

Sound Design Concepts PDF



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Foreword

This is a collection of all the techniques demonstrated in my Sound Design Concepts Series.

There is no particular order to these, you can jump around as you like.

The descriptions are kept as minimal and concise as possible, what you make of these techniques will be up to you, only after trying them in practice will you really know them.

Check out the youtube series for video and audio demonstrations.

Thanks a lot for your support!

1. Filter Movement for Wah and Brass Sounds

Simple Filter Movements are behind two very popular sounds.

A Wah-Pedal is nothing more than a modulated bandpass filter, you can use either the incoming

sound's envelope or a midi triggered envelope to change its cutoff.

Setting the cutoff frequency and modulation range right will make a big difference for getting the right sound.



What is often described as a “Brassy” sound, emulating a trumpet or something of that sort, is the same effect applied to a lowpass filter. Quickly modulating a completely closed lowpass filter up with a midi envelope on e.g. a saw wave will get you this effect.



2. Comb Filters for Physical Modelling & Karplus-Strong Synthesis

A Comb Filter is nothing more than a very short delay. Setting the comb's cutoff frequency, which is equivalent to a delay's delay time, you can tune it to a note. For high feedback values it will now ring out and produce a note, if you input e.g. a very short transient sound.



If we want to keytrack this, we need a comb filter we can modulate using semitone values, like the one in Vital or the one included in Bitwig's Filter+.



If the Comb filter also has a damping control, we are now using Karplus-Strong Synthesis, a very popular technique for physically modelling all kinds of plucked strings.

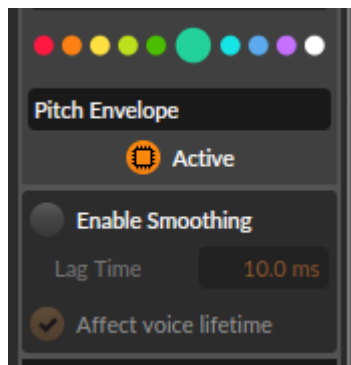
3. Transient-FM with Noise

When synthesizing a kick drum using a simple sine wave with a pitch-envelope, I often like to FM/Phase Modulate this sine with a short burst of noise at the

very beginning. This will help enhance the transient of the kick drum.



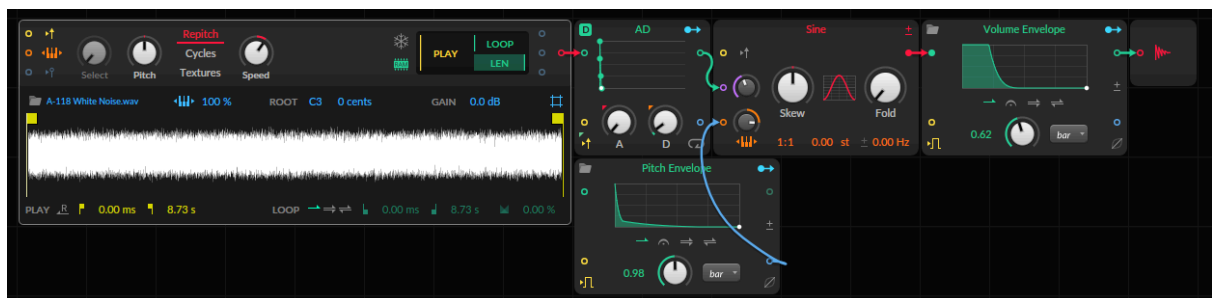
Make sure to disable smoothing on all envelopes you're using for maximum precision.



If you need consistent results, you can use a sample of white noise instead of a random noise generator instead. This ensures that you get the same piece of white noise every time.

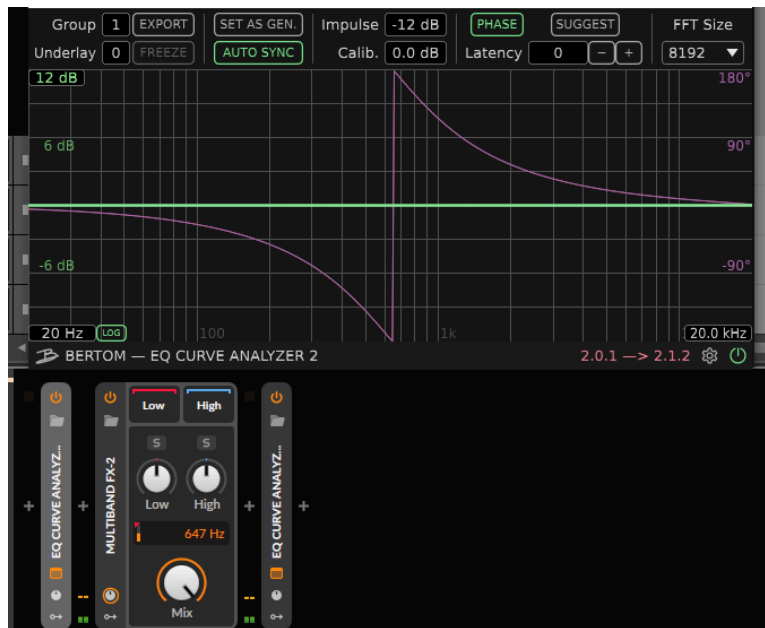
Vital does this automatically, it doesn't have a truly random noise source, in

Bitwig's Grid your setup will look something like this, the white noise module has been replaced with a sampler.



4. Allpass Filters and Dispersers

An Allpass Filter is a filter that only affects the phase, with a neutral frequency response. One way to get this effect is to use any simple multiband split, like Bitwig's Multiband-FX, or Ableton's EQ-3 or a neutral Multiband Dynamics.



If we stack these, we can get a fun frequency specific delay effect that has a strange squishy, rubbery wet character to it. Understanding it intellectually is much less of a priority than just listening to it yourself and getting a feeling for its sound.

The more allpass filters you stack, the more obvious the effect gets. It can't hurt to overdo it a little at first to know what to listen for.



There are a variety of plugins that will do this for you. The OG is Kilohearts Disperser, a free and more flexible alternative is robbert-vdh Diopser, there are probably a few others out there as well.

You can also get similar effects using something like MFreeformPhase.



5. Punchy Pitch Envelopes

Pitch Envelopes are a great way to make your synth patches more punchy, especially if the base oscillator is a sine wave.

This is how to turn a sub-bass into an 808 and it's also at the very core of most kick drum synthesis.



Getting this pitch envelope and the volume envelope right is what will make or break your kick drums,

so it can make sense to use an MSEG-style envelope that offers the maximum amount of control (see Bitwig's segments).

6. Bass Noise

Layering your sub-basses with some noise can have multiple benefits, including increased audibility on smaller speakers, more top-end presence and just a generally more powerful sound.



Ideally you want to somehow modulate this noise volume to glue it to your sinewave-ish bass sound.

This can be achieved in a variety of ways, the simplest is saturating the noise together with your bass. This will cause the two sounds to intermodulate and make the noise take on a pseudo-pitched quality.



Another technique that offers more control is to use ring/amplitude modulation to make the gain of the noise move with individual wave cycles of the bass.



Doing this in a parallel chain and then adding the noise to the bass will allow you to further process and filter the noise.

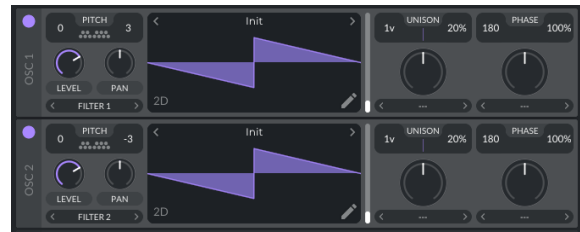


If you do not have access to Bitwig's Audio-Rate Modulator, you can use Ringmod Plugins like the free kHs Ringmod for a very similar effect.



7. Detuned Saws & Reese Basses

Adding two slightly detuned saw-waves to each other will result in a lot of movement, as the close but not identical pitches phase against each other. This is what turns a saw-wave into a Reese bass.



Doing this with more than two voices that are all panned slightly differently is called Unison, a staple in most synthesizers.

8. Dynamics Processing for Glue

Processing the dynamics of two sounds together will modulate their volumes in a synchronized way, this will make them sound more like a single sound.

The classic example of this is a glue compressor on the mix bus, but we can go beyond that.

Any kind of dynamics processing can function as a way to glue sounds, be it limiting, compression, gating, or expansion.



An alternative if you do not want to process on a Group/Bus is to use sidechain processing, e.g. expanding Sound A with a processor that is listening to Sound B in its sidechain input.

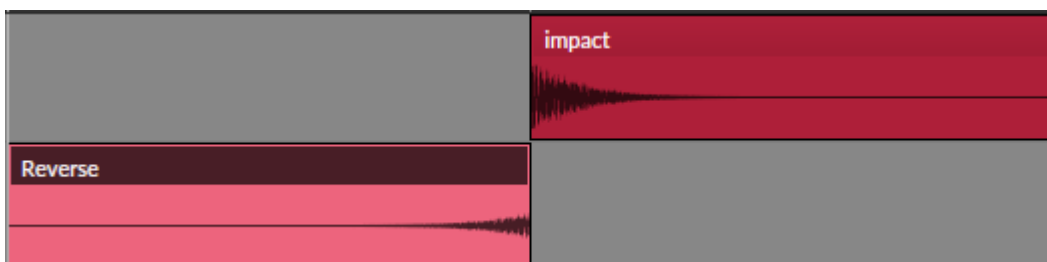


Sound A will be following the envelope of Sound B, the two move together as a unit and have been "glued" together.

9. Reverses for Anticipation

A simple way to create anticipation for a sound is to lead into it with a reversed version of itself or another's sound. This creates a fade into the sound, the listener will form an expectation before the sound hits and the hit can feel more impactful. Essentially this is a micro version of a tension and release relationship.

Processing the faded sound and limiting its frequency range as well as having it a little quieter will prevent it taking away from the impact transient.



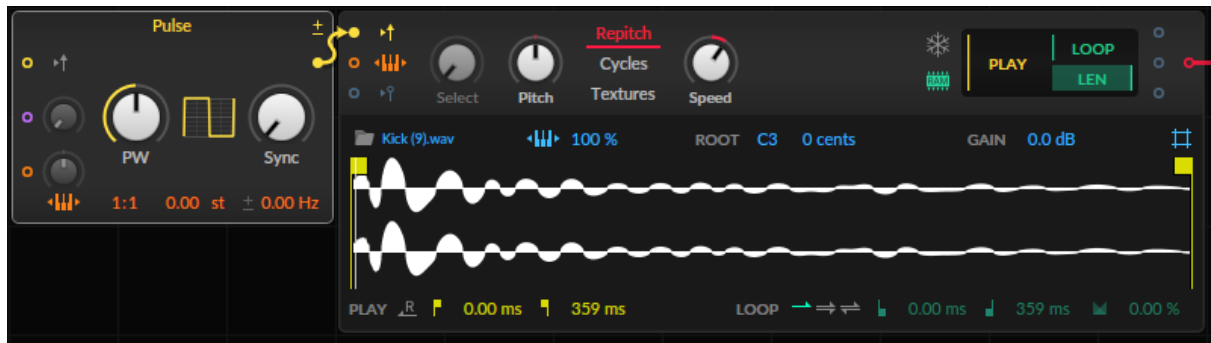
10. Tuning a sound using fast retriggering ("Bicycle Spoke Synthesis")

Pitch is nothing more than a fast, regular repetition. The frequency of this repetition determines the note we hear.

Very quickly repeating a sound therefore is a way to give it a pitch. For different

notes, different lengths of the sound will be playing, making this fundamentally different to pitching a sound by changing its playback speed.

A simple way to make this repetition pitched is using a square wave as a trigger in Bitwig's Grid.



You could also use a note-repeats device set to pitch mode (see the little tuning fork)

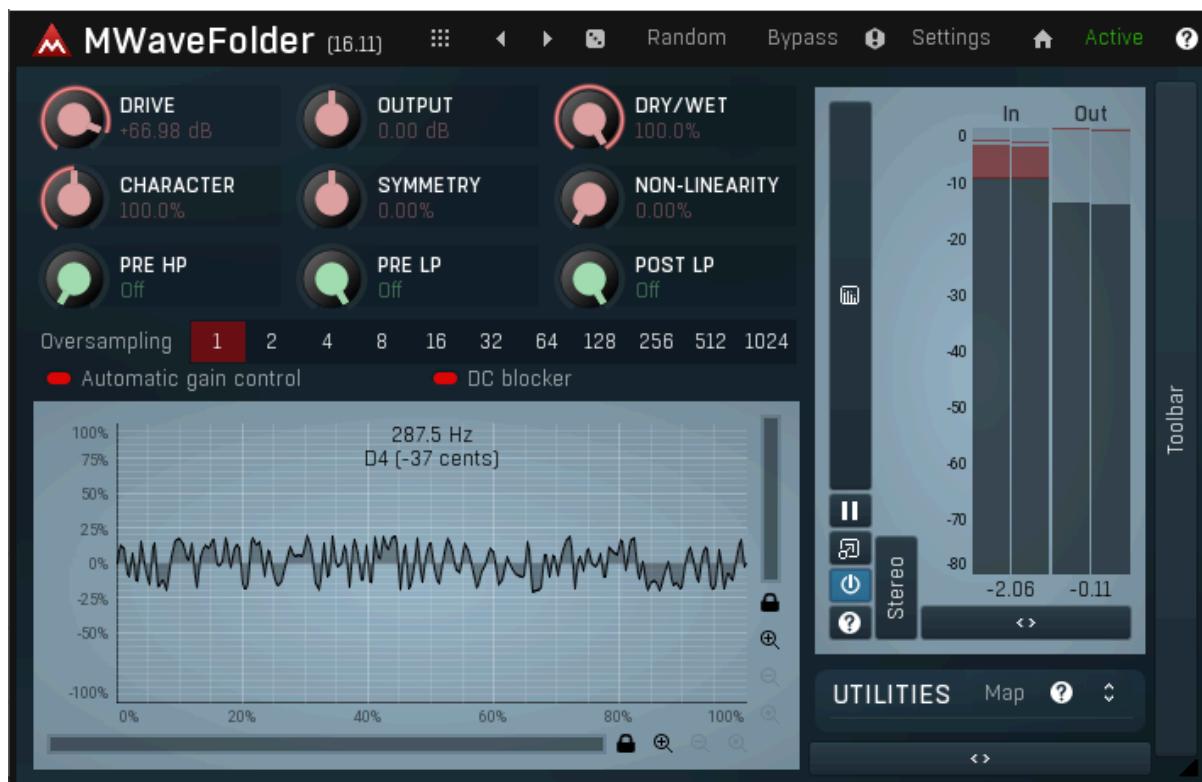


You can think of this as a kind of synthesis equivalent of the fx-based tuning with comb filters, which, being based on delays, are also just using fast repetitions of a sound. There are subtle differences here however, because with a comb filters the repeated sounds will overlap, here they will not.

