



APPLICATION NOTE

KudosPro

Product Application Note No.6

Closed Captions and Teletext Subtitles



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Overview

Closed captioning is a term describing several systems developed to display text on a television or video screen to provide additional or interpretive information to viewers who wish to access it.

Closed captions typically display a transcription of the audio portion of a program as it occurs (either verbatim or in edited form), sometimes including non-speech elements.

The term "closed" in closed captioning indicates that not all viewers see the captions, only those who choose to decode or activate them. This distinguishes from "open captions" (sometimes called "burned-in" or "hardcoded" captions), which are visible to all viewers.

Most of the world does not distinguish captions from subtitles however these terms do have different meanings. "Subtitles" assume the viewer can hear but cannot understand the language or accent, or speech is not entirely clear, so they only transcribe dialog and some on screen text. "Captions" aim to describe to the deaf and hard of hearing all significant audio content. This includes spoken dialog and non-speech information such as the identity of the speakers and occasionally their manner of speaking together with music or sound effects using words or symbols.

This Closed Caption CEA608/708 feature provides the ability to transcode CEA608 captions to/from CEA708 compatibility bytes (708 CB) and pass native CEA708 to CEA708.

What is CEA608?

CEA608 was developed in the 1970s for carrying 960bps captioning data and services in the VBI (Vertical Blanking Interval) of NTSC video, an analog composite video format. In latter day digital component version of NTSC, this analog waveform is digitally encoded and embedded in Line 21 of the Video (Line 284 for Field 2).

What is CEA708?

CEA708 is a migration of the closed caption concepts used in CEA608 to the HDTV environment. This Digital Television Closed Captioning (DTVCC) is allocated 9600bps and is transported as a logical data channel in the DTV bit stream. This allows for the simultaneous transmission of captions in multiple languages and caption windows can consist of text in a variety of colours, size and other attributes.

SMPTE 334-1 outlines a means of transporting the 708 caption as a VANC packet (DID=61 SDID=01). The payload of this ancillary packet contains a Caption Distribution Packet (CDP) and is outlined in SMPTE 334-2.

The CDP payload can consist of CEA608 transported as compatibility bytes (transcoded CEA608/708 CB), native CEA708 or both.

As DTV standards cover many different frame rates, the amount of caption data per field/frame varies dependant on the transmission video standard. Lower frame rates such as 24/25Hz will carry twice the information as the higher frames rates such 50/59.94Hz. This is to maintain the constant 9600bps.

What is World System Teletext (WST)?

WST is the name of a standard for encoding and displaying Teletext information, which is used as the standard for Teletext Subtitles throughout Europe today. WST is exclusive to the 625/50 domain. WST complies to ETSI EN300 706 specification.

What is OP42

OP42 is the specification used for Teletext subtitles in Australia. Similar to WST but not defined by ETSI specification. OP42 extends to analogue television and the specification of Teletext there in.

What are RDD-08 & OP47?

OP47 and RDD-08 Teletext Subtitles are essentially the same thing.

OP47 is compliant to the specification ITU-R BT.1120-7. The OP47 standard for Teletext Subtitling is used worldwide in the 50Hz HD domain.

RDD-08 is the standard used in Europe for Teletext Subtitles in the HD domain. SMPTE document RDD-08 defines the SMPTE recommendation where ITU-R BT.1120-7 specification is quoted.

The specification RDD-08 is used in countries where television standards and principles must adhere to SMPTE specifications.

KudosPro Features:

- Transcode CEA608 to/from CEA708 compatibility bytes in the 59.94 domain
- Passing CEA608 in 59.94Hz SD domain.
- Passing of native CEA708 to/from CEA708 in the 59.94 HD domain
- Transcode WST/OP42 to/from RDD-08/OP47 in the 50 Hz domain
- Passing RDD-08/OP47 in 50Hz HD domain.
- Passing WST/OP42 in 50Hz SD domain.
- Automatic detection of input CEA608 & CEA708 captions
- Caption data delayed/co-timed with video
- Easy set up, intuitive GUI
- Independent configuration for individual video channels

Introduction

The way in which Closed Captions or Teletext signals are handled is dependent upon the video process being performed by the KudosPro unit.

