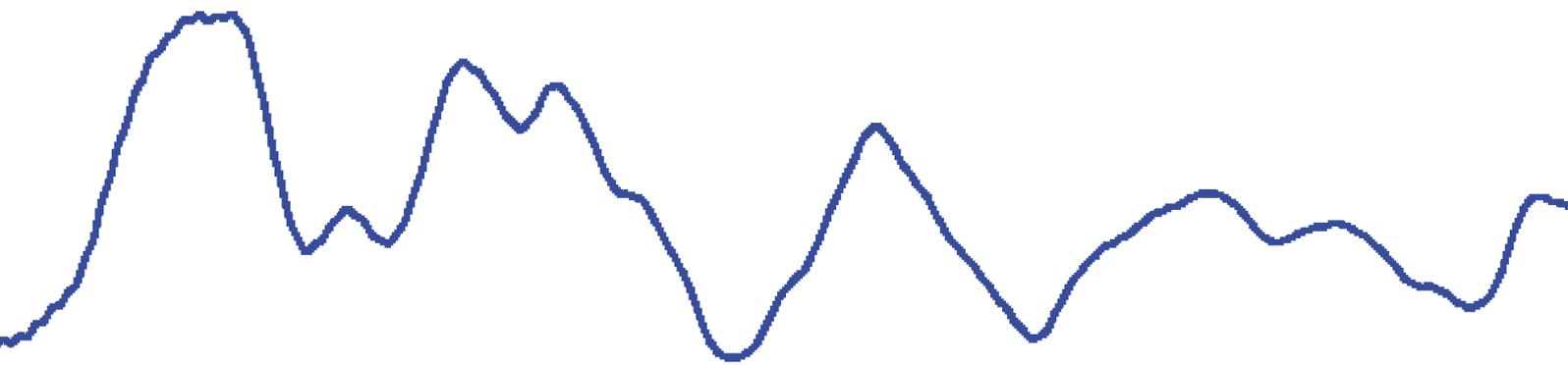


# VIBRO

WAVETABLE SYNTHESIZER



Thank you for purchasing Vibro!

I hope that you will enjoy playing it as much as I enjoyed making it!

A handwritten signature in black ink, appearing to be the name 'Gustav' written in a cursive style.

Gustav

LoveOne Consulting AB

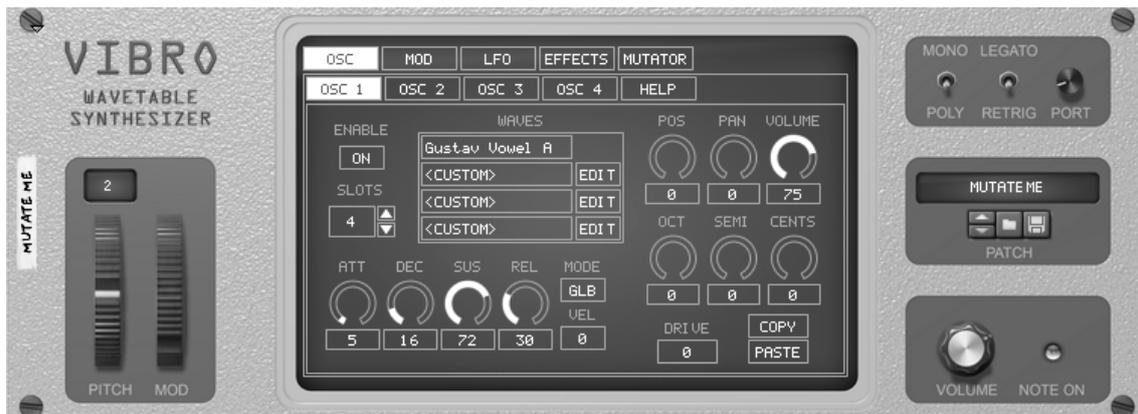
<http://www.soundlove.se>

## INTRODUCTION

Vibro is a polyphonic hybrid additive/subtractive synthesizer with a knack for producing quirky and unexpected sounds. It has the following main features:

- 64 built-in wavetables
- Partial editor for designing custom wavetables
- 4 oscillators that can each sweep across up to 4 wavetable slots
- 8 LFOs (4 free-running, 4 per-voice)
- 2 multi-mode filters (lowpass, highpass, bandpass)
- Stereo delay
- Chorus
- Reverb
- Patch mutator/randomizer

Almost all of Vibro's controls are accessed through the main display in the center of the device:



By clicking the buttons in the top row, you can access the main parameter sections: oscillators (OSC), modulation matrix (MOD), low-frequency oscillators (LFO), effects (EFFECTS), and patch mutator (MUTATOR). Each main parameter section has subsections, which can be accessed by clicking on the buttons in the second row. Each main parameter section has a HELP subsection that contains reference information.

