RP 157-1995

SMPTE RECOMMENDED PRACTICE

Key Signals

1 Scope

This practice describes the format of a key video signal which is used to control the contribution of an associated fill video signal into a composite of two or more signals. Such signals are commonly referred to simply as key signals. This description is given for composite and component analog and digital signals.

2 General specifications

A key video signal represents the opacity or transparency of its associated fill video signal. When the fill signal is opaque, it will obscure all videos of lower priority in the composited image and will be visible unless it is itself obscured by videos of higher priority. When the fill video is transparent, it will not be visible. When the fill video is partially transparent, it will be mixed with the video(s) of lower priority.

Normally, the key signal shall have the same video format as the video signal with which it is associated (see note 1).

The key information shall be treated as a video signal, with black representing complete transparency and white representing complete opacity (see note 2). Values between black and white indicate partial transparency. Black and white levels shall conform to the specifications for the appropriate video format (see note 3).

The chrominance of the signal shall be set to zero (see note 4).

3 Synchronization and timing (see note 5)

3.1 Synchronization

The key signal shall incorporate the same synchronizing elements as a video signal of the same format, including color burst for composite formats (see note 6).

3.2 Picture phase

Picture phase defines the timing relationship between picture information in the video, and the synchronizing information of the same video. The key signal shall have picture phase identical with that of its associated fill video signal, ± 0 lines vertically and ± T/25 horizontally (see note 7). In digital component systems, key samples shall be co-sited with the corresponding luminance samples.

3.3 Timing

The key signal shall be timed coincident with its associated fill video signal, ± 0 lines vertically and ± T/25 horizontally. In composite systems, S_CH timing shall match that of the associated fill video signal.

NOTES

1 In facilities employing multiple video formats, it is possible that the key signal and fill video signal will be of different formats. The intent of this practice is that the key signal shall be constituted according to the equipment through which it will pass. For example, a key signal which is to be handled by analog NTSC equipment should conform to specifications for analog NTSC video signals.

2 It should be noted that chroma keyers have traditionally used the opposite polarity to all other key signals. The

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method of implementation within equipment is at the discretion of the designer, but any key signal outputs from chroma keyers for external connection should conform to this practice.

3 When the fill video is required to be opaque at the horizontal edges of the picture, use of transmission blanking width on the key signal may give rise to undesirable edge effects. Facilities using narrow blanking for video should use the same blanking width for key signals. Edge artifacts will be removed when transmission blanking is applied. Facilities using transmission blanking width may wish to use narrower blanking for key signals to avoid edge artifacts.

4 In component systems, it is possible to use the color information channels for other purposes. Any such information does not form part of the key signal.

5 Much equipment now in use does not meet these specifications. Designers of new equipment should take this into account. The tolerances specified are those required to ensure no discernible error in the composited picture.

6 It should be noted that, for composite systems, burst is an essential part of the synchronization information. Many devices which operate in the composite domain do not operate properly when burst is not present. Consequently, burst is required on key signals in a composite environment.

7 T is the letter symbol for the duration of one half-period of the nominal upper cutoff frequency of a transmission system, thus $T = 1/(2f_c)$. It is commonly referred to as the Nyquist interval. For system M, T is approximately 125 ns.