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SMPTE STANDARD

Material Exchange Format (MXF) — MXF Generic Container



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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, and Engineering Guidelines, 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 Administrative Practices.

SMPTE Standard 379-1 was prepared by Technology Committee 31FS.

Intellectual Property

At the time of publication no notice had been received by SMPTE claiming patent rights essential to the implementation of this Standard. However, attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. SMPTE shall not be held responsible for identifying any or all such patent rights.

Introduction

This section is entirely informative and does not form an integral part of this Engineering Document.

The MXF generic container is a streamable data container that can be placed on any suitable transport and potentially stored. The concept of this container was based on the work done by the EBU/SMPTE Task Force in the Wrappers and Metadata sub-group. The MXF generic container defined in this standard is fully compatible with the work of the EBU/SMPTE Task Force Report.

The MXF generic container format is intended for inclusion into a MXF (Material eXchange Format) file as an essence container. This standard defines the MXF generic container for use in an MXF file body.

The premise for the MXF generic container format is that of a general purpose essence data and metadata container for the containment of many different kinds of essence and metadata elements into a single entity by interleaving the data streams in a defined and time-synchronous manner (typically over a 1-frame duration). Associated SMPTE mapping documents define the essence data and metadata elements that can be placed in the generic container. Some mapping documents define complete mappings for an entire content package while others simply define mapping of metadata or essence data into an element.

A streamable data container is designed to allow the audio-visual material to be continuously decoded through mechanisms such as interleaving essence components with stream-based metadata.

The EBU/SMPTE Task Force report defines: "Content is composed of **content packages**, which in turn are composed of **content items**, which are further composed of **content elements**". These content packages are convenient groupings of the various Items where each Item is a group of similar element types. Although the term "content package" is also used in the SDTI-CP specification, the generic container content package is a more generalized arrangement that retains backwards compatibility with the SDTI-CP content package.

1 Scope

This standard specifies the format of the MXF generic container. 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.

Appropriate essence and metadata payloads that can be mapped into the MXF generic container are defined in associated documents.

The MXF specification includes operation pattern specifications that may define restrictions on the way in which this essence container type should be implemented. The reader is advised to carefully study the appropriate operational pattern document for compliance to a defined implementation.

2 Conformance Notation

Normative text is text that describes elements of the design that are indispensable or contains the conformance language keywords: "shall", "should", or "may". Informative text is text that is potentially helpful to the user, but not indispensable, and can be removed, changed, or added editorially without affecting interoperability. Informative text does not contain any conformance keywords.

All text in this document is, by default, normative, except: the Introduction, any section explicitly labeled as "Informative" or individual paragraphs that start with "Note:"

The keywords "shall" and "shall not" indicate requirements strictly to be followed in order to conform to the document and from which no deviation is permitted.

The keywords, "should" and "should not" indicate that, among several possibilities, one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited.

The keywords "may" and "need not" indicate courses of action permissible within the limits of the document.

The keyword "reserved" indicates a provision that is not defined at this time, shall not be used, and may be defined in the future. The keyword "forbidden" indicates "reserved" and in addition indicates that the provision will never be defined in the future.

A conformant implementation according to this document is one that includes all mandatory provisions ("shall") and, if implemented, all recommended provisions ("should") as described. A conformant implementation need not implement optional provisions ("may") and need not implement them as described.

3 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 336M-2007, Data Coding Protocol Using Key-Length-Value

SMPTE 377-1-2009, Material Exchange Format (MXF) — File Format Specification

4 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 377-1. It is not repeated here to avoid any divergence of meaning.

4.1 Acronyms Used in this Standard

CP: Content package – a generic term for a grouping of some combination of system, picture, sound, data and / or compound items.

GC: Generic container.

4.2 Terms Used in this Standard

Picture essence: A general term for all types of picture essence including video, still images, graphics, etc.

Sound essence: A general term for all types of sound essence including audio, MIDI, sampled data, etc.

Data essence: A general term for all types of data essence including tele-text, closed caption data, etc.

Compound essence: A general term for essence that contains an indivisible mixture of different essence types.

5 MXF Generic Container Format

The MXF generic container shall comprise a contiguous sequence of one or more content packages as illustrated in Figure 1. The content packages may be of constant or variable length depending on the application. The example in Figure 1 shows a generic container with content packages of variable length.

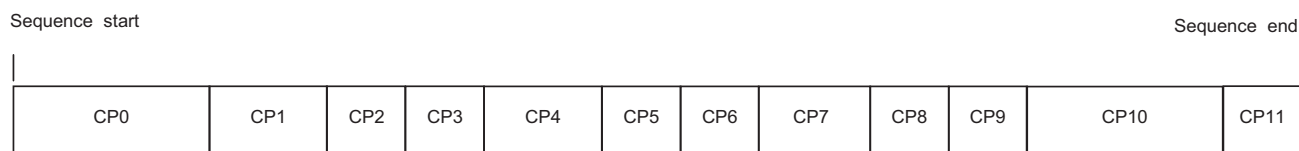


Figure 1 – Generic container as a contiguous sequence of content packages

5.1 Content Package

Each content package represents the essence and metadata elements interleaved over a defined duration (typically 1 picture frame) and shall be constructed of up to five Items which are the system, picture, sound, data and compound items.

5.1.1 System Item

A group of up to 127 metadata or control data elements related to the container itself may be related to the elements in the other four items below.