

# PitchFactor Algorithms

Ten distinctive pitch-based algorithms – Diatonic, Quadravox, HarModulator, Micro-Pitch, H910/H949, PitchFlex, Octaver, Crystals, HarPeggiator, and Synthonizer.

## Performance Switch

The action of the Performance Switch depends on which PitchFactor algorithm is currently running. The Performance Switch can be activated by MIDI CC, Auxiliary Switch or by using H9 Control.

Pitch-based parameters, such as pitch shift, are in cents. One cent is 1/100th of a semitone interval. Positive values make the pitch go up, and Negative values make the pitch go down. For example, “500” cents is a Perfect 4th up and “-500” cents is a Perfect 4th down. Some common values are: 700 cents = Perfect 5th, 1200 cents = 1 Octave, 1900 cents = 1 Octave + Perfect 5th, and 2400 cents = 2 Octaves.

## Diatonic - [DTONIC]

Diatonic pitch shifters track the notes that you’re playing and shift the pitch by the selected harmonic interval based on the Key and Scale that you’ve selected.

Diatonic Shifter features twin independently-controlled pitch changers (A and B) with independent delays and feedback. Diatonic tracks the notes that you’re playing and automatically adjusts the amount of pitch shift so that the resultant note is in-key. Use the PitchA/B control knobs to set each pitch interval. Use the Control Knobs to select the key, scale and interval.

Using H9 Control (or if you’ve connected an AUX Switch), you can use Learn mode to set the key. See SYSTEM Mode section of the H9 User Guide for details on setting up an AUX Switch.

Note: Due to the limitations of Diatonic Pitch Shifting, the pitch tracking algorithm is monophonic and works best on single, isolated notes, and octaves.

Mix	[MIX]	wet/dry mixer, 100% is all wet signal.
Pitch A/ Pitch B Mix	[PICHMX]	Controls the ratio of the level of Pitch A to Pitch B. Note: The A/B mix is set before the feedback delays so that feedback can continue on A or B and not be affected by new audio when the Pitch Mix control is turned completely to the opposite channel. This allows you to create a mini 'looper' effect.
Pitch Shift A	[PICH-A]	Selects the harmonic interval (pitch shift) for Pitch A

Pitch Shift B	[PICH-B]	Selects the harmonic interval (pitch shift) for Pitch B
Delay A	[DLY-A]	Controls the amount of time delay of the A pitch shifted output. With Tempo OFF, delay is displayed in mSec. With Tempo ON, delay can be sync'd to the tempo and is displayed as a rhythmic sub-division of the tempo beat value.
Delay B	[DLY-B]	Controls the amount of time delay of the B pitch shifted output. With Tempo OFF, delay is displayed in mSec. With Tempo ON, delay can be sync'd to the tempo and is displayed as a rhythmic sub-division of the tempo beat value.
Key	[KEY]	Selects the key.
Scale	[SCALE]	Selects the scale. The supported scales are: [MAJ]-Major, [min]-Minor, [DOR]-Dorian, [PHRG]-Phrygian, [LYD]-Lydian, [MLYD]-Mixolydian, [LOC]-Locrian, [Hmin]-Harmonic Minor, [Mmin]- Melodic Minor, [Wton]-Whole Tone, [ENIG]-Enigmatic, [NPLT]-Neapolitan, [HUNG]-Hungarian.
Feedback A	[FBK-A]	Controls level of voice A Feedback. The feedback delay length is the length of either Delay A or Delay B, whichever is longer, to make sure both voices fade out simultaneously.
Feedback B	[FBK-B]	Controls level of voice B Feedback. The feedback delay length is the length of either Delay A or Delay B, whichever is longer, to make sure both voices fade out simultaneously.

**Performance Switch / LEARN MODE** - Press and hold the Learn switch while playing a note and the H9 will set the key to that note.

## Quadravox - [QUADVX]

Quadravox is similar to Diatonic but delivers up to four pitch shifted voices (A, B, C, D) instead of two. You can select the interval of each voice independently. You can also turn OFF any of the voices.

