

Technical Committee Reports

MINUTES OF THE MEETING OF THE DIGITAL AUDIO TECHNICAL COMMITTEE

Date: 1983 March 13

Time: 1900 hours

Place: Van Dijck and Van Gogh Rooms, Hotel Co-cagne, Eindhoven, The Netherlands

Present: G. Alexandrovich (Stanton Magnetics), W. Aubert (RTBF), D. Bennett (CBC), B. Blüthgen (Polygram), D. Browning (EMI Music) representing R. Blinn, T. Doi (Sony), R. Finger (CBS), H. Ford (Consultant), P. Gaswell (BBC), T. Griffiths (Decca), R. Hankinson (Decca), D. Haynes (Ampex), A. Heaslett (Ampex), M. Jones (Neve), M. Kano (Sony), H. Kitagawa (Matsushita), H. Kobari (JVC), T. Kogure (Matsushita), R. Lagadec (Studer), B. Locanthi (PNA), L. Martin (Telefunken), T. Mori (JVC), J. Nunn (BBC), B. Pisha (Audio Elec. Lab.), L. Schmidt (Polygram), W. Shelton (BBC), T. Stockham (Soundstream), K. Tanaka (Mitsubishi), H. Tendeloo (Polygram), E. Torick (CBS), A. Weisser (TDF/EBU).

1 The chairman presented the names of the proposed Executive Committee of the AES Digital Audio Technical Committee and asked for comments. Since there were no proposed additions or deletions the list constitutes the Executive Committee membership as follows:

G. Billia (EBU), B. Blesser (Consultant), R. Blinn (Capitol Records), B. Blüthgen (Polygram), K. Davies (SMPTE/CBC), T. Doi (Sony), M. Fujimoto (JVC), J. Gibson (SMPTE), T. Griffiths (Decca), A. Heaslett (Ampex), L. Iwashita (PEC), T. Kogure (Matsushita), T. Kohler (N. A. Philips), M. Kosaka (Matsushita), R. Lagadec (Studer), B. Locanthi (PNA), A. MacPherson (Warner Records), J. G. McKnight (MRL), Dr. Mizoguchi (NHK), Y. Sohma (Totsu), K. Tanaka (Mitsubishi), E. Torick (CBS), T. Stockham (Soundstream), M. Strong (SMPTE), A. Weisser (TDF/EBU), T. Yamamoto (Pioneer), R. Youngquist (3M Co.).

2 Emil Torick reported that his working group on recommended sampling frequencies had completed its assignment and presented the finished document to the parent committee for approval and subsequent publication in the *AES Journal*. He then made a motion for the Executive Committee to take a vote on his proposal. The motion was seconded by Mr. Heaslett and the vote

was unanimous approval.

Dr. Stockham noted that while the AES had given serious consideration to sampling frequency studies and had proposed recommended sampling frequencies, a company in the USA was using a sampling frequency of 44.056 kHz for digital audio associated with video in satellite broadcasting. The chairman noted that the committee could only advise, not police, and stated that a copy of the committee's recommendations would be sent to that company. Any organization can choose their sampling frequencies and inherit any difficulties which may result from that choice.

Mr. Torick made a motion to add a footnote to paragraph 4.1 of his approved document as recommended by Mr. Gibson to assure synchronization with video. This was discussed and approved by the committee. Mr. Torick was then requested to send the recommendation to the chairman for submission to those executive committee members who were not present at the meeting for their comments and approval.

Mr. Weisser indicated that he would like to abstain from voting pending his discussion with the EBU of the proposed footnote.

3 Alastair Heaslett reported on the meeting of the input-output working group held in Eindhoven on March 13 at 0900 hours. The minutes of the previous meeting in Anaheim, California, had been approved. A report was submitted from Roger Lagadec, whose sub-working group, consisting of Toshi Doi, Kuminaro Tanaka, Alain Weisser, and Bob Youngquist, was charged with producing an AES digital I/O document.

It is hoped that differences between Dr. Tanaka and Dr. Doi, on the one hand, and the remainder of the sub-group on the other, have been resolved at the Eindhoven meeting. The principal reason for the lack of a consensus was that the test cable used by Dr. Tanaka was 200 meters in length, while the maximum length cable previously settled on by the working group was 150 meters. The original reason for selecting 150 meters as a maximum was based on experience as representing a practical limit without equalization; therefore, one should have expected some difficulties to arise at 200 meters length. Dr. Lagadec presented the digital I/O document to the working group with a majority vote since a consensus was not possible. After further discussion, Mr. Heaslett called for an informal vote of his working group and the document presented by Dr. Lagadec as an I/O interface document was accepted.

Further discussion took place concerning the carriage

of time information in the serial interface. It was clear to all that there were enough channel status data bits reserved for time information in the data blocks to present time data in any form imaginable. The principal difficulty was in arriving at a preferred form of the time information.

It was agreed that a new sub-working group, chaired by John Nunn of the BBC, would be formed and charged with producing a coherent and cogent statement as to the manner and form in which the 48 bits of data in the channel status block should be used to represent time-of-day or timing information. The mandate to this group included the reconciliation of the needs of NTSC and PAL video standards and that this code would be used at 44.1 and 32 kHz. Other members of this group, volunteers and appointees, are Ken Davies of CBC, Lothar Maerten of AEG Telefunken, Björn Blüthgen of Polygram, and Roger Lagadec as *amicus curiae*.

John Nunn of the BBC brought up the topic of system synchronization. The chairman agreed to make this an agenda item for the next meeting. Mr. Shelton of the BBC offered to distribute to members of the committee a document prepared by the BBC concerning their research on system synchronization. The chairman welcomed the offer.

