NUGEN Audio



OPERATION MANUAL

Halo Downmix

Precise Downmixing & Surround Rebalancing

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Introduction

NUGEN Audio Halo Downmix is a versatile surround sound manipulation and balancing tool capable of producing better balanced surround and stereo mixes from original surround material.

Intuitive, visual controls for relative levels, timing, and direct vs. ambient sound balance allow for precise fine-tuning, delivering accurate downmixes that are no longer limited by typical in-the-box coefficients-based processes.

Halo Downmix is also capable of providing a parallel surround/stereo workflow enabling a rapid monitoring system that promotes better surround/stereo coherence, awareness and control when working solely with surround delivery requirements.

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Interface - General Layout

The Halo Downmix interface has been designed to facilitate intuitive operation by following a logical flow from left (input) to right (output), grouping related aspects of operation together into distinct zones as shown below.



1 Utility controls

2 Input section

3 Monitoring section

4 Surround adjustment zone

5 Stereo downmix metering and control

6 Settings panel control

Interface - Compact Layout

A compact interface is also provided. This view enables a minimal foot print mode, reducing the Halo Downmix interface to displaying essential metering and parameters only. The controls are illustrated in the remainder of the manual using the main interface, however most functionality remains the same when compact mode is active.

The compact interface is enabled via the 'Compact' on/off toggle switch in the Options panel, accessed by clicking the 'Options' button on the main interface.



1 Utility controls

2 Surround manipulation zone

3 Output metering, control

4 Settings panel control

Utility Controls



1 **Bypass.** This button bypasses the effect 'in-place'. This allows for direct A | B comparisons to be made with and without the effect, without altering any other processing in the chain.

2 **Undo | Redo.** Unlimited session undo and redo commands allowing the user to step back and forward through processing modifications.

3 **Preset browser.** Use the arrow buttons to step sequentially through the presets or click the end control to open the preset menu to select from a list. Double click the name to re-name session presets.

> Note: 5.1 and 7.1 versions of Halo maintain independent preset systems.

Preset management.

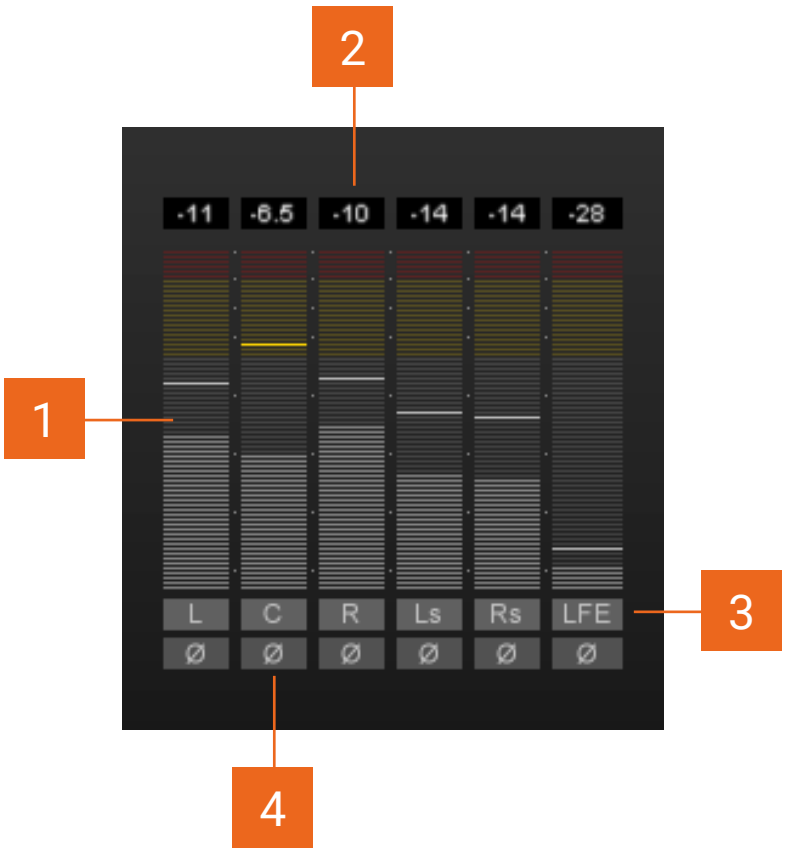
- The 'Installed' folder contains the factory presets. These cannot be overwritten.
- User presets can be saved in the 'User folder'. An '*' symbol will be shown against the preset name if the settings have been changed from the saved version.
- Additional folders can be created using the '+' button
- Presets and folders can be organised by clicking the '...' symbol which is highlighted when the mouse pointer is placed over the folder/preset name. Folders can be deleted, renamed and browsed using the standard OS interface. Presets can additionally be moved and copied.