Implementing this in another DAW or Synthesizer might be tricky, but probably not impossible. You will need to figure this out on your own.

11. Wavefolder Noise

Wavefolding a sound very aggressively (with high drive) will result in a white noise like sound, that is still based on your original sound. A great plugin for doing this is the free MWaveFolder.



Doing this in parallel can be a great way to create interesting Noise Layers for your Bases.

See Chapter 6 for techniques for processing this noise further.

12. Resonant Bandpass Filters

A Bandpass Filter with a very high Q-value will start to ring and act as a resonator.

This can be a way to tune a sound. Adding multiple keytracked bandpass filters in parallel tuned to e.g. an overtone series can be a way to create a simple physical modelling patch.



13. Processed Parallel Reverbs

Adding your reverbs in a parallel chain will allow you to process them in various ways to clean them up before adding them to the original sound. This is somewhat equivalent to a send, with subtle routing differences.

This can include things like ducking the reverb based on the dry sound, compressing, distorting or eq-ing the reverb or using pretty much any other processing technique you can think of.



This will allow you to get a lot more control over the sound of your reverb.

14. Fast Gritty Tremolo

Very fast tremolo will stop sounding like a volume LFO and become a grainy, textural effect. This can be a great way to add grit to a sound, it's reminiscent of the grain envelopes of granular fx or the intermodulation buzz caused by aggressive distortion.

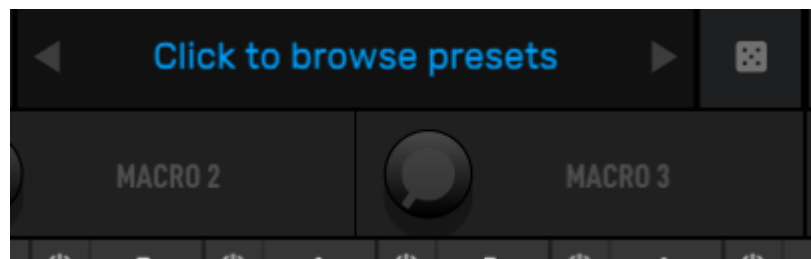


Again using this in a parallel chain will grant you deeper control over your grit layer, allowing you to e.g. eq, pitch shift, distort or layer in noise.

15. Jumping between Presets for Glitch

Recording a tracks audio output while jumping between the presets of a multi-fx plugin can result in some very interesting glitchy movements you would never think to design yourself.

Especially useful for this are plugins that provide a button that randomly selects a new preset, like this dice icon in Devious Machines Infiltrator.



16. Pitch Shifters for Upper Presence

An alternative to boosting the highs of your sound with EQ can be to layer in a pitch shifted version of it.



Different Pitch Shifters can have drastically different sounds and none of them will be perfectly clean, so it can be helpful to know a few different alternatives and their characters.

Most of them will fall into two categories, they will either use granular or spectral processing to achieve their effect.

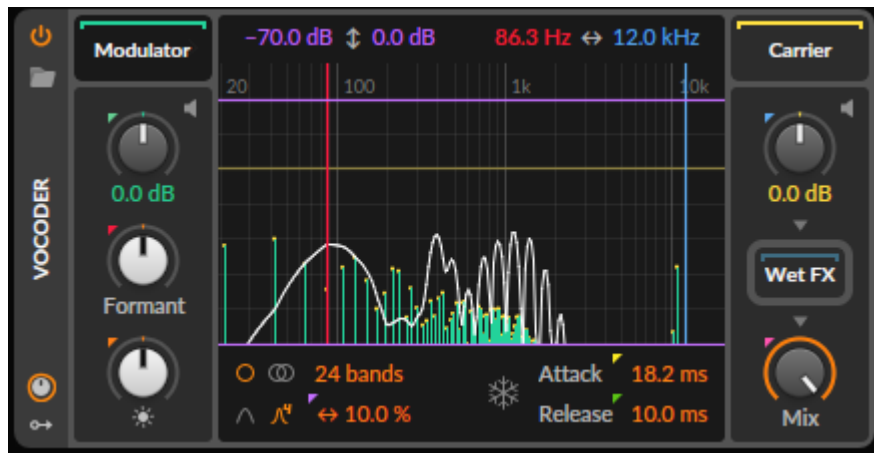
Spectral Pitch Shifters will have a washyness to them, while granular pitch shifters will sound rough and coarse. Even inside these categories there can be a lot of deviation tho.

A few I use include Bitwig Stock(granular), BlepFX Prisma(spectral), Soundtoys Little Alter Boy(granular-ish?) and the free khs Pitch Shifter(granular).

It will be up to you to pick the right one for the sound you're going for, it's not necessarily a matter of better or worse, just of different sonic characters and textures.

17. Colour Bass Vocoder

A Vocoder is nothing more than a bank of bandpass filters and envelope followers. Using the same sound as both modulator and carrier of the vocoder (for ableton users: modulator mode), and then using really narrow bandpass filters we can get a spectral, shimmery resonant kind of sound reminiscent of the colour bass aesthetic.

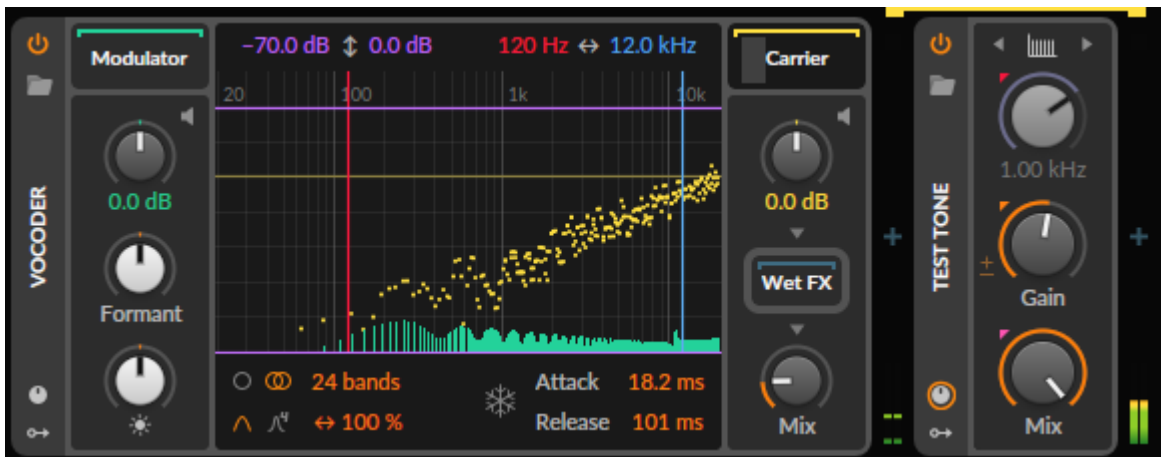


18. Enveloped Noise

Layering a sound with some noise can be a good way to add brightness or a tail. To make them sound coherent, you will often want the noise to follow the general envelope of the original sound.



To get a more detailed envelope, you can do the same in multiband, which is exactly what a vocoder is designed to do. Use your original sound as the modulator, the noise as the carrier and set the attack/release as desired, then layer in the vocoded noise to the original sound.

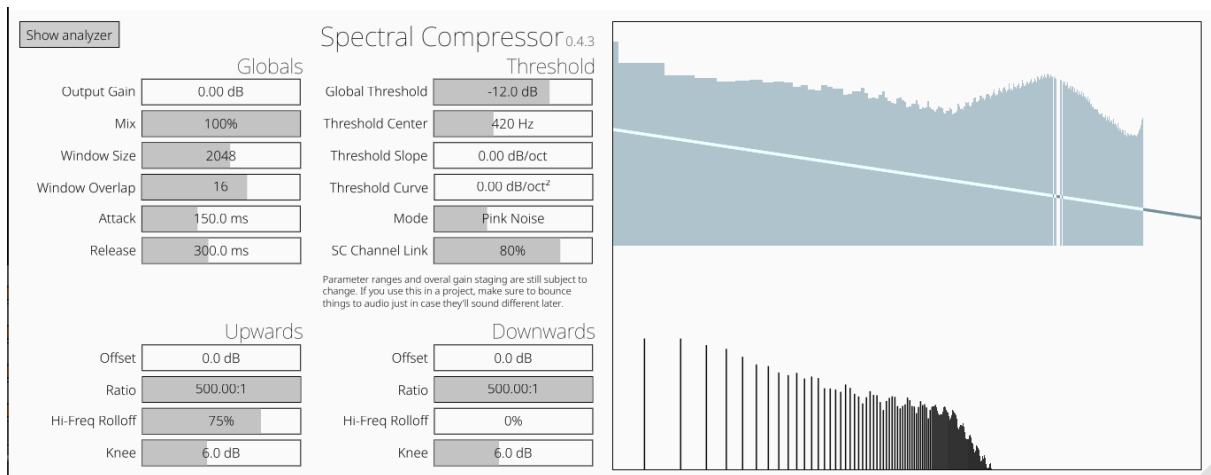


19. Discovering Inaudible Artefacts

FX processors often create some very quiet artefacts that are barely audible. Using extreme compression we can bring them up to an audible volume and use them for our sound design.



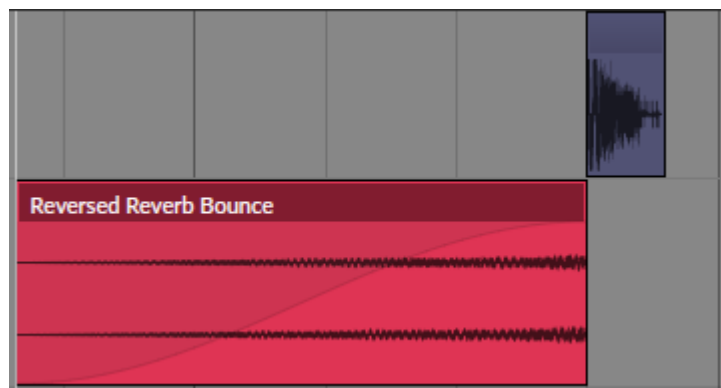
To get even more aggressive we can also do this in multiband, using an OTT like effect, or even using a spectral compressor with extreme ratios and fast attack/release.



Some part of what comes out may be artefacts caused by the compressor as opposed to the original effect. I personally don't care as long as it sounds cool tho.

20. Reverse Reverb Risers

The oldest trick in the book. Add a long reverb to a sound, bounce it out, remove it from the original sound, then reverse the bounced reverb to use it as a fade-in to the original sound.

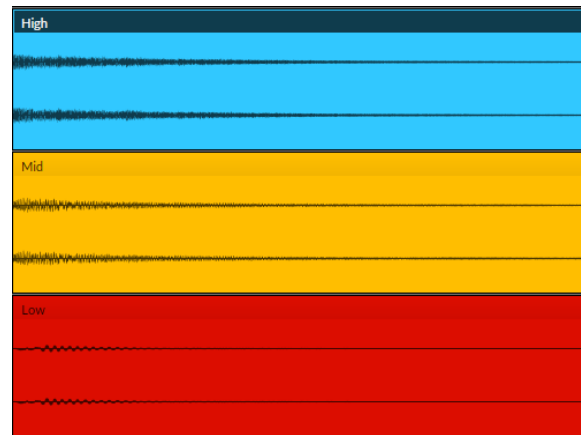


This can also work with other ways to add a tail to a sound, like delays or granular processing. Try out reversing the sound before bouncing the reverb or processing the tail further in whatever way you can think of. There are a lot of variations on this technique.

21. Multiband Envelope Bounces

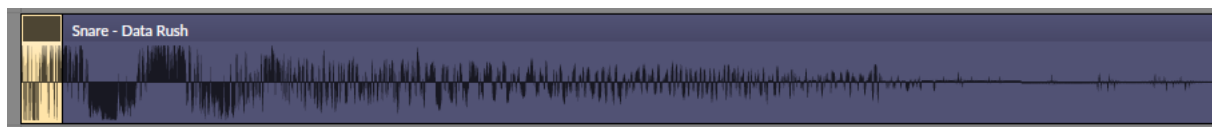
You can bounce out the bands of a multiband split individually while soloing them, to gain further control over the different frequency areas of a sound.

This can be useful for editing their envelopes individually.



22. Boosting Transients

A way to enhance your transients without using a transient shaper is simply cutting the drum clip right after your transient and changing the gain of the transient part of the sound.



Adding a clipper to the sound can help control its peak levels and convert the added dynamic energy of boosting the transient into harmonic energy (driving the transient harder into the clipper).

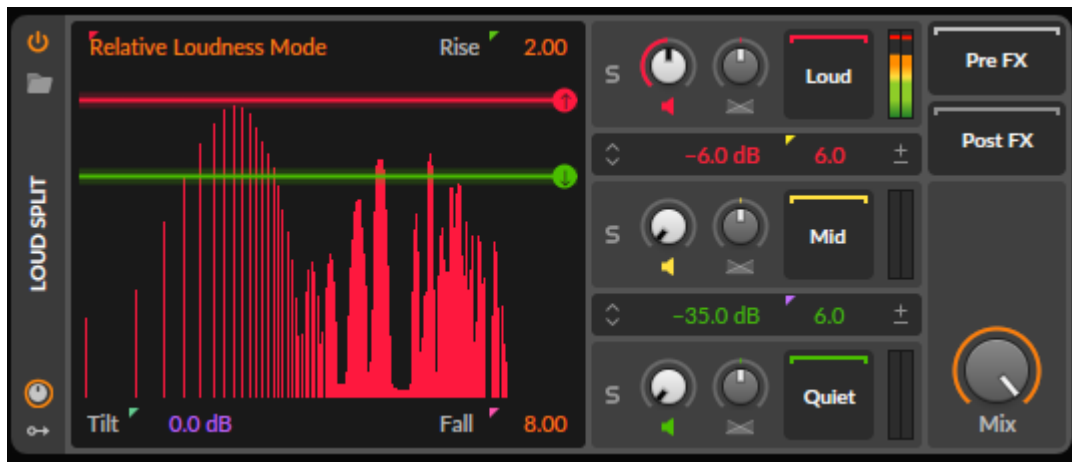
You can also experiment with changing the transients pitch, while you're at it.

