Auro Technologies

Auro-3D Authoring Tools Guide

Plug-in Version: 2.0

User Guide Version: 1.0

Auro Technologies NV
Kievitstraat 42
B-2400 Mol
Belgium

Phone: +32 14 31 43 43
email: info@auro-technologies.com
web: www.auro-technologies.com

Table of Contents

Chapter 1: Introduction to Auro-3D

Welcome to Auro-3D®, the next step in sound evolution brought to you by Auro Technologies. Audio reproduction has evolved from a point source (mono), to a single dimension (stereo), to two-dimensional Surround Sound (5.1). To produce true three-dimensional sound, a reproduction system must include a vertical Z axis (top-to-bottom), in addition to the existing X (side-to-side) and Y (front-to-back) planar axes found in current systems. Auro-3D's three-layered approach (Lower, Height, and Top Layers) completes this evolution by creating a realistic three-dimensional soundscape.

Auro-3D films can still be shown in theatres without an Auro-3D decoding system by storing the Auro-3D content in a 5.1-channel carrier, and playing the 5.1-channel standard without any loss of audio quality. Theatres with an Auro-3D system decode and play back the Auro-3D format while ignoring the 5.1-channel version.

Auro-3D Formats

The Auro-3D 9.1–11.1 formats are based on, and compatible with the 5.1 Standard. They include the following additional channels:

- **9.1**: 5.1 + four Height Channels (one above each side channel)
- **10.1**: 9.1 + Top Channel (aka *Voice of God*)
- **11.1**: 10.1 + Height Center

The Auro-3D 11.1b and 13.1 formats are based on, and compatible with the 7.1 Standard. They include the following additional channels:

- **11.1b**: 7.1 + four Height Channels
- **13.1**: 11.1b + Height Center + Top Channel

Auro Technologies has developed the Auro-3D Authoring Tools to allow three-dimensional panning in any DAW (Mac and PC) that supports AAX plug-ins.

Auro-3D and Object-based Audio

The Auro-3D Authoring Tools will fully support the open object-based audio workflow once it is fully defined. The object renderer lets audio objects retain their own panning data, which is stored separately from the channel-based data. They can then be rendered in real time to any speaker system.

Auro-3D Authoring Tools

Auro-3D Authoring Tools consist of five plug-ins, the Auro-Encoder, the A3DHost service, and the Auro-Settings application. Each plug-in connects to the A3DHost service, which runs in the background to control all audio streams and processing.

Auro-Panner plug-in: The Auro-Panner enables 3D panning, replacing the DAW's panner when working in Auro-3D. The panned information is sent to the Auro-Bus plug-in.

Auro-Bus plug-in: The Auro-Bus collects panned information from a number of Auro-Panners to form a subgroup or stem. All connected Auro-Panners can be summed, leveled, and their down-fold settings can be adjusted in case a planar mix is required.

Auro-Mixing Engine plug-in: The Auro-Mixing Engine sets the Auro-3D configuration and controls how all connected Auro-Buses are mixed and encoded. It displays the level of all channels in the Auro-3D field, and outputs a downmix to the DAW track on which it is inserted, and a mix and downmix to the connected Auro-Return plug-ins.

Auro-DMix Control plug-in: The Auro-DMix Control lets the mixing engineer dynamically downmix all channels in an Auro-3D configuration to a different surround format.

Auro-Return plug-in: The Auro-Return delivers the channels from the Auro-Mixing Engine to the DAW. The Height and Lower layers are typically delivered to two separate multichannel tracks, each with its own Auro-Return instance.

Auro-Encoder: The Auro-Encoder controls are embedded in the Encoder tab of the Auro-Mixing Engine plug-in. It lets you encode up to three PCM channels into one channel while remaining in the PCM domain. There is no signal degradation or loss of audio quality, and the encoded format complies with DCI specifications.

A3DHost: A3DHost runs as a background process and forms the core of the Auro-3D ecosystem in which all plug-ins connect. The A3DHost architecture has made it possible for Auro to surmount the industry's eight-channel track limitation, making it possible to create the more sophisticated Auro-3D formats.

Auro-Settings: The Auro-Settings application (accessible through the Mac menu bar and the Windows system tray) enables the user to specify the Solo behavior for Auro plug-ins and the software architecture of the DAW used for the Auro-3D Authoring Tools.

NOTE: *We currently support AAX plug-ins for Avid's Pro Tools 10 and 11. Please contact Auro Technologies for information on when VST versions will be available.*

Auro-3D Authoring Tools Concept

Auro-3D introduces additional channels for the extra layers to enhance sound reproduction. As discussed above, even the smallest Auro-3D listening format (9.1) has 10 channels. To enable Auro-3D panning in DAWs limited to eight-channel pan/bus formats, the vector-based panning information is actually rendered in the A3DHost processor outside the DAW.

Each inserted Auro-Panner sends its individual audio stream, with its vector-based panning information, through the Auro-Bus plug-in to the A3DHost process and Auro-Mixing Engine. An Auro-3D configuration (e.g., Auro 11.1) uses two Auro-Return plug-ins inserted on their own DAW tracks, both set to a 5.1-channel format, to split the Auro-3D output into Lower and Height + Top channels. The channels returned depend on the configuration selected in the Auro-Mixing Engine plug-in.

