Stereoizer

v 3.2

NUGEN Audio

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Contents   Page

Introduction   3

Controls   3

Practical Application   13

Reporting a Problem   14

Version History   14

Introduction

The NUGEN Audio Stereoizer is designed for the introduction and control of variable stereo spread into mono and stereo signals. We have paid particular attention to the provision of individual controls that induce mono-compatible stereo images, as this can be important in some applications and is not always an independently accessible feature with plug-ins of this type.

Stereoizer introduces a feeling of natural space without unwanted artefacts allowing expansion and control of the stereo image with comprehensive and intuitive ease using professional quality algorithms.

This is achieved by taking elements within the original audio signal and applying algorithms that extend and adapting these characteristics using techniques in harmony with the way the human ear perceives sound direction naturally, without adding any artificial reverberation and maintaining the original character of the sound.

Optional visual feedback is also available, showing the stereo spread relative to frequency, allowing for frequency conscious adjustment without the needs to refer to a separate analysis plug-in.

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Controls

The Controls are grouped into several distinct zones to aid intuitive operation (see diagram below).

1 Inter-aural Intensity Difference (IID) control zone
2 Inter-aural Time Difference (ITD) control zone
3 Global Linear width
4 Stereo frequency analysis
5 Stereometer and output balance
6 I/O control zone
7 Dynamics zone
8 Utility control zone
9 Parameter value display window

1. Inter-aural Intensity Difference (IID)

This algorithm uses the principle that sound can be localised using the difference in level between the left and right channels. By manipulating the relative levels across the frequency spectrum, the stereo image can be enhanced with a natural sounding balance, leaving the original character of the incoming audio intact.

The algorithm can be used to enhance the existing stereo spectrum or add stereo depth to a mono signal and is mono compatible.
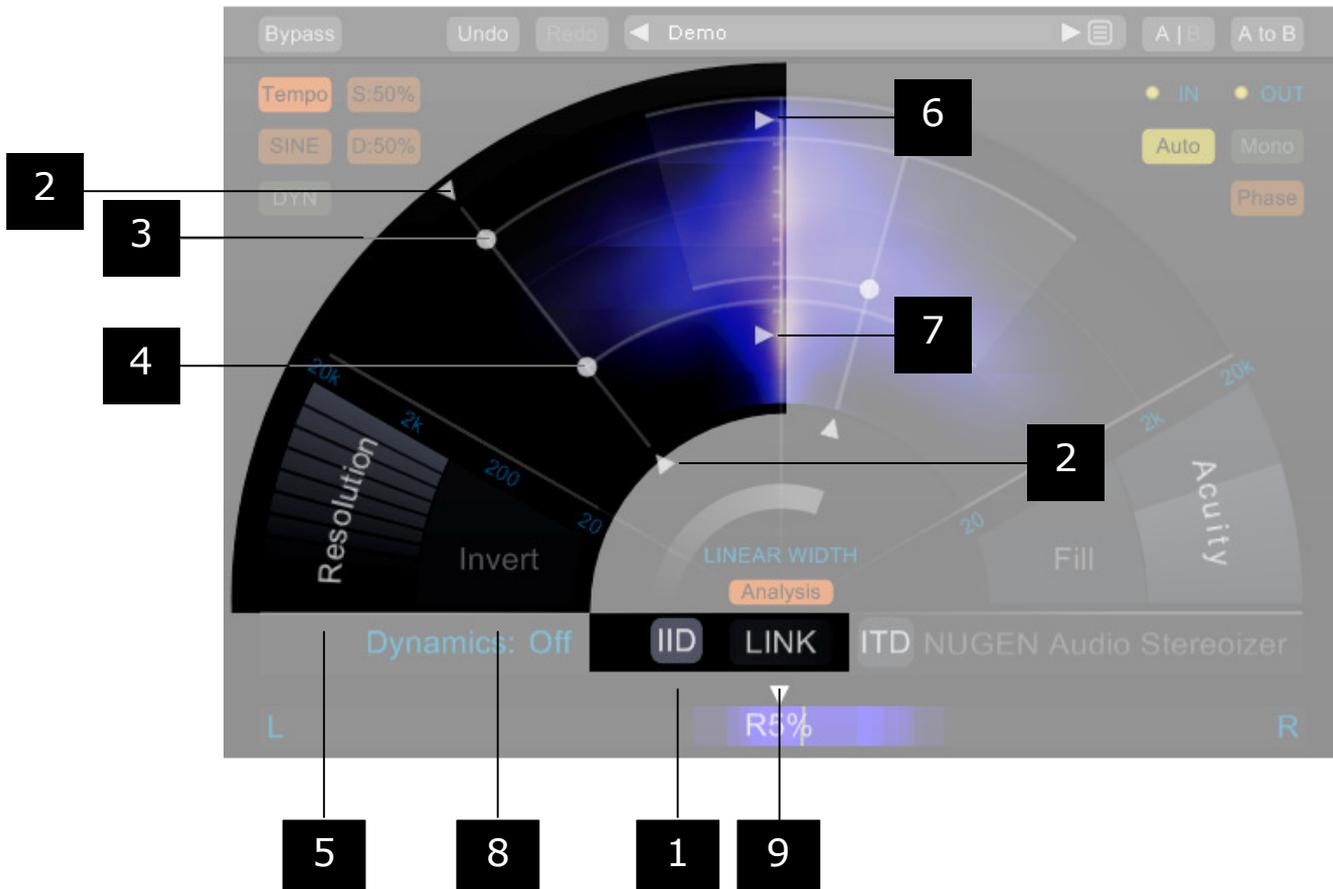
1   **IID algorithm on/off.** Toggles the IID effect on or off. The IID effect is independent of other algorithms.

