Using EEG Encoders for Captioning in 4K

With the demand for 4K video emerging, closed captioning is at the forefront of establishing compliant and accessible production standards. The HD49x Series of SDI Encoders allows broadcasters to easily incorporate a 3G-SDI encoder into a 4K workflow when adding closed captioning to their content.

4K video carries four times as much data as 3G video and shows up in one of two formats in the field. One of these consists of a 12 Gbit/sec signal on a single cable; the other consists of four separate 3G signals and is known as "quad-link." This application note provides information about setting up, encoding, and decoding captions in 4K video productions.

Encoding 4K Video

For encoding, EEG Video offers a form of support for a quad-link workflow since caption data only needs to be carried on one of the four signals. Customers can use any of our currently-offered encoders to encode captions into one signal, leaving the other three without any caption data.

4K signals can be transported through SDI, but this process requires four 3 Gbps SDI cables per program. Typically, these are organized into quadrants of the picture, each viewable as an independent 1080P program representing only one corner of the screen (i.e., top-right, top-left, bottom-right, bottom-left).

Compression encoders for 4K signals take in all four SDI quadrants, but only expect closed captions in VANC of one of these signals. This is usually the lower-left but can vary based on manufacturer of the compression encoder, or even be configurable. The quadrant the captions are encoded into is independent of the position of the captions on the final combined image.

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Synchronization

Since EEG encoders introduce 1/4 line of delay (2.5 microseconds), customers may need to also run the other three signals through our encoders to equalize the latency; in this case, the customer will need a second encoder since all EEG encoders have two video channels. However, many downstream devices will have a 4 microsecond sync window, so a second encoder may not be necessary.

Monitoring

The encoded 3G-SDI quad can be monitored with a standard CC decoder. It is important to note that the captioning positioning on the output will reflect the final positioning on a home screen relative to the overall monitor picture, not just the video quad visible from the one SDI signal on which the VANC data is encoded.

Decoding 4K Video

Currently, EEG's solution for decoding captions in 4K video is to use our DE291 VANC Decoder/Monitor to decode one of the four legs of a quad-link signal (the leg containing the closed caption data). This will yield an accurate representation of the closed captions, though it will render the captions on a video background representing only part of the entire 4K picture. As a result, the DE291 decoder should not be used to determine the positioning of the captions with respect to the picture.

In Q1 2021, EEG will release a 12G-SDI decoder, which will allow full closed caption decoding for 4K workflows. Please contact Sales for more information.

Compatible Hardware

HD492, HD491, and HD490 iCap Encoders