



Engineering Sciences Section – 2007

C49 Analysis of MiniDV Recording Date/Time Information

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After attending this presentation, attendees will learn about a characteristic of MiniDV digital video recordings that may assist the forensic video examiner when conducting authenticity examinations, matching recordings to recorders, and performing other forensic analyses.

This presentation will impact the forensic community and/or humanity by setting forth theoretical and practical information regarding an analysis technique that will aid the forensic audio/video community when conducting forensic examinations of submitted MiniDV recordings.

The MiniDV digital video format provides excellent video and audio quality on a relatively small tape format and has proven to be a versatile media for personal, professional, and investigative recordings. Unlike consumer analog video recordings, MiniDV recordings usually contain metadata along with the recorded video and audio information. This metadata can include information about the camcorder's settings at the time that the recording was made (e.g., exposure, white balance, shutter speed, aperture, etc.) and/or the recording date and time, using the camcorder's internal clock.

The overall digital data stream of a MiniDV recording contains separate sectors of data including the Insert and Track Information Sector, the Audio Sector, the Video Sector, and the Subcode Sector. The metadata mentioned above is contained within the Video Sector in the auxiliary video data (VAUX) portion of the digital stream. The VAUX portion is present ten (10) times per video frame for the NTSC DV standard and twelve (12) times per video frame for the PAL DV standard, resulting in 299.7 occurrences of the VAUX data per second for the NTSC standard and 300 occurrences per second for the PAL standard (based on the video frame rates of 29.97 for NTSC and 25 for PAL). Therefore, it follows that each second of the recording time information (for a continuous recording) is present approximately 300 times in the data stream.

Research and detailed analysis by the authors revealed that the recording date and time information is represented in the VAUX data by six (6) encoded bytes, with one byte each for the day, month, and year of the date and for the hours, minutes, and seconds of the time. Based on this information, the authors developed a script for counting the number of occurrences of each unique recording date and time stamp and for converting the encoded bytes to their decimal equivalents, which ultimately provides a detailed overview of the recording date and time information contained in a recording.

The script was applied to a submitted PAL MiniDV recording produced on a Samsung camcorder, and it was determined that the number of occurrences of each second of the recording date and time information varied between 264 and 336, in multiples of twelve (12). This variable pattern deviated widely from the nominal 300 occurrences per second, when analyzed second-by-second. However, taken as a whole, the number of occurrences averaged out to 300 per second of time information.

The script was then applied to recordings produced on a variety of PAL and NTSC MiniDV camcorders/recorders from various manufacturers including Canon, Panasonic, and Sony. These analyses were conducted in an effort to determine whether the eccentricity in the recording date and time information encountered in this particular case was unique.

The results of this study will be presented as well as how the forensic examiner may utilize this analysis of the recording date and time information to their advantage when conducting video authenticity examinations and when determining whether a recording was produced on a particular camcorder/recorder.

Video, Authenticity, MiniDV