

EEG Application Note

CCPlay for Caption File Playout to SDI

Applies to Products: HD490/491/492

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CCPlay is a software add-on module for EEG closed caption encoders that inserts caption data from imported text or binary files into the encoder's SDI video output. The caption data files contain time codes, and insertion into the video can be synced to an external time code source including LTC, HD ANC VITC, and SD DVITC, or timed with a self-generated video frame clock. A wide range of caption and subtitle file formats are supported, including ECF, SCC, SRT, Cheetah binary and ASCII, CAP, TDS, and more.

CCPlay can be controlled either through a point-and-click web browser interface on the encoder Web Portal, or through a scriptable REST-based HTTP web service. This document primarily discusses the point-and-click interface on the web portal. For interactive documentation on the REST API, point your browser to <http://{your-4xx-ip}/ccplay/api>. A basic list of commands is also included at the end of this document.

Importing files into CCPlay

To import caption files into CCPlay, go to the CCPlay tab on the HD4xx Web Portal. Then, click on the "Upload" sub-tab. Click in the box labeled "Please select your file", and an open dialog will appear, allowing you to navigate the drives accessible from your local computer. Click "Open" when you have selected a file, and then press "Upload."

Once the file is uploaded, CCPlay checks it for a compatible format. You may see an error message if your file cannot be understood by CCPlay.

When successfully uploaded, your file should now appear in the "Filelist" sub-tab, along with all other files imported into CCPlay. You can click on the file name to download the file or view it in your browser. CCPlay also displays compact metadata for each file, including the start and end time code values. The start time code value is especially important for syncing your file to a time code source, or setting up the correct self-generated time code for play out.

Triggering Encoding with External Synchronization

Applications in post-production captioning for tape-to-tape or server ingest workflows typically require finely tuned synchronization between the caption data source and the master video. For these applications, the CCPlay “Synced” mode corresponds closely to the type of applications supported by EEG’s Windows-based CCPlay application used with an EN530 or HD485/495 encoder.

HD49xx encoders can read external time code from LTC on an XLR input, VITC embedded in HD video as a VANC or HANC packet (ANC VITC), or VITC embedded in SD video as a VBI signal (DVITC). To select your time code source, go to the CCPlay Status tab, and select from the time code options on the top right of the page. The “Current Timecode” field should begin incrementing when your time code source is active.

Before beginning your encode job, you should rewind your master video and time code to an appropriate point at or before the desired begin point for caption data encoding.

To play out an imported file with synchronization to the external time code source, go to the Filelist tab and set the Playback Mode to “Synced”. Press the green Play button to select a file.

An offset window will appear, providing an opportunity to set a linear time offset required to create accurate synchronization between your video time source and your caption file. Setting an offset may be necessary if additional time-coded material has been added or removed to the beginning of the video, or for example if the video time code source begins at 00:00:00:00 and the caption file begins at 01:00:00:00, etc.

Figure 2 - Time code shift dialog



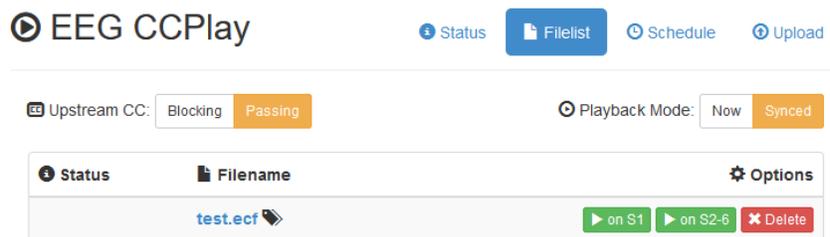
You can also play files for both services simultaneously by selecting both, and applying the appropriate offsets if necessary, before beginning the video and time code.

Once you have loaded the desired caption files and selected offsets, you can begin to play out your video and time code. The data from the caption file will not begin encoding until the time code input enters the range of time-stamped data in the file (though this range may be adjusted from the original if an offset was set in the previous step). If the time-code begins in the middle of the range of data in the file, encoding will start from that point. If time code is paused, data encoding will also pause until it is resumed, and if the time code jumps to a discontinuous value, encoding will pick up at the corresponding discontinuous point in the caption file. Thus, it is possible to remove captions from edited-out video segments automatically, as long as the timecode from the original is preserved and the position of the deleted segment is kept as a timecode discontinuity.

Triggering Encoding with 'Play Now'

Play Now encoding provides an easy and immediate way to begin outputting caption data from an imported caption file into the master video. While Play Now encoding is the simplest operational mode, for situations where precise timing of captions to an external time code source is desired, consider using "Synced" encoding (described in the previous section) to achieve superior control.

Figure 3 - File list in the "Play Now" mode



To trigger an encoding in Play Now mode, go to the Filelist tab, and set the Playback Mode selector to “Now”. Then, press the green Play button for the desired caption file and caption language. CCPlay will immediately begin inserting data from the caption file into the video signal. The first time-stamped data record is written to the master video immediately, and subsequent records are paced according to the self-generated or external time code input.

