Guitar Effects Chain

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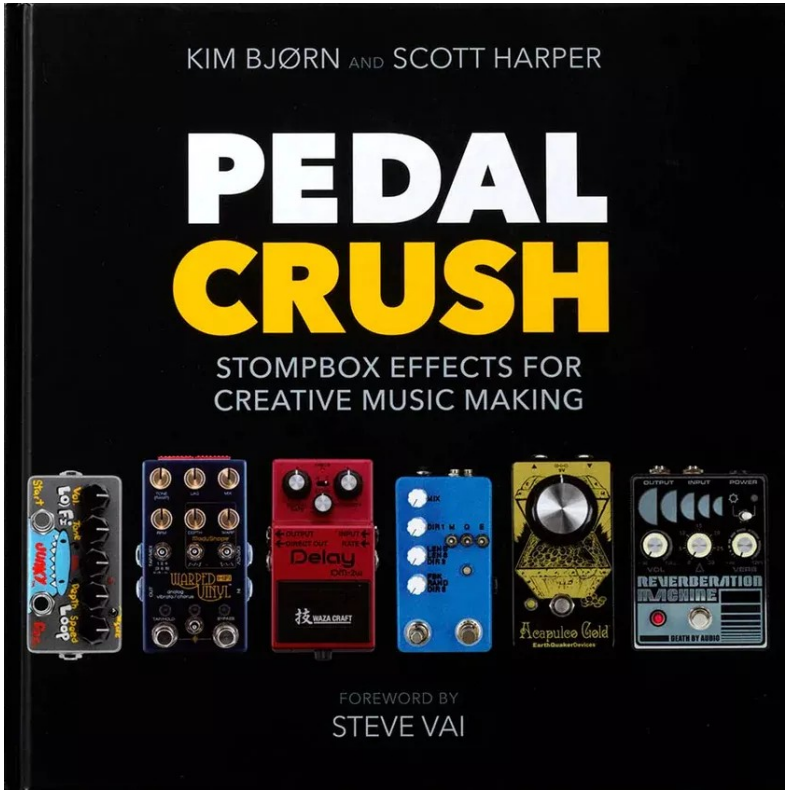
References

Book about pedals, pedals and people building pedals :

Pedal Crush

A lot of good information in this book



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Plugins used

- **mod-pitchshifter / mod-gxpitchshifter** : pitch shifting plugins. The gx version is a modified version of mod-pitchshifter useable with Guitarix
- **spectra.lv2** : A spectrum analyser from x42 as a LV2 plugin
- **sisco.lv2** : an oscilloscope from x42 as a LV2 plugin
- **lsp-plugins-lv2** : some LV2 plugins. A nice spectrum analyzer is available in the package
- **guitarix** : a lamp amplifier simulator. A complete Guitar amplifier with nice effects
- **lv2-calf-plugins-gui** : some nice plugins. We will use the compressor.
- **raysession** : a jack session manager
- **audacity** : a powerful sound recorder
- **Carla** : a plugin rack. We will use carla to manage the oscilloscope and the spectrum analyzer

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Guitar Effects Chain

Pre-Amp

Pitch

Comp.

Dist.

Wah

Mod.

Delay

Eq.

Gate

Volume

Reverb

MIDI Pedal Board

Line6 FBV
Express MKII

MIDI Mouse
Tech 21

Behringer
Fcb1010

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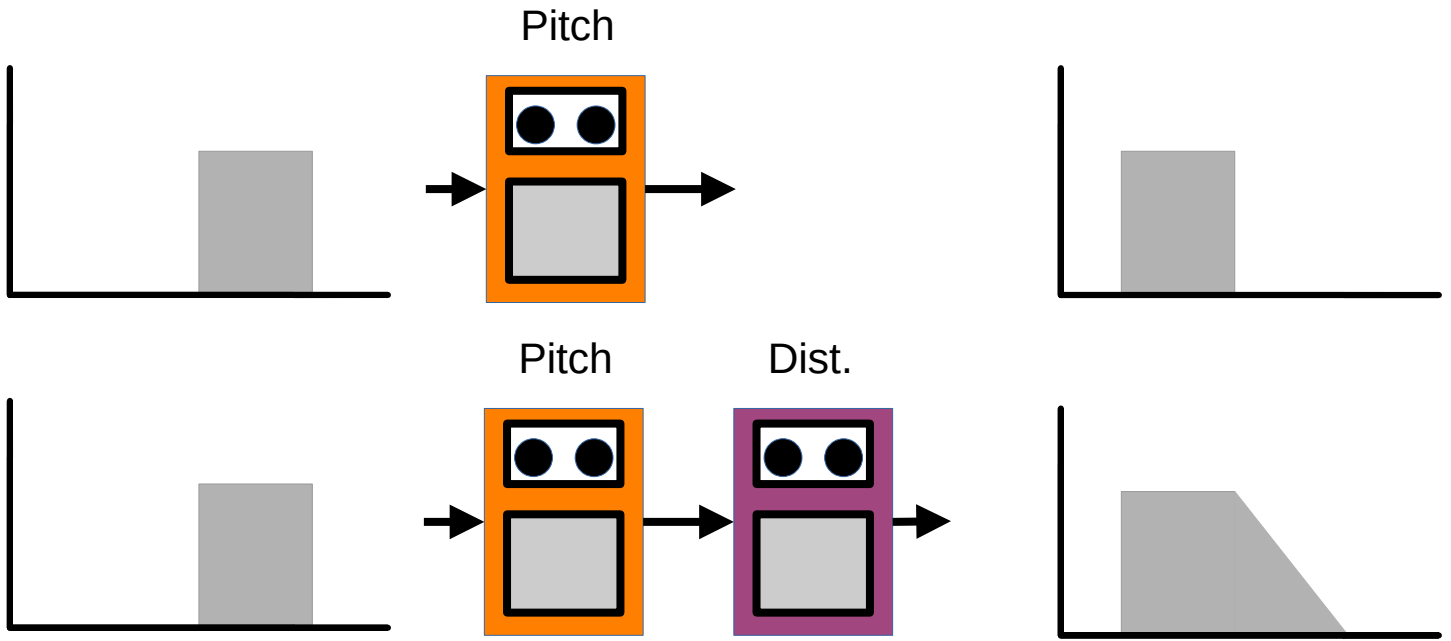
Pitch Shifter Effect



