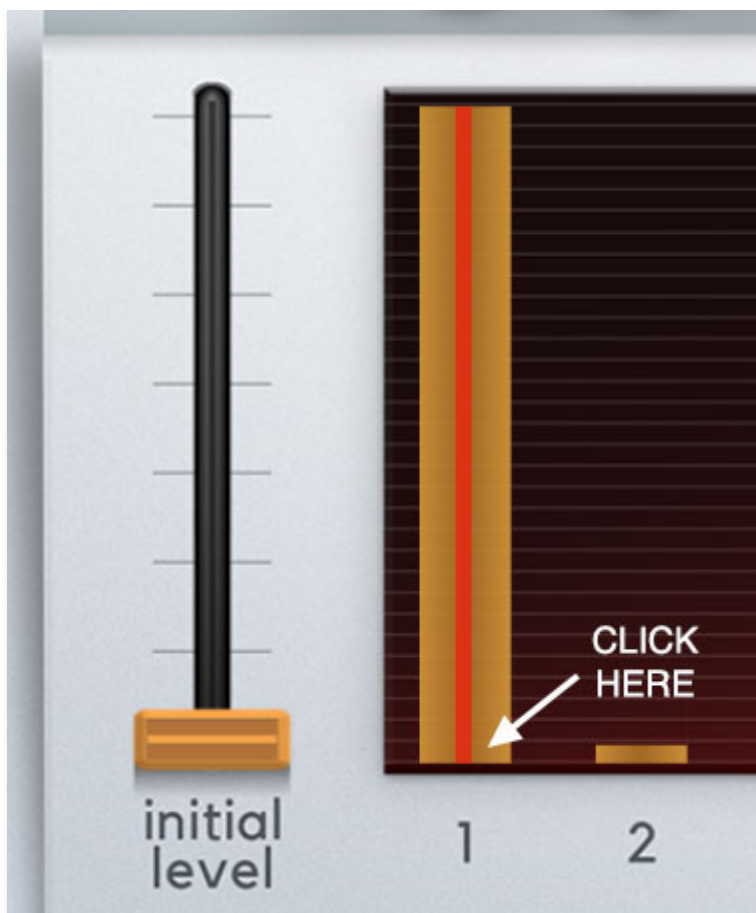
Basic ROMpler

It's safe bet that every keyboardist has used a "ROMpler"-type instrument. These use brief audio samples of real or electronic instruments or effects. Unlike a classic sampling instrument where users could record their own custom samples, a ROMpler contains a fixed set of raw samples to create sounds ("ROM" is an acronym for "read-only memory," i.e., permanently programmed).

In a sense Harmonia is a gussied-up ROMpler instrument in that it also uses a fixed collection of audio samples to create sounds. The difference is that Harmonia lets you do a heck of a lot more with those samples in order to create insane (or slightly-saner) evolving tones, but because its raw sample library was custom made to be quirky and unique, there are plenty of great sounds to be made without using any of Harmonia's fancy modulation capabilities. Here's how:



- Click the *New* button in the top left corner to create an initialized patch.
- Click on the orange text in Oscillator 1's *Waveform* selector, and select something spicy. In this example, we've chosen *Orch>Flute Distress 2*.
- Pull the *Initial Level* fader down to zero.



- Click Harmonic Level Bar *1* at the bottom and drag it vertically to its max setting. (Harmonic Level Bars can actually be clicked and moved *anywhere* in their vertical travel. They're also fabulous places for harmonics to meet other lonely harmonics and... oh, nevermind.)
- Set the Amp Envelope *Attack* and *Release* controls to desired length and we've got a lovely faux-Mellotron.

By selecting various raw waveforms, Harmonia can be used just like any other basic ROMpler instrument. You can also fatten up sounds by duplicating Oscillator 1's settings with Oscillator 2 and altering the *Detune* knob a bit for natural chorusing (the *Utility* button *Copy Oscillator* command does a swell job of this).

