

Letter to the Editor

Addendum to "Worldwide Color Television Standards — Similarities and Differences"

By MICHAEL ROBIN

Editor's Note: The Journal Office at SMPTE Headquarters has received a lot of favorable comment regarding the paper by Pritchard and Gibson, published in the February 1980 Journal, on the NTSC, PAL, and SECAM color television standards, with their many variants. One letter, by Michael Robin of the Canadian Broadcasting Corp., pointed out that this timely and interesting article could be enhanced if some additional comments were published. Consequently, after consulting with one of the original authors (Pritchard) and with Robin, we are pleased to offer the following letter-addendum to SMPTE Journal readers. We thank both Mr. Robin and the original authors for their valuable information.

Dear Sirs,

I have read with interest the article "Worldwide Color Television Standards — Similarities and Differences," by D. H. Pritchard and J. J. Gibson, which appeared in the February 1980 issue of the *SMPTE Journal*. I would like to point out a few statements in this article which could be interpreted as inaccuracies that found their way into print. I have the following comments.

Page 112, comment (a): In the first line of column 1 on this page it is stated that "The concept of providing horizontal interlace for reducing the visibility of the color subcarrier(s) is followed in all approaches."

This is true for NTSC and PAL but is untrue for SECAM due to the frequency modulation of the subcarriers. Various attempts, detailed elsewhere in the article (see page 117, column 1, last paragraph) have been made to achieve reduced subcarrier visibility. There is however no luminance/chrominance interlace in SECAM, except when there is no chrominance information and the subcarriers are at rest.

Page 112, comment (b): At the end of the first paragraph in column 3 on this page, "(simple PAL)" and "(standard PAL)" are mentioned. Standard PAL (actually PAL-Delay line or PAL-Deluxe) as opposed to PAL-Simple is just another way of decoding the PAL signal. The impression is given that there are two PAL systems, namely: PAL-Simple and PAL-Standard. Regardless of the transmission standards (PAL-I, PAL-B, PAL-G, PAL-M, or PAL-N) there is only one method of PAL color encoding, common to all standards.

Hence, the statement "The standard PAL system has been adopted by numerous countries . . ." may be misleading. The countries adopt the transmission standard. The manufacturer chooses the decoding method best suited for the price category of his product.

Page 113, column 3, the paragraph following the equations: It should be pointed out that, strictly speaking, the *I* and *Q* signals are formed in the camera encoder and not at the transmitter, as stated in the article.

Page 117, comment (a): With regard to the "wideband systems available in France and the USSR" — column 3, and first paragraph — it is worth mentioning that the same SECAM signals are used in East Germany, Egypt, Greece, Lebanon, etc., which use the "narrowband" B, G, systems.

Page 117, comment (b): With regard to the next paragraph in column 3, it should be pointed out the SECAM is a color encoding system that can be used with any transmission standard. The method of sound transmission is specified by the transmission standard and not the color encoding standard. Here follow three examples.

1. France uses the L system for its 625-line, SECAM-encoded transmissions. System L specifies an 8-MHz transmission channel,

AM sound, positive picture carrier modulation, 6.5-MHz intercarrier spacing.

2. East Germany, Greece, Egypt, Lebanon, etc., use the B system with their 625-line SECAM-encoded transmissions on VHF. System B specifies a 7-MHz transmission channel, FM sound, negative picture carrier modulation, 5.5-MHz intercarrier spacing. On UHF, these countries use the G system which is identical to the B system, except that it is transmitted in an 8-MHz channel.

3. The Soviet Union, Poland, Czechoslovakia, Hungary, and Bulgaria use the D system for their 625-line SECAM-encoded transmission on VHF. System D specifies an 8-MHz transmission channel, FM sound, negative picture modulation, 6.5-MHz intercarrier spacing. System K, identical to system D, is used for UHF transmissions.

It is hence erroneous to imply that for the transmission of sound SECAM employs amplitude modulation only.

Page 118, Fig. 18, comment (a): With regard to L III SECAM, the following should be kept in mind: L is a transmission system and III refers to the third chronological version of the SECAM color encoding system. As a matter of fact, since it was first conceived in the 1950s, the SECAM concept has undergone the following changes.

