Gaudio Spatial Audio for Wearable Devices

Hear wider space that sound shapes

Nowadays, as people are using mobile devices like smartphones, AR/VR devices to enjoy immersive visual content more than TVs, there are significant needs to bring cinematic experience into mobile devices and here, immersive sound experience is the key for users to be aligned with the visual cues on mobile display.

Gaudio Spatial Audio(a.k.a GSA) is the best embedded audio software to provide a lifelike immersive 3D sound experience on earbuds using psychoacoustic and interactive head-tracking technologies. In classic stereo, users feels that sound comes out from their head, called in-head localization, without sense of 360 degrees. Gaudio Spatial Audio creates a wide and deep surround sound all around the user's head. Using Gaudio's innovative binaural rendering technology, the sound gets immersive and surrounds you in 360 degrees without any loss of sound quality, so that you can feel as if you are in the same event ("being there"). By integrating GSA onto earbuds, you can enjoy the same lifelike experience not only with a smartphone but also with any visual devices.


Classic Stereo Audio　　　　**Gaudio Spatial Audio**

Ready to spatial audio for truly lightweight processors

GSA is designed for spatial audio for the lightweight processor for earbuds. It requires the smallest memory and the lowest computing power, so it helps to increase power efficiency and users can experience long playtime movies with the high quality of spatial audio. Also, because all the things needed for spatial audio, movement sensing and spatial audio processing, are working in earbuds, it can promptly update sound layout responding to the user's subtle head movement. Gaudio's standard-winning technologies provide high-quality and low latency soundstage without any further implementation or optimization of the source device.
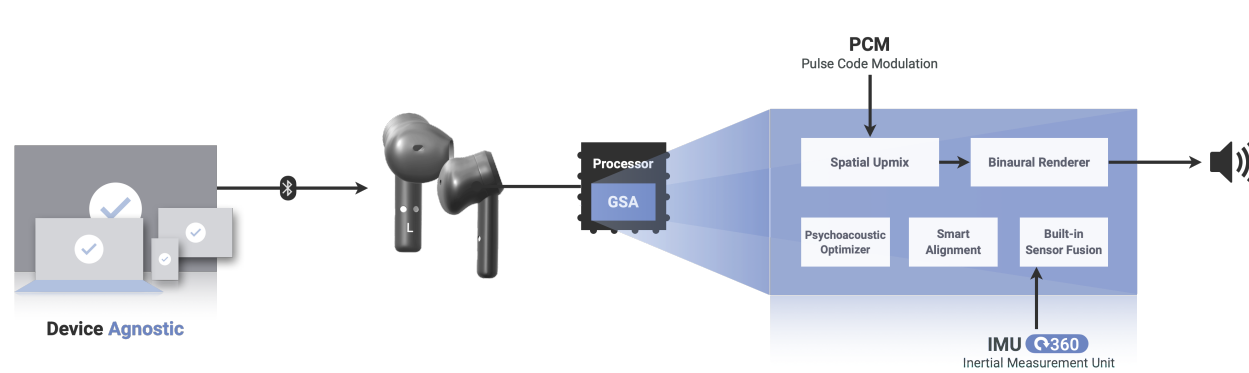
Features and Benefits

Features	Benefits
Psychoacoustically precise binaural rendering with full FIR-based convolution (HQ mode)	Expanded natural and lifelike immersive 3D sound
Real-time high quality rendering on earbuds-side	Source device agnostic / Perceptually zero motion-to-sound latency
Smart display alignment	Automatic alignment with display while moving
Various IMU sensors (6-axis, 9-axis) and data formats supported by built-in sensor fusion module	Easy and flexible system design
Adjustable IMU data update rate	Higher rates for precise head-tracking / Lower rates for extended battery life
Intuitive tuning user interface (accompanying app)	Real-time tuning for custom spatial audio preset

Specifications

	HQ (High-Quality)	LC (Low-Complexity)
Rendering Type	Full FIR-based convolution	Simplified modeling in time-domain
Input Format	Mono, stereo, 5.1ch	Mono, stereo
Computing Power	22MIPS [2]	31MIPS [3]
Memory	295KB	56KB
Motion-to-Sound Latency [1]	53 - 120ms	
Rendering Modes	Head-tracked(3DoF), fixed	
Supported Audio Codec	Codec-agnostic (such as AAC, SBC and apt-X)	
Compatible IMU Sensors	Any 6-axis or 9-axis IMU sensors	
Sensor Interface Format	Agnostic (floating raw accelerometer / gyroscope data)	

Note:
1) Motion-to-Sound Latency : Measured by Gaudio Lab's proprietary measuring system
2) Measuring computing power on Goodix Tarantella DSP with SIMD optimization
3) Measuring computing power on Qualcomm Kalimba DSP

Deliverables

- GSA library & integration guide
- GSA Tunemeister™ - Dedicated sound tuning and control application
- (GSA-HQ, Optional) GSA Pro 5.1™ - Source-side software library for 5.1 pre-processing

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GSA Ordering Information

		HQ (High-Quality)		LC (Low-Complexity)	
		GSA-HQ-FX	GSA-HQ-HT	GSA-LC-FX	GSA-LC-HT
Rendering Modes	Fixed	✓	✓	✓	✓
	Head-tracked		✓		✓
Input Format	Mono	✓	✓	✓	✓
	Stereo	✓	✓	✓	✓
	5.1ch	✓	✓		
Audio Quality		High audio quality, ultra-wide depth of surround sound		Balanced audio quality, wide depth of surround sound	
Memory		295KB		56KB	

For more information, please contact us. support@gaudiolab.com

About Gaudio Lab, Inc.
Gaudio Lab is an audio technology start-up which was founded in 2015, after the company's spatial audio technology for headphones was adopted as the binaural renderer for the ISO/IEC MPEG-H Audio standard in 2014. Ever since its establishment, the company has developed technologies and solutions which deliver superior audio experiences wherever there is sound, navigation across reality and virtuality to bring optimized audio to diverse platforms such as earbuds, smartphones, OTT, VR/AR, theaters and more.

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