

FILE FORMATS: .MP3

File Format Name: Moving Picture Experts Group, Audio Layer III

File Extension(s): .mp3

Date Introduced: 1989

Dates in Use: 1989 to the present

Variations: On April 8, 2004, the *New York Times* Circuits Section reported that the Fraunhofer Institute in Germany had "announced a new version called MP3 Surround that adds the extra audio channels needed for 5.1 sound without appreciably increasing file size."

Developers: Developed by ISO technical program JTC 1/SC 29 (WG11), aka the Motion Pictures Expert Group (MPEG). In fact, it all started in the mid-1980s, when the Fraunhofer Institut in Germany began working on the development of a high quality, low bit-rate audio format. In 1989, Fraunhofer was granted a patent for the MP3 compression format in Germany and a few years later it was submitted to the International Standards Organization (ISO), and integrated into the MPEG-1 specification. Fraunhofer also developed the first MP3 player in the early 1990s, which was the first attempt at developing an MP3 player. In 1997, a developer at Advanced Multimedia Products created the AMP MP3 Playback Engine, which is regarded as the first mainstream MP3 player to hit the Internet. Shortly after, a couple of creative university students took the Amp engine, added a user-friendly Windows interface and called it Winamp. The turning point was in 1998, when Winamp was offered to the public as a free music player, and thus began the MP3 craze.

The Moving Picture Experts Group (MPEG) is a working group of **ISO/IEC** in charge of the development of international standards for compression, decompression, processing, and coded representation of moving pictures, audio and their combination. It was established in January 1988 with the aim to develop standards for coded representation of moving pictures, audio and their combination. It operates in the framework of the **Joint ISO/IEC Technical Committee (JTC 1)** on Information Technology and is formally WG11 of SC29. Starting from its first meeting in May 1988 when 25 experts participated, MPEG has grown to an unusually large committee. Usually some 350 experts from some 200 companies and organizations from about 20 countries take part in MPEG meetings. As a rule, MPEG meets three times a year (in March, July and November) but meets more frequently when the workload so demands.

Open Source/Proprietary: Open standard. A big reason MP3s have become the de-facto audio standard is that the original patent holders made it freely available for anyone to develop MP3 software. This open source model allowed early MP3 pioneers to develop MP3 software that accelerated the acceptance of the MP3 audio format. MP3 is just one of several types digital audio formats and it is not necessarily the most efficient or of highest sound quality. Better compression technologies have existed for some time now, but the success of MP3 is due to the relatively open nature of the format.

Although no one company owns exclusive rights, MP3 software developers must pay a licensing fee to use any of the patented mp3 encoders which is very expensive.

Associated Operating System:

Associated Application(s): An **MP3 encoder** is a software that uses an MP3 Codec (compression/decompression algorithm) to make MP3 files. Most encoders convert WAV to MP3 although many can convert other formats such as WMA, Real Audio, Ogg, and more. There are very few unique encoders. Most software uses only about four main encoding engines due largely in part by the patents held by Fraunhofer-Gesellschaft and other companies that helped produce the ISO source that MP3 is based on. The major encoding engines are LAME (non-ISO source), BladeEnc, Fraunhofer Encoders, and Xing from Real Networks.

MP3 encoders encompass the core technology behind MPEG-Layer 3. The programs work by applying a series of algorithms or rules that compress audio. Encoders intelligently detect audio data that is too high or low for the human ear to hear and gets rid of it. They also detect sounds that occur simultaneously and try to get rid of any sounds that are "masked" or made inaudible by other sounds

Associated Media (storage) : hard disk drive, streaming on the Web, portable players.

Compression: Compressed

MP3 is capable of 12:1 compression with no noticeable loss in quality. MP3 files can be compressed at different rates, but the higher the compression, the lower the sound quality. A typical MP3 compression ratio of 10:1 is equal to about 1 MB for each minute of an MP3 song. MP3 compression is based on a psycho-acoustic model which recognizes that the human ear cannot hear all the audio frequencies of a recording. The human hearing range is between 20Hz to 20Khz and it is most sensitive between 2 to 4 KHz.

This is known as 'destructive' compression. After a file is compressed, the data that is eliminated in the creation of the MP3 cannot be replaced.

Primary Usage: Widely adopted for World Wide Web dissemination and playback on specialized devices. MP3 files, sound files created by an algorithm that highly compresses (reduces) the amount of data required to convey the audio information, proliferate on the Web, illegally as well as legally. MP3 files commonly consist of "home-recorded" tracks by aspiring popular music groups; illegally distributed commercially owned recordings of contemporary and older popular music groups; and spoken-word and music recordings made available free or offered for sale by legal owners or licensees. In addition, thousands of individuals and corporations offer music, spoken-word recordings, and radio programming over the Web as "streams"—continuous sound delivered from Web sites to which users have no choice of content other than deciding which site to monitor.

Many software tools exist for encoding and decoding. Generally used for final-state, end-user delivery. It is a de facto standard for sending audio and video across computer networks. The popularity of MP3 comes from its practical uses. Music tracks in WAV format are extremely large in file size, averaging around 50MB in size. Since it is so large, it is not practical to send WAV files through email or offer them for download on the Internet. MP3, however, compresses WAV audio on average of 10 to 12 times smaller than the original size. The result is audio tracks around 3 to 4 MB in size, perfect for downloading and sending through the Internet. The format is also popular for turning the PC into a jukebox or for loading songs into a portable mp3 player and taking your music collection wherever you want.

Risks: .mp3 is a compressed format and as such, it loses information from the original source.

Other risks involve copyright infringement. MP3s can't be bought in a store. Therefore, the user

can either make them herself or get them from others who have made them. The most popular ways to get mp3 from other users include using file sharing software (P2P) and downloading them from someone else over the Internet. Although this method is popular, there are some risks. Most music is copyrighted and if the user doesn't own the CD of the songs she wants, she will technically be breaking the law. Also, there is the risk that downloading files over the Internet will contain viruses or other unwanted material.

Conservation Actions: .mp3 is not an archival format. It's a short-term format for access. Preservation reformatting will be required. The original recordings from which the compressed files were created are high fidelity and should be preserved in that form when possible. The original file, or other source with more information, should be located in order to preserve the information. If an .mp3 is the only format available, it should be migrated to an archival file format.

Resources:

MP3: The Definitive Guide by Scot Hacker, O'Reilly Inc, 2000.

Digital Preservation – Library of Congress: <http://www.digitalpreservation.gov/>

MP3 Converter.com: http://www.mp3-converter.com/faq/what_is_mp3.htm