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24TB Technical Report

Internet Caption Technical Requirements for SMPTE Timed Text

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This is a set of **authoring and transmission** technical requirements that are derived from prior 24TB-Captions analysis. **This does not cover apparatus requirements.** A strict interpretation of the derived requirements is summarized in Table 1 with reference to provisions of SMPTE Timed Text (including W3C TTML 1.0). In addition a small number of new features are proposed (see Table 4) which we feel are essential to faithfully represent captions authored for US television (i.e. 608 and 708 captions).

Table 1. Derived Technical Requirements for Authoring and Distribution – strict interpretation

47CFR79.103(c)	Regulation Text	Inferred Caption Command Stream	Suggested SMPTE-TT/TTML Provision
1a Presentation	All apparatus shall implement captioning such that the caption text may be displayed within one or separate caption windows and supporting the following modes:...	Multiple windows.	<region>
1b Presentation	...text that appears all at once (pop-on),...	Window visibility control.	tts:visibility
1c Presentation	...text that scrolls up as new text appears (roll-up), and...	Window addition, modification, or replacement of text.	<region> with FO behavior that includes scrolling (e.g. tts:scroll="on")
1d Presentation	...text where each new letter or word is displayed as it arrives (paint-on).	Window addition, modification, or replacement of text.	<region> with FO behavior



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47CFR79.103(c)	Regulation Text	Inferred Caption Command Stream	Suggested SMPTE-TT/TTML Provision
2a Character color	All apparatus shall implement captioning such that characters may be displayed in the 64 colors defined in CEA-708 and...	Font color attribute to support CEA-708-D, Section 8.8: RGB resolution of 4 bits for each primary (0-3).	tts:color supporting the defined 64 colors
2b Character color	...such that users are provided with the ability to override the authored color for characters and select from a palette of at least 8 colors including: white, black, red, green, blue, yellow, magenta, and cyan.	N/A	N/A
3 Character opacity	All apparatus shall implement captioning such that users are provided with the ability to vary the opacity of captioned text and select between opaque and semi-transparent opacities.	N/A [<i>Note that there is no explicit requirement to support opacity from the caption author.</i>]	N/A – i.e. no requirement for tts:color alpha values



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47CFR79.103(c)	Regulation Text	Inferred Caption Command Stream	Suggested SMPTE-TT/TTML Provision
4 Character size	All apparatus shall implement captioning such that users are provided with the ability to vary the size of captioned text and shall provide a range of such sizes from 50% of the default character size to 200% of the default character size.	N/A [<i>Note that there is no explicit requirement to support font size from the caption author.</i>]	N/A – i.e. no requirement for tts:fontSize
5a Fonts	All apparatus shall implement captioning such that fonts are available to implement the eight fonts required by CEA-708 and § 79.102(k)...	Font family attribute supporting the list of 8 to the left.	tts:fontFamily. See Table 5, including 3 new values.
5b Fonts	...Users must be provided with the ability to assign the fonts included on their apparatus as the default font for each of the eight styles contained in § 79.102(k).	N/A	N/A



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47CFR79.103(c)	Regulation Text	Inferred Caption Command Stream	Suggested SMPTE-TT/TTML Provision
6a Caption background color and opacity	All apparatus shall implement captioning such that the caption background may be displayed in the 64 colors defined in CEA-708 and...	Font background color attribute supporting the range of RGB as provided in 2a above.	tts:backgroundColor supporting the defined 64 colors
6b Caption background color and opacity	...such that users are provided with the ability to override the authored color for the caption background and select from a palette of at least 8 colors including: white, black, red, green, blue, yellow, magenta, and cyan...	N/A	N/A
6c Caption background color and opacity	...All apparatus shall implement captioning such that users are provided with the ability to vary the opacity of the caption background and select between opaque, semi-transparent, and transparent background opacities.	N/A [<i>Note that there is no explicit requirement to support font background opacity from the caption author.</i>]	N/A – i.e. no requirement for tts:backgroundColor alpha values



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47CFR79.103(c)	Regulation Text	Inferred Caption Command Stream	Suggested SMPTE-TT/TTML Provision
7a Character edge attributes	All apparatus shall implement captioning such that character edge attributes may be displayed and...	Character edge attribute allowing for the 5 settings listed. See CEA-708-D, Section 8.5.8.	tts:textDecoration, tts:textOutline, tts:textEdge (see Table 4)
7b Character edge attributes	...users are provided the ability to select character edge attributes including: no edge attribute, raised edges, depressed edges, uniform edges, and drop shadowed edges.	N/A	N/A
8a Caption window color	All apparatus shall implement captioning such that the caption window color may be displayed in the 64 colors defined in CEA-708 and...	Window color attribute supporting the range of RGB as provided in 2a above.	tts:backgroundColor on <region>
8b Caption window color	...such that users are provided with the ability to override the authored color for the caption window and select from a palette of at least 8 colors including: white, black, red, green, blue, yellow, magenta, and cyan...	N/A	N/A



