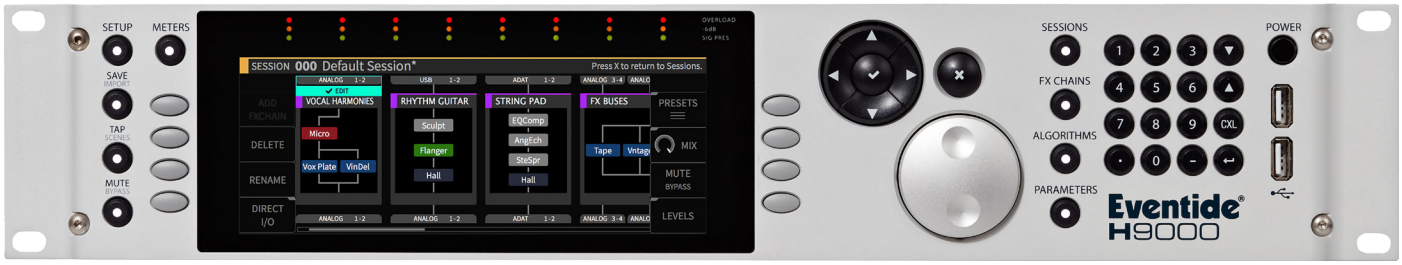
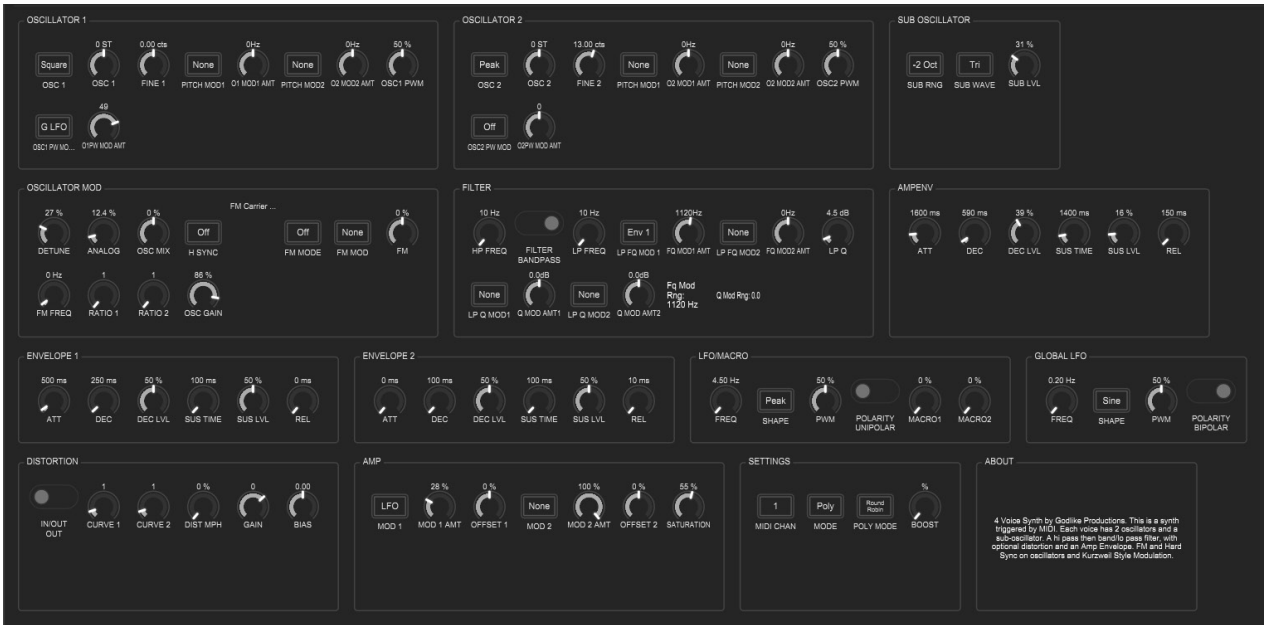



