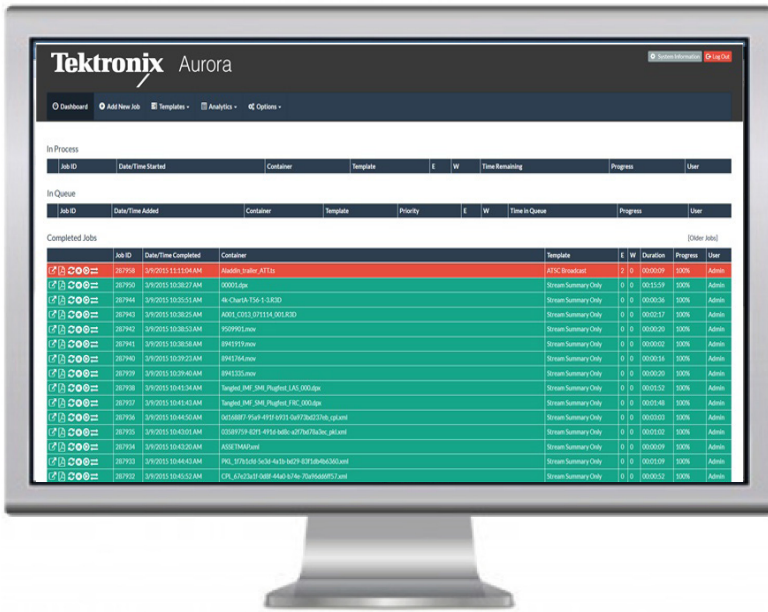# Aurora integration with NEXIO® video servers

Save significant time and money in your broadcast production workflow by identifying, reviewing and taking action on media file quality issues as part of your Nexio® solution

Quality issues in media files can take many forms and have many causes. These may be in the metadata (breaking standards or simply the wrong media being delivered) or in the media (visible to the human eye or audible to the human ear). Identifying such issues early in your production workflow means that you can assess them and possibly decide to take corrective action before expensive and time consuming processes occur later in your operation or non-compliant content is played to air or distributed externally.

Imagine Communications has partnered with Tektronix, the leading supplier of file-based test and measurement solutions, to integrate a suite of products with the Nexio® video server to help you efficiently address this requirement at the initial ingest stage of your production workflow. Build confidence that the files you have on your Nexio® video server meet the quality standards you need to meet.

Aurora brings the fastest and most accurate file-based QC analysis in the market to the Nexio® ingest solution. Hydra brings a frame accurate player for all the files on your Nexio® with Tektration and tools to speed up manual review by up to 8 times. And AutoFix Audio Normalization completes the suite, bringing audio loudness correction to your media files.

Aurora File-based QC Analysis

Adding Aurora to your Nexio® solution enables you to build confidence that the media on your Nexio® video server meets the quality standards needed for the rest of your production workflow. With unrivalled QC analysis speed and accuracy, Aurora has a high degree of correlation to human perception, delivering QC reports with less false positives so you can focus on the issues that really matter.

Hydra Player and Manual Review

Adding Hydra Player to your Nexio® video server enables you to frame accurately playback nearly any file stored on it. Integrate Hydra with Aurora and Nexio® and it provides a manual QC workflow that is up to 8 times faster than traditional linear review.

AutoFix Audio Normalization

Adding AutoFix Audio Normalizaton to your Nexio® video server enables you to ensure that the audio loudness in the files held on the Nexio® meet international loudness standards. With excellent dynamic retention AutoFix has passed "golden ear" assessment in leading broadcasters around the world.