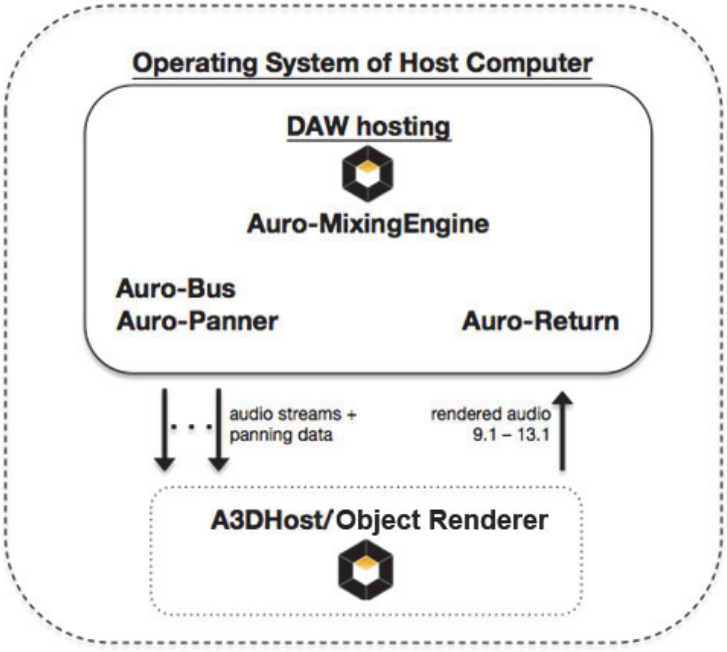

Figure 1-1 Auro-3D block diagram

This user guide covers the following information:

- Chapter 2: *System Requirements and Installation* – Lists system and DAW requirements and discusses how to install Auro-3D software.
- Chapter 3: *Auro-3D Authoring Tools Plug-ins* – Discusses each plug-in's parameters in detail.

Chapter 2: System Requirements and Installation

2.1 System Requirements and Compatibility

The Auro-3D Authoring Tools are in AAX format and run on the following:

- **Operating Systems**: Mac OSX 10.7.5 (or later) and Windows 7 (or later)
- **DAWs**: Pro Tools 10.3.8 and Pro Tools 11.1.2

Please refer to complete system requirements and a list of qualified computers, operating systems, hard drives, and third-party devices for Avid's Pro Tools by visiting:

www.avid.com/compatibility

The Auro-3D Authoring Tools support audio sample rates of 44.1 and 48 kHz. A future release will support higher sample rates.

2.2 Installation

Both Mac and Windows users must first download the latest software from the Auro website:

www.auro-technologies.com

2.2.1 Mac

To install the Auro-3D Authoring Tools on a Mac running OSX:

1. If you have previously installed another version of Auro-3D Authoring Tools, uninstall it by double-clicking AuroPlugins.Uninstall.command from:

   /System/Library/Application Support/Auro Technologies/
2. Restart your computer
3. Double-click the ZIP file you downloaded from the Auro website, then double-click Auro-3D Authoring Tools.pkg to begin the standard installation.
4. Follow installation instructions, then restart your computer.

The following software is installed:

- Auro-Panner, Auro-Bus, Auro-Mixing Engine, Auro-Return, and Auro-DMix Control plug-ins
- A3DHost service
- Auro-Settings menu bar extension and standalone application

2.2.2 Windows

To install the Auro-3D Authoring Tools on a Mac running Windows:

1. If you have previously installed another version of Auro-3D Authoring Tools, uninstall it by locating Start > Control Panel > Programs > Programs and Features, select the Auro-3D software in the Program column, and click Uninstall.
2. Restart your computer
3. Double-click the ZIP file you downloaded from the Auro website, then double-click Auro-3D Authoring Tools.exe to begin the standard installation.
4. Follow installation instructions, then restart your computer.

The following software is installed:

- Auro-Panner, Auro-Bus, Auro-Mixing Engine, Auro-Return, and Auro-DMix Control plug-ins
- A3DHost service
- Auro-Settings system tray extension and standalone application

2.2.3 Licensing

The Auro-3D Authoring Tools require installing the correct licenses on an iLok USB key. There are three license levels:

- **Auro-Panner** – Includes all DAW channel-based panning and mixing functionality.
- **Auro-Codec** – Includes the Auro-Panner license plus the following additional functionality:

  The channel-based output is encoded with the Auro-Codec using Home Entertainment encoding profiles.

- **AuroMAX** – Includes the Auro-Codec license plus the following additional functionality:

  The channel-based output is encoded with the Auro-Codec using Digital Cinema encoding profiles.

Chapter 3: Auro-3D Authoring Tools Plug-ins

A basic Auro-3D session consists of an Auro-Panner, Auro-Bus, Auro-Mixing Engine, and an Auro-Return plug-in. Each plug-in is inserted on its own DAW audio track and connects to the A3DHost processor.

The Auro-Panner sends its track's audio to a selected Auro-Bus, which routes it (and other Auro-Panners) to the Auro-Mixing Engine. The Auro-Mixing Engine lets you set Auro-3D and down-mix configuration settings, mixes the audio, and then sends it back to the DAW using the Auro-Return plug-in.

3.1 Auro-Panner

Figure 3-1 Auro-Panner plug-in

3.1.1 Connection

The Connection LED lights yellow to indicate the Panner is properly connected to the A3DHost service and the other two plug-ins. If the LED lights red or blinks red, there is a connectivity problem (see page 34 for help).