4 **A | B and A to B (B to A).** These controls switch data between the 'A' and 'B' memories for direct comparisons between two different sets of parameters. The A|B control toggles between the A and B memories (current active memory highlighted). The A to B (B to A) button transfers current settings to the memory indicated, ie. From A to B or vice versa.

5 **?** Opens the 'About' page, with access to credits and the product manual (if installed).

Input Section

The inputs section (advanced interface only) shows input audio levels, and gives access to secondary input monitoring functions.



1 **Input meter.** Shows sample peak input levels for each input channel individually.

2 **Margin.** Shows remaining channel headroom. Click to reset.

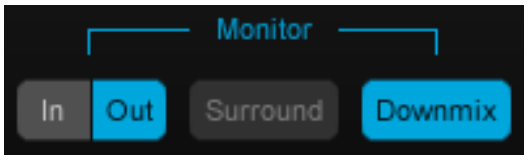
3 **Individual channel label.** Clicking the channel label allows for individual channel Mute (M) and Solo (S) control depending upon the configuration determined in the settings panel. Muted channels will show 'greyed out' meters as the audio is no longer contributing to the audio output.

4 **Input phase invert.** Click to invert phase of incoming audio.

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Monitoring Section

Halo Downmix provides a number of useful monitoring facilities which enable easy A/B auditioning and comparison when using the functions for different tasks.



In/Out.

These controls toggle between input (unprocessed audio) and output audio.

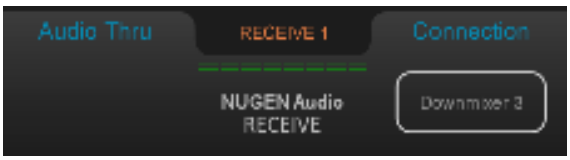
> **NB: downmix coefficients**
>
> When listening to the combination In + Downmix, the input audio will be summed using the downmix coefficients as specified in the settings panel to allow for quick comparison between the original downmix of the input audio and the processed version. For more info see settings panel notes below.

Surround / Downmix

These controls toggle the output between the downmixed and surround signal path. The exact audio routing depends upon how the plug-in has been initiated.

