



HARMONY ENGINE

USER GUIDE

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Introducing Harmony Engine



Harmony Engine lets you quickly produce professional quality harmony arrangements from a single vocal or monophonic instrument track. It offers a variety of control modes, from fully automatic to individual control of every note.

Harmony Engine features four high-quality Harmony Voices with independently adjustable **vocal timbre**, **vibrato**, and **pan** settings for realistic or extreme effects. And five channels of our **Choir** vocal multiplier lets you turn each harmony voice into 2, 4, 8, or 16 individual unison voices.

Harmony Engine provides all the tools you need to produce lush and convincing harmonies. Craft your own vocal arrangement note-by-note, perform your harmonies with your MIDI controller, or just choose the chords and let Harmony Engine do the rest.

With four independent harmony voices, a variety of flexible harmony generating modes, and humanization features for more natural-sounding performances, Harmony Engine gives you the tools you need to produce any vocal arrangement you can imagine.

Quick Start

Follow these steps to get started with Harmony Engine.

Set the Input Vocal Range

To optimize Harmony Engine's pitch tracking algorithm, choose the setting from the [Input Vocal Range](#) menu that best describes your track. Options include Soprano, Alto/Tenor, Baritone/Bass, and Instrument.

Choose a Harmony Mode

Specify how you'd like Harmony Engine to generate harmonies by choosing an option from the [Harmony Source](#) menu.

Choose an [Interval Mode](#) ([Fixed Interval](#) or [Scale Interval](#)) to manually select a harmonic interval for each of the Harmony Voices.

Choose a [Chord Mode](#) ([Chord Degrees](#) or [Chord Name](#)) to select a chord and some general features of the chord voicing, and let Harmony Engine automatically assign a pitch to each of the Harmony Voices.

Choose a [MIDI Mode](#) ([Chord Via MIDI](#), [MIDI Omni](#), or [MIDI Channels](#)) to control the pitches of the Harmony Voices using MIDI input.

Choose Your Harmony

If you're using an [Interval Mode](#), set the [Interval](#) menu for each voice to specify its harmonic interval in relation to the input voice.

If you're using a [Chord Mode](#) choose a chord root and quality from the [Key/Root](#) and [Chord](#) menus, and dial in the chord voicing with the [Inversion](#), [Spread](#), and [Register](#) controls.

Save your [Harmony Control](#) settings to a [Harmony Preset](#) button for quick recall. Try automating the Harmony Presets in your DAW to quickly program an entire harmony arrangement for your track.

If you're using a [MIDI Mode](#), route some MIDI to Harmony Engine from an external MIDI controller or a MIDI track in your DAW.

Set the Voice Controls

Set the [levels](#) and [pan](#) positions for each of the Harmony Voices. Try different settings for the [Throat Length](#) controls to give each voice its own unique vocal timbre.

Humanize the Harmony Voices

Use the [Naturalize](#), [Pitch Variation](#), and [Timing Variation](#) controls to automatically apply subtle variations in pitch and timing to each voice, for a more natural-sounding harmony arrangement.

Add Some Vibrato and Choir

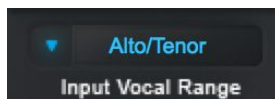
Use the [Vibrato Controls](#) to add individually generated vibrato to each voice (turn down [Naturalize](#) first so the natural and generated vibratos don't conflict).

Use the [Choir Controls](#) to add up to 16 unison voices to each Harmony Voice, each with its own subtle variations in pitch and timing. Spread out the Choir voices with the [Stereo Spread](#) control.

Controls

Audio Input Controls

Input Vocal Range



The **Vocal Range** menu lets select the voice type of your track, to optimize Harmony Engine’s pitch tracking and voice modeling algorithms. Options include Soprano, Alto/Tenor, Baritone/Bass, and Instrument.

Model Glottal



The glottal waveform is the waveform produced by the vibration of the vocal cords. It’s determined in part by the anatomy of the singer’s vocal tract, but also varies based on loudness or intensity of singing.

The **Model Glottal** control lets you specify the glottal intensity level (soft, medium, loud, intense) that you would like to apply to the generated harmony voices. To preserve the character of the original vocal, start with this control set to Medium.