You can go to the “Status” tab at any time to view the caption encoding progress. Note that the “Shifted Timecode” for your file will differ from the system master timecode (“Current Timecode”). This is because a shift from the master timecode is automatically computed in the “Play Now” mode, so that the time-code range covered in your file will immediately become active. In this mode, the system timecode is used for pacing, but its starting value relative to the time range in your file is unimportant.

If you trigger files in the “Play Now” mode, but use an external time code source (VITC or LTC), note that discontinuities or pauses in your external time code source do still affect the caption encoding. Generally, combining these settings is not recommended.

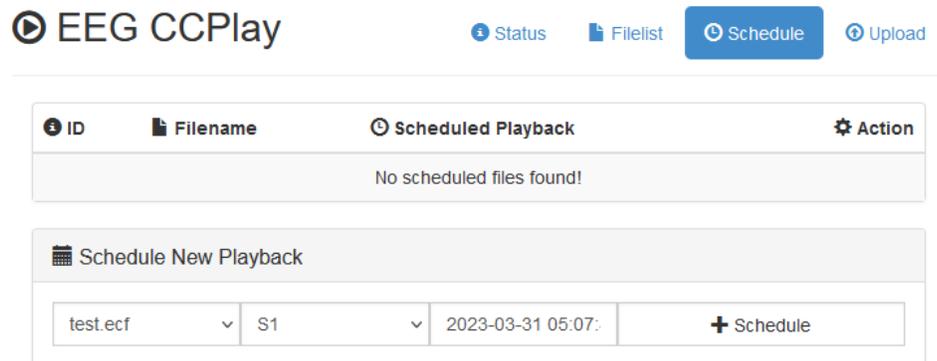
When the final time-stamped data record is written to video, the file will be unloaded and the caption service will appear idle in CCPlay.

Triggering Scheduled Encoding

CCPlay also has a scheduling feature, enabling you to play out files at a future date and time. The “Schedule” play out works similarly to the CCPlay “Play Now” feature, except play-out does not trigger until the selected date and time (on the HD490 internal clock). At the scheduled time, play-out will immediately begin at the beginning of caption data in the file, without requiring external time code synchronization. Data play out then continues through self-synchronization to the master video frame rate.

The clock used for scheduled CCPlay events is the system clock on the HD4xx encoder. You can set this clock, change the time zone, or select synchronization with NTP from the Date/Time tab on the HD490 Web Portal. For accurate long-term scheduling, NTP synchronization is highly recommended, as the internal clock may drift enough to affect captioning synchronization.

Figure 4 - CCPlay Schedule Page



Upstream CC Options

The File List tab also includes an option to control the blocking behavior of upstream closed caption data, which in some cases may already be present on the master video input.

When CCPlay is not actively encoding, you may choose to “Block” or “Pass” upstream closed caption data. In the blocking mode, the encoder will strip all closed captioning from the master input. In the passing mode, closed captioning from the master input will be regenerated on the master output unless it is replaced by live captioning from iCap or another source.

When CCPlay is actively encoding on a service, upstream CC data in that service is automatically overwritten from the beginning of the time code matches until the end of the caption file is reached. If you wish for upstream CC to be returned as soon as the current caption file ends, check “Unblock after playback.” If you do not check this option, blocking of upstream data will continue after caption file playback ends, until the “Passing” button is pressed manually. Controlling the return to upstream data manually can be desirable to ensure that no extraneous upstream CC data is passed through in the time that may be left after a caption data file is completed, but before the associated video program is finished.

Using the CCPlay Status Page

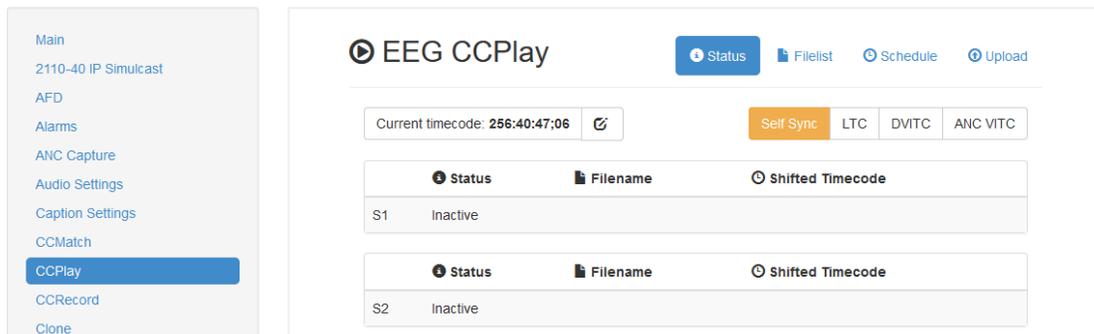
The CCPlay status page shows data currently playing through CCPlay on CEA-708 Service 1 (CC1) and CEA-708 Service 2 (CC2 or CC3).

