Voxengo Soniformer User Guide
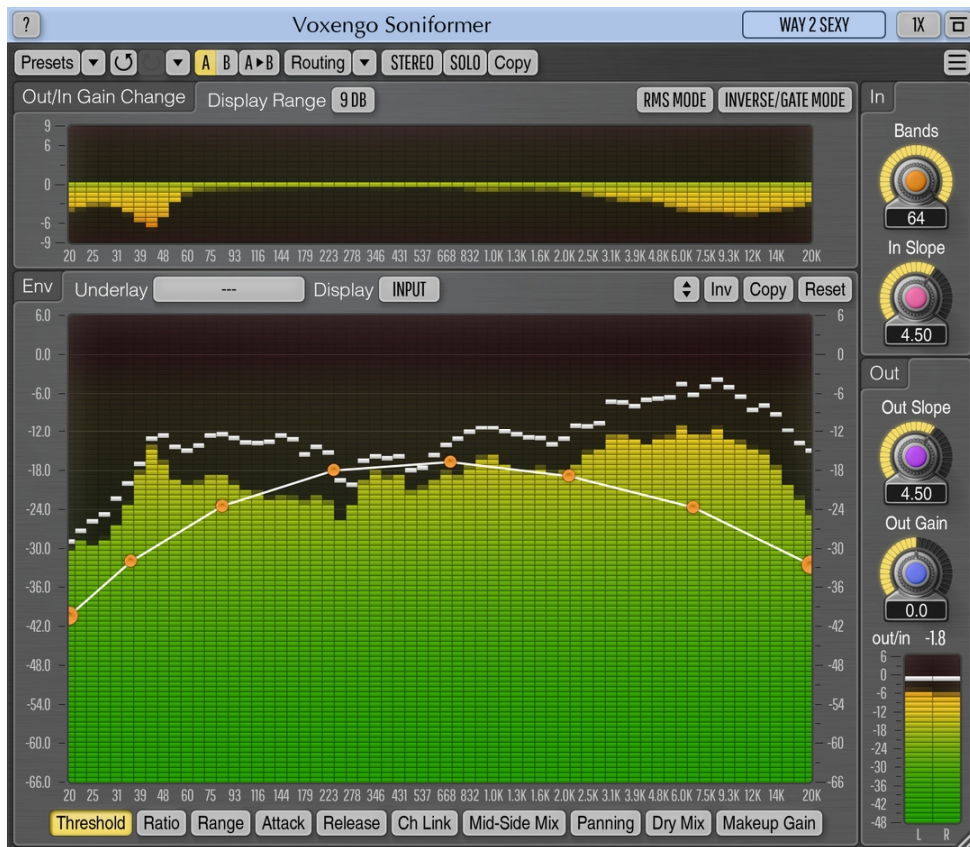
Version 3.16

https://www.voxengo.com/product/soniformer/

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Introduction

Soniformer is a spectral mastering dynamics processor plug-in for professional music production applications. During its operation, Soniformer splits incoming sound signal into multiple spectral bands. This makes Soniformer a powerful and precise tool for mastering and sound restoration purposes.

Every parameter in Soniformer is defined by means of a graphical envelope which is freely-modifiable and which may contain any number of control points. Beside usual threshold, attack, release, and compression/expander ratio parameters, Soniformer offers you control over "stereo width" and "panning" parameters making Soniformer an effective tool for stereo-field adjustments.

Not only Soniformer offers you an easy-to-use parameter envelope editing interface, it also features a comprehensive set of spectral metering tools: you can switch between input, output, stereo correlation, and stereo balance spectrums. The spectral gain change meter (that is always present on the user interface) gives you an outline of the overall signal power change applied by the plug-in's processing chain.

Features

- Up to 64-band dynamics processor
- Envelope-driven parameters
- Up to 64-band "analog" spectrum analyzer
- Stereo balance and correlation meters
- Multi-band panning
- Narrow-band sweeping
- Stereo and multi-channel processing
- Internal channel routing
- Channel grouping
- Mid/side processing
- Up to 8x oversampling
- 64-bit floating point processing
- Preset manager
- Undo/redo history
- A/B comparisons
- Contextual hint messages
- All sample rates support
- 14 ms compensated processing latency

Compatibility

This audio plug-in can be loaded into any audio host application that conforms to the AAX, AudioUnit, VST, or VST3 plug-in specification.