The pitch bend and modulation wheels are to the left of the main display. Drag the number in the small display above the pitch bend wheel to change the pitch bend range (in semitones).

At the top right of the device, there are controls for switching between monophonic and polyphonic voice mode. There is also a control for switching between legato and retrigger note triggering, and a knob that controls the amount of portamento (these settings have no effect in polyphonic voice mode). The patch browser is below the voice controls. It works just the same as in all the other Reason devices. Beneath the patch browser, you can find the main volume knob and an indicator lamp that lights up when Vibro receives MIDI notes.

Turning to the back side of the rack, you can see that Vibro has eight sockets. The stereo audio output sockets (AUDIO OUT) are to the left. In the middle there are standard GATE and NOTE CV input sockets where you can connect, e.g., Reason's Matrix or RPG-8 devices. On the right there are four CV inputs (MODULATION) that can be used as sources in Vibro's modulation matrix.

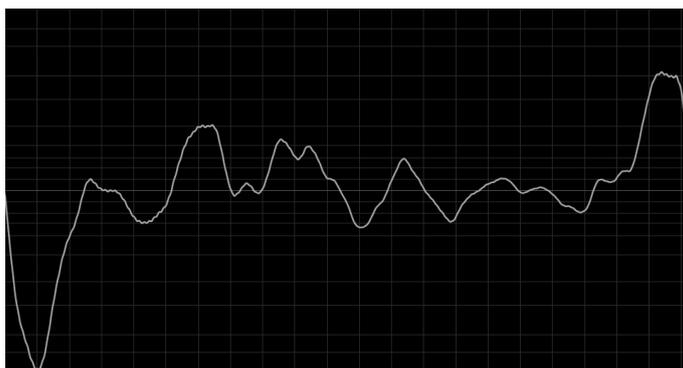


To get a feel for what Vibro can do, load the "MUTATE ME" patch and click the MUTATOR button to switch to the patch mutator. Then press one of the RANDOMIZE buttons and play some MIDI notes! Every time you press a RANDOMIZE button, Vibro creates a new patch for you. Also, try clicking the DISCREET/MIDDLEING/CHAOTIC button to choose how strong the randomization should be!

When you are ready to dig into the details of how Vibro works, read on!

## WAVES

The most basic audio building block in Vibro is called a wave. Technically, a wave is a mono audio sample that contains a single cycle (period) of sound. The image below shows a wave, extracted from a recording of a person saying "aaah". Playing this wave at different speeds creates a sound timbre reminiscent of a human voice at different pitches.



Compared to standard samples, a single cycle wave has the advantage that playing it at higher speeds/pitches will not "shorten" its sound (i.e., no "chipmunk artefacts"). Also, single cycle waves require a lot less RAM compared to standard samples. The main drawback of using single cycle waves is that they can only contain frequencies that are integer multiples of the note you play. Another way of saying this is that single cycle waves contain harmonic partials. This means that some timbres (such as noisy sounds) cannot be represented by waves, since they contain frequencies that are not integer multiples of the root note.

Vibro contains a collection of 64 built-in waves that were created by analyzing recordings of human voices, as well as different synthetic sounds. You can also create your own waves by using the custom wave editor (see below).

## OSCILLATORS

Vibro can use up to four oscillators per voice. The oscillators are edited in the OSC section of Vibro's main display. The OSC 1, OSC 2, OSC 3, and OSC 4 buttons select which oscillator to edit, while the HELP button shows reference information.



The ENABLE toggle button selects whether the selected oscillator should play or not. If you do not need one or several oscillators for the sound you are creating, you should consider turning them off since this will reduce Vibro's CPU consumption.

Each oscillator has up to four wave slots, and the SLOTS control selects how many slots to use. Contrary to what you might think, the oscillator does not play all four waves simultaneously. Instead, you use the POS

control to seamlessly mix (or “sweep”) between the four waves in the slots. When the POS control is at 0, the first slot is heard. When it is at 100, the last slot is heard. By automating the POS control or by modulating it using the modulation matrix (see below), you can create patches where the timbre changes over time or where the timbre depends on other parameters such as the MIDI key velocity or a CV input signal.