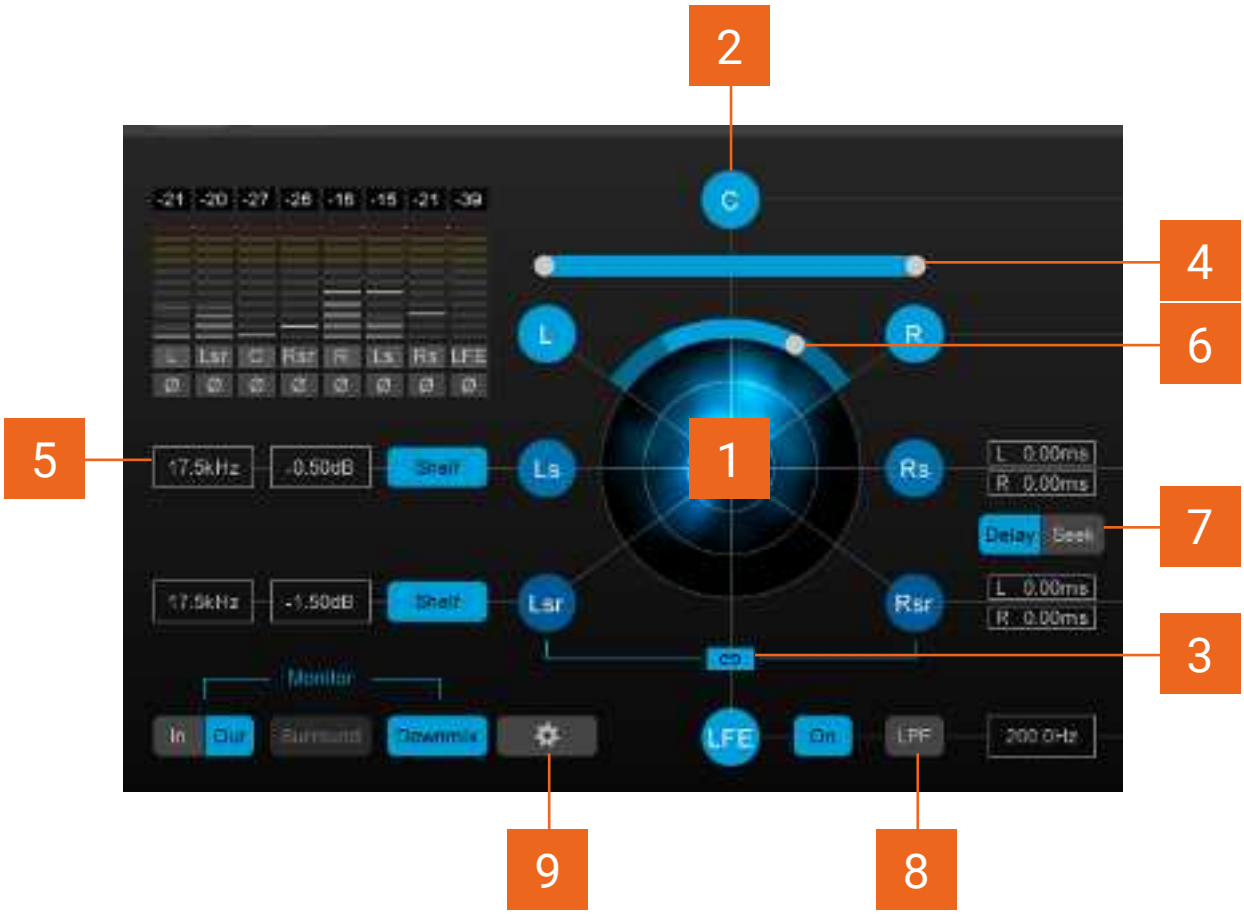
Surround-to-surround instance. If the plug-in is in surround-to-surround mode, the audio is routed through the plug-in in both cases.

Surround-to-stereo instance. If the plug-in is in surround-to-stereo mode, the downmix button monitors the audio through the plug-in. To activate the Sur round button, a NUGEN Audio Receive plug-in (included in the Halo Downmix installer) will need to be instantiated on an appropriately routed surround track. Halo Downmix can then be connected to the Receive plug-in and audio will be monitored through the receive plug-in when the Surround button is active.



Surround Adjustment

This section allows for the adjustment of the surround mix before it is downmixed to stereo. The plug-in is available in two different versions, 7.1 and 5.1. The 7.1 version is described here, however the functionality is analogous in the 5.1 version.



1 **Surround analysis.** This dynamic real-time analysis view shows the energy distribution of the audio output prior to downmix. Brighter sections indicate increased energy at that position in the surround panorama. Colour can also be used to indicate the speaker source of the audio in any position.

