



SMPTE EBU Joint Task Force on Timing & Synchronization

By Peter Symes

In late 2007 the Society of Motion Picture and Television Engineers (SMPTE) and the European Broadcasting Union (EBU) formed a new Joint Task Force to examine future needs for timing and synchronization in the moving picture and related industries, and to recommend appropriate standardization.

Current methods of timing and synchronization for television, audio and other moving picture signals rely on standards that have been in place for over 30 years. These standards are becoming increasingly inappropriate for the digital age with, for example, networked content sharing or higher frame rate HDTV image formats, and they now impose unacceptable limitations for the future.

SMPTE 12M Time Code is probably the most widely used of all SMPTE Standards. Time Code was originally designed as a very simple data label that could be recorded on an audio edge track on a video tape recorder, and is used as the principal indexing mechanism for video editing systems. But its use has spread far beyond tape machines, and far beyond video systems. This in itself creates a problem—SMPTE has created a number of extensions and improvements to 12M (the latest published early this year), but the work has always been complicated and constrained by the need to ensure backwards compatibility with a vast range of implementations in many industries. We decided that the time had come to leave 12M as a stable solution for all those using it, and to embark on the creation of a new design suited to the needs of the future.

Television synchronizing systems used to require feeds of several pulses, and of subcarrier, to each item of equipment. In the 1980s most equipment became capable of extracting all of the necessary timing signals from a single composite video feed—usually color black, because accuracy was improved by more nearly constant level. This is still the dominant synchronizing signal for television installations today.

Color black is still a viable method of synchronization, but it is clearly rooted in the analog composite domain, and uses frequencies that are inconvenient to generate and use, and that have no relevance in the digital component world. Color black is also a wideband signal with component frequencies from a few hertz to several megahertz and requires careful equalization for distribution in a plant.

More importantly, color black does not provide sufficient information for unambiguous timing of video and AES audio, and cannot easily be used for equipment operating at multiple frame rates.

One factor common to these two issues, time labeling and synchronization, is that the existing solutions are still workable, although limited. In both cases there are clear user needs for improved systems for the future. The danger in such situations is that a variety of proprietary solutions will appear, each offering some benefit, but none solving all of the issues. Once proprietary applications are in the marketplace, it is very difficult to achieve consensus for standardization of a broader solution.

So, the timing was right to provide a forum for users and manufacturers to get together, define the user requirements for the future, and to map out a plan for creating standards to meet those needs. But we also knew that we should be looking beyond just the traditional broadcast experts. Television installations are increasingly relying on equipment and technology from the IT industry; it was important to engage IT and communications experts, and to tap into that knowledge base.

The Task Force was formed in September 2007, chaired jointly by Dr. Hans Hoffmann of the EBU Technical Department, and Peter Symes, SMPTE Director of Standards & Engineering. The first meeting was held in New York in November; four more meetings have been held, two in North America and two in Europe, attended by an average of about 25 members from user and manufacturer communities.

The Task Force began by focusing on user requirements from broadcasters, and from the media and entertainment industries. Once these user

requirements were known, the Task Force published a Request for Technology (RFT) in February 2008. The industry's responses to the RFT are being evaluated against the user requirements, and the outcome of this process will be a set of specifications that will be passed to the appropriate SMPTE Technology Committees for due process standardization.

Good progress is being made. As is usual in these situations, seemingly disparate approaches turn out to have a great deal in common when examined closely. The Task Force has iden-

tified a few key issues that need to be resolved, but it looks probable that consensus will be achieved on new approaches to both synchronization and time labeling.

The Task Force will present a report on objectives and progress to date at IBC, and a further update at the SMPTE Annual Tech Conference & Expo in Hollywood at the end of October. It is hoped to complete the work by the end of 2008, with standardization work commencing early in 2009.

PETER SYMES gained a B.S. degree with honors in 1967 and began his career in television in the engineering department of the British Broadcasting Corporation. He worked in product management for Philips and Central Dynamics before joining Grass Valley. From 1983 to 2007 he held a number of positions with responsibilities that include strategic planning, intellectual property, and technological liaison. He represented Grass Valley in many organizations including SMPTE, where he served two terms as Engineering Vice President and one as Financial Vice President. In July 2007, he left Grass Valley to join the SMPTE staff as Director of Standards & Engineering.

Symes holds patents and is the joint recipient of Emmy awards for the architecture of the digital picture processor. He is a Senior Member of the Institution of Electrical Engineers (IEEE), and a Fellow of SMPTE. He has written and presented numerous papers at industry conferences, and is the author of *Video Compression* (1998), *Video Compression Demystified* (2001), and *Digital Video Compression* (2003), all published by McGraw-Hill. He has also contributed to other books, including *Understanding Digital Cinema* (Focal Press, 2004) and two editions of the *NAB Engineering Handbook*.



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