

**MEETING NOTICE!**

**AUDIO ENGINEERING SOCIETY, INC.**  
SAN FRANCISCO SECTION  
60 EAST 42ND STREET, ROOM 2520  
NEW YORK, NY 10165-2520  
ADDRESS CORRECTION REQUESTED



## AUDIO ENGINEERING SOCIETY, INC. SAN FRANCISCO SECTION

APRIL 1998

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### In Memoriam, Leo de Gar Kulka

It is with deep sadness that we announce the passing of Leo de Gar Kulka. Leo served many with the local section as well as with the national committee.



### Chip makers seek help for MPEG-2 Advanced Audio Coding

With the Japanese government's endorsement last month of the newly standardized MPEG-2 Advanced Audio Coding (AAC) as the audio coding algorithm for digital TV in Japan, IC vendors are beating the bushes for information on AAC and are seeking partners who will give them access to AAC intellectual property. To date, no one has launched a chip capable of processing AAC, and there is no one-stop shop for licensing the IP.

Now an ISO standard, MPEG-2 AAC is a perceptual audio-coding algorithm that is not backward-compatible with MPEG-1 or MPEG-2 audio. It provides high-quality sound at a rate of 64 kbits/second per channel for multichannel operation. AAC applications are not limited to the satellite-based Japanese digital-TV service slated for roll out in 2000; they extend to such new services as

delivery of downloadable CD-quality music over the Internet, satellite or cable. AT&T, for instance, has begun a trial service called "a2b music" over the Internet in collaboration with record companies. Some in the industry even speculate that MPEG-2 AAC may become an integral element for CD-recordable systems, or an additional DVD audio feature when DVD becomes recordable.

IC vendors are examining various digital-audio algorithms. Besides linear pulse-code modulation (PCM), MPEG-1 and 2 and Dolby Digital--the mainstays of today's DVD players--at least a half a dozen more have been proposed for DVD, home-theater and Internet-audio applications, some by such heavyweights as Bell Labs, Sony and Philips. For chip vendors seeking design wins in DVD systems 18 months from now, the worst-case scenario is a chip that's expected to support not only Dolby Digital, Linear PCM and MPEG-1 and 2, but also AAC and any (or all) of the other audio options. The challenge is to guess which audio-coding algorithms are worth supporting, at what cost and under what kind of silicon architecture. The MPEG Committee's Audio Subgroup reported just last month that MPEG-2 AAC, tested under the stringent requirements of the ITU-R test methodology, "demonstrated full broadcast-quality audio at 128 kbits/s for stereo, approximately half the bit rate of that needed by the earlier MPEG-1 Layer II codec." The Layer II audio codec is currently used in U.S. and European digital-satellite TV services.

If AAC is still a ways off, a more pressing matter for most chip vendors today is how to respond to Japanese consumer-electronics manufacturers' new demand that they integrate a DTS Digital Surround stream output feature into a DVD chip set. Developed by Digital Theater Systems Inc. (Westlake Village, Calif.), DTS Digital Surround is an encode/decode system that delivers 5.1 channels of master-quality, 20-bit audio. It is derived from the surround-sound technologies the company developed for motion pictures and movie theaters. The DVD standard does not mandate DTS. But as Hollywood studios have released more DVD movie titles featuring DTS Digital Surround, "consumers' awareness has been going up," said Darren Neuman, director of DVD engineering for LSI Logic Corp. (Milpitas, Calif.). Although DVD players may not have a built-in DTS-decoding capability, manufacturers expect to give them at least an ability to output a DTS bit stream, with decoding in a separate audio/video receiver.



# APRIL MEETING



**Subject:** AAC, The New Standard in High Quality Audio Coding  
**Speaker:** Dr. Earl Levine, Scott Levine, Liquid Audio  
**Place:** Liquid Audio, Inc. 810 Winslow, Redwood City, CA  
**Time and Date:** April 21, 7:30 PM (refreshments at 7:00 PM)

AAC was standardized as the non-backward compatible version of MPEG-2 in April 1997. It is also currently being used as the foundation for high quality coding in MPEG-4. AAC is the first codec that has been able to achieve perceptually lossless quality according to EBU standards. As such, this codec will significantly impact many aspects of the audio industry. This talk will explain how this codec achieves such incredible performance and also expose attendees to comparisons of this performance to existing standards such as AC-3 and MPEG-2. A brief overview of perceptual audio transform coding will be presented first. After this background, we will then describe the features and functions of AAC (Advanced Audio Compression). There are several new features that enable it to have 'perceptually lossless' quality at bit rates lower than any other audio codec's today. These features include a high-resolution filter bank, time & frequency prediction techniques, and improved Huffman coding of MDCT coefficients.

