

PRESS RELEASE

PRESS RELEASEApril 10, 2015 || Page 1 | 4

Jünger Audio MPEG-H Audio Monitoring and Authoring Unit Powers World's First Live Broadcast Demonstration of Interactive and Immersive TV Audio

New prototype product extends current consoles for MPEG-H sound, provides operational monitoring and authoring

Las Vegas, Nevada, USA, April 10, 2015 – NAB, South Upper Hall, SU3714: The MPEG-H Audio Alliance will present their world's first live broadcast demonstration of interactive and immersive next-generation TV audio system based on MPEG-H Audio at the Fraunhofer NAB booth, SU 3714. The demonstration will be a complete simulation of a live broadcast, including mixing the audio live in a remote truck, combining with recorded programming from video servers at the network, distribution to affiliate stations, insertion of local commercials, and emission to viewer's living rooms.

Key to this demonstration will be a new class of equipment – an Audio Monitoring and Authoring Unit – that extends today's infrastructure for producing immersive and interactive MPEG-H Audio for TV. Fraunhofer has partnered with Jünger Audio to bring the first prototypes of a monitoring and authoring product to the NAB show.

The Jünger Audio MPEG-H Audio Monitoring and Authoring Unit used in the demonstration will allow all MPEG-H Audio modes and configurations to be monitored, including simulation of the operation of consumer receivers for interactive elements. Loudness of each presentation or preset mix in an interactive program will be displayed on the unit's remote control panel and web interface.

The unit also includes the tools needed to mix and author content in immersive sound, to add audio objects for interactivity, and to pan dynamic audio objects. Existing 5.1 surround audio consoles can be upgraded by connection to the Jünger Audio Unit, as will be shown in the demonstration.

Head of Corporate Communications

Thoralf Dietz | Phone +49 9131 776-1630 | thoralf.dietz@iis.fraunhofer.de | Fraunhofer Institute for Integrated Circuits IIS | Am Wolfsmantel 33 | 91058 Erlangen, Germany | www.iis.fraunhofer.de |

Head of Marketing Communications Audio & Multimedia

Matthias Rose | Phone +49 9131 776-6175 | matthias.rose@iis.fraunhofer.de | Fraunhofer Institute for Integrated Circuits IIS | www.iis.fraunhofer.de

US Contact

Jan Nordmann | Phone +1 408 573 9900 | Cell +1 408 390 6698 | press@dmf.fraunhofer.org | Fraunhofer USA, Inc. | Digital Media Technologies* | 100 Century Center Court | Suite 504 | San José, California 95112 | www.dmf.fraunhofer.org

FRAUNHOFER INSTITUTE FOR INTEGRATED CIRCUITS IIS

The MPEG-H Audio Alliance's new TV audio system will bring three primary new features to television broadcasts:

- Interactivity to enable consumers to choose different audio presentations, such as a home team or away team commentary at a sports event, or to turn up or down particular audio elements in a program – such as dialogue or sound effects – as they prefer.
- Immersive sound to improve the realism of the sound by adding height channels, using MPEG-H Audio's Higher-Order Ambisonics mode, or statically panned objects above the listener.
- Multi-platform Adaption. Unlike today's TV sound, the MPEG-H Audio system will tailor playback so it sounds best on a range of devices and environments – from quiet home theaters with speakers to the subway or airport with earbuds.

All of these features will be under the control of the broadcaster or content distributor, providing new creative opportunities, such as the ability to efficiently add additional languages, player, or official microphones, or, as the Alliance has demonstrated, car to pit crew radios at races.

Monitoring MPEG-H Audio:

MPEG-H Audio signals in production and contribution are intended to be embedded in standard HD-SDI video signals or MADI audio signals as uncompressed PCM audio. As such, MPEG-H Audio broadcasts can be confidently monitored using the standard HD-SDI monitor panels broadcasters use today, and production can be done using today's 5.1 consoles and monitors.

To completely monitor broadcasts using the advanced features of MPEG-H Audio, several additional functions must be provided:

- Audio objects must be rendered to the speaker configuration being used and combined with the main program bed.
- The speaker configuration may include height channels for immersive sound, so a monitor controller for up to 12 speakers must be provided.
- Loudness metering for programs with immersive sound or audio objects must be provided.
- Audio presentation presets sent to consumer receivers must be checked for proper authoring, content, and mixing.