2   **IID width.** This control increases or reduces the width of the applied effect. The inner and outer controls are identical, simply use the most convenient. Drag outward to increase the width, inward to reduce the effect.

3/4   **IID upper and lower frequency bounds.** These controls can be used to determine the frequency range of the effect. The upper frequency bound (3) determines the maximum frequency and the lower frequency bound (4) the lowest frequency affected. Higher frequencies are towards the outer edge, lower frequencies toward the inner.

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5   **IID resolution.** This control affects the density of the effect, and is adjusted to suit the audio material in question. Higher resolutions give a 'smoother' spread across the frequency range. The effect of the resolution control is also dependent upon the frequencies within the original audio material.

6/7   **IID focus.** The IID focus controls (upper 6 and lower 7) define the range that the IID algorithm operates within globally. These controls have both the effect of compressing the resolution and restricting the range of the effect in the frequency spectrum to remain within the upper and lower bounds.

         These controls are useful for fine detailed tuning of the overall effect. Generally the same effect can be obtained using the resolution (5) and frequency bounds (3 and 4), however, gently 'squeezing' the range can shift about the effected frequencies and help to select/avoid specific frequencies in audio with dominant frequency spikes. It can also be used to gain a very high density within a limited frequency range, giving an almost 'air' like quality to the enhancement.

8   **IID Invert.** Reverses the effect in the two channels. In an established mix, this can help an individual track 'sit' better. Can also produce an alternative 'sound' if the original audio material already contains marked stereo distribution.

9   **IID/ITD Link.** Toggles a link between IID and ITD frequency bounds and applied width of the effects. This is a relative link, preserving the relative separation where relevant.

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2. Inter-aural Time Difference (ITD)