To change the wave, click on the corresponding wave slot. This will open a dialog where you can choose among Vibro’s built-in waves. The SOLO toggle button in this dialog allows you to audition the currently selected wave in isolation (though the effect section will still be active). The -CUSTOM- wave is special: instead of playing a built-in pre-recorded single-cycle sample, the timbre of the custom wave is designed in the wave editor (see below).

The DRIVE slider modifies how Vibro’s oscillators sweep through the waves. Turning it up introduces additional frequencies in the sound and often (but not always!) produce timbres similar to frequency modulation.

The rest of the oscillator controls are fairly standard, and if you have programmed a subtractive synthesizer before you will probably recognize them. The PAN and VOLUME controls are used to set the stereo pan position and volume of the oscillator, respectively, while the OCT, SEMI, and CENTS controls are used to tune the oscillator in octaves, semitones, and cents, respectively.

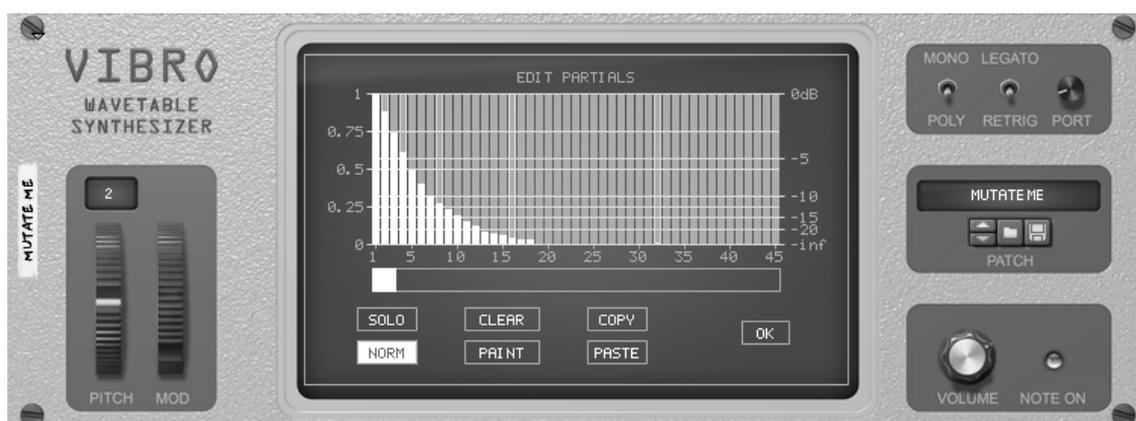
The ATT, DEC, SUS, and REL controls are used to configure the attack, decay, sustain, and release of the amplitude (volume) envelope of the oscillator, respectively. The OSC/GLB toggle button allows you to select whether the amplitude envelope should be specific to this oscillator only (OSC), or if the oscillator should use a global, shared amplitude envelope (GLB). When more than one oscillator uses the global envelope, their amplitude will evolve in sync. The VEL control allows you to choose how much the MIDI note velocity should affect the volume of the oscillator.

The COPY and PASTE buttons allow you to copy the settings for one oscillator to another oscillator. To use this function, first select the oscillator you want to copy from. Then press the COPY button to store its settings into an internal memory slot. Next, select the oscillator you want to copy to and press the PASTE button to overwrite its settings with the ones in the internal memory slot. Note that you can paste again to another oscillator if you like. Also note that for technical reasons, the contents of the memory slot is saved in patches. This means that the memory slot may not contain default values when you switch between patches.

## CUSTOM WAVE EDITOR

When a wave slot is set to the -CUSTOM- wave, you can use the wave editor to define its timbre. There is one custom wave per wave slot, so you can design different timbres for different wave slots.

To edit a custom wave, press the EDIT button next to it. This will open up the wave editor:



The timbre of a custom wave is created by adding together partials (which is a fancy word for “sine waves”). In Vibro, the frequency of each partial is an integer multiple of the frequency of the MIDI note you play. In other words, the frequency of the first partial is the same as the root note. The frequency of the second partial is at 2x the root note frequency. The third partial is at 3x, and so on.

The wave editor constitutes the additive part of Vibro’s hybrid additive/subtractive synthesis: it allows you to control exactly which partials to use in each of the wave slots for each of the oscillators. This means that you can shape which partials to “fade in” and “fade out” as an oscillator sweeps across the wave slots.