PRESS RELEASEApril 10, 2015 || Page 2 | 4

FRAUNHOFER INSTITUTE FOR INTEGRATED CIRCUITS IIS

- Monitoring of downmixes that duplicate those in consumer receivers must be possible.
- Monitoring of Dynamic Range Profiles must be provided.
- Content in the Higher-Order Ambisonics mode of MPEG-H Audio must be rendered to the speaker configuration being used.

PRESS RELEASEApril 10, 2015 || Page 3 | 4

The Jünger Audio MPEG-H Audio Monitoring and Authoring Unit provides all these functions.

Authoring MPEG-H Audio:

To produce advanced MPEG-H Audio broadcasts, the following tools will be needed to create the additional elements:

- Static audio objects must have their position and default levels specified, and names assigned for those objects exposed to the consumer.
- Additionally, dynamic audio objects must be able to be panned during live or post-produced broadcasts.
- Audio object groups and presentations must be named and specified.
- Dynamic range profile settings, downmix gains, and the target loudness level of the program specified, if desired by the broadcaster.

For broadcasts using dynamic objects, the Jünger Audio MPEG-H Audio Monitoring and Authoring Unit will create a MPEG-H Audio control track containing the panning data that may be carried with the audio signals over embedded HD-SDI or MADI. The Audio Monitoring and Authoring Unit will also encode the other static metadata above in the control track, so that all the information needed to prepare a show can be entered directly in the unit.

The control track is only needed to take advantage of MPEG-H Audio's dynamic audio objects or for agile loudness control or channel assignment. Broadcasters may continue to use a fixed loudness level and channel assignment as they do today without the need for control track information. In this case, configuration information may be entered in the MPEG-H Audio encoder.

The demonstration will feature three static audio objects for commentary, to allow the viewer to switch between the network commentary, venue PA commentary, and a foreign language commentary. Sound effects from the event will be panned using MPEG-H's Audio dynamic audio objects.

FRAUNHOFER INSTITUTE FOR INTEGRATED CIRCUITS IIS

Qualcomm Technologies, Inc. is also demonstrating an end-to-end live simulated broadcast of MPEG-H immersive, scene-based audio, showing every stage of HOA production from live capture, through transport through a TV plant (NoC to affiliate), through an emission encoder (MPEG-H) to consumers devices with various speaker configurations. See this demo at South Upper Hall, room S201LMR.

PRESS RELEASEApril 10, 2015 || Page 4 | 4

For more information about the MPEG-H Audio Alliance demonstration at NAB, please visit the Fraunhofer booth SU3714 at NAB or browse www.mpeghaa.com/nab2015.

About Fraunhofer

When it comes to innovative audio technologies for the rapidly evolving media world, Fraunhofer IIS stands alone. For more than 25 years, digital audio technology has been the principal focus of the Audio and Multimedia division of the Fraunhofer Institute for Integrated Circuits IIS. From the creation of mp3 and the co-development of the AAC to the future of audio entertainment for broadcast, Fraunhofer IIS brings innovations in sound to reality.

Today, technologies such as Fraunhofer Cingo for virtual surround sound, Fraunhofer Symphoria for automotive 3D audio, AAC-ELD for telephone calls with CD-like audio quality, and Dialogue Enhancement that allows television viewers to adjust dialogue volume to suit their personal preferences are among the division's most compelling new developments.

Fraunhofer IIS technologies enable more than 8 billion devices worldwide. The audio codec software and application-specific customizations are licensed to more than 1,000 companies. The division's mp3 and AAC audio codecs are now ubiquitous in mobile multimedia systems.

Fraunhofer IIS is based in Erlangen, Germany and is a division of Fraunhofer-Gesellschaft. With nearly 24,000 employees worldwide, Fraunhofer-Gesellschaft is comprised of 66 institutes and research units making it Europe's largest application-oriented research organization.

For more information, contact Matthias Rose, matthias.rose@iis.fraunhofer.de, or visit www.iis.fraunhofer.de/amm.