NOTE: *Despite the setting names (soft, loud, etc.), the purpose of this control is not to change the level of the signal, but to model the glottal waveform that would result from the various styles of singing.*

Tracking



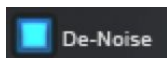
In order to accurately track pitch, Harmony Engine requires a periodically repeating waveform.

The **Tracking** control determines how much variation is allowed in the incoming waveform for Harmony Engine to still consider it periodic.

If you're working with a well-isolated solo signal you can typically leave the Tracking control at its default value.

If your audio is noisy or not well-isolated, or if it's a particularly breathy voice, you may need to set it to a higher value. If you're encountering artifacts such as clicking or popping, try setting it to a lower value.

De-Noise



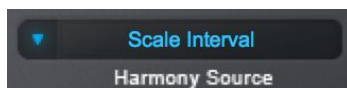
The **De-Noise** button reduces noise and artifacts that can sometimes occur during the formant correction and pitch shifting process.

Harmony Controls



The **Harmony Controls** let you control the notes assigned to each of the Harmony Voices in various ways, depending on which **Harmony Mode** is active.

Harmony Source



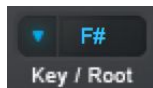
The Harmony Source menu lets you choose between 7 different modes for generating harmony notes.

The **Interval Modes** (**Fixed Interval** and **Scale Interval**) let you choose a harmonic interval for each of the Harmony Voices using the **Interval** menu in each voice's channel strip.

The **Chord Modes** (**Chord Degrees** and **Chord Name**) let you choose a chord and some general features of the chord voicing. Harmony Engine then automatically assigns a pitch to each of the Harmony Voices.

The **MIDI Modes** (**Chord Via MIDI**, **MIDI Omni**, and **MIDI Channels**) let you control the pitches of the Harmony Voices using MIDI input, which can be routed to Harmony Engine from a MIDI controller or a MIDI track.

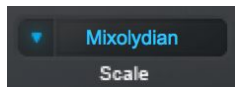
Key/Root



The **Key/Root** menu lets you select the key or chord root, depending on which **Harmony Mode** you are working in.

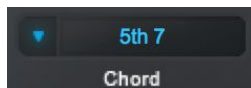
In **Scale Interval** mode, the **Key/Root** menu is used in combination with the **Scale** menu to specify the scale. In **Chord Name** and **Chord Degrees** modes, it defines the root of the current chord. In **Fixed Interval** mode and the **MIDI Modes**, the **Key/Root** menu is disabled.

Scale



The **Scale** menu lets you choose the scale from which harmony pitches are chosen. It's active in **Scale Interval** and **Chord Degrees** modes, and disabled in the other **Harmony Modes**.

Chord



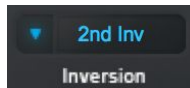
The **Chord** menu lets you choose the chord from which harmony pitches are chosen when using the **Chord Modes**.

In **Chord Name** mode, the chord is specified using a combination of the **Key/Root** and **Chord** settings (e.g. Eb Minor 7), without regard to a particular scale.

In **Chord Degrees** mode, the chord is specified using a combination of the **Chord**, **Key/Root** and **Scale** settings (e.g. the chord built on 5th scale degree in the scale of Bb minor).

In all of the other **Harmony Modes**, the **Chord** menu is disabled.

Inversion



The Chord menu lets you choose which of the chord's pitches will be in the lowest voice. It's active in [Chord Name](#) and [Chord Degrees](#) modes, and disabled in the other [Harmony Modes](#).

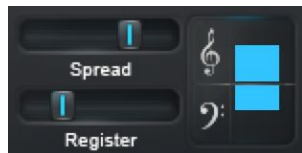
When **Root** is selected, the chord's root will be in the lowest voice (e.g. C in a C major chord)

When **1st Inv** is selected, the 3rd of the chord will be in the lowest voice (e.g. E in a C major chord)

When **2nd Inv** is selected, the 5th of the chord will be in the lowest voice (e.g. G in a C major chord)

When **3rd Inv** is selected, the 7th of the chord will be in the lowest voice (e.g. Bb in a C dominant 7th chord)

Spread and Register

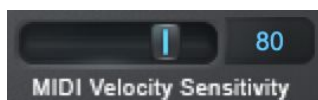


The **Spread** and **Register** controls let you define the general spacing and range of the pitches that are assigned to the Harmony Voices when using the [Chord Modes](#) or [Chord Via MIDI](#) mode.