23. Spectral Gate

A spectral gate acts like a normal gate in that it only lets the louder parts of a sound pass, but instead of acting on the full spectrum it works in the frequency domain to treat each frequency individually, letting only the loudest harmonics remain.

Here's how to set it up using

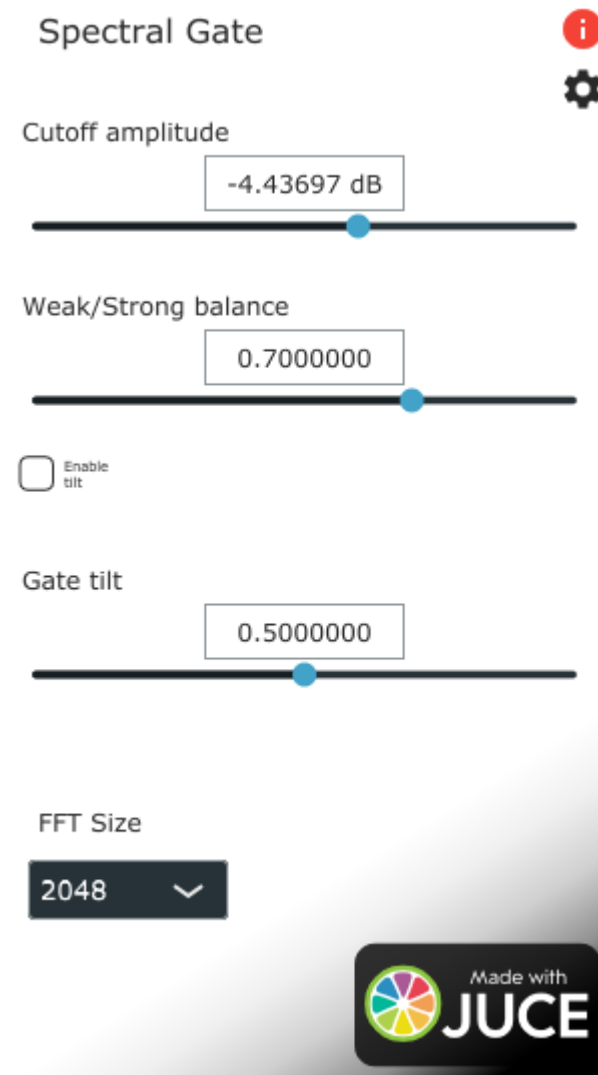
Bitwig's Loud Split. Make sure to adjust the red threshold to your liking and switch off relative loudness mode for a different kind of gating.



This can also be done using a plugin like MTransformer, by drawing a Gate-Like Transfer Curve in the Level section.



Or using a free plugin like Andrew Reeman's Spectral Gate or NIH-Plug's Spectral Compressor.



24. Sine Compression

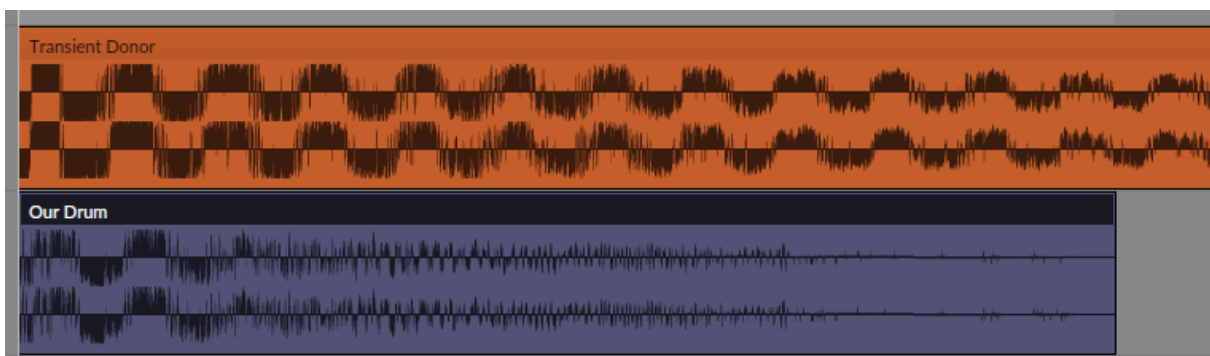
The term Sine Compression describes a bass design process of repeatedly distorting and filtering a sine wave.

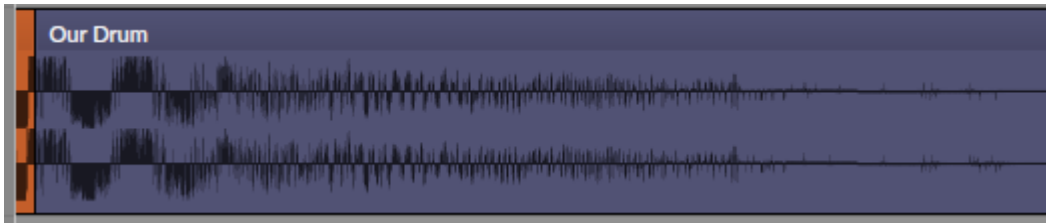
The distortion will add some harmonics to the sine, while the filters are automated or modulated to add movements to those harmonics. Repeating this process can result in very complex overtone movement.



25. Transient Replacement

A Transient is the very first attack part of a sound. If you do not like your Drums Transients, you can simply replace them with the transient from another sound. This will be cleaner than layering because it cannot result in any phase cancellation.



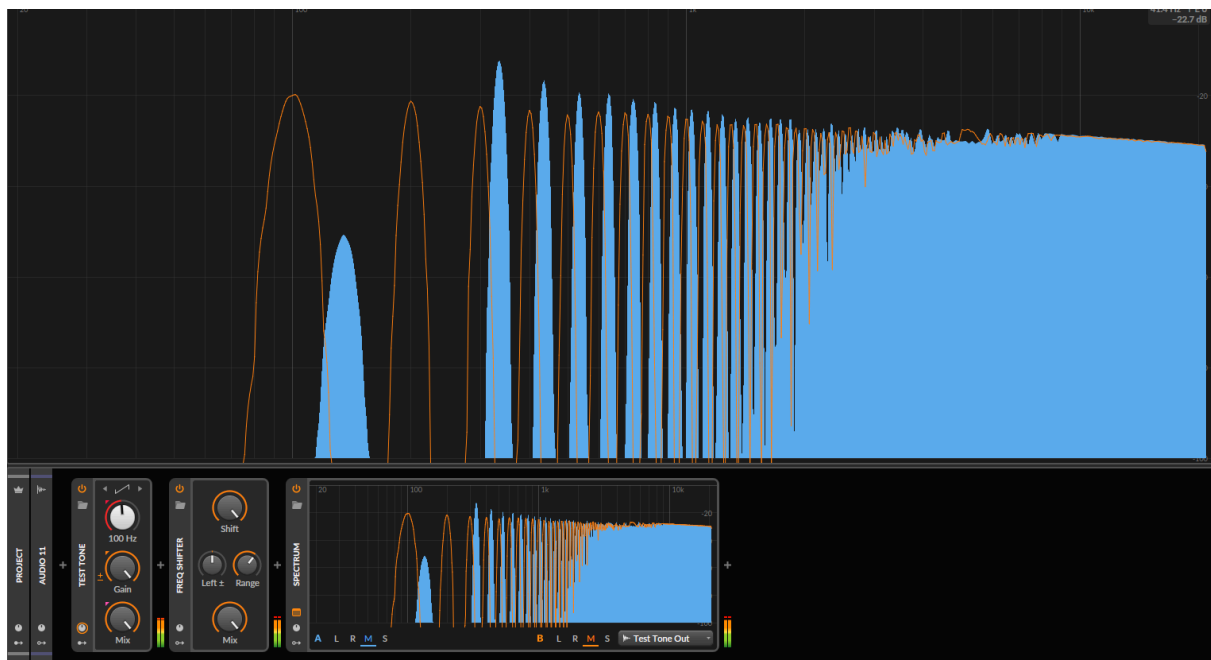


Crossfading the transient into your sound is an option, but not strictly necessary.

26. Metallic Frequency Shifter

Unlike Pitch Shifters, Frequency Shifters will move all of a sound's harmonics by the same number in Hz, disturbing their harmonic relationships.

Since inharmonic overtones are characteristic of metal resonators, this can make your sound more metallic.



27. Repitching = Rescaling

An interesting property of physical resonators is that a sound's pitch is directly related to the dimensions of its origin (e.g. longer strings will produce lower notes).

Changing its pitch therefore can be a simple way to change its perceived size, pitch up a wooden log sound and it will sound like a toothpick, pitch down a tiny

coin sound and it will resemble a giant metal sheet.

For pitching sounds down it is advisable to use recordings with a higher sample rate,

or it will lack higher frequencies.

28. Retuning Kicks with Filters

A kick strongly resembles a sine that is pitching down and landing on a pitch.

This final stage of the pitch envelope will determine the note it is heard as, provided it rings out long enough.

Using EQ, we can force the sound to ring out on a different frequency, changing its perceived pitch.

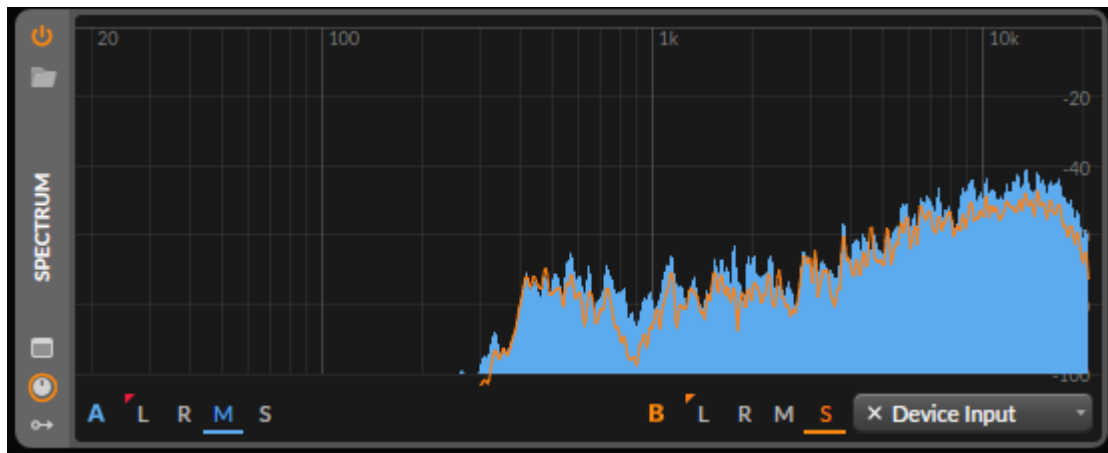


Keep in mind that this will change the sounds phase relationships to e.g. your sub bass. If you did not manually adjust them, this will not be an issue.

Linear Phase EQ is not advisable for such extreme EQ moves in the low end, since it will come with a lot of pre ringing, weakening your transient.

29. Hihat Synthesis with Comb Filters

Analyzing the spectrum of a hihat recording, we can tell that it consists of many resonances, not really following a particular overtone series but also not resembling the complete uniformity of white noise.

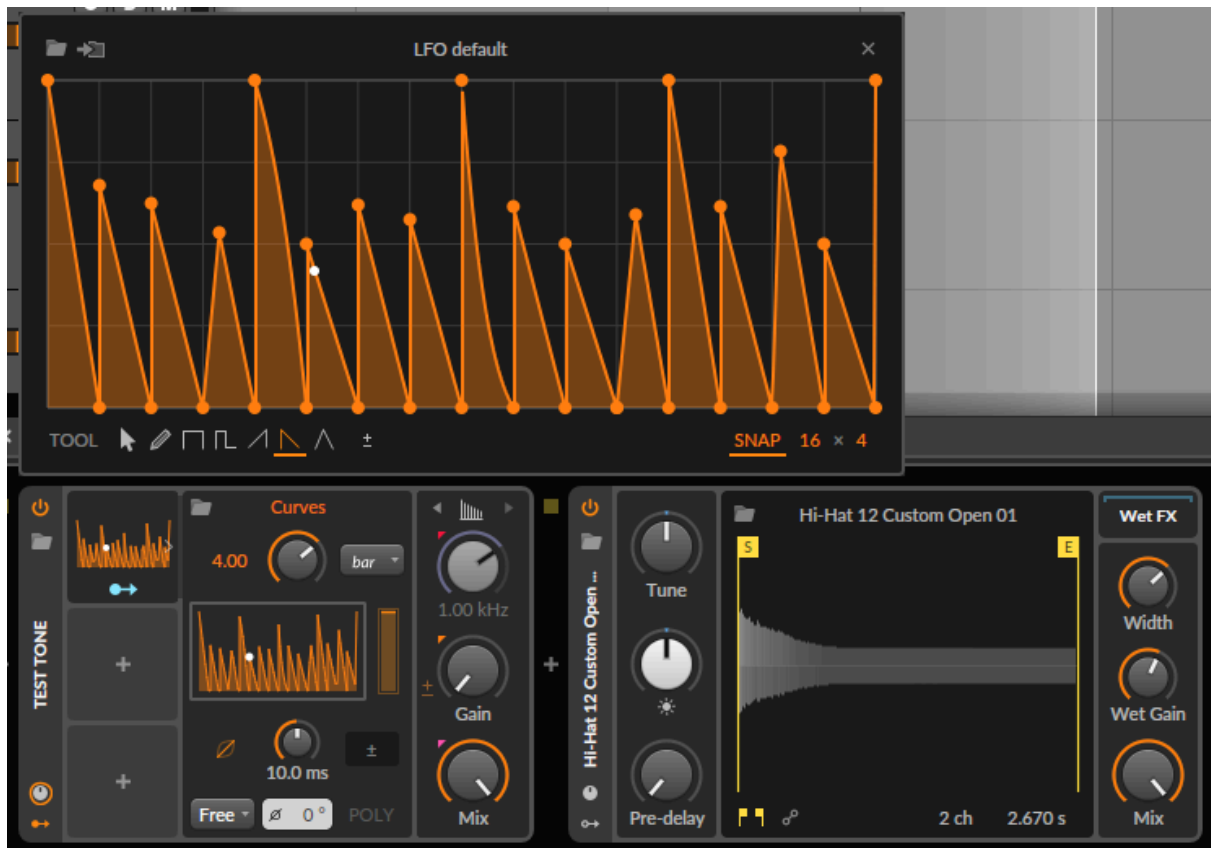


A simple way to replicate this effect is to send a short burst of white noise through a few comb filters in series or parallel. Make sure the comb filters are all tuned to different frequencies to imitate the atonal resonance of a hihat.