NOTE: It's possible to select OFF for all four voices. If you do, and the Mix knob is set 100% Wet, there will be no output signal.

Mix	[MIX]	wet/dry mixer, 100% is all wet signal.
Pitch A and C/Pitch B and D Mix	[PICHMX]	Controls the ratio of level Pitch A+C to Pitch B+D. With the knob set full counter-clockwise, PitchA + PitchC are set to equal level. Full clock-wise, sets Pitch B + Pitch D to equal levels. The ratio of level of Pitch A to Pitch C and of Pitch B to Pitch D are fixed at equal levels and cannot be changed.
Pitch Shift A	[PICH-A]	Selects the harmonic interval (pitch shift) for Pitch A. Set to minimum to turn OFF voice A.
Pitch Shift B	[PICH-B]	Selects the harmonic interval (pitch shift) for Pitch B. Set to minimum to turn OFF voice B.
Delay D	[DLY-D]	QUADRAVOX's delay controls work differently from those in the other effects. Quadravox's four delays are not independently variable. Instead, they are staggered with A having the shortest delay, B longer than A, C longer than B and D the longest. The Delay D control is used to set the last delay. With Tempo OFF, delay is displayed in mSec. With Tempo ON, delay can be sync'd to the tempo and is displayed as a rhythmic sub-division of the tempo beat value.
Delay Grouping	[DLYGRP]	Select the grouping of the four delays (A, B, C, D). The delays can be evenly spaced or spread out.
Key	[KEY]	Selects the key.
Scale	[SCALE]	Selects the scale. The supported scales are: [MAJ]-Major, [min]-Minor, [DOR]-Dorian, [PHRG]-Phrygian, [LYD]-Lydian, [MLYD]-Mixolydian, [LOC]-Locrian, [Hmin]-Harmonic Minor, [Mmin]- Melodic Minor, [Wton]-Whole Tone, [ENIG]-Enigmatic, [NPLT]-Neapolitan, [HUNG]-Hungarian.
Pitch Shift C	[PICH-C]	Selects the harmonic interval (pitch shift) for Pitch C. Set to minimum to turn OFF voice C.
Pitch Shift D	[PICH-D]	Selects the harmonic interval (pitch shift) for Pitch D. Set to minimum to turn OFF voice D.

**Performance Switch / LEARN MODE** - Press and hold the Learn switch while playing a note and the H9 will set the key to that note.

## HarModulator - [HARMNY]

HarModulator combines twin chromatic pitch shifters with modulation to deliver an extremely wide range of effects from the subtle to the insane. Chromatic pitch shifters allow you to set the pitch ratio of each of the voices in semi-tone intervals (12 steps per octave). HarModulator features a six octave range (three up, three down).

To get a sense of how to use the modulation function, it's best to start simply by setting both Pitch A and Pitch B to UNISON, the delays to minimum, and feedback to 0. Now use the Mod Depth control to set the amount of pitch modulation and the Mod Speed control to adjust the modulation rate. Turn selecting different modulation shapes and sources. Note that you can select ENVELOPE as a source and use the dynamics of your playing to drive the modulation.

Mix	[MIX]	wet/dry mixer, 100% is all wet signal.
Pitch A/ Pitch B Mix	[PICHMX]	Controls the ratio of the level of Pitch A to Pitch B.
Pitch Shift A	[PICH-A]	Selects the pitch shift interval in semitone increments from down three octaves to up three octaves.
Pitch Shift B	[PICH-B]	Selects the pitch shift interval in semitone increments from down three octaves to up three octaves.
Delay A	[DLY-A]	Controls the amount of time delay of the A pitch shifted output. With Tempo OFF, delay is displayed in mSec. With Tempo ON, delay can be sync'd to the tempo and is displayed as a rhythmic sub-division of the tempo beat value.
Delay B	[DLY-B]	Controls the amount of time delay of the B pitch shifted output. With Tempo OFF, delay is displayed in mSec. With Tempo ON, delay can be sync'd to the tempo and is displayed as a rhythmic sub-division of the tempo beat value.
Modulation Depth	[M-DPTH]	Controls the amount (or depth) of pitch modulation displayed in cents over a four octave range (two octaves down, two octaves up). Fine control for micro-pitch modulation is available and displayed in cents, ranging from -30 to +30 cents. When the modulation is a positive value the two voices will modulate in sync with each other; when the value is negative they will modulate out of sync.