3.1.2 Name

The name field initially displays a unique, automatically generated name. We recommend assigning a more meaningful name to each Auro-Panner instance, such as the name of the track on which it is inserted.

To rename an Auro-Panner instance, click the name field and type a new name. Note that this does not change the name of the respective DAW track.

3.1.3 Volume

The Volume fader sets the signal level sent to the assigned Auro-Bus instance, but has no effect on the Auro-Panner plug-in's direct output to the DAW track.

The Volume can be set three ways:

- Click and drag the fader.
- Click in the path of the fader.
- Double-click the numerical field at the bottom of the fader and enter a value.

Level Meter

This meter displays the DAW track's direct audio input level to the Auro-Panner.

Clip

The Clip LED lights red if more than five consecutive samples cross a threshold of -0.1 dBFS. Click the Clip LED to clear it.

Solo

The S LED lights yellow to indicate this instance is soloed, and all other instances not soloed or designated *solo safe* are disconnected from their buses and not audible.

The S LED flashes yellow to indicate another Auro-Panner instance is soloed.

- Click the S to toggle the solo status of this Auro-Panner instance only.
- Alt + click a lit or flashing S to unsolo all Auro-Panner plug-ins.
- Command (Mac) or Ctrl (Windows) + click the S to designate this Auro-Panner instance *solo safe*: When other Auro-Panner instances are soloed, this instance will remain audible.

NOTE: *The Solo behavior can be changed between X-OR and Latch in the Auro-Settings application (see page 34).*

Mute

The M LED lights red to indicate this instance is muted. Multiple instances can be muted at the same time.

- Click the M to toggle the mute status for this instance only.
- Alt + click a lit M to unmute all Auro-Panner plug-ins.

3.1.4 Bus Assignment

The bus assignment menu, located below Solo and Mute, lets you send the audio and panning information to the Main Bus (default) or an Auro-Bus in your session. The currently selected bus name displays on the menu.

NOTE: *The Main Bus is always available even when no Auro-Bus plug-ins are inserted.*

3.1.5 HDX Aux

On Pro Tools HDX Systems, an Auro-Panner inserted on an Aux Input track requires enabling the HDX Aux switch. This ensures correct synchronization between Audio Track Panners and Aux Input Track Panners, before being mixed together in the Auro-Mixing Engine. The HDX Aux Delay settings are in the Auro Setting app (see page 34).

Figure 3-2 HDX Aux switch in the Auro-Panner

3.1.6 Send 1, Send 2

This feature is not currently implemented.

3.1.7 Object

This feature is not currently implemented.

3.1.8 LFE

The LFE rotary encoder lets you control the amount of signal added to the LFE output routed to the Auro-Mixing Engine. If an LFE channel is already present in the track (e.g., the Auro-Panner is inserted on a 5.1-channel track), it is not affected by the LFE rotary encoder, and is added completely to the LFE output to the Auro-Mixing Engine.

Two switches affect the LFE encoder:

- M: Lets you mute the LFE output to the Auro-Mixing Engine. The M LED lights red when muted.
- P: Lets you toggle the LFE send between pre- and post-fader; the default setting is post-fader. The P LED lights green when set to pre-fader, and is unlit otherwise.

To send the signal from this Auro-Panner instance to the LFE channel only:

1. Mute the Volume fader.
2. Toggle the LFE send to pre-fader.
3. Use the LFE rotary encoder to set the signal amount.

3.1.9 Scene

The Scene parameters provide intuitive graphic control of the orientation of channels in the Auro-Panner. Each channel's icon can be dragged to a new location. The left graphical view shown in Figure 3-3 corresponds to the horizontal plane (X-Y coordinates) as viewed from the top; the right view corresponds to the vertical plane (X-Z coordinates) as viewed from behind. These two views clearly describe your 3D panning moves.

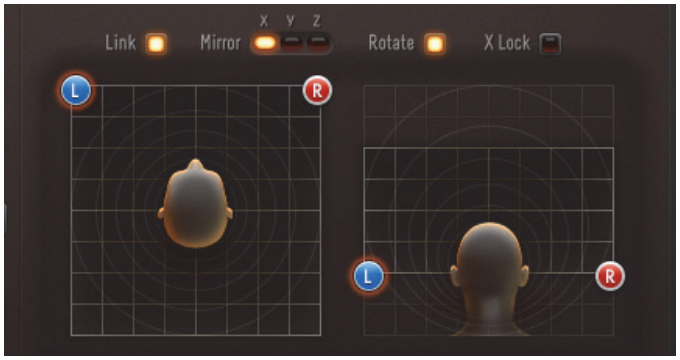

Figure 3-3 Scene parameters

The Scene Parameters (Link, Mirror, and Rotate) enhance the control of the different channels, so that complex panning moves are faster and easier to execute. X Lock prevents channel movement in the X-domain but allows changes to the Y-Z coordinates.

These parameters are explained below but the best way to learn how they work is to experiment by dragging channels around with various options enabled.

Link

When active, multichannel source channels move together when dragged. Their behavior depends on the Mirror, Rotate, and X Lock controls described below, and on which channel is dragged.

Mirror

Mirror X, Y, and Z can be selected individually or in any combination. Link must be enabled for the Mirror controls to have an effect.

When one or more Mirror controls are active, the movement of the channel dragged around is mirrored by moving all other channels around the middle point between the channel dragged and any other channel on the same axis. Therefore, with Mirror X active, two channels with the same X-coordinate will not be mirrored along the X-axis because there is no distance between them on that axis.