This plug-in is compatible with Windows (32- and 64-bit Windows XP, Vista, 7, 8, 10 and later versions, if not announced otherwise) and macOS (10.11 and later versions, if not announced otherwise, 64-bit Intel and Apple Silicon processor-based) computers (2.5 GHz dual-core or faster processor with at least 4 GB of system RAM

required). A separate binary distribution file is available for each target computer platform and audio plug-in specification.

User Interface Elements

Note: All Voxengo plug-ins feature a highly consistent user interface. Most interface elements (buttons, labels) located at the top of the user interface are the same in all Voxengo plug-ins. For an in-depth description of these and other standard features, and user interface elements, please refer to the "Voxengo Primary User Guide".

General Information

During processing, Soniformer divides incoming audio signal into multiple equally-spaced bands (this makes Soniformer a rather CPU-consumptive plug-in), extracted by means of array of band-pass filters. The lowest band has center frequency of 20 Hz; the highest band has center frequency of 20k Hz. This layout brings about 25 dB of attenuation at DC, which is also good for DC offset removal. Output spectrum's average ripple is within 0.25 dB, with a slight raise around 20 Hz and 20k Hz regions. Frequencies above 22 kHz drop down by 9 dB per octave.

The "Bands" parameter controls the number of bands the signal is split into.

Envelopes

This panel displays parameter envelope control surface. Please refer to the "Voxengo Primary User Guide" (namely, the topic called "Standard Controls – Envelope Editor") for in-depth information about this control surface's functions.

Soniformer is controlled by means of parameter envelopes. Each parameter's envelope is defined across the audible frequency range. Values on the right of the envelope control surface show either the scale of the spectrum analyzer or the scale of the gain change meters, depending on the currently selected display mode. Values on the left side show the scale of the currently selected parameter envelope.

Note that you may engage the "narrow-band sweeping" function by clicking the left mouse button on the control surface while holding the "Ctrl" ("Command" on macOS) key. This function allows you to listen to a selected narrow spectral band in order to detect unwanted sonic resonances which can then be tamed by adjusting suitable parameter envelopes.

As far as compression and expanding settings are considered, Soniformer uses a rather standard set of parameters, so if you are familiar with broadband compressors and expanders, these settings would not be hard for you to understand. The only difference between Soniformer and usual broadband dynamics processing is that in Soniformer all parameters should be defined in two dimensions (parameter value vs. frequency), instead of a single dimension.

Processing chain of Soniformer is as follows (left to right): Dynamics > Mid-Side Mix > Panning > Dry Mix > Makeup Gain. This sequence corresponds to the sequence of envelopes in the envelope selector (if read from left to right).

The following parameters can be specified in Soniformer (the "Mid-Side Mix" and "Panning" parameters are applicable to channel groups with two assigned channels):

- Threshold: compressor/expander threshold (dB).

- Ratio: compressor (>1:1) or expander (<1:1) ratio.
- Range: maximal gain change (reduction or boost) that can be applied (dB). "Caps" the gain change meter.
- Attack: attack time (milliseconds).
- Release: release time (milliseconds).
- Ch Link: channel linking amount (percent). Specifies whether to process channels together (100%) or completely separately (0%). At heavier compression or expanding settings reducing the channel linking may help reduce the "stereo field narrowing" effect. Reducing the channel linking is especially useful and meaningful for spectral regions where stereo correlation is near zero.
- Mid-Side Mix: the amount of side channel signal present in the output signal (in percent). When the value is at 100% (no mid channel present) the resulting full side channel output will be 6 dB louder in comparison to 50% position to account for a usually quieter side channel signal.
- Panning: stereo panning (percent).
- Dry Mix: the amount of dry unprocessed signal to mix in (percent).
- Makeup Gain: overall makeup gain (dB). May also be used as an equalizer.

The "Underlay Env" selector allows you to underlay a specified envelope from a specified channel group under the currently selected envelope.

The "Display" selector chooses the type of spectrum to display for the currently selected envelope (note that the "Bal" and "Corr" are applicable to channel groups with two assigned channels):

- Off: disable spectrum display completely.
- Input: input spectrum display (in decibel), affected by the "In Slope" parameter.
- Output: output spectrum display (in decibel), affected by the "Out Slope" parameter.
- Bal: display output channels balance (in decibel). Integration time depends on the "Release Time" meter setting. If negative then the left channel is louder.
- Corr: display correlation between output channels. Integration time depends on the "Release Time" meter setting. Positive values – channels are in-phase, zero values – channels are uncorrelated, negative values – channels are out-of-phase. Please read the topic named "Knowledge Bit – Correlation" in the "Voxengo Primary User Guide" for specific information about correlation values and their possible meaning.