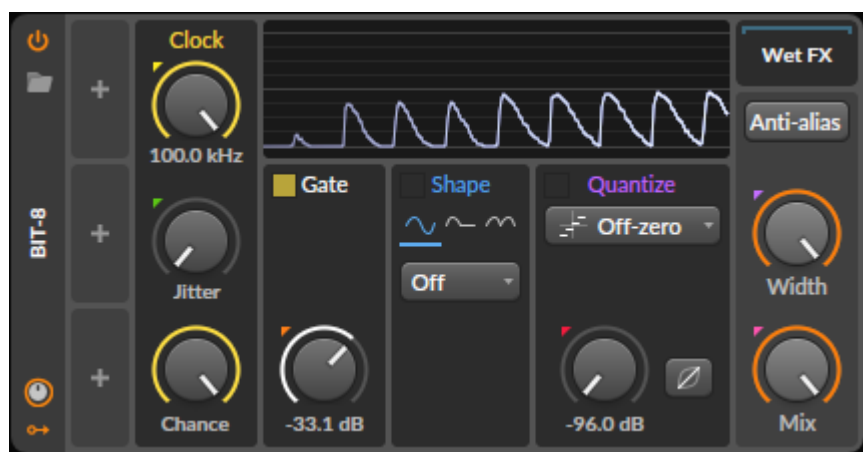
30. Hihats as Impulse Responses

Using the recording of an acoustic hihat as an impulse response will make incoming white noise sound like said hihat. We can use this to our advantage by programming complex patterns in the white noise, including different volumes, attack and decay times. This will create a hihat pattern that sounds like it was all played on one resonating hihat as opposed to just retriggering samples.

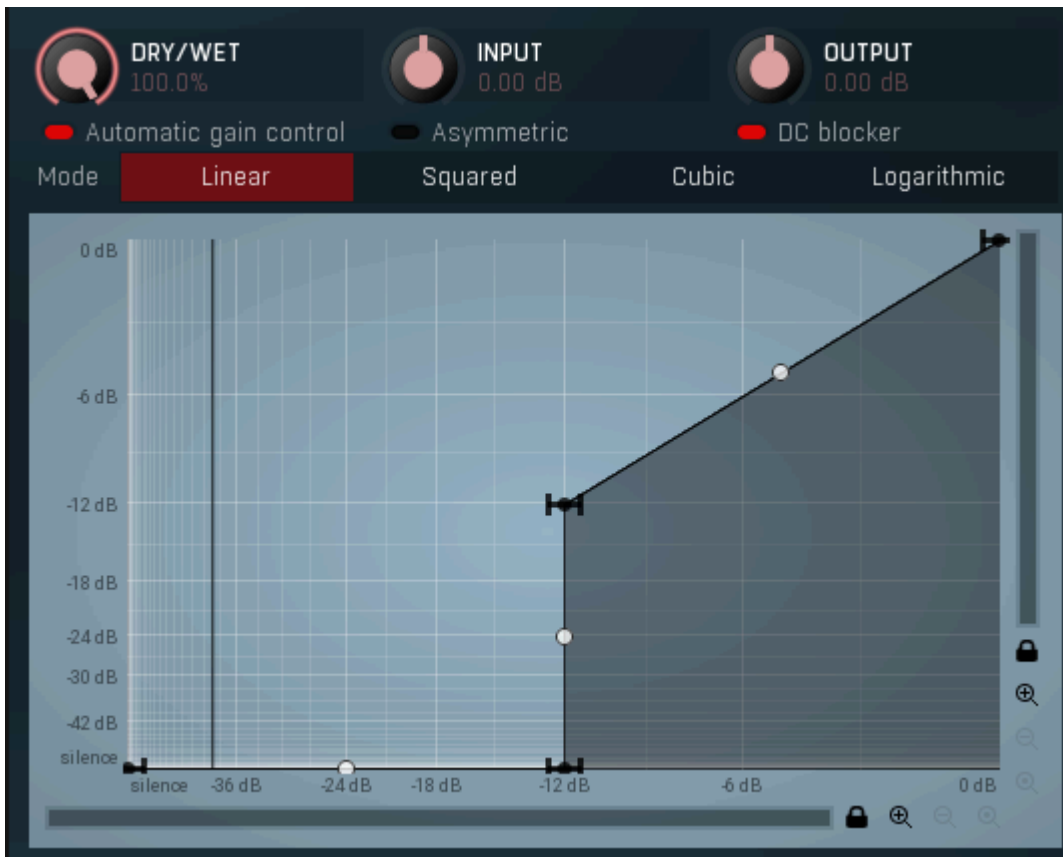


31. PCM Gating

Gates normally open and close based on a smoothed envelope follower. However we can use a kind of gate that opens/closes for every single sample to add an interesting noisy gritty kind of distorted gating character to a sound. The gate of Bitwig's Bit-8 can do this.



You can recreate this effect with the free plugin MWaveshaper, just draw in a gate like transfer function that sets all quieter samples to 0.



32. Just Intonation for targeting Overtones

Standard Tuning (12-TET) is designed to roughly approximate the overtone series with certain notes.

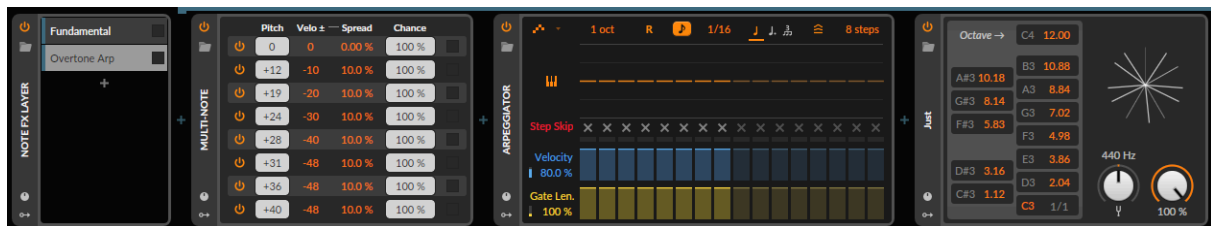
Using Just Intonation instead, we can target the overtones of a certain note even more accurately.

It is important that we select the right just intonation tuning for our fundamental.

If we do this, the notes 12, 19, 24, 28, 31, 36, 40,... semitones above our fundamental will exactly be its second, third, fourth, fifth,... harmonic.



This is useful for sound design, because we can use multiple oscillators tuned to these notes in a similar way to an additive synth, they will sound more like different components of the same pitch than a chord. This allows for a lot of different sound design applications, a favorite of mine is arpeggiating through a few upper harmonics together with a constant fundamental to create a shifting overtone sparkling effect. The applications are as flexible as your understanding of overtones.



Make sure that the synth you are using supports mpe/microtuning. All of Bitwig's stock does by default.

33. Multiband Bandpass

Sometimes we want the sound of a moving bandpass filter on a sound, but we would like to still preserve some bass and high-end. We can simply place the bandpass filter inside a multiband split, to limit the frequency range it can affect.

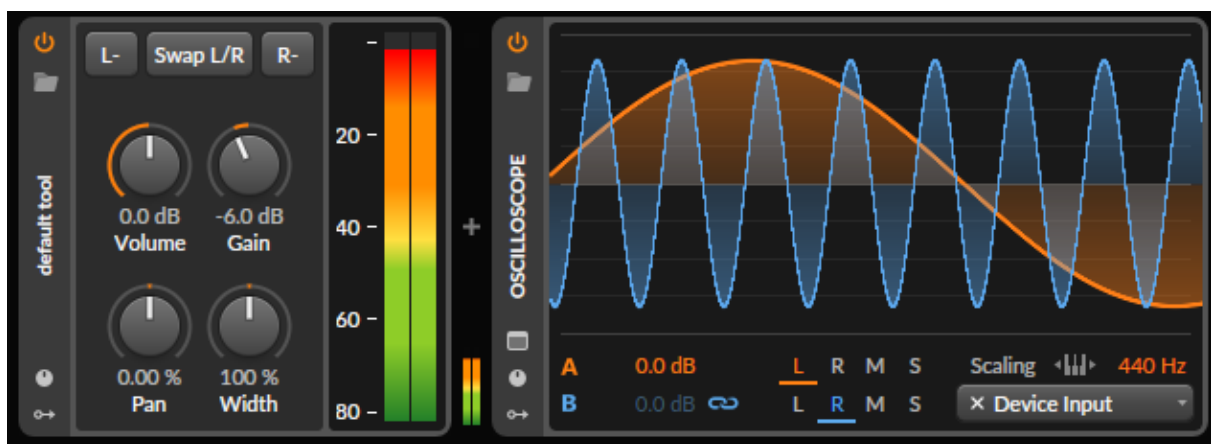


This way highs and lows will be unaffected by the bandpass placed in the mid chain.

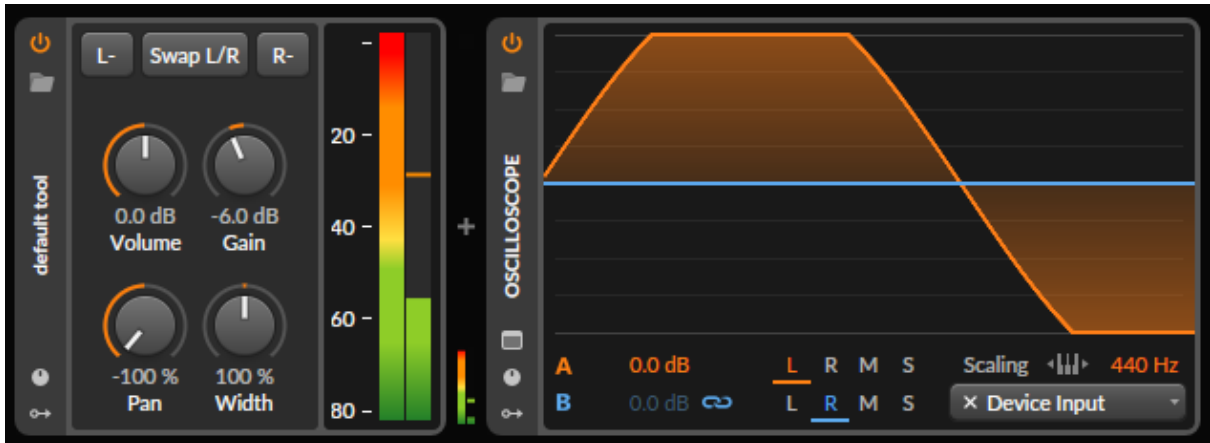
34. True Stereo Panning

Ordinary panning simply turns up or down the volume of the left and right channel.

In this example I placed a 100Hz sine in the left (orange) and a 1000Hz sine in the right (blue) channel.



Hard Panning the sound will therefore result in a complete loss of the information in the opposite channel.



An alternative to this simple Stereo Balance based panning is True Stereo Panning, which will move sounds from one channel into the other. In Bitwig we achieve this with the Dual Pan device. In your DAW it may be a setting, or accessible by right-clicking your pan knobs.



As you can see we get independent pan controls for left and right channel, and moving both of them to the left will simply move the signal from the right channel over to the left.

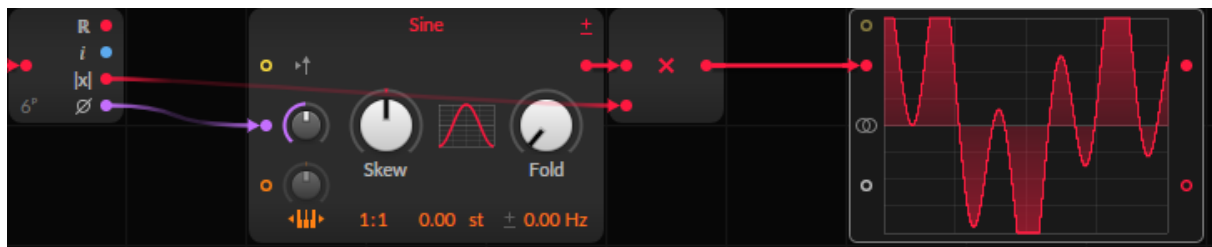


35. Hilbert Transform Resynthesis

Using a type of filter based on the hilbert transform (called Dome in the Grid), we can take apart a signal into two components, its phase and its amplitude.



Applying these two signals to a sine wave at 0Hz like such (multiply by magnitude signal, modulate phase with the phase signal), we can perfectly reconstruct our original signal. This will work on any sound.



The interesting part is that we can then replace this sine wave with any other oscillator, like a wavetable, to reconstruct our original sound using this new base. This can yield some interesting sounds, especially if you experiment with adding other components or parameters of the setup.



Recreating this outside of Bitwig will likely require a modular environment like plugdata or max/msp.

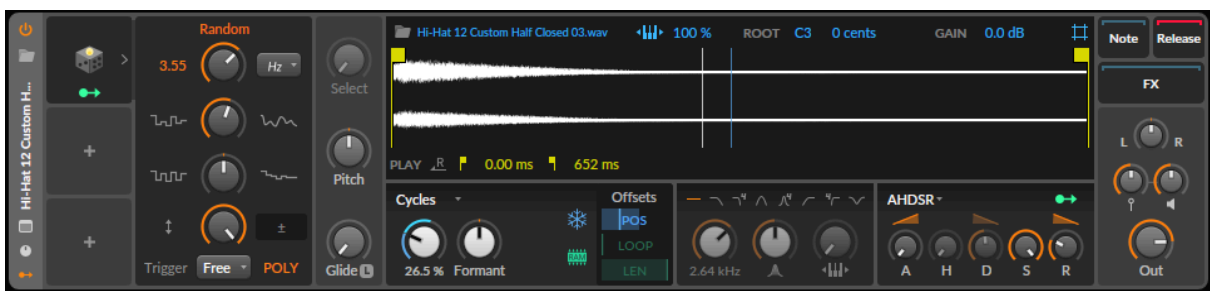
Your hilbert transform module may look slightly different, I recommend reading up on wikipedia on how to extract its phase and magnitude components. Hilbert Transforms are also an essential part of other audio effects, like frequency shifters, for example.