# Instruction Manual

## Four Voice Synth V1.08

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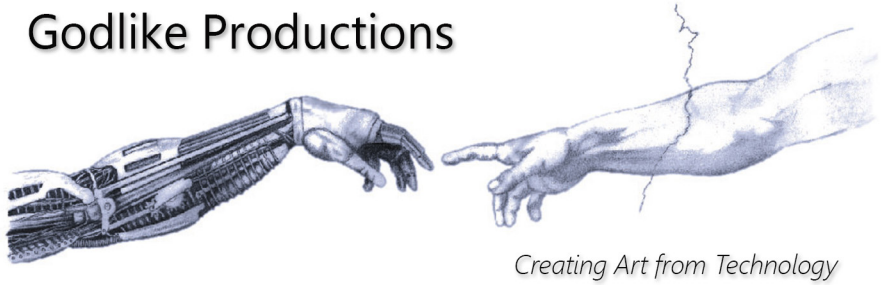

*Creating Art from Technology*

Revision 1.00

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## Caution

Ensure you have backed up all algorithms and other data of your H9000 prior to use of this product. You use these algorithms, chains, presets, sessions and/or other content entirely at your own risk and to all extents allowable under the law of Western Australia, Godlike Productions is not liable for loss of damage, direct, consequential or otherwise.


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# Getting Started

This manual is for a custom algorithm for the Eventide H9000 available at https://godlike.com.au/index.php?id=420. The Four Voice Synth V1.08 algorithm can be downloaded either as an algorithm that you can import from a USB drive (FAT32 formatted) onto your H9000 from the front panel, via Emote, or that can be uploaded via VSIG 3.3.3 or later.

There will also be a copy of this manual in PDF format. If you lose your copy of the files, please contact us at https://godlike.com.au/index.php?id=contact and we will be happy to send you another copy, or re download the algorithm from the link above. This manual will be available within the zip file.

