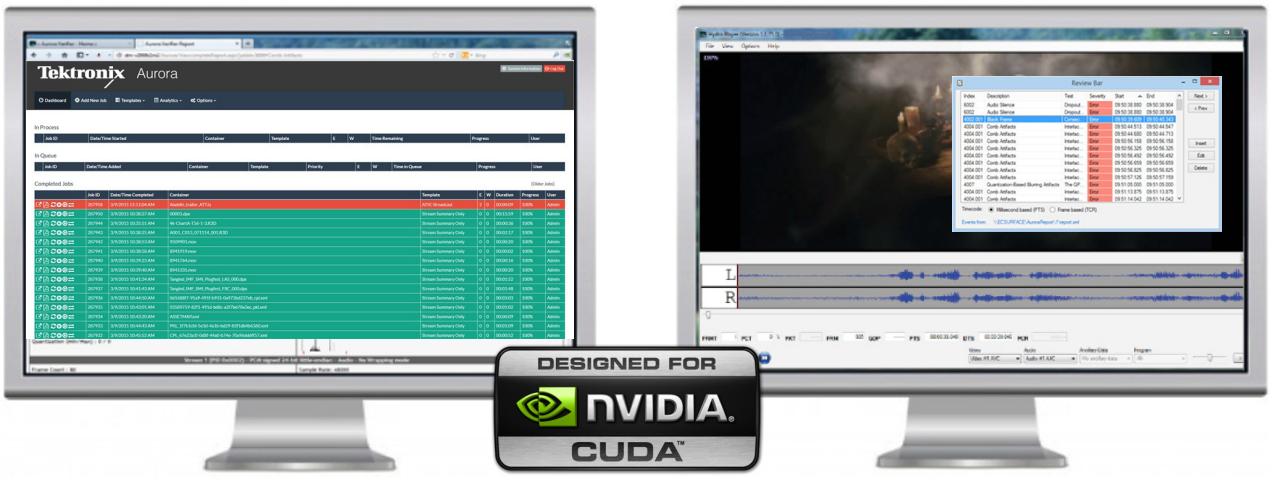
Aurora integration with NVIDIA CUDA GPU



Tektronix utilizes the NVIDIA CUDA GPU to significantly accelerate file-based QC analysis and provide smooth frame accurate playback up to JPEG2000 4K

For production the file-based QC analysis speed should not introduce unacceptable delays in the wider media workflow and the manual review of any reported QC artifacts must include a frame accurate player that can smoothly and reliably playback the media. Unfortunately some more complex QC tests require significant processing, and high bit rate files (like 4K) have historically resulted in slower than real-time testing and playback issues.

Tektronix has met these challenges by utilizing the power of the NVIDIA CUDA GPU. With the ability to process SD files 2x to 5x faster than real-time and HD content at real-time or faster, our GPU accelerated quality testing allows the user to run any combination of tests without fear of slowing down performance. And with the unique, available JPEG 2000 GPU decoder option, HD J2K files can be analyzed 4x faster than the CPU alone, with 4K J2K files running faster than real-time!

Aurora is the first and currently only QC solution that can test and play back IMF, the master format agreed on by major motion picture studios. Aurora has the ability to QC and playback complex CPLs and is uniquely capable of testing 4K at real-time or faster in any other container or codec, including JPEG 2000, DPX, HEVC, and H.264/AVC/AVCI/XAVC, making it suitable for 4K production. .

JPEG2000 4K QC Analysis

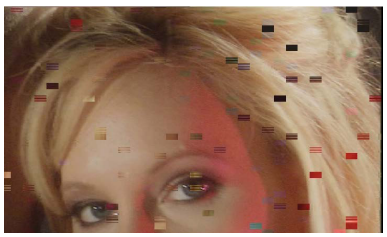
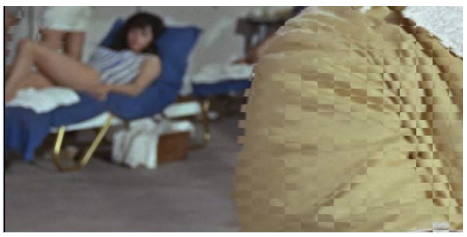
The Tektronix Aurora file-based QC software uses the NVIDIA CUDA to provide for its GPU accelerated JPEG 2000 decoder (licensed from Comprimato), which is capable of maximum HD decoding speeds of 130 fps and 4K decoding speeds of 30 fps. This option is available as a plug-in to Aurora Professional and requires the NVIDIA Quadro K5000 (active cooled), Tesla K10 (passive cooled), K20 (passive cooled), K20c (active cooled), K20X (passive cooled) or K40c (active cooled) or better, 200 processing cores per VU (Tesla models preferred).

JPEG2000 4K Playback

The Tektronix Hydra Player provides frame accurate real time playout with no chunking or delays at 4K using the NVIDIA CUDA GPU. Scrub using keyboard short-cuts or a Shuttle USB controller. Play, pause, fast playback/reverse and frame-by-frame playback are supported. This functionality uses our Advanced Codec Pack plug-in option for Hydra, and any NVIDIA Kepler GPU with at least 1.5GB of memory, including GTX 660/670/680/690, GTX 760/770/780, Titan, Quadro K series and Tesla K series cards.

Aurora integration with NVIDIA CUDA GPU

NVIDIA GPU accelerated QC tests in Aurora


Tape Hit Detection

Aurora can detect tape hits that are introduced by VTR device heads where RF drop-outs occur. Tape hits can evidence in as alternating high/low luma values in scan lines of the block (alternating lines), blocking artifacts which do not align on macro-block boundaries of the current codec (mosaic), or every other pixel in an 8x8 block alternating wildly in the luma domain from its' neighbor (pixel array).This test will execute rather slowly on the CPU, with test speeds slowing down by between 5 time and 20 times. But when Aurora uses the power of the NVIDIA GPU to deliver accelerated performance this test has no noticeable impact to the QC analysis speed.

Subliminal Shot Detection

Aurora can detect subliminal shots. It looks for scene change detection points using frame similarity, and compares the frame count between scene change points to the user input for maximum number of frames to allow between scene changes. Any scenes shorter than the user maximum are declared subliminal or short shots. Without the GPU, slowdowns of QC analysis speed may be noticed between 25% to 50%. With the NVIDIA GPU there should be no noticeable impact on the Aurora QC performance.

Perception-Based Video Artifact Detection

Aurora uses characteristics of known human perception to detect artifacts that occur in the middle of a run of similar frames. Similar to how the human eye and brain work together to determine if video is obstructed without having any reference to the original content, the Perception Based Video Artifact Detection routine uses only the video frames in immediate vicinity to other frames to find visual breakups. This is done by utilizing Structural Similarity Index Matrix (SSIM), which is used with a value of 100 indicating that the frames are perfectly identical and a value of 0 indicating that the frames are perfectly dissimilar. With the NVIDIA GPU this analysis can be performed without noticeable impact on the QC speed.

Contact Us

For complete information and sales contacts, go to www.tektronix.com/file-based-qc.