36. Sample Scrubbing

Some samplers allow us to load a sample and then jump around in time and move through it at many different speeds. This can yield a lot of interesting results.

The way

i do it in Bitwig is using the sampler in cycles mode, freezing the playback position and then modulating the playhead like such:



37. Granular Pitch Shift

Most simple pitch shifters are granular processors, they cut up the audio in many tiny fragments they can loop and repitch. This allows them to change the sound's pitch independently of its timing.

The artefacts this produces have a distinctly granular sound. Sometimes I will just use two pitch shifters cancelling each other out to get the granular texture without changing my sound's pitch.



Some of your DAW's Warp-Modes may also be based on granulization and able to produce similar results.

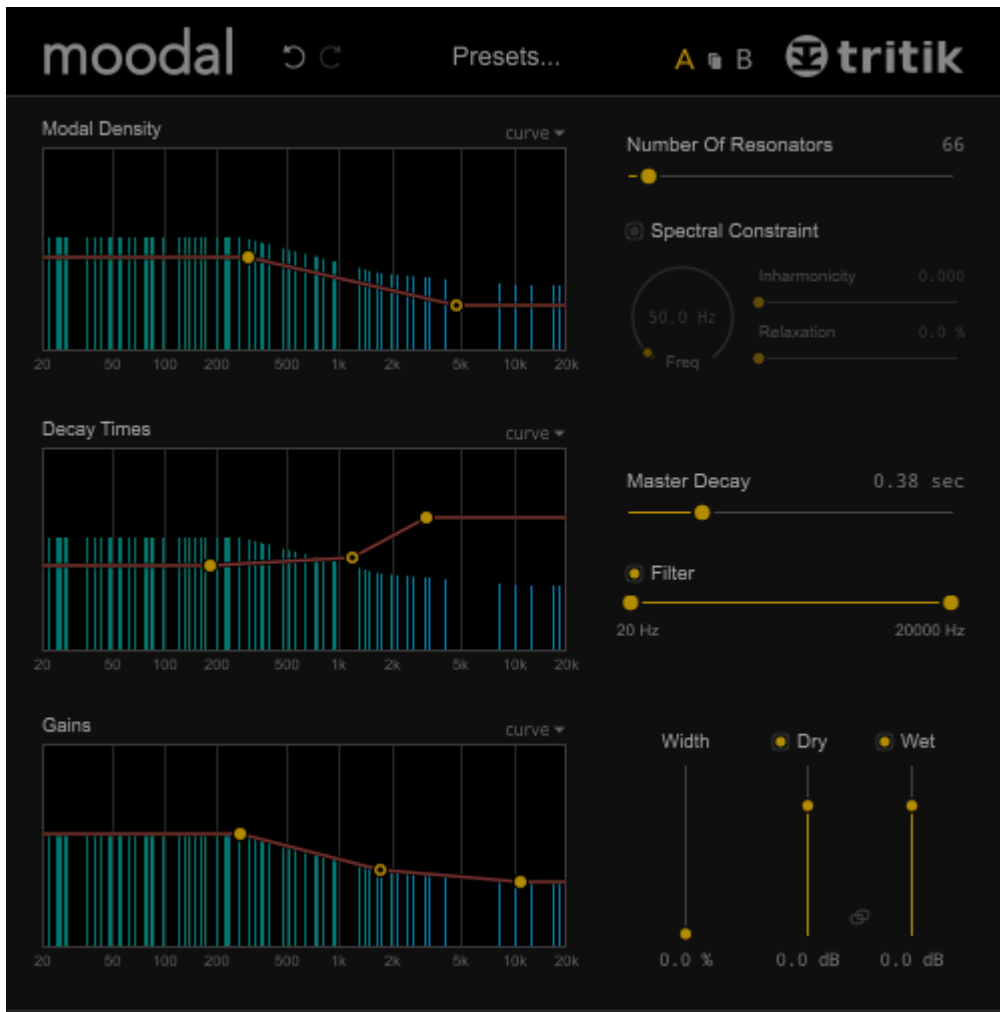
38. Metallic Resonances with Modal Filterbanks

Modal filterbanks are a great way to introduce a metallic, cymbal like character to a sound. These consist of a lot of narrow bandpass filters that ring out. For a metallic sound you want filters that don't follow too much of a harmonic pattern.

Usecases for this include synthesizing hi-hats and adding metallic resonances to a snare drum.

The plugin

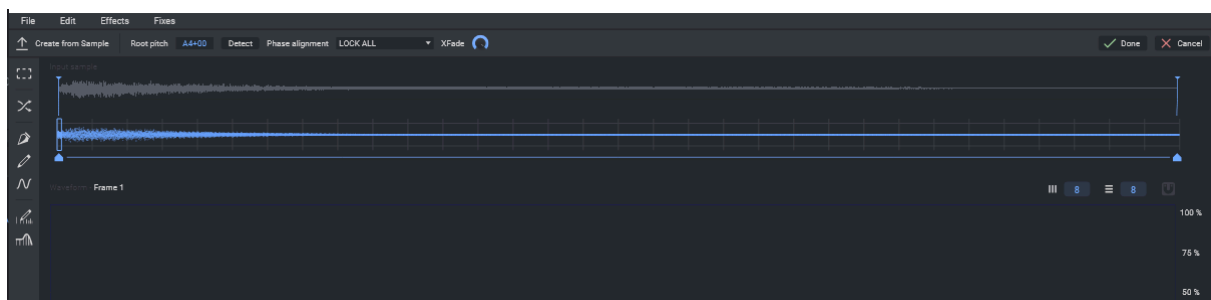
i use for this is called Tritik Moodal, I don't know any others that do quite the same (Moodal can use up to 1000 resonators), but the hihat in a convolver technique (see chapter 30) has a similar sound.



39. Custom Wavetables

To turn a sound into a wavetable, you will need some kind of synthesizer that comes with a Wavetable editor that can import audio files. The usual suspects are Serum, Vital and Phase Plant.

While wavetables are commonly just .wav files, they follow very specific formatting.

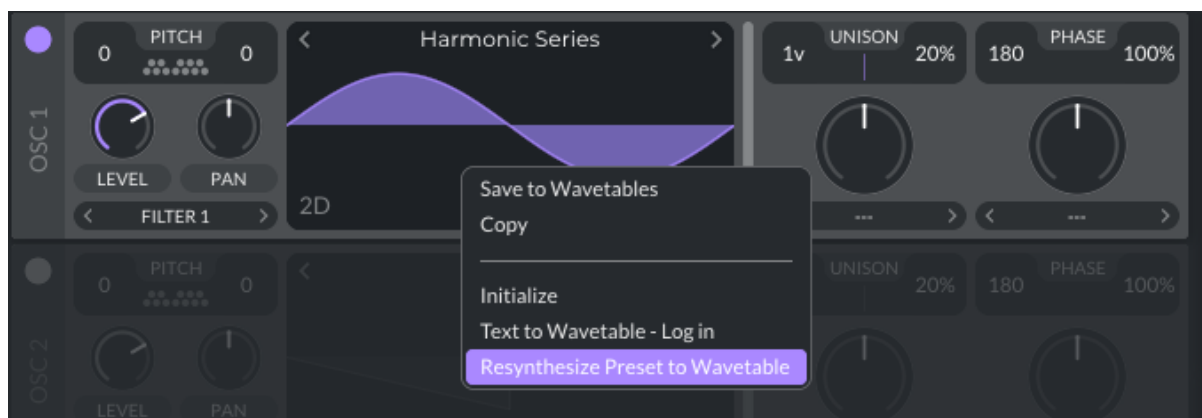


You can then export the wavetable as a .wav that you will be able to import in many other synths, e.g. Bitwig's Polymer.

There is a whole art and science to which kinds of audio files make for the best wavetables that is far beyond the scope of this book. For now I'd recommend you stick to short, constant pitch snippets with smooth spectral movements and experiment a little on your own.

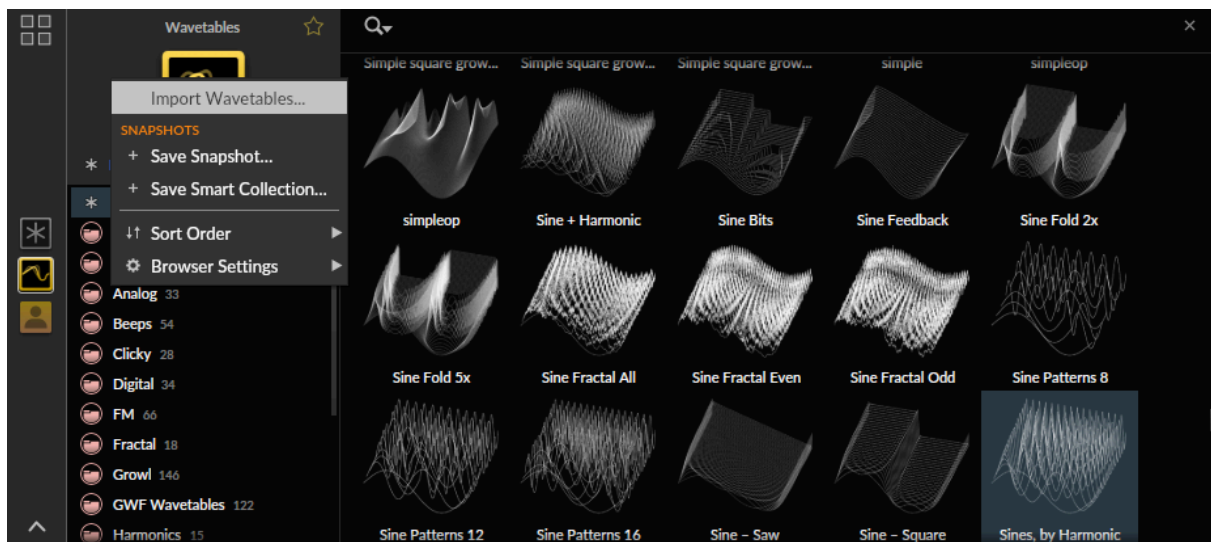
40. Custom Wavetables the easy Way

The free synth Vital has a very simple and efficient way to create custom wavetables. Simply create a patch with any kind of movement you like, then right click any of the oscillators and select "resynthesize preset to wavetable".



You can then copy this wavetable, initialize your vital preset and paste it into one of the oscillators, which will give you a blank preset with a custom wavetable. Using the wavetable editor you can also export this preset for use with other synths.

You will then be able to import these wavetables into Bitwig's Polymer using the "Import Wavetables" function in the browser.



41. FM for Metallic Donk

The “metallic donk” is a broad category of sounds typically made with an fm synthesizer, which ranges all the way from a rhodes patch to a snare membrane.

The idea here is to modulate the modulation amount of your carrier oscillator with a pluck-like, quickly descending envelope. This will give you a sound that is rich in overtones at first but gradually descends to a more pure tone.



Combining different modulators and carrier pitches with this technique can yield a wide range of percussive tonal or semi-tonal sounds with a metallic character.

42. Send Abuse for Physical Modelling

If your DAWs sends allow for feedback, you can use them as physical modelling tools.

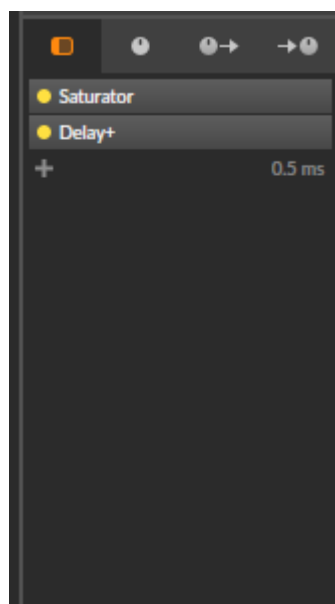
Sending a short impulse into your send channel, that feeds back into itself will cause it to ring like a comb filter. By placing a delay on the send-track, you can

tune it. You can then place other effects, like filters, saturation, etc in your feedback loop, send the send to other sends that feedback as well and create quite complex systems of resonators this way.

This is known as a feedback delay network. It will not be playable with midi, but you can resample its outputs.



Keep in mind that any effect with latency will change the length of the feedback loop and therefore your tuning. Stick to zero latency effects when possible. In Bitwig you can check an effect chains latency in the inspector, it will appear as a time value below the chain (0.5 ms here)



I've had some success modelling different sounds like snare drums and kicks with this technique.

Always be mindful of your feedback amounts and place a limiter on your master channel when playing with feedback. These systems can blow up quickly and

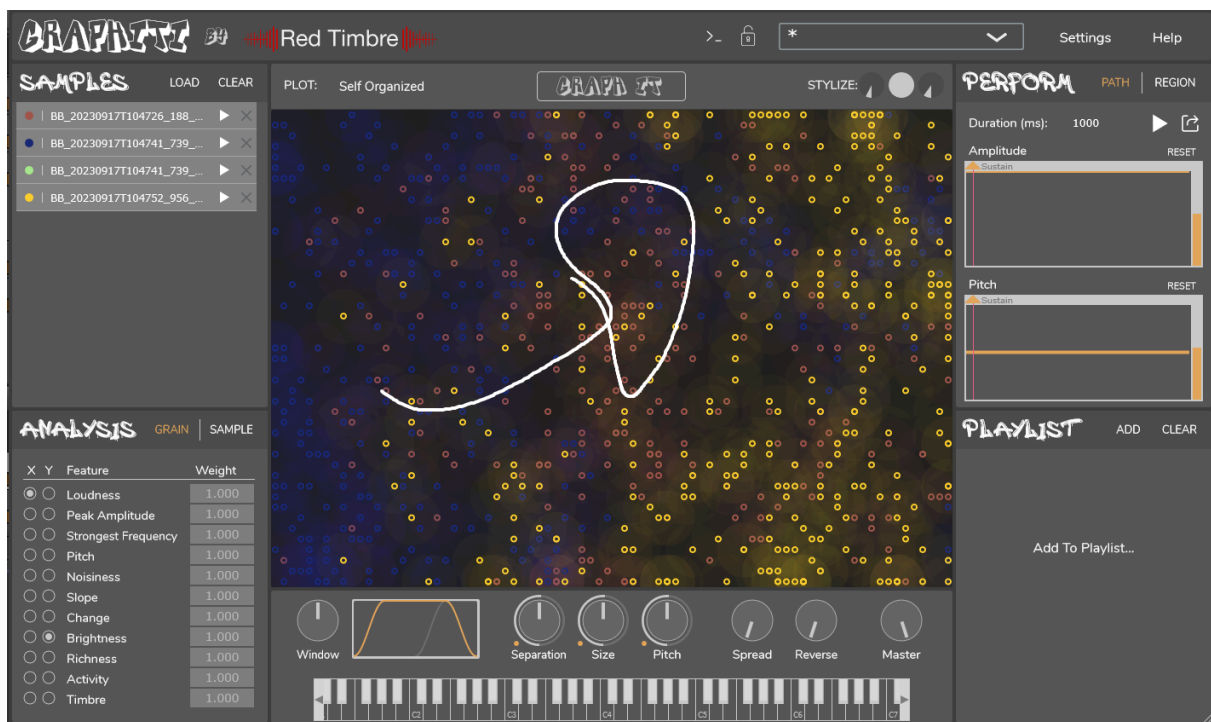
damage both your speakers and your ears.