Aurora file-based QC with NEXIO® video servers

Aurora is the file-based QC analysis solution for use with Nexio® video servers. It allocates CPU processing power per verification unit and GPU acceleration to deliver unrivalled QC analysis speed and accuracy of QC artefact detection. By placing Aurora in your workflow you can build trust in the quality of the content in your Nexio®, saving both time and money later in your production workflow.
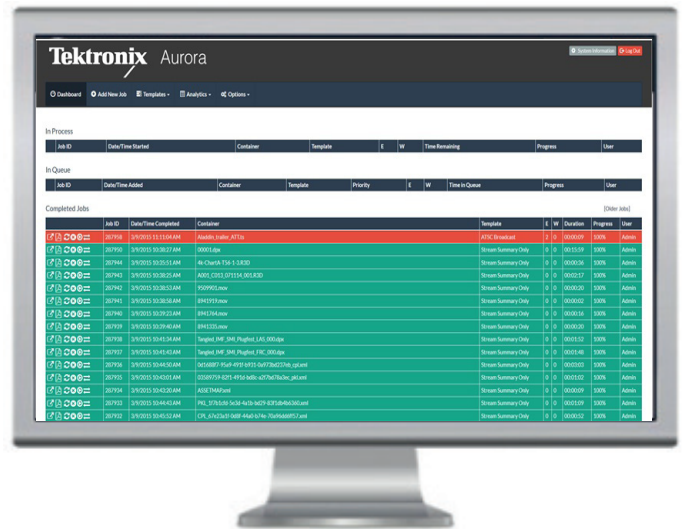
The impact of having media ingested into, or distributed from, your Nexio® video server that doe not meet your or industry quality standards can be significant. Identifying and correcting quality issues later in your production workflow can be expensive and time consuming. By placing a file-based QC analysis tool upstream and/or downstream from your Nexio® you can build confidence and trust in your media, and have a more efficient and cost effective media operation.

Imagine Communications has selected the Aurora file-based QC analysis solution from Tektronix for this purpose as it offers the unrivalled speed and performance, test result accuracy and ease-of use, and systems integration that our Nexio® customers demand.

Aurora is the automated file-based QC tool that you can place in your Nexio® ingest or production workflow and rely on to consistently deliver efficiency benefits. Its focus on minimising false positives and a high degree of correlation to human perception means that the test reports highlight just the issues you need to address, not hundreds of non-issues.

The unique Aurora architecture and advanced use of both CPUs and GPUs ensures that concurrently analyze more types of file (including 4K and ABR) at a faster speed than alternative solutions. And our user interface makes configuration, operation and review easy and practical in production environments.

Product Features

- Unrivalled, scalable speed - faster than real-time testing so there are no bottlenecks in your ingest workflow.

- Minimal False Positives - so your QC reports show just the real issues that you need to review.

- Broad Codec and Wrapper Support - analyze almost any file format that you can place on your Nexio®.

- Comprehensive Test Portfolio - all the video, audio, metadata and distribution constraint tests you need.

- Smart Test Plan Workflow - automatic application of test plans according to file attributes.

- Easy-to-Use QC Reports - quickly understand the issues with well laid out reports available on-line and as PDFs

- Fast Access Help Files - quickly understand each test and result, including recommended actions to resolve issues.

- Email Notification - receive emails with summary data, an HTML link to the QC report and optionally an attached PDF.

- Hydra Player Integration - for a manual process that is up to 8 times faster than traditional linear review.

- Decision Engine - automated file movement and corrective action-taking based on QC test results.

- QC Report Analytics - optional plug-in to identify QC artifact trends and deliver result comparisons.

Hydra Player with NEXIO® video servers

Hydra is the frame accurate file-based player that smoothly and consistently plays out the files on your Nexio® server, with support for more file formats than any other products in its class, tools for video, audio, captions/subtitles/text and metadata visualization. Its tight integration with Aurora delivers a manual QC review process that is up to 8 times faster than traditional linear review.

The ability to preview in full resolution any media file on your Nexio® is a fundamental requirement to your operation. Often this is achieved with the integration of a software solution, such as a MAM or playout system. These systems are relatively complex and expensive, and are not required in some operations. Players in these type of systems are also designed for their specific tasks, do not support all codecs and wrappers, and do not have tools specifically designed to assist in manual review of content.

Imagine Communications has selected the Hydra Player solution from Tektronix to enable you to cost effectively playout any file on your Nexio®. Hydra is the file player that you can rely on to consistently, frame accurately and smoothly playback more file types than any other player in its class.