2 **Channel node.** Indicates an upmix channel. L, C, R etc. Click to Solo the channel output. The Solo function can be globally switched to Mute in the settings panel. Channels are paired left and right (where appropriate) by default. This pairing can be adjusted using the link control [4].

3 **Link.** This control is used to pair related channel operation (eg. L and R) to allow single-click operation of both sides simultaneously when activated.

4 **Balance.** This control can be used to pan each side of the input matrix to adjust any L/R present in the original audio. The centre channel remains unaffected.

5 **Rear shelf filter.** The Shelf button Activates a shelf filter to roll off or boost the high frequencies from the rear channels to address any imbalance which may have occurred due to proximity and directional shadowing during recording, or as a result of surround balance energy adjustments.

6 **Centre divergence. NB.** This control is only available when downmixing to channel configurations which include a centre channel (eg. 7.1 to 5.1). The centre channel divergence control is used to determine the spread of the centre channel (if any) into the L & R channels in the downmix. At 0%, this directly translates the existing centre channel to the downmix. Increasing the divergence will move some of the centre channel energy into the L & R channels, until at 100%, the centre channel is effectively off, and all of the energy is in the phantom centre.

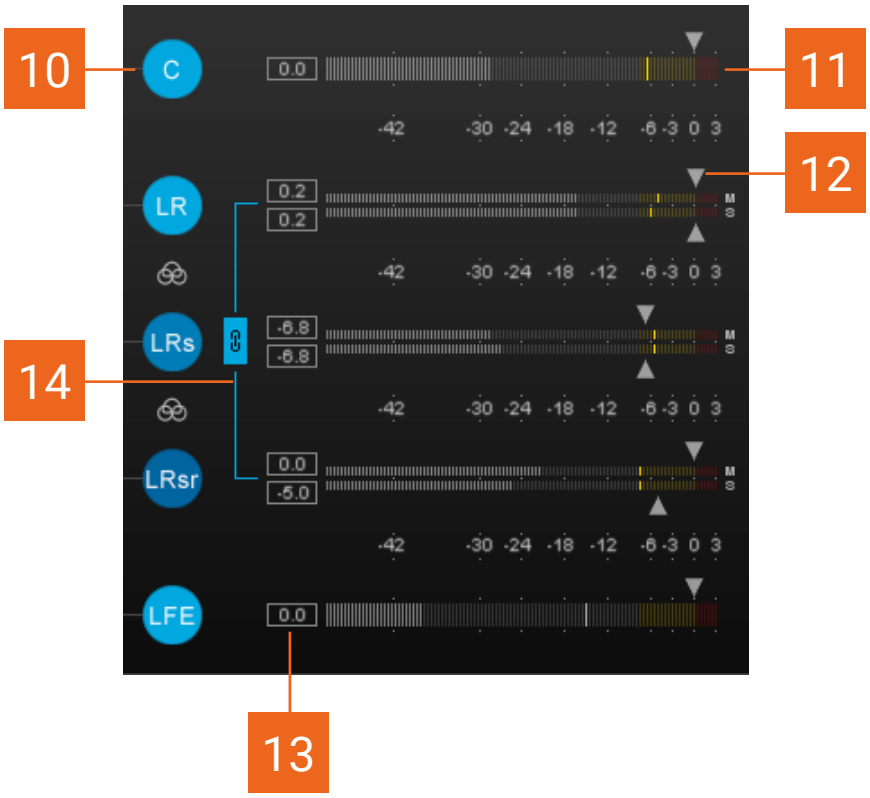
7 **Rear channel delay.** These parameters can be used to 'un-delay' the rear channels to provide a more coherent sum to stereo. Legacy upmix practices often utilise delay in the rear channels (approx. 10 -25 ms) to create a sense of space in the upmix. When downmixed this can lead to phase or even audible delay artefacts, which can be redressed using the delay parameters. The Delay switch activates the delay.