This algorithm uses the principle that sound can be localised using the difference in time of arrival between left and right channels. This is a subtle manipulation, not as course as a more usual 'Haas delay' or simple 'phase shifting'. This effect, unlike the simple implementations of ITD concepts is also fully mono-compatible.
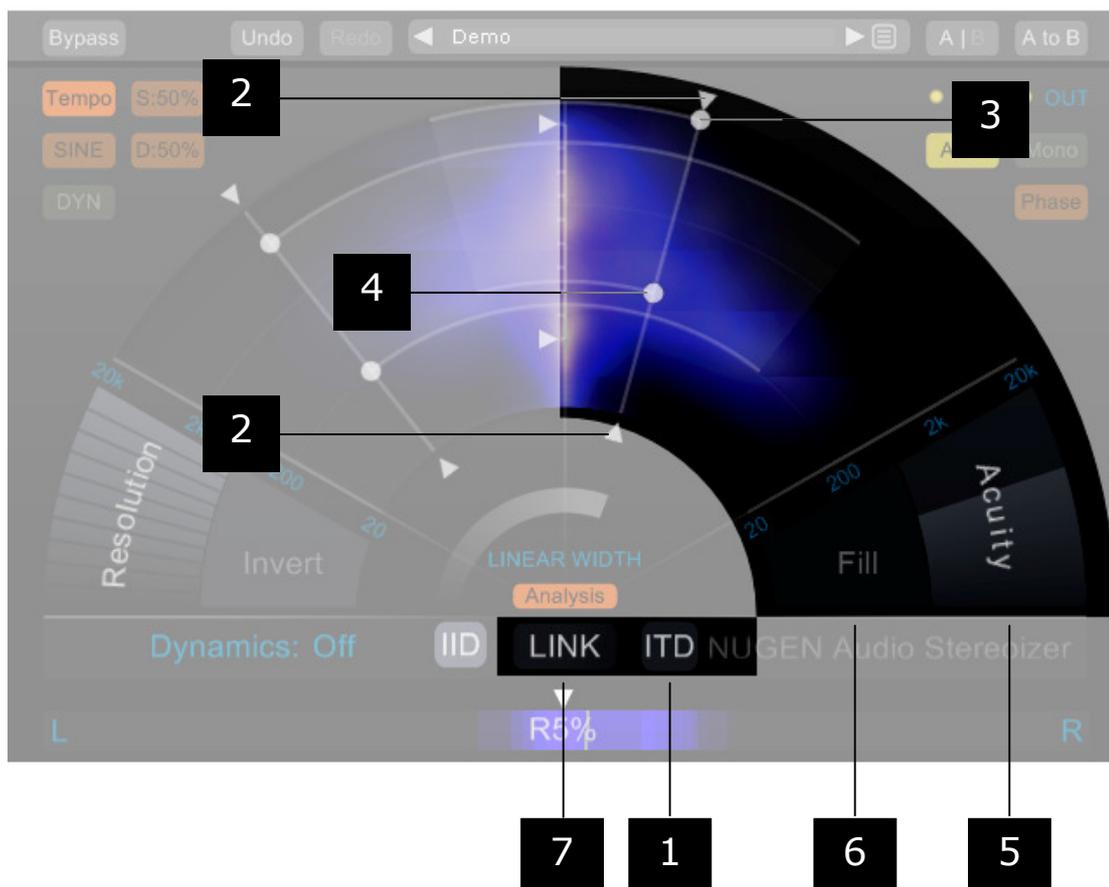
1   **ITD algorithm on/off.** Toggles the ITD effect on or off. The ITD effect is independent of other algorithms.

2   **ITD width.** This control increases or reduces the width of the applied effect. The inner and outer controls are identical, simply use the most convenient. Drag outward to increase the width, inward to reduce the effect.

3/4   **ITD upper and lower frequency bounds.** These controls can be used to determine the frequency range of the effect. The upper frequency bound (3) determines the maximum frequency and the lower frequency bound (4) the lowest frequency affected. Higher frequencies are towards the outer edge, lower frequencies toward the inner.

5   **ITD acuity.** This control affects the 'sharpness' of the effect. Depending upon the input material this can be quite pronounced, or relatively subtle. When the incoming audio contains a high level of transients, adjusting the acuity control can fine-tune the effect for a natural sound.

6   **ITD fill.** Adds an additional dimension to the algorithm, increasing the density of the effect. The fill control is not mono compatible, and is more pronounced at lower overall width levels, being absorbed by the main algorithm as the width is increased.

7   **IID/ITD Link.** Toggles a link between IID and ITD frequency bounds and applied width of the effects. This is a relative link, preserving the relative separation where relevant.

3. Linear Width

This control expands or reduced the stereo spectrum established in the audio (either at source, and or via one of the Stereoizer processes). A value of 100% will leave the audio unaffected (effectively turning the algorithm off). Values above 100% expand the stereo spectrum, and values below collapse towards mono (0%).

As this algorithm is based entirely upon a natural mathematical extrapolation of in incoming signal, it leads to extremely natural expansion of existing stereo material, with no side effects.

This algorithm has no effect on a mono signal. If a mono signal is input and the IID and ITD algorithms are not engaged, the output will remain mono.

4. Stereo frequency analysis

The 'analysis' control toggles on/off the stereo spectral frequency analysis. This tool displays the stereo deviation from centre against frequency. Frequency rises from 20Hz (inner edge) to 22kHz (outer edge), representing stereo position as a deviation from centre (vertical).

A central (mono) signal, will result in a blank display, only deviation from centre is represented.

5. Stereometer and output balance

The Stereometer shows the overall balance of the stereo image. The moving bar indicates the stereo position and the numeric read out gives the value as a percentage.

The 'haze' shows a historical stereo position, with brightness indicating stereo focus.

1   **Global stereo balance control.** Slide left or right to adjust the output.

2/3   **Output solo.** Click to toggle output solo for Left (2) and Right (3) channels respectively.