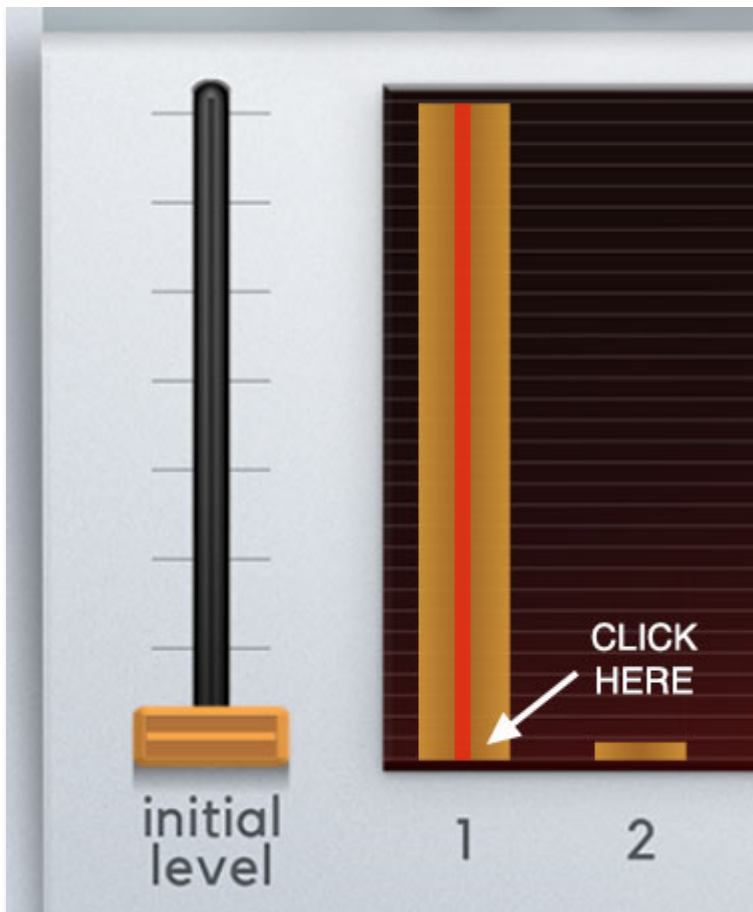
Of course, you might want to experiment with raising additional Harmonic Level Bars to add additional timbral interest. This segues us right into the next section...

Additive Synthesis

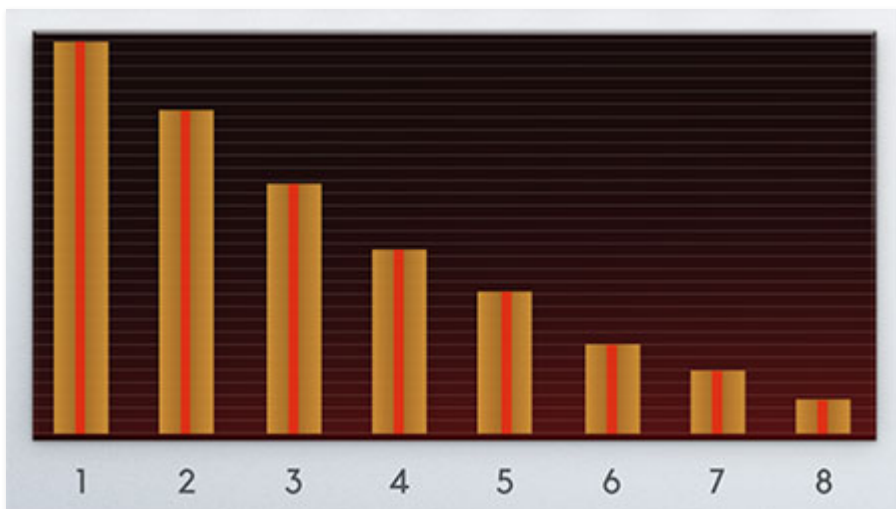
Additive synthesis must be cool, because it has a cool-sounding name, right? As discussed in the **Oscillator and Harmonics Tuning** section, the idea behind additive synthesis is that multiple sine waves are tuned to mathematical ratios and combined at various amplitudes to create more complex tones - conceptually, like combining prime numbers to create a larger, fancier number.

The main limitation of this technique is that you need a lot of of sine waves to create really complex tones, but with that said, there are still interesting tones to be found mixing pure sine waves, and of course, we can select far richer waveforms. Let's begin with an initialized patch as in the previous example:

- Click the *New* button in the top left corner to create an initialized patch.
- Click on the orange text in Oscillator 1's *Waveform* selector, and select *Basic Analog>Sine*.
- Pull the *Initial Level* fader down to zero.
- Click the orange text in the Harmonics Preset window and select *Harmonics Presets>Even Order*. This configures the tuning of all eight harmonics to even multiples.