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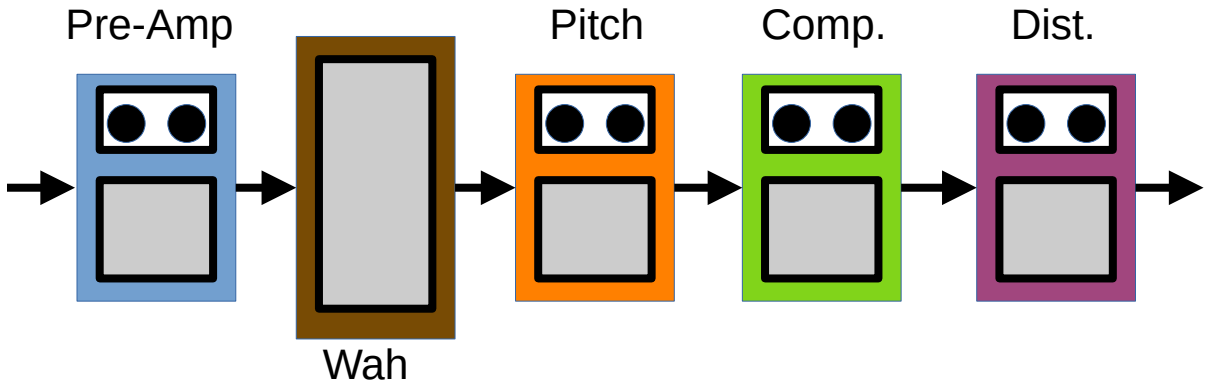
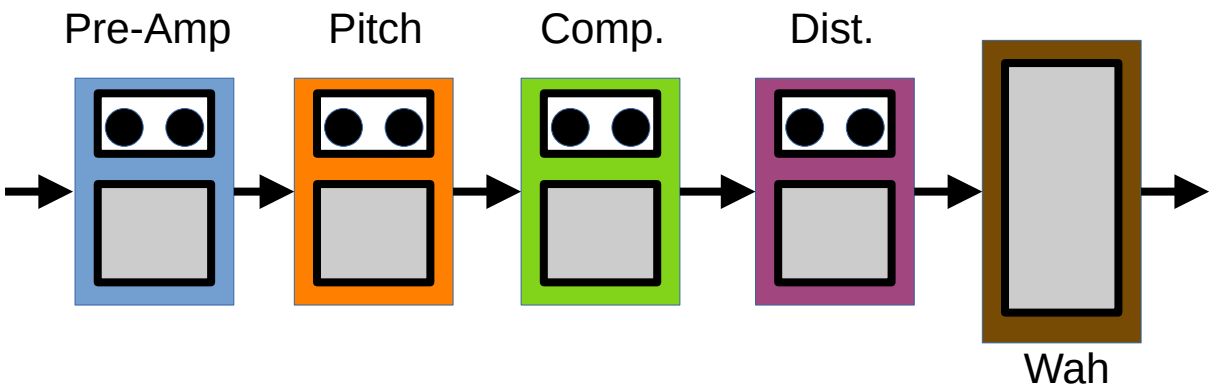
Wah Pedal Position





In the pre-amp we have a quasi-sinusoïd from the guitar.
The wah pedal which is a filter will just filter a quasi-sinusoïd and will behave more or less as a volume pedal.

After the distortion pedal, the signal has a richer specter and when processed by the wah, the wah effect will be more pronounced.

