



Rekombinator III

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Licence and technical information

Rekombinator III is a virtual instrument for Native Instruments Kontakt sampler, you need full version of Kontakt 6.6.1 or newer to run it.

Instrument interface is fairly large, it takes 1000x820 pixels inside Kontakt. If you want to be able to access the whole interface without scrolling, be sure to use screen resolution of at least 1280x1024.

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Please DO NOT: include provided scripts and samples in any music library or sample library; sell, re-package or re-distribute the samples or sampler programs.

USE AT YOUR OWN RISK! This device is provided 'as is' and there is no warranty of any kind.

Caution

Rekombinator III plays sample grains by generating midi notes internally, which means it does make a lot of notes. Kontakt can output MIDI and can be used as MIDI generator. In case of this instrument I would advise to disable MIDI output for the plugin instance it is loaded into. Or make sure that it's MIDI out is not connected to any MIDI input in your DAW. Else you may be flooded with hundreds of MIDI events per second.

Also note that this instrument, depending on program, can create significant CPU load. It will trigger many voices in Kontakt, don't be surprised when it activates 30 or more voices for a single note held.

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Introduction

This instrument upgrade of Rekombinator II from 2019 and a follow up of Rekombinator released in 2015. The first Rekombinator is a quirky and enigmatic machine, it will take your samples apart and re-play them in different order, according to seed based pseudo random number generator. Every key has it's own seed, so it creates different patterns depending on which note you play.

Rekombinator III is rather focused on regular granular sample playback, there's no grain order shuffle. It should be easier to understand and will be useful for creating drones, otherworldly ambiences and slowly evolving soundscapes. It is by all means an experimental machine and as much a tool as an adventure.

Rekombinator III has the same playback engine and sample pool as Rekombinator II, but the modulator and effects sections are vastly upgraded. Also it supports sample drag'n'drop, making it much easier to load your own samples.

Rekombinator III is based on double waveform design – two samples are combined in the playback engine.

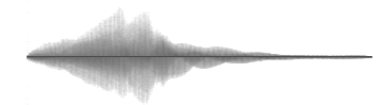
Granular mechanics

Granular playback means that instead of playing the entire sample in a single run, you play small fragments of the sample, gradually moving the playback start. The sample fragments are being called grains. This method is often used to change sample speed while preserving sample pitch. To avoid choppy and grainy sound, you can define grain size to be larger than the playback position step, so the grains are overlapping, which also creates a kind of sound blur effect.

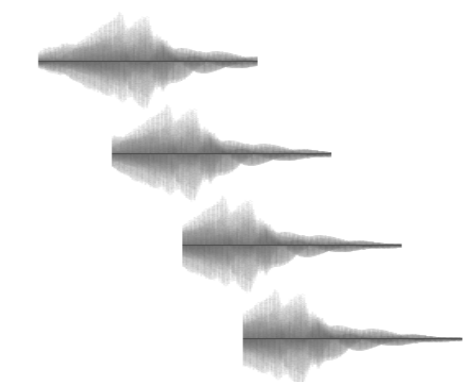
Rekombinator III is using script generated notes to create grains, for each grain there's a note being played internally. Kontakt's AHDSR envelope is used to shape volume envelope of individual grains. As the grains are overlapping, playing a single note on the keyboard will generate many voices internally. Don't be surprised by the high voice count on Kontakt's voice meter.

It is worth noting that waveforms A and B are being played in an interlaced manner. The playback schedule is: play grain A, wait, play grain B, wait, play grain A, and so on. It should be apparent when using large grains. This works towards more uniform distribution of grains.

Base sample



Layered grains



User interface layout

User interface is divided into five panels. You can change panels using tab switches at the bottom of the UI.

WAVEFORMS – contains controllers for granular engine, selecting samples and defining sample properties.

FILTERS – set of basic effects and filters, equalizer, limiter.

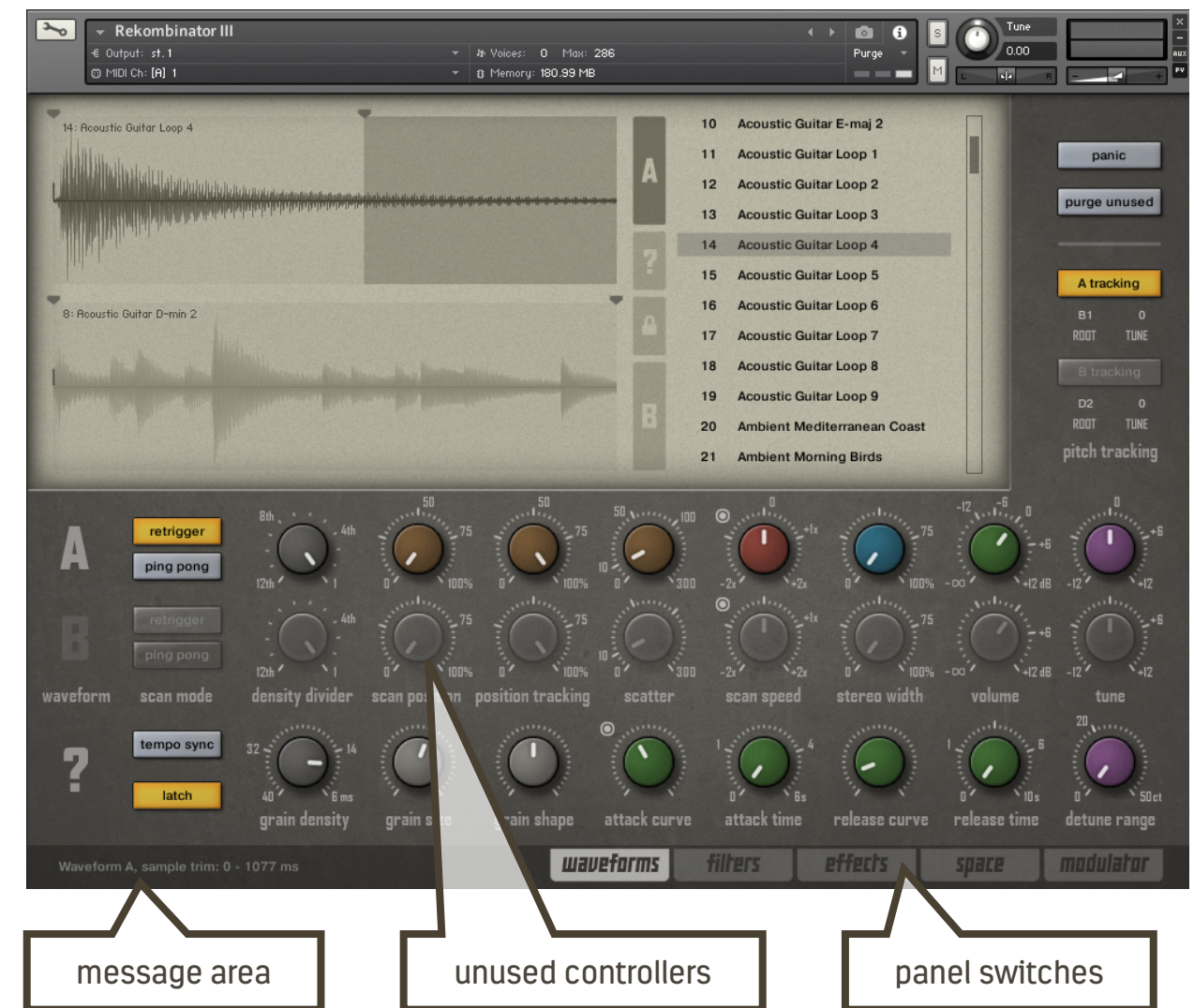
EFFECTS – insert effect rack. There are 4 effect slots where you can insert effects from a list, chorus, phaser, flanger, delay, etc.

SPACE – send effects rack. There are 3 send effect slots, with reverbs and delays to choose from.

MODULATOR – controllers related to instrument's modulator.

The bottom-left corner of the UI is message area. Anytime you manipulate a controller you will get a text feedback there (unless it's a very basic function like turning an effect on or off).

There are many parts of the instrument that can be turned off (effects, modulator, modulator parts, even one of the waveforms). Controllers which are connected to parts that are currently turned off are semi-transparent to give you the indication that tweaking them does not have any audible effect at the time. Like in the picture, where one of the waveforms is muted.



Samples

Rekombinator III operates on two waveforms, named A and B. Each waveform consist of a single sample, so any sound is derived from not more than two samples, there are no round robins or velocity layers. The samples are granulated and re-tuned to cover the whole instrument range.

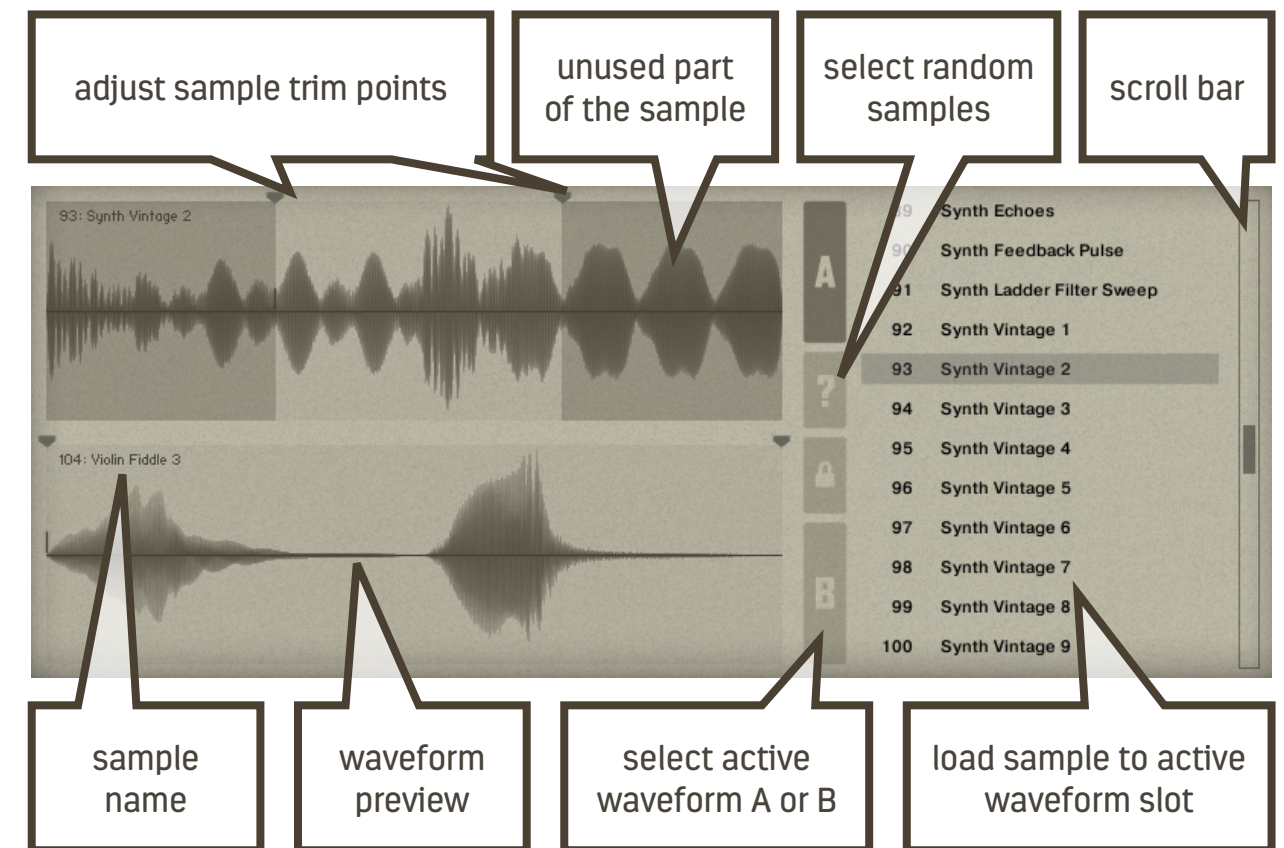
Sample selection provided with the instrument is a little bit of everything, it will give you some notion of what kind of sounds work best, given the experimental nature of the machine. There are acoustic instrument fragments: piano, violin, guitar; synthesized sounds; environmental recordings; human voices; animal sounds; found sounds...

Most of the sounds have been recorded with this instrument in mind, though there are few recorded before and taken from other projects. Acoustic guitar selection is Yamaha APX travel guitar. Electric guitar is Gibson Firebird. Synthesized waveforms are generated with Sequential Circuits Six-Track vintage synthesizer and modern modular system. Piano is an old German upright. For the violin, I used Stentor 'student', Chinese made instrument I had no regrets abusing – you will notice the samples are often scraps and noises, be it piano or violin, reason behind this is that these kind of sounds tend to give interesting results, especially when blurred and slowed to the extreme. Human voices section is a family matter: me, my wife and kids (don't be upset with the crying samples – it was over a discussion of getting more sweets)...

Sample browser section occupies upper part of WAVEFORM panel. To load a sample, first select waveform slot by pressing A or B button, then select sample name from the list. Note that when you select a waveform, the list is being scrolled automatically to show you the selected item. To avoid this, for example if you want to load the same waveform to the other slot, hold ALT key when switching waveforms.

In between A and B buttons, there's "question mark" button, press it to load randomly selected samples to both waveforms. It's a quick way of creating a new patch.

Again, you can hold ALT key to load random sample only to currently selected waveform. Also if one of waveforms is muted it will not be affected by this function.



Activate the lock button to prevent waveforms from being replaced when you load a snapshot. Basically it will reload locked waveforms after reading the snapshot, which is very useful when user samples are loaded.

On the upper edge of waveform preview you can find two small triangle controllers. You can drag them to trim the waveform, by setting playback beginning and end points. It can be useful if you don't want to prepare samples especially for the instrument or just want to use a fragment of the sample in the patch. The trim points are being reset each time you load a new sample.

You can play the selected sample in regular manner (not granular) to examine its original sound. Hover the mouse to the bottom left corner of the waveform preview area, a text "click to audition" will appear. Click to play the sample, click again to stop playing (sample with a loop will play indefinitely).