- Click the Harmonic Level Bar *1* at the bottom and drag it vertically to its max setting. Play some notes and behold One Boring Sine Wave.
- Experiment with raising the other Harmonic Level bars - notice how it creates interesting composite tones?



If the harmonics are set something like above, the tone will resemble, you guessed it, a sawtooth wave. It'll be a bit duller, because it's missing upper

harmonics, but it's certainly in the ballpark.

- Try leaving the Harmonic Level bars at their faux-sawtooth settings, and switch the waveform to *Basic Analog>Square*. This sounds even more like a sawtooth wave, and incidentally, this is how many string machines and organs create saw-like waves using square-wave sound generation

Naturally, this stacking of static waveforms isn't limited to basic waveforms - experiment with Harmonia's more complex looped waves. And also experiment with different Harmonics Presets. We recommend starting with *Harmonics Presets>Harmonics 1-8, Even Order, and Odd Order*.

Interesting sounds can often be created by raising Harmonic Level 1 and/or 2, then raising a one or more super high harmonics (feel free to twist the red tuning knobs on these to taste).

Morphing Through Harmonics

Smoothly sweeping through harmonics by modulating the oscillator *Center* and *Width* controls are Harmonia's "main event," and the key to creating awesome evolving soundscapes. Here we'll show how to create these types of patches:

- Click the *New* button in the top left corner to create an initialized patch.
- Click on the orange text in Oscillator 1's *Waveform* selector, and select the *Vocal>ChoirVerb* wave
- The *Initial Level* fader needs to be turned up - it will default to 80% in the initialized patch.

Before go any further, hold a note down on the keyboard, slowly move Oscillator 1's horizontal *Center* slider, and behold the awesome of Harmonia's interpolated scanning harmonics mixer. Since moving onscreen controls with a mouse while playing isn't much fun, we'll automate the *Center* slider movement using low-frequency oscillator #1:

The *LFO>Center Mod* routing is already configured in the default patch, but we'll explain how it's done.

Because *Center* and *Width* mod is so important in Harmonia, we've given these controls dedicated mod routings (*Center* and *Width* can also be modded using the Mod Matrix).

- Set the *Center* slider all the way to the left. To modulate *Center*, click on the *Src* button in the *Center Mod* section. In this example, we're using LFO 1 as the mod source. Once the mod source is selected, turn the gray *Center Mod* knob to the right to around three o' clock.
- Now we'll set up LFO parameters. Make sure the *#1* tab is selected (it should be orange). We'll use the default triangle wave.

Because the *Center* slider is at its minimum setting and we want the LFO mod to raise its value, we'll set the LFO *Bias* knob to max (all the way right). This means the swing of the LFO goes from zero to max and back to zero - that is, it won't go negative. The dashed line in the *Wave* window makes the swing of the LFO easier to understand.

- Now set the LFO rate as desired - somewhere around 0.30 Hz will work well.

The *Center Mod* amount knob will affect how "far" the mod travels, that is, how many higher harmonics are heard.

The *Center* slider position can be used to set the initial start point, and the reducing the LFO *Bias* knob can be used to modulate the *Center* slider up and down from initial *Center* position.

To increase the amount of neighboring harmonics heard, increase the orange *Width* knob setting. The *Width* knob can be similarly modulated using its dedicated *Width Mod* bus.

Quasi-Harmonic Sequencer

That may sound like some fancy terminology, but it's basically the same as the *Morphing Through Harmonics* example with one difference - the *Width* knob is set to zero. Instead of smoothly interpolating between adjacent harmonics, Harmonia instantly snaps from one harmonic to the next as the *Center* control is moved or modulated. This allows the creation of sequencer-like note patterns.

We like to say "sequencer-like," because it's not exactly like using a traditional analog step-sequencer in that the playback rate of harmonics (notes) changes depending the Center Mod depth setting. It makes sense if you think about it because an LFO at a given speed is going to modulate between two adjacent harmonics far more slowly than if it were modulating across all eight, for example.

More Faux-Sequencer Tips



- At the risk of pointing out the obvious, the above sequencer-like tricks are what prompted us to include the harmonics tuning *Semitone* mode. The Harmonics Presets include a number of semitone scales, which are great head start, or you can create melodies from scratch by dialing the red tuning knobs as with any step sequencer.
- If you missed this in the **Oscillator 1 & 2 section**, dialing a harmonics tuning knob fully counterclockwise disables sound altogether for that harmonic. This is useful for rests/silent steps in our faux sequences (notice in the image above how harmonic #8's display is blank).