Modulation Rate	[M-RATE]	Controls the modulation rate. Note: If Envelop is selected as the Mod Shape [SHAPE], then modulation is driven by the amplitude of the audio input and Modulation Rate [M-RATE] becomes a Sensitivity [SENS] control.
Modulation Shape	[SHAPE]	Selects the modulation shape. Select Envelop and your playing will drive the pitch modulation.
Feedback	[FEEDBK]	Controls the amount of feedback for Delays A and B.

**Performance Switch / FLEX** - Shifts both voices up one octave.

## MicroPitch - [MICRO]

Fine-resolution pitch shifter for subtle tone-fattening plus delays for interesting slap back effects.

Mix	[MIX]	wet/dry mixer, 100% is all wet signal.
Pitch A/ Pitch B Mix	[PICHMX]	Controls the ratio of the level of Pitch A to Pitch B.
Pitch Shift Up A	[PICH-A]	Controls the amount of pitch shift up for voice A from Unison to +50 cents.
Pitch Shift Down B	[PICH-B]	Controls the amount of pitch shift down for voice B from Unison to -50 cents.
Delay A	[DLY-A]	Controls the amount of time delay of the A pitch-shifted output. With Tempo OFF, delay is displayed in mSec. With Tempo ON, delay can be sync'd to the tempo and is displayed as a rhythmic sub-division of the tempo beat value.
Delay B	[DLY-B]	Controls the amount of time delay of the B pitch-shifted output. With Tempo OFF, delay is displayed in mSec. With Tempo ON, delay can be sync'd to the tempo and is displayed as a rhythmic sub-division of the tempo beat value.
Modulation Depth	[M-DPTH]	Controls the amount (or depth) of pitch modulation around the current pitch for each voice. A value of 100 represents a bipolar full swing of the modulation from 0 cents to 2x Pitch. Lesser values scale proportionally.

Modulation Rate	[M-RATE]	Controls the modulation rate.
Feedback	[FEEDBK]	Controls the amount of feedback for Delays A and B.
Tone Control	[TONE]	Controls the tone filter.

**Performance Switch / FLEX** - Doubles the pitch shift amount of both voices.

## H910/H949 - [910.949]

This effect emulates the sound and functionality of Eventide's legendary H910 and H949 Harmonizer™ effects units. The H910 Harmonizer was the world's first real-time pro-audio pitch changer and introduced the word "glitching" to the pro-audio vocabulary. The H949 was the world's first de-glitched Harmonizer.

Unlike the Diatonic pitch shifters, pitch shifting is in the feedback loop allowing for arpeggiated repeats.

Note: For the purists in our audience, you may remember that the H910 and H949 were mono in, stereo out devices. In other words, they featured a single pitch shifter with independently adjusted delays. To best emulate these vintage boxes, we recommend that you set either Pitch A or Pitch B to unison (1.00) and use that output for feedback without pitch change. Also note that these recreations offer ten times the maximum delay of the original gear.

Mix	[MIX]	wet/dry mixer, 100% is all wet signal.
Pitch A/ Pitch B Mix	[PICHMX]	Controls the ratio of the level of Pitch A to Pitch B.
Pitch Shift Up A	[PICH-A]	Controls the amount of pitch shift for voice A expressed as a ratio.
Pitch Shift Down B	[PICH-B]	Controls the amount of pitch shift for voice B expressed as a ratio.
Delay A	[DLY-A]	Controls the amount of time delay of the A pitch-shifted output. With Tempo OFF, delay is displayed in mSec. With Tempo ON, delay can be sync'd to the tempo and is displayed as a rhythmic sub-division of the tempo beat value.