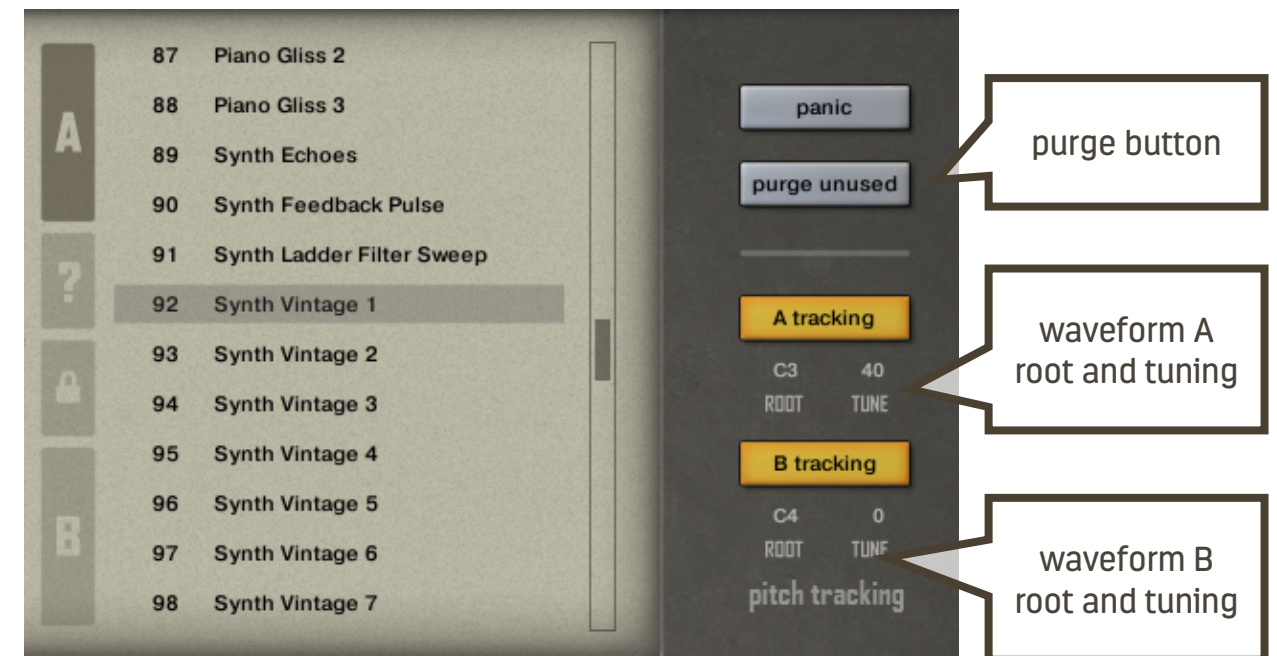


Adding user samples

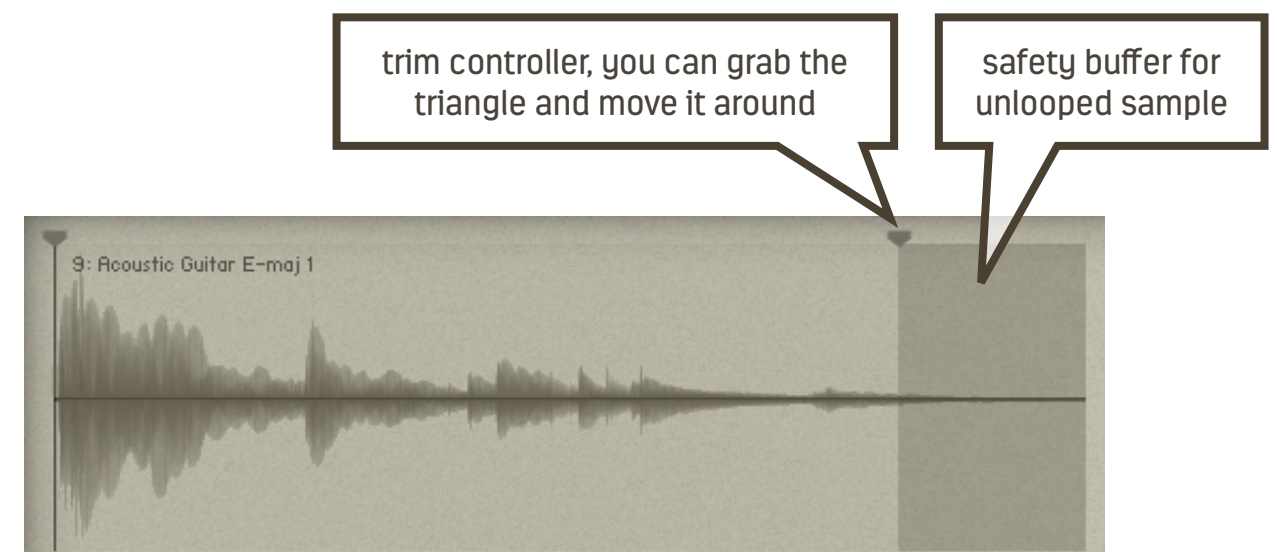
To use your own sample, simply drag and drop sample file onto waveform preview in Waveforms tab. The sample will appear on the sample list as “User Waveform” with index number “0”. Note that user waveforms are not shared between A and B like other samples in the list. If you want to use the same sample in A and B you need to repeat drag and drop procedure for each waveform.

When loading user sample, the instrument will use Kontakt’s pitch detection to determine the correct tuning. “Root” and “Tune” parameters (below “Tracking” buttons) will be set automatically. Usually pitch detection works reasonably well, but sometimes it just doesn’t. If the pitch is off, adjust root and tune manually. Also you can turn “Tracking” off, then the sample pitch will not be affected by note number. Peak detection will be used as well. If sample is not normalized the instrument will attempt to compensate for lower volume level.

Rekombinator III works in “sampler mode” which means that all samples are loaded to RAM, this way it can access any part of the sample without a delay. Of course, you only use two samples at a time, the rest just takes memory until you select a different sample. Original sample pool takes less than 180 MB, which is nothing by Kontakt standards, but if memory is an issue or you only going to use your own samples, you can use “purge unused” option. Press this button and the instrument will only load selected samples to memory, the rest of sample pool will be purged. This will heavily reduce memory usage, however there can be lag/delay when selecting different samples as Kontakt will have to load/unload data. Normally you can change samples glitch free while playing, with “purge unused” option on, glitches may occur when swapping samples.



Rekombinator III plays samples in a loop, when playback position reaches the end of the sample, it will start playback from the beginning. Most of included samples have seamless loops. When you load your own samples, consider that when sample has no defined loop, then when play position reaches the end of the sample, and grain body will go over the sample duration it will be truncated. To avoid such situation I’d recommend to trim the end of the sample, giving grains some space to play through. You can also use ping pong play mode, which will be discussed later.



Snapshots

Rekombinator III is using Kontakt's snapshot format for presets. Snapshots have to be installed manually.

To install snapshots, locate the snapshot folder, usually similar to ...Documents\Native Instruments\User Content\Kontakt\ (depending on system), create folder named 'Rekombinator III' and copy contents of snapshots folder in instrument package into it.

You can use Kontakt to find or create snapshot folder quickly. Go to edit mode (press wrench button), click on 'Instrument Options', select 'Snapshots' tab and click 'Show' button. You will see system message 'There is no User snapshot saved yet. Do you want to create a path?' Click 'Yes', the destination folder will be created for you and it will be opened in file manager (unless you did save a snapshot already, in which case the folder will be opened without the dialog). Now copy 'snapshots' folder contents into it, preserving folder structure. Once the operation is completed successfully, snapshot list will appear in snapshot tab in the instrument.

If you have Rekombinator II, note that its snapshots are not compatible with version III. Loading them can technically work, because there are variables and arrays with same names, but it will break the instrument as the internal setup is different.



Granular engine

Each time a new note is received Rekombinator III starts an engine thread which will keep generating grains as long as the note is held. Different notes will spawn independent threads running in parallel. An engine thread is basically a sequencer that keeps tapping given note in defined interval.

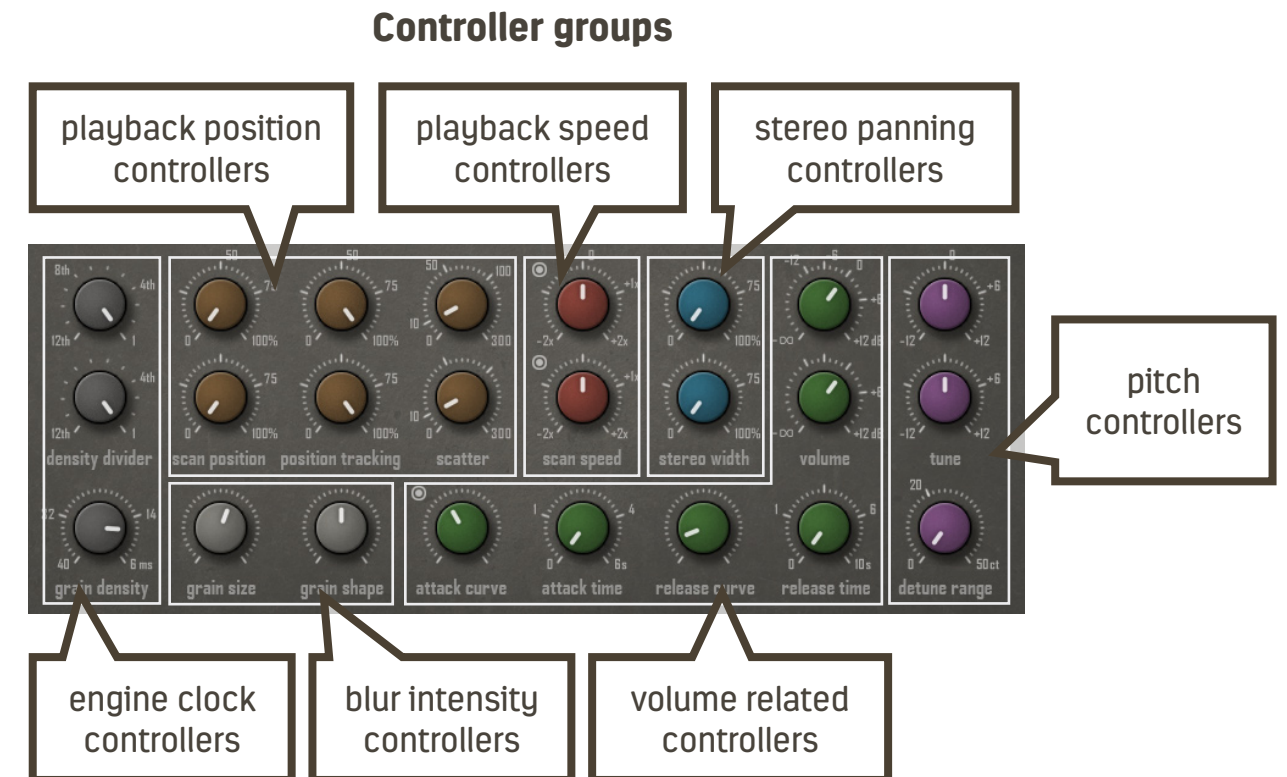
If you get stuck notes (which should not happen) or some notes stop responding (which could happen if Kontakt engine has been interrupted while running a thread, for example because of CPU overload) you can press “panic” button. It should stop and reset any threads that are running or haven’t been closed properly. Alternatively you can restart Kontakt engine by pressing “!” button in upper right corner of Kontakt UI.

Granular engine controllers are located in lower part of WAVEFORMS panel. There are three rows of controllers, top two rows starting with A and B switches are connected to parameters which can be tweaked independently for each waveform. In the third row there are general controllers for the granular engine.



Note that you don’t have to use both waveforms, you can mute/turn off one of the waveforms by clicking on A/B labels. It can be also useful when programing a patch, to examine how a waveform part sounds separately.

Controller knobs are color coded according to function as show in the picture.



ENGINE CLOCK

Grain density parameter defines the rate of engine clock, that is how often new grains are being played. For example when grain density is set to 20 ms, the engine will generate new grain every 20 ms. (A and B waveforms are played in interlaced manner, so actual schedule would look like: play grain A, wait 10 ms, play grain B, wait 10 ms, play grain A, and so on). You should adjust density by ear, different values may work better depending on source. High density (small interval) will work towards smearing transients when using slow playback speeds.

Use **tempo sync** button to synchronize clock with current tempo. Grain density will be defined as note value. The range is 256th to 8th, while 256th and 128th clocks can be considered as belonging to granular domain, clocks values like 8th or 16th take it to sequencer range, making the instrument a kind of a stutter machine.

Density divider can be used to play on of the waveforms at lower grain density, make it sound more grainy or glitchy. The mechanics of the divider are simple, the engine skips some grain steps for the waveform. When divider is set to 1 engine is playing every grain in the queue, set it to 2 and every second grain will be played, set it to 4 and only every 4th grain in the queue will be played. An so on.

BLUR

Grain size and **grain shape** are parameters that define grain envelope. They have much more impact on sound than clock rate. Also they determine number of grain overlaps, which translates to sound smoothing or blurring, as well as number of voices (and CPU load).

Grain size is duration of following notes being generated, it is defined as percentage of clock rate. Setting grain size to less than 200% will give you grainy/choppy sound, you can push it up to 500% to add more blur. If you have sharp transients in the source sample, that you would rather smear at slow playback, it might be a good idea to stick with moderate grain size.

Grain shape applies grain volume envelope, higher values add more attack and release to the envelope. Note that release time adds over to grain size, so higher values of grain shape will produce even more overlaps. Keep shape value in the middle range for smooth sound, push it up to add more blur or pull it down for glitchy vibe.

PLAYBACK SPEED

Scan speed is the parameter which is most fun to play with. It defines how fast playback position is being moved in relation to original sample speed. The controller is bipolar, at the middle point the playback is frozen as the playback position doesn't move. Push it to the right to play sample forward, or push it to the left to play sample backwards. The controller value is defined as percentage of normal speed and the range is up to 200% (double speed). Hold ALT key while tweaking the knob value to round it to 50% (switch between 0%, 50%, 100%, 150% and 200%), which can be useful to synchronize speeds. For example play one waveform at half speed and the other at double speed.

What I find particularly interesting, is playing with extreme time stretch in Rekombinator III, in other words playing samples at very low speeds. It can create some fascinating drone sounds. I imagine many users will be interested in very limited range of speed parameter, so the knob has a fine resolution mode. The small white circle next to speed knob is fine mode switch, turn it on and the knob range will be set to -10% to 10%. It makes it much easier to dial speeds like 1% or 0,5%...

Scan speed can be tweaked live (as any of engine parameters) to create slowdowns or speedups. Also you can use modulator to create acceleration curves.

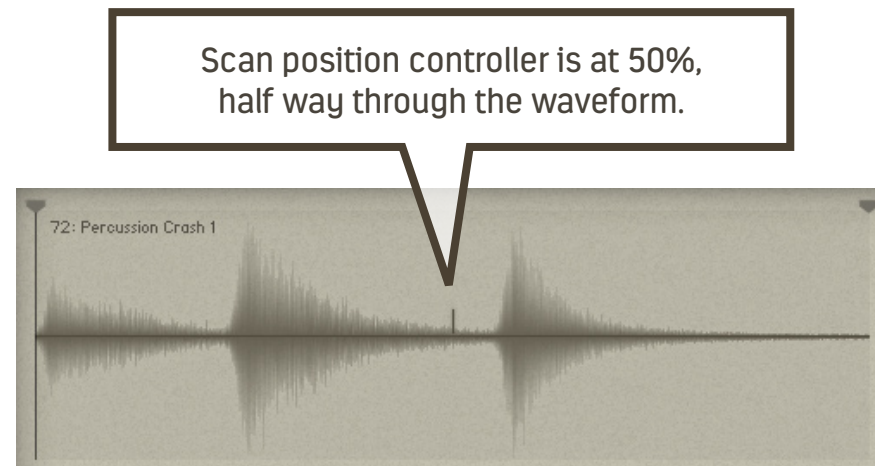


Ping pong is alternative playback mode available for each waveform separately. Normally when playback position (set for each grain according to scan speed) reaches the end of the sample (or playback area if you trimmed the sample) it starts to play from the beginning and it goes on in an infinite loop for as long as the note is held. Most of included samples have seamless loops, but if you are dealing with unlooped sample and you want a smooth sound, you may try ping pong mode. In this mode when playback position reaches the end of sample the scan speed polarity is being reversed and it starts to go the other way. Visually it will bounce off sample edges.