Rotate

When Rotate is active, dragging a channel rotates all channels around the scene's origin in the X-Y plane. The relative distances of all channels to the origin remain intact. Link must be enabled for Rotate to have an effect.

NOTE: *When Rotate is enabled, the X- and Y-coordinates are linked, regardless of the state of the Link X and Y options.*

X Lock

When X Lock is active, all channels retain their current X-coordinate position, but can move in the Y-Z plane.

NOTE: *When both Rotate and X Lock are enabled, the channels cannot move in the X-Y plane.*

3.1.10 Channel

The Channel parameters determine the position of a source by specifying its X, Y, and Z coordinates, divergence (width and height), and phantom or discrete routing for each channel.

Figure 3-4 Channel parameters

X, Y, Z

Each channel has X-, Y-, and Z- panning coordinates. If you dragged the channels around the Scene, these numbers reflect the channel's current location.

X- and Y-coordinates vary from -100 to 100. LEDs around the rotary encoders light to indicate the current value, with 0 at the top-center. Z-coordinates vary from 0 to 100. LEDs around the rotary encoder light to indicate the current value, with 0 being fully counterclockwise.

To assign coordinates to a channel:

- Click and drag the channel icon in the Scene (see page 14).
- Adjust a rotary encoder by clicking it and dragging up and down.
- Double-click a rotary encoder's numeric field and enter a coordinate value.

Width and Height

The Width and Height rotary encoders allow you to set the horizontal and vertical divergence, respectively, which controls how much signal is spread to adjacent channels. For example, in a 5.1-channel format, the Width parameter for the C channel causes the signal to first spread into L and R channels and then Ls and Rs. The Height setting affects spread into the Z dimension.

C%, HC%, T%

These settings determine whether a centered source (C, HC, T) will be reproduced by its own center channel or adjacent L and R channels to create a phantom image. The values range from 0–100%.

100% – Entire signal is sent to the center channel, none to L and R channels.

0% – Entire signal is sent to applicable L and R channels, none to C channel. The centered localization is reproduced entirely by a phantom image.

NOTE: *How these settings affect adjacent channels also depends on the multichannel format.*

3.1.11 Controls and Settings Tabs

Click the Controls tab to access the plug-in's normal controls.

Click the Settings tab to adjust the Downfold settings for this Auro-Panner and view information about the Auro-Panner plug-in.

Figure 3-5 Auro-Panner Settings tab

Downfold Settings

These settings control the level of the Height and Top layers reproduced by the Lower layer if a planar mix is selected in the Auro-Mixing Engine.

Enable

When the Enable LED is lit, the Height and Top gains are active. When not lit, the entire Height and Top layer signals are folded down to their respective Lower layer channels.

Height and Top Gain

Both of these controls attenuate only and are at 0 when fully clockwise.

Adjust Height gain to send the desired signal amount from this Auro-Panner to the planar mix.

Adjust Top gain to send the desired signal amount from this Auro-Panner to the planar mix.

About

Click the user manual link to view this guide as a PDF.

Click the Auro web link to visit our website.

The plug-in's software version is displayed in the top-right.

3.2 Auro-Bus

The Auro-Bus collects panned information from a number of Auro-Panners to form a subgroup or stem before delivering them to the Auro-Mixing Engine.

Figure 3-6 Auro-Bus plug-in

3.2.1 Connection

The Connection LED lights yellow to indicate the Auro-Bus is properly connected to the A3DHost service. If the LED lights red or blinks red, there is a connectivity problem (see page 34 for help).

3.2.2 Name

The name field initially displays a unique, automatically generated name. We recommend assigning a more meaningful name to each Auro-Bus instance, such as the name of the track on which it is inserted.

To rename an Auro-Bus instance, click the name field and type a new name. Note that this does not change the name of the respective DAW track.

3.2.3 Volume

The Volume fader sets the signal level sent to the assigned Auro-Mixing Engine.

The Volume can be set three ways:

- Click and drag the fader.
- Click in the path of the fader.
- Double-click the numerical field at the bottom of the fader and enter a value.

Level Meter

This meter displays the direct input level of the connected Auro-Panner with the highest level. It acts as an indication that audio is passing through the bus. Precise metering should be done in the Auro-Mixing Engine, where the audio is mixed to the correct corresponding channels.

Solo

The S LED lights yellow to indicate this instance is soloed, and all other instances not soloed or designated *solo safe* are disconnected from their buses and not audible.

The S LED flashes yellow to indicate another Auro-Bus instance is soloed.

- Click the S to toggle the solo status of this Auro-Bus instance only.
- Alt + click a lit or flashing S to unsolo all Auro-Bus plug-ins.
- Command (Mac) or Ctrl (Windows) + click the S to designate this Auro-Bus instance *solo safe*: When other Auro-Bus instances are soloed, this instance will remain audible.

NOTE: *The Solo behavior can be changed between X-OR and Latch in the Auro-Settings application (see page 34).*

Mute

The M LED lights red to indicate this instance is muted. Multiple instances can be muted at the same time.

- Click the M to toggle the mute status for this instance only.
- Alt + click a lit M to unmute all Auro-Bus plug-ins.

3.2.4 Tracks

The Tracks field lists all tracks routed to this Auro-Bus by its Auro-Panner instances.