Integration, release, and peak hold times of the spectrum analyzers can be adjusted via the "Settings" window.

Out/In Gain Change

This panel displays multi-band gain change meter, with 200-millisecond integration time. This is a "true" gain change that is produced by all processing stages of the plug-in, including any changes produced by the "Mid-Side Mix" and "Panning" parameters.

The "Display Range" selector changes the gain change range displayed on the meter.

The "RMS Mode" switch enables the RMS signal power estimator with 2-millisecond integration time. When this switch is enabled, plug-in produces a less distorted sound overall, especially at low attack and release time values. This mode may also sound overly smooth and "rounded". If this mode was not enabled, the plug-in uses instant peak level to calculate dynamics function. Note that the "RMS Mode" switch does not affect the spectrum analyzer.

The "Inverse/Gate Mode" inverses dynamical response of the plug-in producing a so called "downward expanding" instead of compression when ratios >1:1 are used. This mode can be used for various "de-noising" tasks or when you want to make a recording to sound more "in your face", with louder solo instruments separated from the rest of the mix. Engaging this mode is similar to using "expander" (<1:1) ratios in the non-inverse mode except that in the "inverse mode" quiet sounds become increasingly quieter while with the "expander" ratios, loud sounds become increasingly louder. Note that the "Attack" and "Release" settings act swapped in this mode.

In other words, in the "inverse" mode the signal levels that are below the threshold line are affected while in the "normal" mode the signal levels that are above the threshold line are affected. The "Inverse Mode" can be also called as the "Gate Mode". For best gating results, this mode can be used with long Attack and short Release times.

In

The "In Slope" parameter in the "In" panel adjusts the slope of the "Input" spectrum you see on the envelope control surface. This parameter does not affect the signal directly – it only affects spectrum view and plug-in's threshold. Note that this parameter is specified for all channel groups at once.

Out

The "Out Slope" parameter in the "Out" panel adjusts the slope of the "Output" spectrum you see on the envelope control surface. This parameter does not affect the output signal. You should carefully choose the output slope value since under its guide you may get either too bright or too dark mix if the slope value chosen is unsuitable for the mix you are working on. Note that this parameter is specified for all channel groups at once.

The "Out Gain" parameter (in decibel) changes overall output signal level of the plug-in. This parameter is not reflected on the out/in gain change meter. You may take a look at the "out/in" indicator to see the average loudness change taking place, which may be accounted for with the "Out Gain" knob, or via clicking on the numerical value of this indicator.

Credits

DSP algorithms, internal signal routing code, user interface layout by Aleksey Vaneev.

Graphics user interface code by Vladimir Stolypko. Graphics elements by Vladimir Stolypko and Scott Kane.

This plug-in is implemented in multi-platform C++ code form and uses "zlib" compression library (written by Jean-loup Gailly and Mark Adler), filter design equations by Magnus Jonsson, FFT algorithm by Takuya Ooura, VST plug-in technology by Steinberg, AudioUnit plug-in SDK by Apple, Inc., AAX plug-in SDK by Avid Technology, Inc., Intel IPP and run-time library by Intel Corporation (used under the corresponding licenses granted by these parties).

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Questions and Answers

Q. Do you have any tips on how to tune Soniformer for compression?

A. The following compression tuning technique can be used:

1. Load the "Default" factory ROM preset.

2. Start the audio playback and set the "In Slope" parameter to a desired value. It can be suggested that you adjust the "In Slope" until you get a mostly "horizontal" spectrum making it easier for you to draw the "Threshold" envelope.

3. Edit the "Threshold" envelope. This envelope should have the shape the spectrum should follow in your opinion. Draw this envelope somewhere in-between the average (green bars) and peak (white/red marks) levels you see on the spectrum analyzer.

4. Draw appropriate "Attack", "Release", and "Ratio" envelopes. In the simplest case all these envelopes should be left as horizontal lines set at a required parameter values.

5. Lower the threshold envelope until you clearly hear the difference.

6. Adjust the "Attack", "Release" and "Threshold" envelopes further. The "Ratio" envelope can be also adjusted. At this step you should optimize these parameters so that you get a tight, "glued", but not an overly compressed, sound.

7. Tune the "Makeup Gain" envelope to accommodate for gain adjustments taking place. Or after setting the "Out Slope" parameter, use the "Makeup Gain" envelope as equalizer and achieve a required output spectrum.

