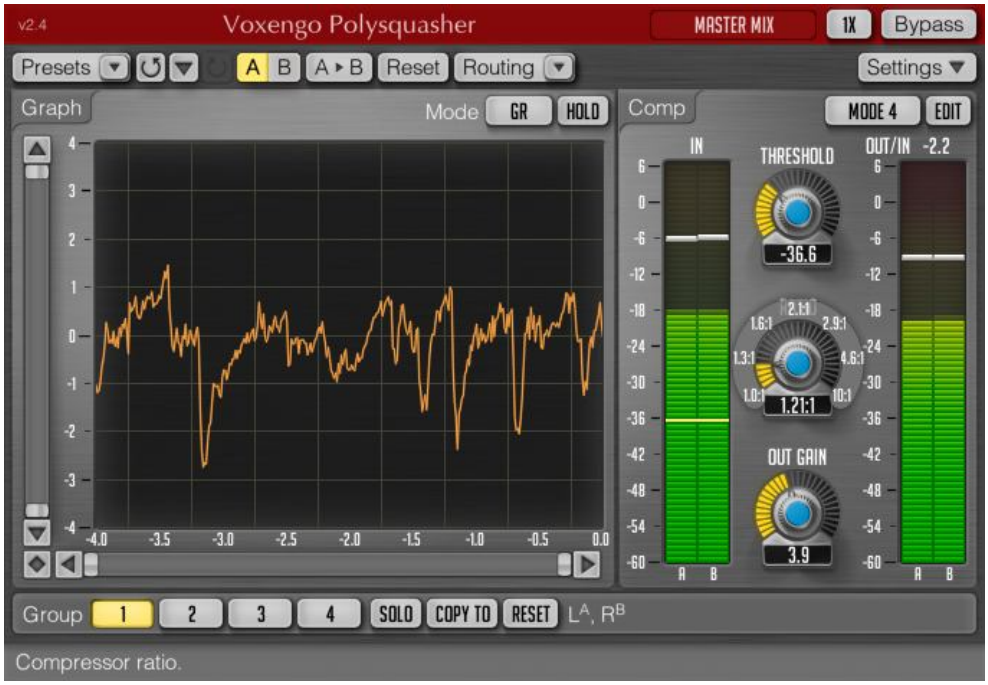
Sound with a soul
Voxengo

Voxengo Polysquasher User Guide



Software version 2.4

http://www.voxengo.com/

Contents

Introduction

Voxengo Polysquasher is a mastering compressor plug-in for professional audio and sound production applications. Polysquasher was designed with a main goal: to be transparent. Transparent compression action is a cornerstone for any mastering compressor. Transparency of audio signal processing is necessary to preserve all existing elements in the mix, while compression itself is necessary to make the mix sound uniform to other mixes (tracks) and to make it sound more solid and "glued".

Polysquasher achieves its goal by using a unique compression algorithm which requires a small number of parameters – basically threshold and ratio only – making this compressor a joy to use. More advanced settings are hidden in the "compressor mode editor" panel where you can create your own compressor modes that can be easily recalled later.

Polysquasher is best used as a finishing compressor inserted in the chain before the final mastering limiter.

Polysquasher also features real-time gain reduction and waveform graphs. Full multi-channel operation is supported.

Features

- Transparent compression sound
- Real-time gain reduction graph
- 8 built-in compressor modes
- Compressor mode editor
- 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
- 22 ms compensated processing latency

Compatibility

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

This plug-in is compatible with Windows (32- and 64-bit Windows 7, Vista, XP) and Mac OS X (10.5 and later versions, 32- and 64-bit, Intel processor-based) computers (2 GHz dual-core or faster processor with at least 1 GB of system RAM required). A separate binary distribution file is available for each target computer platform for each audio plug-in specification.

User Interface Elements

Note: Most interface elements (buttons, labels) located on the top of the user interface and on the bottom are standard among all Voxengo plug-ins and do not require much learning effort. For an in-depth description of these and other standard user interface elements and features please refer to the "Voxengo Primary User Guide". Learned once it will allow you to feel comfortable with all pro audio plug-ins from Voxengo.