- If you don't want the sequence to transpose when playing different keyboard notes, disable the *Keyb Track* button at the top. The *Octave* and *Detune* controls can be used to tune the sequence to the desired key/range.

The Combo Platter

One of Harmonia's niftiest features (that we accidentally discovered) is that just about any of the sound programming techniques we've described can be combined. Following is an admittedly over-the-top example of how to make a single oscillator sound like... three-and-an-half oscillators?

- Click the *New* button in the top left corner to create an initialized patch.
- Click on the orange text in Oscillator 1's *Waveform* selector, and select the *Vocal>Choral 3* wave.
- Click the *Harmonic Level Bar 1* at the bottom and drag it vertically to its max setting, then *Harmonic Level Bar 2* about halfway up.
- Make sure the *Initial Level* fader is turned up near max.
- Set the *Center* slider between harmonics 6 and 7 (about 80%).
- Now we'll modulate the *Center slider*. Click on the *Src* button in the *Center Mod* section and set it to *LFOs>LFO 1*. Turn the gray *Center Mod* knob right to around 9%. Harmonic 6 and 7's skinny red VU meters should be going nuts.
- Now we'll set up LFO parameters. Make sure the *#1* tab is selected (it should be orange). We'll use the default triangle wave. Set the *Rate* to 2.25 Hz, and *Bias* to center.

Now we have the first two harmonics playing a static "base" note, and the higher harmonics flipping back and forth. But wait... we'll make an even bigger mess by using the Mod Matrix to modulate the levels of harmonics 4 and 5:

- First, we'll set up an LFO. Click the *LFO #3* tab, set the *Rate* to 2.00 Hz, the *Wave* to *Square*, and the *Bias* knob to center position (0%).
- In the Mod Matrix, click the *#3* button. Click in the blank *Source* window and select *LFOs>LFO 3*. Click in the blank *Destination* window and select *Oscillator 1>4th Harmonic*. Turn the *Amount* knob all the way up (+).

- Now click Mod Matrix, button #4. Click in the blank *Source* window and select *LFOs>LFO 3* here too. Click in the blank *Destination* window and select *Oscillator 1>5th Harmonic*. Turn the *Amount* knob all the way down (-).

How's that for a whole lotta sound from just one oscillator?!? We could even mod harmonic 3 with some other mod source for more chaos. Or mod the Width knob for splashes of all the harmonics - the possibilities are endless.

And finally, keep in mind that the red harmonic tuning knobs can be used to set the harmonic pitches however you'd like - that is, "higher" harmonics don't necessarily need to be higher.

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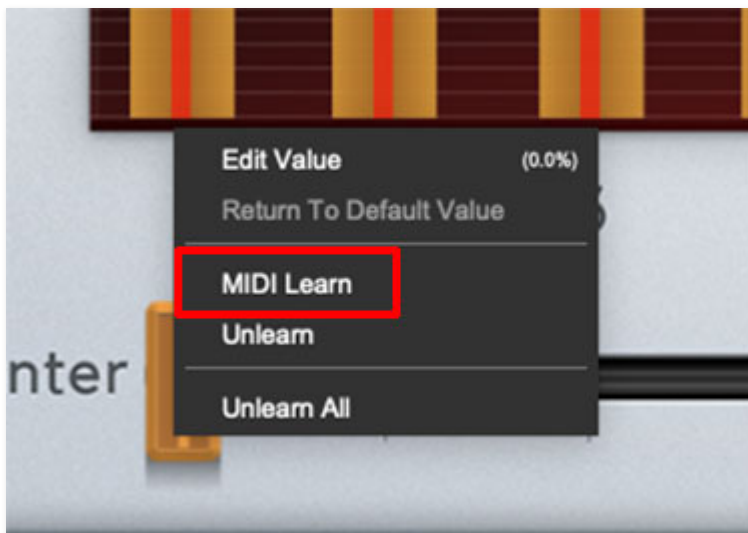
MIDI Controllers Setup and the MIDI Tab

Assigning internal and external hardware controls adds a whole new dimension of control and musicality to patches, and it's really easy to do. The MIDI Tab is where all controller assignments can be viewed and tweaked. First we'll show how to assign an external hardware controller to a Harmonia control, then we'll go over all parameters in the MIDI Tab.