6. Input/Output control
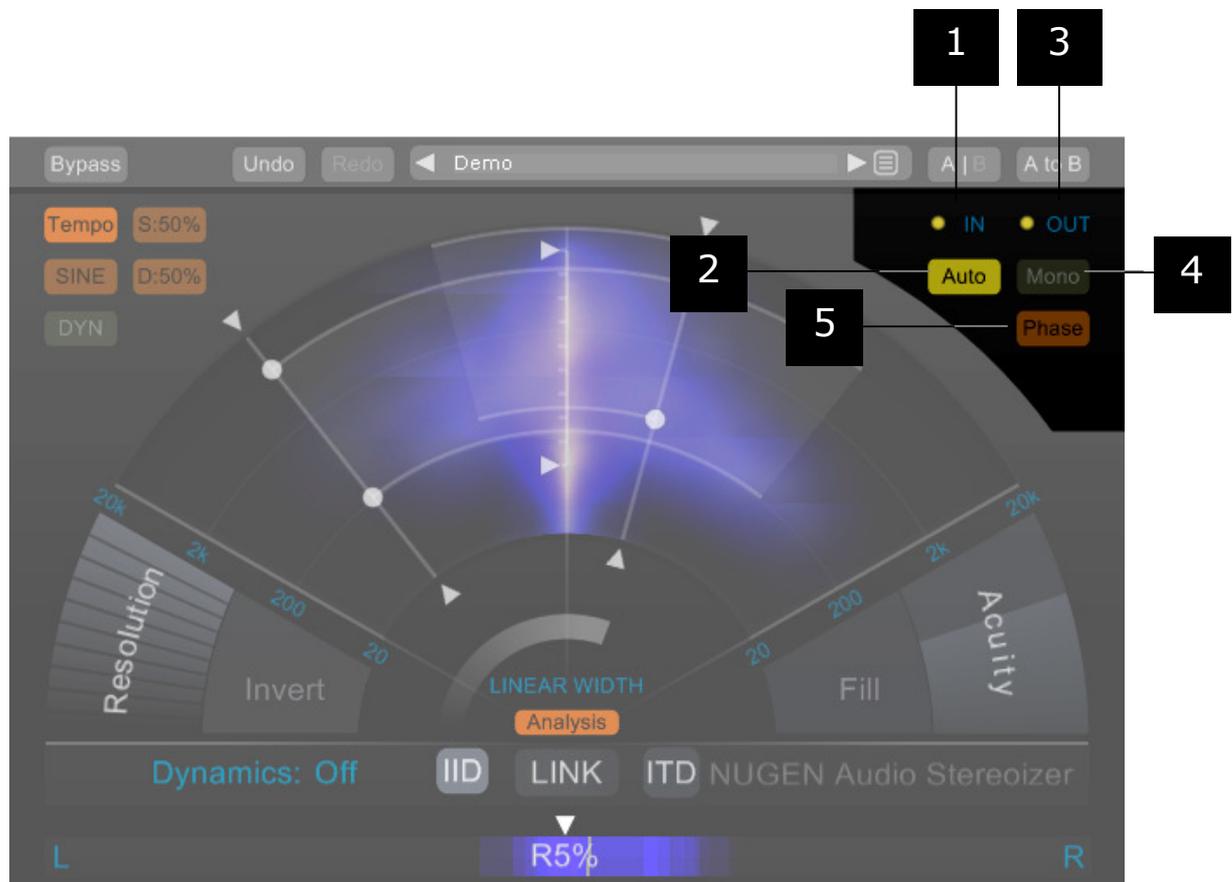
1   **Input meter.** Gives a simple input level indication. Click in this area to display the input level in dB in the parameter value display.

2   **Auto input level adjust.** Toggles on/off to automatically adjust the input gain to match input/output and avoid distortion.

3   **Output meter.** Gives a simple output level indication. Click in this area to display the output level in dB in the parameter value display.

4   **Collapse output to mono.** Mono collapse control to check mono compatibility.

5   **Phase Shift.** Click drag upward to shift the relative phase of right and left channels. Drag down to invert phase of one side. Useful for phase alignment. Can be used for eccentric psycho-acoustic stereo widening, although this method is not mono compatible and may lead to phase cancellation when recombined to mono.

7. Dynamics

The dynamics section is designed to introduce movement into the stereo spectrum. The dynamics controls do not adjust the existing stereo spectrum, but rather modulate the IIT and IID algorithms.