Graph

This frame displays real-time graph that represents compressor's operation. You may switch between "GR" (gain reduction) graph that displays gain reduction function applied to the input signal, and "Wave" graph which displays input and output waveform graphs, overlaid (note that overlay color is represented by a combination of input and output's graph colors). Gain reduction graph is displayed relative to 2-second average: thus, it does not reflect constant gain reduction values.

With the help of these graphs you may evaluate how "deep" the compressor goes in its operation.

You may enable the "Hold" switch to freeze the graph display temporarily for closer inspection purposes.

Compressor Parameters ("Comp")

This frame contains parameters that affect compression.

The mode selector allows you to switch between various built-in compressor modes and your own preset modes. The "Edit" button opens the "Compressor Mode Editor" popup window that offers you a thorough control over the compressor mode. Note that built-in modes named with "Pnch" suffix represent modes with a "punchy" sound, augmenting transients in the input signal.

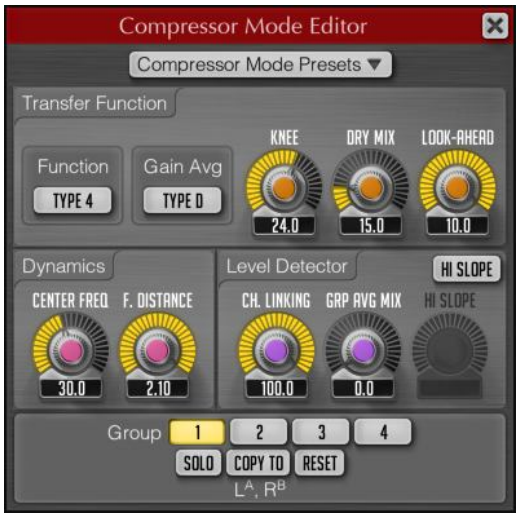
The "Threshold" parameter specifies compression threshold (dB relative full-scale). Input signal louder than this threshold level will be compressed. The value of the "Threshold" parameter is reflected on the "In" level meter.

The "Ratio" parameter specifies "input-to-output" compression ratio. "3.0 : 1.0" means increase of input signal above compression threshold by 3.0 decibel will result in increase of output signal by only 1.0 decibel.

The "Out Gain" parameter adjusts overall output signal level (decibel). Note that in order to retain original input signal's sonic qualities Polysquasher does not contain an output DC blocking (high-pass) filter which is usually required in compressors due to the fact compression introduces minor DC offset. For best results it is suggested to use a suitable DC filter after Polysquasher in chain – like the one found in Voxengo Elephant mastering limiter. However, as the DC offset introduced by Polysquasher is usually very small you may not even need to worry about it.

Polysquasher is best used at "4x" oversampling setting that minimizes distortion and increases level detection precision.

Compressor Mode Editor



This popup window gives you means of deep compression algorithm tuning. This window contains several parameter blocks that affect specific aspects of the compression algorithm.

Transfer Function

These parameters control the transfer function of the compressor. The relationship between the detected input level and output level is what gets called the “transfer function”.

The “Function” selector specifies the core transfer function algorithm. Note that Polysquasher mainly uses feedback compression topology.

The “Gain Avg” selector specifies internal gain reduction averaging topology: how the selected “function” treats the calculated gain reduction (it may smooth it out or leave intact thus producing a faster dynamic response). Gain reduction averaging can be further controlled via the “Dynamics” set of parameters. Note that the gain reduction averaging topology styles cannot be described in words thus they are labeled “Type A”, “Type B”, etc.

The “Knee” parameter specifies transfer function’s knee (in decibel) centered around compressor threshold level. Values above 0 dB resemble “soft knee” compression.

The “Dry Mix” parameter specifies the amount of original unprocessed “dry” signal sent to output (in percent).

The “Look-ahead” parameter controls the length of look-ahead buffering (in milliseconds). Values above zero allow compressor to suppress input peaks harder and behave a little more “precise”. This is especially true for lower frequencies.

Dynamics

Even though, Polysquasher has no common compression attack and release settings, nevertheless the compression algorithm relies on internal timing constants. These “Dynamics” parameters allow you to control these constants.

The “Center Freq” parameter specifies central timing constant (expressed in Hertz).