3.2.5 Downfold Settings

Like the Auro-Panner plug-in, the Auro-Bus contains two Downfold Settings to control how the Top and Height levels are delivered to a planar mix. The Height gain and Top gain rotary encoders attenuate only, are always enabled, and default to 0.

NOTE: *When the Downfold Enable switch of a connected Auro-Panner is active, the Auro-Bus Downfold Settings will not have any additional effect on that Auro-Panner's audio.*

Height and Top Gain

Both of these controls attenuate only, and are at 0 when fully clockwise.

Adjust Height gain to send the desired signal amount from this Auro-Bus to the planar mix.

Adjust Top gain to send the desired signal amount from this Auro-Bus to the planar mix.

3.3 Auro-Mixing Engine

The Auro-Mixing Engine plug-in lies at the heart of the Auro-3D workflow, and performs the following functions:

- Receives audio from connected Auro-Bus plug-ins.
- Sets the Auro-3D configuration format.
- Outputs a downmix from its own DAW-track, depending on that track's format.
- Contains the Auro-3D Encoder.

The Auro-Mixing Engine output can be monitored by routing it to one or more Auro-Return plug-ins.

Figure 3-7 Controls tab of Auro-Mixing Engine

The Auro-Mixing Engine has three tabs: Controls, Encoder, and Settings.

The Objects tab is not yet implemented.

3.3.1 Controls Tab

Click the Controls tab to access the Auro-Mixing Engine's main controls.

Connection

The Connection LED lights yellow to indicate the Auro-Mixing Engine is properly connected to the A3DHost service. If the LED lights red or blinks red, there is a connectivity problem (see page 34 for help).

Name

The name field initially displays a unique, automatically generated name. We recommend assigning a more meaningful name to each Auro-Mixing Engine instance, such as the name of the track on which it is inserted.

To rename an Auro-Mixing Engine instance, click the name field and type a new name. Note that this does not change the name of the respective DAW track.

Volume

The Volume fader sets the signal level sent to the connected Auro-Return plug-ins and also affects the downmix sent to the DAW track.

The Volume can be set three ways:

- Click and drag the fader.
- Click in the path of the fader.
- Double-click the numerical field at the bottom of the fader and enter a value.

Solo

The S LED lights yellow to indicate this instance is soloed, and all other instances not soloed or designated *solo safe* are disconnected from their buses and not audible.

The S LED flashes yellow to indicate another Auro-Mixing Engine instance is soloed.

- Click the S to toggle the solo status of this Auro-Mixing Engine instance only.
- Alt + click a lit or flashing S to unsolo all Auro-Mixing Engine plug-ins.
- Command (Mac) or Ctrl (Windows) + click the S to designate this Auro-Mixing Engine instance *solo safe*: When other Auro-Mixing Engine instances are soloed, this instance will remain audible.

NOTE: *The Solo behavior can be changed between X-OR and Latch in the Auro-Settings application (see page 34).*

Mute

The M LED lights red to indicate this instance is muted. Multiple instances can be muted at the same time.

- Click the M to toggle the mute status for this instance only.
- Alt + click a lit M to unmute all Auro-Mixing Engine plug-ins.

Configuration

The Auro-Mixing Engine can create many formats that can be selected from the Configuration menu. The meter labels automatically change to reflect the channels present in each configuration.

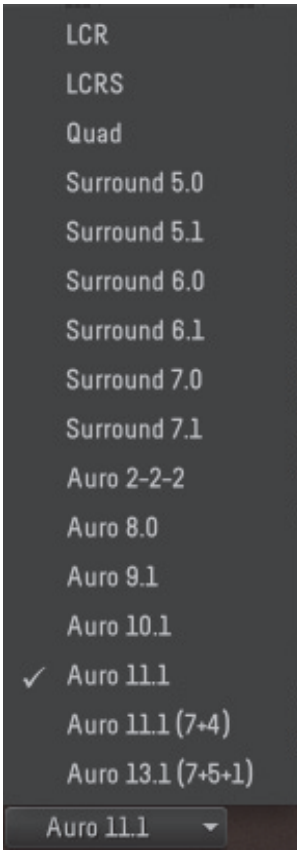

Figure 3-8 Configuration options

Buses

The Buses area lists the Main Bus and the names of all active Auro-Bus plug-ins present in your session. The LED to the left of the bus name lights when that bus is selected; multiple buses can be selected. If no Auro-Bus plug-ins are present, Main Mix is selected by default.

Metering

The channel meters and the pan graph both offer real-time visual representations of the signal level sent to each channel of the current configuration. While the meters give an accurate measurement of the signal level in decibels, the pan graph offers a three-dimensional localization of the energy. Each dot in the pan graph represents a channel's location; its brightness indicates the signal level.

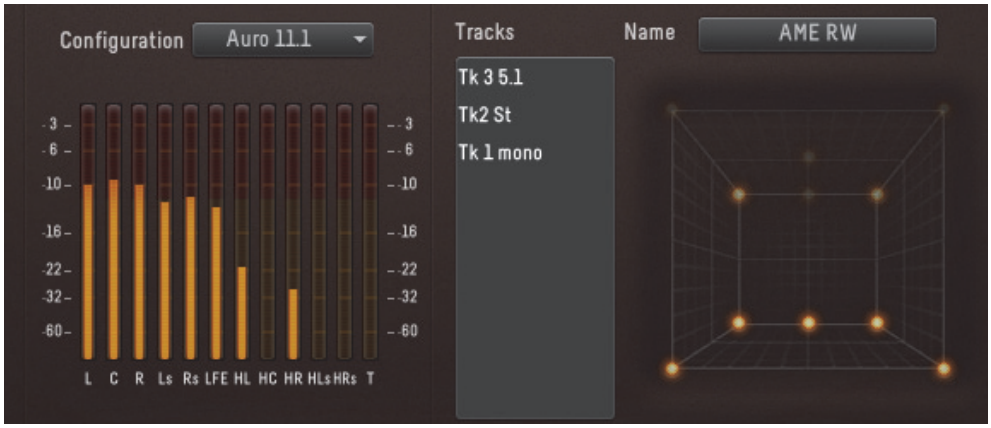

Figure 3-9 Pan Graph

3.3.2 Encoder Tab

Click the Encoder tab to adjust parameters related to the encoding process.

