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SMPTE STANDARD

Material Exchange Format (MXF) — Specialized Operational Pattern “OP-Atom” (Simplified Representation of a Single Item)



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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 ST 390 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.

This standard defines MXF Operational Pattern "Atom". In the MXF file format specification (SMPTE ST 377-1), the concepts of Operational Patterns and the general conditions for audio-visual material interchange and interoperability are described in outline form. The introductory sections of these documents are not repeated here.

1 Scope

This standard defines the specialized Operational Pattern “OP-Atom” or OP-Atom for the storage and exchange of an MXF file with a tightly defined structure for a single item of essence described by a single Essence Track. It defines the operating restrictions, Structural Metadata objects and individual attributes applied to the MXF file format specification to achieve interoperability when exchanging a single item of audio-visual material.

Operational Pattern “OP-Atom” is intended to satisfy the demands of applications where there is a requirement for exchange of material and associated metadata together in a single file with an open and standardized format, yet also a demand for a simple, predictable, layout with minimum scope for variation. OP-Atom is specifically intended for applications where each Essence Track is held separately. Operational Pattern “OP-Atom” provides for a subset of MXF features.

The provisions of OP-Atom make it unsuitable for certain applications, in these cases a generalized Operational Pattern or a different specialized Operational Pattern is used. In all cases, the suitability of this pattern needs to be judged on a per-application basis. Some specific areas to consider are:

- OP-Atom is optimized for applications where the record (file creation) process is completed before a playout (file read) process is started. Therefore, it is unsuitable in applications where the record/playout (file creation/file reading) processes occur concurrently.
- This Operational Pattern places a full Index Table in the Footer Partition which, with VBR essence, makes it impossible to use as a streaming format where stream delivery requires advanced knowledge of frame boundaries. With VBR essence, it also requires the (possibly very large) Index Table to be stored separately until the file recording ends.
- Each OP-Atom file holds a single track of essence data therefore many applications will need an external mechanism to synchronize essence among multiple files. This standard does not define such a synchronization method; however, it does include an annex detailing a method of informatively recording synchronization among files created as a group.

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.