Delay B	[DLY-B]	Controls the amount of time delay of the B pitch-shifted output. With Tempo OFF, delay is displayed in mSec. With Tempo ON, delay can be sync'd to the tempo and is displayed as a rhythmic sub-division of the tempo beat value.
Splice Type	[TYPE]	Selects the type of Harmonizer emulated [H910], [H949-1], [H949-2] and [MODERN]. The H949 offered two splicing algorithms. Algorithm 1 created a 'soft' gradual splice. Algorithm 2 analyzed the audio and used an intelligent splicing algorithm that was successful in greatly reducing glitching. You can select each of these algorithms and emulate their classic sounds. Of course, given the many orders of magnitude increase in DSP power since the days of the H910/H949, even greater intelligence can be brought to bear in de-glitching. The [MODERN] pitch shifting algorithm takes advantage of its powerful DSP to further improve de-glitching. Each of these algorithms has a distinct quality and, when combined with various amounts of delay and feedback, offers a broad pallet of pitch-shifting effects
Pitch Coarse/ Fine Control	[P-CNTL]	Selects the type of pitch ratio control for Pitch A and Pitch B knobs. Normal allows continuous control as a pitch ratio. Micro allows for fine adjustments around Unison. Chromatic allows you to select intervals equal to the 12 note per octave scale.
Pitch A Feedback	[FDBK-A]	Controls the amount of feedback for Delay A.
Pitch B Feedback	[FDBK-B]	Controls the amount of feedback for Delay B.

**Performance Switch / REPEAT** - Press and hold for infinite repeat.

## PitchFlex - [PCHFLX]

PitchFlex is designed to be used 'live' with either an Expression Pedal, the on board HotKnob, or the FLEX switch. Using the Heel and Toe controls you can set the pitch shift of two voices at each end of travel of the Expression Pedal. Turning these controls 'OFF' results in no pitch change. The other controls allow you to tailor the 'sweep' by controlling its speed and shape.

Mix	[MIX]	wet/dry mixer, 100% is all wet signal.
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Pitch A/ Pitch B Mix	[PICHMX]	Controls the ratio of the level of Pitch A to Pitch B.
Set Pitch A with Exp Pedal in Heel Position	[HEEL-A]	Sets pitch shift of voice A in the heel position. When 'OFF' is selected, the voice is muted at the heel position and the pitch is set to unison.
Set Pitch B with Exp Pedal in Heel Position	[HEEL-B]	Sets pitch shift of voice B in the heel position. When 'OFF' is selected, the voice is muted at the heel position and the pitch is set to unison.
Heel-to-toe glissando	[HTGLIS]	These parameters are for use when using an Auxiliary Switch to control the pitch change effect for voices A and B. Sets the time to move from 'heel' to 'toe.' In Tempo Mode maximum is $\frac{1}{2}$ note.
Toe-to-heel glissando	[THGLIS]	Parameters for use when using an Auxiliary Switch to control the pitch change effect for voices A and B. The Delay A knob sets the time to move from the virtual 'toe' to the virtual 'heel.' The Delay B knob sets the time to move from 'heel' to 'toe.' In tempo Mode maximum is $\frac{1}{2}$ note.
Low Pass Filter	[LPF]	A low pass filter to 'darker' the effect.
Glissando Shape	[SHAPE]	Controls the 'shape' that the pitch modulation follows when using the Flex Switch. If set to Negative values, the pitch goes slowly towards "Toe" and quickly transitions to "Heel", Positive is the other way around, and 0 means the pitch shifts up and down linearly.
Set Pitch A with Exp Pedal in Toe Position	[TOE-A]	Sets voice A's pitch shift in the toe position. When 'OFF' is selected, the A pitch shifter is disabled at the toe position and toe is treated as unison.
Set Pitch B with Exp Pedal in Toe Position	[TOE-B]	Sets voice B's pitch shift in the toe position. When "OFF" is selected, the B pitch shifter is disabled at the toe position and toe is treated as unison.