The **Spread** control lets you specify how widely spaced the pitches in the chord voicing will be, and the **Register** control allows you to shift the overall pitch

These controls are active in [Chord Name](#), [Chord Degrees](#), and [Chord Via MIDI](#) modes, and disabled in the other [Harmony Modes](#).

MIDI Velocity Sensitivity



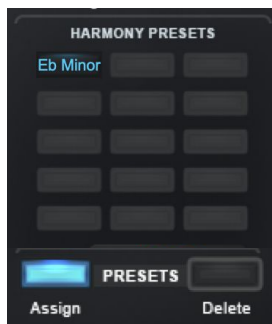
MIDI Velocity Sensitivity control lets you scale the volume of the harmony voices based on the velocity of incoming MIDI notes.

With this control set to 0, MIDI velocity will be ignored and the channel levels will be defined entirely by the Channel gain settings. As you increase the value of this control, MIDI velocity will have progressively more effect on the channel levels.

This control is active in the [MIDI Modes](#), and disabled in the other [Harmony Modes](#).

Harmony and Voice Parameter Presets

Harmony Presets



The **Harmony Presets** let you assign combinations of [Harmony Control](#) settings to each of 15 buttons for quick recall.

You can use the preset buttons manually, or automate them in your DAW to quickly program complex harmonic progressions.

Harmony Presets can store settings for the following controls: [Harmony Source](#), [Key/Root](#), [Scale](#), [Chord](#), [Inversion](#), [Register](#), [Spread](#), [MIDI Velocity Sensitivity](#), and [Interval](#) (for each Harmony Voice).

Voice Parameter Presets

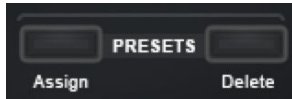


The **Voice Parameter Presets** let you assign combinations of voice parameter settings to each of 6 buttons for quick recall.

You can use the preset buttons manually, or automate them in your DAW to change the timbre and mix of your Input and Harmony Voices over time.

Voice Parameter Presets can store settings for all of the [Voice Controls](#) (except the [Interval](#) menus, which are stored in Harmony Presets), as well as the [_Vibrato Controls](#), and [Choir Controls](#).

Assign and Delete



The Assign and Delete buttons let you assign, delete, and edit [Harmony Presets](#) and [Voice Parameter Presets](#).

To assign a Harmony or Voice Parameter Preset:

1. Choose the Harmony Control or Voice Control settings that you'd like to store in the preset
2. Click the **Assign** button
3. Type a name for the preset in the Name field.
4. Press Return or Enter on your keyboard
5. Click a preset button to assign the preset

To delete a Harmony or Voice Parameter Preset:

1. Click the **Delete** button
2. Click a preset button to delete the preset

To edit an existing Harmony or Voice Parameter Preset:

1. Click the preset button to call up its settings and place its name in the Name field.
2. Edit the settings as desired.
3. Click the Assign button and then the preset button to assign the settings to the preset.

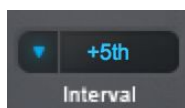
Voice Controls



Harmony Engine's **Voice Controls** consist of 5 channel strips: one for the original **Input Voice**, and one for each of the four generated **Harmony Voices**.

The Voice Controls let you monitor and adjust the levels and pan positions and mute or solo each individual voice. The Harmony Voice channel strips also include settings for harmonic interval and adjustable throat modeling.

Interval



The **Interval** menu sets a Harmony Voice's pitch interval relative to the original input in Fixed Interval and Scale Interval modes.

In both modes, the range is plus-or-minus two octaves. In Fixed Interval mode, the popup displays half-steps in the range -24 to +24. In Scale Interval mode, the popup displays scale degrees in the range 16va to 16vb.

Gain and Level Meters



The **Gain** controls let you individually control the gain of each of the Harmony Voices and the Input Voice.

The **Level Meters** let you monitor the level of each voice.

Solo



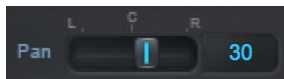
The **Solo** buttons let you individually solo any of the Harmony Voices or the Input Voice.

Mute



The **Mute** buttons let you individually mute any of the Harmony Voices or the Input Voice.

Pan



The **Pan** controls let you individually set each voice's position in the stereo field.

Note: the *Pan* controls are only available when *Harmony Engine* is instantiated on a stereo track.