The Seek control will engage an automated algorithm which will attempt to determine a best-fit value for reducing correlation issues in the downmix to a minimum. The success of this algorithm will depend upon the complexity of the problems within the original source and has primarily been designed to 'undo' legacy upmix practice offsets. Once a delay has been automatically detected, further adjustment can be made by click-dragging (or double-clicking and directly entering) the individual values in the edit boxes.

8 **LFE control.** The On button can be used to switch the LFE channel on/off. For a standard TV downmix, the LFE channel is discarded. This button can be used to audition this effect when working on a full surround mix. The LPF button can be used to enable the low pass filter, to ensure compliance with certain distribution platforms. The frequency control can be used to adjust the LPF frequency cutoff.

> **NB.** The LFE channel remains subject to the downmix coefficients determined in the settings panel. If the LFE downmix coefficient is set to -inf, then the On button will have no effect

9 **'Gear' icon.** This button opens the settings panel (see below).



10 **Channel node.** Indicates an upmix channel or channel pair. Click to Solo the channel output. The Solo function can be globally switched to Mute in the settings panel.

11 **Channel level meter.** This meter shows the channel level immediately prior to output. In the case where the channels are presented as a stereo pair, the meters indicate Mid/Side levels as noted on the meter.

12 **Channel trim.** These arrows can be dragged vertically to apply a dB offset (gain or reduction) to the channels concerned. Again, these are subject to the Link 'pairing' function below.

Stereo pairs are presented in Mid-Side mode to allow adjustment of the relative direct and indirect sound in the final downmix. A standard downmix can lead to an overly diffuse sounding stereo mix resulting from the addition of excess rear surround energy. Mid/Side balancing can be used to alleviate this, while maintaining important direct sound queues. These controls can be automated where required to allow for differences in treatment between scenes.

13 **dB offset.** The offset applied using the trim controls is shown here. Double click to enter a numerical value directly.

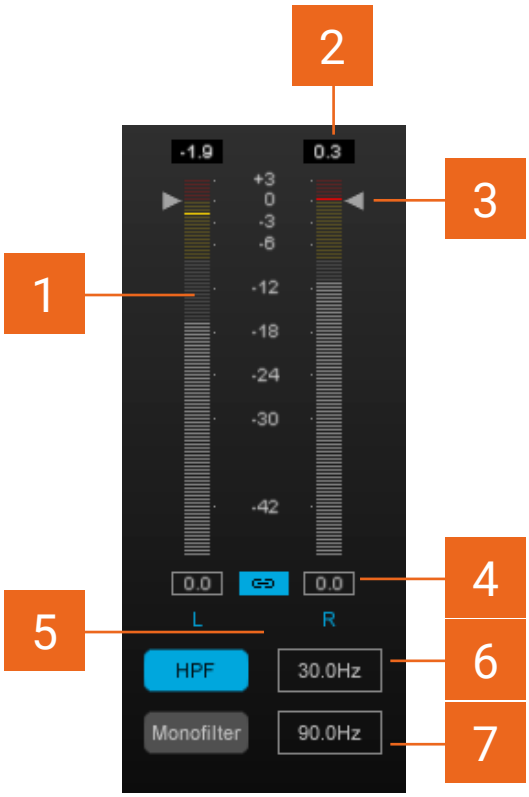
14 **Link.** Pairs related Mid and Side channels, allowing a single control to affect the stereo pair with a single gain boost/reduction adjustment.

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Stereo Downmix

The stereo downmix section provides metering and additional control when the monitor section is set to monitor the downmix.

NB. Prior to metering and final adjustment, the surround audio is summed to generate the stereo downmix using the downmix coefficients as determined in the settings panel (see below).



1 **Output level meter.** Indicates peak level output of downmixed stereo audio.

2 **Margin.** Shows remaining channel headroom. Click to reset.

3 **Trim control arrows.** These arrows can be dragged vertically to apply a dB offset (gain or reduction) to the channels concerned. These are subject to the Link 'pairing' function below).

