

# BLACK AUDIO RENDERING ENGINE



- ▶ LOCALISATION
- ▶ ROOM ACOUSTICS
- ▶ IMMERSIVE AUDIO
- ▶ STAGE TRACKING

## Key Features

- ▶ Powerful, ease of use
- ▶ 128 input channels with 64 configurable audio objects
- ▶ Up to 128 spatialized output channels
- ▶ Built-inSFF player supports scaling in X,Y and Z axis
- ▶ Wordclock
- ▶ LTC Timecode
- ▶ Robust 4RU rack-mount housing
- ▶ Ultra-low noise cooling
- ▶ Redundant solid state drives
- ▶ A range of redundant options
- ▶ Web-browser based control
- ▶ CSV configuration file exchange



## Tools for the Creation and Deployment of ear-catching 3D Audio

The heart of the Black Audio Rendering Engine harnesses auralite3D technology, developed with Fraunhofer Institute for Digital Media Technology IDMT, and makes fully object-based, sophisticated immersive audio accessible for the end user.

The rendering algorithm auralite3D uses is Adaptive Wave Field Synthesis. The embedded decorrelation characteristics minimize interference when objects are rendered through multiple loudspeakers, which makes auralite3D supports 2.0/5.1/7.1/7.1.4etc.channel-based audio playback. auralite3D is able to provide 3 pre-defined moving trajectories for each audio object, whose Z-axis value can be set either automatically or manually.

CPU-based with a Linux ecosystem, each Black Audio engine offers up to 128 MADI network pathways at 48kHz/24bit resolution. All paths are assignable to at least 64 audio input channels (point-source or plane-wave) that can be rendered to up to 128 independently processed outputs.

True object-based immersive audio is achieved with 40 synchronization up-

dates per second, per object, to ensure absolute accuracy, plus advanced algorithms applied to fast moving objects to prevent audible errors. Effects (like the doppler effect) could be minimized with different delay options for each source individually.

Latency is a mere 5ms.

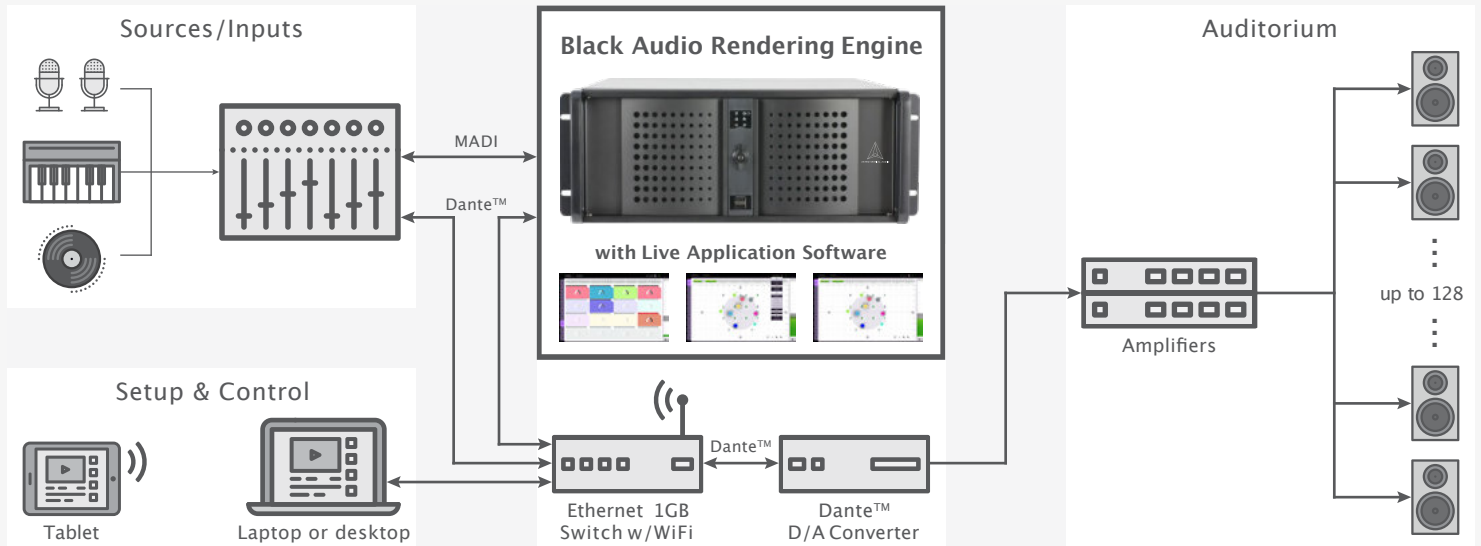
Reliability and ease of operation is ensured by Black Audio's built-in web-server. This provides browser-based access to an easy-to-operate graphical user interface, with simultaneous control of multiple devices, ranging from mixing consoles, digital audio workstations and Windows, Linux or Mac operating systems, to tablets and phones running either Android or iOS. Control via third-party systems or MIDI is achieved via Open Sound Control (OSC). Constructed in a rugged 19-inch, 4U casing with an internal, expandable 250GB SSD drive and full redundancy, Black Audio is ready for the road or the rack, with the power and intelligence to make sophisticated spatial sound a scalable, accessible reality for sound engineers.

Find out more by visiting [astroaudio.eu](http://astroaudio.eu)



**3D**  
AUDIO

## Typical system diagram for 3D Spatial Audio in a Live Application



## Technical Specifications

### Audio and control

Audio inputs	64 configurable objects, 32SFF player objects
Audio outputs	Up to 128channels
Sample rate	48kHz, 24bit (support up to 96kHz possible)
Latency	<8ms, incl. loudspeaker management
External Control	Open Sound Control (OSC) for MIDI, RS232 and GPIO
Standard: MADI	1 x Optical (SC) and coaxial (BNC)
Wordclock	Selectable internal / external (BNC)
Network	1 x Gigabit on Ethercon Neutrik NE8
Maintenance only	1 x VGA 1024 x 768 or higher 2 x USB 3.0, 1x RJ45 Gigabit Ethernet

### Storage

RAM	8 GB
Internal storage	2 x 250GB Solid State Drive
Redundancy	Optional RAID 1SSD (internal) Parallel Black Audio Engines (daisy chain or full mirroring) is possible

### Power Supply

Connector	Cold Appliance Plug
Optional	Quiet Kit – Colling with less noise

### General

Housing	19"Rackmount, 4RU
Dimensions	WxDxH 482 x 520 x 178mm (19"x 21.7"x7")
Operating System	Linux CentOS

## About Astro Spatial Audio

Astro Spatial Audio (ASA) combines Auralite 3D technology, developed with the Fraunhofer Institute for Digital Media Technology IDMT, with the intelligence and power of the Black Audio Rendering Engine. The result is the leading independent solution for scalable and easy-to-operate fully object-based immersive audio. Delivering new creative options on tour with major artists and in installations worldwide, ASA can be found in venues as varied as theatres, houses of worship, planetariums, theme parks, museums, nightclubs, cruise ships and more.