Throat Length



The **Throat Length** controls lets you individually adjust the formant frequencies for each of the Harmony Voices by lengthening or shortening a digital model of the human throat.

Settings greater than 1.00 will lengthen the throat, resulting in lower formant frequencies. Settings less than 1.00 will shorten the throat, resulting in higher formant frequencies.

Vibrato Controls



The **Vibrato Controls** let you apply individually generated vibrato independently to each of the Harmony Voices.

Note: When using the Vibrato Controls to generate vibrato for the Harmony Voices, it's a good idea to set the [Naturalize](#) control to 0, so that the natural and generated vibrato don't conflict with one another.

Vibrato Rate



The **Vibrato Rate** control lets you set the frequency (in Hz) of the vibrato.

Vibrato Onset Delay



The **Vibrato Onset Delay** control lets you set the amount of time, in milliseconds, between the beginning of a note and the start of the vibrato.

Vibrato Pitch Amount



The **Vibrato Pitch Amount** control lets you set the pitch width of the vibrato.

Vibrato Amplitude Amount



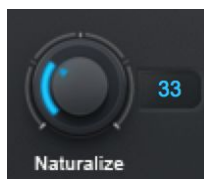
The **Vibrato Amplitude Amount** control lets you set the amount of loudness variation in the vibrato.

Humanize, Glide, and Freeze Controls



The **Humanize, Glide** and **Freeze Controls** let you select various global behaviors and characteristics of the generated Harmony Voices.

Naturalize



This **Naturalize** control lets you select how much of the natural vibrato and pitch variation from the Input Voice will be applied to the generated Harmony Voices.

Lower settings will remove some of the original vibrato and pitch variation from the Harmony Voices, and higher settings will allow more of it through.

Note: *If you're planning to use the [Vibrato Controls](#) to generate new vibrato for the Harmony Voices, it's a good idea to set Naturalize to 0, so that the natural and generated vibrato don't conflict with one another.*

Pitch Variation



The **Pitch Variation** control lets you select the range of random variation in pitch applied to each Harmony Voice.

Higher values result in a larger maximum variation, but the specific amount of variation applied to each voice is randomized, and will be different for each voice.

Timing Variation



The **Timing Variation** control lets you select the range of random variation in timing applied to each Harmony Voice.

Higher values result in a larger maximum variation, but the specific amount of variation applied to each voice is randomized, and will be different for each voice.

Glide Transition Rate



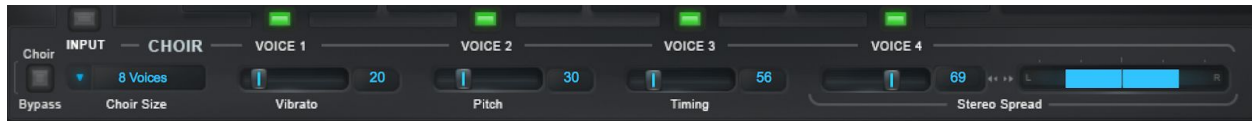
The **Glide Transition Rate** control lets you select the time it takes for Harmony Voices to transition from note to note during legato phrasing. Higher values result in slower note transitions.

Freeze Pitch



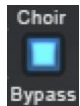
The **Freeze** control lets you freeze the Harmony Voices at their current pitch levels while the Input Voice continues. This can be useful for creating sustained chords in the Harmony Voices underneath a lead vocal in the Input Voice.

Choir Controls



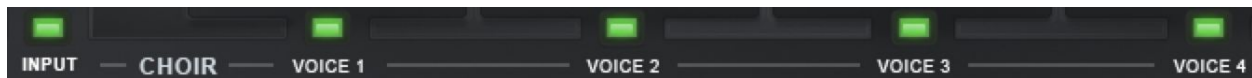
The **Choir Controls** let you generate up to 16 individual voices singing in unison with each of the Harmony Voice and Input voice. Each voice includes individual random variation in pitch, timing, and vibrato for a realistic choir effect.

Choir Bypass



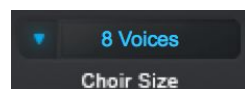
The **Choir Bypass** button lets you bypass the Choir effects for all voices.

Choir On



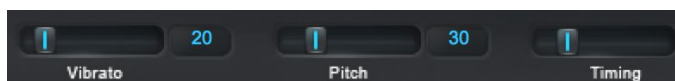
The **Choir On** buttons let you turn the Choir effect on and off individually for each of the Harmony Voices and the Input Voice.