Hydra allows you to select any program, video essence track, audio essence track or ancillary/text available in the container. Use the audio service map to assign a layout to your mono or AES wrapped audio tracks to ensure that you are hearing the program you desire. Visualize your audio and metadata, and see your caption / subtitles / text on the video, including subtitles side-car support.

Integrated with Aurora QC, Hydra becomes a fully event driven player. Simply click on Aurora QC test report issues and be taken directly to the exact frame, with the ability to jog and shuttle to review the issue. Open the Hydra Review Bar and you can enter your QC decisions and add annotations, all of which is added to the Aurora QC XML Report.

Product Features

- Broad Codec and Wrapper Support - playback almost any file that you can place on your Nexio®.

- Frame Accurate Real-time Playout - smooth playback with scrubbing control from keyboard, UI or shuttle.

- HDMI or SDI Output - full resolution playback on on the PC monitor or optionally use an AJA card for SDI output.

- GPU Acceleration- for smooth playout of higher resolution files and complex wrappers.

- Scaling & View Options - default 100% pixel density, but manual or automatic scaling options available.

- 4K Real-time Playback - smooth playback in full resolution, including support for JPEG200 and IMF.

- Adaptive Bit Rate Playback - playback of ABR filesets, including any of the codecs or text referenced in the playlist.

- Reference File Handling - playback any program, video and essence tracks, or ancillary/text data in the container.

- Aurora QC Integration - with a single click jump to the exact frame of an Aurora reported QC issue instance.

- Review Bar - efficiently jump between reported QC issues, adding annotations and making QC decisions.

- Quality Test Overlays - toggle on/off an overlay that highlights QC artefacts on the video playout.

AutoFix Correction with NEXIO® video servers

AutoFix Audio Normalization is the audio loudness correction tool that you can rely on to ensure that the audio in the files that you have on your Nexio® video server meet international broadcast standards. AutoFix's correction methods result in exceptional dynamic retention that has passed "golden ears" listening tests in major broadcasters worldwide, ensuring files are technically ready for playout while retaining the audio quality.


Broadcasting or distributing content that breaks legal loudness levels can result in direct financial penalties and can upset viewers and customers. Correcting audio loudness later in the production workflow can be time consuming and is often neglected. Better then to test and correct the audio loudness in your Nexio® video server at the ingest stage to ensure compliance with the appropriate regulations.

Imagine Communications has selected the AutoFix Audio Normalization solution from Tektronix for this purpose as it offers a high quality solution to loudness correction at a cost effective price for Nexio® users.

AutoFix Audio Normalization is a tool for the automated correction of audio loudness in your broadcast files. You can rely on AutoFix to deliver the trust you need that your files are compliant and ready for distribution and playout.

The AutoFix Audio Normalizer tool supports a wide range of audio file formats and has exceptional dynamic retention capabilities, having passed audio trials by "golden ears" in leading broadcasts in Japan, UK and USA.

The AutoFix default settings use a multi-band compressor for both first pass compression/reduction and make-up gain correction, only adjusting the audio that is out of range. Additionally, you can choose to correct by clipping or simply adjusting the volume gain.
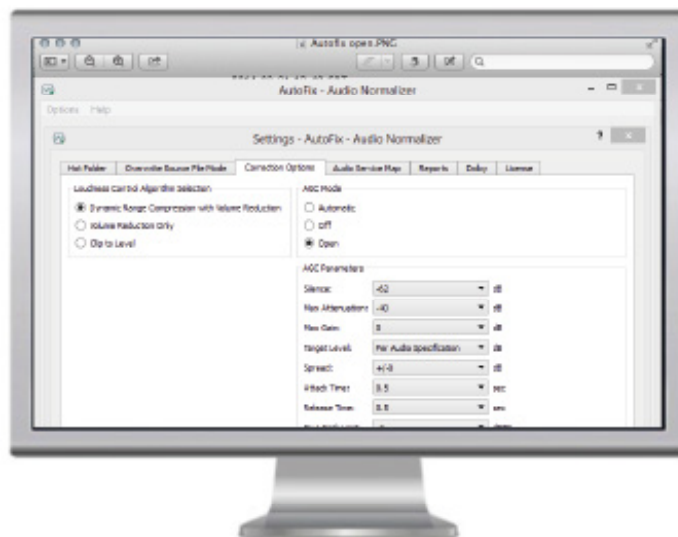
Product Features

- Audio Loudness Measurement - multiple test including maximum level, average loudness and range tests.