**Performance Switch / FLEX** - Sweep the pitch shift from MIN to MAX of HOTKNOB.

## Octaver - [OCTAVE]

Octavers traditionally use analog techniques to track the pitch of the input audio signal and synthesize a signal whose musical tone is an octave lower than the original. Octaver creates a pair of sub-harmonics, one an octave below the note that you're playing and the other two octaves below. It also adds an Octave FUZZ generator. The sub-harmonics can be filtered and the filters modulated by the input audio level.

Note: Octaver is a parallel (dual mono) rather than stereo effect. Tempo cannot be used with this effect.

Mix	[MIX]	wet/dry mixer, 100% is all wet signal.
Sub-Harmonic Mix	[SUB-MX]	Controls mix of 1st and 2nd sub-harmonics (A and B). Note that Inputs 1 and Inputs 2 are not mixed.
Filter Center Frequency A	[CNTR-A]	Controls the center frequency of the resonant filter for A.
Filter Center Frequency B	[CNTR-B]	Controls the center frequency of the resonant filter for B.
Filter Resonance A	[RESN-A]	Controls filter resonance for A. Note: After adjusting the filter's center frequency and resonance, you may want to try modulating the filter.
Filter Resonance B	[RESN-B]	Controls filter resonance for B.
Envelop Filter Shift	[ENVLOP]	Octaver allows your playing to vary the center frequency of the filters. This control adjusts the degree to which the input signal's envelop shifts the filter's center frequency.
Envelop Sensitivity	[SENSE]	Controls the sensitivity of the frequency sweeps to the input signal level.
Distortion	[FUZZ]	Controls the amount of distortion (fuzz).
Octave-Fuzz Mix	[OCT-MX]	Controls the mix of octaves and fuzz.

**Performance Switch / NONE - Unused**

## Crystals - [CRYSTL]

Crystals is a classic Eventide effect – twin reverse pitch changers, with independently adjustable delays and feedback with added reverb.

Mix	[MIX]	wet/dry mixer, 100% is all wet signal.
Pitch A/ Pitch B Mix	[PICHMX]	Controls the ratio of the level of Pitch A to Pitch B
Pitch Shift A	[PICH-A]	Controls the amount of pitch shift for A in cents (1 cent = 1/100th of a semitone).
Pitch Shift B	[PICH-B]	Controls the amount of pitch shift for B in cents (1 cent = 1/100th of a semitone).
Reverse Delay Buffer A	[RDLY-A]	Controls the length of the reverse time buffer for A. With Tempo OFF, delay is displayed in mSec. With Tempo ON, delay can be sync'd to the tempo and is displayed as a rhythmic subdivision of the tempo beat value.
Reverse Delay Buffer B	[RDLY-B]	Controls the length of the reverse time buffer for B. With Tempo OFF, delay is displayed in mSec. With Tempo ON, delay can be sync'd to the tempo and is displayed as a rhythmic subdivision of the tempo beat value.
Reverb Mix Level	[VRB-MX]	Selects the Reverb Mix level.
Reverb Decay Rate	[VRB-DC]	Selects the Reverb Decay rate.
Feedback A	[FBK-A]	Controls level of Feedback A.
Feedback B	[FBK-B]	Controls level of Feedback B.

**Performance Switch / FLEX** - Shifts both voices up one octave.

## HarPeggiator - [HARPEG]

HarPeggiator creates dual 16-step arpeggios that combine three elements:

- dual 16-step pitch-shift sequencer
- dual 16-step rhythm sequencer
- dual 16-step effect sequencer

HarPeggiator lets you choose from a list of pre-programmed sequences for pitch, rhythm and effect and using the many possible combinations gives you quite a bit of creative control. That writ, it's important to understand the underlying concepts or you're likely to spend quite some time scratching your head.

First off, we suggest that you experiment with only one voice (e.g. A) and the pitch sequence only. To do so, turn OFF the rhythm and effect controls. This is important because, by definition, for many rhythms not every step in the sequence is played. For example, you could select a rhythm that divides the 16 steps into four bars of quarter notes and only sounds the first step (note) of each bar. As a result, although the pitch sequence is 16 steps long, only four notes will sound. Also, use the Length control to set an appropriate length for each step so that you can clearly hear the pitch at each step.