This section can be used to apply anything from subtle random drifting through to tempo locked modulation pulses.
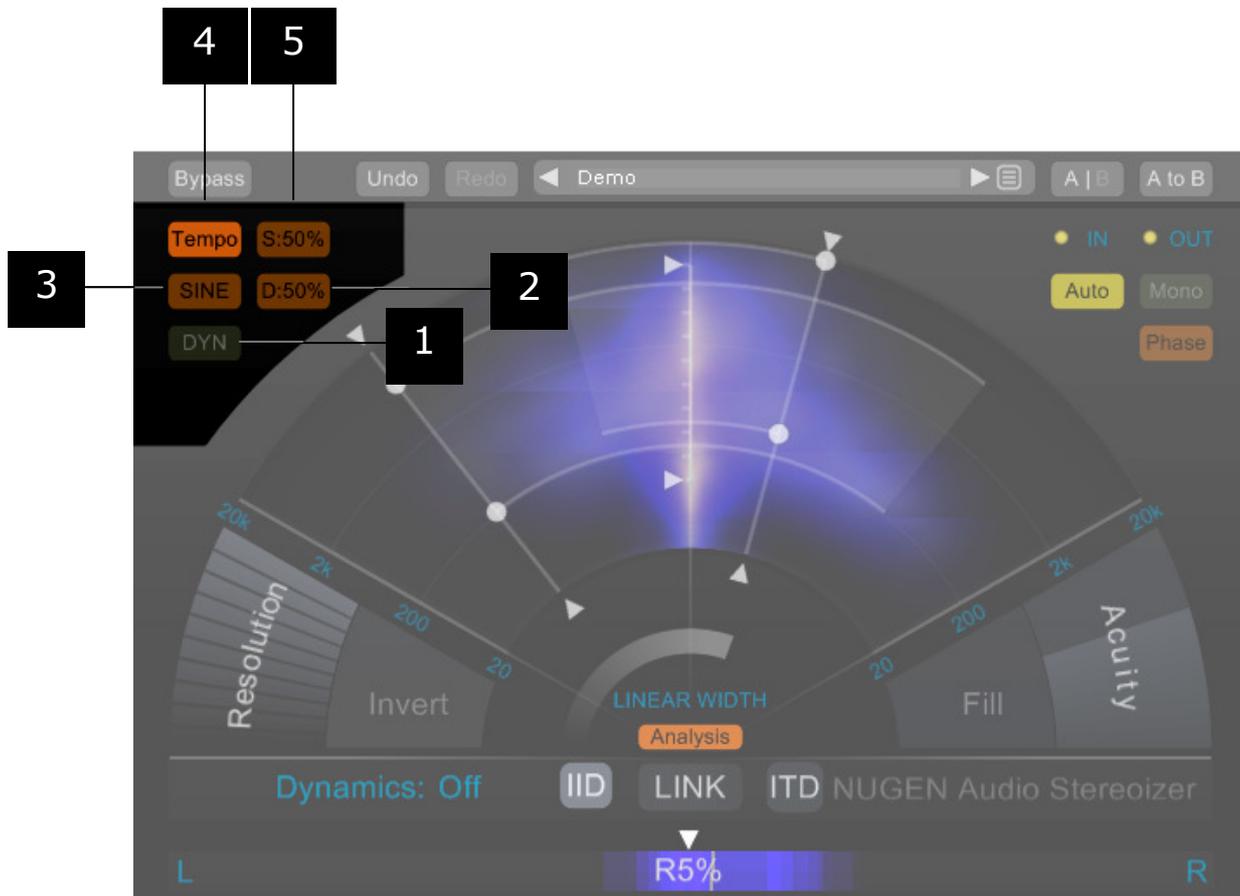
1   **Dynamics on/off.** Toggles the dynamics controls on/off.

2   **Dynamics Depth.** Controls the depth of the dynamics modulation.

3   **Dynamics Shape.** This parameter determined the shape of the modulation effect. Choose from Rhythmic Sine, Triangular and Square. RND1 is a square random modulation, and RND2 is a smooth randomised waveform suitable for subtle stereo spectrum drift effects.

4   **Dynamics Tempo lock.** Activate to lock the speed control (5) to multiples of the DAW tempo.

5   **Dynamics Speed.** Adjust the speed of the dynamics modulation effect. When the tempo lock control is active (4) this control will lock to multiples of the DAW tempo.

