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SMPTE STANDARD

for Television —

Material Exchange Format (MXF) —

Mapping A-law Coded Audio

into the MXF Generic Container



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1 Scope

This standard specifies the mapping of A-law coded audio into a sound essence track of the MXF generic container. A-law coding is a sample-by-sample coding defined by ITU G-711 and used throughout the audio transmission chain.

The MXF generic container is the native essence container of the material exchange format (MXF) file body. The MXF generic container is defined for the interchange of streamable audio-visual material.

This standard defines the data structure at the signal interfaces of networks or storage media. This standard does not define internal storage formats for MXF compliant devices.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

SMPTE 377M-2004, Television — Material Exchange Format (MXF) — File Format Specification

SMPTE 379M-2004, Television — Material Exchange Format (MXF) — Generic Container

ITU-T Recommendation G.711, Pulse Code Modulation (PCM) of Voice Frequencies

3 Glossary of acronyms, terms and data types

The general glossary of acronyms, terms and data types used in the MXF specification is given in SMPTE 377M and is supplemented in SMPTE 379M. These glossaries are not repeated here to avoid any divergence of meaning.

4 Introduction

The MXF generic container (GC) is fully described in SMPTE 379M. This standard specifies a mapping of A-law coded audio as a sound element that may be used in the sound item of the MXF GC. A-law coding is defined in ITU G-711.

This standard specifies the key, the length and the value fields of the A-law coded sound element together with the SMPTE Universal label (UL) that uniquely identifies this essence element mapping into the MXF GC.

4.1 A-law coding summary

A-law coded audio is used for voice circuits and results in a low bit-rate with albeit a low quality, though almost no codec delay. A-law coded audio is used in some voice-only circuits within broadcast and telecommunications applications. Its applications in MXF lie in its use as a voice-over channel or as a proxy audio track.

The source coding uses 8K samples per second with 14 bits for each sample. Each sample value is divided into coding ranges where each range is assigned an 8-bit code value. The result is a coded bit rate of 64 Kbps.

If used with video, the number of bytes per frame for the commonly used frame rates are as defined in table 1.

Table 1 – Bytes per frame for the A-law coded audio element

Frame Rate (Hz)	Coded Bytes per Frame	Minimum Bytes per Frame	Maximum Byte per Frame	Frame Sequence Length
24/1.001	333.666(recurring)	333	334	3
24	333.333(recurring)	333	334	3
25	320	320	320	1
30/1.001	266.9333(recurring)	266	267	15
30	266.666(recurring)	266	267	3
50	160	160	160	1
60/1.001	133.4666(recurring)	133	134	15

The result is that decoders of video frame rates that have a frame sequence of greater than 1 will have to provide a small amount of additional buffering to handle the variable number of coded bytes per frame.

4.2 Application in the MXF generic container

This mapping may be used in either a frame-wrapped or clip-wrapped generic container as defined in SMPTE 379M.

5 Key-length-value

5.1 Essence element key

The values of the first 12 bytes of the essence element key are defined in SMPTE 379M. The values of the last 4 bytes of the sound element key are given in table 2.