## Installation and Activation

### Method 1 - Install from USB

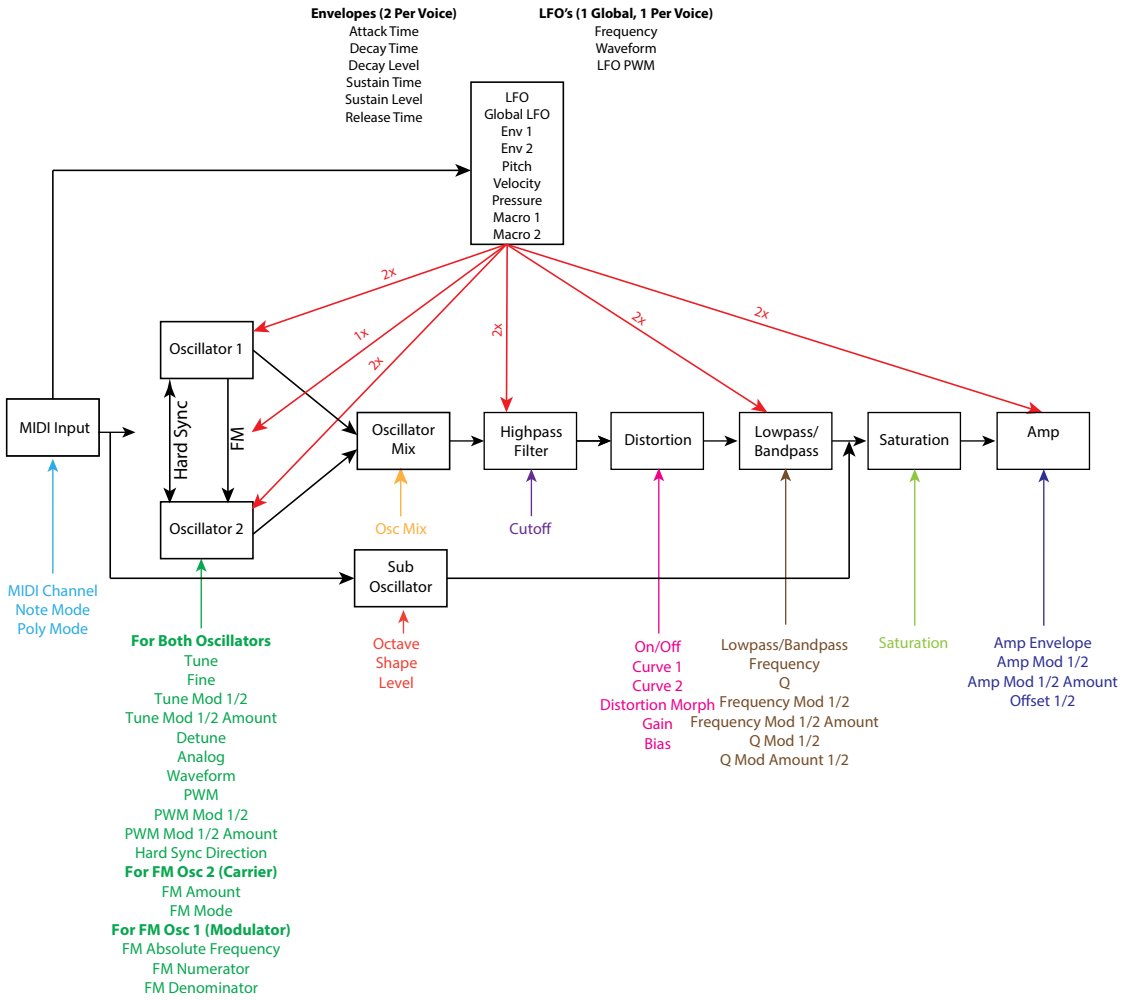
- Unzip the Algorithm and any presets. Copy Four Voice Synth V1-08_277407664.9ka as well as the .9kp files to your USB drive and insert into your H9000.
- Long press the front panel Save/Import button; the Load Options screen will appear.
- Use the cursor up/down buttons or the wheel to navigate to Algorithms and press the Enter Key.
- Use the cursor up/down keys or wheel to select the Four Voice Synth V1.08 algorithm and then press the SELECT Key.
- If you do not wish to load presets, then you can use this algorithm as is. If you wish to use the presets, you will need to repeat this proceedure until this algorithm appears as algorithm 10145. If you have installed to 10145, copies at lower numbers can be safely deleted using Emote (see below).
- Open the .9kf files from your USB drive using the same procedure.

## Method 2 - Install from Emote

- Unzip the Algorithm and any Presets.
- In Emote, select Algorithm -> Import
- Navigate to the unzipped Four Voice Synth V1-08_277407664.9ka file and press open.
- If you do not wish to load presets, then you can use this algorithm as is. If you wish to use the presets, you will need to repeat this proceedure until this algorithm appears as algorithm 10145 or install it, and then use our H9000 Preset Tool. Our preset tool is available from https://godlike.com.au/index.php?id=479
- You can safely delete lower numbered algorithms used to bump this to 10145 by right clicking on the lower numbered algorithm and selecting Delete. Continue doing this until the only copy of Four Voice Synth V1.08 is the one loaded into slot 10145.
- To load the presets, select Presets and then Open. Navigate to the .9kp preset files and press Open. Repeat for each preset.

# Setting Things Up

The diagram below shows the signal flow of this algorithm.