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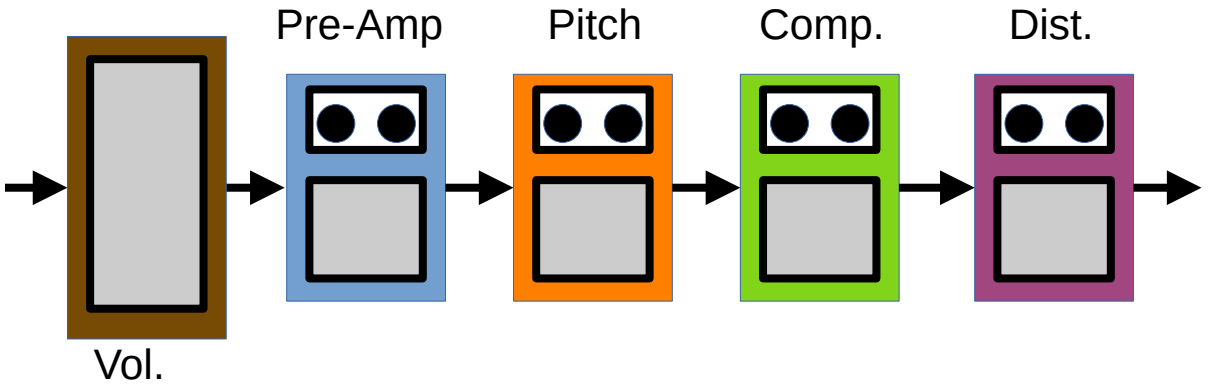
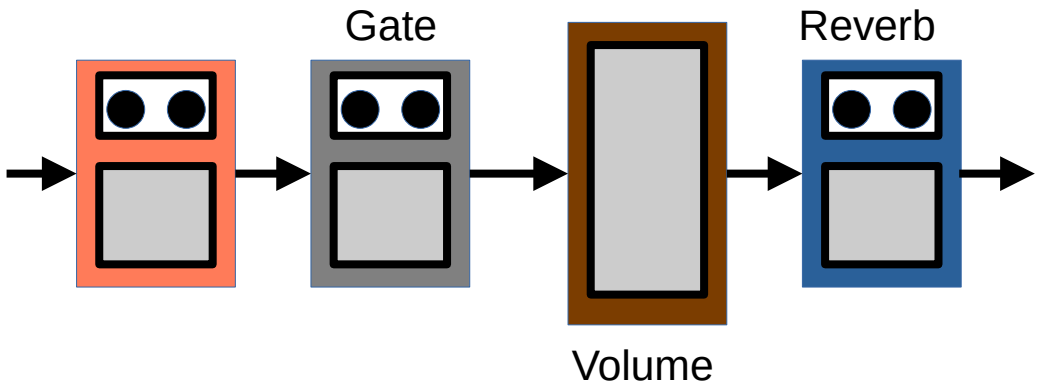
Volume Pedal Position



Placed at the beginning of the chain, the volume can have an impact on the sound. Compressor and distortion are tuned for a given level of signal.



At the end of the chain, the identity of the sound will be preserved if we reduce the level of signal via the volume pedal.

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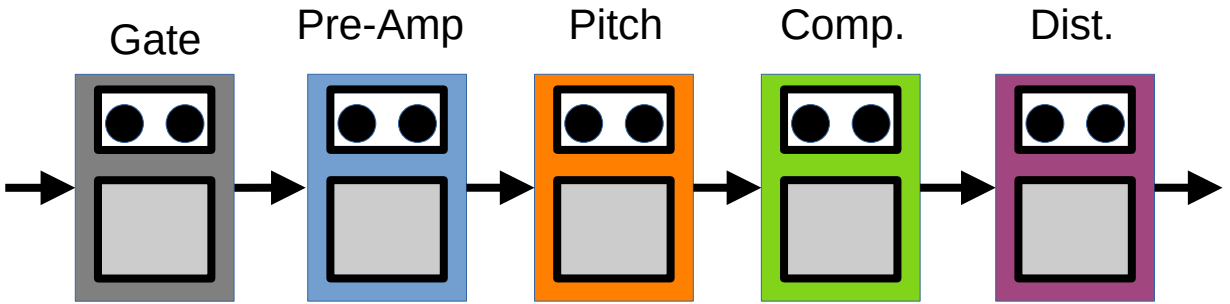
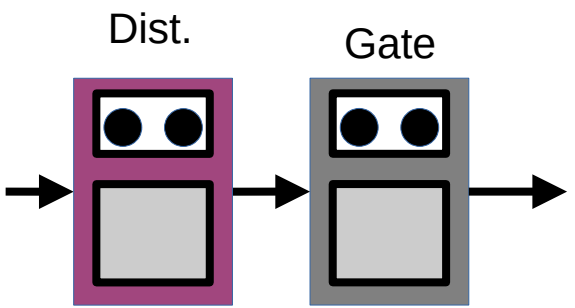
Noise Gate Position



Placed at the beginning of the chain, the volume can have an impact on the sound. Compressor and distortion are tuned for a given level of signal.



