AAC Software from Fraunhofer IIS

MPEG ADVANCED AUDIO CODING
More than 20 years of experience in developing and implementing audio codecs

Inventor of mp3 and co-inventor of AAC

Extensive range of AAC software products

Leading independent provider of optimized AAC implementations

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**MPEG AAC-LC**

The AAC-LC is the next-generation successor to the highly successful mp3 audio codec, the industry-standard coding scheme that Fraunhofer IIS invented. AAC-LC delivers transparent quality in compressed audio at only 64 kbit/s per channel – compressed audio that is virtually indistinguishable from the source. The AAC-LC fulfils the requirements for broadcast quality as defined by the European Broadcasting Union (EBU). With sampling rates ranging from 8 kHz up to 192 kHz, bit rates up to 256 kbit/s per channel, and with support for up to 48 channels, AAC-LC is one of the most flexible audio codecs available from industry. Indeed, it can be used in a range of applications that demand high quality and unlimited bandwidth. The standard also supports mono, stereo and all common multi-channel configurations (for example 5.1 or 7.1). As important, low computational demands make this AAC the ideal codec for any low-bit-rate, high-quality audio application on mobile devices.

**MPEG HE-AAC**

HE-AAC is the low-bit-rate codec in the AAC family and integrates the functionality of the AAC-LC audio codec with Spectral Band Replication (SBR) bandwidth expansion tool. HE-AAC allows designers to trade off quality against other metrics such as bandwidth, file size or bit rate. For example the HE-AAC delivers good stereo quality at bit rates of 32 to 48 kbit/s. The codec is completely multi-channel compatible. (The HE-AAC also is known as aacPlus.)

**MPEG HE-AAC v2**

The HE-AAC v2 adds the Parametric Stereo (PS) feature to HE-AAC to further enhance efficiency in low-bandwidth media. Fraunhofer’s HE-AAC v2 codec delivers good-quality audio at bit rates from 16 to 24 kbit/s for stereo content. (The HE-AAC v2 also is known as aacPlus v2.)

**MPEG Surround**

MPEG Surround is a fully backward-compatible, parametric surround extension and can be used in combination with the AAC family. It provides unsurpassed compression efficiency for high quality multi-channel audio.

**MPEG AAC-ELD**

AAC-LD, the low delay version of AAC, combines the full-bandwidth, superior quality of AAC with a low coding delay that is necessary for two-way audio communication. The AAC-LD features an algorithmic delay of only 20 ms, while offering CD-like audio quality at 64 kbit/s per channel. By integrating SBR technology with the feature set of the LD codec, Fraunhofer’s AAC-ELD provides full audio bandwidth at data rates down to 24 kbit/s per channel. Both the AAC-LD and AAC-ELD codecs are perfectly suited for applications that require bi-directional communication, such as Internet telephony and video conferencing.

**HD-AAC**

The MPEG standard HD-AAC offers music encoding with quality beyond CDs while being compatible with iPods and mobile phones. Indeed, today’s audio CDs store uncompressed music in 16-bit, 44.1 kHz quality, while most music is now produced in the improved 24-bit, 96 kHz format. HD-AAC provides this high-quality sound experience to the user, the online music distribution and the consumer electronics industry. Based on the MPEG standards, Scalable lossless (SLS) and AAC, HD-AAC provides scalable-to-lossless compression of 24-bit quality music content, thereby ensuring a seamless migration to future AAC-compliant standards.
AAC Solutions

With more than 20 years of experience in developing and implementing audio codecs, Fraunhofer IIS is the leading provider of AAC implementations. Optimized encoder and decoder software as well as source and object code libraries of various AAC flavours are available for:

- PC platforms with Windows, Mac or Linux OS
- PowerPC
- Texas Instruments DSPs (C64x; C67x)
- Analog Devices DSPs (Blackfin)
- ARM- and MIPS-powered processors

Computer Platform Support

The encoder, available for personal computer (PC) platforms, is designed to achieve maximum audio quality and fast encoding speed at the same time. The PC decoder is an MPEG-4 compliant audio decoder.

DSP/µC Design Kits

Highly optimized AAC source or object code libraries are available for several DSP and microcontroller families. The Fraunhofer IIS Core Design Kits (CDKs) are bit-precise reference and template codes optimized for memory requirements and processing power. They are written in C/C++ and are available in two different versions: directly compilable and pre-optimized for 16-bit or 32-bit fixed-point embedded processors (ARM, MIPS, PowerPC, ADI, TI, and others) used, for example, in consumer electronics or as a template code for DSPs with fractional or integer arithmetic of any word length.

The Fraunhofer AAC floating-point reference code is designed for general-purpose computers to develop operating system libraries or software products – like rippers, audio workstations, music managers and players.

Licensing Software

Fraunhofer licenses its codecs to manufacturers of hardware or software and to end-users such as online-stores or labels as ready-to-use software products. Source code, redistribution licenses, bundles of codec licenses and special configurations are readily available. For more information please contact amm-info@iis.fraunhofer.de

About Fraunhofer IIS

The Fraunhofer Institute for Integrated Circuits IIS, based in Erlangen, Germany, is home of the organization’s Audio and Multimedia division that has been working in compressed audio technology for more than 25 years. Fraunhofer IIS is universally credited with the development of the seminal mp3 coding algorithms and co-development of AAC (Advanced Audio Coding) as well as MPEG Surround technology standards. Throughout more than two decades, Fraunhofer IIS has licensed its audio and video codec software to more than 1000 companies. Fraunhofer estimates that it has enabled more than 1 billion commercial products worldwide using its mp3, AAC and H.264 core 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 13,000 employees worldwide, Fraunhofer-Gesellschaft is composed of 56 Institutes conducting research in a broad range of research areas. For more information on Fraunhofer-Gesellschaft and Fraunhofer IIS, contact Matthias Rose, +49 9131 776-6175.