Note: If MIDI clock and Tempo are both set to ON, the sequencer will not progress through the steps until a MIDI clock signal is applied.

Mix	[MIX]	wet/dry mixer, 100% is all wet signal.
Arpeggiator A/Arpeggiator B Mix	[ARP-MX]	Controls the ratio of arpeggiator A to arpeggiator B.
Pitch Sequence A	[SQNC-A]	See the description for Pitch Sequence B.
Pitch Sequence B	[SQNC-B]	<p>These controls select one of 27 pitch sequences for A/B. The pitch sequences are selectable presets numbered from [01] to [26] plus random [RANDOM]. Set to minimum [ARPOFF] to turn off the pitch effect.</p> <p>For the majority of pitch sequences each step is a fixed pitch however the H9 has the ability to glide the pitch within any step and this feature is used in several of the sequences. The last sequence [RANDOM] is a random sequence of pitches.</p> <p>When selecting pitch sequences, it is best to first turn OFF both Rhythm and FX sequences so that the pitch sequence is unaffected by these parameters. As always, your ears are the best judge of what works.</p> <p>The first several pitch sequences are fairly straightforward. Here's a general description of each of these sequences:</p> <ul style="list-style-type: none"> <li>• All steps are one octave up.</li> <li>• All steps are one octave down.</li> </ul>

- All steps are a fifth up.
- All steps are a fourth down.
- Unison and one octave down.
- One octave down, unison, one octave up, two octaves up.
- Two octaves down, one octave down, unison, one octave up.
- One octave down, unison, one octave up, 2 octaves up.
- Unison, one octave up, unison, one octave up.
- Unison, one octave up, unison, one octave up, etc.
- Unison and fifth up.
- One octave down climbing to unison.
- Unison, fourth down, one octave down, two octaves down, unison, one octave up.
- Starts at two octaves down, swoops up to unison and at the 13th step jumps up one octave and ends at unison.
- Mostly up one octave with a short swoop to unison in the middle, back to an octave up and ending by swooping to unison.
- Starts at unison, swoops down two octaves, makes a couple of jumps up one octave and ends on unison.
- Starts at unison, swoops down one octave, jumps back to unison, brief jump up one octave, brief jump to up a fifth and ends on unison.
- Four quick jumps up one fifth, swooping back down to unison.
- Swoops from unison up one octave and does it twice.
- Swoops from up one octave down to unison and does it twice.
- Starts at unison steps up one octave and steps back down to unison.
- Staggers its way from unison to up one octave.
- Similar to 22.
- Swoops up from unison to one octave up and does it four times.
- Jumps between unison and octaves and fifths and fourths up and down.
- Similar to 25.

For those who find the above description less than satisfying the following tables may help. In these tables, the 26 sequences are labeled at the column heads and, for each sequence, the 16 steps are listed vertically. Pitch sequences

marked with an asterisk glide the pitch within a step in the sequence and an arrow indicates the step in the sequence that glides and the direction of the glide.

Intervals are indicated as 1oct = one octave, 2oct = 2 octaves, M2 = major second, m2 = minor second, M3 = major third, m3 = minor third, P4 = perfect fourth, d5 = diminished fifth, P5 = perfect fifth, M6 = major sixth, m6 = minor sixth, M7 = major seventh, m7 =minor seventh.

### Pitch Sequences 1 - 7

	1	2	3	4	5	6	7
1	+1oct	-1oct	+P5	-P4	unison	-1oct	-2oct
2	+1oct	-1oct	+P5	-P4	unison	-1oct	-2oct
3	+1oct	-1oct	+P5	-P4	unison	-1oct	-2oct
4	+1oct	-1oct	+P5	-P4	-1oct	-1oct	-2oct
5	+1oct	-1oct	+P5	-P4	unison	Unison	-1oct
6	+1oct	-1oct	+P5	-P4	unison	Unison	-1oct
7	+1oct	-1oct	+P5	-P4	unison	Unison	-1oct
8	+1oct	-1oct	+P5	-P4	-1oct	Unison	-1oct
9	+1oct	-1oct	+P5	-P4	unison	+1oct	unison
10	+1oct	-1oct	+P5	-P4	unison	+1oct	unison
11	+1oct	-1oct	+P5	-P4	unison	+1oct	unison
12	+1oct	-1oct	+P5	-P4	-1oct	+1oct	unison
13	+1oct	-1oct	+P5	-P4	unison	+2oct	+1oct
14	+1oct	-1oct	+P5	-P4	unison	+2oct	+1oct
15	+1oct	-1oct	+P5	-P4	unison	+2oct	+1oct
16	+1oct	-1oct	+P5	-P4	unison	+2oct	+1oct