Choir Size



The **Choir Size** control lets you select the number of individual Choir voices that will be generated from each of the Harmony Voices and Input Voice. The options are 2, 4, 8 or 16.

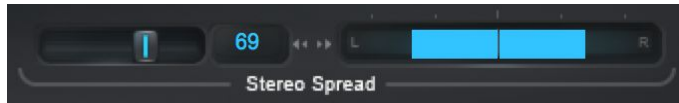
Choir Vibrato, Pitch, and Timing Variation



The global **Choir Vibrato**, **Pitch**, and **Timing** controls let you select the range of variation in vibrato depth, pitch, and timing applied to the generated Choir voices.

Each Choir voice is individually assigned a random amount of variation in these three parameters relative to the Harmony Voice or Input Voice. Higher settings for these controls result in greater possible variation.

Choir Stereo Spread

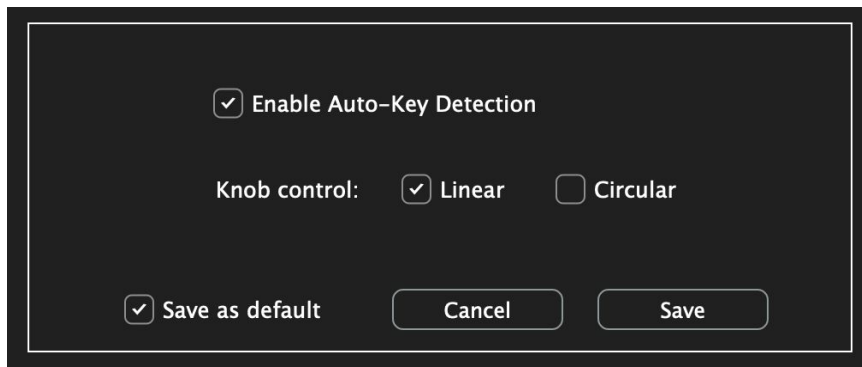


The **Choir Stereo Spread** control lets you select how widely the Choir voices are spread across the stereo field.

The **Pan** position of each Harmony Voice or Input Voice acts the center of the stereo spread for the Choir voices that are generated from it.

So, for example, if a Harmony Voice is panned mostly to the left, the Choir voices for that voice will also be mostly on the left, but will spread out from that position according to the Stereo Spread setting.

Preferences



Enable Auto-Key Detection

Enable Auto-Key Detection

Auto-Key is a plug-in (sold separately) that automatically detects the key of your music, and then sends that information to Harmony Engine.

When **Enable Auto-Key Detection** is on, Harmony Engine listens for any incoming messages from Auto-Key.

Knob Control

Knob control: Linear Circular

The **Knob Control** preference lets you select the behavior of the knobs in Harmony Engine.

If you prefer to adjust the knobs by dragging in a straight line, choose Linear. If you prefer to drag in a circle, choose Circular.

Harmony Modes

Harmony Engine offers a variety of different modes for generating harmony notes, depending on the setting that you choose in the [Harmony Source](#) menu.

The **Interval Modes** ([Fixed Interval](#) and [Scale Interval](#)) let you choose a harmonic interval for each of the Harmony Voices using the [Interval](#) menu in each voice's channel strip.

The **Chord Modes** ([Chord Degrees](#) and [Chord Name](#)) let you choose a chord and some general features of the chord voicing. Harmony Engine then automatically assigns a pitch to each of the Harmony Voices.

The **MIDI Modes** ([Chord Via MIDI](#), [MIDI Omni](#), and [MIDI Channels](#)) let you control the pitches of the Harmony Voices using MIDI input, which can be routed to Harmony Engine from a MIDI controller or a MIDI track.

Interval Modes

The **Interval Modes** let you choose a harmonic interval for each of the Harmony Voices using the Interval menu in each voice's channel strip.

Fixed Interval



Fixed Interval mode lets you specify the harmonic interval for each voice in semitones, without regard to key or scale.

The number of semitones is specified in the [Interval](#) menu for each Harmony Voice.

In this mode, all of the [Harmony Controls](#) are disabled except Harmony Source, and the harmony is chosen based solely on the Interval setting for each voice.