Figure 3-10 Encoder tab with Stereo Downmix control

Encoding

To encode your session:

1. Select your start and stop locater positions in the DAW.
2. Activate the Enable switch.
3. Select an encoding profile from the Profile menu.
4. Launch playback in your DAW from the start of the audio you wish to encode, and stop playback at the end.

   When playback stops, the encoder will begin processing the audio.

Enable

Click the Enable switch to toggle the encoder's status. The Enable LED lights yellow when activated for encoding.

Profile

The Profile menu contains a collection of Encoder settings for different target applications that depends on the Auro-3D Authoring Tools license level.

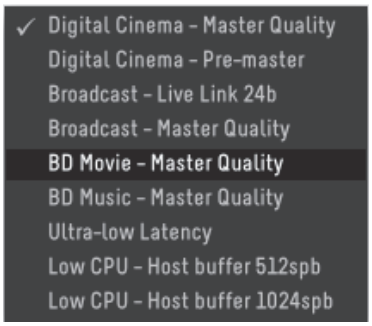

Figure 3-11 Profile menu

Meters

The Auro-Codec Encoder always encodes upper-format content into a lower-format carrier. The meters show the signal level in each carrier channel. Each channel is a static or dynamically controlled downmix of a combination of upper-format channels. To control this downmix, see page 27.

Clip

On top of each meter, a Clip LED lights when the Encoder Limiter activates for that channel. The limiter prevents clipping during encoding, but we recommend using it as a preventive measure only, because of the inevitable distortion. Click a red Clip LED to clear it.

Program Settings

Program settings contain Dither and Room type parameters and a Native Content switch.

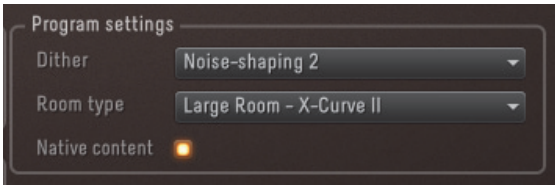

Figure 3-12 Program settings in Auro-Mixing Engine Encoder tab

Dither

This menu lets you select a dithering algorithm for encoding.

NOTE: *Dithering is disabled for the Digital Cinema Profile menu options.*

There are four Dithering menu options:

- None: No dithering is applied during encoding.
- Standard: A TPDF dithering algorithm is used during encoding.
- Noise-shaping 1: The noise-shaping type 1 algorithm is used during encoding.
- Noise-shaping 2: The noise-shaping type 2 algorithm is used during encoding.

Room Type

This menu lets you specify which kind of environment the content was mixed in.

There are four Room Type options:

- No room type defined
- Large Room – X-Curve
- Large Room – X-Curve II
- Small Room – Flat monitoring

Native Content

Content that originates from an original Auro-3D recording or mix is considered *Native*. The Native Content checkbox is enabled by default.

Do not select the Native Content checkbox for content that originates from upmixed mono, stereo, or surround material.

Stereo Downmix and Auro-Matic

The controls displayed in this area depend on the Configuration selected from the Controls tab. A Configuration with 5.1 (six) or less channels displays Auro-Matic controls, while those with more channels display Stereo Downmix faders. The active category title is highlighted.

Stereo Downmix

The Stereo Downmix faders let you to replace the standard downmix coefficients for Surround carriers that require stereo playback with your own. Adjust each channel fader to specify the amount you wish to downmix to stereo. Figure 3-10 shows these controls.

Auro-Matic

These settings control how content encoded in a 2D carrier will play in a 3D configuration using the Auro-Matic upmixing algorithm. For example, when encoding an Auro 2-2-2 configuration into a stereo carrier, the Auro-Matic Preset and 3D Strength parameters supply precise instructions for the Auro-Matic upmixing algorithm to use when playing this content back through an Auro-3D configuration.

Figure 3-13 Encoder tab with Auro-Matic controls

Preset

Select an option from the Preset menu for the Auro-Matic algorithm to use when upmixing 2D content to a 3D configuration.

3D Strength

The 3D Strength parameter is used when a planar (2D) configuration has been encoded into a stereo carrier but will be decoded and played back in a 3D configuration. Normal decoding renders the planar mix, but this must be upmixed through the Auro-Matic algorithm to play on a 3D system. The 3D Strength parameter helps determine the default level for the height layer.

The 3D Strength options are: Low, Medium (default), High, and Extreme.

3.3.3 Settings Tab

Click the Settings tab to adjust Downmix settings, Panning settings, Export path, set Program name, and view info about Auro-3D Authoring Tools.