525 59i input

KudosPro will accept Closed Captioning information conforming to CEA608 specification, located on line 21 (line 284 for field 2).

Closed Captions from the source can be passed to a 525 SD output only.

Where cross field conversions are configured, Closed Captions will be stripped.

Closed Captions from the source can be Transcoded to the HD 59.94 domain. Closed captions will be transformed into CEA708 CB (Compatibility Byte).

HD/3G 29.97/59.94 input

KudosPro will accept Closed Captioning information conforming to CEA708 specification, or CEA708 CB.

Only Closed Captions from the input, conforming to CEA 708 CB, can be Transcoded to 525i in the SD domain. Closed Captions will be placed on line 21 and will conform to CEA608 specification.

Native CEA708 Closed Captions cannot be Transcoded to 525 in the SD domain. In this circumstance, the Closed Caption will be stripped.

Where cross-field conversions are configured, Closed Captions will be stripped.

Native CEA708 Closed Captions can be passed to any same frame-rate HD output.

625 50i input

KudosPro will accept Teletext Subtitles conforming to WST or OP42 specification.

Teletext Subtitles from the source can be passed to a 625 SD output only.

Where cross-field conversions are configured, Teletext Subtitles will be stripped.

Teletext Subtitles from the source can be Transcoded to a same frame-rate HD output. Teletext information will be output conforming to the RDD-08 specification.

HD/3G 25/50 input

KudosPro will accept Teletext Subtitles conforming to RDD-08 specification, or OP47 specification.

Teletext Subtitles from the source can be Transcoded to a 625 50i SD output. Teletext Subtitles will emerge on the SD output conforming to the WST and OP42 specification.

Where cross-field conversions are configured, Teletext Subtitles will be stripped.

RDD-08 Teletext Subtitles from the source can be passed to any same frame-rate HD output

OP47 Teletext Subtitles from the source can be passed to any same frame-rate HD output.

KudosPro Control Interface for Closed Captions/Teletext

Control can be either from the Front Panel, or via the Rollcall Template.

Since each channel can be configured separately, with respect to Closed Captions and Teletext, the relevant control menu is found under the channel template.

Front Panel

In the channel menu, navigate to and select 'Metadata'.

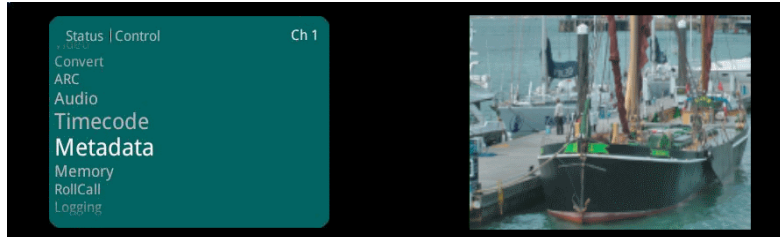


Figure 1: Metadata selection within the Channel Menu (Channel 1) via the Front Panel

RollCall

In the channel RollCall menu, locate and enter the 'Metadata' sub-menu.

