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FRAUNHOFER INSTITUTE FOR INTEGRATED CIRCUITS IIS

AUDIO COMMUNICATION ENGINE RAISING THE BAR IN COMMUNICATION QUALITY

BENEFITS

HIGHEST AUDIO QUALITY FOR NEXT GENERATION COMMUNICATION SYSTEMS

Communication products using the Fraunhofer Audio Communication Engine provide a natural, convenient and efficient experience that is comparable to talking to someone in the same room.

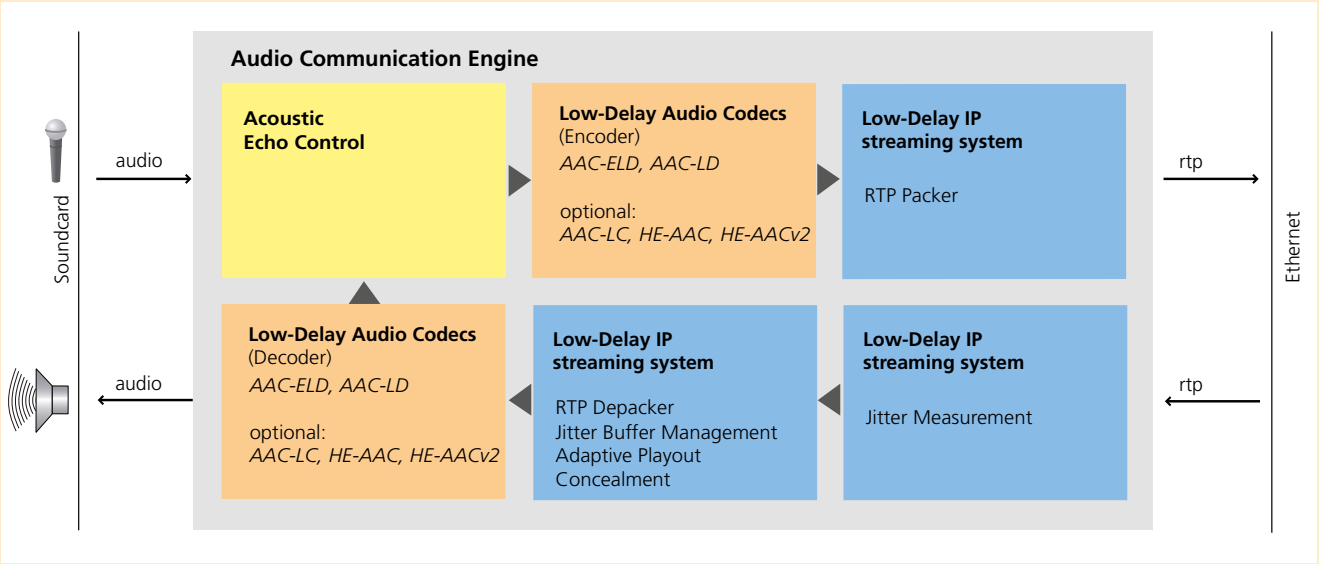
FASTER TIME TO MARKET WITH AN ALL-IN-ONE-SOLUTION

As the Audio Communication Engine integrates the major components required for high-quality communication systems into one single solution, it accelerates the product development phase.

EASY INTEGRATION

Fraunhofer's audio experts have optimized the interaction of the individual components to ensure the best possible performance and minimal implementation effort.

INTEGRATED SOLUTION FOR INTERNET PROTOCOL-BASED-COMMUNICATION PRODUCTS INCLUDING VOICE OVER IP (VOIP) AND VIDEO CONFERENCING, ENABLING CD-LIKE AUDIO QUALITY, VERY LOW LATENCY, ROBUSTNESS AND HANDS-FREE OPERATION



Key components of the
Audio Communication Engine

THE AUDIO COMMUNICATION ENGINE COMPRISES THREE MAIN COMPONENTS

MPEG AAC low-delay audio codecs for CD-like audio quality:

MPEG Enhanced Low Delay AAC (AAC-ELD) offers high audio quality for speech, music and ambient sounds, enabling a compelling communication experience for your customers. AAC is used in more than one billion devices, such as cell phones, portable audio players including iPod as well as digital television and audio broadcasting services.

Efficient Acoustic Echo Control for a hands-free natural communication experience free of echoes:

This technology is adaptive to changing acoustic conditions, even if several people are talking at the same time. The Acoustic Echo Control is a very flexible and robust solution. For example, microphones and loudspeakers can be moved freely during conversations.

Robust low-delay IP streaming system for consistent, reliable services:

The streaming system provides users with the best audio quality even under adverse network conditions.