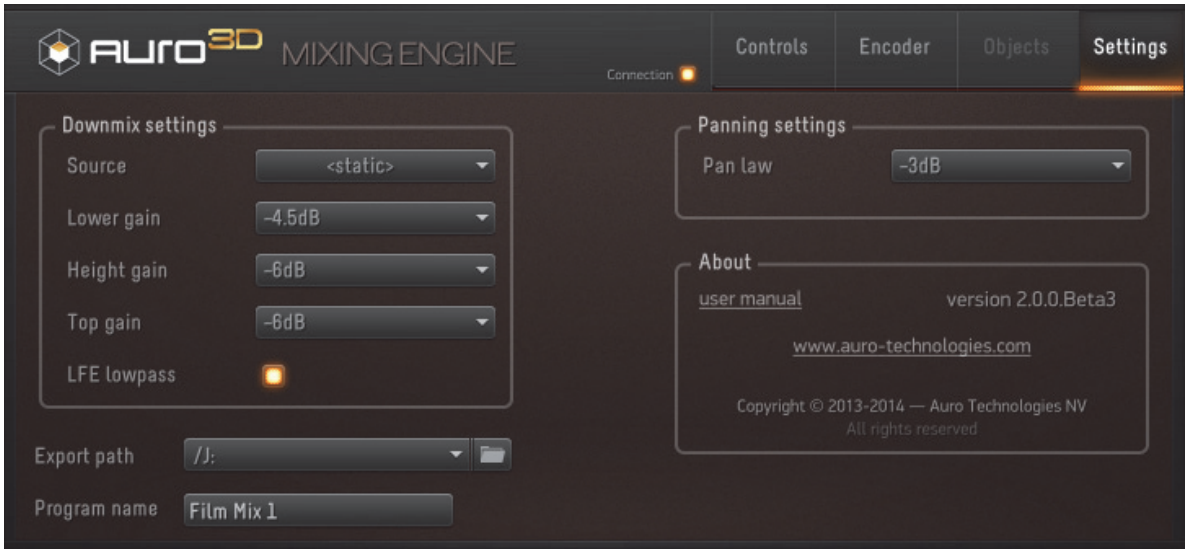

Figure 3-14 Auro-Mixing Engine Settings tab

Downmix Settings

In the absence of an Auro decoding system, downmix settings enable 2D playback on a normal 5.1 Surround system.

In addition to the encoded downmix, the Auro-Mixing Engine always outputs a downmix in the same format as the track on which the plug-in is inserted (Stereo – 5.1). The Top channel is downmixed to the corner channels.

Source

The Source menu has a Static option that lets you specify fixed attenuations for Lower gain, Height gain, and Top gain.

The Source menu also contains the names of the Auro-DMix Control plug-ins in your session. You can choose one of these and use its settings for a dynamic downmix. See "Auro-DMix Control" on page 32.

Lower gain, Height gain, and Top gain each offer five attenuation options: 0, -3dB, -4.5dB, -6dB, -9dB

LFE lowpass

A lowpass filter can be applied to the LFE channel with a cut-off frequency of 100 Hz and slope of 6 dB/octave.

Export Path

You can specify a folder location to save Auro-encoded files.

Program Name

You can assign a name to the Auro-encoded file.

Panning Settings

Click the Pan Law menu to choose -3dB or -6dB.

About

Click the user manual link to view this guide as a PDF.

Click the Auro web link to visit our website.

The plug-in's software version is displayed in the top-right corner.

3.4 Auro-Return

The Auro-Return plug-in routes channels from a specific Auro-Mixing Engine to the DAW track on which it is inserted.

Figure 3-15 Auro-Return plug-in

3.4.1 Connection

The Connection LED lights yellow to indicate the Auro-Return is properly connected to the A3DHost service and the other plug-ins. If the LED lights red or blinks red, there is a connectivity problem (see page 34 for help).

3.4.2 Name

The name field initially displays a unique, automatically generated name. We recommend assigning a more meaningful name to each Auro-Return instance, such as the name of the track on which it is inserted.

To rename an Auro-Return instance, click the name field and type a new name. Note that this does not change the name of the respective DAW track.

3.4.3 Bus

This menu lets you select the Mixing Engine plug-in from which to receive panned audio.

3.4.4 Stem

This menu lets you select all stems or a single stem (i.e., an Auro-Bus).

3.4.5 Output

This menu lets you select a regular mix or downmix.

3.4.6 Preset

This menu lets you select a channel configuration that best suits your application. Film and ITU conventions are both available for Lower and Height channels.

The options in this menu depend on the following:

- The Configuration selected in the Mixing Engine connected to this Auro-Return plug-in (see page 23).

  - and -

- Whether Mix or Downmix is selected in the Output menu.

3.4.7 1...N

The 1...N channel menus are initially populated by the selected preset, but can be individually set to create a custom format. The Preset menu displays Custom to indicate a modified preset.

Select from these menus to reassign the Mixing Engine channels routed to this Auro-Return plug-in's output channels.

NOTE: *To assign an incremental range of channels, hold down Alt and select an output.*

3.5 Auro-DMix Control

The Auro-DMix Control plug-in lets you:

- Creatively and dynamically control the downmix that encodes Auro-3D content into a 5.1 Surround or four-channel carrier.
- Control the non-encoded downmix.

Unlike the Downmix Settings in the Auro-Mixing Engine, the Auro-DMix Control lets you automate the channel gain attenuations so you have complete dynamic control. When the encoded carrier plays through a 5.1 Surround system, these gains determine how the source channels are mixed together.