Basic External Hardware Control Assignment

This is the quick, "I just want to assign a hardware control right now!," section. We recommend reading this whole section to best take advantage of Harmonia's MIDI control assignments.

In this example we'll assign a control to oscillator 1's *Center* slider.



Begin by right-clicking on oscillator 1's *Center* slider and selecting *MIDI Learn*. A transparent purple overlay appears over the knob indicating that it's in learn mode. Now move the desired hardware control device. The purple overlay disappears and the hardware control will move the onscreen slider. If you get cold feet (or accidentally put the wrong control into learn mode), learn mode can be aborted by right-clicking and selecting *Stop Learning*.

This is the basic procedure for assigning hardware controllers to almost any Harmonia control.



When in MIDI learn mode, any previously assigned controller numbers will show in squares. These indicate the MIDI continuous controller number of the assigned hardware control (these are also displayed in the *MIDI* library tab at left).

Once a MIDI controller has been assigned, in addition to real-time control of a Harmonia parameter, you'll also be able to record and play back controller data from a DAW.

The MIDI Tab

This is command central for all MIDI controller assignments. Here you'll be able to see information about all currently assigned controllers and adjust control ranges.



To view or hide the MIDI Tab, click the *MIDI* button in the top toolbar.



MIDI Learn button- This is almost exactly the same as enabling MIDI learn mode by right-clicking a control. Click the *MIDI Learn* button to enter learn mode (all controls turn purple). Unlike right-clicking on specific knobs, where Harmonia automatically exits controller assignment mode, clicking the *MIDI Learn* knob "stays on" to enable assignment of multiple hardware controls. This is handy for quickly assigning a bunch of continuous controls or the buttons of a grid-style controller.

To assign multiple controls, click *MIDI Learn*, click an on-screen control, move the desired hardware knob or slider, continue clicking and assigning on-screen controllers until all desired controls are assigned, then click *Stop Learning* to exit learn mode.

Remember that a single hardware knob/slider/button isn't limited to controlling just one parameter - a single hardware controller can simultaneously operate as many controls as you'd like.

MIDI Tab Columns

Name- Displays the name of the parameter being controlled.

Type- There are five possible types of controller automation in Harmonia

- *Note*- Notes played on a MIDI keyboard controller, expressed as C-1 to G9
- *CC (MIDI Continuous Controller)*- The standard 128 MIDI controller numbers as defined in the MIDI spec. More specifically, these are the

controllers transmitted by hardware knob and slider controls. MIDI CC's can be used to control parameters in real-time or recorded and played back within DAW software.

- *MMC (MIDI Machine Control)*- The MIDI control protocol for tape machine-style transport controls. Back in the dark ages, this was used to control wonky old Tascam and Fostex reel-to-reel monsters, but it's useful if your MIDI controller has tape-style transport control buttons.
- *Pressure*- Some keyboard controllers transmit controller data when keys are pressed and released as they're held down; this is known as a "pressure" or "aftertouch." The vast majority of keyboard controllers with aftertouch transmit "mono" aftertouch only; in other words, aftertouch data is the sum of all keys to one single data stream.

The Touch Sensor section allows super fast assignment of aftertouch control to basic Poly Synthesizer and Lead Synthesizer controls, but this can be used to control *any* Harmonia parameter.

- *Key*- This allows keys of the computer QWERTY keyboard to act as button controls for Harmonia's onscreen controls.

Value- Displays the specific automation controller. In the case of a *Note* this would show a MIDI note number (C-1 to G9, for a MIDI CC, this would be the MIDI CC controller number, etc. Clicking on the value opens a pop-up menu where all values are displayed and can be selected.

Min- Sets a limit on the lowest value any automation control can set a mapped controller to. This actually recalibrates the range of the automation controller to the remaining parameter range.