- Necessary Correction - identifying the true experience of the human ear and only making needed correction.

- Choice of Correction Method - choose how to normalize from a selection of correction methods.

- Exceptional Dynamic Retention - tested and approved by "golden ears" in leading broadcasters worldwide.

- Automated Correction to Legal Requirements - correction available to R128, ATSC A/85, ARIB TR-B32 and OP59.

- Guaranteed Playout Capability - correction and re-insertion into the original file wrapper.

- Correction Reports - XML reports for web browser viewing or printing, with both measured and corrected values.

- Broad Codec and Wrapper Support - supports the latest fixed bit rate codecs and wrappers.

- Mac or Windows Application - available as a standalone application for both Mac OS and Windows.

- Integration with Aurora - optional one workflow for QC analysis and automated loudness correction.

System Archiecture and Workflow
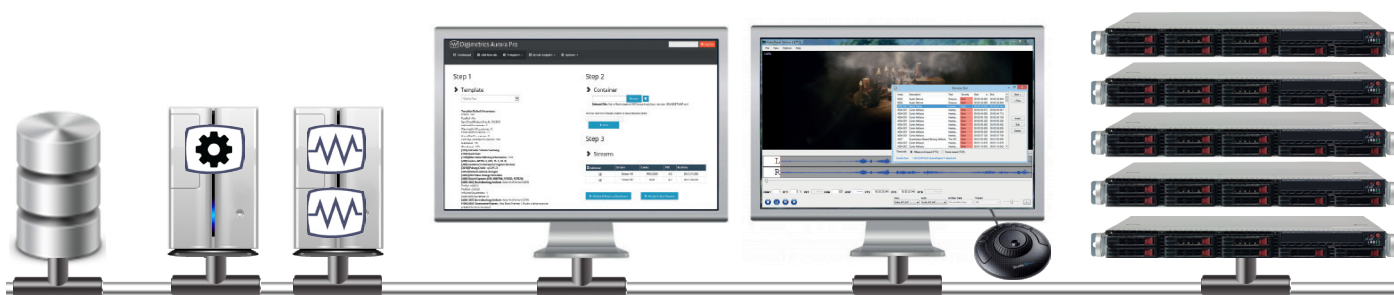
Components

Aurora consists of two key software components - the Aurora Controller and the Aurora Verification Unit (VU). The VU is the QC engine software that performs the analysis. The Aurora Controller is the software than manages allocation and queueing of QC tasks to the VUs. It also manages the access by unlimited platform independent Aurora Client web browsers to the system for test plan configuration, QC task progress monitoring, and QC test report viewing.

Hardware

Aurora VUs are installed on industry standard IT servers that meet the latest Tektronix hardware specifications. Where required this includes an NVIDIA GPU card(s) for higher bit rate files and more complex codecs. The Aurora Controller can be installed on one of the above servers, or a lower spec machine. The Hydra Player instances are installed on industry standard IT workstations to the latest Tektronix hardware specifications. Where required an AJA Corvid or Kona card can be included for SDI output.

System Scaling

The number of VUs installed per server depends on how many CPU cores are to be allocated to each VU. How many VUs and servers required depends on the QC analysis throughput required. Additional VUs and servers can be added at any time to support more concurrent file testing, and the number of CPU cores allocated per VU can be dynamically changed at any time (up to the limit of the server) to increase throughput performance per VU. Additional Aurora Controllers can be added for independently managed QC task queues to different configurations VU sets.

Ingest & Import

SDI is ingested into the Nexio® video server using Imagine Communications or third party software and stored in industry standard file formats. Files to be imported from external sources can either be placed directly on the Nexio® video server for Aurora to directly test, or can be placed on a separate NAS or on the Aurora server for testing prior to placing on the Nexio®. This latter approach enables files that fail QC to be kept off of the Nexio® server.