Scott Levine is currently consulting for Liquid Audio as well as completing his Ph.D. program in electrical engineering at Stanford University/CCRMA. His thesis presents new audio representations for low bit rate data compression that also allows compressed-domain effects (such as time-scale modification and pitch-shifting). Previous to Liquid Audio, he has worked on audio projects with Texas Instruments, the Joint E-mu/Creative Technology Center, and Dolby Laboratories. Scott received his B.S. in electrical engineering from Columbia University in 1993, and his M.S. in electrical engineering from Stanford University in 1995.

Earl Levine works at Liquid Audio developing DSP technologies to enable sale of music over the internet. In 1997 he worked at Vxtreme on streaming video and audio over the internet. He graduated with a Ph.D. in Electrical Engineering from Stanford University in 1996, doing a dissertation on a new method for vector quantization with state-feedback. Prior to that he completed the MSEE at Stanford in 1992 and BSEE in 1989 at The University of Texas.

### Directions

**From The North:** Take U.S. 101 to the Whipple Avenue exit. Make right at first light (Whipple) Continue West on Whipple. Turn left on Winslow (1st light) Continue on Winslow for 4-5 blocks until you reach Broadway. Liquid Audio is on the corner of Winslow and Broadway Continue past Broadway, Liquid Audio is on the right. Park in the first lot on the left.

**From The South:** Take U.S 101 to the Whipple Avenue exit. Make left at light (Whipple) Continue West on Whipple. Turn left on Winslow (2nd light) Continue on Winslow for 4-5 blocks until you reach Broadway. Liquid Audio is on the corner of Winslow and Broadway Continue past Broadway, Liquid Audio is on the right. Park in the first lot on the left.

# COMING EVENTS

April 6 - 10  
 NAB  
 Las Vegas, NV

April 20 - 23  
 Comdex  
 Chicago, IL

April 27 - 29  
 NSCA  
 Las Vegas, NV

April 28 - 30  
 IT Forum  
 San Francisco, CA

## JOB BOARD

ELECTRONIC DESIGN ENGINEERS  
 Job Code #EDEAES398

Euphonix, Inc. is a manufacturer of digitally controlled mixing consoles and audio signal processing equipment, based in Palo Alto, California.

We are looking for creative, self-motivated electronic engineers to work on new product designs. Will be responsible for original hardware topology and design, simulation, prototyping, schematic entry - possibly some software. Must have a rudimentary knowledge of PCB layout techniques. Experience: (3+ years experience) Background in the design & development of complex mixed signal PCBs, using Orcad or equivalent. Design of digital control circuitry, embedded microprocessor hardware and firmware essential, experience with FPGAs, PCs, analog & audio circuits very desirable. Digital Audio & DSP familiarity also an asset. Must be good team worker. Education: BSEE or equivalent required.

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## SAN FRANCISCO SECTION

**CHAIRPERSON** BOB MEGANTZ  
 408-257-8330  
 TACTEC@COMPUSERVE.COM

**VICE CHAIRPERSON** TED TANNER JR.  
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### AUDIO ENGINEERING SOCIETY, INC.

**INTERNATIONAL HEADQUARTERS**  
 60 EAST 42ND STREET, ROOM 2520  
 NEW YORK, NY 10165-2520  
 TEL. 212-661-8528  
 FAX 212-682-0477  
 HTTP://WWW.AES.ORG

**SAN FRANCISCO SECTION**  
 3429 MORNINGSIDE DRIVE  
 EL SOBRANTE, CA 94803  
 TEL. 510-222-4276  
 FAX 510-232-3837  
 HTTP://REALITY.SGI.COM/CSP/AESSF