### Pitch Sequences 8 – 14

	8	9	10*	11	12*	13*	14*
1	-1oct	Unison	unison	unison	-1oct ↑	unison ↓	-2oct ↑
2	unison	Unison	+1oct	unison	-m7 ↑	-P4 ↓	-1oct ↑
3	+1oct	+1oct	+1oct	unison	-m6 ↑	-1oct ↓	-P5 ↑

	8	9	10*	11	12*	13*	14*
4	+2oct	+1oct	unison	unison	-P5 ↑	-2oct	-m3 ↑
5	-1oct	+1oct	unison	unison	-P4 ↑	Unison	unison
6	unison	+1oct	+1oct	unison	-m3 ↑	Unison	unison
7	+1oct	+1oct	unison	unison	-M2 ↑	Unison	unison
8	+2oct	Unison	+1oct	unison	-m2 ↑	Unison	unison
9	-1oct	Unison	+1oct	unison	unison	Unison	unison
10	unison						
11	+1oct	+1oct	+1oct	unison	unison	Unison	unison
12	+2oct	+1oct	+1oct	+P5	unison	Unison	unison
13	-1oct	+1oct	unison	unison	unison	+1oct	-1oct ↑
14	unison	Unison	+1oct	+P5	unison	Unison	unison
15	+1oct	Unison	+1oct	unison	unison	Unison	unison
16	+2oct	Unison	+1oct	unison	unison	Unison	unison

### Pitch Sequences 17 - 21

	15*	16*	17*	18*	19	20	21
1	+1oct	unison	unison	+P5 ↓	unison	+1oct	unison
2	+1oct	-m2 ↓	-d5 ↓	unison	+M2	+M7	+M2
3	+1oct	-M3 ↓	-1oct	unison	+M3	+M6	+m3
4	+1oct	-M6 ↓	-1oct	unison	+P4	+P5	+M3
5	+1oct	-P4oct ↓	unison	+P5 ↓	+P5	+P4	+P4
6	+1oct	-2oct	unison	unison	+M6	+M3	+P5
7	+1oct	unison	unison	unison	+M7	+M2	+M6
8	+1oct	unison	unison	unison	+1oct	Unison	+M7
9	+1oct	+1oct	+1oct	+P5 ↓	unison	+1oct	+1oct
10	+1oct	unison	+P5 ↓	unison	+M2	+M7	+M7
11	+1oct	unison	unison	unison	+M3	+M6	+M6
12	+1oct	+1oct	unison	unison	+P4	+P5	+P5
13	+1oct	unison	unison	+P5 ↓	+P5	+P4	+P4

		15*	16*	17*	18*	19	20	21
14	+1oct ↓	unison	unison	unison	unison	+M6	+M3	+M3
15	+m6 ↓	unison	unison	unison	unison	+M7	+M2	+m3
16	+M3 ↓	unison	unison	unison	+1oct	Unison	+M2	

### Pitch Sequences 22 - 26

	22	23	24*	25	26*
1	unison	unison	unison ↑	unison	-1oct
2	unison	unison	+P4	-1oct	Unison
3	+M2	+m3	+P5	unison	+P5
4	unison	unison	+1oct	+1oct	+P4
5	+M3	+P4	+m3	unison	-1oct
6	unison	unison	+P4	-P5	+1oct
7	+P4	+P4	+P5	unison	-P4
8	unison	+d5	+1oct	+P5	-P5
9	+P5	+P5	+m6 ↑	unison	Unison
10	unison	unison	+P4	-P4	-1oct
11	+M6	+P5	+P5	unison	Unison
12	unison	unison	+1oct	+P4	+P5
13	+M7	+m7	+m7	unison	+P4
14	unison	unison	+P4	-m3	Unison
15	+1oct	+1oct	+P5	unison	Unison
16	unison	unison	+1oct	+m3	-2oct ↑