## Oscillator Parameters

Each voice consists of two oscillators, plus a sub-oscillator. Each of the main oscillators has a wide range of waveform shapes and hard sync is available in either direction. Hard Sync retriggers the destination oscillator every time the source oscillator rises above 0.5 FS. FM is also available such that Oscillator 1 becomes the modulator for Oscillator 2. Both FM and Hard Sync can be used at the same time. The sub-oscillator can be set to sine, triangle and square waves and can be set to oscillate at 0, 1 or 2 octaves below the MIDI note value. The sub-oscillator is affected by the Amplitude Envelope and is mixed back into the signal at the amp stage, so is not subject to the filters or distortion.


| Parameter | Description | Range |
|---|---|---|
| Waveform | The oscillator shape | Sine, Triangle, Square, Peak, Saw Up, Exponential Saw, Noise 1, Noise 2, Noise 3<br>Default: Sine |
| Coarse | Coarse tuning for the oscillator | -36ST to 36ST<br>Default: 0ST |
| Fine | Fine tuning for the oscillator | -100 cents to 100 cents<br>Default: 0 cents |
| Pitch Mod 1/2 | Modulation sources for pitch modulation of each oscillator | Off, Env 1, Env 2, GLFO, LFO, Macro 1, Macro 2, Pitch, Velocity, Pressure<br>Default: Off |
| Mod Amount 1/2 | The amount that the modulators will affect pitch at it's maximum value. | -20kHz to 20kHz<br>Default: 0Hz |

| Parameter | Description | Range |
|---|---|---|
| PWM | Pulse width modulation applied to the oscillator. This is classically used on square waves, but it also affects the waveshape of the other oscillator shapes as well. | -100% to 100% Default: 0% |
| PWM Mod | Modulation sources for modulation of PWM of each oscillator | Off, Env 1, Env 2, GLFO, LFO, Macro 1, Macro 2, Pitch, Velocity, Pressure Default: Off |
| PWM Mod Amount | The amount of modulation of PWM by the mod source, above. | -100% to 100% Default: 0% |