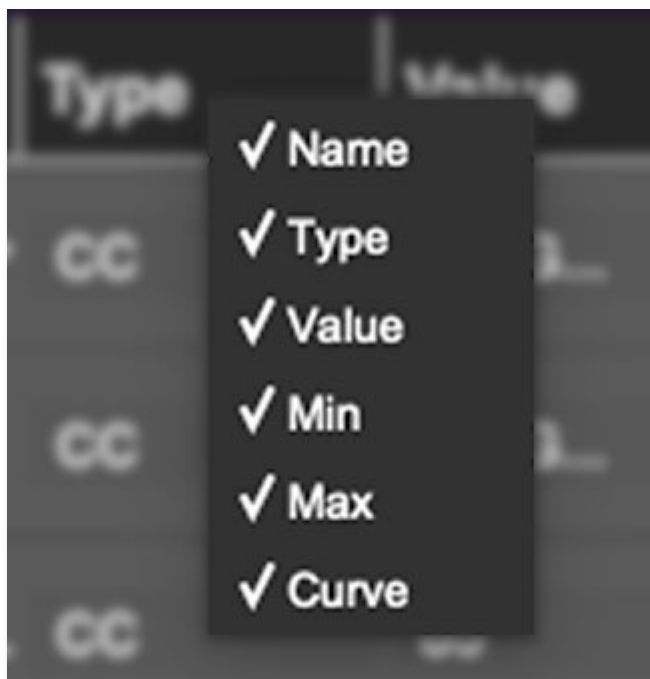
Max- Sets a limit on the highest value any automation control can set a mapped controller to. This actually recalibrates the range of the automation controller to the remaining parameter range.

- ***Super Tricky Min-Max Tricks***- Not only can parameter ranges be limited via the *Min* and *Max* knobs, mapped control destinations can be completely inverted by setting the *Min* knob all the way up and the *Max* knob all the way down (or anywhere in between).

Limiting and inverting parameter ranges with the *Min/Max* controls is particularly useful when multiplexing a single hardware control to operate multiple parameters. Along with the *Curve* control, the customization possibilities are super flexible.

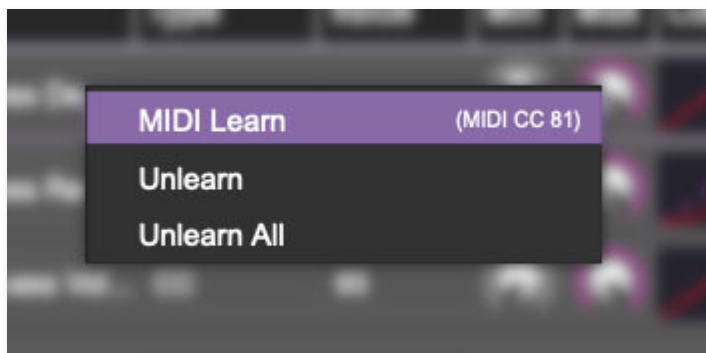
Curve- These allow the customization of how incoming MIDI CC controls affect the movement of Harmonia's onscreen controls, ranging from exponential to linear to logarithmic curves.

MIDI Tab Column Configuration Right-Click Menus



Right-clicking anywhere in the top row (*Name*, *Type*, *Value*, etc.) displays the column configuration menu. Checking/unchecking these allows hiding and display of each column. This has no effect on assignments.

MIDI Tab Parameters Right-Click



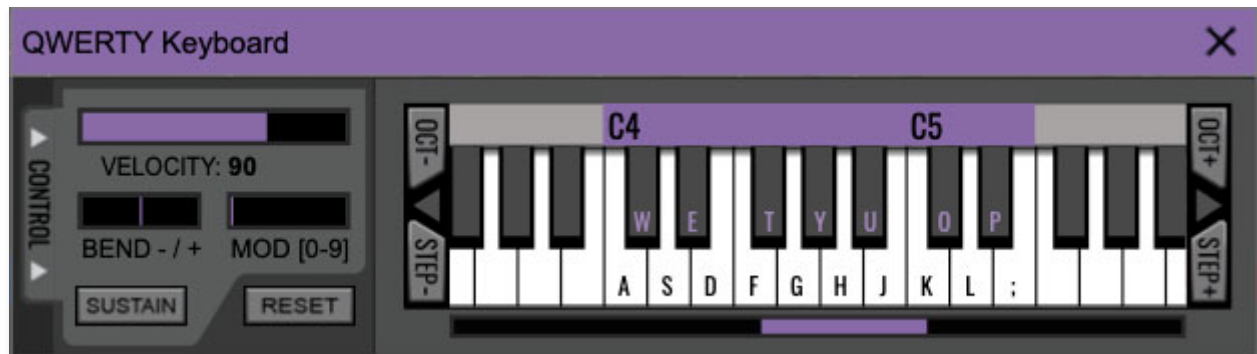
Right-clicking on an assigned parameter opens the menu above.

MIDI Learn- This is used to change the controller assigned to a particular parameter.