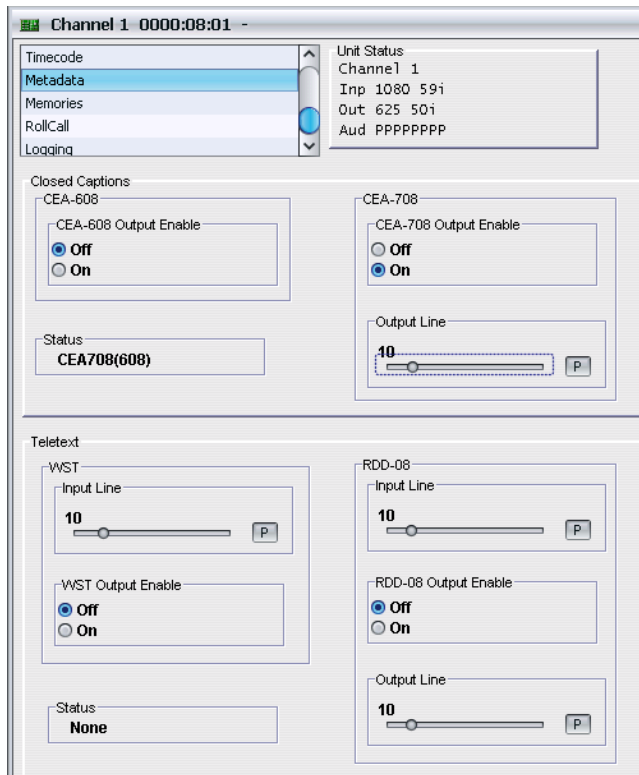


Figure 2: Metadata selection within the Channel Menu (Channel 1) via Rollcall

In the Metadata menu there are two sub-menus

- Closed Captions
- Teletext.

Closed Captions

Front Panel: In the Metadata Menu, select 'Closed Captions'

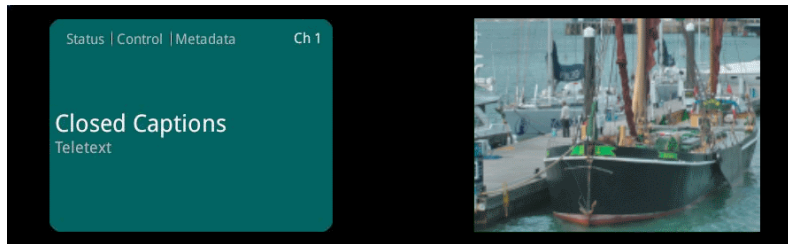


Figure 3: Selecting 'Closed Captions' sub-menu via the Front Panel.

Rollcall Template: refer to the 'Closed captions' menu:

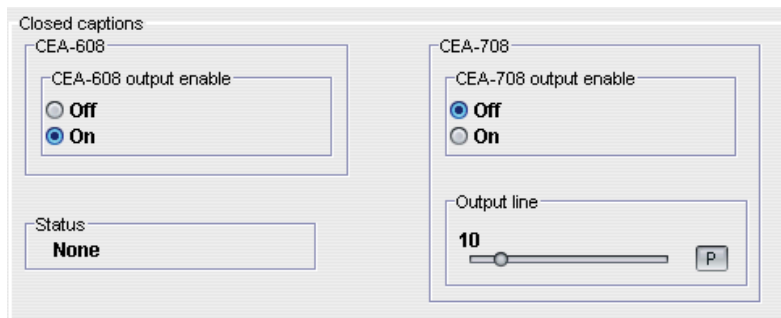


Figure 4: Rollcall template 'Closed Captions' control menu.

CEA-608 Output Enable

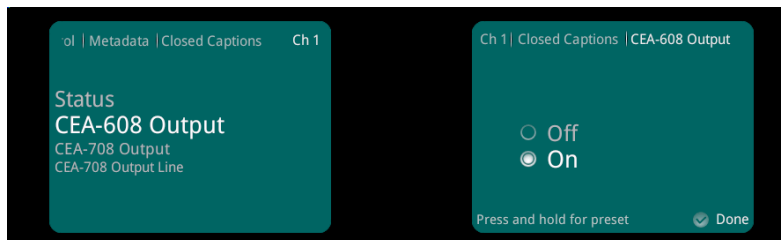


Figure 5: CEA-608 Output Enable, via the Front Panel

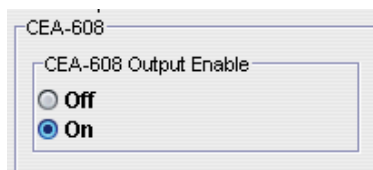


Figure 6: CEA-608 Output Enable, via Rollcall

When set to 'on', if output standard is 525i, then:

- Valid CEA-608 Closed Captions from a 525i input will be passed to the output.
- Valid CEA-708 CB from a 59.94Hz HD input will be transcoded to CEA608 Closed Captions to the output.

In both cases, output CEA608 Closed Captions will be placed on Line 21 (line 284 for field 2) of the 525i output.