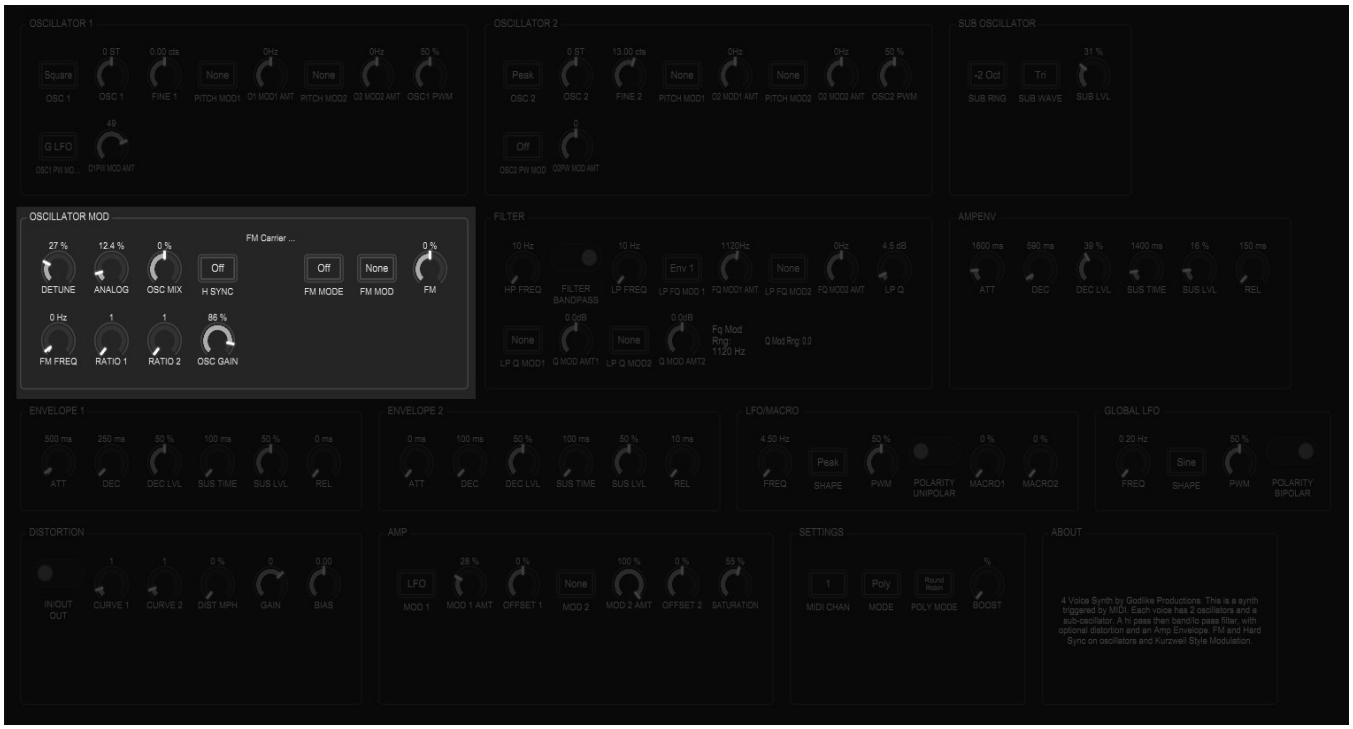
## Sub Oscillator Parameters

The sub-oscillator determines its pitch from the MIDI note, and the signal path bypasses the filters and distortion. It is mixed into the signal path prior to the saturation


| Parameter | Description | Range |
|---|---|---|
| Sub Range | The number of octaves below the MIDI note value that the sub-oscillator will sound | 0, 1, 2 Default: 0 |

| | | |
|---|---|---|
| Sub Wave | The waveform of the sub-oscillator | Sine, Triangle, Square<br>Default: Sine |
| Sub Level | The volume of the sub-oscillator. Note, this may reduce headroom of the Boost parameter. If clipping occurs, reduce Boost. | 0 - 100%<br>Default: 0% |

## Oscillator Mod




| | | |
|---|---|---|
| Detune | When each voice is triggered, each oscillator is randomly detuned to simulate randomness inherent in analog oscillators. | 0 - 100%<br>Default: 0% |
| Analog | When each voice is triggered, the phase of each oscillator is randomly determined in the range of -45 degrees, to 45 degrees (so as to always stay in phase) | 0 - 100%<br>Default: 0% |
| Osc Mix | This determines how much of Osc 1 (-100%) and Osc 2 (100%) contributes to the sound. This does not affect the suboscillator amount. | |

| | | |
|---|---|---|
| Hard Sync Direction | Oscillator 1 can be used to reset Oscillator 2, or Oscillator 2 can be used to reset Oscillator 1. This can be used in conjunction with FM. Hard sync uses retriggers one oscillator when another oscillator exceeds half of full scale. Normally Hard Sync uses falling sawtooth waves to this synthesis, but the H9000 allows for any oscillator to be retriggered. The analog parameter is still in effect, so random oscillator phase can be triggered in conjunction with Hard Sync. | Off, Osc 1 -> Osc 2, Osc 2 -> Osc 1. Default: Off |
| FM Mode | Determines if Oscillator 1 modulates the frequency of oscillator 2. In absolute mode the modulator frequency is set by the FM Frequency controller which is added to the Oscillator 1 frequency. In Ratio, the Numerator and Denominator selectors are used to set the frequency of oscillator 1 relative to oscillator 2. The coarse and fine tuning for Oscillator 1 are disabled in this mode. | Off, Absolute, Ratio Default: Off |
| FM Mod | Selects the FM carrier amp modulator (for FM this is normally an envelope) | Off, Env 1, Env 2, GLFO, LFO, Macro 1, Macro 2, Pitch, Velocity, Pressure Default: Off |
| FM Amount | The amount that Oscillator 1 is allowed to modulate Oscillator 2, after Oscillator 1 is modulated by Pitch Modulation itself. | -100% to 100% |
| FM Absolute Frequency | This frequency is added linearly to the Oscillator 1 frequency when doing FM | -500Hz to 10kHz |
| FM Numerator/ Denominator | Use these to set an FM Ratio. Numerator divided by Denominator sets a multiplier of oscillator 2 (the carrier), when setting the modulator (oscillator 1). Whole number ratio's are frequently used in FM synthesis, and this provides the easiest way to do this. This calculation is done after note pitch is determined by MIDI note value and after Oscillator 2 tuning and pitch modulation is applied. | 1 to 15 Default: 1 |