The main area in the wave editor shows the amplitude of the partials as a bar chart. To change the amplitude of a partial, drag it in the chart. The scales on either side of the chart allows you to see how loud the partial is; the scale on the left shows amplitude, while the scale on the right shows decibels. Note that some of the partials are highlighted with a bright frame: these are the partials that are at octaves compared to the MIDI note you play. You can tweak the amplitude of all partials up to the 450th. The editor window can fit 45 partials per page; use the scroll bar to navigate to different pages.

As you explore the partial editor, you may notice that Vibro removes partials from the sound when you play high-pitched MIDI notes. This is intentional and is done to avoid aliasing; if the partials had been kept, they would have caused audible noise and jitter in the sound. (Vibro uses the same technique to avoid aliasing for the built-in waves too.)

The rest of the wave editor controls work as follows:

The SOLO toggle button allows you to audition the wave you are editing in isolation (though the effects section will still be active).

The CLEAR button sets the amplitude of all partials to 0.

The NORM button normalizes the wave as you edit it. Since the wave editor adds together sine waves at the amplitudes you select, it is not difficult to accidentally create a wave where the total amplitude exceeds 0 dB and clips. When normalization is active, Vibro will automatically modify the total amplitude of the entire wave so that it becomes precisely 0 dB. (Note that this will also increase the volume of a wave that has a total volume of less than 0 dB before normalization.)

The PAINT/SINGLE toggle button changes the edit mode. When it is set to PAINT, you can “paint” the amplitude across several partials by dragging in the bar chart. When it is set to SINGLE, your edits are restricted to a single partial at a time, which is useful for fine-tuning.

The COPY and PASTE buttons allow you to copy the contents of one custom wave slot to another. To use this function, first select a wave slot and edit its wave in the editor. Then press the COPY button to copy the wave’s settings into an internal memory slot. Next, open the wave editor for the slot you want to copy to and press the PASTE button. Note that you can paste again into a different custom wave if you like. Just like the oscillator COPY/PASTE buttons, the wave editor’s internal memory slot is stored in patches, so be aware that it may not contain the expected values when you open a new patch.

When you have finished editing your custom wave, press the OK button to return to Vibro’s main display.

## LOW FREQUENCY OSCILLATORS

Vibro’s LFOs and the modulation matrix (see below) are the key to create interesting sounds: without them, Vibro would sound very static and boring indeed!

Vibro has eight LFOs: four of them are free-running LFOs, and four are per-voice. The free-running LFOs are always active, regardless of whether MIDI notes are playing or not. The per-voice LFOs run independently for each MIDI note.

The LFOs are edited in the LFO section of Vibro’s main display. Pressing the FREE button displays the free-running LFOs, while the VOICE button displays the per-voice LFOs. The HELP button shows reference information.



The TYPE button selects the type of the LFO (i.e., its “shape”). When you press the button, a menu is displayed where you can select an LFO type. The types are:

- SIN: A smooth sine function.
- SAWTOOTH: A ramp function. Increases from -1 to 1 and then jumps back to -1 and repeats.
- INV SAW: A ramp function. Decreases from 1 to -1 and then jumps back to 1 and repeats.
- TRIANGLE: Increases from -1 to 1, then changes direction and decreases back to -1, and repeat.
- PULSE: Jumps between -1 and 1.
- RANDOM: Jumps between random values in the range -1 to 1.
- SMOOTH RND: Moves smoothly between random values in the range -1 to 1.
- RND PULSE: Jumps between -1 and 1 at random times.
- STAIR: Staircase jumps from -1 to 1 in four steps.
- STAIR U/D: Staircase from -1 to 1 and back again in six steps.
- RAMP: Increases from -1 to 1, then holds there indefinitely. This type is available for per-voice LFOs only.
- QUAD RAMP: Increases quadratically (slowly first, then faster) from -1 to 1, then holds there indefinitely. This type is available for per-voice LFOs only.