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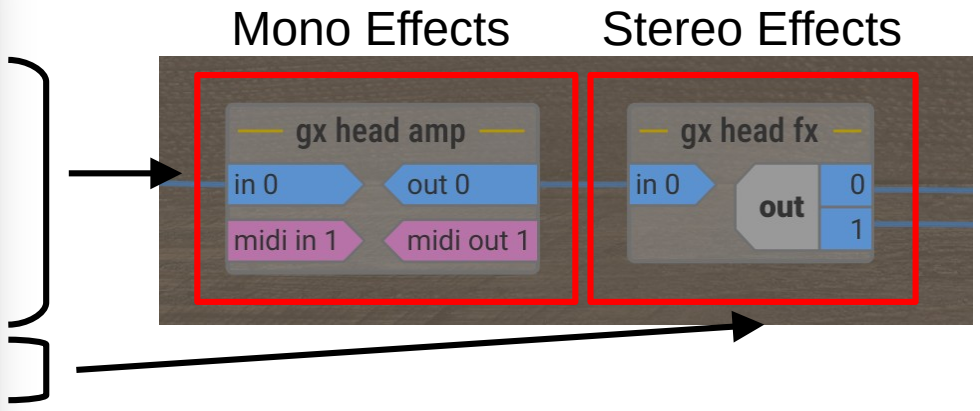
Guitarix Rack Structure



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Guitarix Default Racks

Level of the threshold compressor at the top of the rack

Clipping level at the bottom of the rack

Level of the noise gate at the top of the rack

Gain of the preamp at the bottom of the mono rack

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Guitarix Default Racks

Gain at amp input

Gain at amp output

Lamp configuration selection

Allow freq below 31 Hz

Mix level

Gain of the lamp stage

Bass level

High frequency boost

Amp internal reverb level

Hiss remover

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Guitarix Default Racks

Convoler : to imitate the style of a given band
Amp Impulse : to imitate an amplifier style

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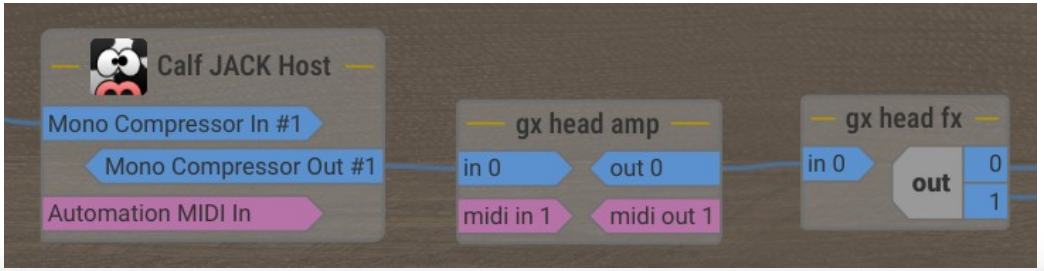
Compressor Experiment

We use the compressor from Calf plugins. This one has a nice GUI which eases the tuning of the compressor.

We then use audacity to generate a special signal using Generate -> Silence + Generate -> Tone to show the compressor behavior.

This signal is sent to calf / compressor and audacity records the audio of calf / compressor

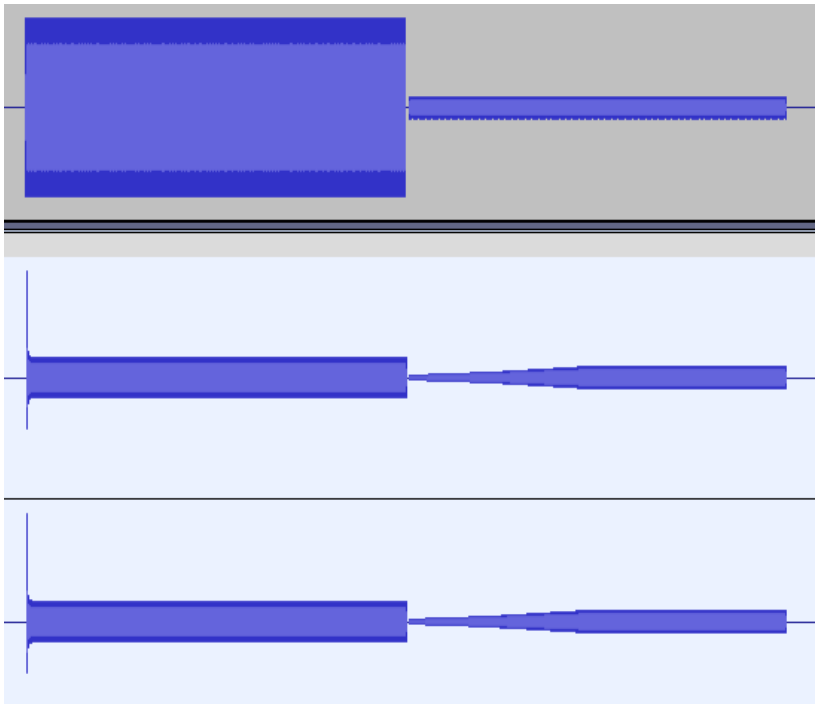


Compressor Experiment

The first part of the signal is above the threshold and the second part is below.
I set a huge release and a huge attack level.