I recommend a plugin like Ice-8 Automute as an additional layer of safety.

43. Concatenative Synthesis

Concatenative Synthesis encompasses a wide range of techniques, but here is the gist of it:

A selection of sounds, called a corpus, is sliced into short grains, analyzed using a variety of parameters like pitch, volume, frequency balance, ... and displayed as a two dimensional map. You can move in both directions through this map, stringing together (concatenating) any sounds you pass on your way.



This can be great for creating sfx and interesting foley mashups.

The plugin I currently use is graphiti by red timbre audio, other alternatives include the standalone audiostellar, the free M4L patch Corperous Concativus and Datamind Audio's Concatenator.

Some plugins like the concatenator will also allow you to resynthesize an input sound from the sounds of your corpus using the audio analysis.

44. Automating Delay for Doppler Shifts

When you automate a delay time, you are squashing and stretching time. Depending on how your delay plugin is set up, this can cause interesting changes in pitch that are closely related to the doppler effect.

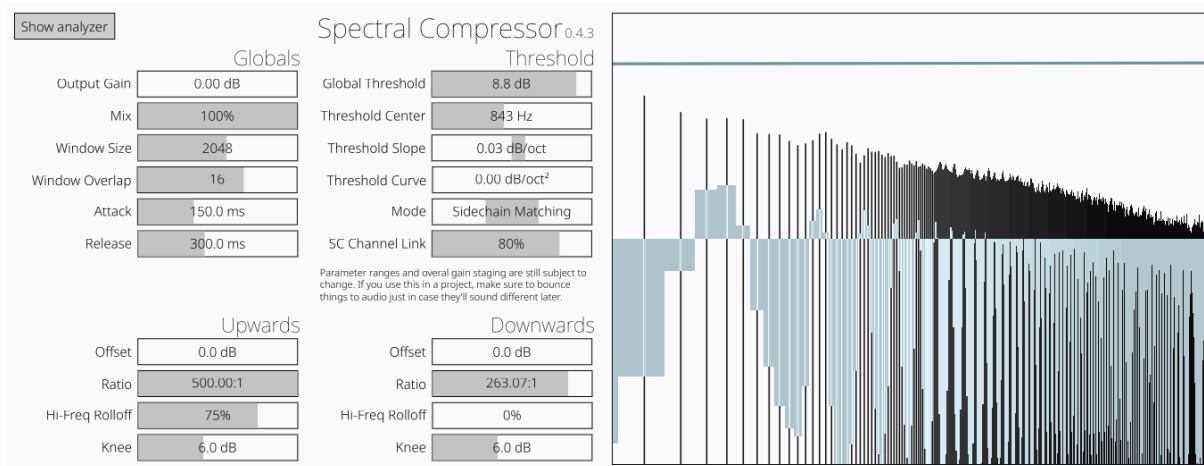
With Bitwig's delay+, set it to repitch mode in the inspector, place it on your sound and modulate the delay time. You will hear what I'm talking about. This can be a cool way to create glitchy or watery textures from a wide variety of sounds.



45. Spectral Resonance

We can use the free plugin spectral compressor by robbert vdh to create a pseudo-resonator, resembling a comb filter, to combine any tuned oscillator's harmonic profile with any atonal sound.

To do this, you use the oscillator as a sidechain input for the spectral compressor placed on the atonal sound. Using spectral compressor in "sidechain matching" mode with aggressive upwards and downwards compression will now force your atonal sound into the harmonic profile of the oscillator, assuming its pitch.



Adjust Window Size, Window Overlap, Attack, Release, the Threshold Parameters and the two Ratios to taste, they will all change the character of the effect.

Consult the spectral compressor documentation for a detailed explanation of these parameters.

46. DIY Time Domain Transient Split

Using some simple components, we can split any sound into its transients and sustained parts.

We can then EQ, Distort, ... the two parts of our signal independently.

We will do this in the time domain, avoiding any of the FFT Artefacts of Bitwig's Transient Split.

To isolate the transients, we will use a transient shaper to turn down the sound's sustained part. I will be using the free plugin khs Transient Shaper. We then gate the transients, to completely remove the now significantly quieter sustained parts of the sound. We have now isolated the transients.



To isolate the sustained parts, we will use our transient signal and add a polarity inverted version of it to the dry sound. This will remove the transients from that signal. Make sure to use the transient signal from after the gate, BEFORE you do any further processing to it.

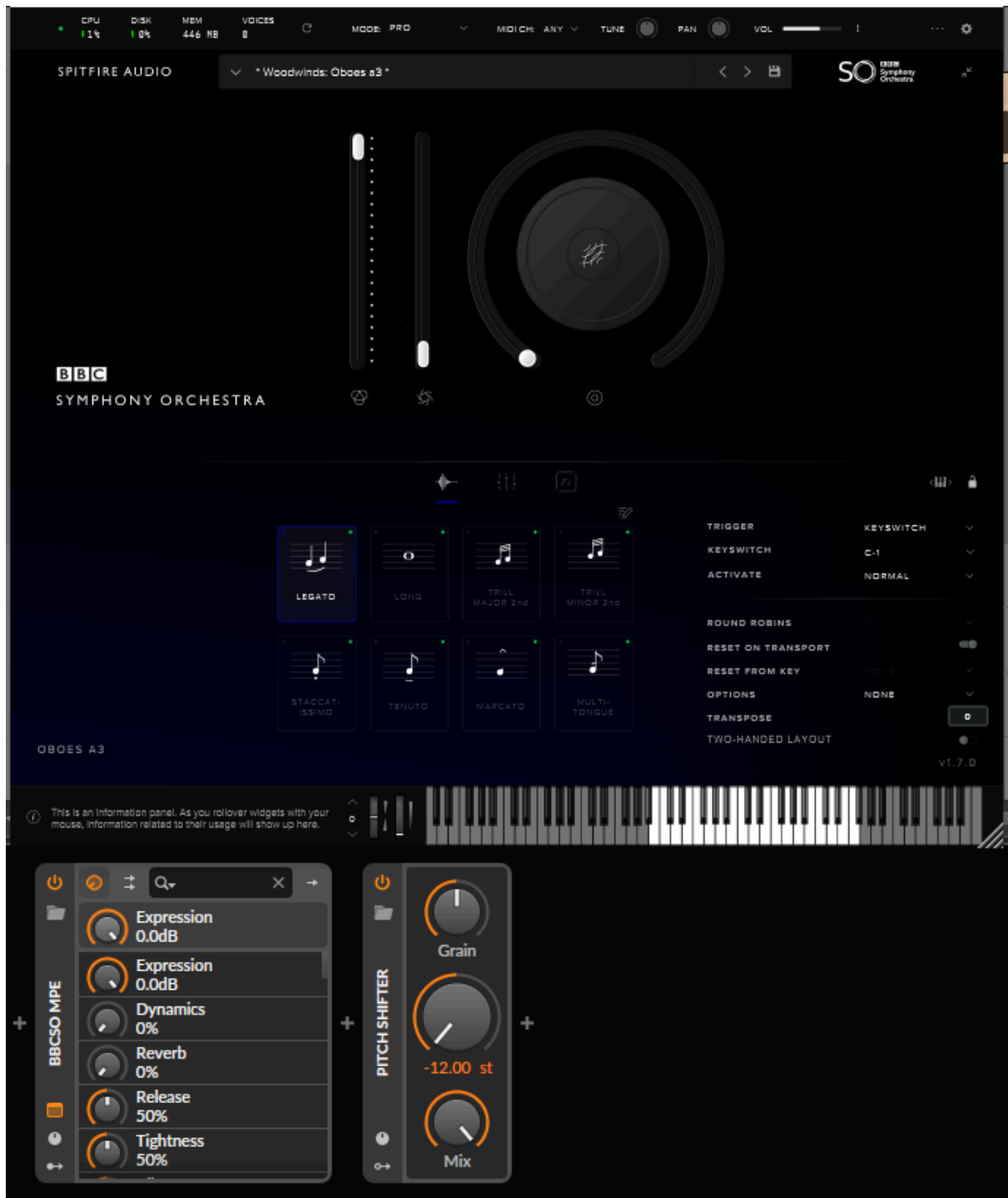


We have now separated the signal into two chains, transient and sustain, which we can process independently. Without any processing, these two chains will add up to perfectly reconstruct our original signal. As an example, here I am boosting the high end of only the transients using an EQ.



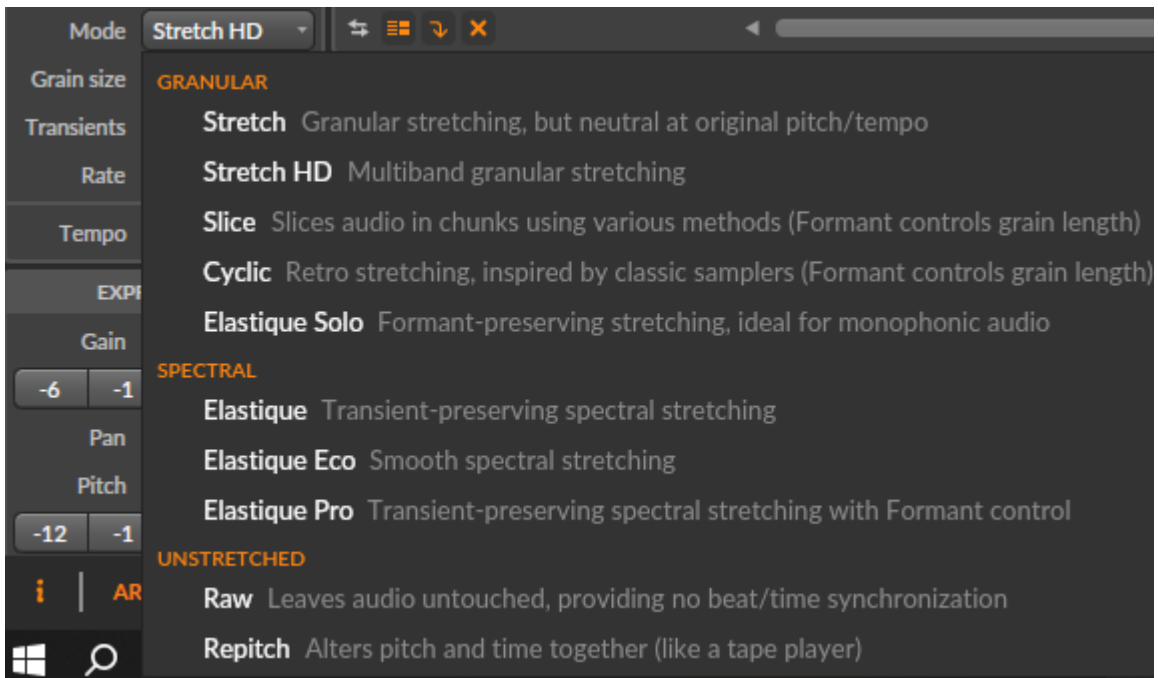
47. Pitch Shifting Orchestral instruments

Pitch shifting Orchestral Instruments around is a very simple, but surprisingly effective way to discover new, interesting timbres. As discussed in chapter 16, different pitch shifters can have different characters, I would recommend to try a few different ones to get the best results for your use case.



48. Abusing Warp/Stretch Modes

The Warp/Stretch Modes of our DAW allow us to change a sounds timing and duration independently of its pitch. Some of them are granular, others are spectral, none of them will be without artefacts. Pushing them past their breaking points can yield many interesting new timbres.

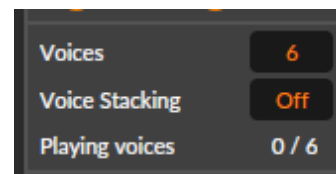


A good kind of sound to try this on is foley. Stretch your sound as far as it can go and see what you can discover. Multiband Compression/OTT can help further bring out these artefacts. This will also sharpen your ear for more subtle applications of these warp modes.

49. Harmonic Interresonance (Physical Modelling)

When playing chords on an acoustic instrument, the notes all resonate with the same physical body, interacting with each other in complex ways.

A way to approximate this is using polyphonic, keytracked filters. Filter+ will work for this, using either comb or resonant bandpass filters of the svf module.



With polyphony enabled, we can place this after our original sound source, e.g. a synthesizer.

Filter+ will create a resonant filter for each midi note. Because the signal it receives contains all notes of our chords, the filters will create interaction for the notes.

E.g. if the Filter receives a C E G chord, the filter created for the E midi note it receives will also receive the C and G components of the audio, creating interaction between the resonances.

This has a subtle, but very nice sound to it i urge you to try for yourself.

Keep in mind that this will not work if the filters are placed in the same grid patch as the original oscillators, as the voices will be kept separate and the E Filter will only receive the E audio.

50. Kicks from Bandpassed Noise

A Kick is nothing but a tone with a rapidly descending pitch envelope. The classic way to create this is using a sine wave oscillator, but we can create the same effect with noise and a filter, for a more diffuse, organic kick drum sound.



Make sure to use unsmoothed envelopes and a filter that allows for fast modulation so the transient is not lost to smoothing .In Bitwig, EQ-2 and EQ-5 will work, EQ+ will not.