### Filter Parameters


| Parameter | Description | Range |
|---|---|---|
| Hipass Frequency | The cutoff frequency of the highpass filter. This filter is a single pole 6dB/Oct highpass filter. | 10Hz - 20kHz<br>Default: 10Hz |
| Filter Type | Selects whether the 2nd filter in series is a resonant lowpass or resonant bandpass filter. | Lowpass, Bandpass.<br>Default: Lowpass |
| LP Frequency | The cutoff frequency of the 2nd filter. | 10Hz - 20kHz<br>Default: 20kHz |
| LP Frequency Mod 1/2 | Modulation sources for the cutoff frequency of the 2nd filter. | Off, Env 1, Env 2, GLFO, LFO, Macro 1, Macro 2, Pitch, Velocity, Pressure<br>Default: Off |
| Frequency 1/2 Mod Amount | The amount of modulation that the mod source applies to the cutoff frequency of the 2nd filter. | -20kHz to 20kHz<br>Default: 0Hz |
| LP Q | The resonance of the second filter | 0 - 48dB<br>Default: 0dB |

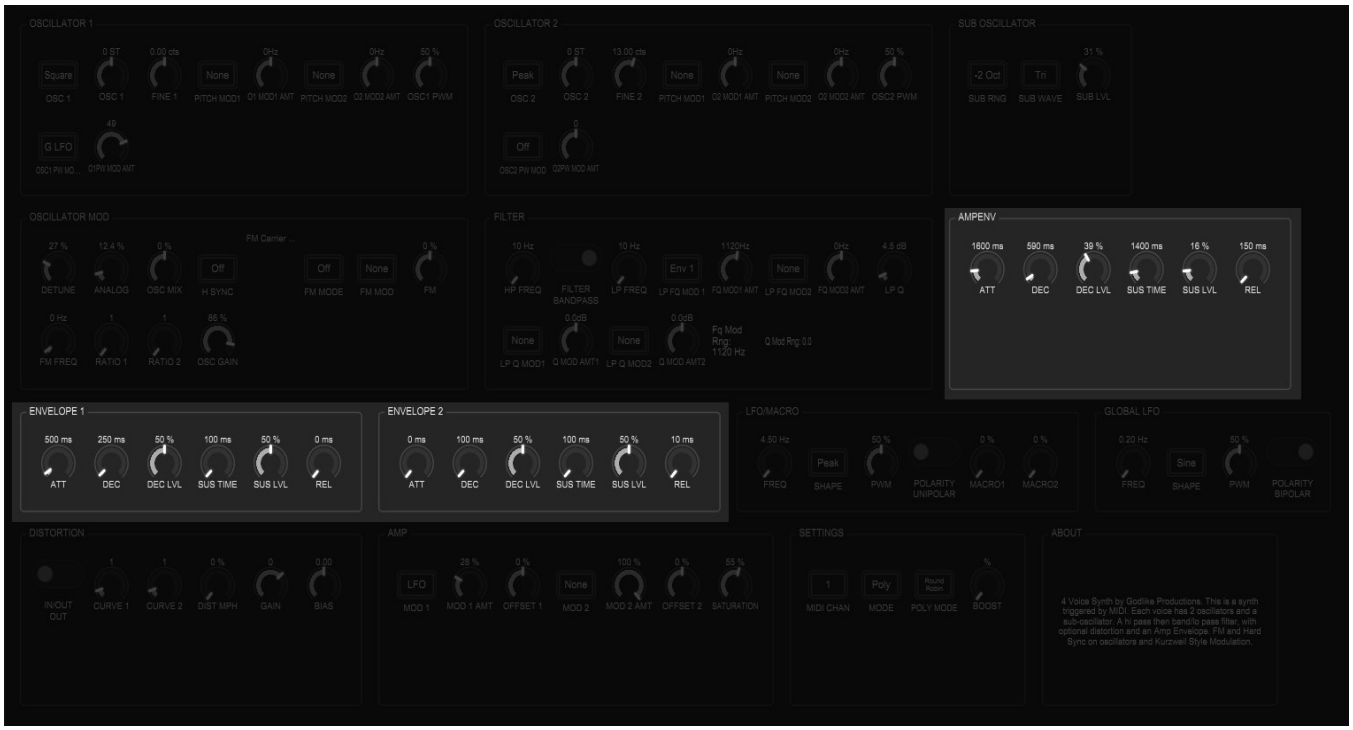
| | | |
|---|---|---|
| LP Q Mod 1/2 | The modulation source for the resonance of the 2nd filter | Off, Env 1, Env 2, GLFO, LFO, Macro 1, Macro 2, Pitch, Velocity, Pressure<br>Default: Off |
| LP Q Mod 1/2 Amount | The amount of modulation that hte mod source applies to the resonance of the 2nd filter. | -48dB to 48dB<br>Default: 0dB |
| Fq Mod Range | This displays the total modulation amount applied to the cutoff frequency. | |
| Q Mod Range | This displays the total modulation amount applied to the resonance. | |