Unlearn- Deletes the selected automation parameter.

Unlearn All- Deletes all controller assignments for the patch. Harmonia will display a warning dialog prior to deletion in order to thwart potential unlearn-related disasters.

QWERTY Musical Typing Keyboard (MTK)



If you don't have a MIDI keyboard attached to your computer, the standard QWERTY computer keyboard can be used to play notes - we're pretty sure you've got one of those! We'll refer to this as the "MTK." Following is a list of MTK keyboard modifiers and functions:



Opening and Closing the MTK - click the circular keyboard icon in the top toolbar. To close the MTK, click the keyboard icon in the top toolbar, or click the *X* in the top right corner.

Play Notes- To trigger notes, simply press the corresponding computer keyboard key or mouse click the onscreen keys.

Adjust Currently Visible MTK Range- Slide the purple scroll bar horizontally to adjust the currently visible keyboard range.

Adjust Overall Visible Keyboard Range- Clicking and dragging the right edge of the MTK window allows the overall size of the window to be adjusted. This lets you view more or less of the onscreen keyboard. Note that the MTK window's borders cannot exceed the overall outside dimensions of the Harmonia window.

Shift Range Up/Down Octave- Click the *Oct-* and *Oct+* buttons at the top left and right of the onscreen MTK. The current range is displayed above the

keyboard.

Shift Range Up/Down Semitone- Click the *Step-* and *Step+* buttons at the bottom left and right of the onscreen MTK. The current range is displayed above the keyboard.

Hide/View Controllers- Clicking *Control* at the far left hides and displays velocity, bender, mod, and sustain control parameters. Hiding the control view makes more space available for the keyboard.

Set Note Velocity- Move the purple *Velocity* bar to adjust the output velocity of notes.

Pitch Bend- To pitch a note or notes, press the + or - computer keyboard keys while playing a note. Notes will bend up to an octave. Notes can also be pitchbent by clicking the mouse in the *Bend* area.

Mod Wheel- To add mod wheel modulation, press the number keys from 0-9 (above the character keys) while playing a note. The modulation amount will vary from none (0) to full modulation (9). Note that modulation will "stick" at the selected number; to disable modulation, click the 0 key. Mod can also be engaged by clicking the mouse in the mod bar area.

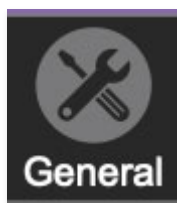
Sustain- The *Sustain* button mimics the functionality of a standard sustain pedal. Click the [TAB] key to engage sustain, or [SHIFT]+[TAB] to lock it. The *Sustain* button can also be engaged by mouse clicking it.

Reset- Initializes all MTK parameters including keyboard range and control parameters.

Settings

Clicking the settings gear opens a window with multiple tabs for configuring various "under-the-hood" settings. These are mostly set-and-forget kind of parameters - all the stuff you'll want to tweak is on the front panel, as the heavens intended!

General



- **Add Undo For Control Changes With The Mouse**- Enabling this allows undo of knob/slider/button adjustments. You'll want this on if you want the ability to undo all aspects of patch editing and programming.
- **Create A Log File For Usage**- This creates a text doc of all of Harmonia's internal and routines during use. It is mainly intended for our tech staff should you experience any issues. Clicking *Show Log Folder* opens the folder containing Harmonia log file docs.
- **Load Last Preset On Startup (Standalone Only)**- Automatically loads the last preset used when Harmonia standalone version is started.
- **Preset Folder**- Displays the current location of Harmonia's sound presets. This can be changed by clicking and typing in the field.
 - **Browse...** - Displays the current location of preset folder in the file manager.
 - **Set Default**- Sets the current displayed *Preset Folder* path as the default location
- **Clear Cache Files**- Deletes all log files, temporary sounds, and the image cache.



Interface

Allows customization of Harmonia's user interface settings.