If you set scan speed to play sample forward and you see it playing backwards, chances are that it's in ping pong mode in bounced state.

PLAYBACK POSITION

Scan position and **position tracking** controllers define where is the start point for sample playback. When you press a key, engine thread is started, playback position is set respectively and is being moved from there according to **scan speed**. Scan position parameter is visualized on waveform preview with a small line.



The starting playback position also depends on **retrigger** switch. When retrigger is on, for each new note being played the playback position is being moved back to start point defined by **scan position**. So playback position will not be synchronized between notes.

When **retrigger** is off, any new note will start playback at the position of note that is currently playing, so if you add new notes they will track the same area of the waveform. Also if you release all notes and press new note, the new note will continue playback from last known position.

Scan position controller can be tweaked live, in fact you can automate it as an alternative to using scan speed. Set **scan speed** to zero and move **scan position** knob around, the effect is analogous to turntable scratching. Note that tweaking scan position is effective regardless of **retrigger** option state.

Scan position can be attached to the modulator. You can generate a playback position curve in the modulator and use it for nonlinear waveform playback.

Position tracking adds a constant value to playback position which depends on note position on the keyboard. It's similar to pitch tracking, pitch tracking makes lower notes play lower pitches and higher notes higher pitches. **Position tracking** makes the lower notes start to play at the beginning of the sample (assuming scan position is at zero) and higher notes at the end of the sample.

The idea behind this controller is that you can turn off pitch tracking and use different notes to play different portions of the sample, which can be interesting with slow drones. But it can also be used to add some variation to the sound.

Note that position tracking works as a modulator for playback position, it is being added to current play position, so it is independent from retrigger and will de-synchronize notes playback position even when retrigger is off.

Scatter controller acts as position randomizer. It adds a random value from defined range to start position of every new grain being played. Scatter is more important than it may seem at first. With constant speed and high grain density overlapping samples will generate a ringing effect, with ringing pitch being related to density value. It sounds similar to ring modulator. Adding a bit of randomness to grain position removes the effect, so unless it's desired, I'd recommend to keep scatter value around 10 ms by default.

You can also try to add more scatter for more organic/random sound.

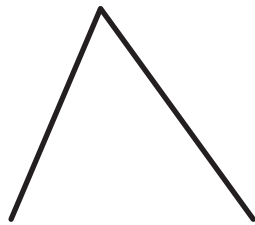
VOLUME AND VOLUME ENVELOPE

Volume controllers surely need no explanation, but it's worth noting that if you need more gain control you can also use limiter gain in filters panel.

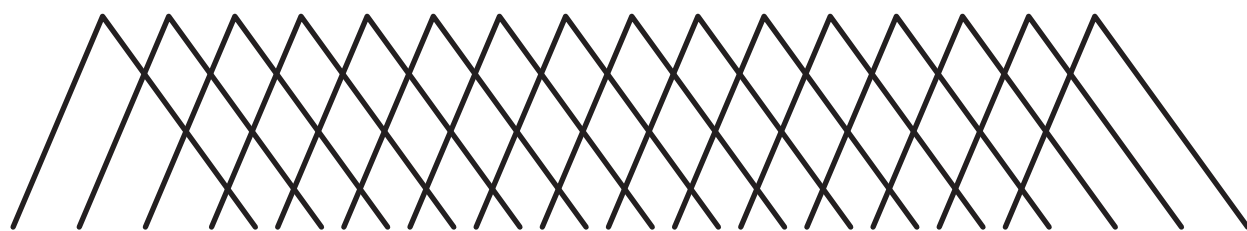
As I mentioned before, Kontakt's internal envelopes are used to shape individual grains. And since in Rekombinator III a single note generates a stream of short notes it needs an envelope shaping on another level.

The granular engine has a simple envelope built in, that has attack and release stages with time and curve control. What is unusual about the envelope is that it works on grain level, it doesn't affect the output volume directly, but it modulates the overall volume of following grains. So effectively the envelope is quantized to grain size. To illustrate this.

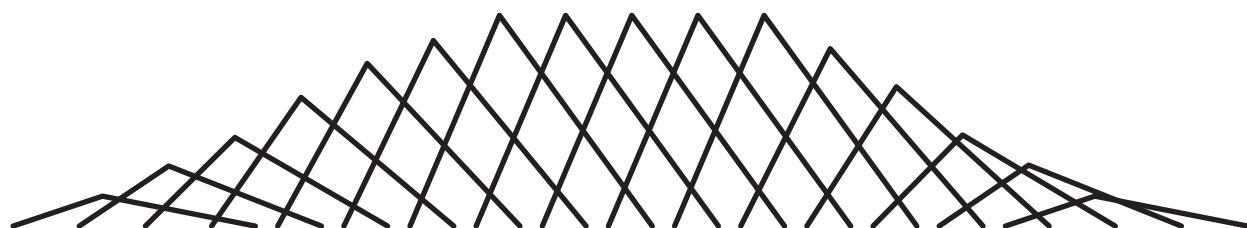
Assume this is how single grain envelope looks like:



With no attack and no release stages, the layered grains would look like this:



And this is how they would look with the engine envelope applied:



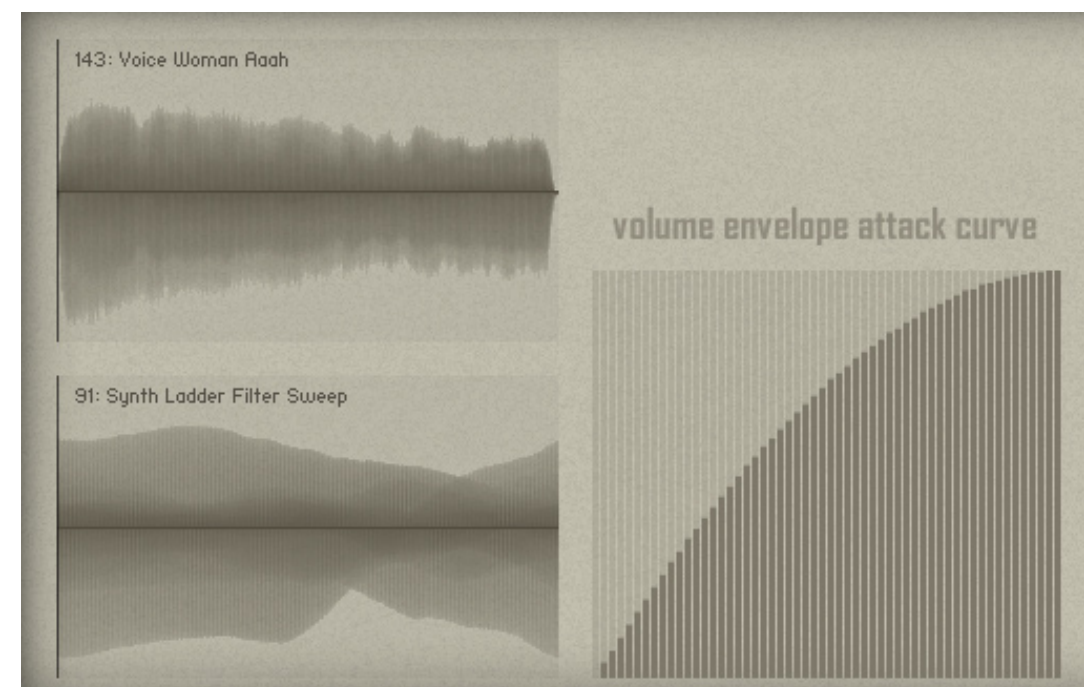
Keep in mind that if the attack or release time of the envelope is shorter than grain size, it will have no effect at all.

Another quirk of engine envelope is that there can be only one envelope per engine thread. So in case you release a key and press it again before the envelope reaches the end of release stage, the release stage will be abandoned and the envelope will move to attack stage, adjusting initial volume to the level it has reached in aborted release stage.

Long story short, playing a note with long release stage repetitively won't result in multiple layered notes, but will make the volume level bounce up and down with a single note.

You can adjust curve shape for both attack and release stage. The shape will be visualized on waveform preview area as you tweak the curve knob. The visualization can be turned off if desired, use the small white circle switch next to **attack curve** knob.

Envelope stage visualization



STEREO PANNING

Stereo width controllers can be used to create stereo image. Included samples are all monophonic. Stereo function works simply by alternating stereo position for following grains. For example if you set width to 20%, first grain will be panned 20% to the left, next grain will be panned 20% to the right and so on. When used with high grain density and some scatter or detune is applied it will create very effective artificial stereo image.

PITCH

Tune knobs can be used to adjust sample tuning for given waveform, in range of +/- 12 semitones. Hold ALT key while tweaking the knobs to round the value to semitone.

Detune controller will apply random pitch change from defined range to every new grain. Used moderately it can add some organic feel to the sound.

Note that both controllers will work when pitch tracking is off.

PARAMETER RANDOMIZATION

Press “?” button below A/B labels to apply random values to whole set of engine parameters. Note that there is no undo, so be sure to save any valuable configuration before trying this option. If one of the waveforms is turned off (click on A/B labels), randomization function will only apply to active waveform and will not be applied to the common engine parameters.

Latch

Rekombinator III can be useful for creating long slowly evolving drones, which involves keeping some keys down for extended periods of time. Latch function can make it easier on your fingers and keep the virtual keys pressed for you.

Latch mechanics are slightly different here than from what you can find in other instruments. Press latch button to activate latch mode. Now if you press a key it is being latched, it stays down when you release the physical key on your controller. If no physical key is being held, pressing a new key will release all previously latched keys, then the new key is being latched. So if you play a chord, it will be latched, if you release all keys and play a new chord, previously latched chord will be replaced with the new one.

Turning latch button on will also latch any keys that are being held at the moment. Turning latch button off will release all latched keys. As you can see once you get latched keys, the only way to release all keys is to turn the latch button off. Latch button can be automated and I would suggest to patch it to a button on your MIDI controller. The alternative way of releasing all keys is latch release keyswitch. It's B0, right below the lowest note in instrument's range. Latch release key will be colored black on virtual keyboard, when latch button is engaged.



Modulator: overview

Rekombinator III modulator is fully scripted low frequency oscillator which plays back pre-rendered waveforms. You can design modulator waveforms using one of two methods: step sequence or node sequence. Each time you adjust waveform parameters, the instrument will render new waveform. Technically the modulator is high frequency step sequencer, where step interval is one MIDI tick, which translates to 960 steps per quarter note. Rendering can be quite CPU intensive, because the number of steps in the final waveform sequence can be quite high (up to 61440). Therefore the modulator is not suited for live tweaking of waveform shape and automation of waveform shaping controllers is disabled. On the other hand you can have complicated modulation waveforms and the modulator doesn't need much CPU when playing back. When the instrument is playing, modulator will reduce waveform update frequency to avoid choking the CPU, you will notice there is significant lag when you tweak waveform shape.

You can define up to 8 modulator waveforms which can be attached to most of available knob controllers (apart from those in modulator panel). Each waveform can be attached to two parameters (described as A and B). You can attach multiple waveforms to single parameter, in which case modulations will add up.

By default the modulator engine is OFF. Modulator on/off switch is labeled "MODULATOR". When modulator is disabled, the controllers in modulator panel will be semi-transparent, just as other controllers in Rekombinator III that are not in use at the moment. You can also switch individual waveforms on and off, as well as A and B output points.

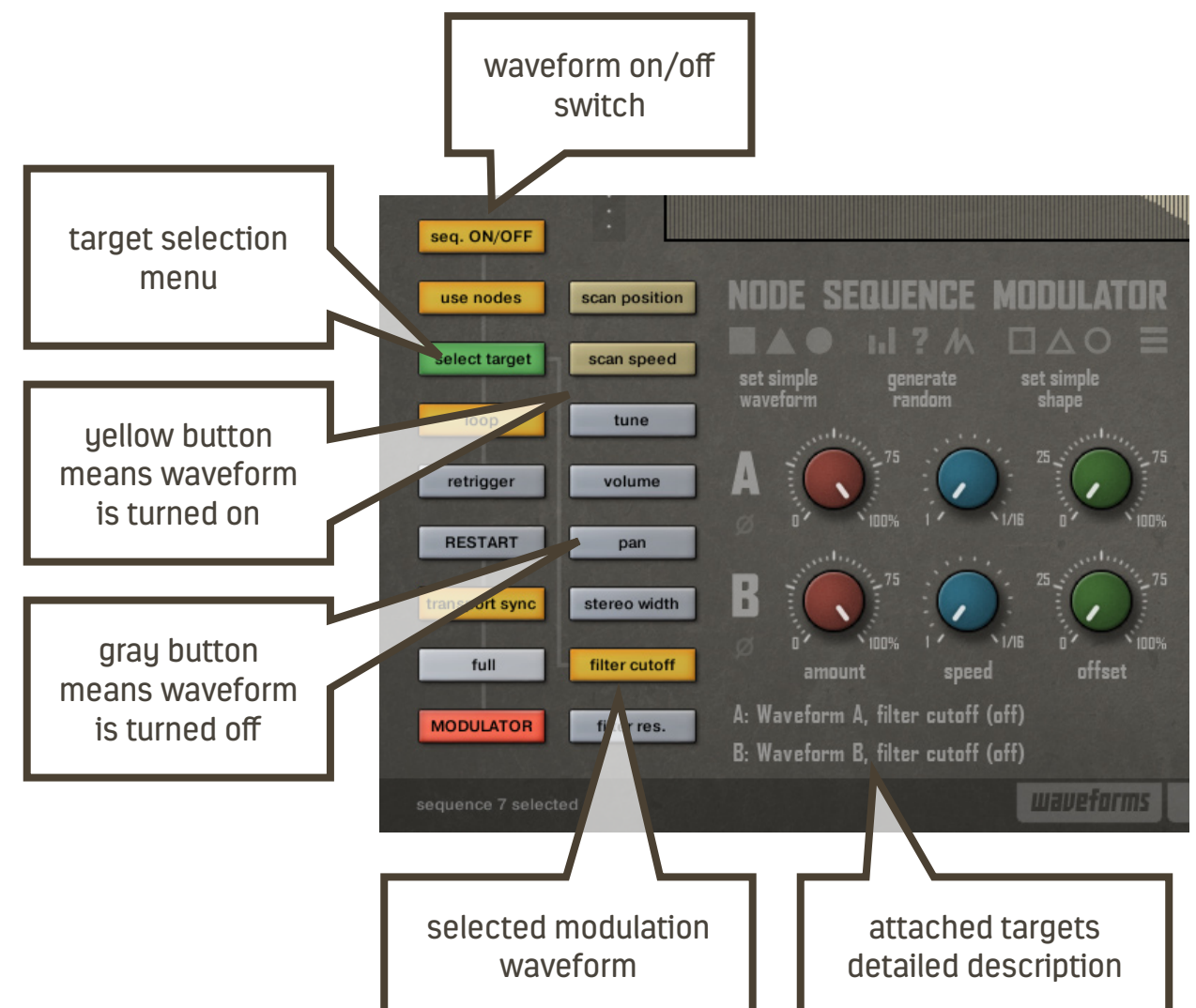


modulator on/off switch

Modulator: modulation targets

The second columns of buttons is waveform selector. Initially each waveform is attached to a set of (presumably) commonly used parameters, like volume, or scan position. You can use it as is, or you can arrange modulation targets as you like. Waveform selection buttons will be labeled depending on modulation target. In case A and B are attached to different targets, button label will be labeled according to first target with "+" suffix. Next to selection buttons there is detailed description of targets assigned to selected waveform.

