

SMPTE STANDARD

Academy Density Exchange Encoding (ADX) — Encoding Academy Printing Density (APD) Values



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Foreword

SMPTE (the Society of Motion Picture and Television Engineers) is an internationally-recognized standards developing organization. Headquartered and incorporated in the United States of America, SMPTE has members in over 80 countries on six continents. SMPTE's Engineering Documents, including Standards, Standards and Engineering Guidelines, are prepared by SMPTE's Technology Committees. Participation in these Committees is open to all with a bona fide interest in their work. SMPTE cooperates closely with other standards-developing organizations, including ISO, IEC and ITU.

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

SMPTE ST 2065-3 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.

Academy Density Exchange Encoding (ADX) is an encoding of motion picture film color negative and internegative image data as Academy Printing Density (APD) values. ADX values encode image data as the APD printing density values of a color negative film designed to be printed on Kodak Vision® family, Fujifilm Eterna® family, and Fujifilm F-CP® color print films. It is expected that ADX will primarily be used to encode image data represented by the APD printing density values, or an approximation of the APD printing density values, from scanned film. The ADX equations specified in this document provide conversions from APD values to digital code values as 10-bit or 16-bit integer color components. This document also specifies the method for converting between the 16-bit and 10-bit component value encoding metrics.

Most color negative and internegative films require no transformation in order to be compatible with the ADX encoding method, because most color negative and internegative films can be printed onto contemporary motion picture color print films with reasonable results. Color interpositive films are also compatible with the ADX encoding method as they are part of the negative reproduction chain. Some film stocks, such as scan-only color negative film (e.g. Eastman Kodak® 5299) and color print films, were not designed to be printed onto color print films. Printing a scan-only negative or color print film onto a contemporary motion picture color print film is not likely to yield a result that would be considered "good-looking." Scanned density values from these materials require additional transformation, not covered by this specification, in order to achieve compatibility with the ADX encoding method.

1 Scope

This Standard defines the Academy Density Exchange Encoding (ADX) including the encoding method, the 16-bit and 10-bit component value encoding metrics, and the method for converting between the 16-bit and 10-bit component value encoding metrics.

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.

3 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

SMPTE ST 2065-2:2012, Academy Printing Density (APD) — Spectral Responsivities and Reference Measurement Device