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8. Utility controls

Stereoizer supports a number of standard utility controls. These may be duplicated in some instances within the host DAW, however the controls within the plugin will operate 'in place' to provide seamless audio performance.

1	**Preset Browser.** Click to open preset browser window to select presets from list. Use arrows to move through presets* in order.
2	**Bypass.** In-place bypass mode, preserving PDC to avoid re-lock issues.
3	**Undo.** Unlimited session undo.
4	**Redo.** Unlimited session redo.
5	**A|B.** Switch between temporary session A and B memories to compare two sets of settings.

General Functions

• Holding down control (Ctrl) and clicking a control will return the control to the default position (Win) or double click a control (OSX).

• Holding down shift whilst moving a control will allow fine adjustment to be made.

Practical Application

Stereoizer is capable of subtle stereo enhancement through to dramatic 'ultra-wide' effects. Below are some suggestions to help you get the most from the plug-in.

Presets. To get a feel for what Stereoizer is capable of, take a run through the presets. These will introduce many of the possible effects. Try them through a variety of material, from smooth pads and E.P.'s to transient filled percussion and drum loops. Also experiment with Stereoizer in different contexts, on tracks, groups, inserts, sends and even the master bus.

Emphasis. Try Stereoizer on a part that's getting lost and forgotten in the mix. Subtle dynamics can also help to catch the ear. A wide sound can often be pushed louder without upsetting the balance of key central sounds.

Space. Often important pad, EP and guitar sounds clash with vocal and lead sounds, cluttering the same frequency bands. Try using Stereoizer as an alternative to heavy EQ to 'move' them out of the way, leaving a clear solid centre *and* plenty of wide mid range sounds intact in the mix.

Effects. Adding Stereoizer to an effect return can add extra depth, or tame a hard panned effect output, bringing a deeper level of coherence. Stereoizer can also be used as an alternative to an exciter or reverb, expanding and enhancing the original stereo content of a sound without adding simulated reverberations or overcooking the highs.

Easy does it. As with all effects, when first finding inspiration it's easy to get carried away. If you are looking to introduce natural width and find space in a mix, dial in the effect gently until you get the space you are looking for, and always check it in the context of a mix.

Mono compatibility. Stereoizer offers mono-compatible stereo enhancement. This is as important now as it ever has been. Many club and PA sound systems are still set-up for mono playback. The majority of portable radio sets are mono, even the most popular DAB radios are still mono. Many TV sets are mono, and even where stereo playback is common, the speakers as so close together as to provide little practical stereo separation (eg. Typical mp3 player dock).

Frequency bounds. When working on sounds with existing stereo information, using the audio analysis will help to pinpoint the areas of the frequency spectrum that may benefit from additional treatment. With a sound that is largely working, but suffers a specific frequency clash with a key lead part, frequency banding can be used to apply the effect to the precise are that needs 'widening' out of the way. As with mono-compatibility, frequency banding can also be a very important consideration, especially in the low frequencies. Leaving the low frequencies mono helps apply an even load to the bass reproduction section of the playback system, meaning louder more consistent bass response at high levels. This is also important when pressing to vinyl to avoid needle skip.

Mastering. When mastering, using just the right amount of enhancement is critical. Often the linear width control on it's own is enough to subtly adjust the width to suit. This will crucially leave the centred parts untouched. If more control is required, addition of a little band limited widening can be introduced. Use multiple instances if more band control is required. It is suggested that phase adjustment and the 'fill' control are not applied when mastering due to potential phase cancellation issues in the resulting mix.

Reporting a problem

If you encounter a problem with any of our products, please let us know.

Please email NUGEN Audio at **support@nugenaudio.com** giving a clear explanation of the problem. Please state how frequently you've experienced the problem. If there are any particular steps you need to go through to see the problem, please detail these. Also, if the problem is with a VST plugin, please give details of the VST Host you are using, including version number (eg- Ableton Live 8.0.1).

Please also state your operating system, and the rough specs for your machine (eg- CPU speed, RAM).

Please be patient with any problems you may experience, particularly with products at a beta stage of release. At NUGEN we take problems with our software seriously, and will endeavour to correct them as quickly as possible.

Version History

3.2   AAX 32 & 64-bit versions released
RTAS 32 bit version released
VST 64-bit version released (OSX)
AU 64-bit version released

Numerous compatibility fixes

3.1   Numerous host specific compatibility fixes
Graphic optimisations

3.0   Initial release

* Presets 21-40 kindly created by Francis Gorini - musicXart | Arysound

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