4 **dB offset.** The offset applied using the trim controls is shown here. Double click to enter a numerical value directly.

5 **Link.** Pairs Left and Right channels, mirroring changes to one side on the other.

6 **High pass filter.** Rolls off low frequency energy below the cut-off point when activated.

7 **Monofilter.** When active, this control automatically sums low frequency energy to mono. This can be helpful when mixing down highly stereo material for TV reproduction where power distribution and stereo imaging may be a concern.

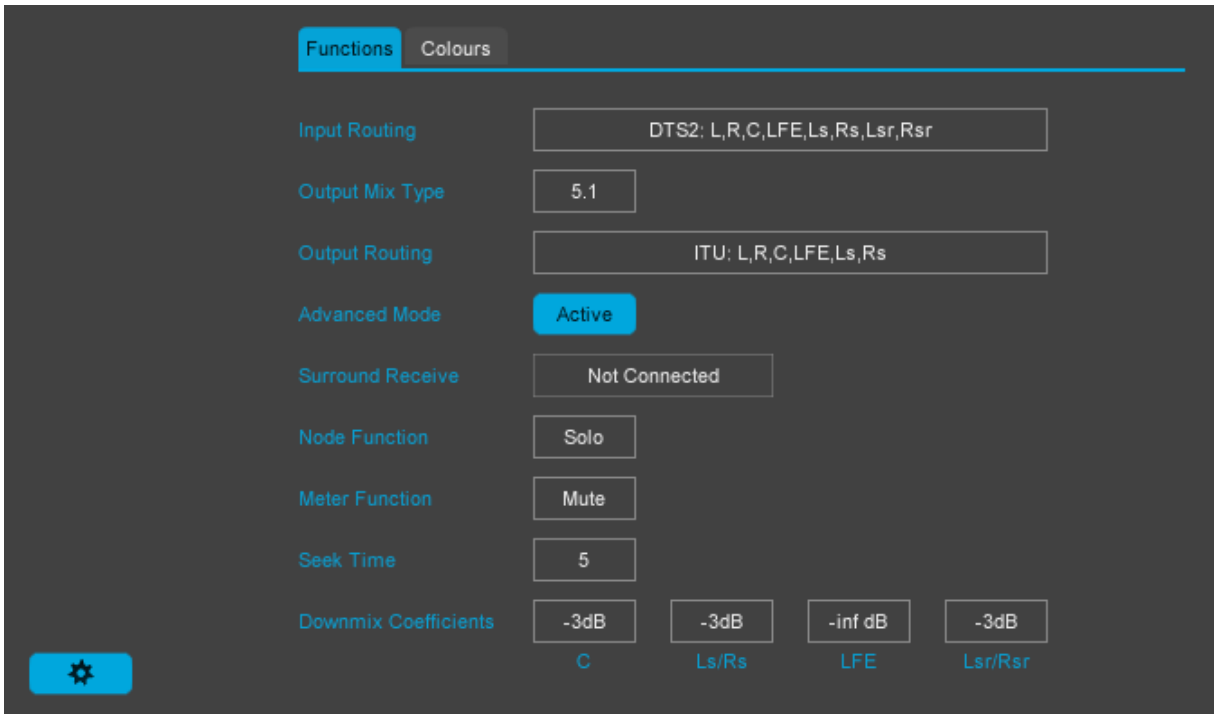
Settings panel

In addition to a number of presets for typical use, Halo Downmix can be customised to a high level via the options in the settings panel. The settings panel contains two tabs;

Functions - the main parameters governing the operation and set-up of Halo

Colours - which is used to define channel colours and meter split colours

Functions



Input routing. Depending upon the DAW/NLE and/or project requirements, different surround channel routings may be required. By default, Halo Downmix will generally choose the appropriate input for the DAW/NLE in question, however, if the routing is not as expected/desired, these can be changed using the 'Routing' option in the settings panel, which allows for a number of different standard configurations.

