SMPTE STANDARD

D-Cinema Distribution Master — Closed Caption and Closed Subtitle

Table of Contents

Approved
December 3, 2008

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 constrains the format of a DCDM Subtitle file [SMPTE 428-7] for use in Closed Caption and Closed Subtitle applications. Note that this document does not replace [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 Standard 428-7-2007, D-Cinema Distribution Master — Subtitle

2. World Wide Web Consortium (W3C) (2004, February 4). Extensible Markup Language (XML) 1.0 (Third Edition)

3. World Wide Web Consortium (W3C) (2004, October 28). XML Schema Part 1: Structures (Second Edition)

4. World Wide Web Consortium (W3C) (2004, October 28). XML Schema Part 2: Datatypes (Second Edition)

5. Internet Engineering Task Force (IETF) (1996, November). RFC 2396 — Uniform Resource Identifiers (URI): Generic Syntax

4 Glossary

Timed Text: The presentation of text in synchronization with picture and sound.

Subtitle: Timed text translation of the sound track's dialog, normally in a language other than that of the sound track.

Caption: Timed text intended to benefit those who are deaf or hard-of-hearing.

Open: Visible to all members of the audience.

Closed: Visible only to specially equipped members of the audience.

5 Overview

SMPTE 428-7, D-Cinema DCDM Subtitles, specifies the distribution format for open captions and open subtitles in the D-Cinema application, where rendered text or graphical overlays are presented along with the primary picture in a d-cinema work, such as a motion picture, trailer, or advertisement. In such applications, the display characteristics are well-known, and [SMPTE 428-7] allows for placement of timed text in a display-dependent manner. There are applications, however, where timed text may be rendered on privately viewed displays available only to select audience members, for the purpose of presenting Closed Captions or Closed Subtitles. As such, the display characteristics may not be known by the caption or subtitle creator and may not be uniform, requiring that [SMPTE 428-7] be constrained for display-independence. Thus, the constraints in this specification are to be applied to [SMPTE 428-7] when authoring timed text files for Closed Caption and Closed Subtitle applications.

DCDM Closed Caption and Closed Subtitle files contain a set of file-global metadata and a set of constrained structures which encode the content and temporal and spatial locations of the text to be displayed. A virtual timeline provides the temporal dimension of the timed text file. The timeline is a contiguous set of editable units. The spatial positions for timed text lines are expressed relative to one other, in a display-independent fashion.

The DCDM Closed Caption and Closed Subtitle file may reference external font resources for rendered text. The font resource formats are specified in SMPTE 428-7 D-Cinema DCDM Subtitles. Graphical images are not referenced in the DCDM Closed Caption and Closed Subtitle format.

As results may not be consistent across the spectrum of target display systems, timed text authors are encouraged to view their work on target display systems to learn of any limitations.

6 DCDM Closed Caption and Closed Subtitle Structural Constraints (Normative)

A DCDM Closed Caption or Closed Subtitle file is an XML document consisting of a single `SubtitleReel` element as defined in [SMPTE 428-7]. DCDM Closed Caption and DCDM Closed Subtitle files shall comply with SMPTE 428-7 with the constraints defined in Section 7 below.

7 Subtitle Element Instance Constraints (Normative)

A timed text instance is a display of integral text contained in a `Subtitle` element, defined in [SMPTE 428-7]. It is either rendered onto the primary picture or presented to select members of the audience through a closed-type display.

7.1 TimeIn and TimeOut Attributes

The time window defined by the `TimeIn` and `TimeOut` attributes of each `Subtitle` element shall not overlap the time windows of another `Subtitle` element.

7.2 Image Element

The `Image` child-element shall not be present.

7.3 Text Element

Each `Subtitle` element shall have a maximum of three `Text` child elements.

Note: Closed-type displays may place a limit on the number of characters allowed per line. For example, some devices place a limit of 32 characters per line. Caption and subtitle authors are encouraged to view their work on target display systems to learn of any limitations.