With the attack set to a non nul value, the output signal start with the original level and then reach the level defined by the compressor at the speed defined by the attack level/

With the release set to a non nul value, at the amplitude change, the compressor keeps its gain and apply the gain to the low amplitude and slowly reach the unity gain and the speed defined by the release level.



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Compressor : Tuning

How to tune the compressor :
- Play some tapping or legato notes and set the threshold so that the notes are above the threshold in the Calf compress graph
- Play some notes using the pick and set the compressor level to reduce the level difference between a legato or tapping note and the note played with the pick.

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Distortion

- Use scopes to see the shape of the signal as you add effects (compressor, distortion, an overdrive, etc ...)
- Use spectrum analyzer to check the shape of harmonics too. Clipping on higher level harmonics may happen.

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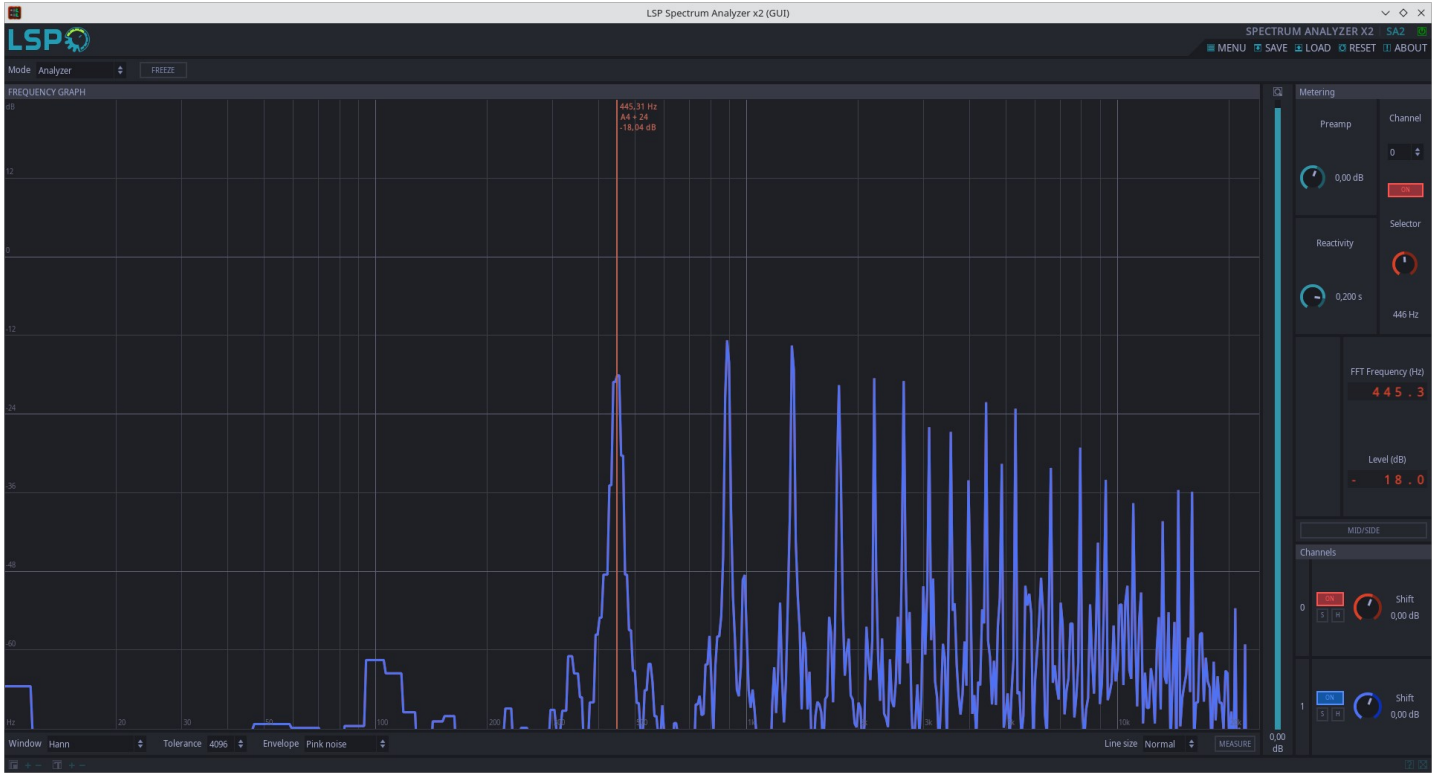
Distortion

Here is a A (440 Hz) played on a guitar with a lot of distortion.
As you can see the first harmonic has a level above the fundamental. So, when you set a distortion some clipping may happen of higher order harmonics. So keep a margin on the sound level ....