You can change targets using drop-down menu "select target". You can pick one from the list of common targets: scan position, scan speed, tune, volume, pan, stereo width, filter cutoff, filter resonance. Picking a target from the list will attach both modulation waveform outputs to controllers for waveform A and B.



To select a parameter that is not on the list, pick “select target A” or “select target B” (to attach to one of two waveform outputs). Then navigate to waveforms, filters, effects or space panel and click on target controller to modulate. Modulator can be attached to any visible knob on those panels. Some controllers are excluded from the list of possible targets. In effect and space panels there are few atypical controllers and some that would break Kontakt when automated (convolution). Also there are some controllers on waveforms panel that I simply thought are not worth the trouble to make “targetable”, as they wouldn’t likely see much use. Knobs unavailable as modulator targets will be hidden, with empty circle visible instead, to let you know what can be selected.

If you change your mind and decide not to select a target, click on “cancel” button in message area, then previously selected target will be restored. You can also activate target selection by clicking on target description label, which is probably quicker way to access it. You choose to delete the modulation target, in which case given waveform output will have no effect and will be labeled as “undefined”.

Once a controller is attached to modulator a sine wave icon will appear underneath. Click on it to invoke a drop down menu that will list all modulator waveforms attached. Then if you click on an item in the list, the instrument will switch to modulator panel and show selected waveform. When you start playing the instrument, a halo indicator will appear under modulated controller, giving you live update of combined modulation status.

If you turn off an effect attached to modulator, target description will indicate that labeling it with “(off)” suffix. In case of space and effects panels, given effect can be removed or and there can another effect in place. If the modulator is attached to controller which does not exist anymore, it will indicate that with “effect removed” label.



selecting a target from space panel

click cancel to abort selection

unavailable targets

click on any knob to select it as modulator target

modulation indicator

attached modulation waveforms list

Modulator: amount, speed and offset

Amount, speed and **offset** are parameters that define how modulation waveform is applied to each of outputs (A and B). You can use them to create different modulations out of single waveform.

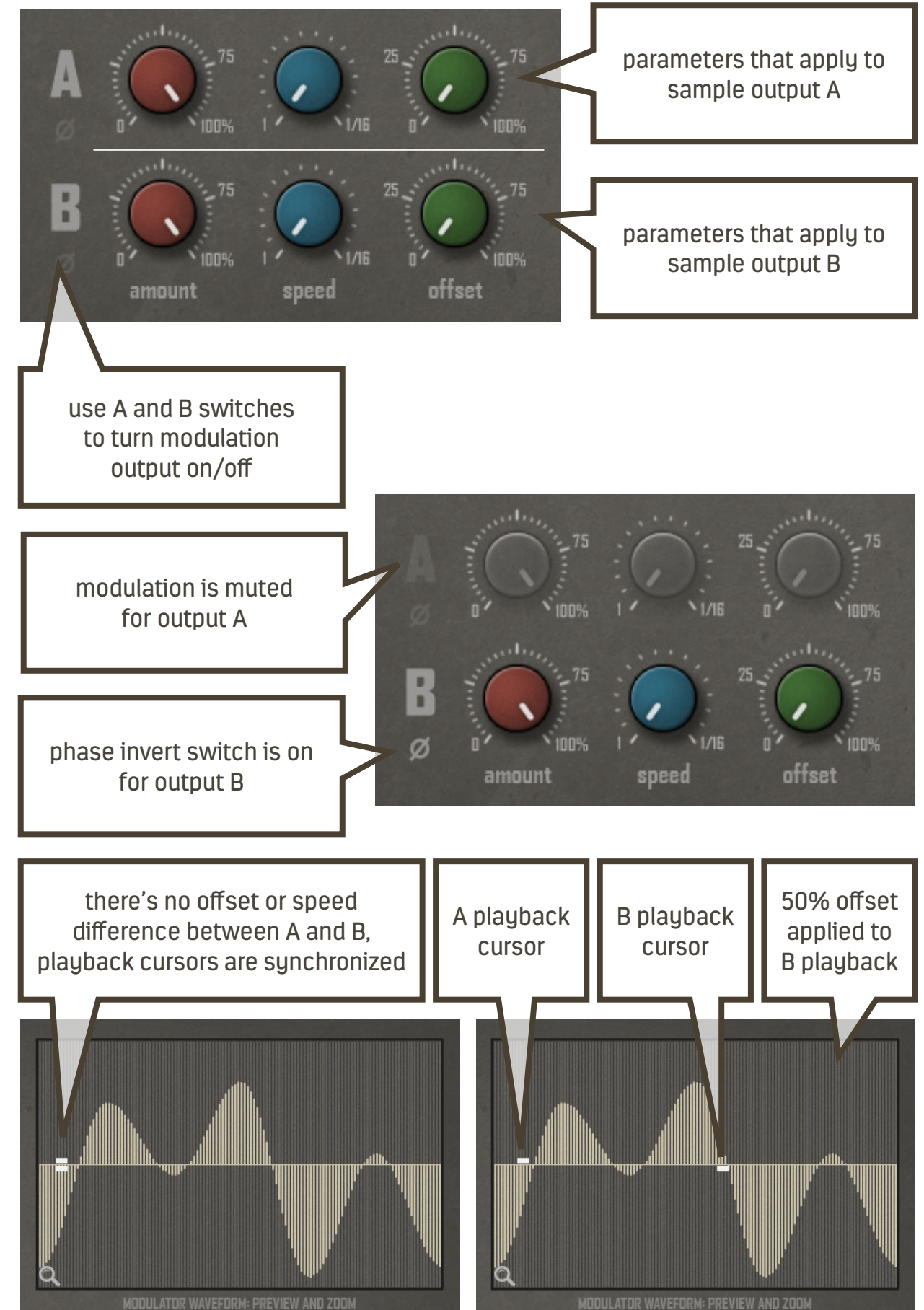
Amount defines intensity of modulation. It scales down the waveform. Setting amount to zero effectively disables modulation although the modulator is still running. A and B labels are also on/off buttons. They can be used to audition each output of the waveform, or to turn one output off completely, which would be preferred way of disabling it, if it is unused. (Even better you can remove the modulation target completely).

Phase invert is the small button beneath A and B. It will invert modulation for given output. Using phase invert is easy way of creating crossfades (when used with volume). It is also useful when modulating stereo pan.

Speed controllers can be used to play modulation waveform at different speeds for each output. It acts as a divider, 1/1 speed is full speed as defined by sequence rate, 1/2 is half speed and so on, up to 1/16th speed. Speed change is achieved by using different playback clock for modulation waveform. For 1/1 speed, waveform sequence step is 1 MIDI tick, for 1/2 speed, the step is 2 MIDI ticks. So the waveform is just played at slower rate.

Offset parameter can be used to change playback position of modulation waveform for each output, so different parts of modulation waveform can apply to A and B at given time.

While modulation waveform is being played, you can see playback cursors for both sample waveforms over the modulation waveform preview.



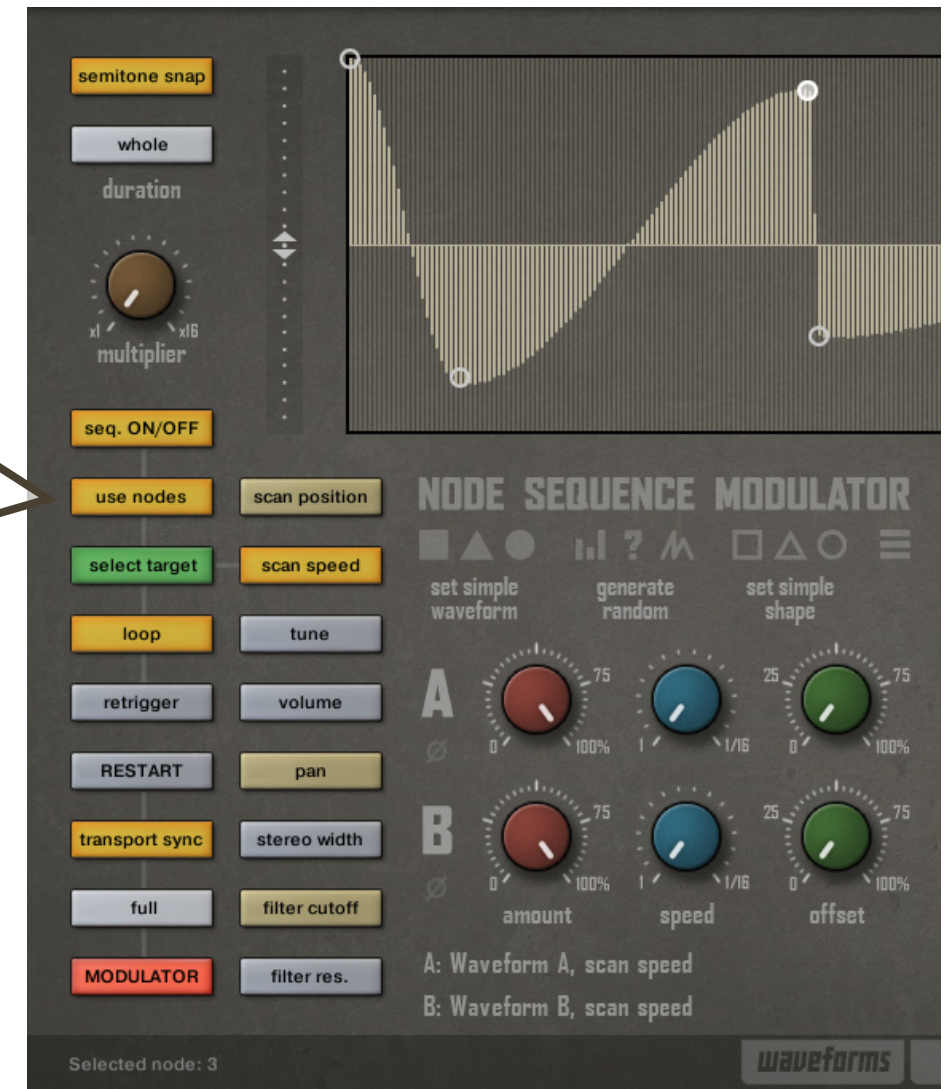
Modulator: crafting waveforms

There are two modes of crafting a modulator waveform: step sequence and node sequence. Step sequence has been used in Rekombinator II, node sequence is new in Rekombinator III. You can change the mode by clicking “use nodes” button, which will activate node sequence. The modes have independent controllers so you can switch between them while preserving both waveform settings.

In step sequence mode you program a regular table based step sequence, as seen so often in Kontakt. Then you can shape the transition curves between steps. This mode is simpler, quicker and naturally creates waveform with evenly distributed chunks.

In node sequence mode, you can place nodes anywhere in waveform area and then render curves from one node to the next. It's good for making asymmetrical waveforms that would be impossible to design in step sequence mode. It probably requires more effort though.

waveform
crafting mode
switch



Modulator: step sequence waveform

In this mode waveform is defined by the sequence and shape. Waveform shape within a step area is rendered starting from value of previous step in the sequence stretching the curve to reach the value of current step at the end of step duration. When waveform is played in a loop, the initial value is the value of last step in the sequence.

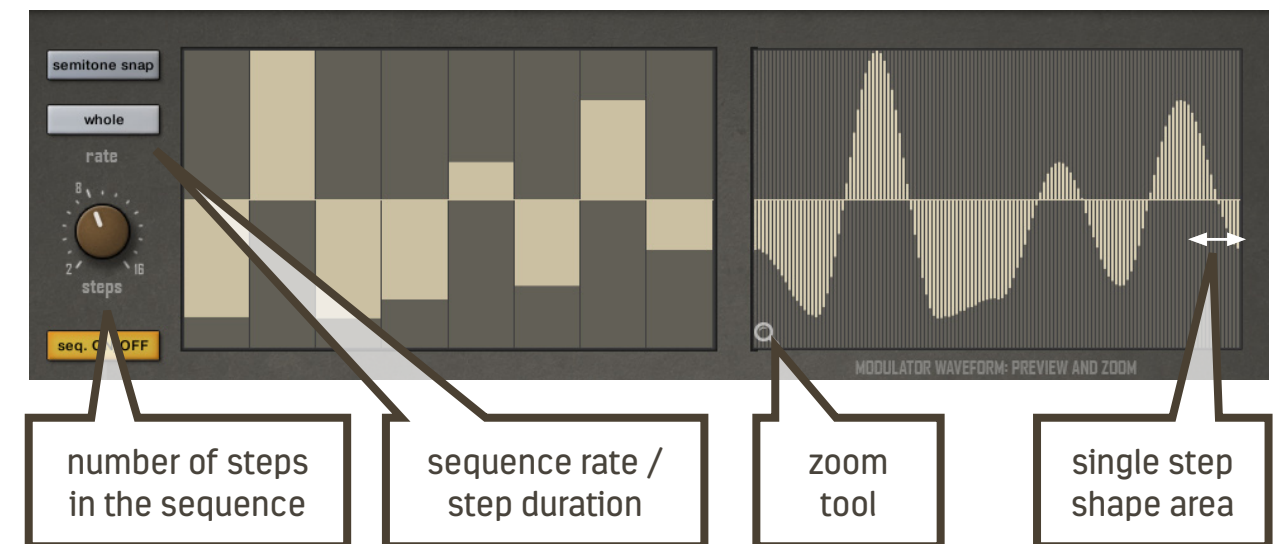
Use **steps** knob to define number of steps in the sequence and **rate** dropdown menu to pick sequence rate (step duration). **Rate** is defined as note value, so the modulator is always tempo synchronized.

Waveform preview is just a coarse preview of rendered waveform, there's no free-hand draw option.