The “F. Distance” parameter specifies distance between all internal timing constants. This value is used to multiply a given timing constant and produce a next adjacent timing constant. For example, when “F. Distance” equals 2.0 and “Center Freq” equals “100” this will produce a set of internal timing constants “25, 50, 100, 200, 400”. The actual number of timing constants is not specified.

Note that this aspect of compression mode is very hard to visualize and make objective – please use your ears to evaluate the effect of these parameters on the compression mode. Lower “Center Freq” parameters produce a smoother sound that sounds like a long attack/release time. Higher “Center Freq” parameters produce a harder sound. The “F. Distance” parameter’s effect is less obvious, but it affects the “structure” of the compression sound.

Dynamics parameters deeply interrelate with the “Function” and “Gain Avg” settings.

Level Detector

Level detector parameters control the way loudness of multi-channel input signal is estimated. Polysquasher uses peak level detection.

The “Ch. Linking” parameter specifies power of linking between channels in the channel group (expressed in percent). 0% means channels are fully unlinked.

The “Grp Avg Mix” parameter specifies ratio (in percent) between channel’s own peak level and average signal level of all channels in the group used to estimate channel’s loudness level. For example, if channel “A”'s loudness equals 0.5, channel “B”’s loudness equals 0.0, the average loudness of both channels approximately equals 0.25. When you are setting the “Grp Avg Mix” to 100%, the level detector will use loudness value of 0.25 for both channels, if the “Grp Avg Mix” was set to 0%, the channel “A”'s own loudness of 0.5 will be used (0.0 for channel “B”). The “Grp Avg Mix” parameter has no effect if only a single channel is assigned to a group.

The “Hi Slope” parameter specifies magnitude of gradual (linear) spectrum slope change from low to high frequencies (in decibel per octave). Higher values allow you to force compressor to overreact to a higher frequency content thus preserving the lower frequency content better. This is a kind of pre-emphasis filtering which allows you to obtain a “silky” top end without over-compressing the lower frequencies. Increasing the slope also helps at reducing “ducking” artifact caused by short and loud low-frequency sounds. The “Hi Slope” switch should be enabled for the slope to be applied.

Credits

This plug-in was produced by Aleksey Vaneev in Syktyvkar, Komi Republic, Russia.

DSP algorithms and internal signal routing code were created by Aleksey Vaneev.

Graphics user interface code and the “standard” graphics design were created by Vladimir Stolypko.

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 Robert Bristow-Johnson, FFT code by Takuya Ooura, VST plug-in technology by Steinberg, AudioUnit plug-in SDK by Apple, Inc. (used under the corresponding licenses granted by these parties).

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Questions and Answers

Q. I'm wondering what attack/release values Polysquasher use?

A. Polysquasher has no defined attack/release values in a common sense. Due to its design both attack and release times depend on the program material and the mode used. Also “Dynamics” parameters defined in the “Compressor Mode Editor” affect attack and release values.

Q. I used “Mode 4 Punch” on a mix and then I used “Mode 2 Punch” on the same mix, and the mode 2 was almost 6 decibels louder than the mode 4. Is that supposed to happen? It’s a big difference...

A. Level difference between modes is unavoidable, unfortunately since these algorithms vary vastly in their implementation, and thus the auto-gain can't be matched. This is especially true if you are using low thresholds and high ratio settings.

Q. I’m trying to match settings between the version 1 and version 2 of Polysquasher. Is this at all possible?

A. Mode matching between these versions is basically possible, but please bear in mind that version 2 implements a much deeper control over compression mode. You may replicate version 1’s compression modes this way: version 1’s Mode1=Type1(Function) & TypeA(GainAvg) in version 2; Mode2=Type2&TypeB; Mode3=Type3&TypeC.

Q. I've noticed that when using Polysquasher in MS mode, mid and side channels are processed as groups, completely individually. Is there a way to link them (and vary an amount of linking)?

A. By default, the “Mid-Side Stereo” preset assigns mid and side channels to different groups, thus forcing unlinked operation. After loading the “Mid-Side Stereo” routing preset please change the group assignment of the channel “B” to group “1” in order to link the channels.

Happy Mastering!