LSP spectrum analyzer

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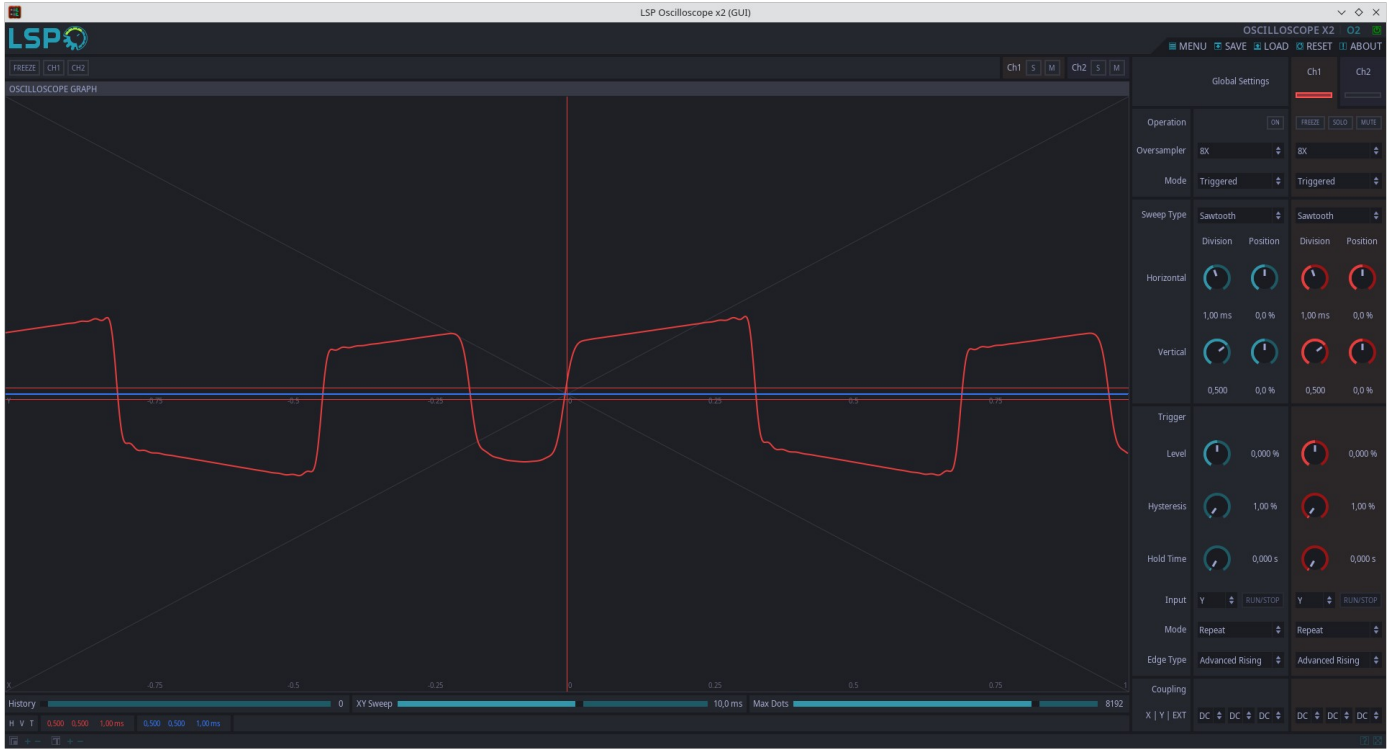
Distortion

Use a scope to check the shape of the sound and see how parameters can change the sound



LSP Oscilloscope

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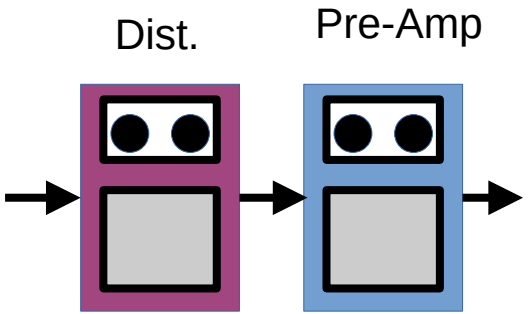
Some Distortions tuning



When using a distortion before the pre-amp or the amplifier head, the first drive / tone distortion tuning has nearly no effects. Use a little drive in the first distortion.
For the second one (the pre-amp or the amplifier head), use the level of drive you want, but after that, to limit the aliasing effects due to the spectre extension produced by the distortion, use a low pass filter to limit the frequencies after the Nyquist frequency.

Aliasing can produce some unwanted noises like ike crackling, harshness and metallic noises.