Output mix type. This is used in some versions of Halo Downmix to determine the type of Downmix to be performed where this is not automatically determined by the type of track the plug-in is inserted onto.

Advanced mode. When active, the full (advanced) control interface is displayed. If de-activated, the interface will switch to compact mode. Most important options are available within compact mode, allowing for a simpler workflow and freeing up more screen space.

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Surround receive. This drop down menu is used to select a NUGEN Audio Receive plug-in. See the section on monitoring for operational details.

Main node function. Determines whether clicking a channel node on the main interface engages the Solo or Mute function.

Meter function. Determines whether clicking a channel label on the meter bars in the output and monitoring section engages the Solo or Mute function.

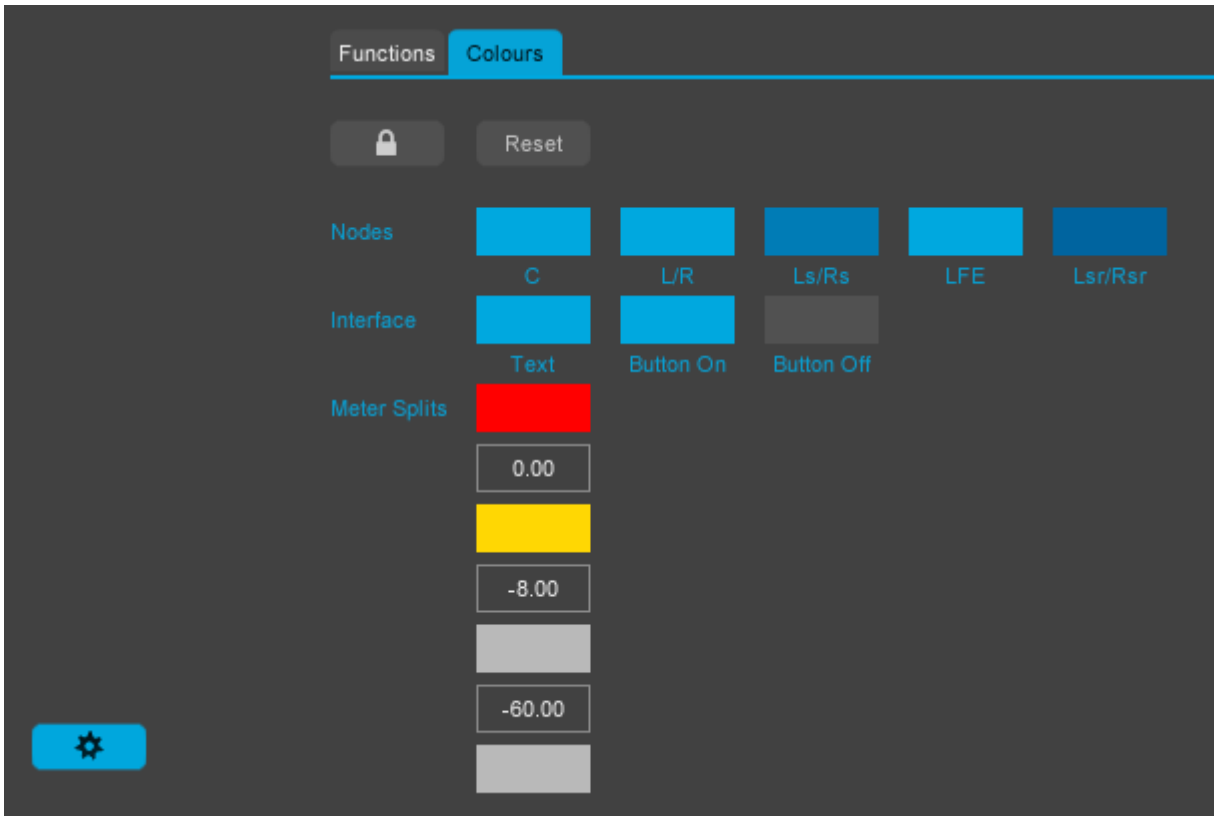
Seek time. This parameter determines the amount of time the delay 'Seek' function will use to determine a value. The default setting is usually suitable, however in complex mixes with high channel counts (eg. 7.1.2), more audio pairs must be compared and on occasion a higher value will be required.

