

SMPTE STANDARD

Material Exchange Format (MXF) —
File Format Specification —
Amendment 2



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Foreword

SMPTE (the Society of Motion Picture and Television Engineers) is an internationally-recognized standards developing organization. Headquartered and incorporated in the United States of America, SMPTE has members in over 80 countries on six continents. SMPTE's Engineering Documents, including Standards, Recommended Practices, Engineering Guidelines and Registered Disclosure Documents, are prepared by SMPTE's Technology Committees. Participation in these Committees is open to all with a bona fide interest in their work. SMPTE cooperates closely with other standards-developing organizations, including ISO, IEC and ITU.

SMPTE Engineering Documents are drafted in accordance with the rules given in Part XIII of its Operations Manual.

SMPTE Amendment 2 to SMPTE 377-1:2011 was prepared by Technology Committee 31FS.

1 Scope

The purpose of this amendment is to address various issues identified since the publication of SMPTE ST 377-1:2011.

2 Descriptive vs Application Plugin Metadata

Change Section 9 (Header Metadata) from:

The Header Metadata contains Metadata Sets that define the contents of the file as a whole, including any Essence Containers. It may also describe Essence that is stored external of the file.

The Header Metadata is broadly split into two categories: Structural Metadata (see Sections 9.5 and 9.6) and Descriptive Metadata (see Section 9.8).

Application-Specific Metadata (see Section 9.7) can be used to extend either of the two categories.

All three categories shall be encoded as a single sequence of KLV coded packets.

This specification defines Structural Metadata as a single extensible scheme. There shall be no other Structural Metadata schemes in MXF; i.e., there shall be no other scheme of similar or identical functionality that replaces the scheme that is defined in Section 9.5.

To: (redline shows difference)

The Header Metadata contains Metadata Sets which defines the contents of the file as a whole, including any Essence Containers. It may also describe Essence that is stored external of the file.

The Header Metadata is broadly split into two categories: Structural Metadata (see Sections 9.5 and 9.6) and Descriptive Metadata (see Section 9.8).

Note: Application-Specific Metadata (see Section 9.7) can be used to extend either of the two categories. However, extending Descriptive Metadata is not recommended unless the application that defines the Application Scheme is the same as the application that defines the Descriptive Metadata Scheme.

All three categories shall be encoded as a single sequence of KLV coded packets.

This specification defines Structural Metadata as a single extensible scheme. There shall be no other Structural Metadata schemes in MXF, i.e. there shall be no other scheme of similar or identical functionality that replaces the scheme that is defined in Section 9.5.

3 Application Plugin Schema Publication Requirements

Change Section 9.7.2 (Application Metadata Scheme Specification) from:

For each Application Metadata Scheme, there shall be an Application Plug-in Scheme specification. For MXF Application Metadata Schemes, the Application Plug-in Scheme specification should be an SMPTE Engineering Document.

In addition to the Application Metadata Plug-In payload elements and semantics, Application Metadata Scheme specifications shall define the Application Scheme Label.

For further requirements on Application Metadata Scheme specifications, see Annex C.

To: (redline shows change)

For each Application Metadata Scheme, there shall be an Application Plug-in Scheme specification. ~~For An MXF Application Metadata Schemes, the~~ Application Plug-in Scheme specification should be a ~~an SMPTE Engineering Document~~ public standard from an internationally accredited standards body. This is to ensure that all Application Plug-in Schemes can be used for interchange.

In addition to the Application Metadata Plug-In payload elements and semantics, Application Metadata Scheme specifications shall define the Application Scheme Label.

For further requirements on Application Metadata Scheme specifications, see Annex C.

4 AFD

Replace Annex G.2.5 with the following:

Active Format Description, as defined by SMPTE ST 2016-1, describes a video picture in terms of the aspect ratio and other characteristics of the active image within the coded frame. In general, Active Format Description can vary within a video stream, reflecting changes to the formatting of the video picture within the coded frame over time. In particular cases, Active Format Description might be constant for an individual video clip or stream.

Note 1: The SMPTE RP 210 name for the element used here in the Picture Descriptor is Active Format Descriptor, in contrast to the SMPTE ST 2016-1 term Active Format Description.

For cases where the Active Format Description is constant for the duration of the essence container (whether encoded as MXF essence elements or embedded in the essence), then the Active Format Descriptor element may be encoded in the Picture Descriptor. For cases where the Active Format Description varies with time, the Active Format Descriptor element shall not be encoded in the Picture Descriptor. If the Active Format Description is encoded in the Picture Descriptor, then it shall be encoded if and only if it is constant in the essence container (whether encoded as MXF essence elements or embedded in the essence).

If the Active Format Description is time-varying, then it should be encoded as VANC data according to SMPTE ST 2016-3 and embedded in an MXF essence container according to SMPTE ST 436.

For decoders of MXF files: if the Active Format Descriptor value is encoded in the Picture Descriptor, the essence track shall be assumed to have a constant Active Format Description value in the essence container. If the Active Format Description value is not encoded in the picture descriptor, no assumptions can be made about whether a per-frame Active Format Description value is encoded in the essence container, or whether it is constant or not.

The Active Format Descriptor element in the Picture Descriptor is expressed as an 8-bit unsigned integer (b7-b0) with characteristics as follows:

Encoders

Encoders compliant with SMPTE 377-1 shall encode b7-b0 as defined in SMPTE ST 2016-1 Table 4, where b7, b1, b0 are each '0' (reserved), b6-b3 are the AFD code data bits a3-a0, and b2 is an aspect ratio bit.

Note: AFD code data bits a3-a0 are defined in SMPTE ST 2016-1 Table 1. The aspect ratio (AR) bit uses value '1' to indicate 16:9 and '0' to indicate 4:3.