Q. Do you have any suggestions on how to use Soniformer during mastering?

A. Soniformer is best used before any equalizer in the mastering chain, because if used after an equalizer, the settings of this equalizer will be adjusted by Soniformer. Alternatively, you may use Soniformer's own "Makeup Gain", without any additional equalizer. A sample effect chain would be: Soniformer, equalizer, and loudness maximizer (limiter). It can be suggested that mastering reverbs be used before Soniformer so that the reverb can be additionally "densified", to create a warmer and "glued" sound.

Equalizer can be also used before Soniformer if the original frequency balance is far from what is needed. This way, the initial equalizing will help Soniformer straighten the spectral balance further.

Q. Do you have any tips on how to use the factory presets?

A. Factory presets are "starting points" only. While they can be instantly usable, in most cases they require some tweaking, to make them suitable for a particular mix. What you will definitely need to adjust is the threshold envelope, because the input level of your mix might be different from what was used by us during the design of the preset. The other parameter that you might need to adjust is the output gain.

Q. I find it difficult to understand how node (control point) dragging works.

A. When you are dragging a single control point, you can move it freely around. When you are dragging a selection of control points, you have two options: either drag one of the selected points to move all of them horizontally, or drag the segment line between the points to move all of them vertically. The segment between the points can be also dragged when no control points were selected: in this case, the segment alone can be moved vertically.

Q. Can you solo a band or group of bands in Soniformer to hear just what's going on in a certain frequency range?

A. While you cannot solo individual bands in Soniformer, you can use the "narrow band sweeping" function: to enable it, press the left mouse button on the control surface while holding the "Ctrl" ("Command" on macOS) key.

Q. When you start mastering with Soniformer, do you have to master all the tracks that you want to master all at once with the same mastering settings? Or do you have to master the tracks separately with different mastering settings?

A. Most of the settings should be fine-tuned for every track. It is mastering engineer's task to make everything sound uniform. A plugin itself usually cannot do this automatically since tracks usually have different instruments and dynamics, a plugin cannot "hear" the song as a human hears it. Mastering is an art for the most part. However, when you are mastering an album recorded with the same instruments used in all tracks (e.g., jazz session album) you may use a single Soniformer setting to process all tracks.

Q. Do you mind stating briefly the principle behind the stereo width parameter? Is there some mid-side going on in the background?

A. It is exactly mid-side technique, but applied in a multi-band manner. Since it is a mid-side technique, it is not based on any phase shifting or signal delaying techniques, it is fully mono-compatible if used moderately (the "Corr" spectrum display can be used to check whether your track is mono-compatible or not).

Q. When moving the "In Slope" knob, should I be able to hear these changes?

A. You cannot hear the changes in sound directly when adjusting the "In Slope" parameter. However, if you have a non-unity "Ratio" envelope setting and the "Threshold" envelope set at signal's average level, you will immediately hear the effect of the "In Slope" knob as it rotates the spectrum around the "Threshold" envelope.

Q. Can Soniformer compress the lower frequency content only, leaving the higher frequencies unaffected?

A. Yes, it can do that since it supports frequency-dependent envelopes for all parameters. In order to compress the lower frequencies only, you should set the

compression ratio envelope for the lower frequencies to values >1:1 (e.g., 3:1) while leaving the compression ratio at 1:1 for the higher frequencies.

Q. Does Soniformer have "limiter" capabilities on its various bands, or would that be best achieved by using a separate limiter plug-in?

A. Soniformer does not have a built-in limiter. However, at high compression ratios, fast attack and release settings, you can achieve multi-band limiting with Soniformer. On the other hand, multi-band limiting may be suboptimal since it may go over the desired signal level – it is suggested that you use a broadband brickwall limiter like Elephant.

Q. Does Soniformer support side-chaining?

A. No, it does not support side-chaining, and this feature is not planned for implementation.

Q. Why when I'm feeding Soniformer with a white-noise or pink-noise sample I see a level drop above 12 kHz on the analyzer?

A. This drop is caused by a band-pass filter approaching the Nyquist frequency that technically has no frequencies beyond it. So, an "asymmetry" in signal's loudness appears between the left and right lobes of the filter. This is in no way an error in filter design nor loudness estimation. If in doubt, you can enable the built-in oversampling which will demonstrate a similar "drop". With 96kHz input sample rate and above, the drop becomes less pronounced, because the noise goes far beyond 20kHz and covers a wider range of frequencies. Also, the drop does not manifest on pure sinewaves: this demonstrates that the band-pass filters produce an approximately linear amplitude response.

Happy Mastering!