

SMPTE STANDARD

D-Cinema Packaging — Caption and Closed Subtitle



Table of Contents	Page
Foreword	2
Intellectual Property	2
1 Scope	3
2 Conformance Notation	3
3 Normative References	3
4 Glossary	4
5 Overview	4
6 Composition Playlist Extensions (Normative)	4
6.1 Extension Elements	4
6.2 Namespace	4
6.3 ClosedCaption [Optional]	5
6.4 ClosedSubtitle [Optional]	5
6.5 MainCaption [Optional]	5
6.6 CaptionTrackFileAssetType	5
6.6.1 Language [optional]	6
7 Schema	6
8 Samples (Informative)	7
9 XML Diagram Legend (Informative)	9
9.1 Element Symbols	9
9.1.1 Examples	9
9.2 Model Symbols ("Compositors")	10
9.3 Types	10
9.4 Model Groups and References	11

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. This SMPTE Engineering Document was prepared by Technology Committee DC28.

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.

1 Scope

This document defines the [SMPTE 429-7] Composition Playlist asset type extensions required for inclusion of [SMPTE 428-10] Closed Captions and Closed Subtitles, as well as the asset type extension required of Open Captions created per [SMPTE 428-7].

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 recommended practice. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this recommended practice are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

1. SMPTE 428-7-2007, D-Cinema Distribution Master — Subtitle
2. SMPTE 428-10-2008, D-Cinema Distribution Master — Closed Caption and Closed Subtitle
3. SMPTE 429-7-2006, D-Cinema Packaging — Composition Play List
4. World Wide Web Consortium (W3C) (2004, February 4). Extensible Markup Language (XML) 1.0 (Third Edition)
5. World Wide Web Consortium (W3C) (2004, October 28). XML Schema Part 1: Structures (Second Edition)
6. World Wide Web Consortium (W3C) (2004, October 28). XML Schema Part 2: Datatypes (Second Edition)
7. Internet Engineering Task Force (IETF) (1996, November). RFC 2396 — Uniform Resource Identifiers (URI): Generic Syntax

4 Glossary

The reader is directed to the glossary terms defined in [SMPTE 428-10], and should be aware of the terminology defined in [SMPTE 429-7].

5 Overview

This specification defines the `ClosedCaption`, `ClosedSubtitle`, and `MainCaption` asset type extensions to [SMPTE 429-7] Composition Playlist. These extensions are used to describe Closed Caption essence, Closed Subtitle essence, and Open Caption essence, respectively. Definitions for Closed Caption, Closed Subtitle, and Open Caption essence can be found in [SMPTE 428-10].

6 Composition Playlist Extensions (Normative)

6.1 Extension Elements

To reference the Closed Caption essence, Closed Subtitle essence, and Open Caption essence in a Composition, the extension elements defined in this section shall be used to extend the Reel element of a Composition Playlist, as specified in SMPTE 429-7.

6.2 Namespace

The `ClosedCaption`, `ClosedSubtitle`, and `MainCaption` extension elements defined in this specification shall be associated with a unique XML namespace name that shall be the string value "http://www.smpte-ra.org/schemas/429-12/2008/TT". This namespace name conveys both structural and semantic version information, and serves the purpose of a traditional version number field.

XML namespace names used in this standard are identified in Table 1. Namespace names are represented as Uniform Resource Identifier (URI) values [RFC 2396]¹.

Table 1 – XML Namespaces

Qualifier	URI
Cpl	http://www.smpte-ra.org/schemas/429-7/2006/CPL
Tt	http://www.smpte-ra.org/schemas/429-12/2008/TT

URIs listed in Table 1 are normative, whereas the namespace qualifier values themselves (used in Table 1 and elsewhere in this standard) are not normative. Thus, namespace qualifier values may be replaced in instance documents by any arbitrary XML compliant namespace qualifier, meaning that conformant implementations shall expect any XML compliant namespace qualifier value that is associated with a URI from Table 1.

Datatypes from other schemas that are used in this document will be prefixed with the appropriate namespace qualifier (e.g. `xs:dateTime`). See [XML Schema Part 2: Datatypes] for further information about these types.

¹ Readers unfamiliar with URI values as XML namespace names should be aware that although a URI value begins with a "method" element ("http" in this case), the value is designed primarily to be a unique string and does not necessarily correspond to an actual on-line resource. Applications implementing this standard should not attempt to resolve URI values on-line.