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Guitarix Settings

Overdrive : 5.1 / 100 %
Compressor : 4.5 / -51.1 / 2 / 0 / 0
Rat : 0.86 / -4.8 / 0.75
Amp : See after
Wah : ColorSound Wah / 0 / 52
Echo : 150 / 15.0
Volume : 6.3
Freeverb : 0.78 / 0.50 / 40
Cabinet : 4x12 / -0.5 / 0.6 / 3.8

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Guitarix Settings

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AIDA-X

AIDA-X are neural amplifier models developed for the MOD Device. These models a lightweight enough to be used in real time.
You can load an AIDAI-X model via the RTNeural Guitarix plugin.
The LV2-AIDA-X plugiin is not yet compatible with Guitarix but can be loaded into Carla-Rack.
You can find some good AIDA-X models on :
https://www.tone3000.com/

The NAM model is quite big and when I tried it, the load was too high and produced X-runs.

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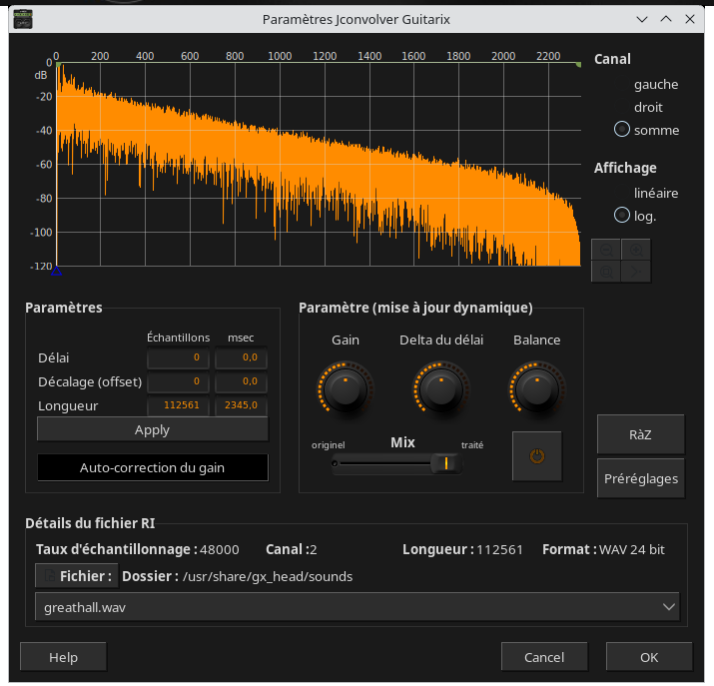
Convolver



The convolver allows you to applied an Impulse Response (IR) on an input signal. The tool allows to ‘copy‘ a given sound.

With guitarix, you can find a lot of preinstalled IR for bands and for amplifier.

Another usage of IR is to reproduce a reverberation. You can find a lot of IR for reverberation on the internet.

The last usage is to mimic a cabinet (and ensemble of speakers). Same as for reverberation, you can find a lot of IR for cabinets on the internet.

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Rehearse with TuxGuitar

Applications used :
- **guitarix** : guitar amplifier simulator
- **tuxguitar** : to play GuitarPro scores
- **timemachine** : to record some audio
- **jack_mixer** : to fine tune the audio level between tuxguitar and guitarix
- **non-mixer-xt** : (another option to replace jack_mixer)
- **ray session** : to start all these applications and reconnect them

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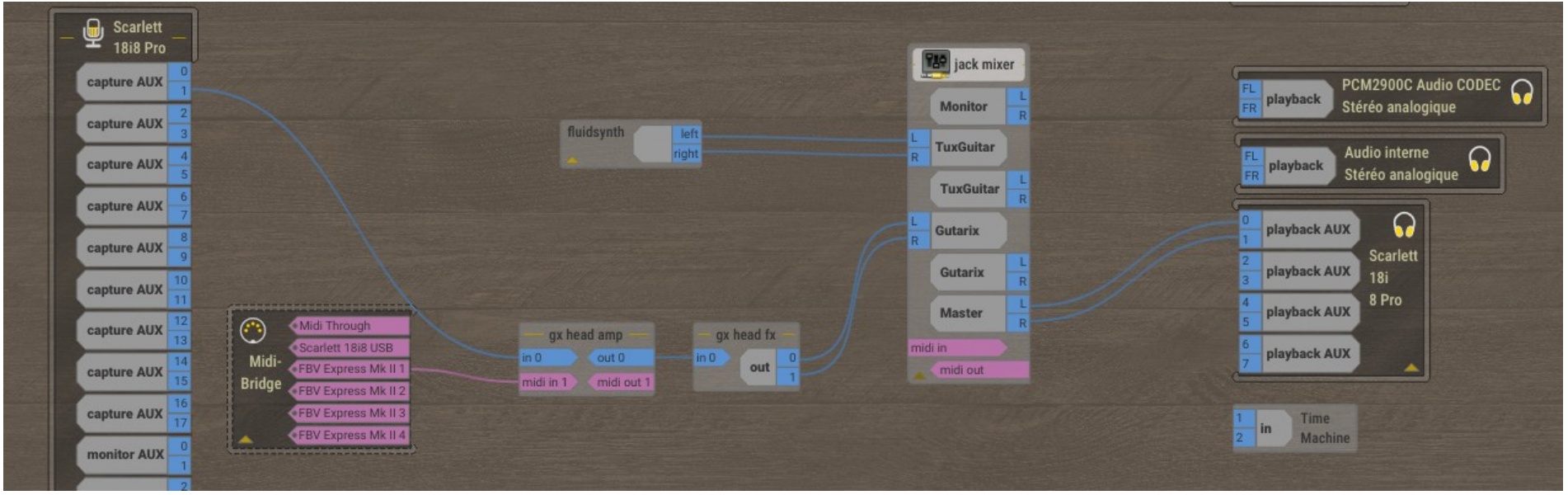
Rehearse with TuxGuitar