Waveform shape definition consists of two curves. Curves can be distributed between steps in two manners: **rise/fall** or **even/odd**. In rise/fall method, first curve applies to any step which value is higher than the value of previous step – you can define different curve for rising the parameter value and different one for lowering it. In even/odd method curves are applied in round robin, step 1 – first curve, step 2 – second curve, step 3 – first curve and so on. With even/odd method curve preview is shown for rising curve, falling curve is rendered as vertical mirror of rising curve.

There are three types of curves to choose from: **exponential**, **sinusoidal** and **logarithmic**. For each type you can selected **invert** mode, which reverses the curvature. There's also **curve shape** controller which can be used to bend the curve. When curve type is exponential, curve shape parameter is function exponent, with the range being 1 to 4. So when curve shape is at minimum, the function is $y=x^1$, which is linear. And when curve shape is at maximum, the function is $y=x^4$.

Above curve shape knob there's **curve stretch** (or speed) controller. It defines how long does it take the value to reach the maximum, where time is defined as percentage of step duration. So at 100% stretch the curve takes the whole step duration to reach maximum. At 0% stretch the value jumps to maximum instantly, which translates to square waveform shape.



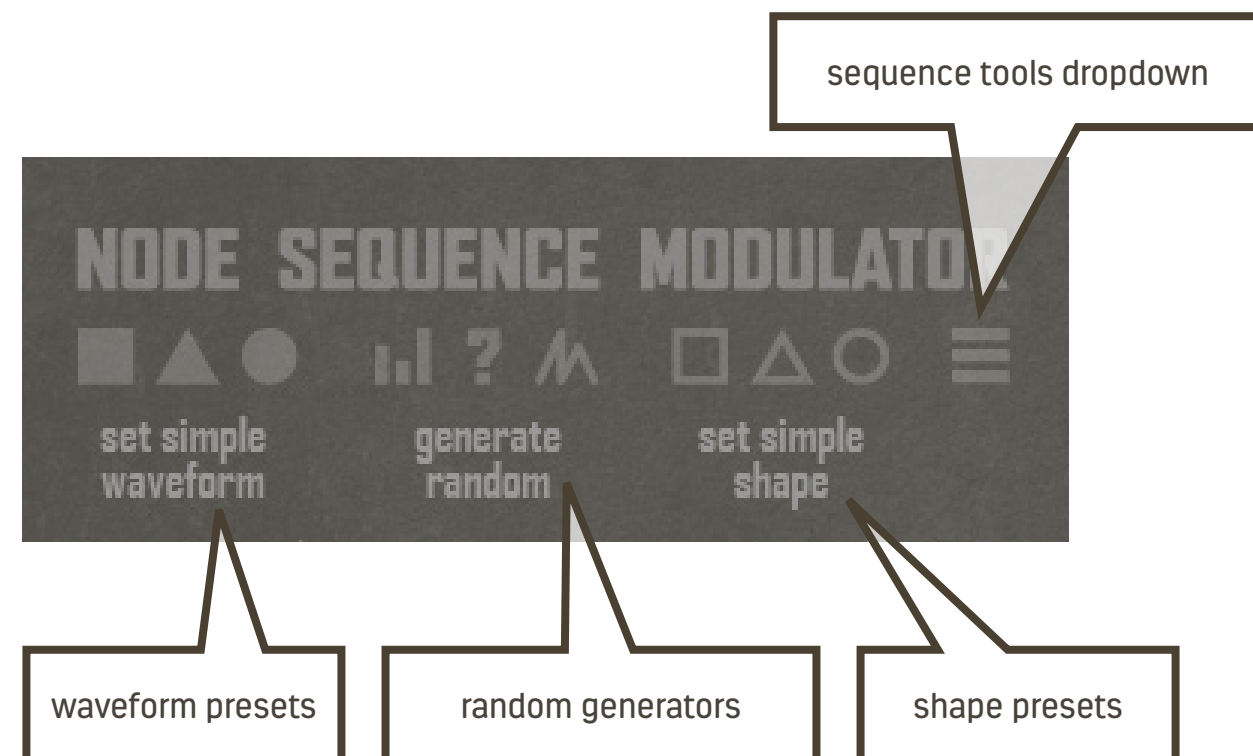
example curve definitions



Modulator: step sequence waveform tools

Below modulator title label, there's set of 10 tool buttons. First three are simple waveform presets, labeled "set simple waveform". You can use them to create simple common waveforms with a single click. Press filled square button to generate simple square waveform, the function will generate simple two step sequence and set-up curve parameters to make a regular square waveform. Similarly, triangle button will generate triangle waveform and circle button will generate sine waveform. There's analogous set of buttons labeled "set simple shape", these have the same functionality, but only apply to curve controllers, leaving sequence unaffected. The middle set can be used to randomize the waveform. Button on the left generates a random sequence, button on the right generates random shape (applies to curve controllers) and the middle button creates a whole new random waveform.

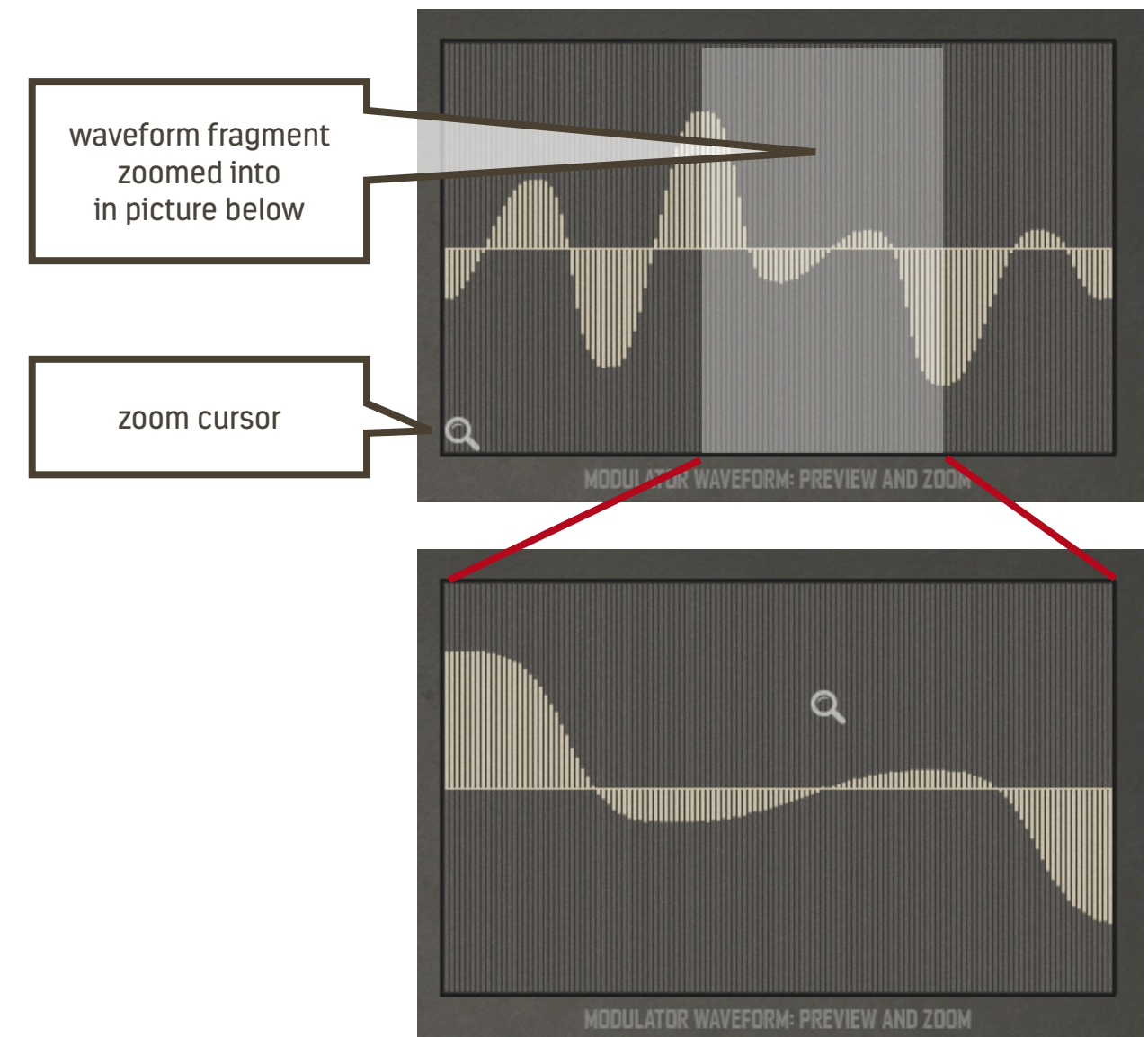
More functions are available in "sequence tools" dropdown menu. You can reset sequence or shape parts, slide the sequence to the left or to the right, or use copy/paste function to clone sequence, shape or both parts to another waveform.



Modulator: sequence zoom tool

In modulation waveform preview area you can see a magnifying glass icon, it is zoom tool cursor. You can grab it and move around the preview area. The zero position of the cursor is in bottom left corner. Move it upwards to zoom the waveform in, that is, display just a fragment of the waveform in the preview area. Move the cursor horizontally to scroll magnified waveform through preview window.

Zoom is not just a preview tool. When zoom is engaged, only the waveform fragment visible in preview will be played, so it is also a waveform trim tool. Zoom parameters are being saved for each modulation waveform.

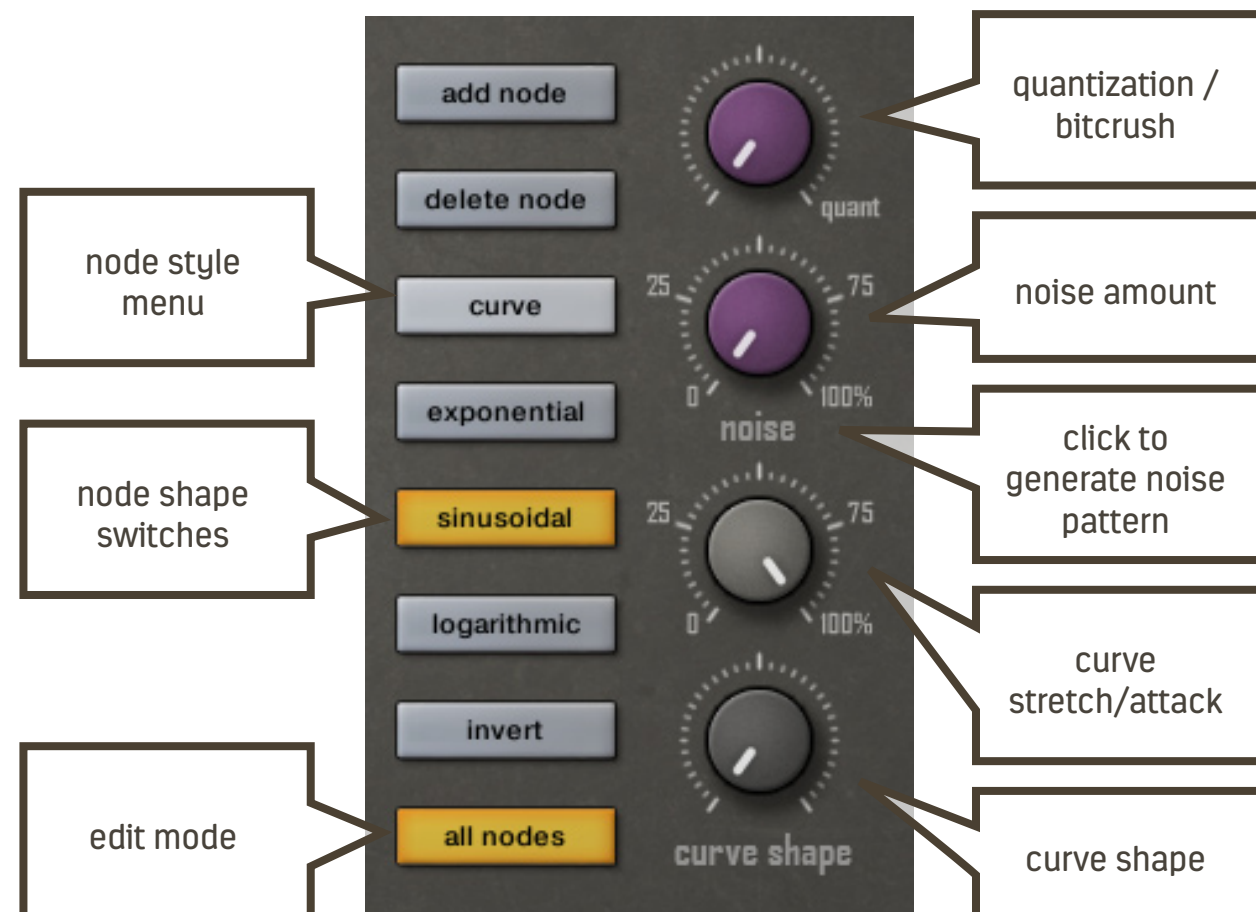


Modulator: node sequence waveform

In node sequence mode you place points/nodes in rectangular area, then the waveform curve is plotted from one node to the next. Nodes can be dragged around and placed anywhere. You can have up to 16 nodes in the sequence, which is a limitation imposed by Kontakt's XY controller used for editing the sequence. Sequence preview is being displayed right under the node area. Again, it's just a coarse preview.

Curve shape controllers are the same as in step sequence mode: **exponential**, **sinusoidal** and **logarithmic**, with **invert** switch. You also have **curve shape** and **stretch/attack** knobs. Additionally you can select one of **node styles**, add **noise** and **quantize** the curve. Those parameters can be applied to whole node sequence or you can edit each node individually. Node parameters determine curve shape on the right side of the node, until next node.

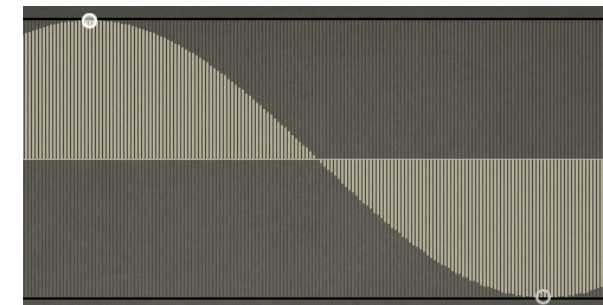
Use **all nodes** switch to select whether you want to edit the whole sequence or tweak each node separately. Switching **all nodes** back on, will apply properties of currently selected node to all nodes.



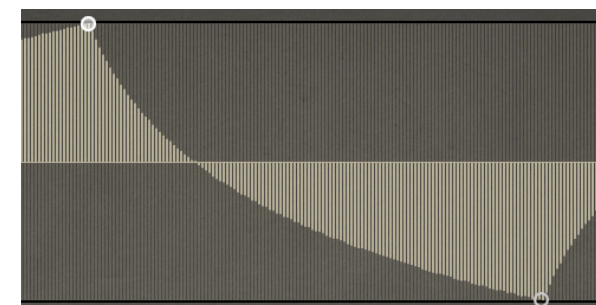
Default node style is named **curve**, it plots waveform from node to node. I added other style as a shortcut for creating shaped which otherwise would require several nodes to plot and seem desirable to have.