CEA-708 Output Enable

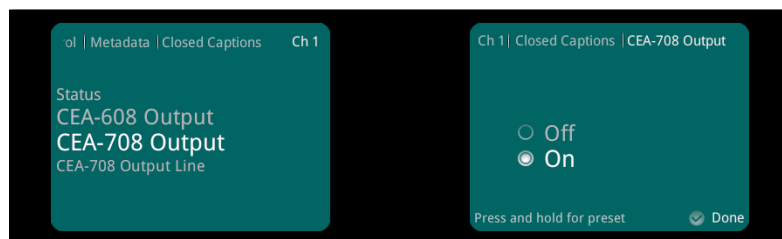


Figure 7: CEA-708 Output enable via the Front Panel

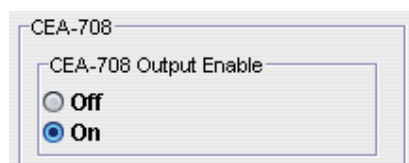


Figure 8: CEA-708 Output enable via Rollcall

When set to 'on', if output standard is 59.94Hz and is HD, then:

- Valid CEA-708 Closed Captions from a 59.94 HD input will be passed to the output.
- Valid CEA-708 CB Closed Captions from a 59.94 HD input will be passed to the output.
- Valid CEA-608 Closed Captions from a 525i input will be transcoded to CEA-708 CB, to the output.

Output Line

CEA-708 Closed Captions will be output as a data-packet in VANC space. In the HD domain, the User can control on which output line the VANC packet is placed (this can be any line between 8 and 20, line 10 being the 'default' setting).

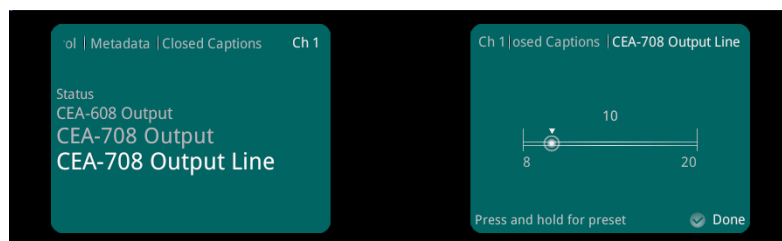


Figure 9: CEA-708 Output line select, via the Front Panel

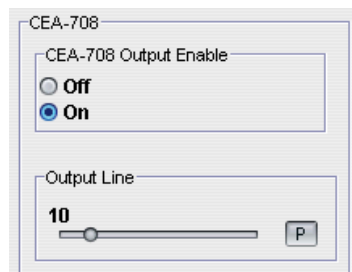


Figure 10: Closed Caption Output line selection control via Rollcall

Status

Successful detection of incoming Closed Captions is confirmed in the 'Status' window.

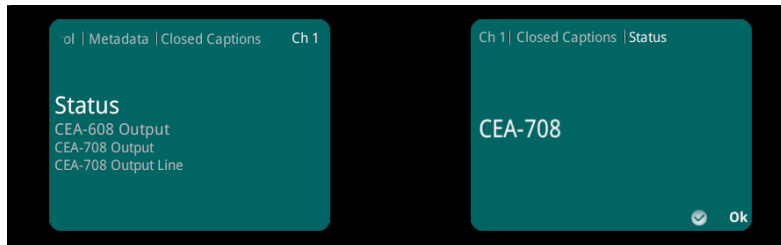


Figure 11: CEA708 Status via the Front Panel

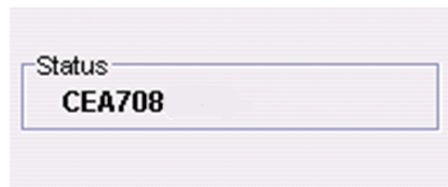


Figure 12: CEA708 Input Status via Rollcall

Teletext

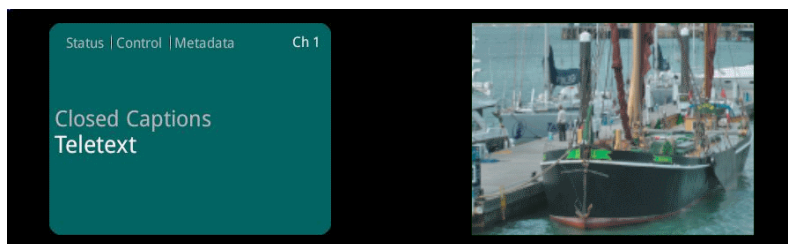


Figure 13: Selecting 'Teletext' sub-menu via the Front Panel.

