4K/UHD Demo Room at the SMPTE 2013 Annual Technical Conference & Exhibition

Produced by Insight Media in cooperation with the Society of Motion Picture & Television Engineers (SMPTE)

Objectives of the Demo

The 4K/UHD Demo room has been organized to showcase the growing maturity of 4K/UHD in professional and consumer markets. In addition, it will address some potential challenges in the roll out of 4K while showcasing the value propositions of 4K. The demonstrations include side by side comparisons which drives home the advantages of various technologies.

This demo will feature the largest collection of 4K/UHD displays in one room to date. You will see these demonstrated:

- 1 x Samsung 85” UHD TV
- 3 x Canon 30” professional 4K monitor
- 6 x Seiki 50” UHD TV
- 2 x Sony 55” UHD TV
- 1 x Sony 30” professional 4K monitor

The demos are in four basic categories:

1) Upconversion and scaling of 1080p content. This will demonstrate that quality upscaling and conversion engine can make lower resolution content look exceptional on a 4K/UHD display. It means a huge library of native 4K content is unnecessary to begin enjoying a 4K experience. A special test reel of UHD/24 and 1080/24 frame content has been mastered and will be shown. The 1080p content is upscaled, converted, and displayed on a UHD TV. The native IHD content is displayed on nearby UHD TVs so attendees can judge the quality of the upscaled and converted images.

2) Delivery of 4K native content to homes, commercial and professional sites will require compression. HEVC is being developed to address this need for 4K and promises to allow delivery of 4K content to homes with the bandwidth currently used for HD channels. Experience for yourself how mature this new technology is: You can view split-screen demos showing various HEVC and H.264 encodes to help you see that this technology is nearly ready for 4K.

3) 4K/UHD images with expanded bit depth, wider color gamuts and higher frame rates are all planned to enhance the larger pixel count of 4K. Demos of higher frame 50 and 60p content are on display to give you a glimpse of what UHD TVs with the new HDMI 2.0 connector will enable.
4) 4K acquisition and production is also maturing quickly. Demonstrations of live 4K content are being displayed on professional monitors as well as file-based color grading.

We hope you enjoy this state of the art demonstration.

Chris Chinnock, Insight Media, 203-831-8404, chris@insightmedia.info
Exhibitors

**Cisco**
Cisco will be showing 4K film test clips encoded using our internally developed, standard compliant, HEVC codec. Encoding 3840x2160p24 material to very aggressive distribution bitrates (3-11Mbps) to enable delivery over existing infrastructure to consumers

Cisco, Peter Chave. Business Development Manager Media Solutions, chavep@cisco.com

**Rovi**
Rovi will demonstrate current 4K compression benefits of their MainConcept HEVC SDK v1.1 with an encoding split screen comparison using HEVC/H.265 and AVC/H.264, as well as DivX Ultra HD playback using our DivX 10 consumer software running on a PC workstation

The DivX HEVC content that will be shown was prepared using TotalCode Studio, our professional desktop transcoding solution.

Rovi, Hans Baumgartner, director product management, 858-882-0702, hans.baumgartner@rovicorp.com

**Quantel**
Quantel will be showing File-based Post-Production workflow on Pablo Rio, by soft-mounting the Raw Canon C500 files and performing live de-Bayering, conforming, color grading, effects and finishing. The Pablo Rio software is powered by NVidia Maximus GPU technology and the 3G output to a Canon 4K display will be done via the Aja Corvid device.

Quantel, Danny Peters, Director of Creative Services, 1 201 951 7246, danny.peters@quantel.com
Colorfront
Colorfront will demonstrate the live de-Bayering and processing of Canon C500 RAW data for 4K on-set grading using Colorfront On-Set Live! Colorfront will also show the short movie Fly, shot on Canon C500RAW in 4K@60p and conformed, graded and finished on Colorfront Transkoder.

Colorfront, Aron Jaszerenyi, +36 1 880 3900, aron@colorfront.com

Sony
Sony will demonstrate the power of its upconversion and scaling engine using supplied 1080p test reel content on a 55” UHD TV. This will be compared next to a second 55” UHD TV showing the native UHD content. In addition, Sony will have an F55 4K camera in the room showing live content on its professional 4K monitor.