Optional node styles are named **sawtooth**, **spike**, **peak** and **block**, in each of them curve is plotted from zero line to node Y value and back to zero again. Curve shape and stretch applies to every style.

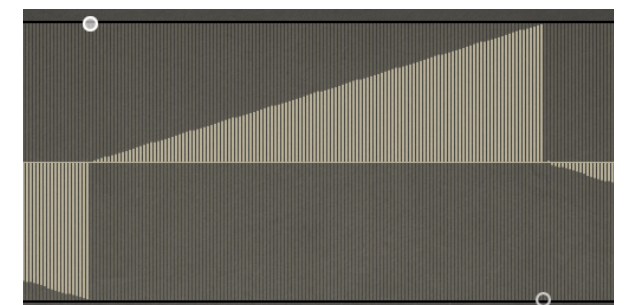
style: curve, sinusoidal



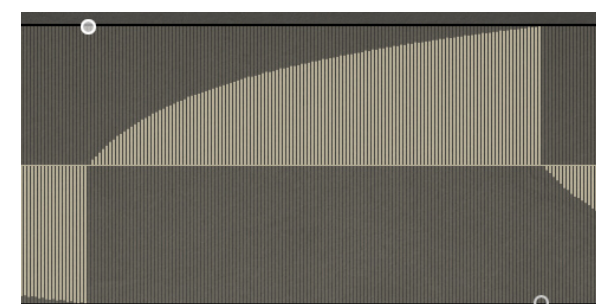
style: curve, logarithmic



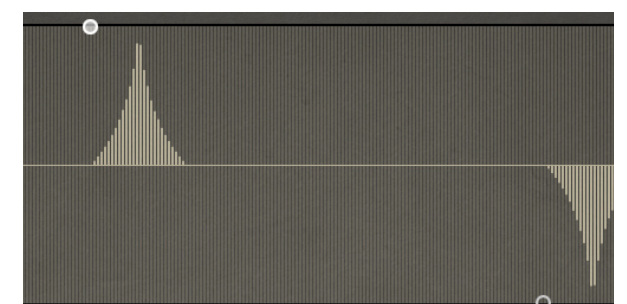
style: sawtooth, linear (exponential)



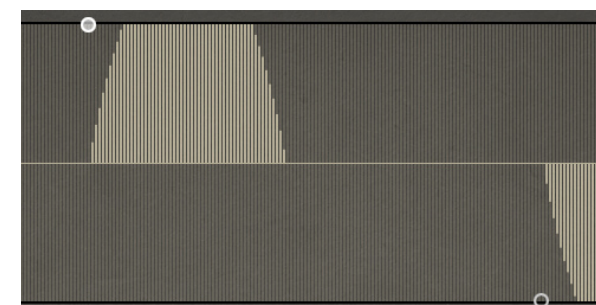
style: sawtooth, logarithmic



style: spike, logarithmic



style: peak, logarithmic

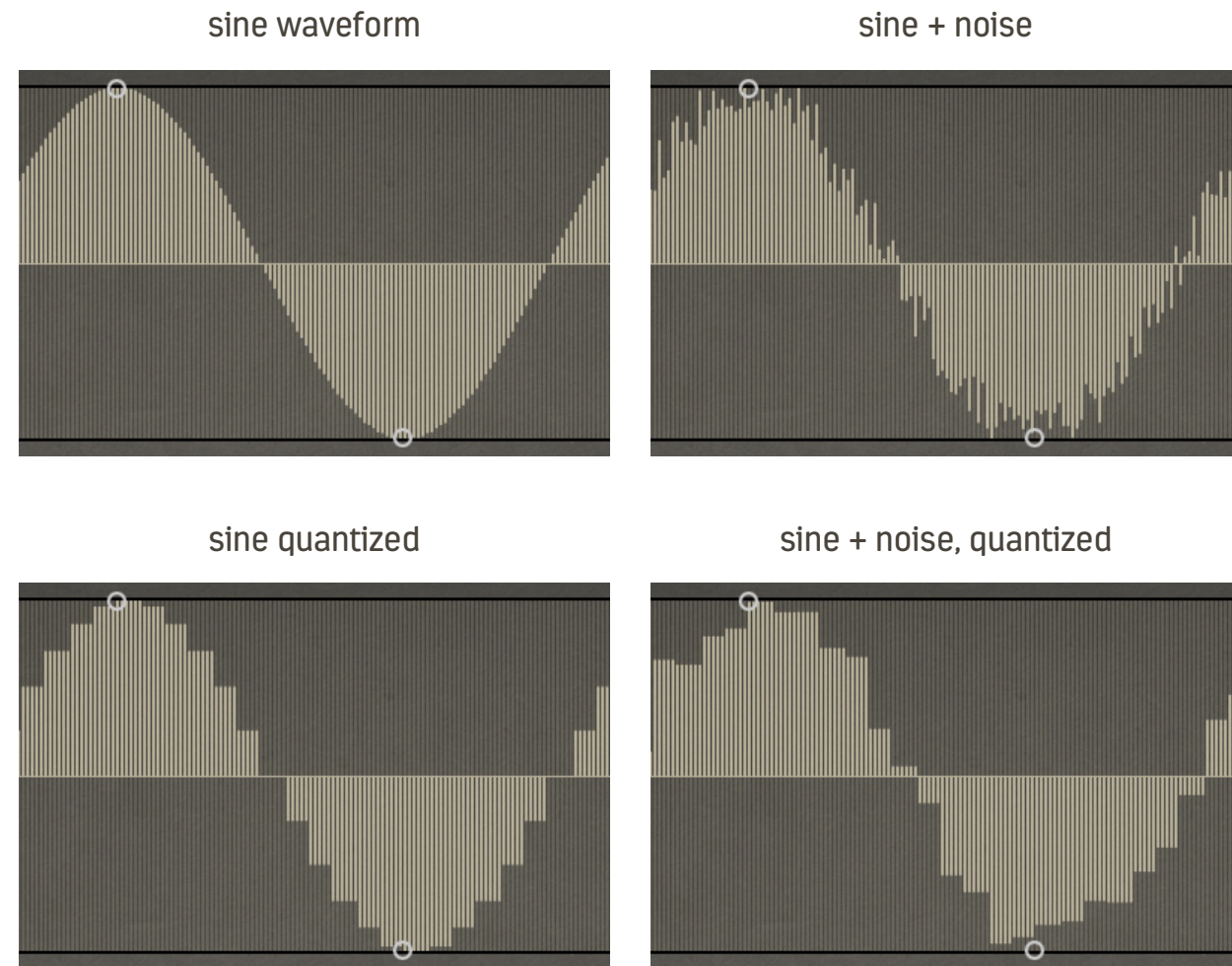


style: block, linear (exponential)



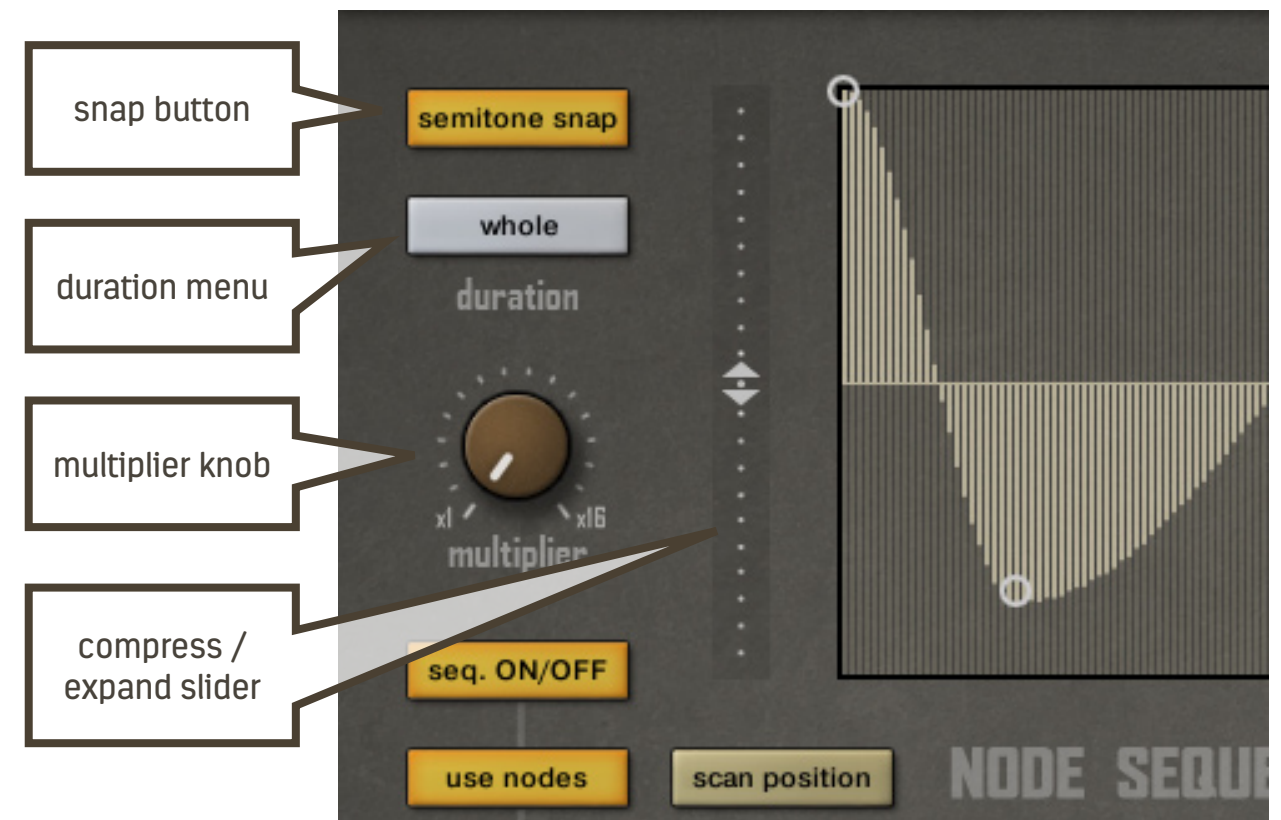
Noise amount controller will add pre-rendered noise to modulation waveform. Note that noise is not generated live, but it's imprinted into rendered waveform – each waveform cycle plays the same. You can change noise pattern by clicking on noise label under the knob.

Quantization will reduce curve resolution, just like in bitcrush effect.



Node sequence duration is defined by drop-down menu labeled **duration** and knob labeled **multiplier**. Combined they specify the duration of the whole node sequence. E.g. duration = quarter and multiplier = x3, set the rendered waveform duration to 3 quarters. Maximum sequence duration is 16x whole note, that is, 61440 ticks.

Semitone snap will virtually adjust nodes Y-axis values to a multiplier of 1/12 of waveform height. By virtually, I mean that it doesn't change node position in the box, but adjusts its value when rendering – so you will see node misaligned with the waveform preview. Obviously it's designed for tune modulation, however to make it work properly, you need to remember to keep modulation amount controller at 100%. Semitone snapping can be activated for any type of target as it can be useful for aligning the node values.



To the right of sequence duration controllers, there is **compress / expand** slider. You can use it move all nodes in the sequence toward zero line (compress), or away from it (expand). If you hold SHIFT and/or ALT while dragging the slider, the effect strength will depend on node X-position, effectively creating a sort of fade-in or fade-out.

In the middle of the UI you will find series of controllers related to editing nodes positioning.

Center node will adjust selected node X-position, so placing it in the middle point between previous and next node.

Center all, will place all nodes in the middle of waveform area (concerning x-axis), keeping distance between following nodes as is.

< distribute > – distributes nodes horizontally throughout the whole waveform, so the distance between a node and next node is the same for all nodes.

> distribute < – works similarly as the above, but distributes nodes in between first and last node.

Snap to grid work similarly to snap to semitones, but horizontally. It virtually adjusts note values when rendering the waveform.

The area with hand shaped cursor is **move tool**, drag the hand to move all nodes at once. Hold SHIFT while dragging to restrict movement to X-axis.

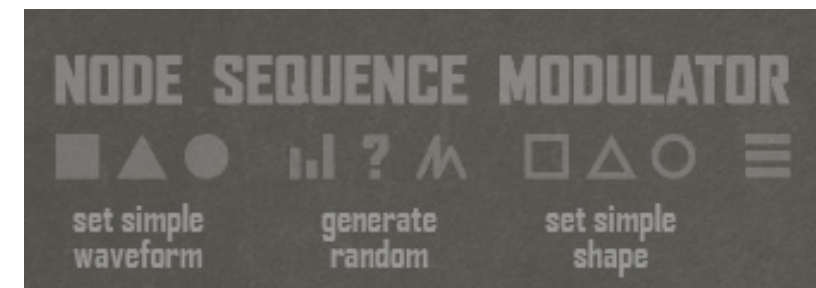
Also you can create node **groups**. Select a node and press group button to add it to group. Press the button again to remove it. Press **ungroup** button to remove all nodes from the group. You can also add/remove nodes from group by holding CONTROL key and clicking on the node.

Creating a group will restrict node editing tools like move or distribute to grouped nodes only. Also when **all nodes** button is off, adjusting node properties like shape or noise will affect all grouped nodes.



As in step sequence mode there is **zoom tool**. Although it has to be activated with a button for technical reasons as well as for the reasons of node UI logic. Press zoom button to activate zoom, then nodes and node editing controllers will disappear, instead the magnifying glass cursor will appear on the waveform preview. Press zoom button again to close zoom mode.

Also just as in step sequence mode there is a set of icon tools, which work the same way with exception of the drop-down menu which has a set of entirely different functions, including, mirror/repeat transformations, creating larger sequences (useful to avoid tapping on add node button again and again, when you want 16 node sequence to begin with). You will find align functions there as well.



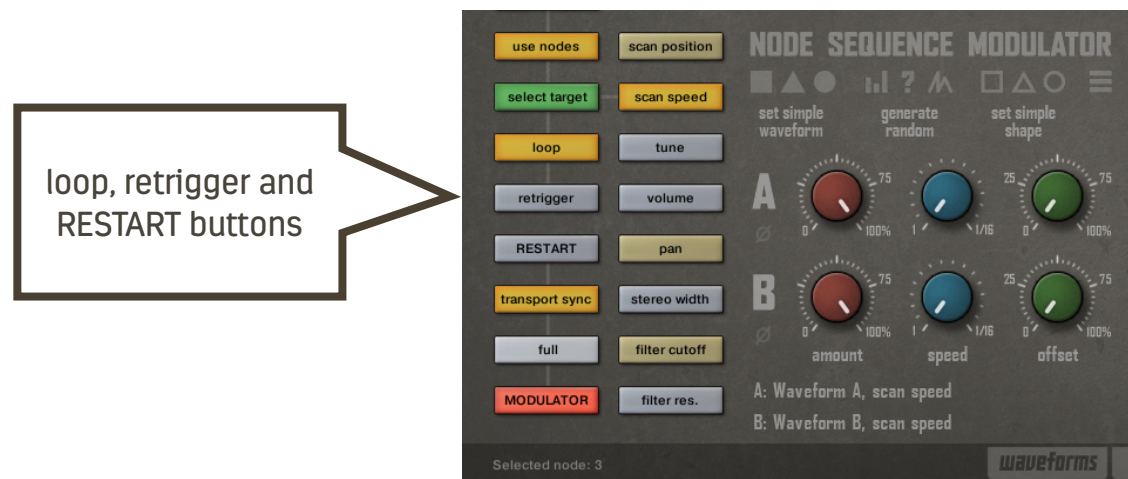
Modulator: loop and retrigger

Each modulation waveform has two option switches named **loop** and **retrigger**. Button controllers for those options are located under the modulation target menu button.