The Auro-DMix Control plug-in can be inserted on any kind of audio track.

Figure 3-16 Auro-DMix Control plug-in

3.5.1 Connection

The Connection LED lights yellow to indicate the Auro-DMix Control plug-in is properly connected to the A3DHost service and the other plug-ins. If the LED lights red or blinks red, there is a connectivity problem (see page 34 for help).

3.5.2 Name

The name field initially displays a unique, automatically generated name. We recommend assigning a more meaningful name to each Auro-DMix Control instance, such as the name of the track on which it is inserted.

To rename an Auro-DMix Control instance, click the name field and type a new name. Note that this does not change the name of the respective DAW track.

3.5.3 Mixing Engines

The Mixing Engines field lists all Auro-Mixing Engines that receive downmix gains from this instance of Auro-DMix Control.

3.5.4 Channel Gain

Each source channel's level can be attenuated for the downmix. Only negative gain values are allowed because downmixing already creates a rise in level.

The channel gain can be set three ways:

- Click and drag the fader.
- Click in the path of the fader.
- Double-click the numerical field below the fader and enter a value.

3.5.5 Group Layer

The channel gain faders for the Lower and Height layers can each operate as their own group. Click the Group layer LED so it lights. When active, dragging one channel gain fader up or down also drags the others.

3.6 Auro-Settings App

Auro-Settings runs as a Finder menu bar extension and standalone app. It provides easy access to Solo Mode, Architecture, and HDX Aux Delay settings, and can restart the A3DHost service.

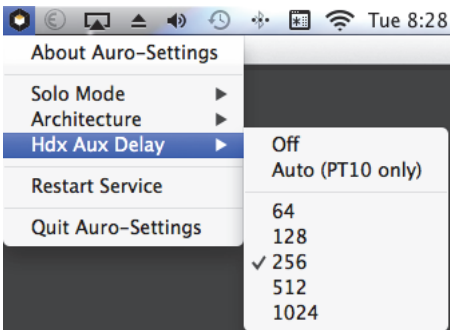

Figure 3-17 Auro-Settings with HDX Aux Delay options in the Mac menu bar

3.6.1 Solo Mode

There are two Solo Mode options:

- X-OR: Each solo selection replaces the previous selection(s).
- Latch: Each solo selection adds to the previous selection(s).

3.6.2 Architecture

There are two Architecture options:

- 32-bit: To use Auro-3D Authoring Tools in Pro Tools 10.
- 64-bit: To use Auro-3D Authoring Tools in Pro Tools 11.

3.6.3 HDX Aux Delay

To synchronize Auro-Panners on Audio Tracks and Aux Input Tracks in Pro Tools HDX Systems, you must select a setting appropriate for your system.

- Off: No HDX System used
- Auto (PT10 only): HDX System with Pro Tools 10. Synchronization will be applied correctly, independent of the H/W buffer size in Setup > Playback Engine.
- 64 … 1024: HDX System with Pro Tools 11. Mirror this setting for the H/W buffer size in Setup > Playback Engine so that the Auro-Panners on both types of tracks are synchronized correctly.

See “HDX Aux” on page 13.

3.6.4 Restart Service

A blinking Connection LED in an Auro-3D Authoring Tools plug-in means there is no valid connection between it and the A3DHost service and/or the Auro-Mixing Engine. This can occur for the following reasons:

- The A3DHost service was not installed properly, or the workstation was not restarted after installation.
- The A3DHost service stopped for some reason and did not automatically restart.

To restore your system, quit and restart your DAW, and select Restart Service from the Auro Settings app. If that does not work, restart your computer.

NOTE: *The same command (A3DHost.RestartService.command) can be found in: Library/Application Support/Auro Technologies/A3DHost.*

3.7 Keyboard Shortcut List

Table 3-1 General

Function	Mac Shortcut	Windows Shortcut
Reset fader/rotary encoder	Opt + click fader/rotary encoder	Alt + click fader/rotary encoder
Adjust with precision	Cmd + adjust rotary encoder	Start + adjust rotary encoder

Table 3-2 Auro-Panner

Function	Mac Shortcut	Windows Shortcut
Reset X-, Y- and Z-coordinates	Opt + Cmd + click X-, Y- or Z-encoder Shift + Opt + click X-, Y- or Z-encoder	Alt + Start + click X-, Y- or Z-encoder Shift + Alt + click X-, Y- or Z-encoder
Reset X-, Y- and Z-coordinates	Opt + click Channel Icon	Alt + click Channel Icon
Unmute all Panners	Opt + click Panner Mute	Alt + click Panner Mute
Solo Safe Panner	Cmd + click Panner Solo Button	Start + click Panner Solo Button
Unsolo all Panners	Opt + click a lit Solo Button	Alt + click a lit Solo Button

Table 3-3 Auro-Mixing Engine

Function	Mac Shortcut	Windows Shortcut
Unmute all Mixing Engines	Opt + click Mixing Engine Mute	Alt + click Mixing Engine Mute
Solo Safe Mixing Engine	Cmd + click Mixing Engine Solo Button	Start + click Mixing Engine Solo Button
Unsolo all soloed Mixing Engines	Opt + click a lit Solo Button	Alt + click a lit Solo Button

Table 3-4 Auro-Return

Function	Mac Shortcut	Windows Shortcut
Select incremental range of outputs	Opt + click fader/rotary encoder	Alt + click fader/rotary encoder