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# Voxengo HarmoniEQ User Guide



Version 2.11

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

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## Introduction

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HarmoniEQ is a parametric, harmonically-enhanced equalizer plug-in for professional music production applications. Harmonic enhancement HarmoniEQ applies to the sound is an inherent element of its overall sonic quality. HarmoniEQ also features dynamic equalization modes that offer you a vast palette of sound-shaping capabilities, suitable for mastering. Beside that, HarmoniEQ features a saturation module of the original “Lampthruster” algorithm which produces a unique, impactful, sonic character.

Since the easiness of tuning was one of our goals when producing this plug-in, HarmoniEQ features a single control surface to specify the equalizer curve. HarmoniEQ's control surface workflow implements our best findings in the area of “user-equalizer” interaction. Just drag the filter control points to the right places. You can enable up to 7 parametric filters, with the filter type freely-selectable from peaking, low-shelf, high-shelf, low-pass, high-pass, and notch filter types.

Another useful element of HarmoniEQ is its control surface's frequency range which goes up to 38 kHz. Such extended range allows you to make smooth “air” boosts easily. While HarmoniEQ is best suited for boosts, its cuts also sound great.

## Features

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- Harmonically-enhanced equalizer
- Dynamic equalizing
- Real-time spectrum analysis
- 7 parametric filter bands
- Narrow-band sweeping
- User interface window resizing
- 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 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

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**Note:** All Voxengo plug-ins feature a highly consistent user interface. Most interface elements (buttons, labels) located on 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”.

### Equalizer

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This panel displays parametric equalizer’s control surface. Please refer to the “Voxengo Primary User Guide” for in-depth information about this control surface’s functions.

The “Range” selector allows you to set the accessible range of EQ gain adjustments.

The “Hold” switch allows you to hold spectrum updates temporarily for the purpose of visual comparison. Note that spectrum updates will be automatically resumed whenever you switch between channel groups.

The “Underlay” selector allows you to add an additional underlying EQ curve and spectrum (in a specified color) from another channel group of the current plug-in instance.

The “Spec” selector allows you to select and edit spectrum’s display mode. Please refer to the “Voxengo Primary User Guide” for in-depth information about spectrum mode settings.

The “Dyn” selector specifies dynamics mode (Extreme/Hard/Soft variants offer differing “strengths” of the modes):

- The “Off” mode disables all dynamics.
- The “Exp Extra/Hard/Soft” modes enable “expanding” dynamics. In these modes an EQ boost will result in a slight overall level increase of all transients thus empowering these transients. These modes produce “expanded” dynamic range sound.
- The “Comp Extra/Hard/Soft” modes enable “compressing” dynamics. In these modes an EQ boost will result in a slight overall level decrease of all transients thus compressing these transients. These modes produce “tight” dynamic range sound.

Dynamics modes of HarmoniEQ should not be compared to those of GlissEQ – they use a completely different approach. Dynamics implemented in HarmoniEQ give its equalizer very unique characteristics and benefits. When you are using “expanding” dynamics modes you do not need to use large EQ boosts since any EQ boost you do is “amplified” by the dynamics. Moreover, since dynamics are processed in a broadband manner, any EQ boost produces a broadband loudness boost thus producing a much less hollow sound while allowing you to achieve a required sonic coloration. The “compressing” dynamics modes offer you a quite different benefit: they allow you to apply equalization without increasing peak levels thus reducing general EQ harshness.

It is important to note that EQ cuts in the “expanding” modes produce a compressed dynamic range. While EQ cuts in the “compressing” modes produce an expanded

dynamic range. The descriptions of dynamics modes given above are based on EQ changes performed by a single filter. If you are using an intermix of EQ boosts and cuts, the actual dynamical behavior will depend on what prevails – EQ boost or EQ cut. Note that the signal’s original dynamic range will not be changed if there is no energy present in the frequency range being adjusted.

Also note that dynamics modes are processed in a channel-linked manner; if you want the input channels to be processed completely independently, please load the “Dual Mono” routing preset.

The “Hrm” selector specifies the strength of the harmonic coloration, from “Very Hard” to “Clean”. Note that harmonic coloration HarmoniEQ produces mainly comprises of 2<sup>nd</sup> and 3<sup>rd</sup> harmonics, with 3<sup>rd</sup> harmonic at a low level. Harmonic coloration takes place only after at least a single filter was enabled. Harmonic enhancement’s subjective qualities of HarmoniEQ are different to those of GlissEQ’s harmonically-enhanced filter type. Beside that, HarmoniEQ has selectable “strength” of harmonic coloration while GlissEQ offers harmonic coloration of a fixed strength per filter.

HarmoniEQ features the following filter types:

- Peaking – peaking (parametric) filter.
- Lo-shelf, Hi-shelf – low-shelving and high-shelving filters.
- Lo-pass 12, Hi-pass 12, Lo-pass 24, Hi-pass 24 – low-pass and high-pass filters with the specified slope in decibels per octave. The “bandwidth” affects transition band of these filters. The filter’s slope is fixed: for example, you can’t use the “bandwidth” parameter to turn the 24 dB/oct filter into the 48 dB/oct one – you have to use two 24 dB/oct filters to get the 48 dB/oct slope. The optimal bandwidth for these filters is around 1.9 – it provides minimal transition band without resonance boost appearing.
- Notch – band-rejection filter: filters out a narrow spectral area completely (minus infinity gain at center frequency).
- Bandpass – a standard band-pass filter. This filter type is usually used for “telephone line” sound effects. This filter can be also used for monitoring of a narrow spectral band.

## Out

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The “LT” switch enables the saturation module derived from the classic “Lampthrustrer” plug-in. This module is not just a post-processing kind of module: its topology reacts on all other modules in use: dynamics, equalizer and harmonics. This saturation module adds a lot of “definition” and “character” to the final sound. You may adjust the strength of coloration applied by this module with the “LT Drive” knob; you may also choose between various “modes” that offer you a variety of “colorations”. The offered “modes” are quite diverse: it is advisable to select a mode that is most suitable for the program material being equalized. Please bear in mind that saturation is saturation: it does sound smooth most of the time, but in rare cases may be heard as unwanted transient distortion; some modes may sound smoother than other modes on a specific material. Note that this module may not always work well together with high-pass filters: in this case, it is suggested to leave the “LT” switch off, or to use the “Tube 2” mode. Also note that some “LT” modes may produce transient clicks on mode switching and playback restarts: such behavior

cannot be fixed due to a sheer amount of signal processing non-linearity associated with the “LT” module.

The “In Gain” parameter (in decibel) controls the input signal’s level. Since HarmoniEQ’s filters produce harmonic coloration, the amount of this coloration greatly depends on the loudness of the input signal. Thus the “In Gain” parameter gives you control over strength of harmonic coloration; this parameter should be treated as mission-critical at attaining smooth, non-distorting, harmonic coloration, especially when the “LT” module is enabled. Note that you may use the right mouse button to adjust the “In Gain” parameter together with the “Out Gain” parameter, in an inversely-linked manner.

The “Out Gain” parameter (in decibel) changes overall output signal level of the plugin.

## 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, “base64” code by Jouni Malinen, FFT algorithm by Takuya Ooura, filter design equations by Magnus Jonsson and Robert Bristow-Johnson, 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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