7.3.1 Valign attribute

Each `Text` child element within a single `Subtitle` element shall have the same `Valign` attribute.

7.3.2 VPosition attribute

Within a single `Subtitle` element, the `Vposition` value shall define the relative display order of the `Text` child elements, and shall not define a position based on percentage of display area. Each `Text` child element within a single `Subtitle` element shall have a different `Vposition` value.

The relative display order defined by the `Vposition` value shall be dependent upon the `Valign` value, as defined in Table 1.

Table 1 – Relative Display Order per Vposition and Valign

Valign	*Vposition display order*
Top	Ascending
Center	Ascending
Bottom	Descending

7.4 LoadFont and Font elements

Some display devices may not support the displaying of a font resource identified by the LoadFont element, and may instead use an internal device-specific font. In such cases, each attribute in associated Font elements should, but is not required to, be applied to the device-specific font.

8 Sample (Informative)

The following DCDM Closed Caption and Closed Subtitle sample XML structure is a valid instance of the `SubtitleReel` schema with the constraints defined in this specification applied. XML namespace declarations have been omitted for clarity. This reel starts at `00:00:00:00`. A default font is loaded and then three Timed Text instances are displayed.

```
<?xml version="1.0" encoding="UTF-8"?>
<dcst:SubtitleReel xmlns:dcst="http://www.smpte-ra.org/schemas/428-7/2006/DCST">
 <Id>urn:uuid:fbf6e056-0a6e-4dd8-8003-0a914481ed87</Id>
 <ContentTitleText>Example</ContentTitleText>
 <AnnotationText>This is a test file</AnnotationText>
 <IssueDate>2005-07-14T21:52:02.000-00:00</IssueDate>
 <ReelNumber>1</ReelNumber>
 <Language>en</Language>
 <EditRate>24 1</EditRate>
 <dcst:TimeCodeRate>24</dcst:TimeCodeRate>
 <StartTime>00:00:00:00</StartTime>
 <LoadFont ID="Arial">urn:uuid:3dec6dc0-39d0-498d-97d0-928d2eb78391</LoadFont>
 <SubtitleList>
   <Font ID="Arial" Color="FFFFFFFF" Weight="normal" Size="40">
     <Subtitle SpotNumber="1" TimeIn="00:01:34:17" TimeOut="00:01:40:20">
       <Text HAlign=”left” Hposition=”0.0” Valign=”bottom” Vposition=”30”>
                          <Font Italic="yes">Narrator:</Font></Text>
       <Text HAlign=”left” Hposition=”0.0” Valign=”bottom” Vposition=”10”>accelerate toward
                          light speed</Text>
       <Text HAlign=”left” Hposition=”0.0” Valign=”bottom” Vposition=”20”>Someone watching a
                          car</Text>

     </Subtitle>

   </Font>
 </SubtitleList>
</dcst:SubtitleReel>
```

The closed caption text in the preceding sample XML will render on a capable closed display as:

Narrator:
Someone watching a car
accelerate towards light speed

The preceding sample XML illustrates several constraints or features:

1) Interpretation of the `Vposition` attribute: Note that the `Text` elements appear in the XML in non-sequential order and are rendered according to the `Vposition` values. If a closed caption system wishes to transform the set of Text elements into a single utterance, the elements would be sorted according to the `Vposition` and `Valign` attributes, and then concatenated in that order, with line breaks or spaces between them, depending on the specifics of the display system. Note that in the specific example above, sorting should take place in descending order because the `Valign` value is "bottom". For `Valign` values of "top" and "center", an ascending sort would be appropriate.

2) Utility of the `LoadFont` element: A closed-type display system might not utilize the font specified in the `LoadFont` element. Caption and subtitle authors are encouraged to view their work on target display systems to learn of any limitations.

3) Utility of the `Font` element: The `Font` element is used in the first `Text` sub-element to turn on italics for that content. Note that with a closed-type display device, this action may apply to an internal font used by the display device, and not the font specified by the `LoadFont` element. Caption and subtitle authors are encouraged to view their work on target display systems to learn of any limitations.