Modulation waveform starts playing when you turn the modulator engine on, or when you load the patch/snapshot, if it has been on when saving data. Then it just keeps playing. If you enable **retrigger** option, modulation waveform will be restarted (start to play from the beginning) each time there's no key being held in instrument range and you press a new key. If **retrigger** is disabled, the waveform is also restarted each time transport starts (you press play or record in your DAW).

Loop button determines if modulation waveform should be played in a loop, or as one shot. **Loop** is on by default. Switching it off makes the modulator act as an envelope rather than LFO. Also disabling **loop**, changes the way modulation waveform is rendered, that is the starting value is zero, instead of the last step value. Note that if you disable **loop** and keep **retrigger** option disabled, the waveform will only be played once, at the beginning of your DAW project (unless you turn the modulator engine off and on throughout the project or restart the engine manually).

Below **retrigger** button there is **RESTART** button. You can use it to manually restart all waveforms in modulator engine. Note that while **retrigger** is an option you can turn on/off for each waveform individually, **RESTART** applies to whole modulator, it restarts all active waveforms.



Modulator: waveform resolution

Above modulator on/off switch there's modulator resolution menu. By default resolution is set to "full", which translates to updating modulated parameters every MIDI tick, that is 960 times during quarter note duration. If CPU usage is a problem for you, you can try lowering modulator resolution, then modulated parameters will be updated less often, which results in less smooth modulation curve and somewhat lower CPU usage. It will be mostly effective when you are modulating cutoff/resonance for self-resonant filter models, like ladder or daft, which can generate noticeable CPU load.

Since release of Rekombinator II, I think it became less of an issue as computers got faster. I'd just keep engine resolution at full, unless there's a problem with CPU overload. I also added bitcrush options to the menu, crush 64th and crush 32nd, setting to update frequency to 64th note or 32nd, which will affect all waveforms. Just for fun experimentation.

Modulator: generating MIDI CC

As in Rekombinator II, you can use the modulator to generate MIDI CC. To enable this option pick MIDI CC from **select target** menu. Only output A is used in such case, also modulation amount and offset are disabled. Output B remains unused. Each waveform has unique CC number, first is assigned to CC#20, second to CC#21 and so on. The sequence range value is not bipolar for this case, although it will be displayed in the same manner as with other targets.

If you want to use it to automate external instruments make sure that "engine / send MIDI to outside world / script generated CC" is selected in Kontakt options. Also you will need to make sure Rekombinator is playing (use latch), as modulation engine will turn itself off when noting is being played to save CPU.

Filters

In filters panel you will find effects and filters that I thought would be generally useful for shaping the instrument sound. All effect in this panel are permanently inserted in signal chain, but they can be bypassed. Each effect has separate controllers for sample waveform A and B. Effects can be turned on and off by clicking on effect name label. As anywhere else in the instrument, if the effect is turned off, related controllers will be shown as semi-transparent.

Small icon between effect names is link button. When link is active, all changed applied to section A will be also applied to section B and vice versa. In case of pan controller the changes will be reversed.

Available effects are:

Filter – main filter, with all filter types available in Kontakt 6.

Shape – combo of saturator and transient shaper (attack and sustain).

Trim – simple HP/LP filter, just low cut and high cut controller, useful to tame excess of output in lowest and highest frequency range.

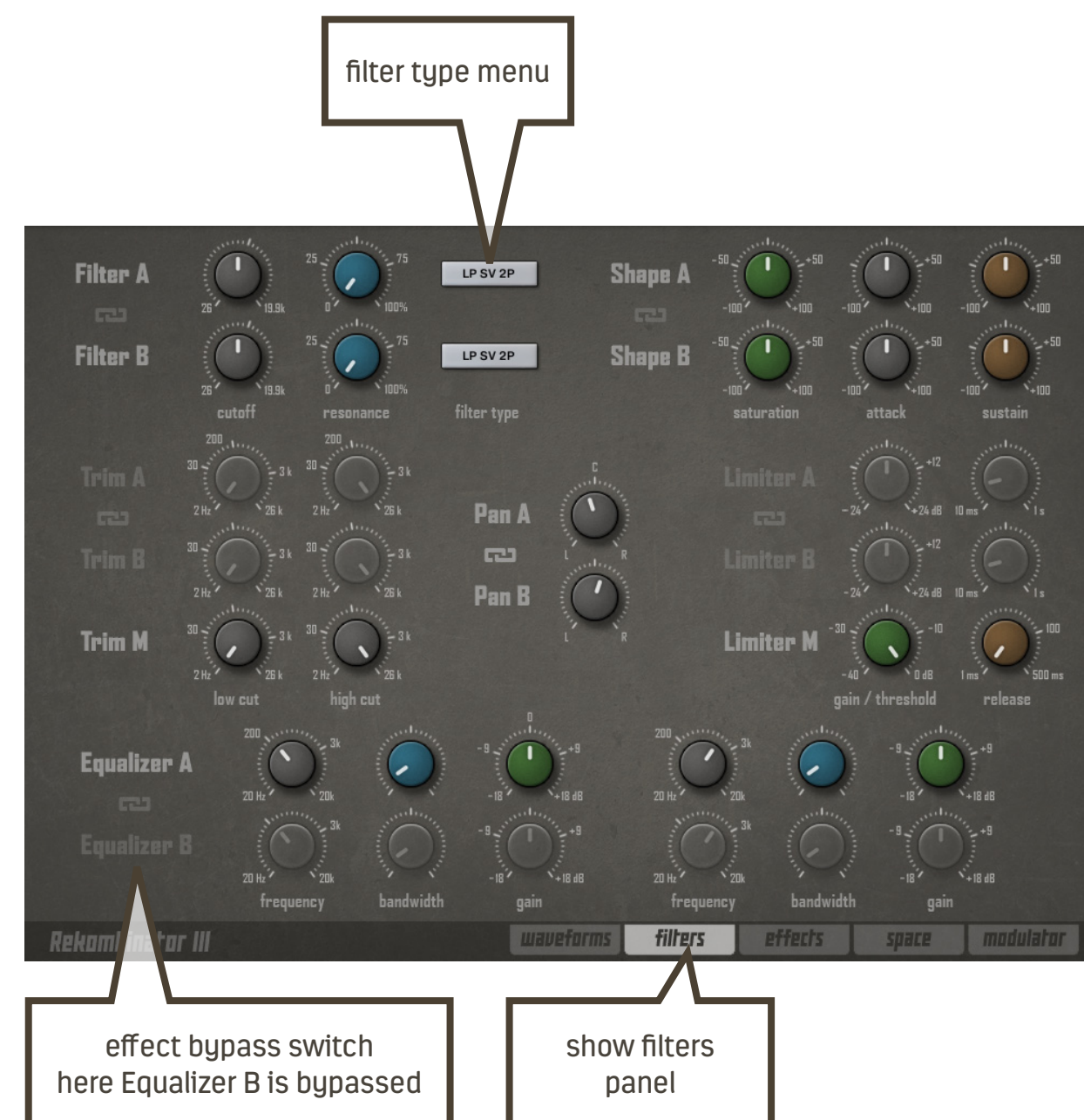
Pan – not an effect, but stereo panning controller. It was missing in Rekombinator II and main panel was way too clogged already, so it landed here. This can't be bypassed.

Limiter – use to shape dynamics, also useful as additional gain level.

Finally there is **two band equalizer**.

Trim and limiter have third set of controllers (besides A and B), labelled M, as Master. Master section is inserted at the very end of the signal chain, after the return point from send effects.

So there's more than just filters, but I decided to keep panel name as it was in previous version of the instrument.



Effects

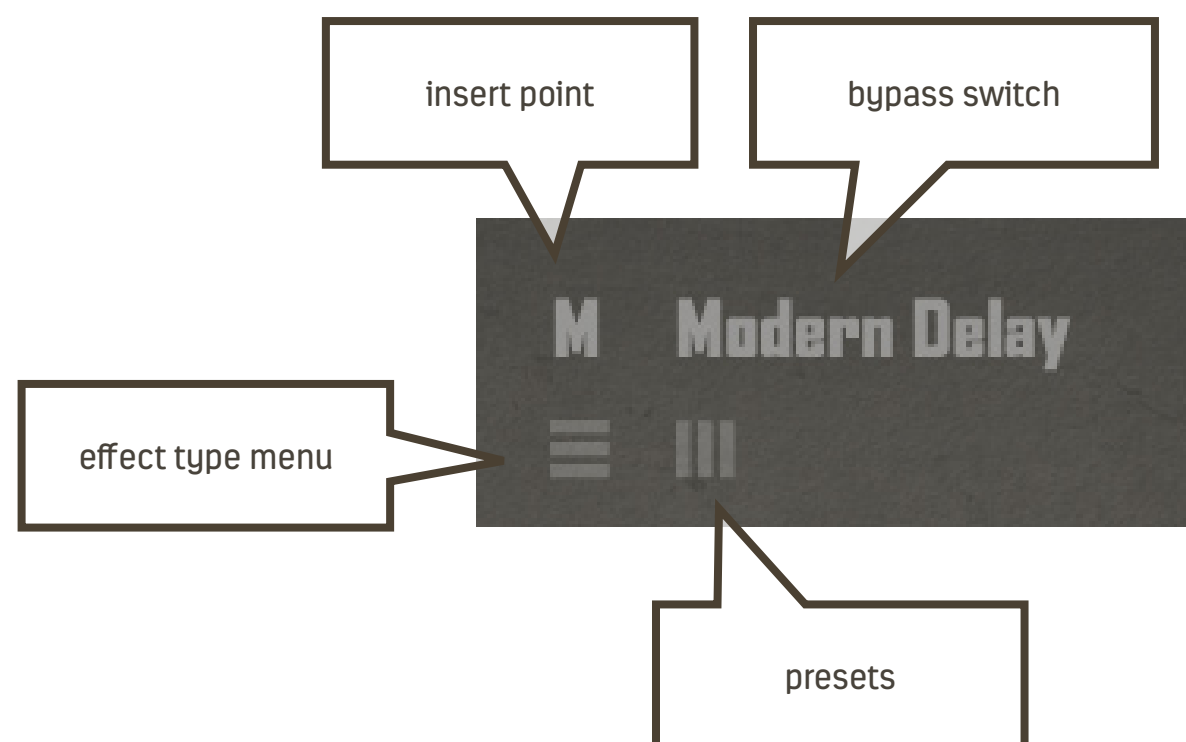
Effects panel is insert effect section. There are 4 effect slots and you can pick effects you like from a list, or have no effects at all.

Available effects are: Choral, Chorus, Delay, Flair, Flanger, Formant, Phaser, Phasis, Rotator, Stereo Modeler, Supercharger, Tape Saturator and Wah.

The delay comes in six flavours: Analogue, Diffusion, Digital, Modern, Tape, Vintage. Digital mode is Kontakt legacy delay and other variants are modes of Replika Delay. I decided to split those into separate effect types as they do have different controller sets.

Similarly Flair is split into three flavors, regular, thru zero and scan.

Each slot has 4 main controllers, insert point, bypass switch (which is represented as effect name, just like in filter panel), effect type menu (where you pick which effect to use) and preset button which will invoke presets window.



There are five insert points to choose from:

A or B – insert effect only in waveform A or B path, before send point, so the effect output will be passed to send effects.

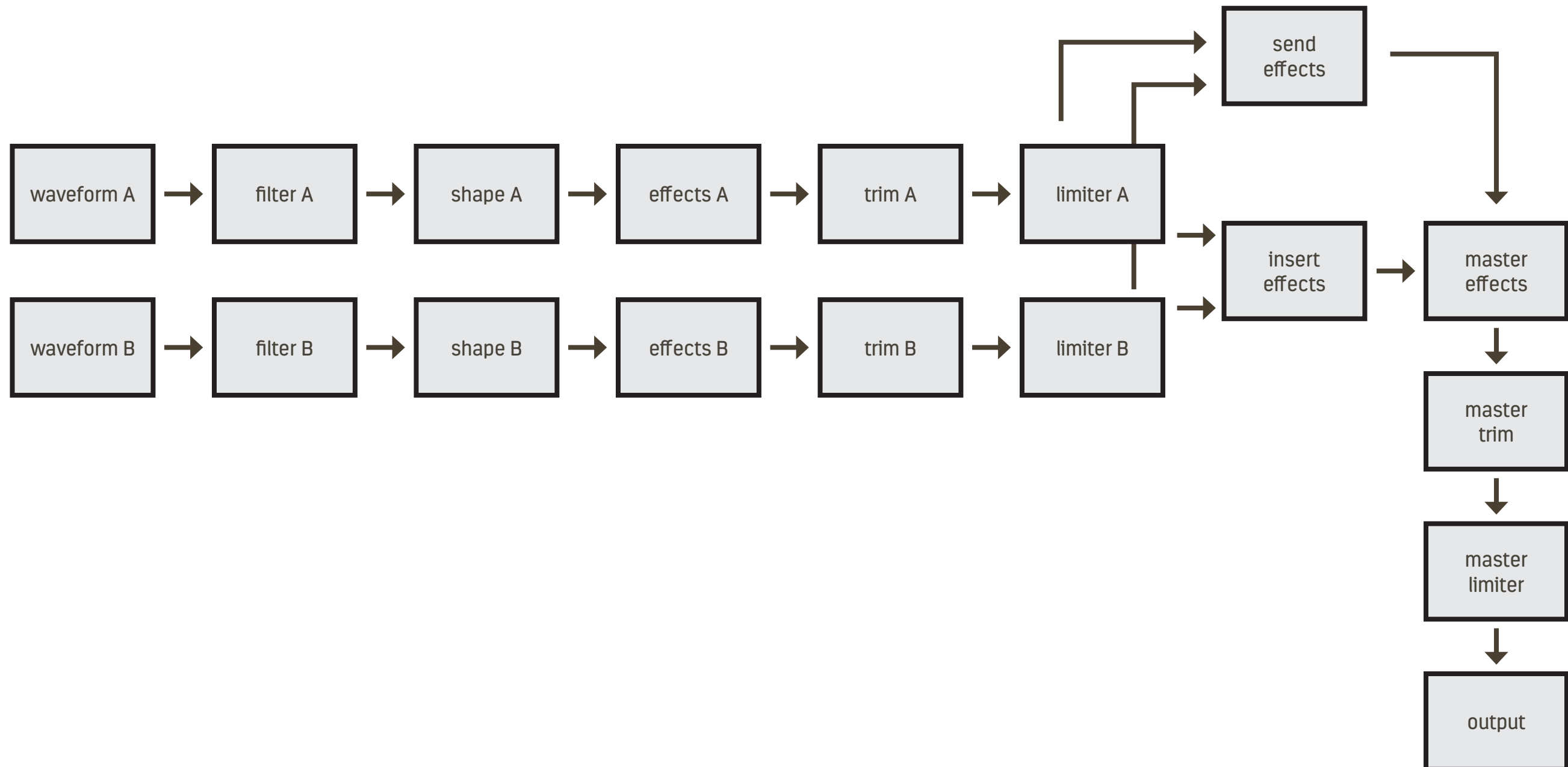
A and B – as the above, but inserts the same effect in both. Basically you have two copies of the effect processing A and B independently, but sharing the controllers.

int – insert, after summing A and B paths, after send point, the effect output will not be passed to send effects.