- **Reset To Default Window Size-** Resets the Harmonia workspace to 100%. Use this to reset the window size if Harmonia's workspace somehow becomes too large for your display and can't be resized.
- **Tooltip Delay-** Tooltips are those informative bits of text that pop up when hovering over a control (go ahead and try it, we'll wait...). The *Tooltip Delay* setting defines how long you must hover before the tooltip pops up.
- **Knob Movement-** Defines which how mouse movements related to turning onscreen knobs. It defaults to *Vertical Drag*, but can be changed to *Horizontal Drag*, or *Rotary Drag* if you're one those folks that cut their teeth on the *Steinberg Model E VST* back in 2000.
- **On Control Double-Click-** Defines what happens when the mouse is double-clicked on a control. If *Edit Value* is selected, an exact number can be entered by typing the number and hitting [ENTER] or [RETURN]. If *Sets Default Value* is selected, double-clicking a control resets it to its default value.
- **Mouse Wheel Adjusts Control Value-** Enabling this lets you adjust knob, slider, and switch values by moving the mouse wheel. This works great with a standard mouse wheel, but you'll want to disable it if you're using an Apple Magic Mouse (which will move the control AND scroll the window).
- **Show Tooltips When Adjusting Controls With Mouse-** Displays parameter tooltips/values when the mouse is hovered over a control or as a control is moved with mouse button down.
- **Show Tooltips When Automating Controls-** Displays parameter tooltips/values next to controls a if a control is moved via an assigned MIDI controller or automation.
- **MIDI Program Changes Should Change Current Preset-** Allows MIDI program change messages to change Harmonia patches.
- **Ask To Save Modified Presets-** This opens a dialog window asking if you'd like to save changes if a patch has been edited and a new patch is selected. If you're the type that likes to click through presets and tweak a control here and there, it can be annoying to have a window pop-up

asking if you'd like to save every time you switch presets - if you're that person, keep this off.

- **Remember MIDI Mappings For New Plug-in Instances-** When enabled, Harmonia remembers all MIDI Tab controller settings.



Account

Settings for your personal login information and account.

- **Email-** Displays the email address of the current login.
- **Update Login Info-** Clicking this opens the same email and password login screen you'll see when initially launching Harmonia. Click **here** for information about soft rock superstars, Loggins and Messina.
- **View Account Settings-** This opens your personal account page on the Cherry Audio Store website containing information about modules purchased and more.

Software Update

- We often fix bugs and make improvements; below are options defining how Harmonia handles updates.
- **Check For Update-** Click this to see if an updated version of Harmonia available.

Status:

- **Automatically Install Updates-** Updates are automatically downloaded and installed.
- **Ask Before Installing Updates-** By default, Harmonia automatically downloads new versions of modules when available. Checking this box defeats automatic updates and will ask if you'd like to install updates when they become available.

We'll never make changes that can potentially "break" existing patches

but we recommend enabling *Ask Before Installing Updates* if you're using Harmonia for live performances or other mission-critical situations.

- **Never Install Updates**- Harmonia never automatically installs updates.
- **Show Updates On Toolbar**- Checking this will display an icon in the toolbar next to the logo letting you know there's an update available.

Show Notifications From Cherry Audio- We occasionally will fire off in-app advertisements; disabling this checkbox will hide them. We hate repetitive, annoying ads as much as you do, so we won't use this feature too often. When we do, it'll be for something super cool (like a killer sale), so we recommend leaving it on.



Audio/MIDI

Settings for audio and MIDI hardware input and output.

This tab is only visible in the standalone version of Harmonia.

- **Output**- Use this drop-down menu to choose a physical audio output source. This defaults to *Built-In Line Output*, i.e. your computer's onboard system audio, but you'll get better fidelity with an external professional audio interface. The biggest audible difference is usually reduced background noise or hum, but external audio hardware also offers greater flexibility in terms of number of inputs and outputs and built-in mic or low-level instruments pres (i.e. electric guitars). These are especially useful if you're using Harmonia's external inputs to process sound. The *Test* button will produce a brief sine wave when clicked; this will help with troubleshooting, aka, "WHY THE HECK ISN'T THIS MAKING ANY NOISE?!?"
- **Sample Rate**- This sets Harmonia's global sample rate. Lower sample rates offer better performance, but if you have a fast computer, high sample rates may offer slightly improved fidelity.
- **Audio Buffer Size**- As with any digital audio app, this defines performance vs. note latency, and will largely depend upon computer CPU speed. A professional external audio interface will almost always exhibit

better performance than “built-in” system audio. Lower settings will result in less latency (in the form of faster response to notes played), but will increase the chances of audio gapping or crackling noise.

- **Active MIDI Inputs**- Displays all available MIDI input sources, i.e. keyboards, pad controls, MIDI knob/fader control surfaces, etc. Check boxes to enable one or more devices. **If notes aren't playing when using Harmonia in standalone mode check to make sure your USB/MIDI controller is checked in this area.**