SMPTE ALMANAC

By Michael Dolan

In this column we hope to provide interesting historical briefs from Journal articles of days past. The purpose of this column is primarily entertainment, but we hope it will also stimulate your thinking and reflection on how far we have come in the industry, as well as (sometimes) how some things never change. This is not meant to be an authoritative reference, and no attempt is made to correct any past errors or omissions of the Journal. We simply hope you enjoy the material. In this inaugural edition, we first provide a slightly belated tribute to 12M time code. We missed the actual anniversary, so please forgive the slightly inaccurate 25th anniversary, which was actually April 2000.

25 Years Ago in the Journal

The July 1975 issue reported, "On 2 April 1975, the American National Standards Institute approved two new standards. C89.12-1975, Time and Control Code for Video and Audio Tape for 525 Line/60 Field Television Systems, specifies a digital code format for use on video and audio magnetic tape recorders to be used for timing and control purposes.....Your attention is directed to C98.12 inasmuch as the time code specified is the same code which has been identified up to now as the SMPTE Code."

And, the February 1976 issue reported in an article on "ASCII-Compatible Time-Code System for Motion-Picture Films Using Microcomputers," This paper recommends the serial 8-bit ASCII code, its standard transmission techniques, and its derivatives as methods for recording time-code data on tape and film. A similar approach has already been implemented for videotape, and a new time-code system is now needed to facilitate production encoding, post-production decoding, and control of mixing and editing equipment in the film industry as well... An integrated-circuit Motorola M6800 microprocessor is presently being used to generate and read time codes recorded on film and tape. The combination of the ASXCII code and the microprocessor has resulted in a system that is "intelligent" and versatile and yet has substantially fewer parts than other systems.....For years, lack of a standardization of time codes plagued the videotape industry..."

ANSI C98.12–1975

American National Standard

time and control code for video and audio tape for 525 line/60 field television systems

Approved April 2, 1975 — Secretariat: Society of Motion Picture and Television Engineers, Inc.

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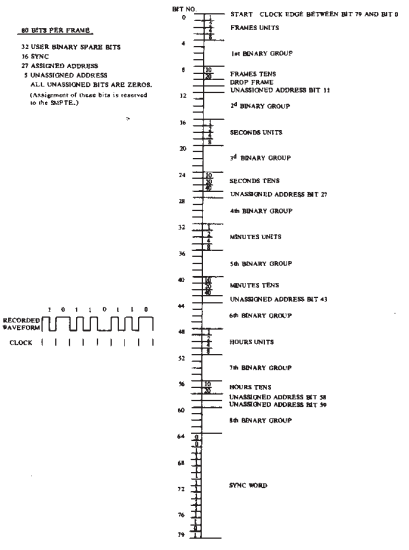
1. Scope

This standard specifies a digital code format and modulation method for video and audio magnetic tape recorders to be used for timing and control purposes. The standard also specifies the location of the code on the tape and its relationship to other signals on the tape.

2. Modulation Method

The modulation method shall be such that a transition occurs at the beginning of every bit period. "One" is represented by a second transition one half a bit period from the start of the bit. "Zero" is represented when there is no transition within the bit period. (See Figure.)



50 Years Ago in the Journal

The February 1951 issue an article on "The Genlock—A New Tool for Better TV Programming," reported, "Recently, the need for more and better techniques in video programming has become more and more apparent, particularly as picture quality has improved, thus focusing attention on ideas for adding the finer touches. One of the gaps in the present programming structure arises from the lack of synchronization between two distinct program sources which may supply successive parts of a program. The field frequency pulses may be phased together by manual adjustment, and they will stay so as long as the same power source is the reference for both generators, but there is no such simple solution to the problem of phasing the line-frequency pulses. Lack of tight lock-in between two such systems results in several programming limitations...."

And, in the standards report, "Two Approved American standards for cutting and perforating 32-mm film...were first published in the February 1949 *Journal* as proposals to elicit comments or criticisms. Since no adverse criticism was received, they were processed through the required channels and officially approved on October 6, 1950. Although film of this type has been used commercially since 1934, there never has been a formal standard. During the intervening years a number of changes have been made to the dimensions. Debrie, who was the originator of the slit-film process..."

75 Years Ago in the Journal

The May 1926 *Journal* reported in an article titled "The Jenkins Chronoteine Camera for High Speed Motion Studies" that "The purpose of this camera is the study of high speed motions—the flight of birds, the movement of animals, the muscular activities of athletes, mechanical, motions, etc. The normal rate of exposures is 3200 pictures per second on standard motion picture film negative... Projection of these pictures at normal rate (16 per second) makes the action two hundred times slower than the original movement and twenty times slower than the slow motion films shown in picture theatres.....this speed seems incredible, for it means at the rate referred to (3200 per second) that two hundred feet of film pass through the camera in one second.....I have been trying for thirty years to acceptably build this camera (it was patented in 1894) but until within the last few months had not succeeded....continuous movement of the film must obviously be employed. So the camera was built with a plurality of lenses moving exactly in synchronism with the film as the lenses pass in succession across the stationary shutter-opening in the camera front."

Michael A. Dolan is an industry technical consultant in the field of television data broadcasting. He holds a BSEE degree from Virginia Tech '79 and has worked in various leading edge computer graphics and realtime systems fields since then.

Dolan has been involved in digital television engineering design for five years. He currently chairs two ad hoc groups in SMPTE's D27 technical committee—one on Declarative Data Essence (DDE) and the other on Application Data Essence, as well as the (data) Application Reference Model Team of the ATSC T3-S17 Specialist Group (DASE).