



Engineering Sciences Section – 2005

C20 Preserving Audio Quality When Converting Digital Audio File Formats

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The goal of this presentation is to describe techniques to convert digital audio files from one format to another and to review precautions and limitations to observe when converting audio files so that the maximum audio quality possible is maintained after conversion.

This presentation will impact the forensic community and/or humanity by demonstrating to the digital evidence examiner the knowledge of the procedures and limitations to consider when converting digital audio files so that the maximum audio quality is maintained.

Analysis of digital audio files is becoming more and more common for law enforcement in today's Internet world. Cell phone technology, Internet communications, and commercial digital telephone service are examples of the numerous occurrences in which proper digital analysis procedures and the limitations of digital audio formats must be recognized by the digital evidence examiner. Digital forensic tools must be used with skill, the characteristics of the digital file format under question must be identified, and the proper steps must be followed in order to convert a digital audio file from one format to another while maintaining the maximum audio quality.

Selection of proper digital analysis tools will include a forensically approved digital hex editor program; a high quality computer-based audio analysis application, and a high-quality computer and operating system. The work on this presentation is based on a Windows 2000 operating system. The reasons for converting digital audio files from one format to another could include the needs of the requesting agency, errors in the audio file rendering it unplayable, or a variety of many other reasons. The goal of the forensic audio examiner in this conversion is to maintain as much audio quality as possible after the conversion.

The format and characteristics of the digital audio file to be converted must be determined. Then the format and characteristics of the converted file must be determined. This can be accomplished by use of a digital hex editor program to identify file characteristics in the header portion of the file. This information could include the type of file, sampling rate, bit rate, Codec, compression characteristics, size of header information as well as the size of the data portion of the file. Comparison of this header information is essential both before and after file conversion. One of the most important features to consider when converting digital audio files is the effect of compression. Since many digital audio files are already compressed when received, case-by-case analysis is required before using any compression algorithms. Nevertheless, preserving audio quality should remain the most important consideration for the digital evidence examiner.

Digital Evidence, Digital Audio, File Conversion