Rhythm A	[RYTH-A]	See the description for Rhythm B.
Rhythm B	[RYTH-B]	These controls select the rhythm/groove sequence for A/B. The rhythm sequences are a set of 21 selectable presets. The level of the signal at each step is graphically represented in the Harpegiator algorithm's custom UI in H9 Control on desktops/tablets. Set the control to minimum to [GRVOFF] to turn off the rhythm sequence. The pitch sequences are numbered from [01] to [20] and [RANDOM] for the random rhythm. With the rhythm sequence turned OFF, all sixteen steps of the sequence are played at full amplitude.

Dynamics (Attack/ Release Time)	[DYNAM]	Sets attack and release time for the dynamics of the Rhythm and Effects. When set to minimum (-10), the audio takes the entire step length to fade in; at mid-range (0), the audio is present for the entire step duration; and at maximum (10), the audio is present for only 1/10th of the step's duration. Note: This control has no effect when both Rhythm and Effect knobs are set to OFF.
Step Length	[LENGTH]	With Tempo OFF, sets the length of each of the 16 steps in mSec. With Tempo ON, sets the length of each step relative to the tap tempo (length of note e.g. whole, quarter, etc.).
Effect A	[FX-A]	See the description for Effect B.
Effect B	[FX-B]	HarPeggiator lets you apply a sequence of filter, fuzz and/or glitch effects to each note of the 16-step sequence. The effect sequences are a set of 25 selectable presets. The effects are indicated by effect type - [FILT]=FILTER, [FUZZ]=FUZZ, and [GLT]=Glitch. [ALL] indicates that the preset uses all three effect types. There are five filter effects, five fuzz effects and five glitch effects to choose from. Or, you can select one of four different types of random effect sequences – [RNFL]=random filters, [RNFZ]=random fuzz, [RNGL]=random glitches and [RNM]=random combination of filters, fuzz and glitches. Set [FX:OFF] to turn Off effects for all steps in the sequence.

**Performance Switch / RESTART** - Restarts the sequence from the beginning.

## Synthonizer - [SYNTH]

Synthonizer tracks the pitch of the note that you're playing and generates a synthesized tone at the same pitch. Voice A is an additive synthesizer useful for creating organ or Theremin-style sounds; Voice B is a subtractive synthesizer for creating classic analog-style synth sounds.

Note: Tempo cannot be used with this effect.

Note: Synthonizer is Mono In only. Use Input 1. Input 2 is disabled.

Mix	[MIX]	wet/dry mixer, 100% is all wet signal.
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Voice A/ Voice B Mix	[VOX-MX]	Controls the ratio of the two synthesized voices A and B.
Waveform Mix	[WVE-MX]	Controls the mix of the various added waveforms to control the tone and perceived pitch of voice A.
Octave Blend	[OCTVES]	Controls the blend between unison, 1 octave down, and 1 octave up synth voices to control the tone and perceived pitch of voice B.
Attack Time Voice A	[ATTK-A]	Controls the attack time for synthesized Voice A.
Attack Time Voice B	[ATTK-B]	Controls the attack time for the filter on synthesized voice B.
Reverb Level	[VRBLVL]	Sets the reverb level.
Reverb Decay Time	[VRBDCY]	Sets the reverb decay time.
Waveshape Voice A	[SHAPE]	Selects voice A waveshape – Sine [SIN], Triangle [TRI], Sawtooth [SW], Organ1 [OR1], Organ2 [OR2].
Filter Sweep Voice B	[SWEEP]	Controls the sweepable filter on voice B. Values from 0-50 sweep a low-pass filter, values greater than 50 sweep a high pass filter.

**Performance Switch / FLEX** - Shifts both voices up one octave.