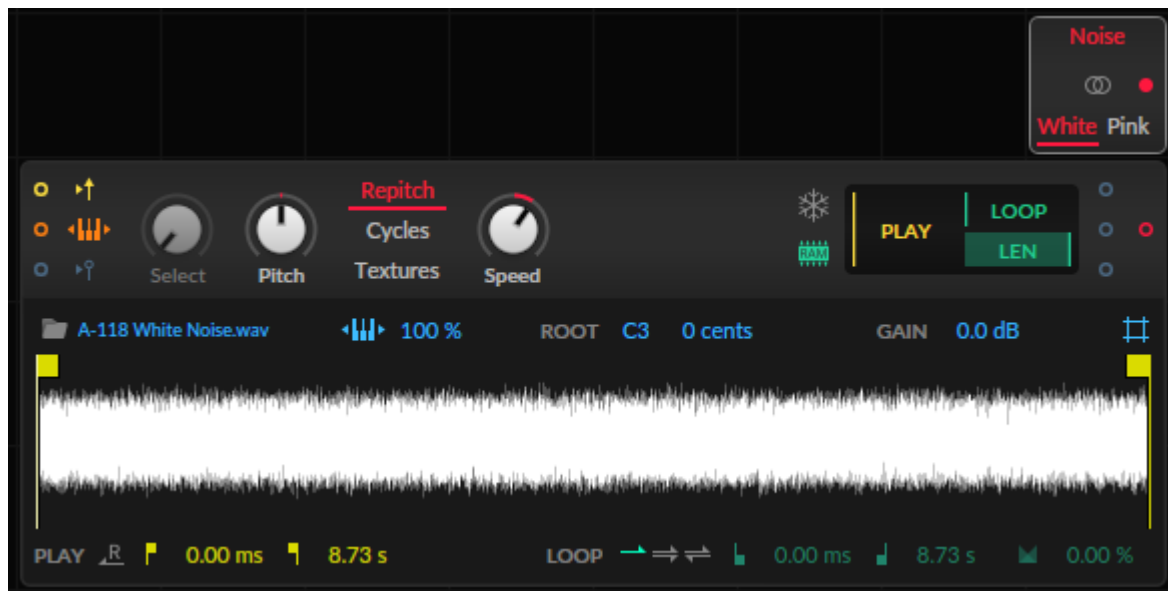
51. Steady vs Random Noise

When using noise in sound design, you are always faced with a simple choice. Do you want to use truly random noise, sacrificing consistency but gaining variation, or resampled noise, that is played back the same every time.

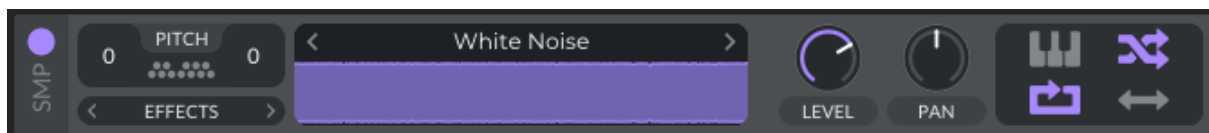
For sustained sounds this may not make much of an audible difference, but especially for drum design, where you're working with fast precise envelopes

the subtle variations of truly random noise can make accuracy impossible and drive you insane.

In the Grid, this will be a choice between a noise sample in a sampler and a noise module.



In Vital you can choose whether to retrigger the noise sample from the same position each time or a random starting point.



Phase Plant's noise oscillator will let you choose between "stable" and "random" noise.



Try to investigate which type of noise you are currently using, whenever precision is a priority. This can save you many headaches.

52. Your Voice → Choir

No matter how horrible your singing, you can easily turn your voice into quite a nice sounding choir patch using the wonders of technology.

First, record yourself holding a single note, it doesn't matter which one, just choose whichever feels most comfortable.



Then use a tuner to identify the note you were singing, and use autotune and eq to stabilize your pitch and clean up the recording as necessary. Here I'm using two free plugins by Melda.



Bounce the processed recording and place it into a sampler, whose root pitch you set to the note you were singing. Set looping and playback modes as desired. Enable polyphony. You now have a playable choir patch unique to yourself.



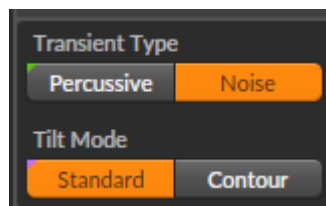
Experiment with voice stacking and random modulation for a bigger, wider sound.

53. De-Noising with Transient Split

A spectral transient split separates a sound into two components, tones and noise. You can then process these separately, which can be very useful for taming or entirely removing the noisy, unpitched parts of a sound.

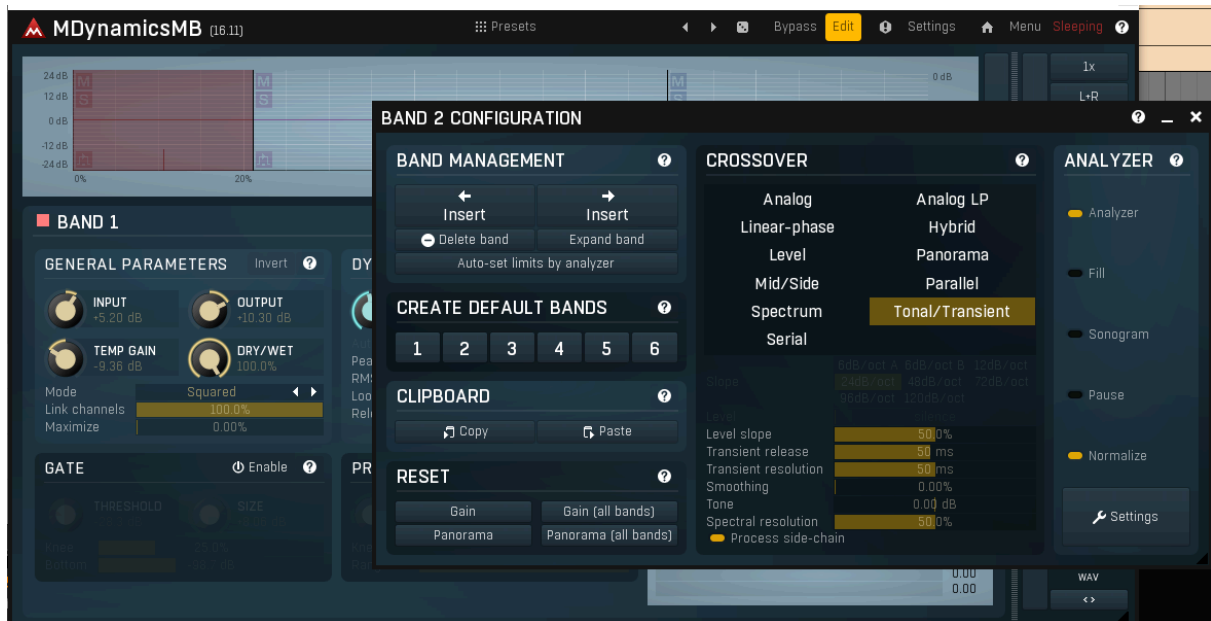


To get this to work properly with bitwig's transient split, make sure to set the transient detection to noise in the inspector.



Plugins that offer a similar functionality are the MB Series by Melda Productions. You can find the transient split as an option in the band

configuration menu by right clicking the multiband split.



54. Recycling Full Songs

Mangling your old music can be a great way to discover new interesting sounds. You can use any techniques from this pdf for this, especially useful will be things like sample scrubbing (36), pitchy delays (44) or your DAW's warp modes (48).

55. Fast Foley Workflow

Recording your own foley quickly is a great way to get new layers.

My personal workflow uses the plugin rolling sampler, which I place on an audio track receiving audio from my microphone.



I jingle, bang and shake a wide variety of objects in front of the mic and whenever I make an interesting sound, I drag it out of rolling sampler and save it as a piece of foley.

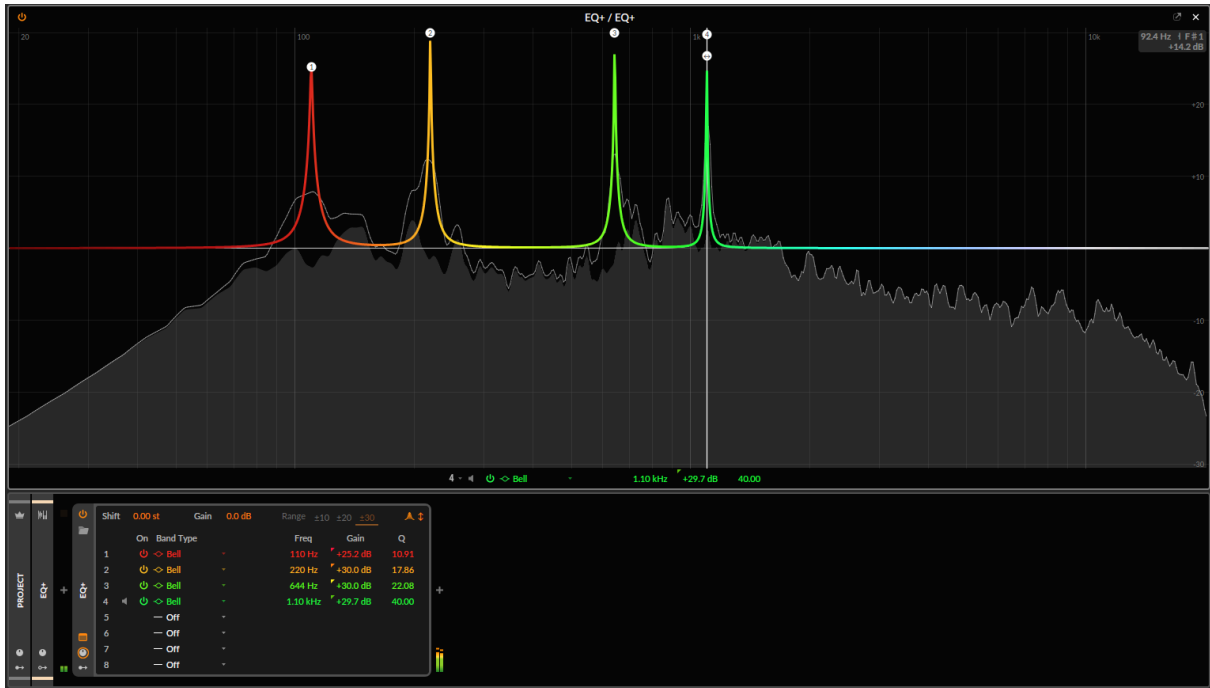
Your kitchen utensils will probably be a good place to start, they will make for some interesting new percussion sounds.

56. Modally Tuned Field Recordings

We can use an EQ to force a pitch onto many different sounds, like noisy field recordings, and then play these as padlike instruments.

The idea is simple. Take any field recording, be it your own or from a sample pack, and place an EQ on it, boosting a harmonic series of any note. I recommend a low A at 110Hz, it simplifies the maths a little.

Set the filter gains and Qs to taste. You will hear the previously atonal sound starting to resonate with a note.



You can then take this sound and load it into a sampler, set to the note you tuned it to and play it like a rich, textural pad. Randomising parameters like panning and start position can add further interest.

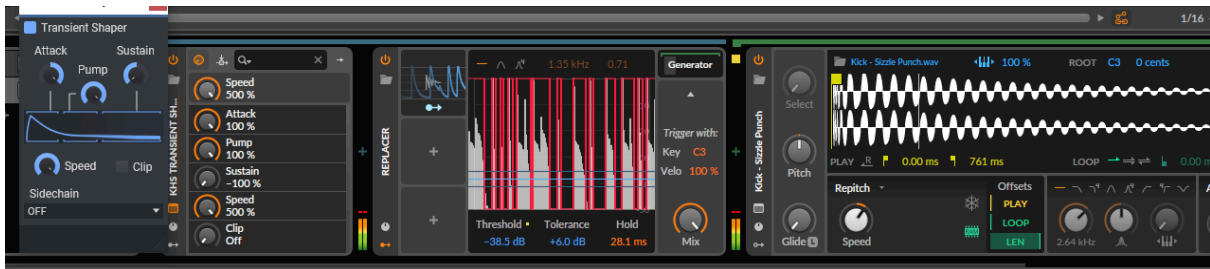


57. Transient layers with Drum Replacers

Replacers, also known as drum triggers, are a kind of effect often used by mix engineers to replace unfortunate drum recordings with better sounds. We can also use them in parallel however, to enhance any sound's transients, by layering them with a kick drum or any other sample of choice.



By placing a transient shaper before the replacer, we can bias it towards reacting more towards the percussive transients of an input sound.



58. Dynamic Folding

When a compressor allows us to freely draw a transfer function, we can abuse it for some interesting dynamic enhancements beyond the realm of traditional compression.

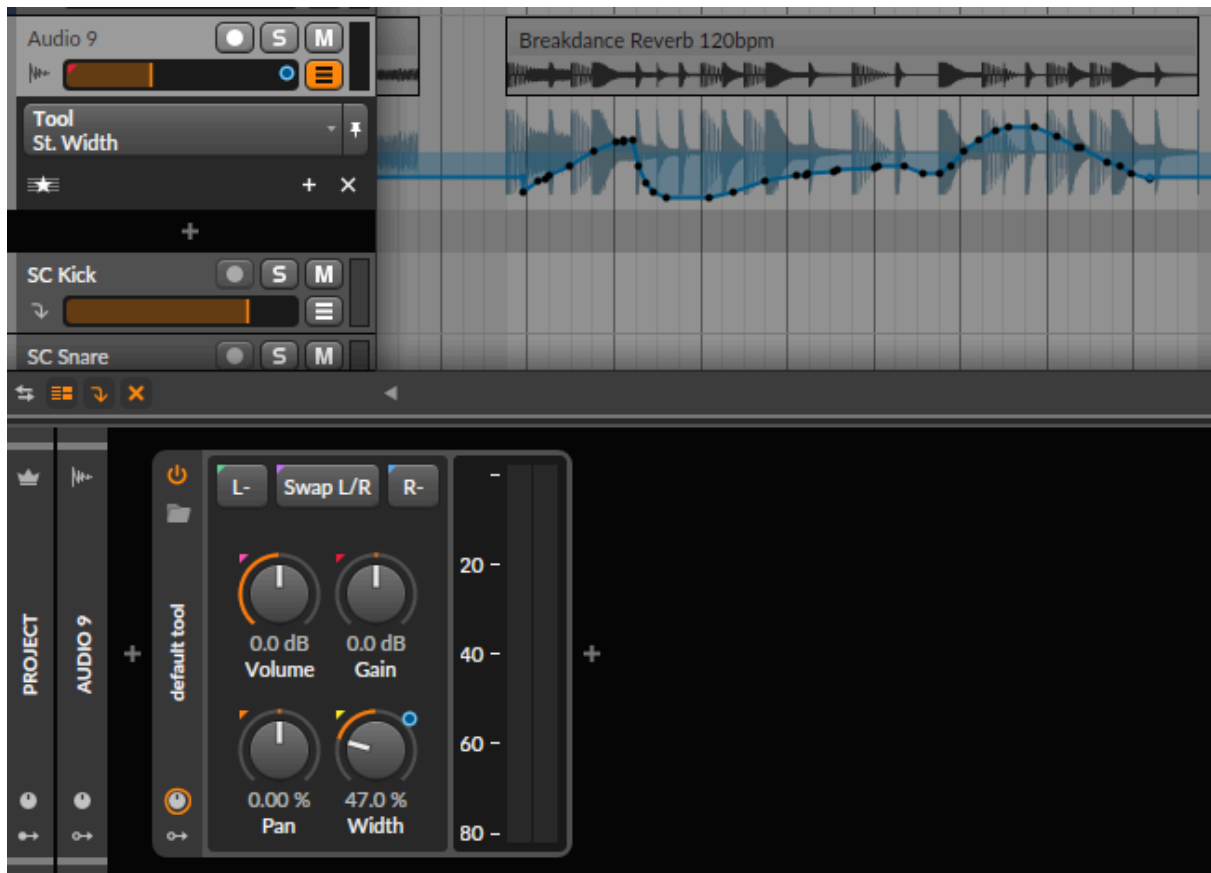
This is the free MCompressor, using a technique I call dynamic folding. By creating a wavefold-like transfer function, we can let the compressor add dynamic information to a sound that was previously not there. This can be an interesting way to add more excitement to a sound effect.