6.3 ClosedCaption [Optional]

The `ClosedCaption` extension element defines the Closed Caption essence to be reproduced on closed-style displays in the auditorium. The actual Closed Caption essence is contained in an external Track File. The `ClosedCaption` element shall be an instance of the `CaptionTrackFileAssetType` element, whose structure is defined in Section 6.6.

6.4 ClosedSubtitle [Optional]

The `ClosedSubtitle` extension element defines the Closed Subtitle essence to be reproduced on closed-style displays in the auditorium. The actual Closed Subtitle essence is contained in an external Track File. The `ClosedSubtitle` element shall be an instance of the `cpl:SubtitleTrackFileAssetType` element, whose structure is defined in [SMPTE 429-7].

6.5 MainCaption [Optional]

The `MainCaption` extension element defines the Open Caption essence to be reproduced on the main screen of the auditorium. The actual Open Caption essence is contained in an external Track File. The `MainCaption` element shall be an instance of the `CaptionTrackFileAssetType` element, whose structure is defined in Section 6.6.

6.6 CaptionTrackFileAssetType

The `CaptionTrackFileAssetType` element, as illustrated in Figure 1, is derived from `cpl:TrackFileAssetType`, defined in [SMPTE 429-7]. The element describes the caption material associated with the reel. Instances of the `CaptionTrackFileAssetType` are the `ClosedCaption` element and the `MainCaption` element.

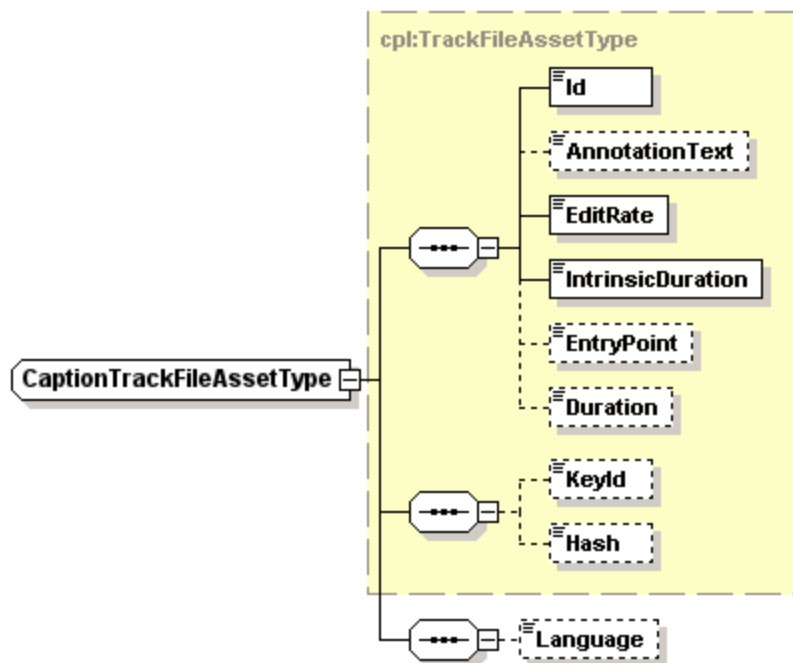


Figure 1 – `CaptionTrackFileAssetType` structure. Dotted lines denote an optional element. (Diagram legend in Section 9.)

The elements defined below replicate values contained in the underlying track file and shall remain consistent with the content of the underlying track file at all times. They are included in the Composition Playlist to alleviate the need for theater management software to access and parse individual track files when scheduling content. In the event an inconsistency exists, the values contained in the underlying track file shall take precedence.

6.6.1 Language [optional]

If a primary text language is used by the Caption essence, then the `Language` element shall be present, and shall reflect the primary text language used by the Caption essence. The absence of the element shall indicate that no primary text language is associated with the asset. It is represented as an `xs:language` value.