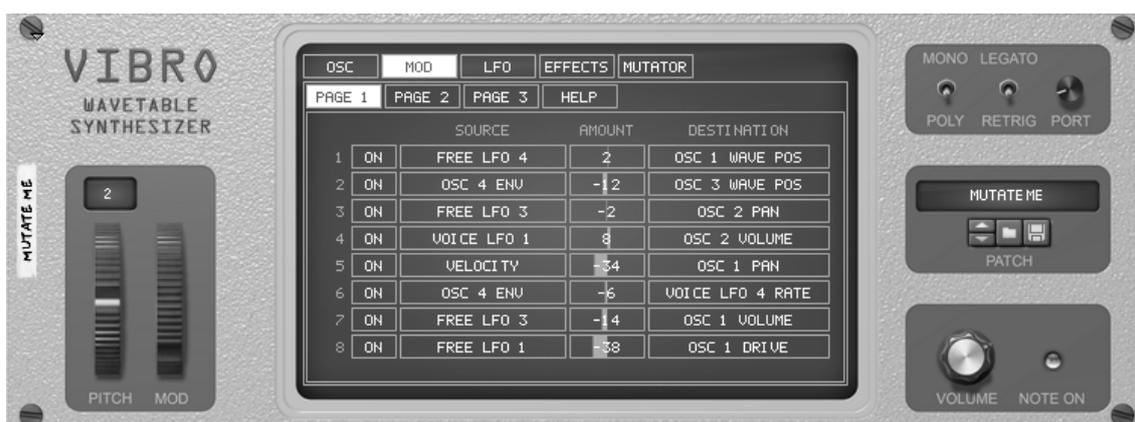
The RATE control sets the rate of the LFO. The SEC/SYNC toggle button beneath the rate control specifies whether the rate should be synchronized with Reason’s tempo, or if it should be free (and specified in seconds). When a free-running LFO is in SYNC mode, it is synchronized to the transport play position if the sequencer is running.

The AMT control sets the strength (i.e., the amplitude) of the LFO.

The PHASE control determines where the LFO should start when it is reset. For example, a sine LFO normally starts at 0 and increases; with a phase setting of 25 it will start at 1 (i.e., at 90 degrees) and decrease, and with a phase setting of 50 it will start at 0 (i.e., at 180 degrees) and decrease.

### MODULATION MATRIX

The modulation matrix is where you “connect” modulation sources, such as LFOs, to modulation destinations, such as the wave position of an oscillator. The modulation matrix is edited in the MOD section of Vibro’s main display. Vibro has 24 modulation slots, divided among 3 editing pages. Pressing the PAGE 1 button displays slots 1-8, the PAGE 2 button displays slots 9-16, and the PAGE 3 button displays slots 17-24. The HELP button shows reference information.



The ON/OFF toggle button selects whether a slot should be active or not.

Click the SOURCE button to select a modulation source. In addition to the LFOs, the following sources are available:

- OSC 1-4 ENV: Oscillator amplitude envelope, converted into values between -1 and 1.
- MOD WHEEL: The modulation wheel on Vibro’s front panel (or MIDI modulation), converted into values between 0 and 1.
- MOD WHEEL BIPOLAR: The modulation wheel on Vibro’s front panel (or MIDI modulation), converted into values between -1 and 1.
- VELOCITY: The velocity of the MIDI key, converted into values between 0 and 1.

- VELOCITY BIPOLAR: The velocity of the MIDI key, converted into values between -1 and 1.
- AFTERTOUCH: The aftertouch of the MIDI key, converted to values between 0 and 1.
- AFTERTOUCH BIPOL: The aftertouch of the MIDI key, converted to values between -1 and 1.
- KEYBOARD: The MIDI note number of the key that is playing, converted into values between -1 and 1.
- CV INPUT 1-4: The CV input sockets on Vibro's back panel.

Click the DESTINATION button to select a modulation destination. You can choose to modulate most oscillator parameters, as well as the per-voice LFO rate and amount parameters. Some of the effects parameters can also be chosen as destinations.

The AMOUNT control selects how much modulation to apply. Note that the amount can be negative.

## EFFECTS

The effects section contains tools for shaping the sound once it has been generated by Vibro's oscillator engine. The effects are edited in the EFFECTS section of Vibro's main display. Pressing the FILTER, DELAY, CHORUS, and REVERB buttons shows the controls for the filters, the stereo delay, the stereo chorus, and the reverb, respectively. The HELP button shows reference information.

## FILTERS

Vibro has two filters that can be used to remove frequencies from the sound coming from the oscillator engine (this constitutes the subtractive part of Vibro's hybrid additive/subtractive synthesis).



The ENABLE toggle button selects whether the filter should be active or bypassed, while the TYPE button allows you to select the filter type. Vibro includes a 24dB per octave resonant low pass filter, a 6 dB per octave resonant high pass filter, and a 6 dB per octave resonant band pass filter.

The CUTOFF control sets the cutoff frequency of the filter, while the RESO control sets its resonance.