Sony, Gary Mandle, Sr. Product Manager - Professional Display Group, [1] 650-947-9144, gary.mandle@am.sony.com

Altera Technology - HEVC and 4K Scaling
Highlights of Altera’s industry leading video technologies, including 4K upscaling and H.265/HEVC encoding, are to be showcased in the SMPTE 4K/UHD demo area. The edge-adaptive scaling engine, which runs on the Stratix V FPGA development kit, demonstrates an efficient single-chip solution upconverting HD to UHD video at 24fps (up to 60fps is supported). Altera H.265/HEVC encoding capability will be demonstrated on 4Kp24 streams highlighting impressive video quality and significant bitrate reduction over H.264. Altera’s comprehensive Broadcast portfolio also includes:

- FPGA industry’s first H.265/HEVC hardware co-processing solution. It showcases motion estimation offload that cuts CPU workload by half, using an architecture that’s scalable to 4Kp60.
- Integration of video protocols being considered for 4K enablement – such as DisplayPort, industry’s first 12G SDI demo, and light-weight visually-lossless mezzanine compression – all demonstrated recently at IBC 2013.
- SMPTE 2022-5/6 video transport, which may be combined with compression such as JPEG2000 to enable 4Kp60 streams
• An innovative design methodology that enables time-division multiplexing of video processing resources, resulting in efficient resource sharing and reduced system overhead.
• A portfolio of real-world design examples, such as the 4K-to-HD down scaler.
• The Video and Image Processing IP Suite, which provides all the common building blocks for professional video system designers.

Altera, Raemin Wang, Strategic Marketing Manager, Broadcast BU, 408-544-8852, raemin.wang@altera.com

Altera, Ben Cope, Video IP manager, 44-149 460 2341, bcope@altera.com

Elemental Technologies
At the SMPTE 4K/UHD event, Elemental will demonstrate HEVC video processing at various bitrates with a display resolution of 3840 x 2160. Side-by-side demonstrations of multiple HEVC encodes will be showcased to demonstrate quality advancements, with playback on 4K monitors from Seiki. Highlights include:

• Side-by-side comparison between HEVC and H.264 encoded content, demonstrating improved quality with HEVC at reduced bitrates.
• Side-by-side comparison between HEVC 10-bit video and HEVC 8-bit video, demonstrating the quality advantages available with a 10-bit video processing pipeline.

For the demonstration, Elemental will use file-based content encoded using an Elemental Server video processing system.

Elemental Technologies, +1 503 222 3212, info@elementaltechnologies.com

Samsung
Gary Demos & Joe Kane will present an illustration of the potential of the 2160p UHD-TV format.

ITU-R BT.2020 has introduced two new TV resolutions, 2160p and 4320p, and possibly a new color space. A number of organizations are looking at additions to what has already been specified to make UHD-TV more desirable to an even larger audience. Using the currently available Samsung 85” S9 consumer LCD, full LED backlit display Mr. Demos and Mr. Kane will be illustrating the value of updating parameters beyond resolution to accomplish this. Included will be video distribution at 4:4:4, a greater bit depth, higher dynamic range, and a codec that can do it all.
We’ll also be illustrating how some of the capability of the ACES work flow could be delivered to a larger audience plus show a new higher dynamic range reference rendering transform for ACES.

Samsung, Joe Kane, [1] 818-505-9829, joekane@att.net

**Canon**

Canon USA will exhibit its prototype 4K studio reference monitor that is intended to support mastering and grading of original 4K content. We will also show the EOS C500 camera originating live 4K. The RAW output of the camera will be fed to a Colorfront Express dailies system via a standardized 3G SDI link. This will DeBayer the 4K RAW in real-time and demonstrate on-set capabilities on the Canon 4K studio monitor. Separately, recorded 4K Canon RAW files will be sent to the Quantel Pablo Rio color grading system. The graded output of the Pablo will be shown on a second Canon 4K studio reference monitor.

1080P HD that was originated by the C500 camera as 444RGB @ 12-bit (with no compression or debayering processes) will be shown on the Dolby PRM-4200 studio reference monitor. This very high quality source is converted to the HD inputs specified by the 4K receivers being exhibited – to show the performance of the internal up conversions to 4K within these receivers when fed high quality HD source material. The same 1080P source material will be shown upconverted within the Canon 4K studio monitor.

Canon, Larry Thorpe, lthorpe@cusa.canon.com

**AV Sponsors**

**AJA**

AJA continues its innovative leadership position as 4K moves into the mainstream. As an AV sponsor for the UHD/4K demonstration AJA is providing conversion equipment including Hi5-4K, AJA-3GDA, and AJA Hi5-3G. Additionally AJA's Corvid Ultra technology is the underlying hardware for both Quantel's Pablo Rio and Colorfront's demonstration.

AJA Video Systems Inc, Jeffrey Way, Territory Manager, Western Region and Education, 530-271-3335, Jeffw@aja.com
**Video Clarity**

Video Clarity is providing several systems to source 4K content for the event. The ClearView Extreme 4K A/V Analyzer is providing a side by side comparison for two independent 4K sequences on the same display. These two sequences are then able to be viewed at any frame rate independent of their format and with several viewing modes to compare quality between sequences.