The “Current timecode” field shows the master timecode currently in use by CCPlay. This timecode may be self-generated, or synced from an external source.

If the timecode button on the top of the page is set to “Self Sync”, then the time code is self-generated from the video frame rate. You can reset this time code to an arbitrary start point with the “Write” button next to the “Current Timecode” display. Note that self-generated time code will not reflect any pauses, rewinds, or shuttle jogs that interrupt normal speed linear playback of your master video signal. For applications like this, synchronization to an external time code source is required.

If you have an external source of time code for Synced Play, select either “LTC” (longitudinal time code connected to the XLR time code input on the HD490 rear panel), “ANC VITC” (VITC time code in VANC/HANC packets on the master video input) or “DVITC” (VITC time code in the SD VBI space) with the top buttons. The “Current Timecode” field should show timecode samples as it receives them from the hardware interface. Note that the refresh rate of the web portal is only once every 2-3 seconds, so seeing uneven ticking in this time code field does not indicate any problem with your time code source.

Figure 5 - CCPlay status page



Each file currently playing data into a CEA-708 data service also has an independent “Shifted Timecode”. This timecode is a combination of the current master timecode, and also a shift applied to synchronize that particular file. This shift may have been set

manually in the Synced Play mode, to handle a caption data file that has timings that do not line up exactly with the timings of the video time code track. A shift is also assigned automatically when play-out is triggered with the Play Now or Scheduled modes. The shift ensures that first record of the data file will begin play as soon as triggered by the user or scheduling engine. This “Shifted Timecode” shows the progress through the selected data file, and when it reaches the last record of timed data in the data file, the data file will close and CCPlay will return to its idle state for that 708 data service.

Each file currently playing also regularly updates the Status field with its “Previous”, “Current”, and “Next” caption data records, with appropriate time codes. When the Shifted Timecode reaches the timecode in the Current (middle) record, that caption record will be encoded into the SDI video. The Current record will then scroll up to the Previous field, the Next record will scroll into the Current position, and a new record will be loaded into the Next field. While the CCPlay web pages may not reflect record changes immediately, especially in files with tightly spaced captioning records, the underlying encoder software is frame-accurate and not affected by the web viewer refresh period.

CCPlay Logging

CCPlay job logging is accessible from the HD490 Web Portal tab “Logs”. Within this tab, there are entries for each software modules that writes log data. CCPlay logs entries are saved for 1 week.

Depending on browser cache settings, sometimes it may be necessary to use the “refresh” button on the bottom-right of the Logs page in order to see updated log entries since you last loaded the HD4xx Web Portal page.

CCPlay HTTP REST API

All of the functions of CCPlay can also be controlled remotely through a REST API. Automation clients written in nearly any programming language will be able to access these features by directing HTTP POST and GET requests to the IP address of your encoder.

All requests will begin with <http://{encoder-IP}/ccplay/>, and most functions can be called with either a “.json” suffix to request delivery of the return data in JSON format, or without this suffix to request deliver as a formatted HTML message. These features are demonstrated on the quick reference / interactive tutorial page on <http://{encoder-IP}/ccplay/api>.

Figure 7 – CCPlay interactive reference on encoder from web browser



Available calls:

GET /ccplay/api/status

Basic information on the current CCPlay status including the current timecode, whether any file is currently playing out, and the current position in the caption file.

GET /ccplay/api/queue

Information on pre-scheduled CC file playout queue.

GET /ccplay/api/files

List of all files currently stored on the encoder, including a URI reference for making calls related to each individual file.

GET /ccplay/api/files/{filename}

Download a caption file stored on the encoder

GET /ccplay/api/files/{filename}/metadata

Get information on the file time code format, detected frame rate, and start and end time codes.

DELETE /ccplay/api/files/{filename}

Remove a file stored on the encoder. It may be important to delete files periodically to conserve the disk space on the encoder (generally 2 GB).

POST /ccplay/api/files/{filename}

Post a new file to the box. Make sure to use “application/octet-stream” as the MIME type, and use any applicable “binary data” flags in your application library.

POST /ccplay/api/play/synced/1

Instructs CCPlay to begin playout out a specified file loaded on its disk, with synchronization to its current input time code source.

A JSON should be posted with the request containing some or all of the following additional parameters:

“filename”: the name of the file on the box to begin playing

“service”: the service number – language 1 or 2 – can also be specified in URI

“tcShift”: an offset to be optionally applied between the input timecodes and the CC file timecodes

“tcShiftDir” : “+” or “-“

POST /ccplay/api/play/now/1

Similar options to the “synced” playout. This command will automatically shift the timecodes in the specified CC file so that caption playout begins immediately on receipt of the command.

POST /ccplay/api/play/stop/1

Stop current file playing on Service 1.