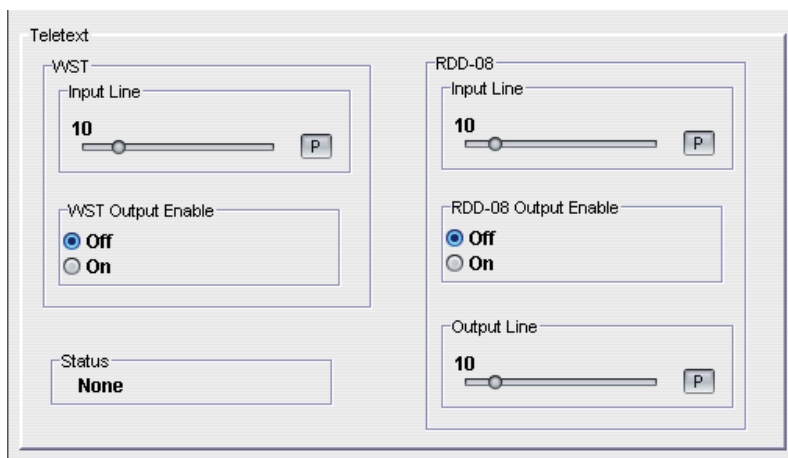


Figure 14: Selecting 'Teletext' sub-menu via Rollcall.

WST (OP42)

For successful processing of incoming WST / OP42 information, manual setting of 'Input Line' by an Operator is required. There is no auto-detect feature for incoming WST.

Incoming WST / OP42 can reside on any line between 7 and 22. Default setting is line 10

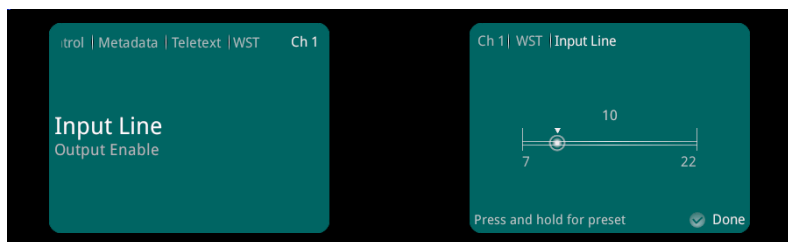


Figure 15: WST (OP42) input line selection via the Front Panel.

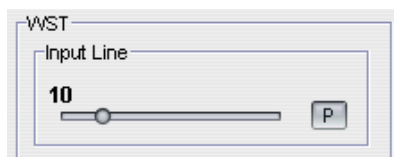


Figure 16: WST (Op42) input line selection via Rollcall.

WST (OP42) Output Enable

When set to 'on', if output standard is 625i, then:

- Valid WST/OP42 subtitles from a 625i input will be passed to the output.
- Valid RDD-08/OP47 subtitles from a 50Hz HD input will be transcoded to the output and will emerge as WST/OP42 subtitles.

Status

Successful capture of incoming WST/OP42 is reported in the Status Window.

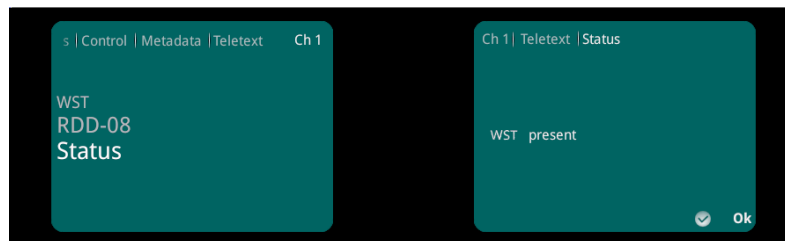


Figure 17: WST (OP42) Status via the Front Panel.