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47CFR79.103(c)	Regulation Text	Inferred Caption Command Stream	Suggested SMPTE-TT/TTML Provision
8c Caption window color	... All apparatus shall implement captioning such that users are provided with the ability to vary the opacity of the caption window and select between opaque, semi-transparent, and transparent background opacities.	N/A [<i>Note that there is no explicit requirement to support window opacity from the caption author.</i>]	N/A – i.e. no requirement for tts:opacity on <region>
9a Language	All apparatus must implement the ability to select between caption tracks in additional languages when such tracks are present and...	Language track attribute.	xml:lang
9b Language	... provide the ability for the user to select simplified or reduced captions when such captions are available and identify such a caption track as “easy reader.”	“Easy Reader” Boolean track attribute.	m708:easyReader



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47CFR79.103(c)	Regulation Text	Inferred Caption Command Stream	Suggested SMPTE-TT/TTML Provision
10 Preview and setting retention	All apparatus must provide the ability for the user to preview default and user selection of the caption features required by this section, and must retain such settings as the default caption configuration until changed by the user.	N/A	N/A

The following Table 2 contains infrastructure provisions that are implied by the requirements in Table 1 and/or are required by customary XML design practices and/or required by TTML.

Table 2. Implied Infrastructure Provisions

SMPTE-TT/TTML Provision	Rationale
<head>	Need a container for metadata and provisions that apply to the entire document – e.g. m708:easyReader
<body>	Need a container for all the content elements.
<meta>	Need a container for metadata.
<div>	Required by TTML as a container for other things that are required. Not in itself required.
	Needed to provide 608/708 attribute control and make use of region FO.
<p>	Need a container for text.
tts:origin, tts:extent	Although the regs don't explicitly state that the caption author has control over positioning and size, this seems like an omission as it would be awkward at best for a user to try and do this with multiple windows.
tts:begin, tts:end	Need a way to define in and out times for text.
xml:id	Needed for region linkage.
xml:space	Needed for proper space symbol handling in <p>.



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SMPTE-TT/TTML Provision	Rationale
Unicode	Unicode symbols are the “code tables” of XML and the Internet.
Equivalent Unicode symbols from the 708 code tables as mapped by 2052-11	Need support for 708 code tables. Although not specifically required by the regs, anything less than the 708 symbol tables would be odd.

Table 3. Other Features Required due to Accessibility Community Requirements

SMPTE-TT/TTML Provision	Rationale
tts:fontStyle	Support for italics, in particular.
608 “smooth scrolling”	Support for regions that scroll should be done “smoothly” to replicate current capabilities in CEA-608, Section C.3. For example, in 29.97 frame rate: A scroll should take from 0.20 to 0.433 seconds to complete. From 6 to 13 discrete steps should be used, with each step as equal in size as possible.. Note there is not necessarily a need to signal it on and off.

Table 4. Suggested New Features”

SMPTE-TT/TTML Provision	Description
ttp:end	Define clearer semantics of no tts:end to mean the end is not determined in this document and it might be continued in a subsequent document with a continuous, but later active time range.
ttp:continue	Indicates that the content is “continued” from a document with an earlier active time range and decoders might wish to handle the content differently (i.e. not re-render it).
tts:textEdge	Defines text edges that map to the values defined in CEA-708, Section 8.5.8. The values are: none, raised, depressed, uniform, shadowLeft, and shadowRight. These could have interaction with tts:textDecoration and tts:textOutline. The initial value is “false” for backwards compatibility.
tts:scroll	This is a Boolean that applies to <region> to signal the text should not only flow but also scroll under certain conditions. The initial value for backwards compatibility is “false”.



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SMPTE-TT/TTML Provision	Description
m708:easyReader	This is a metadata item defined in draft SMPTE RP 2052-11. It is a Boolean with an initial value of “false” for backwards compatibility.

Table 5. Supported Font Families, Including Three New Standardized Family Names

CEA-708 Font “Styles”	tts:fontFamily
Default (undefined)	default
Monospaced with serifs (similar to Courier)	monospaceSerif
Proportionally spaced with serifs (similar to Times New Roman)	proportionalSerif
Monospaced without serifs (similar to Helvetica Monospaced)	monospaceSansSerif
Proportionally spaced without serifs (similar to Arial and Swiss)	proportionalSansSerif
Casual font type (similar to Dom and Impress)	casual
Cursive font type (similar to 6Coronet and Marigold)	cursive
Small capitals (similar to Engravers Gothic)	smallCapitals

END