7 Schema

The XML Schema document presented in this section normatively defines the structure of the [SMPTE 429-7] Composition Playlist extensions previously described using a machine-readable language. While this schema is intended to faithfully represent the structure presented in the normative prose portions of this specification, conflicts in definition may occur. In the event of such a conflict, the normative prose shall be the authoritative expression of the standard.

```
<?xml version="1.0" encoding="UTF-8"?>

<xs:schema targetNamespace="http://www.smpte-ra.org/schemas/429-12/2008/TT"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:cpl="http://www.smpte-ra.org/schemas/429-7/2006/CPL"
  xmlns:tt="http://www.smpte-ra.org/schemas/429-12/2008/TT"
  elementFormDefault="qualified" attributeFormDefault="unqualified">

  <xs:import namespace="http://www.smpte-ra.org/schemas/429-7/2006/CPL"/>

  <!-- MainCaption -->
  <xs:element name="MainCaption" type="tt:CaptionTrackFileAssetType"/>

  <!-- ClosedCaption -->
  <xs:element name="ClosedCaption" type="tt:CaptionTrackFileAssetType"/>

  <!-- CaptionTrackFileAssetType -->
  <xs:complexType name="CaptionTrackFileAssetType">
    <xs:complexContent>
      <xs:extension base="cpl:TrackFileAssetType">
        <xs:sequence>
          <xs:element name="Language" type="xs:language" minOccurs="0"/>
        </xs:sequence>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>

  <!-- ClosedSubtitle -->
  <xs:element name="ClosedSubtitle" type="cpl:SubtitleTrackFileAssetType"/>

</xs:schema>
```

8 Samples (Informative)

Two CPL Reel samples are provided below to illustrate CPL implementation of the extension elements defined in this specification.

Open Caption CPL Reel Sample

```

<cpl:Reel>
  <cpl:Id>urn:uuid:117120ab-07eb-4a26-8356-ce28e7b4a8cf</cpl:Id>
  <cpl:AnnotationText>Reel #1 of The Jazz Singer</cpl:AnnotationText>
  <cpl:AssetList>
    <cpl:MainMarkers>
      <cpl:Id>urn:uuid:e4922ca2-e18e-465b-bd80-9c1d527b0075</cpl:Id>
      <cpl>EditRate>24 1</cpl>EditRate>
      <cpl>IntrinsicDuration>3600</cpl>IntrinsicDuration>
      <cpl:MarkerList>
        <cpl:Marker>
          <cpl:Label>FFOC</cpl:Label>
          <cpl:Offset>0</cpl:Offset>
        </cpl:Marker>
        <cpl:Marker>
          <cpl:Label>LFOC</cpl:Label>
          <cpl:Offset>3600</cpl:Offset>
        </cpl:Marker>
      </cpl:MarkerList>
    </cpl:MainMarkers>
    <cpl:MainPicture>
      <cpl:Id>urn:uuid:8a212f2b-e753-4161-a115-733c3b15f62d</cpl:Id>
      <cpl:AnnotationText>Picture for Reel #1 of The Jazz Singer</cpl:AnnotationText>
      <cpl>EditRate>24 1</cpl>EditRate>
      <cpl>IntrinsicDuration>3800</cpl>IntrinsicDuration>
      <cpl:EntryPoint>100</cpl:EntryPoint>
      <cpl:Duration>3600</cpl:Duration>
      <cpl:KeyId>urn:uuid:7f70a22d-489a-4272-8697-bb649f9f35d8</cpl:KeyId>
      <cpl:FrameRate>24 1</cpl:FrameRate>
      <cpl:ScreenAspectRatio>185 100</cpl:ScreenAspectRatio>
    </cpl:MainPicture>
    <cpl:MainSound>
      <cpl:Id>urn:uuid:d9ba0fb8-40c4-40db-93e3-3d6189904223</cpl:Id>
      <cpl:AnnotationText>Soundtrack for Reel #1 of The Jazz Singer</cpl:AnnotationText>
      <cpl>EditRate>24 1</cpl>EditRate>
      <cpl>IntrinsicDuration>3600</cpl>IntrinsicDuration>
      <cpl:KeyId>urn:uuid:942a31d1-71bc-4272-9a52-cc376859e367</cpl:KeyId>
      <cpl:Language>en-us</cpl:Language>
    </cpl:MainSound>
    <tt:MainCaption>
      <cpl:Id>urn:uuid:92840e55-2c8d-4c84-a688-91a61e602193</cpl:Id>
      <cpl:AnnotationText>Open Caption for Reel #1 of The Jazz Singer</cpl:AnnotationText>
      <cpl>EditRate>24 1</cpl>EditRate>
      <cpl>IntrinsicDuration>3600</cpl>IntrinsicDuration>
      <cpl:Language>en-us</cpl:Language>
    </tt:MainCaption>
  </cpl:AssetList>
</cpl:Reel>