Each of the filters has its own cutoff frequency envelope, which is specified with the ATT (attack), DEC (decay), SUS (sustain), and REL (release) controls, respectively. The ENV control specifies how much the envelope should modulate the cutoff frequency.

The LINK toggle button connects the cutoff and resonance controls for the two filters so that when you edit one, the other will have the same value.

The PARALLEL/SERIES toggle button specifies whether the filters should be applied in series (i.e., the oscillator engine signal is sent to the first filter, and the result is sent into the second filter) or in parallel (i.e., the oscillator engine signal is sent to both filters simultaneously, and the resulting signals from the filters are added together).

## STEREO DELAY

The stereo delay can be used to create echoes and metallic room-like effects.

The ENABLE toggle button controls if the delay should be active or bypassed.

The TYPE toggle button controls whether the echoes should be ping-ponged in stereo, or if they should be

mono.

The TIME control sets the delay time of the echoes. The toggle button beneath the control specifies if the time should be in 16th notes, 16th triplet notes, or in seconds.



The FEEDB control specifies the amount of feedback, i.e., how much of the delayed signal that should be fed back into the delay circuit.

The MIX control allows you to set the mix between the original signal and the delayed signal

### STEREO CHORUS

Chorus is a classic effect that consists of a delay circuit and an LFO that modulates the delay time.



The ENABLE toggle button controls if the chorus should be active or bypassed.

The RATE control sets the rate of the chorus LFO.

The AMT control sets the amount (amplitude) of the chorus LFO.

The DELAY control sets the default delay time of the chorus (i.e., the delay time that is modulated by the LFO).

The FEEDB control specifies the amount of feedback, i.e., how much of the processed signal that should be fed back into the chorus circuit.

The MIX control allows you to set the mix between the original signal and the processed signal

### REVERB

The reverb is an effect that can be used to add a room-like ambience to the audio signal

The ENABLE toggle button controls if the reverb should be active or bypassed.

Vibro's reverb contains a low pass filter that can be used to create a more "dry" reverb signal. The DAMP control sets the cutoff frequency of this filter.

The WIDTH control sets the stereo width of the processed signal.



The MIX control allows you to set the mix between the original signal and the processed signal.

### PATCH MUTATOR

The patch mutator is essentially a toolbox for creating and manipulating random patches. It is great for generating interesting starting ideas for patches!

The patch mutator is accessed in the MUTATOR section of Vibro's main display. The main page is accessed by clicking the MAIN button, while the parameter mask (see below) is accessed by clicking the MASK button. The HELP button shows reference information.



The patch mutator can randomize values for most of Vibro's parameters. Such a set of random values is called a chromosome. The mutator has five chromosome slots: A, B, and 1, 2, and 3.

To create a new random chromosome, press the RANDOMIZE button next to one of the slots. Note that this will modify Vibro's controls so if you are in the middle of creating a patch, do not forget to save your patch first! (You can also use Reason's undo function to revert changes made with the patch mutator.) The bar chart on the right is a representation of the random control values that the chromosome contains.

To select (and activate) another chromosome, click its bar chart.

The MUTATE button creates a variation of the chromosome. In other words, rather than to randomize completely new values, the existing values will be tweaked slightly. Try using the mutate button if you have a random patch that you think sounds promising, but not quite what you were looking for!

The COPY button copies Vibro's current parameter settings into the chromosome. This is useful when you have an existing patch that you want to mutate.

The CROSSBREED button creates new chromosomes in slots 1, 2, and 3. The values for these chromosomes are taken randomly from the chromosomes in the A and B slots. The crossbreed function is great for creating patches that sound like different "blends" of the A and B chromosomes.

The INTERPOLATE button also creates new chromosomes in slots 1, 2, and 3. The values for these chromosomes are interpolated between the values in chromosome A and B. In other words, the values in chromosome 1 is similar to those in chromosome A, the values in chromosome 3 are similar to those in chromosome B, and the values in chromosome 2 are halfway between those in chromosome A and B. Note that some values, such as wave slot selections, cannot be interpolated. In such cases, Vibro uses the setting from chromosome A.

The DISCREET / MIDDLEING / CHAOTIC selection button controls the strength of the RANDOMIZE and MUTATE buttons. As the names suggest, the DISCREET setting is the least random, the MIDDLEING setting produces moderate randomness, and the CHAOTIC setting uses the full range of all parameters when randomizing.

Note that the patch mutator does not randomize the on/off settings for oscillators and filters, nor does it randomize the number of wave slots. So you may have to switch on the filters (try putting them in parallel mode!), some modulation slots, and increase the number of oscillator wave slots in order for the patch mutator to produce really interesting sounds.