A short discussion arose on the agenda item of connector labeling, during which it was resolved that the I/O interface document should include a statement that, wherever an ambiguity might exist as to the nature of the connector, the panel adjacent to the connectors be marked DI, DO, AI, and AO, to designate digital input, digital output, analog input, and analog output ports, respectively.

The chairman agreed to take into account the opinions and information received to date, and the I/O document submitted by Dr. Lagadec's sub-group, to prepare a new document incorporating all the proposed changes, and have it submitted to the members before the next meeting which is tentatively set for 1983 October 7 at the New York Hilton.

Mr. Heaslett was reminded by the chairman that he promised to have an information document prepared for AES publication by the next meeting to assist those in the field waiting for standards. Mr. Heaslett agreed that such matters as the audio data format and the time-of-day format information should be released to the parent committee for submission to the AES for publication as an I/O interface information document as soon as possible.

4 Roger Lagadec reported that his working group on digital audio measurement techniques began at 1400 hours on Sunday, March 13. Björn Blüthgen attended the meeting in a dual role: as a working group member, and as a representative of IEC SC29B Working Group 16. Mr. Blüthgen presented documents from Japan concerning recommended measurements on consumer digital audio equipment using the EIAJ format, and information concerning test records for measuring the performance of CD players from Sony and Philips. It

was understood that relevant information would flow in both directions between the AES and IEC technical committees.

The initial tasks for the working group were reduced to try to make the work more tractable: 1) the conversion from a digital audio signal to an analog audio signal, including possible digital pre-processing, digital-to-analog converters, and analog post-processing and filtering; 2) conversion of an analog audio signal to a digital audio signal, including analog filtering and sampling, analog-to-digital converters, and possible digital post-processing. Future references by Dr. Lagadec to analog-to-digital conversion or digital-to-analog conversion would refer to all of the items listed under 1) and 2) above, respectively.

A decision was then made to set up several sub-working groups to work in parallel. A list of possible sub-group activities was then prepared.

After much discussion within the group, five working parties were formed:

- 1) Measurement techniques in the area of large signal behavior in A/D and D/A conversion.
- 2) Measurement techniques in the area of small signal behavior in A/D and D/A conversion.
- 3) Measurement techniques for intermodulation effects in A/D and D/A converters.
- 4) Measurement of the phase behavior of A/D and D/A converters.
- 5) Measurement techniques for determining channel-to-channel coherence.

The understanding is that the measurement techniques in 1 through 5 would be primarily those of a technical nature, resulting in a definition of terms, a description of parameters to be measured, and a description of the recommended measurement methods. Then, after a consensus has been reached within the working group on the first five tasks, work would begin on the audibility effects, subjective tests, and the issues of correlation between the recommended technical measurements and subjective sound quality.

IRT, Polygram, and Philips promised to supply members to the first working party. Mr. Schneider of Studer was appointed chairman of this sub-group.

For the second working party, Neil Gilchrist of the BBC was suggested as the chairman.

Included in sub-group number three, on intermodulation effects, would be Thomas G. Stockham Jr., Bart Locanthi, and Matti Ojala, with David Hanes of Ampex as the chairman.

AEG Telefunken, Philips, and Ampex agreed to supply members to working party number four. Martin Jones from Neve would also be a member, and Roger Lagadec would be sub-group chairman.

Philip Gaswell of the BBC would be the chairman of working sub-group five, aided by members from NHK, JVC, and Matsushita, and Dr. Stockham of Soundstream.

It was agreed that a report of this meeting would be circulated to the committee members and relevant IEC working groups. The next meeting will be held in New

York two days before the beginning of the AES convention in 1983 October.

This meeting was then adjourned.

5 The next item on the agenda was a report from the chairman on the committee's social responsibility concerning piracy. The matter brought up at the Anaheim meeting by Dr. Stockham concerning the seriousness of piracy matters, now that digital audio recordings will be released to consumers, was reported in the minutes of the previous meeting (*JAES*, vol. 31, no. 1/2, 1983 Jan./Feb.). These digital recordings will be essentially exact replicas of the master recordings. The chairman received several comments from the field to the effect that piracy matters are legal problems and not in the purview of this technical committee. The chairman asked for comments from the floor. Mr. Torick replied that we may be asked by legal representatives for help on anti-piracy matters and we would be better prepared for that role if we did discuss these matters. It was suggested that the AES Digital Audio Technical Committee should have a forum for discussing anti-piracy technology.

Mr. Griffiths reminded us of Dr. Stockham's comment that as engineers we would be socially irresponsible if we do not point out that there really is no engineering solution to piracy. However, further discussion in the committee would be required before this point could be agreed upon. The chairman repeated Mr. Burkowitz's comment from the last meeting: "The only way to prevent piracy is to produce a recording that is not playable."

Han Tendeloo indicated that there are really two problems: one is counterfeiting and the other is home taping. Clearly counterfeiting of the Compact Disc would be extremely difficult. If a signal were added to spoil home taping it would also spoil recording. If the "spoiling" signal could be removed for playback, home taping without the spoiler is also possible. It should be recognized that there is no engineering solution to prevent piracy. Perhaps a solution would be a joint engineering-legal one. Mr. Tendeloo expressed the opinion that home taping represents the greatest threat to the industry. Roger Lagadec said that the transfer from Compact Discs to high-quality cassettes has already started in Europe on an industrial basis, and such cassettes are being sold. This is definitely illegal. Björn Blüthgen suggested that the principal item in favor of the Compact Disc is that its sound quality on reproduction is far better than that of any analog copy.

6 The chairman asked if there was any new business. None was suggested, and the meeting was adjourned at 1015 hours.

7 The next meeting of the AES Digital Audio Technical Committee will be held 1983 October 8 at the New York Hilton.

BART LOCANTHI
Chairman

Digital Audio Technical Committee