Fixed Interval mode typically results in Harmony Voices that move perfectly in parallel, without regard for key or scale. But to further customize the harmonic progression, you can automate the [Interval](#) settings in your DAW, or assign different Interval settings to [Harmony Presets](#) and automate those.

Scale Interval



Scale Interval mode lets you specify the harmonic interval for each voice in scale degrees.

The number of scale degrees is specified in the [Interval](#) menu for each Harmony Voice.

The scale is determined by the settings of the [Key/Root](#) and [Scale](#) menus.

In this mode, [Interval](#) menus for each of the Harmony Voices are active, and all of the [Harmony Controls](#) are disabled except [Harmony Source](#), [Key/Root](#), and [Scale](#).

Scale Interval mode typically results in harmonies that move generally in parallel, but conform to the notes found in the selected key and scale. But to further customize the harmonic progression, you can automate the Interval settings in your DAW, or assign different [Interval](#) settings to [Harmony Presets](#) and automate those.

Chord Modes

The **Chord Modes** let you choose a chord and some general features of the chord voicing. Harmony Engine then automatically assigns a pitch to each of the Harmony Voices.

Chord Degrees



Chord Degrees mode lets you choose a key and scale, and then choose which scale degree to build the chord on (e.g. 4th scale degree in the scale of Bb minor).

In this mode, the harmony notes are automatically generated according to the settings of the

[Key/Root](#), [Scale](#), [Chord](#), [Inversion](#), [Register](#), and [Spread](#) controls.

The [MIDI Velocity Sensitivity](#) control and the [Interval](#) menus for each of the voices are disabled in Chord Degrees mode.

After choosing your settings for the [Harmony Controls](#), you can assign those settings to a [Harmony Preset](#) button, and then automate the Harmony Presets in your DAW for a fully customized harmonic progression.

Chord Name



Chord Name mode lets you choose a chord by name (e.g. Eb Minor 7) without regard to any particular key or scale.

In this mode, the harmony notes are automatically generated according to the settings of the [Key/Root](#),

Chord, Inversion, Register, and Spread controls.

The [Scale](#) and [MIDI Velocity Sensitivity](#) control and the [Interval](#) menus for each of the voices are disabled in Chord Name mode.

After choosing your settings for the [Harmony Controls](#), you can assign those settings to a [Harmony Preset](#) button, and then automate the Harmony Presets in your DAW for a fully customized harmonic progression.

MIDI Modes

The **MIDI Modes** let you control the pitches of the Harmony Voices using MIDI input, which can be routed to Harmony Engine from a MIDI controller or a MIDI track.

Chord Via MIDI



Chord Via MIDI mode lets you define a chord using MIDI input.

Harmony Engine then automatically assigns a pitch from that chord to each of the Harmony Voices, according to the settings of the [Spread](#) and [Register](#) controls.

The [Key/Root](#), [Scale](#), [Chord](#), and [Inversion](#) controls, and the [Interval](#) menus for each of the voices are all disabled in Chord Names mode.

In this mode, you can use the [MIDI Velocity Sensitivity](#) control to scale the volume of the harmony voices based on the velocity of incoming MIDI notes.

MIDI Omni



MIDI Omni mode lets you control the pitches of the Harmony Voices directly with MIDI input.

In this mode, Harmony Engine receives midi notes from all channels and then automatically assigns pitches to each Harmony Voice. Since Harmony Engine has

four Harmony Voices, no more than four incoming MIDI notes will sound at once.

The **Key/Root**, **Scale**, **Chord**, and **Inversion**, **Spread**, and **Register** controls, and the Interval menus for each of the voices are all disabled in MIDI Omni mode.

In this mode, you can use the **MIDI Velocity Sensitivity** control to scale the volume of the Harmony Voices based on the velocity of incoming MIDI notes.

MIDI Channels



MIDI Channels Mode lets you control the pitches of the Harmony Voices directly with MIDI input, including which pitch is assigned to which voice.

In this mode, each Harmony Voice receives input from its own dedicated MIDI channel (1 thru 4

respectively) to give you total control over each voice.

The **Key/Root**, **Scale**, **Chord**, and **Inversion**, **Spread**, and Register controls, and the Interval menus for each of the voices are all disabled in MIDI Omni mode.

In this mode, you can use the MIDI Velocity Sensitivity control to scale the volume of the harmony voices based on the velocity of incoming MIDI notes.