## Envelope Parameters

This algorithm features three independent envelopes per voice. The Amplitude Envelope (AMP ENV) is wired into the audio path, and Envelope 1 and 2 are available as modulation sources.

An important note about envelopes is that because the H9000 doesn't have a voice stealing algorithm, and because I haven't programmed one, if you set your total envelope length larger than your MIDI note length, you can and will lose voices, or notes may fail to sound.

To work around this, you will need to reduce your total envelope length (total of attack, decay, sustain and release times) to be less than your shortest note.




| Parameter | Description | Range |
|---|---|---|
| Attack | The amount of time from when MIDI note on is received until the Envelope reaches 100% | 0ms - 10 sec<br>Default: 0ms |
| Decay | The amount of time from the end of the attack segment (if the note is held for that long) until the envelope reaches the decay level. | 0ms - 10 sec<br>Default: 100ms |
| Decay Level | The level of the envelope at the end of the decay segment. | 0% - 100%<br>Default: 50% |
| Sustain | The amount of time from the end of the decay segment (if the note is held for that long) until the envelope reaches the sustain level. The evelope will maintain the sustain level until a note off event is received for the current note. | 0ms - 10 sec<br>Default: 100ms |
| Sustain Level | The level of the envelope at the end of the sustain segment. For a standard ADSR envelope, set this to the same level as the Decay Level. | 0% - 100%<br>Default: 50% |
| Release | The amount of time that the envelope takes to fade to 0% after a note off event is received. | 0ms - 10 sec<br>Default: 10ms |

## LFO/Macro and Global LFO

The LFO in the first section is available per voice and is triggered when a MIDI note on is received. The Macro controls are simple controls, similar to a mod wheel. The Global LFO starts when the algorithm is loaded and does not retrigger. It is global to all voices.


| Parameter | Description | Range |
|---|---|---|
| Frequency | The frequency of the LFO. While it is selectable in 1 Hz divisions, you can type in decimal values. | 0Hz - 1000Hz<br>Default: 1Hz |
| Shape | The waveform of the LFO | Sine, Triangle, Square, Peak, Warped Sine, Warped Triangle, Half Sine, Half Peak<br>Default: Sine |
| Pulse Width Modulation | Pulse width modulation applied to the LFO. This is classically used on square waves, but it also affects the waveshape of the other oscillator shapes as well. | 0 - 100%<br>Default: 50% |
| Polarity | This determines if the LFO oscillates between 0 and 1 (unipolar) or -1 to 1 (bipolar) | Unipolar, Bipolar<br>Default: Unipolar |
| Macro 1/2 | A simple knob that can be assigned to modulator | 0 - 100%<br>Default: 0% |