```

Closed Caption and Closed Subtitle CPL Reel Sample

```

<cpl:Reel>
  <cpl:Id>urn:uuid:adac28b2-6ac59dee-dcb6-4f24-9e1f-0829dd2b4441</cpl:Id>
  <cpl:AnnotationText>Reel #1 of The Jazz Singer</cpl:AnnotationText>
  <cpl:AssetList>
    <cpl:MainMarkers>
      <cpl:Id>urn:uuid:c543d4ef-ba6c-43bd-976f-869a30ba78b9</cpl:Id>
      <cpl>EditRate>24 1</cpl>EditRate>
      <cpl:IntrinsicDuration>3600</cpl:IntrinsicDuration>
      <cpl:MarkerList>
        <cpl:Marker>
          <cpl:Label>FFOC</cpl:Label>
          <cpl:Offset>0</cpl:Offset>
        </cpl:Marker>
        <cpl:Marker>
          <cpl:Label>LFOC</cpl:Label>
          <cpl:Offset>3600</cpl:Offset>
        </cpl:Marker>
      </cpl:MarkerList>
    </cpl:MainMarkers>
    <cpl:MainPicture>
      <cpl:Id>urn:uuid:2fd9f048-5646-4b75-b0e7-8839b1a395c9</cpl:Id>
      <cpl:AnnotationText>Picture for Reel #1 of The Jazz Singer</cpl:AnnotationText>
      <cpl>EditRate>24 1</cpl>EditRate>
      <cpl:IntrinsicDuration>3800</cpl:IntrinsicDuration>
      <cpl:EntryPoint>100</cpl:EntryPoint>
      <cpl:Duration>3600</cpl:Duration>
      <cpl:KeyId>urn:uuid:6bcb6fb3-cf6b-4585-9a3c-df999d78908b</cpl:KeyId>
      <cpl:FrameRate>24 1</cpl:FrameRate>
      <cpl:ScreenAspectRatio>185 100</cpl:ScreenAspectRatio>
    </cpl:MainPicture>
    <cpl:MainSound>
      <cpl:Id>urn:uuid:5cd4f4ff-3b74-40f9-82b4-3e559dcfba53</cpl:Id>
      <cpl:AnnotationText>Soundtrack for Reel #1 of The Jazz Singer in US
        English</cpl:AnnotationText>
      <cpl>EditRate>24 1</cpl>EditRate>
      <cpl:IntrinsicDuration>3600</cpl:IntrinsicDuration>
      <cpl:KeyId>urn:2bcf55be-3234-4131-99d8-d6983e5afled</cpl:KeyId>
      <cpl:Language>en-us</cpl:Language>
    </cpl:MainSound>
    <tt:ClosedCaption>
      <cpl:Id>urn:uuid:388b82e5-0cb9-426f-80e8-f060c2046570</cpl:Id>
      <cpl:AnnotationText>Closed Caption in US English for Reel #1 of The Jazz
        Singer</cpl:AnnotationText>
      <cpl>EditRate>24 1</cpl>EditRate>
      <cpl:IntrinsicDuration>3600</cpl:IntrinsicDuration>
      <cpl:Language>en-us</cpl:Language>
    </tt:ClosedCaption>
    <tt:ClosedCaption>
      <cpl:Id>urn:uuid:771ea46f-44c8-4bdb-8612-e21aalc91aff</cpl:Id>
      <cpl:AnnotationText>Closed Caption in French for Reel #1 of The Jazz
        Singer</cpl:AnnotationText>
      <cpl>EditRate>24 1</cpl>EditRate>
      <cpl:IntrinsicDuration>3600</cpl:IntrinsicDuration>
      <cpl:Language>fr</cpl:Language>
    </tt:ClosedCaption>
    <tt:ClosedSubtitle>
      <cpl:Id>urn:uuid:00041fbb-e0d8-4182-8dd1-34622a6173c2</cpl:Id>
      <cpl:AnnotationText>Closed Subtitle in French for Reel #1 of The Jazz
        Singer</cpl:AnnotationText>
      <cpl>EditRate>24 1</cpl>EditRate>
      <cpl:IntrinsicDuration>3600</cpl:IntrinsicDuration>
      <cpl:Language>fr</cpl:Language>
    </tt:ClosedSubtitle>
  </cpl:AssetList>
</cpl:Reel>

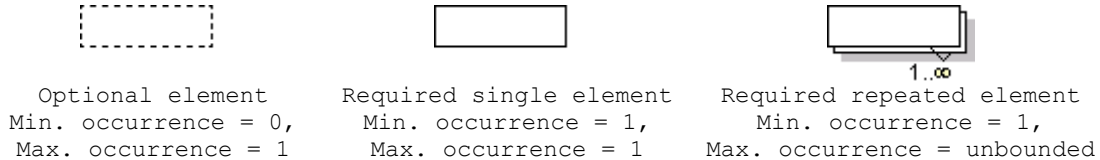
```


9 XML Diagram Legend (Informative)

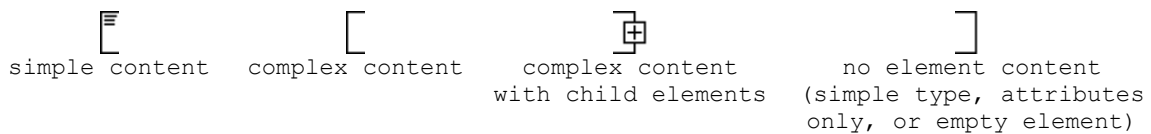
The following provides a legend for notation used in diagrams depicting XML structures.