Sometimes, you may want to restrict randomization to only certain parameters. This can be done by switching to the MASK subsection of the patch mutator:



The mask subsection contains a list of parameters. Highlight the parameters for which you want to enable randomization by clicking on them in the list. To turn off randomization for a parameter, click on it in the list to remove the highlight.

The buttons to the right of the list offer shortcuts to useful masks. The ALL ON and ALL OFF buttons turn on and off all parameters, respectively. The MASK SET 1 button enables randomization for wave slots, wave position, pan, volume, and cents tuning for all oscillators. MASK SET 2 adds the attack/decay/sustain/release envelope parameters, as well as octaves tuning. MASK SET 3 adds filter cutoff and resonance. MASK SET 4 adds to the filter attack/decay/sustain/release envelope, as well as the filter type parameter.

## MIDI IMPLEMENTATION CHART

- [7] Master Volume
- [12] Oscillator 1 Enable
- [13] Oscillator 1 Wave Position
- [14] Oscillator 1 Pan
- [15] Oscillator 1 Volume
- [16] Oscillator 1 Tuning Octaves
- [17] Oscillator 1 Tuning Semitones
- [18] Oscillator 1 Tuning Cents
- [19] Oscillator 1 Envelope Type (Global/Free)
- [20] Oscillator 1 Free Envelope Attack
- [21] Oscillator 1 Free Envelope Decay
- [22] Oscillator 1 Free Envelope Sustain
- [23] Oscillator 1 Free Envelope Release
- [24] Oscillator 1 Envelope Velocity
- [39] Oscillator 2 Enable
- [40] Oscillator 2 Wave Position
- [41] Oscillator 2 Pan
- [42] Oscillator 2 Volume
- [43] Oscillator 2 Tuning Octaves
- [44] Oscillator 2 Tuning Semitones
- [45] Oscillator 2 Tuning Cents
- [46] Oscillator 2 Envelope Type (Global/Free)
- [47] Oscillator 2 Free Envelope Attack
- [48] Oscillator 2 Free Envelope Decay
- [49] Oscillator 2 Free Envelope Sustain
- [50] Oscillator 2 Free Envelope Release
- [51] Oscillator 2 Envelope Velocity
- [52] Oscillator 3 Enable
- [53] Oscillator 3 Wave Position
- [54] Oscillator 3 Pan
- [55] Oscillator 3 Volume
- [56] Oscillator 3 Tuning Octaves
- [57] Oscillator 3 Tuning Semitones
- [58] Oscillator 3 Tuning Cents
- [59] Oscillator 3 Envelope Type (Global/Free)
- [60] Oscillator 3 Free Envelope Attack
- [61] Oscillator 3 Free Envelope Decay
- [62] Oscillator 3 Free Envelope Sustain
- [63] Oscillator 3 Free Envelope Release
- [65] Oscillator 3 Envelope Velocity
- [66] Oscillator 4 Enable
- [67] Oscillator 4 Wave Position
- [68] Oscillator 4 Pan
- [69] Oscillator 4 Volume
- [70] Oscillator 4 Tuning Octaves
- [71] Oscillator 4 Tuning Semitones
- [72] Oscillator 4 Tuning Cents
- [73] Oscillator 4 Envelope Type (Global/Free)
- [74] Oscillator 4 Free Envelope Attack
- [75] Oscillator 4 Free Envelope Decay
- [76] Oscillator 4 Free Envelope Sustain
- [77] Oscillator 4 Free Envelope Release
- [78] Oscillator 4 Envelope Velocity
- [79] Global Envelope Attack
- [80] Global Envelope Decay
- [81] Global Envelope Sustain
- [82] Global Envelope Release
- [83] Per-voice LFO 1 Rate (Free)
- [84] Per-voice LFO 1 Rate (Sync)
- [85] Per-voice LFO 1 Amount
- [86] Per-voice LFO 1 Phase Offset
- [87] Per-voice LFO 2 Rate (Free)
- [88] Per-voice LFO 2 Rate (Sync)
- [89] Per-voice LFO 2 Amount
- [90] Per-voice LFO 2 Phase Offset
- [91] Per-voice LFO 3 Rate (Free)
- [92] Per-voice LFO 3 Rate (Sync)
- [93] Per-voice LFO 3 Amount
- [94] Per-voice LFO 3 Phase Offset
- [95] Per-voice LFO 4 Rate (Free)
- [102] Per-voice LFO 4 Rate (Sync)
- [103] Per-voice LFO 4 Amount
- [104] Per-voice LFO 4 Phase Offset
- [105] Free-running LFO 1 Rate (Free)
- [106] Free-running LFO 1 Rate (Sync)
- [107] Free-running LFO 1 Amount
- [108] Free-running LFO 1 Phase Offset
- [109] Free-running LFO 2 Rate (Free)
- [110] Free-running LFO 2 Rate (Sync)
- [111] Free-running LFO 2 Amount
- [112] Free-running LFO 2 Phase Offset
- [113] Free-running LFO 3 Rate (Free)
- [114] Free-running LFO 3 Rate (Sync)
- [115] Free-running LFO 3 Amount
- [116] Free-running LFO 3 Phase Offset
- [117] Free-running LFO 4 Rate (Free)
- [118] Free-running LFO 4 Rate (Sync)
- [119] Free-running LFO 4 Amount
- [128] Free-running LFO 4 Phase Offset
- [130] Filter 1 Bypass
- [131] Filter 1 Cutoff Frequency
- [132] Filter 1 Resonance
- [133] Filter 1 Envelope Amount
- [134] Filter 1 Envelope Attack
- [135] Filter 1 Envelope Decay
- [136] Filter 1 Envelope Sustain
- [137] Filter 1 Envelope Release
- [140] Filter 2 Bypass
- [141] Filter 2 Cutoff Frequency
- [142] Filter 2 Resonance
- [143] Filter 2 Envelope Amount
- [144] Filter 2 Envelope Attack
- [145] Filter 2 Envelope Decay
- [146] Filter 2 Envelope Sustain
- [147] Filter 2 Envelope Release
- [148] Filter Cutoff/Resonance Parameter Link Enable
- [149] Filter Series/Parallel
- [150] Delay Bypass
- [151] Delay Stereo/Mono
- [152] Delay Time Mode
- [153] Delay Time (Free)
- [154] Delay Time (Sync)
- [155] Delay Feedback
- [156] Delay Mix
- [160] Chorus Bypass
- [161] Chorus Feedback
- [162] Chorus Modulation Depth
- [163] Chorus Modulation Delay
- [164] Chorus Modulation Rate
- [165] Chorus Mix
- [170] Reverb Bypass
- [171] Reverb Room Size
- [172] Reverb High Frequency Damping
- [173] Reverb Stereo Width
- [174] Reverb Mix

