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# Voxengo Soniformer User Guide



Version 3.12

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

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## Introduction

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Soniformer is a spectral mastering dynamics processor plug-in for professional music production applications. During its operation, Soniformer splits incoming sound signal into 32 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 graphic 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

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- 32-band dynamics processor
- Envelope-driven parameters
- 32-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
- 11 ms compensated processing latency

## Compatibility

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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 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 plugin specification.

## User Interface Elements

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**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

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During processing, Soniformer divides incoming audio signal into 32 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 general 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.

### Envelopes

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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 Mac OS X) 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 processors 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 > Side Chn Mix > Panning > 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 “Side Chn 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).
- Chn Linking: 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.
- Side Chn Mix (side channel 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).
- Makeup Gain: overall makeup gain (dB). May also work 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 channel balance (in decibel). Integration time depends on the Release Time meter setting. If negative then the left channel is louder.
- Corr: display output correlation between 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 “Input” and “Output” spectrum analyzers can be adjusted via the “Settings” window.

## Out/In Gain Change

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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 steps of the plug-in, including any change produced by the “Side Chn Mix” and “Panning” parameters.

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

The “RMS Mode” switch enables use of RMS signal power estimator with 2-millisecond integration time by the plug-in. When this switch is enabled, plug-in produces a less distorted sound overall, especially at low attack and release time

settings. This mode may also sound too smooth and “rounded”. If this mode was not enabled, plug-in uses instant peak level to calculate dynamics function. Note that this “RMS Mode” switch does not affect the function of the spectrum analyzers.

The “Downward 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 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-downward mode except that in the “downward mode” quiet sounds become increasingly quieter while with the usual “expander” ratios loud sounds become increasingly louder.

In other words, in the "downward mode" the signal levels that are below the threshold line are affected while in the "normal" non-downward mode the signal levels that are above the threshold line are affected. The “Downward 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.

## Input

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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.

## Output

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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 multi-band gain adjustment meter.

## Credits

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

Graphics user interface code by Vladimir Stolytko. Graphics elements by Vladimir Stolytko 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), “LZ4” compression library by Yann Collet, filter design equations by Magnus Jonsson, 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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### Beta-Testers

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Dave Huizing

Jay Key

Mike Roland

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## Questions and Answers

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

**A.** The following compression tuning technique can be used:

1. Press the topmost “Master Reset” button to reset plug-in’s state.
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 bars) 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 value.
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. On this step you should optimize these parameters so that you get a tight, “glued”, but not an over-compressed, sound.
7. Tune the “Out Gain” envelope to accommodate for gain adjustments taking place, or after setting the “Out Slope” parameter use the “Out Gain” envelope as equalizer and achieve a required output spectrum look.

### **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, EQ 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, EQ plug-in 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.

EQ can also be used before Soniformer if the original track's frequency balance is far from what is needed. This way, the initial EQing 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 be done 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 dragging works.**

**A.** When you are dragging a single node, you can move it freely around. When you are dragging a selection of nodes, you have two options: either drag one of the selected nodes to move all of them horizontally, or drag the segment line between the nodes to move all of them 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.** You cannot solo bands in Soniformer, but 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 Mac OS X) 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. Software itself usually cannot do this automatically since tracks usually have different instruments and dynamics, the software 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 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.

**Happy Mastering!**