Automated QC Analysis

Aurora is either manually controlled to apply specific test plans to specific files located externally or on the Nexio® video server, or its Smart Test Plan functionality can be configured to automatically apply the appropriate test plan to each file according to each file's attributes. With the Aurora unique architecture, use of high quantities of dedicated CPU cores per VU, and GPU acceleration, the analysis of the files will be performed at unparalleled speeds, with the results made available in a HTML and PDF Test Report.

Manual Review and Automated Actions

From a workstation on the same network as the Aurora system and with Hydra Player installed, an operator can click on any reported QC artifact instance in the HTML Test Report and Hydra will jump to the exact frame of that instance. The operator can frame accurately scrub back and forth to review the instance. In the Review Bar they can add annotations and make QC decisions, all of which are placed in the QC Report. Aurora can be configured to then automate actions based on these decisions, including using AutoFix to correct loudness.

Tektronix®

Specifications

Specifications and designs are subject to change without notice.

Aurora and Hydra Supported File formats	
Container Wrappers	MXF (All OP, including AMWA defined AS, RDD-9, P2, SxS), Transport Stream, Elementary Stream, Program Stream/VOB, AVI, WMV/ASF, QuickTime/MOV, GXF, MP4, 3GPP, LXF, R3D, DPX, DXW, HLS, DASH, Smooth Streaming, IMF.
Video Codecs	H.264 (AVC/AVC-Intra/MVC 3D), MPEG-2 (including XDCAM, IMX and D-10), ProRes, JPEG 2000, DNxHD (VC-3), Cineform (VC-2), VC-1 (and WMV), DV/DVCPro, Flash VP-6/7, RAW (Huffman, YUV, RGB, Blackmagic), RED, EXR, DPX, Canopus, HEVC.
Audio Codecs	PCM Audio (WAV/AES/BWF), Dolby Digital (AC-3), DD+ (EAC-3), Dolby TrueHD (MLP), Dolby E, AAC, HE-AAC, WMA Standard/Pro, MPEG-2 (L1,2,3), MPEG-1
Captions/Subtitles/Text	Line 21, CEA-608, CEA-708, Timed Text/DFXP, STL, SRT, SCC
AutoFix Audio Normalization Supported File formats	
Audio Codecs	PCM Audio (WAV/AES/BWF), MPEG Audio (CBR-only). Dolby AC-3 (Dolby D), Dolby AC-3+ (Dolby D+) and Dolby E (additional option) codecs.
Audio Wrappers	MXF (OP-Atom, OP1-a, OP1-b), Transport Stream, Program Stream, MP4/MOV, LXF and GXF wrappers.
Hardware Specifications	
Aurora	Please see latest Tektronix specification
Hydra Player	Please see latest Tektronix specification
AutoFix Audio Normalization	Please see latest Tektronix specification
Aurora Tests	
Video Essence Tests	Macroblock Noise, Up-conversion, Comb Artifacts, Field Order Swaps, Tape/Digital Hits, Perceptual & Film Artifacts, Black/Freeze Frames, Letterboxing/Pillarboxing, Color Bars, PSE/Flash Detection (Harding FPA), and Cadence Change.
Audio Essence Tests	Silence, Drop-outs, Peaks (dBTP, PPM, dBFS), Average Levels (R128, ATSC, ARIB), Clipping, Snaps/Clicks/Pops, Test Tones, Phase Swaps and Hiss/Hum. Use Audio Service Map to process AES wrapped tracks or have mono channel audio essence tracks tested together.
Metadata Tests	Container Syntax, Video Essence Syntax, Dolby Audio Syntax, Dolby E Guard Band Alignment, Caption Syntax, Container Essence Contents, Cross-Check Container-Essence, Rude Word Detection in Text, Start Timecode, Timecode Discontinuity, Video Resolution and Run-times.
Distribution Constraint Tests	CableLabs VOD, iTunes, Netflix, DVB, ISDB-T / TB, ATSC, XDCAM / RDD-9, AS-02, DPP / AS-11, DVD and Blu-ray.

Contact Us

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