KEY FEATURES

MPEG AAC low-delay audio codecs

- MPEG AAC-ELD and MPEG AAC-LD are super wide-band audio codecs (up to 22 kHz audio bandwidth)
- CD-like audio quality supporting speech, music and ambient sounds
- Low bit-rates down to 24 kbit/s
- Low algorithmic delay down to 15 ms at 64 kbit/s
- Sophisticated error concealment
- Long term interoperability guaranteed by ISO/MPEG standardization

Acoustic Echo Control

- High audio quality and full duplex communication enabled by our optimized echo suppression algorithm
- Very low processor workload compared to echo cancellation methods
- Effective echo control even if several people are talking at the same time
- Multi-channel support, including stereo and 5.1 surround sound, with low complexity
- High audio quality for voice, music and ambient sounds
- Up to 60 dB echo suppression
- Full audio bandwidth (up to 24 kHz)

Low-delay IP streaming system

- Sophisticated error concealment provides good speech intelligibility even up to a 30 percent packet loss rate
- Adaptive jitter buffer control minimizes the buffering delay while maintaining a continuous audio playout
- Dynamic switching of codec and bit-rate allows adaptation to variable network conditions

AVAILABILITY

The Audio Communication Engine is available for evaluation as a hardware kit as well as software for Windows, Mac OS and Linux. It can be licensed as a complete system; individual components such as AAC-(E)LD and Acoustic Echo Control can also be licensed as stand-alone software.

AAC-(E)LD audio codecs have been deployed in many telephone and videoconference systems, including those from leading suppliers such as Cisco and Tandberg. Texas Instruments Inc. has licensed AAC-LD for their embedded VoIP solution. Apple has selected it for iChat, and Telos Systems, Digigram, Comrex and AVT Audio Video Technologies GmbH have implemented the technology for use in broadcasting studios.

HOW CLEARLY DO YOU GET YOUR MESSAGE ACROSS?

MARKETS & APPLICATIONS

Service Provider

The Audio Communication Engine enables service providers including cable operators, Internet service providers and telecommunications companies to offer highly differentiated, robust IP phone services. Using the latest high-quality ISO / MPEG perceptual audio codecs, voice, sounds and music are accurately reproduced, allowing rich, natural and productive communication that is superior to anything used in phone services today. This, coupled with Fraunhofer's Acoustic Echo Control and integrated packet management, allows service providers and their suppliers to roll-out advanced VoIP services with minimal effort, be it for cable VoIP, FTTH, IPTV, mobile or internet communications.

Mobile Voice over IP

The forthcoming 4G services for wireless communications, LTE and WiMAX will provide very high bit-rates and very low network latencies. Combined with the Fraunhofer Audio Communication Engine, this will enable a major step forwards in mobile communication quality. Manufacturers of mobile devices and developers of mobile VoIP applications will have the opportunity to achieve high-quality 4G services using Fraunhofer's Audio Communication Engine, with minimal effort.

Video- and Teleconferencing

Today's users of video- and teleconference systems expect superb audio quality with no compromises in usability and utility. By employing Fraunhofer's Audio Communication Engine, manufacturers of video- and teleconferencing systems, devices and software can deliver CD-like quality with hands-free, full-duplex ease-of-use. Using stereo or multi-channel set-ups, conference participants can be localized, which leads to an even more natural and appealing communication experience.

Telepresence at Home

Globalisation is having a profound effect on individuals' business and private lives. The changing patterns of work and life are leading to a greater need for high-quality, easy-to-use personal communication solutions that allow people to keep in touch with friends, family and colleagues. Once again, the Fraunhofer Audio Communication Engine can provide the basis for comprehensive solutions integrated into broadband-connected devices, including PCs, TVs, set-top boxes and mobile phones. Staying in touch should be as natural as having a conversation with all participants present in the same room. The Audio Communication Engine allows service providers and hardware manufacturers to make this a reality.

Broadcasting Equipment

Broadcast studios need to be able to transmit audio from remote locations with low delay and in CD-like quality, often using unpredictable IP network connections which replace the traditional ISDN network approach. Fraunhofer's Audio Communication Engine allows manufacturers of broadcast equipment to develop robust audio gateways for their markets quickly and cost-effectively, giving journalists greater reliability and flexibility for live, on-site reporting over any available IP network.

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For more information about the Audio Communication Engine, please visit

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About Fraunhofer IIS

The Fraunhofer IIS Audio and Multimedia division, based in Erlangen, Germany, has been working in audio coding technology for more than 20 years and remains a leading innovator of technologies for cutting-edge multimedia systems. Fraunhofer IIS is universally credited with the development of mp3 and co-development of AAC (Advanced Audio Coding) as well as technologies for the media world of tomorrow, including MPEG Surround, MPEG Spatial Audio Object Coding and the Fraunhofer Audio Communication Engine.

Through the course of more than two decades, Fraunhofer IIS has licensed its audio codec software and application-specific customizations to at least 1,000 companies. Fraunhofer estimates that it has enabled more than 5 billion commercial products worldwide using its mp3, AAC and other media technologies.

The Fraunhofer IIS organization is part of Fraunhofer-Gesellschaft, based in Munich, Germany. Fraunhofer-Gesellschaft is Europe's largest applied research organization and is partly funded by the German government. With nearly 20,000 employees worldwide, Fraunhofer-Gesellschaft is composed of 60 Institutes conducting research in a broad range of research areas.