Product Overview

The Audience earSmart eS325 Advanced Voice Processor features all the newest technologies necessary for the best-sounding voice experience on modern mobile devices, delivering innovations in real-time communications, speech recognition and media capture.

The earSmart eS325 is the first Advanced Voice Processor to feature industry-first innovations such as: simultaneous three-microphone processing, optimized Automatic Speech Recognition (ASR) Assist, Mobile Audio Zoom, Super Wideband support for Voice over IP (VoIP) and Enhanced Stereo Recording. The earSmart eS325 also features Bandwidth Expansion (BWE) technology for a consistent, HD-quality voice call experience when moving between 3G and 4G networks, while also meeting the tighter latency requirements of the European HD™ Voice standard, ensuring reduced delay for more natural conversations.

Third Generation Advanced Voice Technology Raises Performance Bar

Compatible with leading operating systems and basebands interfaces, including SLIMbus, the Audience earSmart eS325 delivers one of the biggest advances in performance and power consumption ever made between product generations, most notably:

- Three-microphone performance improvements of 30-55% signal-to-noise ratio improvement (SNRi) in noisy environments. In optimal conditions, tests show SNRi improvement of up to 80% over two microphone-enabled, previous generation products.
- Dramatically improved positional robustness, delivering increased consistency of voice quality when mobile device is held in a variety of different positions.
- 41% lower power consumption for Narrowband phone calls and 52% lower power consumption for HD Voice/Wideband calls.

Be Heard — With Best in Class Voice Processing

The earSmart eS325 features 3rd generation Audience Advanced Voice processing features. The eS325 delivers the world’s first true support of three-microphones, where all three are used simultaneously to gather more environmental information around the user and deliver vastly improved voice quality. The processing power of the earSmart eS325 has more than doubled to support high sample-rate VoIP calls (at 24 kHz) in addition to Narrowband and Wideband noise suppression. The Audience earSmart eS325 offers the industry’s first de-reverberation solution to reduce the echo of a speaker’s voice in challenging environments such as hallways and conference rooms.

Be Understood — With Optimized ASR Assist

ASR Assist technology directly addresses the challenge faced by many speech recognition applications today, namely their failure to recognize spoken words and complete assigned tasks because of disruptive background noise. The earSmart eS325 uses custom hardware-accelerated algorithms to isolate voice from surrounding environmental noise, dramatically improving the accuracy of speech-enabled applications such as voice search and speech to text. Mobile devices equipped with Audience ASR Assist technology deliver improved speech application reliability, accuracy and task completion – even in noisy, distracting environments.
Be There — Captured memories sound as good as they look
Mobile devices today are relied upon for media capture as much as they are for communication, and the desire for captured audio to be the same HD quality as video has never been more apparent. The earSmart eS325 Advanced Voice Processor features the world’s first two-microphone 48 kHz noise suppression implementation for recording clean, HD audio. The earSmart eS325 also features Audio Zoom, the world’s first selective audio capture feature to be deployed for mobile devices. Audio Zoom allows users to dynamically switch between a narrator mode, with a single speaker, to interview mode, where the person holding the device can “interview” another person, capturing both voices with crystal clear accuracy while removing background noise.

Product Description

The earSmart eS325 Advanced Voice Processor is a high-performance custom designed audio processing solution with a significant level of integration and flexibility. It includes an advanced Audience Advanced Voice Processor and a hardware accelerator engine that have been optimized to run computationally intensive audio processing algorithms at very low-power consumption.

Key features of the eS325 Advanced Voice Processor are:

- 8 kHz, 16 kHz, and 24 kHz voice processing capabilities for transmit and receive non-stationary noise suppression
- Low-power consumption with hardware-assisted power optimization
- Transmit de-reverberation algorithms for reducing the distortion from environmental reverberation
- SLIMbus digital audio and command interface for easy integration
- Advanced multimedia processing capabilities for enhanced 48 kHz audio recording and playback
- Automated Speech Recognition Assist for ASR-optimized noise suppression and gain control

The Science Behind the earSmart eS325 Advanced Voice Processor

Audience is a pioneer in the development of commercial products based on the science of Computational Auditory Scene Analysis (CASA) to manage the characterization, grouping and processing of complex mixtures of sound. Using the principles of CASA, the eS325 Advanced Voice Processor makes mobile devices acutely aware of their surroundings, instinctively enhancing voice communication and suppressing noise, for a clear voice experience even in noisy settings.
# Product Highlights

## Voice Features
- Non-Stationary and Stationary Noise suppression (Close talk, Far talk)
- ASR Assist mode
- Audience Hi-Fi Voice, Voice Stretch and Acoustic Echo Cancellation
- Automatic Gain Control, Voice Equalization, Post Equalization and Multiband Compressor
- Narrowband (8 kHz), Wideband (16 kHz) and Super Wideband (24 kHz) signal processing
- Transmit De-reverberation

## Audio Features
- UI Tone Mixing, Audio Multiband Compressor (MBC), Parametric EQ and Stereo Widening
- Dynamic Range Compressor (DRC)
- Equalizer Engine and Virtual Bass Boost support (OpenSL ES1.1 compliant)
- Configurable Beep Generator
- Multimedia recording features
  - Audio Zoom directional sound capture modes for camcorder application
  - Enhanced Stereo Recording: Presets for optimized camcorder performance in multiple every day, real-life environments
  - Stereo 2-Mic Stationary Noise Suppression

## Key Device Features
- 3x3 mm footprint
- 40nm process technology
- Third Generation Audience earSmart Advanced Voice Processing core
- SLIMbus Interface
  - 10 receive data ports and 6 transmit data ports.
  - Support for Isochronous, Pushed, and Pulled Transport Protocols
- Digital Audio Ports
  - 3 Master/Slave PCM/I2S ports
  - Supports 4 digital Mic inputs and 1 output
  - Up to 192 kHz sample rates
- I2C, UART, and SLIMbus Host Interfaces