M – master, at the end of signal chain, after the send effects return point.

Signal chain

And this is how signal chain looks like, hopefully it will help to grasp the meaning of effect insert points.



Effect presets

Each effect comes with a set of presets, which you can load using preset window. When you click on preset button it will show you the list of available presets for given effect, just click on preset name to load it.

You can also save your own presets. Set the effect controller the way you like and click on **save new preset** button. You can have up to 256 presets for each effect type.

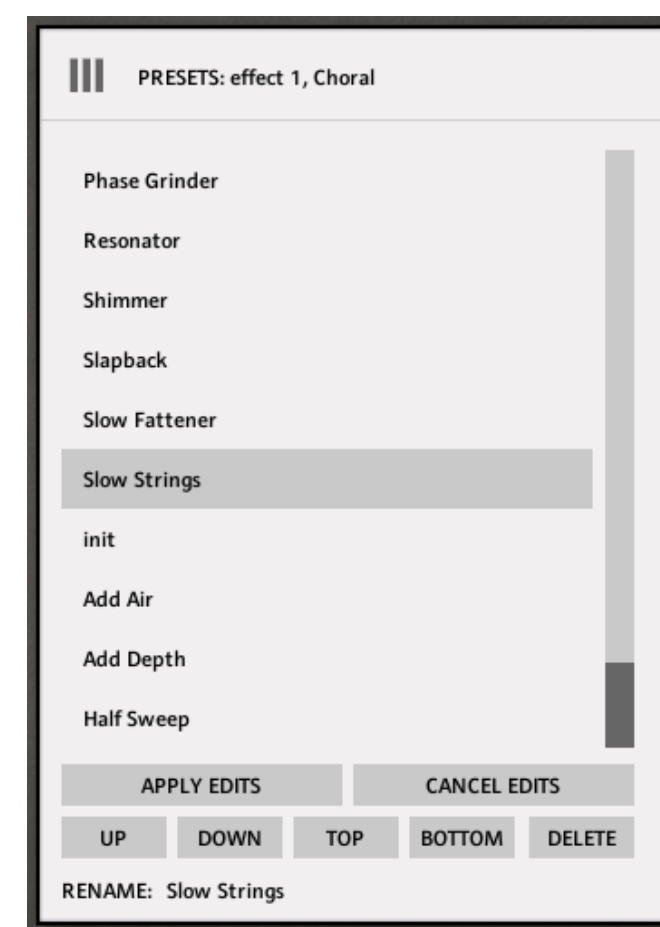


Once you save a preset, you can change it's name, click on preset name after "Rename:" prefix just under preset save button and type in the new name. Note that Kontakt's text input can be somewhat buggy, you may need to stop playing the instrument to be able to type in the text.

Presets are saved to files located in /data/ folder where the instrument nki file is located. The data is loaded each time the instrument starts, so it should be available in any instrument instance, once it's restarted.

If you need to organize your preset list use edit presets button. In edit mode you can manually sort presets moving them up/down/top/bottom of the list (there's no text processing in KSP, so no automatic sorting, sorry). You can also rename or delete existing presets.

When finished editing press **apply edits** button, then all presets will be saved to files in data folder. Or you can **cancel edits**, then nothing will be saved and the instrument will reload presets, so you will get to state before activating edit mode.



Note that **apply** and **cancel** buttons are the only exit points from preset edit mode, windows close button is not available, also switching panels is disabled. Don't panic and decide whether to save changes or not.

A note about delay: delay is only effect shared between space and effects panels. When inserted in effects panel there will be dry/wet controller, when you can sweep between full dry and full wet mix. This is not available in send mode, where you have send/return levels. Dry/wet parameters, as well as send/return, are NOT being saved in presets.

Secret key combo: hold SHIFT and CONTROL, then click on a preset to select it for editing the name without loading the preset data. Select a preset, then after you modify it hold SHIFT and CONTROL and click on save preset button to overwrite selected preset. Use with caution.

Space

Space panel contains send effects, it is organized in similar way as in effects panel. You have three effect slots where you can load effects from a list, fourth slot space is occupied by send and return level controllers. The difference from effects panel is that you cannot remove effect and have an empty slot.

You can insert a delay or reverb of choice into each slot. Delay types are the same as those in effects panel. Reverb has four types: convolution, hall, plate and room.

As in effects panel you have bypass switch, effect type menu and you can invoke preset window.

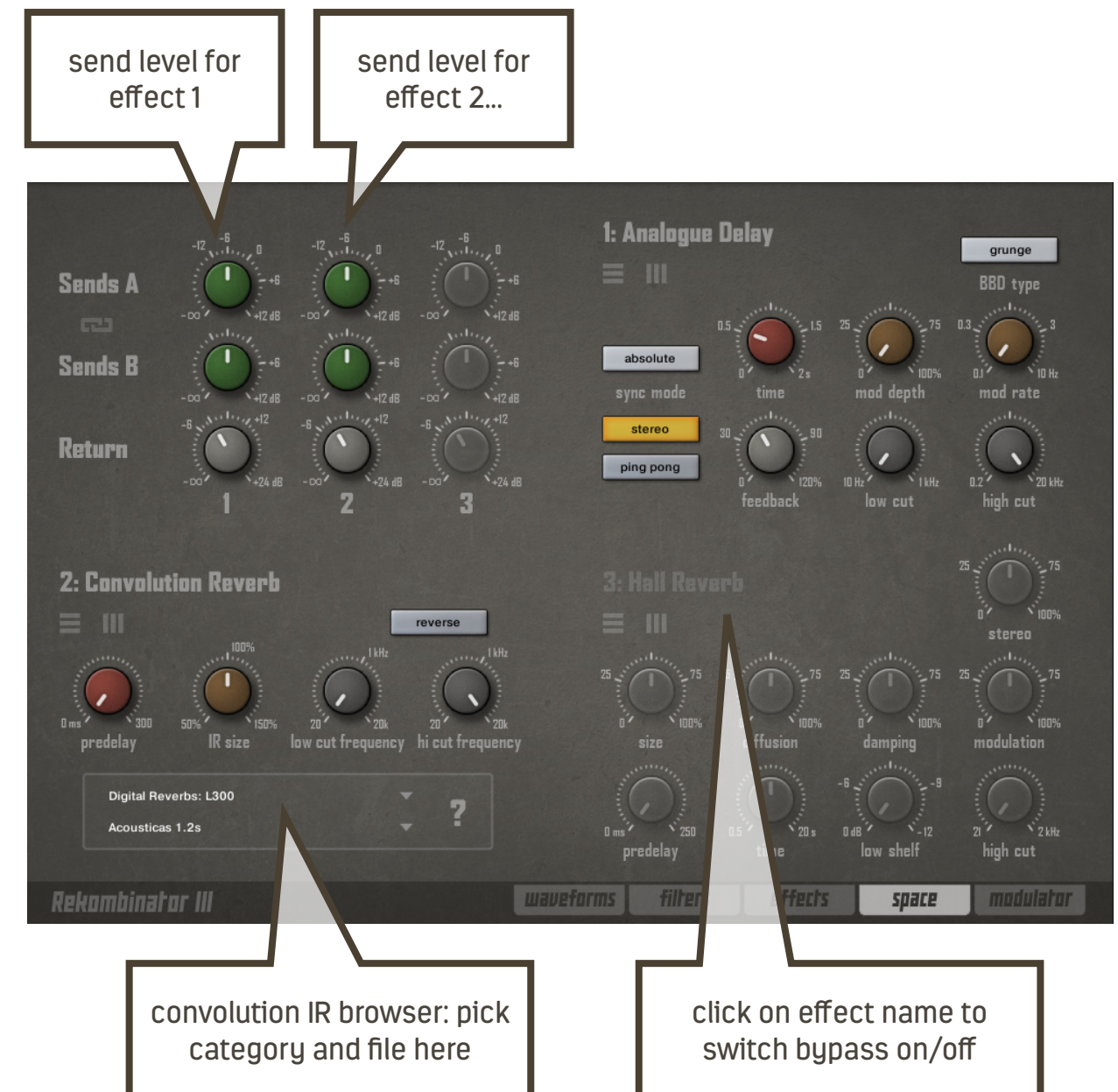
Notes on convolution reverb:

Rekombinator III doesn't come with any custom IR files for convolution reverbs. It will use Kontakt's factory library which should be part of Kontakt installation. IR browser contains shortcuts to all of factory files excluding cabinet section. Press ? button to load a random IR from Kontakt's library.

You can use custom IR files, just drag'n'drop the file onto IR browser area.

You can save convolution reverb presets, and they should work with user IR files, just as long as the file stays in the same location.

Convolution controllers cannot be automated or attached to modulator. Tweaking them make Kontakt recalculate the whole IR file which is a heavy CPU operation. Automation or modulation of those would likely result in breaking/stopping Kontakt audio engine.



Notes on send level controllers:

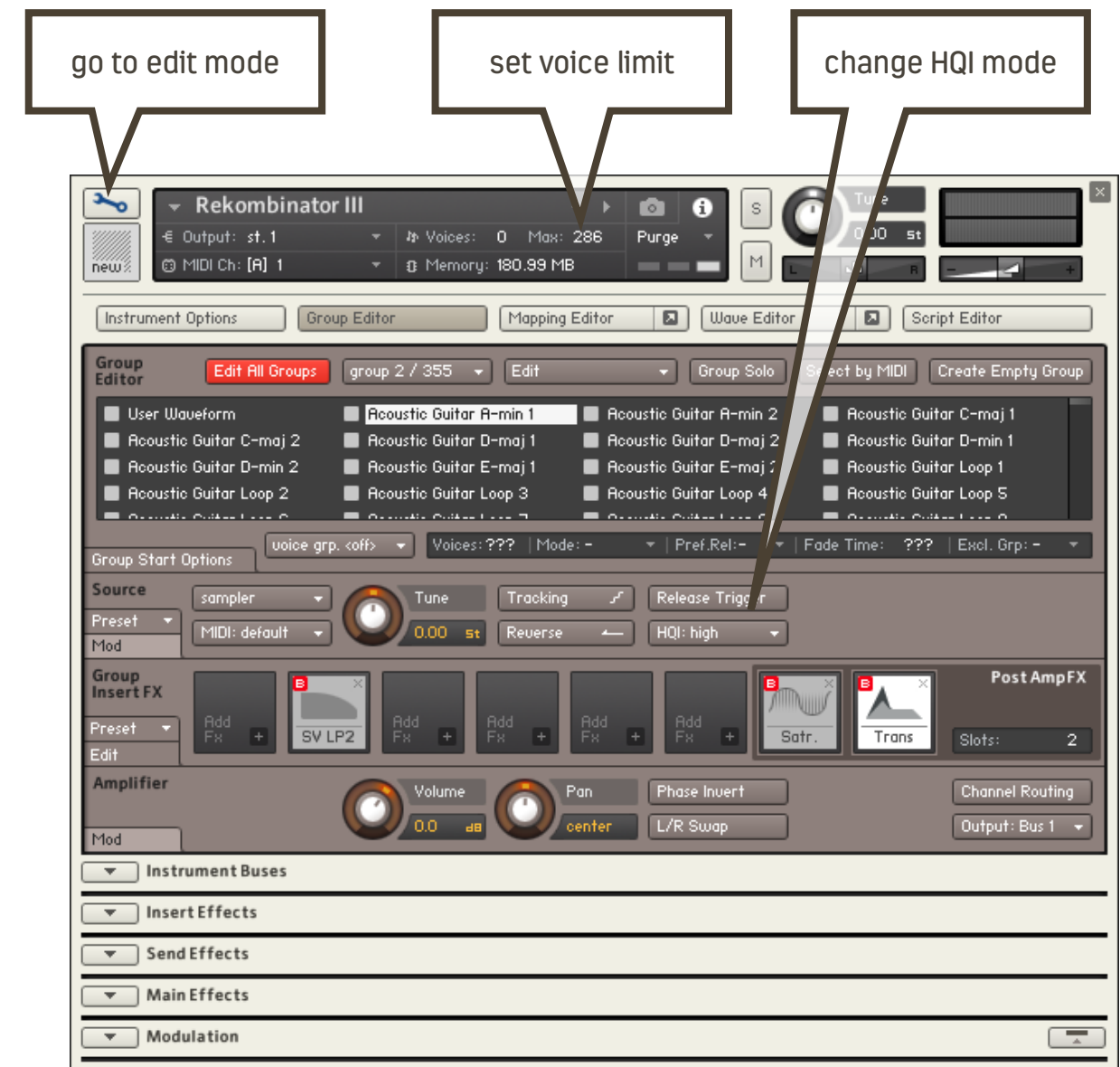
You can bypass whole send section, press Send A label to bypass waveform A send point. It's a quicker way of disabling it than turning all three knobs down.

You can link A and B sections of send controllers, in the same way as can link controllers in filter panel.

CPU load

Rekombinator III can generate fairly high CPU load. It should not be too much for any half-decent modern processor (my 6 core CPU is more than 10 years old and it doesn't go beyond 50% CPU with the most extreme patches). However if you need to lower CPU drain and you don't mind slightly lower sound quality, here's what can be done to lower CPU load.

- Turn down grain size and grain shape controllers, this way the instrument will generate less grain overlaps which equals less voices.
- You can lower voice limit in Kontakt from default 286 voices. This way Kontakt engine will keep voice count down.
- Change HQI mode (High Quality Interpolation) from high to standard. Rekombinator III may be using some extreme pitch changes which can generate noticeable CPU drain for high pitches. Note that in offline mode (when rendering DAW project) Kontakt is always using the best quality mode for HQI. To change this option you need to get into edit mode.
- Don't use convolution reverbs. They can generate significant CPU load, especially when both are enabled.
- If modulator is in use, lower modulator resolution.
- Don't use multiple instances of Rekombinator.



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Rekombinator III has been created by Marcin Gruszczyński.

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