SMPTE STANDARD

2048 × 1080 and 4096 × 2160 Digital Cinematography Production Image Formats FS/709

Table of Contents

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Foreword

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SMPTE Engineering Documents are drafted in accordance with the rules given in Part XIII of its Administrative Practices.

SMPTE ST 2048-1 was prepared by Technology Committee 10E

Intellectual Property

At the time of publication no notice had been received by SMPTE claiming patent rights essential to the implementation of this Standard. However, attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. SMPTE shall not be held responsible for identifying any or all such patent rights.

Introduction

This section is entirely informative and does not form an integral part of this Engineering Document.

This standard defines 2048 × 1080 and 4096 × 2160 image formats primarily for D-Cinema content acquisition and creation. These image formats may also be used for acquisition and creation of high quality content for other D-Cinema applications.

This standard also defines the Color VANC which conveys the parameter values of user-defined color space and Log curve. This standard may be used in the creation of Computer Graphics and other D-Cinema applications related to the pre Digital Cinema Distribution Master (DCDM) creation.

1 Scope

1.1 This standard defines a family of progressive sample structures of 2048 × 1080 and 4096 × 2160 images for D-Cinema content creation as defined in Table 1 and Table 2 in Section 5. This standard specifies:

— R'G'B' color encoding and digital representation[1]

— $Y'C'_BC'_R$ color encoding and digital representation

— $R'_{FS}G'_{FS}B'_{FS}$ color encoding and digital representation

This standard also defines tristimulus values and reference white of Free Scale-Gamut (FS-Gamut), Free Scale-Log (FS-Log) curve and a Color VANC packet. The FS-Log curve has an affinity with the sensitivity of human eye and can specify a much wider dynamic range than the nonlinear curve defined in Recommendation ITU-R BT.709. The Color VANC carries tristimulus values, reference white and parameter values of the FS-Log curve.

An auxiliary component A may optionally accompany R'G'B', $Y'C'_BC'_R$ and $R'_{FS}G'_{FS}B'_{FS}$; these interfaces are denoted R'G'B'A, $Y'C'_BC'_RA$ and $R'_{FS}G'_{FS}B'_{FS}A$. The "A" component if present, shall have the same characteristics as the G', Y' or G'_{FS} channel.

Sampling structures supported by this standard include, 4:4:4:4, 4:4:4, and 4:2:2.

Note: FS-Gamut and FS-Log are identifying names of the defined color space and the Log curve in this standard.

2 Conformance Notation

Normative text is text that describes elements of the design that are indispensable or contains the conformance language keywords: "shall", "should", or "may". Informative text is text that is potentially helpful to the user, but not indispensable, and can be removed, changed, or added editorially without affecting interoperability. Informative text does not contain any conformance keywords.

All text in this document is, by default, normative, except: the Introduction, any section explicitly labeled as "Informative" or individual paragraphs that start with "Note:"

The keywords "shall" and "shall not" indicate requirements strictly to be followed in order to conform to the document and from which no deviation is permitted.

The keywords, "should" and "should not" indicate that, among several possibilities, one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited.

The keywords "may" and "need not" indicate courses of action permissible within the limits of the document.

The keyword "reserved" indicates a provision that is not defined at this time, shall not be used, and may be defined in the future. The keyword "forbidden" indicates "reserved" and in addition indicates that the provision will never be defined in the future.

[1] Throughout this standard, references to signals represented by a single primed letter (e.g., R', G', B', Y', C'_B, C'_R and R'_{FS}, G'_{FS}, B'_{FS}) refer to signals to which the transfer characteristics in Section 6 have been applied. Such signals are commonly described as being gamma corrected.