## Distortion

Distortion is applied to the signal prior to the filters. The distortion algorithm features 9 different waveshaping curve that dynamically vary depending on the input gain. Two different curves can be loaded and the morph parameter let's you pick an intermediate curve between Curve 1 and Curve 2. The distortion algorithm is oversampled at 2x on each voice.


| Parameter | Description | Range |
|---|---|---|
| In/Out | Engages distortion (In) or bypasses the distortion (Out) | In, Out<br>Default: Out |
| Curve 1/2 | The waveshaping curve. The curves are shown below (at unity gain) | 0-9<br>Default: 0 |
| Distortion Morph | The amount that Curve 1 and Curve 2 contribute to the final distortion curve. 0% is Curve 1, 100% is Curve 2. Values in between give a result between Curve 1 and 2. | 0 - 100%<br>Default: 0% |
| Gain | The amount of gain applied to the distortion gain, prior to the waveshaping. | -96dB to 48dB<br>Default: 0dB |
| Bias | The amount of DC offset applied to the input. This can change the harmonic content at the output. A DC blocker removes any DC offset from the output while preserving the harmonic changes. | -0.1 to 0.1 (of full scale)<br>Default: 0 |

## Amp

The amp modulation section works slightly differently to the other modulation sections in this algorithm. Each of the modulation stages multiplies the signal in the range of 0 to 1, so all modulation stages reduce the volume from unity gain. The offset knobs can be used to get the LFO's to apply a small amount of vibrato to the top end of the modulation range, for example.

The amplitude envelope is applied after all other modulation sources and control the overall contour of the amplitude of each voice.


| Parameter | Description | Range |
|---|---|---|
| Amp Mod 1/2 | The modulation source for controlling amplitude of the voice. | Off, Env 1, Env 2, GLFO, LFO, Macro 1, Macro 2, Pitch, Velocity, Pressure<br>Default: Off |
| Amp Mod Amount 1/2 | The amount of modulation applied to the amplitude. Think of this as the range of modulation. | 0 - 100%<br>Default: 100% |
| Offset 1/2 | The amount that the modulation source is offset from 0. Use this to apply modulation to the top end of the range. The absolute maximum modulation amount is 1.00. Modulation signals will be limited at 1.00 | 0 - 100%<br>Default: 0% |

| | | |
|---|---|---|
| Saturation | The amount of analogue saturation applied to the output. This can be used as a soft clipping gain, if desired. A setting of 0 will essentially be bypass.. | 0 - 100%<br>Default: 0% |

## Settings

Settings allows a number of global parameters to be set.


| Parameter | Description | Range |
|---|---|---|
| MIDI Chan | The MIDI Channel that this instance of the algorithm listens to. Global is the global channel for the H9000. Omni will listen on all MIDI channels. | Global, 1-16, Omni<br>Default: 1 |
| Modie | The polyphonic mode of this algorithm. Global is the global setting for the H9000, Poly is polyphonic mode (more than one voice can be active). Mono is monophonic mode, where only 1 voice will sound. | Global, Mono, Poly<br>Default: Poly |
| Poly Mode | This controls how voices are assigned. Round Robin assigns voices 1,2,3,4 in order as new notes are triggered. Ordered will always trigger voice 1 first. If an additional voice sounds then voice 2 will be used. Unison 1 uses all voices when a note is triggered. When multiple notes are tiggered, the voices are divided between the notes. Unison 2 is the same as Unison 1, except that when a voice ends it is reassigned to whatever voices are still sounding. | Round Robin, Ordered, Unison 1, Unison 2<br>DefaultL<br>Round Robin |

This algorithm is a four voice synth with FM and Hard Sync. Each voice consists of 2 oscillators, with optional hard sync, and Oscillator 1 can modulate Oscillator 2 via FM. After crossfading the 2 oscillators, the signal passes through a high pass filter and then optionally through a distortion effect prior to a selectable lowpass/bandpass filter. Finally an amplifier shapes the amplitude of the voice. For a demo of this algorithm visit https://youtu.be/piiwbFauTNA