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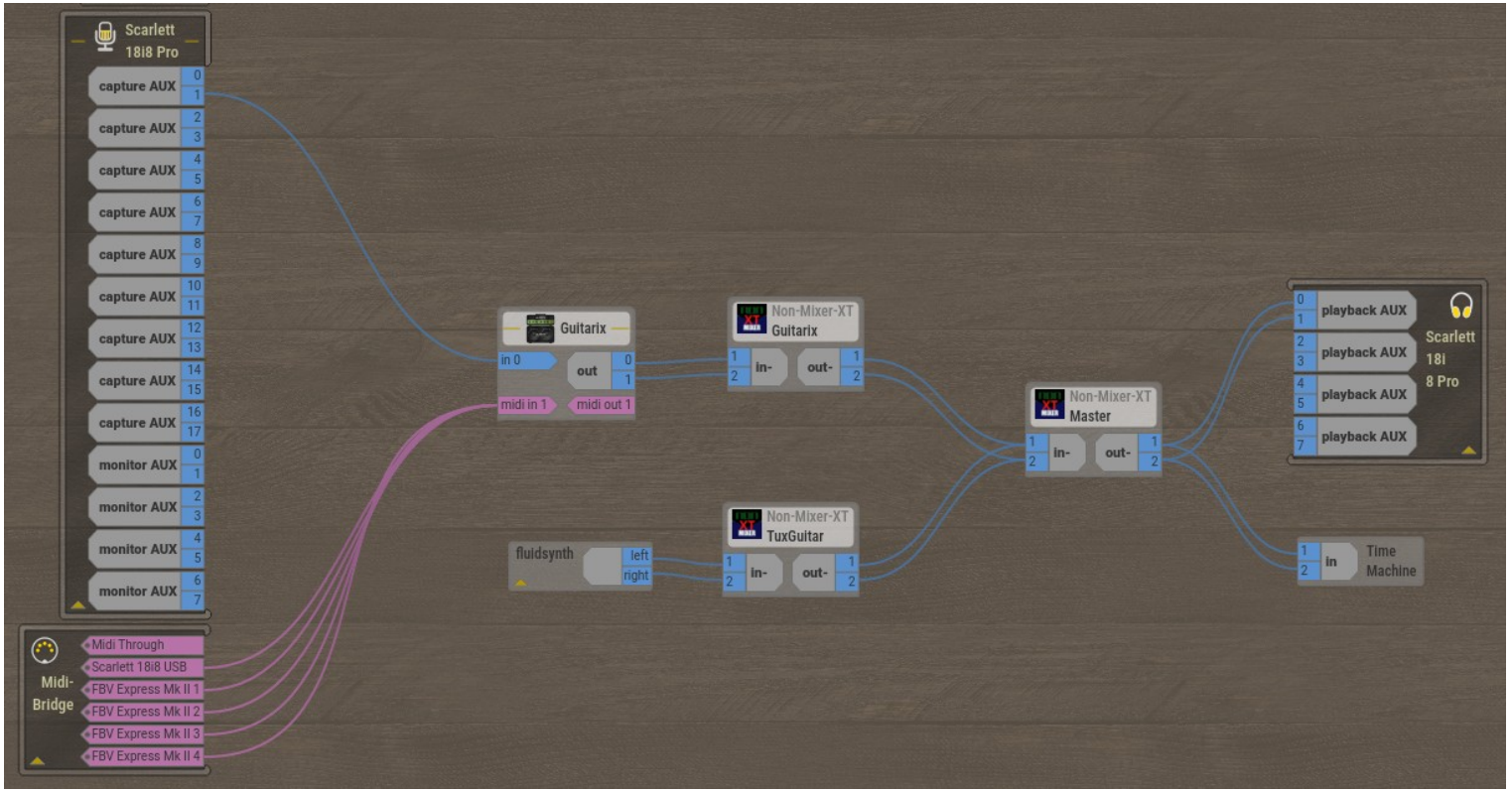
Rehearse with TuxGuitar - 2



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