9.1 Element symbols

In the schema design diagrams presented above of this document, only the elements are drawn. Attributes are not visible. The cardinality of the element (0..1, 1 exactly, 0..n, 1..n) is indicated by the border of the elements. Optional elements are drawn with a dashed line, required elements with a solid line. A maximum occurrence greater one is indicated by a double border.



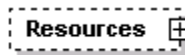
The content model of elements is symbolized on the left and right side of the element boxes. The left side indicates whether the element contains a simple type (text, numbers, dates, etc.) or a complex type (further elements). The right side of the element symbol indicates whether it contains child elements or not:



9.1.1 Examples



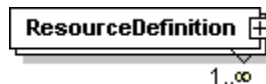
Optional single element without child elements. Minimum Occurrence = 0, Maximum Occurrence = 1, content = complex.



As above, but with child elements. The "plus" at the right side indicates the presence of one or more undisplayed child elements.



Mandatory single element. Minimum Occurrence = 1, Maximum Occurrence = 1, content = complex, no child elements (i.e. this denotes an *empty element*). The gray or green text below the element displays the xml-schema annotation associated with the element.



Mandatory multiple element containing child elements (content = complex). This element must occur at least once (Minimum Occurrence = 1) and may occur as often as desired (Maximum Occurrence = unbounded).



Mandatory single element with containing simple content (e.g. text) or mixed complex content (e.g. text with xhtml markup). Minimum Occurrence = 1, Maximum Occurrence = 1, type = xs:string (for example), content = simple. The three lines in the upper left corner are used for both text and numeric content.

9.2 Model symbols ("compositors")

A sequence of elements. The elements must appear exactly in the sequence in which they appear in the schema diagram.



A choice of elements. Only a single element from those in the choice may appear at this position.

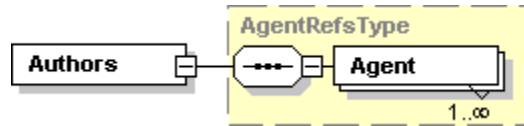


The "all" model, in which the sequence of elements is not fixed.

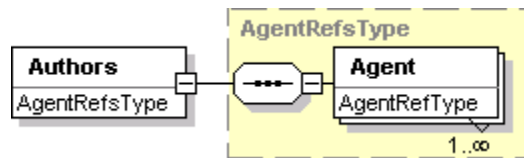


9.3 Types

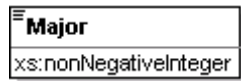
If an element refers to a complex global type, the type is shown with a border and yellow background. You can click on the gray type name shown at the top to jump to the type definition itself.



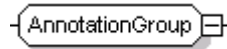
Depending on the settings in xml spy when generating the schema diagrams, the type name may be shown in the line below the element name:



In that case, the type names of simple types are shown as well:

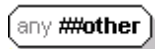


9.4 Model Groups and References



An *element group* is a named container with one or several elements. The group of elements can be reused at multiple places in the schema. Model groups are invisible in the instance document (in contrast to types, which require). Model groups have been used sparingly since they do not map to a feature in object-oriented programming languages (unless they support multiple inheritance).

Import note on reading the diagrams for model groups: If the model group symbol is drawn with simple lines (i.e. not dashed), this does not imply that the elements in the model group are required. The optionality of the group depends on the optionality of elements contained in the model group. (Model groups can be made optional, e.g. to make a model group with required elements optional in some cases, but this has not been used.)



The "*any*" group is a special kind of model group. It is a placeholder for elements not defined in the schema. The "*any*" element defines points where the schema can be extended. After the "*Any*" keyword the namespace from which the elements may come is defined, for example, "*##other*" specifies that the extension elements may come from any namespace, except from the current schema namespace.



Element references are indicated through a link arrow in the lower left corner. They are similar to references to model groups within a schema, but instead of refining the model group, they directly refer to a single global element. The global element can then be reused in multiple places.