The ClearView Player 4K systems being used can record or play from a 4x3G-HDSDI connection up to 4K/60 fps. These systems also allow the user to import from any file format or ingest from IP stream for subsequent file playback. All systems being used can be set in a playlist to accurately play video-audio sequences back to back or in a repeated loop.

Video Clarity, Adam Schadle, Vice President, 408-379-6952, adams@videoclarity.com

**New Media Hollywood**

New Media Hollywood is providing the network of cables, connectors and hardware needed to deliver the 4K and HD signals to the HEVC and Up Converting stations being demonstrated by Rovi, Elemental, Altera, Samsung, Colorfront, Cisco and Quantel. New Media Hollywood is a key part of the 4K integration team which includes Video Clarity, Thinklogical and AJA.

New Media Hollywood: Colette Scott, colette.scott@nmh.com and Chris Speer, chris@nmh.com, (323) 957-5000

**SpectraCal**

SpectraCal, the industry's trusted source for display measurement, is providing hard data on the display characteristics of displays in the demo area, with particular focus on how closely the displays can match the relevant standards.

For selected displays in the demo area, SpectraCal has provided a report on the display performance. SpectraCal’s display measurement solutions available in the demo area for visitors who would like to make their own measurements. Provided tools include:

- CalMAN ColorChecker display QA software
- CalMAN Studio monitor profiling software
- SpectraCal C6 colorimeters
- VideoForge reference test pattern generators

SpectraCal personnel are on hand to discuss results.

SpectraCal, L.A. Heberlein, +1 206 375 6059

**LumaForge**
LumaForge in conjunction with its strategic partners SEIKI Digital and Ultra265 are providing calibrated 50 inch UHDTVs and 3840x2160 content that is designed to showcase the high quality and fine detail of 4K imagery.

The footage used was all shot on the RED EPIC camera in 5K and downressed to 3840x2160 to maintain the maximum level of detail and clarity. The SEIKI UHDTVs are accurately calibrated to the Rec. 709 color space to reflect the importance of the relationship between accurate colorimetry and resolution in facilitating the viewer’s appreciation of 4K content. Content can be streamed directly from a standard Mac Pro or from an IPTV device like the Nuvola NP-1.

LumaForge has been working with 4K imagery since 2006 and has developed a cost-effective data and color pipeline based around products from Apple Corp, Blackmagic Design, SEIKI Digital, MAGMA and high-speed 4K storage from Areca CineRAID.

LumaForge, Neil Smith, 323-850-3550, [www.lumaforge.com](http://www.lumaforge.com)

**Content Sponsors**

**Canon**
Canon, working with FotoKem, provided a UHD/24 clip called Rhythm of Life. It was shot using the canon C500 camera at 4K/23.98 fps. Fotokem did the finishing of the piece.

Canon, Larry Thorpe, lthorpe@cusa.canon.com

FotoKem, Jose Parra, producer, 818.846.3102 ext. 218, jparra@fotokem.com
**Kamerawerk**
Our 4K/60 content is a mix of a music video and short film shot on the Sony F65 with additional high speed sequences shot on FOR-A’s FT-One camera at up to 860fps in 4K. It was produced as a joint effort between Kamerawerk and many industry partners including the EBU.

Kamerawerk, Nicolas Henri Sieber, regie@kamerawerk.ch

**Technicolor**
Technicolor aggregated all of the UHD 24 frame content from the various sources, selected clips and mastered two test reels:

1) UHD, 24 frame, rec. 709, 10-bit, 4:2:2
2) 1080p, 24 frame, rec. 709, 10-bit, 4:2:2

Technicolor, Michael Zink, 818-384-3534, michael.zink@technicolor.com

**4K Film Festival**
4K film festival provided several clips that were integrated into the UHD and 1080p test reels.

4K Film Festival, Tom Funk, [1] (818) 284-3589, tom@4kff.com

**Sony**
Sony provided some test images for the demo reel in 4K resolution.

Sony, Gary Mandle, Sr. Product Manager - Professional Display Group, [1] 650-947-9144, gary.mandle@am.sony.com

**Digital Cinema Society**
The footage featuring Los Angeles area Metal Sculptor and Artist Bruce Gray was done as a demo of RED Epic 5K acquisition using the Angenieux 19.5-94mm Optimo
zoom lens. The project was produced, directed, and photographed by Cinematographer James Mathers in cooperation with the nonprofit educational cooperative he runs, the Digital Cinema Society.

DCS, having recently celebrated ten years of service, was created to help Entertainment Industry professionals keep up with the ever increasing pace of new technologies. The Society strives to objectively examine all media, solutions, services, and technology without favoring any one brand, service, or format over another.

Membership benefits include a monthly eNewsletter, admission to regularly scheduled educational presentations, and access to the members’ site with streaming coverage of past events, and news of the latest developments in the field of Digital Cinema. More details can be found for Bruce Gray: www.BruceGray.com