Figure 18: WST (OP42) Status via Rollcall

Note that successful OP42 detection will report 'WST present'.

RDD-08 (OP47)

For successful processing of incoming Teletext conforming to RDD-08 /OP47 specification, manual setting of the 'Input Line' by an Operator is required. There is no auto-detect feature for incoming RDD-08 / OP47.

Incoming Teletext can reside on any line between 7 and 22. Default setting is line 10

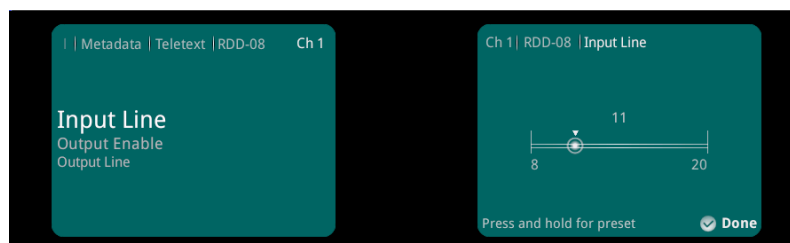


Figure 19: RDD-08 (OP47) input line selection via the Front Panel.

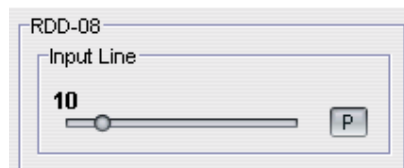


Figure 20: RDD-08 (OP47) input line selection via Rollcall.

RDD-08 Output Enable

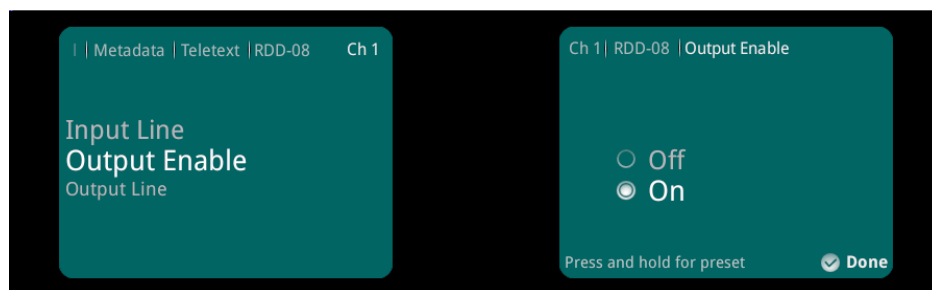


Figure 21: RDD-08 (OP-47) Output line selection via the Front Panel

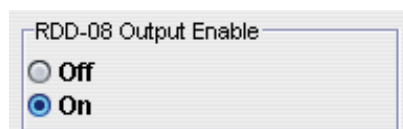


Figure 22: RDD-08 (OP-47) Output line selection via Rollcall

When set to 'on', if output standard is 50Hz HD, then:

- Valid WST subtitles from a 625i input will be transcoded to the output and will emerge conforming to RDD-08 (OP47).
- Valid RDD-08 (OP47) subtitles from a 50Hz HD input will be passed to the output.

Status

Successful capture of incoming RDD-08 / OP47 information is reported in the Status Window.

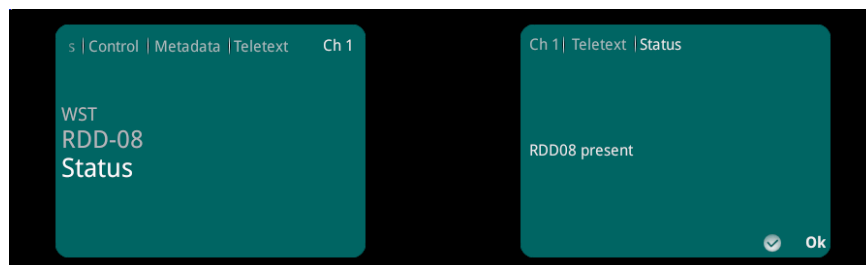


Figure 23: RDD-08 input Status via the Front Panel.



Figure 24: RDD-08 input Status via Rollcall

Note that successful OP47 detection will report 'RDD-08 present'!