

Stereoscopic Content Packaging

Stereoscopic Interop Group

NOTICE

This document is provided without warranty as to its fitness for a particular purpose.

This document describes the Stereoscopic Content packaging method to be used within the Stereoscopic Interop Group.

Acronyms:

CPL – Composition Playlist
KLV – Key-Length-Value
MXF – Material eXchange Format
OP – Operational Pattern
2D – Non-stereoscopic content

Normative References:

[Interop CPL] JPEG Interop – Composition Playlist
[Interop SPTF] JPEG Interop – Sound and Picture Track File
[Interop OC] JPEG Interop – Operational Constraints

1. Introduction

This document provides a definition of a single MXF file design for Stereoscopic Picture content wrapping. It also defines how a Composition Playlist (CPL) shall reference such Stereoscopic Picture Track File and which kind of Audio Track File has to be used in this case.

2. Stereoscopic Picture Track File

The starting point of this Stereoscopic Picture packaging method is a single “Stereoscopic Picture Essence stream” containing both eyes information interleaved on a frame basis as presented below:

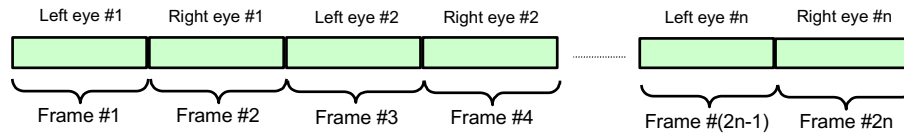


Figure 1: Stereoscopic Picture Essence Stream Structure

This single stereoscopic Picture Essence stream shall be wrapped according to [Interop SPTF] “JPEG Interop Sound and Picture Track File”.

The left frame shall be the first frame in the left/right frames pair as presented in the figure above.

The Sample Rate property of the Picture Essence Descriptor shall be set to the frame rate of the essence stream. The Edit Rate shall be half the Sample Rate as illustrated below:

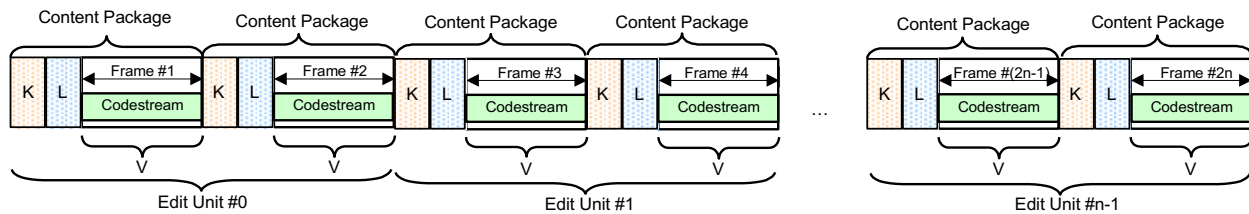


Figure 2: Stereoscopic Picture Track File Body

The Index Table shall be based on Edit Units containing each two KLV packets.

Informative Note: The relationship between Edit Units and Sample Rate reflects the philosophy of SMPTE 377M section E.2.1:

- “Edit Rate is the desired editing rate of the of the image data. An edit unit (1/edit rate) is typically 1 image, but may be larger in some applications”
- “For example, the sampled image may be field based, but the editing may be frame based. In this case the edit rate will be half the sample rate.”

Informative Note: For example, the Sample Rate property of the Picture Essence Descriptor could be set to 48, reflecting “the field or frame rate” as stated in SMPTE 377M - as one sample unit corresponds to one frame in this design, the Sample Rate is the Frame Rate. Then, the Edit Rate indicated in the MXF Header of such Stereoscopic Picture Track File will be half the Sample Rate: 24. In this example, the MXF file will contain the following information:

- Sample Rate (Frame Rate) = 48
- Edit Rate = 24

3. MainStereoscopicPicture Element

In order to reference the Stereoscopic Picture Track File in a standard Composition Playlist, a `MainStereoscopicPicture` element is defined within the namespace defined in [Table 1](#) and shall be used in the Reel element of a Composition Playlist as specified in [Interop CPL] “JPEG Interop Composition Playlist”, Section 9.6.

Table 1. MainStereoscopicPicture Element Namespace.

<http://www.digicine.com/schemas/437-Y/2007/Main-Stereo-Picture-CPL>

The `MainStereoscopicPicture` element shall indicate stereoscopic picture essence to be projected onto the main screen and shall reference an external Track File as defined in section 2. The `MainStereoscopicPicture` element shall be an instance of `PictureTrackFileAssetType` and its structure is defined in [Interop CPL] "JPEG Interop Composition Playlist", Section 9.11.

4. Composition Playlist Constraints

If present in a given Composition Playlist, the `MainStereoscopicPicture` element shall indicate the existence of stereoscopic content as specified in this document and the optional `MainPicture` element shall be omitted.

Notwithstanding the following, the provisions of [Interop OC] "JPEG Interop Operational Constraints" shall apply.

Informative Note: The `MainStereoscopicPicture` element avoids erroneous 2D playback of the Stereoscopic Picture Track File.

Informative Note: The Edit Rate of the associated `MainSound` element in the CPL shall be the same as the `MainStereoscopicPicture` Edit Rate defined above - 24 in the example above – and shall match the Edit Rate of the underlying Sound Track File.

4.1 Edit Rate

The Edit Rate of the `MainStereoscopicPicture` element in the CPL shall match the Edit Rate of the underlying Stereoscopic Picture Track File.

4.2 Frame Rate

The Frame Rate of the `MainStereoscopicPicture` element in the CPL shall match the Sample Rate of the underlying Stereoscopic Picture Track File per [Interop CPL] "JPEG Interop Composition Playlist" section 6.4.1. In this design, the Frame Rate of the Stereoscopic Picture MXF file shall be provided by the Picture Essence Descriptor Sample Rate property.

5. Schema

The XML schema of the `MainStereoscopicPicture` element is provided below:

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema targetNamespace="http://www.digicine.com/schemas/437-Y/2007/Main-Stereo-Picture-CPL"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified" attributeFormDefault="unqualified">
  <xs:import namespace="http://www.w3.org/XML/1998/namespace"
    schemaLocation="http://www.w3.org/2001/03/xml.xsd"/>

  <!--MainStereoscopicPicture-->
  <xs:element name="MainStereoscopicPicture" type="cpl:PictureTrackFileAssetType"
    minOccurs="0"/>

</xs:schema>
```

Note that in case of conflict between the prose and the schema, the prose shall be the authoritative expression of the `MainStereoscopicPicture` element definition.