SECAM I, line sequential AM modulation of a single subcarrier. This was dropped because of poor compatibility.

SECAM II, line sequential FM modulation of a single subcarrier. This was dropped because of poor compatibility.

SECAM III, line sequential FM modulation of two subcarriers.

SECAM IIIb, also called optimized. This is the same as SECAM III but with the addition of high frequency subcarrier preemphasis (BELL) and periodic phase change of the undeviated subcarrier frequencies in an effort to improve the compatibility. This latter version is now known as SECAM (no suffix).

In addition, there are two types of SECAM decoding methods (not unlike PAL with PAL-D and PAL-S). They are:

SECAM V, where the line switching sequence synchronizing signal is derived from the identification signals transmitted during the vertical blanking interval. This method is slowly becoming obsolete, especially in countries using negative modulation, because of its susceptibility to noise and, hence, the possible occurrence of full wrong color fields.

SECAM H, where the line switching synchronizing signal is derived from the nondeviated subcarrier present on the horizontal back porch. This method allows a line by line correction, (as opposed to a field by field correction as in SECAM V) and is favored by the newcomers to the SECAM world who all use negative modulation.

Page 118, Fig. 18, comment (b): With regard to the chrominance bandwidth in the system identified as L III SECAM in Fig. 18, the following applies. The chrominance bandwidths shown in Fig. 18 are apparently not intended for accurate frequency scaling purposes. Essentially the SECAM chrominance information is contained in a spectrum extending from 3.9–4.8 MHz, as a result of clipping of the color difference signals after preemphasis and prior

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to frequency modulation at the respective carriers. (See also Fig. 24 under SECAM chroma and bursts deviation). This explains why SECAM can be transmitted in 5-MHz systems like B and G without difficulty.

Page 118, Fig. 19: The "N" in this figure is not an NTSC standard, but rather it is a 625-line, 50-Hz standard with reduced luminance bandwidth (4.2-MHz) transmitted in a 6-MHz channel conforming to the practice used on the American Continent. (See page 119, column 1, last paragraph.)

Page 118, Fig. 21: The "E" in this figure is not a SECAM E system. System "E" is a monochrome 819-line, 50-Hz standard transmitted in a 14-MHz channel. It happens to be used in France where the SECAM encoding system was invented.

Perhaps it is not accurate to note in Fig. 21 and in text at the top of page 120 that this system is becoming extinct, because it is radiated by some 1200 transmitters in the VHF bands I and II and carries the main French program, albeit in monochrome because of lack of compatibility with SECAM. Its extinction is still far in the future when the third UHF 625-line network will achieve full country coverage.

The "L" (III) in Fig. 21 is not a system, as explained earlier. Furthermore, Russia and other East European countries use standard "D" on VHF and standard "K" on UHF. Both standards use negative modulation and FM sound.

Page 119, column 2, last paragraph, point (4) of the paragraph: In this place, the statement is made "Some systems use positive polarity (luminance proportional to voltage) modulation of the video carrier . . ." Now, positive modulation is generally defined as

occurring when the amplitude of the modulation envelope of the radiated picture carrier increases with increasing light in the scene before the camera.

Page 119, Fig. 22: In this figure, as well as elsewhere on page 119, mention is made of "sound carrier frequency" in megahertz. I believe that what the authors mean is "sound carrier to picture carrier spacing" in megahertz. All of the megahertz frequency values shown in Fig. 22 refer, of course, to baseband values (spacing in the RF domain).

Page 120, column 2, first four lines: The writer of this Letter to the Editor does not know of any television camera chains developed and manufactured to operate at "625 lines and 48-field rate . . ." Rather, the Europeans operate their telecine chains slightly faster, at a 50-field/s rate, and accept the associated 4% sound pitch change and movement acceleration as inherent and generally unnoticeable.

(With regard to this point, the following *authors' comment* was received: "In the United States, users of television-to-film conversion systems have modified broadcast cameras by replacing the conventional standard sync generator with a special sync generator chip to operate at 655 lines/s, 48 field/s. Note that 655 lines is correct, not 625 as erroneously given on page 120! The Europeans operate their telecine chains with another technique, as stated by Mr. Robin.")

I believe that publication of my comments will help enhance this timely and interesting article.

Yours truly,

signed: M. Robin