59. Width Automation

Automating a sound's width is a surprisingly effective and visceral technique. Because a wider sound suggests a closer sound source, we can use this to greatly enhance the dynamic gesture of a sound.

The standard width knob you can find in many utility plugins will suffice, it simply changes the gain of your sides. Keep in mind that this will only work on a stereo sound, if your sound is perfectly mono you will need to create some side information from it first.

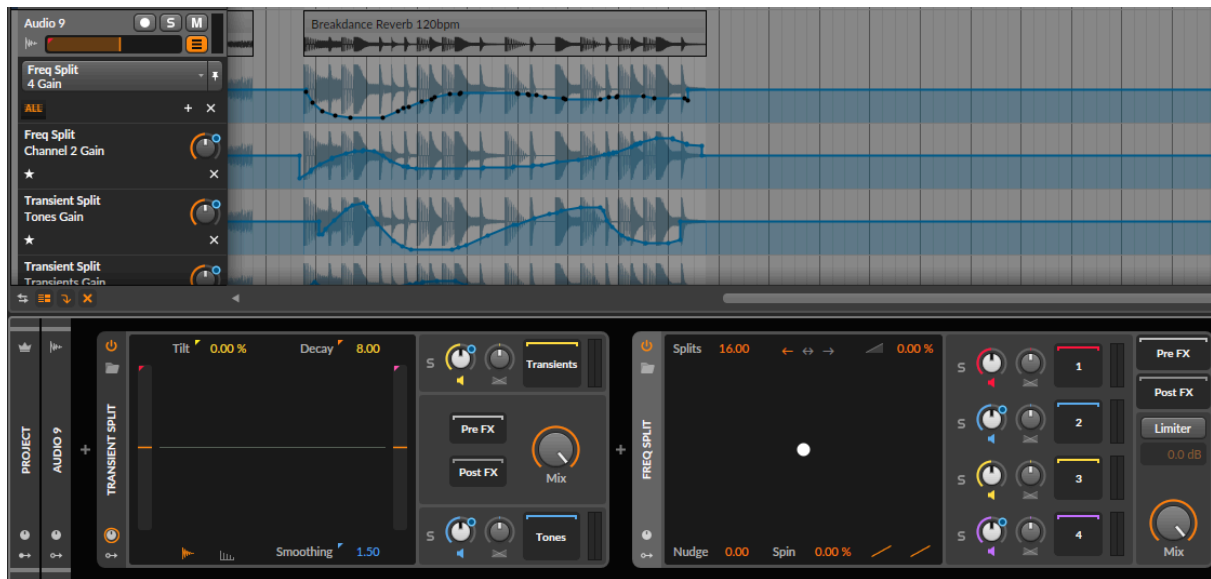


60. Spectral Automation

Splitting a sound into different components and then independently automating the volume of these components can add a lot of detail and interest to the sound.

A favorite for me are

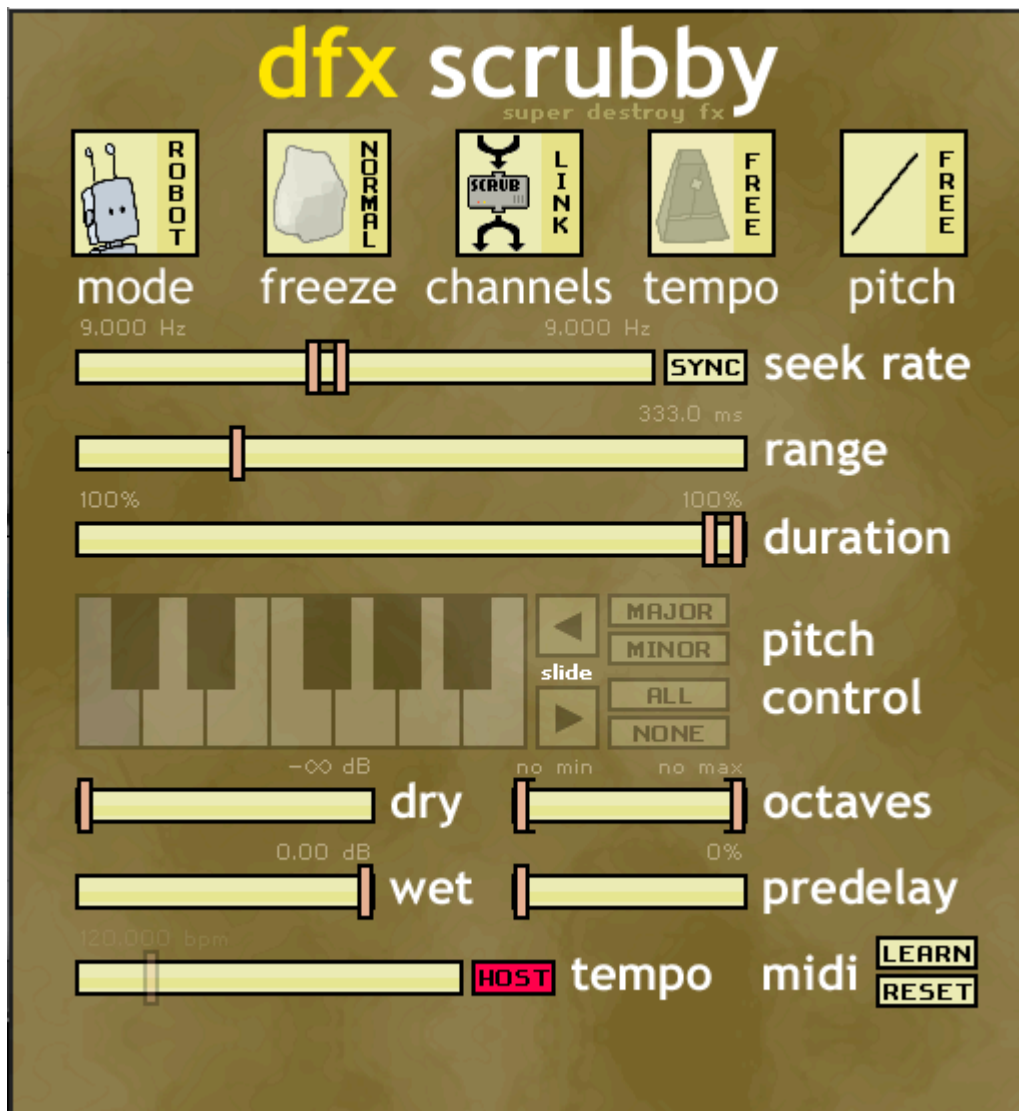
Bitwig's spectral suite devices, I will often automate the volume of each of their output chains to enhance a sound's gesture and movement. This can be a great way to bring more dynamics to a lifeless sound effect.



61. Scrubby Glitches

dFx Scrubby is the best plugin ever made. It provides a very efficient way to make a mess of any sound you feed it. It's free too.

As the name suggests, it records a buffer and randomly scrubs around in time through this buffer, think of it like a granuliser, but a lot more harsh and unpredictable.

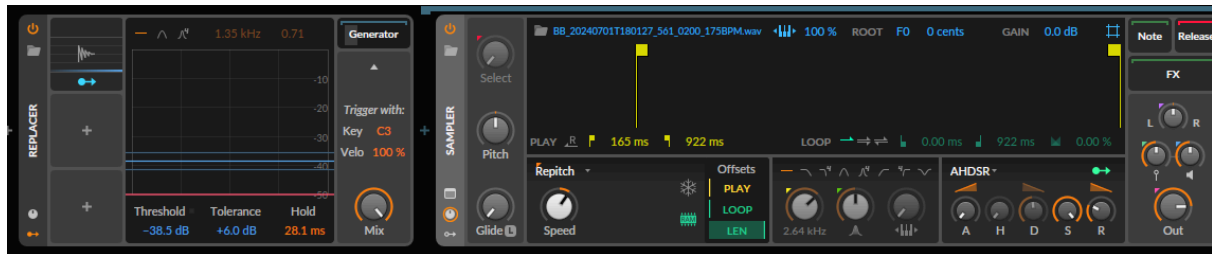


The main controls you will likely want to focus on are seek rate, range, duration and octaves.

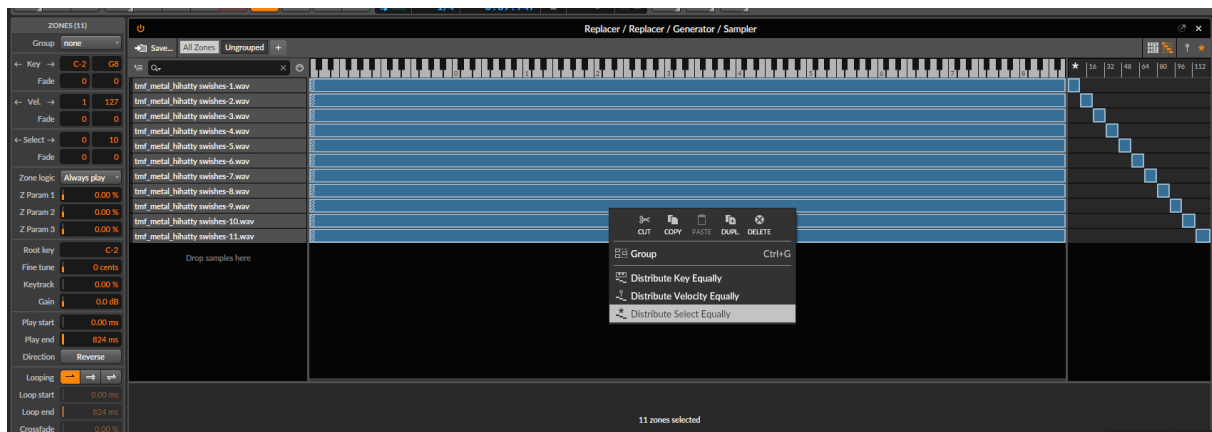
The seek rate determines how often it jumps, range how far it jumps, duration determines how long the snippets of audio it plays are. The octaves control can restrict how much it changes the playback speed, so the pitch of your sound. Have a play with it, it can be a great way to create random layers or fills. it's quite unpredictable, so you will want to resample it and then chop the audio as needed.

62. Randomised Percs Layers with Replacer

Using a Drum Trigger and some Multisampling, we can create a device that randomly spits out a different percussive layer each time it receives a drum hit. To create this effect, place a sampler inside a replacer.



Then load the sampler with a selection of percussive layers, in my case some metal Foley. Make sure the samples occupy the full range of the keyboard and right click to "distribute select equally". Set their keytrack amount to 0%.



We can then use a random modulator in "hold" mode, that retriggers with every note to select a random sample with each incoming midi note.



Quietly layering this with a drum can help add some subtle variation to it and make it feel a lot less repetitive. You can experiment with randomly changing parameters like the samples pitch for even more variation or use a "Steps" instead of a random modulator for more predictable repeating patterns.

63. Tuning Reverbs with Prisma

When using reverb in a parallel chain, we can use a spectral polyphonic tuning plugin like zynaptic pitchmap, chroma or in my case BlepFX Prisma, to tune the reverb, either to a given scale or some incoming midi.

This will make the reverb enhance the tonality of your sound instead of washing it out.



64. Vocomber

I often like to use comb filters to tune a sound. The issue is that a very resonant comb filter will ring out for a long time and wash out a lot of a sounds dynamics. We can mitigate this by placing it in a vocoder.

Here we are using the comb filtered sound as the carrier, while using the dry sound as the modulator. This will help restore some of the sounds dynamics, by still imparting a strong pitch on it.



65. Envelope Following OTT

OTT is a great way to flatten out a sound's spectrum, but it also inevitably will flatten out its dynamics. A way we can mitigate and control this is by modulating the OTT's amount with an envelope follower. Now it will only squash the louder parts of the sound into a bright, loud brick. Needless to say this is very sensitive to input gain, if your incoming sound is too loud this may well result in the opposite effect.



66. Randomised Mass Production

This last concept is less of a specific technique and more of a workflow. As you gain experience creating a specific kind of sound, you will gain an understanding of what makes it work, which ranges can function for which

parameters.

You can use this knowledge, to randomly modulate the parameters in these ranges, using something like a random modulator that outputs a new value with each midi note.



This can be a fast way to bounce out a lot of different variations of a sound and then hand pick the best few.

The wider the ranges for the parameters, the more unexpected results you will get, but more of your output will likely be bad. How you balance this variation vs reliability dilemma will be up to you.

Outro

Trying out all the techniques in this book should expand your sound design vocabulary quite a bit.

Just reading about them will be useless, you need to recreate them in your DAW to really remember and be able to use them.

I cannot tell you when to choose which technique. There is no real right and wrong in sound design.

If you understand them all well and develop an intuition for how they sound, your tastes will dictate your own system of rules for their use.

Only practice and experimentation can get you there.

Thanks a lot for your support.

If you're interested in taking private lessons with me, head over to <https://calendly.com/tildesounds/lessons>

For a selection of projects I've worked on, consult <https://tildesounds.carrd.co/>

You can reach me at tildesounds@gmail.com or on discord under the username tildesounds.

Cheers,
yona