[180] Modulation Slot 1 Amount  
[181] Modulation Slot 1 Active  
[182] Modulation Slot 2 Amount  
[183] Modulation Slot 2 Active  
[184] Modulation Slot 3 Amount  
[185] Modulation Slot 3 Active  
[186] Modulation Slot 4 Amount  
[187] Modulation Slot 4 Active  
[188] Modulation Slot 5 Amount  
[189] Modulation Slot 5 Active  
[190] Modulation Slot 6 Amount  
[191] Modulation Slot 6 Active  
[192] Modulation Slot 7 Amount  
[193] Modulation Slot 7 Active  
[194] Modulation Slot 8 Amount  
[195] Modulation Slot 8 Active  
[196] Modulation Slot 9 Amount  
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[198] Modulation Slot 10 Amount  
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[201] Modulation Slot 11 Active  
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[203] Modulation Slot 12 Active  
[204] Modulation Slot 13 Amount  
[205] Modulation Slot 13 Active  
[206] Modulation Slot 14 Amount  
[207] Modulation Slot 14 Active  
[208] Modulation Slot 15 Amount  
[209] Modulation Slot 15 Active  
[210] Modulation Slot 16 Amount  
[211] Modulation Slot 16 Active  
  
[212] Portamento  
  
[213] Oscillator 1 Drive  
[214] Oscillator 1 Drive  
[215] Oscillator 1 Drive  
[216] Oscillator 1 Drive

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Vibro's patch mutator is inspired by the patch mutator in the Nord Modular G2 synthesizer (by Clavia).

Vibro's filters are based on source code by Paul Kellett.  
<http://www.musicdsp.org/>

Vibro's reverb is based on the STK version of FreeVerb.  
<https://cerma.stanford.edu/software/stk>

Some of Vibro's waves are based on analyzed recordings of the Wavestation synthesizer (by Korg).

Some of Vibro's waves are based on analyzed recordings from the Adventure Kid Waveform library.  
<http://www.adventurekid.se/AKRT>