Downmix coefficients. Downmix coefficients are the way that a 'standard' downmix is produced from a surround input. Typically these are those as specified in ITU-R BS.775, although alternatives are sometimes used and can be implemented here.

In normal operation, Halo Downmix bypasses these settings and uses the gain structure as implemented in the main interface. The downmix coefficients are used when the surround input is listened to in stereo through the combination of 'In' and 'Downmix' in the monitor section of the plug-in. This allows for a quick and easy comparison between the Halo Downmix stereo output and a typical 'in the box' downmix.

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Colors



Colours are automatically saved with the preset.

Lock. The Lock control can be used to prevent preset-recall overwriting established colour sets with those saved with the preset.

Reset. The Reset button can be used at any time to restore default colours.

Nodes. These colours set the colours for each channel. This is also used to determine the colour spectrum used by the surround analysis veiw.

Interface. These colours define the global colours used by the remainder of the interface and can be used to tweak to suit a user defined set of node colours.

Meter splits. The Meter splits are persistent settings and only affect the meters on the Center and I/O panels.

3D Immersive Audio Extension



The 3D Immersive Audio optional extension for Halo Downmix expands the core Halo Downmix algorithm, introducing the ability to handle 7.1.2 format files.

This extension expands the Halo Downmix interface, introducing additional visual feedback and a number of additional parameters.

All operational functionality is analogous to 5.1 and 7.1 operation as discussed above.

Applications

Surround to stereo downmix.

In standard mode, Halo Downmix operates as a surround-to-stereo downmixer. Stereo mixes are required from surround material in numerous situations.

A standard downmix is usually generated by simply mixing together the surround output according to standard downmix coefficients, however, this can often lead to unsatisfactory results, particularly if legacy upmix practices have been employed in generating the original surround mix. Halo Downmix can be quickly employed to mitigate these issues eg. controlling excessive diffuse sound from added artificial reverberation, or removal of delay artefacts introduced in the rear channels.

Halo Downmix can be quickly deployed to produce a more controlled, coherent stereo mix. Typical applications include:

- Stereo Mix production for Television within a Surround workflow.
- Producing a controlled, precise stereo downmix of a 7.1 feature film.
- Generating a stereo mix from surround recordings where no stereo recording exists.
- Producing stereo interim listening mixes in a surround workflow.

Surround to surround.

In surround to surround mode, Halo Downmix can be used to optimise an existing surround mix, re-balancing levels, controlling the general direct vs diffuse surround balance and brightening or toning down real channels for a more balanced surround presentation.

Surround to surround to stereo.

Halo Downmix can also be used in conjunction with the Receive plug-in (see above) to enable a parallel surround/stereo workflow.

This workflow allows for rapid A/B listening checks between surround and stereo downmix. This mode is particularly useful for:

- Optimising a surround mix for better stereo downmix (standard coefficients)
- Harmonising surround and stereo experiences, producing both a modified and stereo mix

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Reporting a Problem.

If you encounter a problem with any of NUGEN Audio's products, please let us know, to help us improve them.

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.

Please also state your operating system, and the rough specs for your machine (e.g.- CPU speed, RAM) - in Windows XP you can get this information by rightclicking "My Computer" and selecting properties.

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

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Version History

1.0 Initial release

1.1 3D Immersive Audio extension added

Multichannel to multichannel (beyond stereo) support added

Centre divergence control added

Several minor bug fixes

VST2 support retired

1.2 New ranges for downmix coefficients added

LFE LPF enable control added

LFE LPF filter cutoff control added

Netflix preset added

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