Technical Bulletin

TB-2014-001

Academy Color Encoding System (ACES) Documentation Guide

The Academy of Motion Picture Arts and Sciences

Science and Technology Council

Academy Color Encoding System (ACES) Project Committee

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Summary: This document describes the technical documentation provided with ACES System Release.

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Revision History

Version	Date	Description
1.0	12/19/2014	Initial Version
1.0.1	04/24/2015	Formatting and typo fixes
	03/29/2016	Remove version number - to use modification date as UID

Related Academy Documents

Document Name	Description

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Introduction

The Academy Color Encoding System (ACES) is a free, open, device-independent color management and image interchange system that can be applied to almost any current or future workflow. It was developed by hundreds of the industry's top scientists, engineers and end users, working together under the auspices of the Academy of Motion Picture Arts and Sciences.

ACES technical documentation is available for product developers wishing to implement ACES concepts and specifications into their products and for workflow/pipeline designers to use ACES concepts and ACES-enabled products for their productions.

1 Scope

This document describes the technical documentation provided with the ACES Version 1.0 System Release.

2 Document Types

ACES technical documentation is a collection of Society of Motion Picture and Television Engineers (SMPTE) Engineering Documents, Academy Specifications, Academy Procedures and Academy Technical Bulletins. These document types are described below.

2.1 SMPTE Engineering Documents

Certain ACES technical specifications have been standardized by SMPTE, the industry's accredited standards development organization. For more information on SMPTE standards, please visit http://www.smpte.org.

2.2 Academy Specification

An Academy Specification is a document that states basic technical specifications, dimensions or criteria that describe the form and function of a system and/or its components. Specifications may include informative text describing basic usage of the specification and other contextual information. Academy Specification numbers use the following format: S-xxxx-yyy where xxxx is the publication year and yyy is the document sequence number (a maximum of 999 Academy Specifications may be published in any year).

2.3 Academy Procedure

An Academy Procedure is a document that provides a set of recommended step-by-step instructions intended to facilitate the implementation of one or more specifications. Academy Procedure numbers use the following format: P-xxxx-yyy where xxxx is the publication year and yyy is the document sequence number (a maximum of 999 Academy Procedures may be published in any year).

2.4 Academy Technical Bulletin

An Academy Technical Bulletin is a document, often tutorial in nature, intended to provide a broad system overview, in-depth usage information, in-depth specification derivation not required to implement a specification, or any other technical information or reporting that falls outside the scope of an Academy Specification or Procedure. Academy Technical Bulletin numbers use the following format: TB-xxxx-yyy where xxxx is the publication year and yyy is the document sequence number (a maximum of 999 Academy Technical Bulletins may be published in any year).

3 ACES Documents

3.1 Overview/General

3.1.1 ACES Versioning System

"Academy S-2014-002, Academy Color Encoding System – Versioning System" describes the versioning of the engineering components that comprise the public release of the ACES system. Version numbers are intended to be used within ACES files such as transforms and the ACES Clip-level Metadata file. A separate document deals with naming and versioning issues as they relate to end-users (see Section 3.1.3).

3.1.2 ACES Component Names

"Academy TB-2014-012, Academy Color Encoding System Component Names" defines key ACES component names as a prelude to an ACES glossary.

3.1.3 ACES User Experience Guidelines

"Academy TB-2014-002, Academy Color Encoding System User Experience Guidelines" provides guidelines for product developers building products that implement ACES and for others looking for guidance on how best to present ACES terminology and concepts to end-users.

3.1.4 Alternate ACES Viewing Pipeline User Experience

"Academy TB-2014-013, Alternate ACES Viewing Pipeline User Experience" describes an alternate approach to implementing and presenting the ACES viewing pipeline.

3.2 SMPTE Engineering Documents

3.2.1 SMPTE ST 2065-1:2012

"Academy S-2008-001 – Academy Color Encoding Specification (ACES)" was published prior to SMPTE ST 2065-1:2012. S-2008-001 served as the basis for the SMPTE document but is now superseded by the SMPTE standard.

"Academy TB-2014-004, Informative Notes on SMPTE ST 2065-1 – Academy Color Encoding Specification (ACES)" provides background and contextual information related to SMPTE ST 2065-1:2012. Appendix A provides Academy S-2008-001 for historical reference.

3.2.2 SMPTE ST 2065-2:2012 and SMPTE ST 2065-3:2012

Academy S-2008-002 served as the basis for SMPTEST 2065-2:2012 and ST 2065-3:2012, but is now superseded by the SMPTE standards.

"Academy TB-2014-005, Informative Notes on SMPTE ST 2065-2 – Academy Printing Density (APD) – Spectral Responsivities, Reference Measurement Device and Spectral Calculation and SMPTE ST 2065-3 Academy Density Exchange Encoding (ADX) – Encoding Academy Printing Density (APD) Values" provides background and contextual information related to SMPTE ST 2065-2:2012 and SMPTE ST 2065-3:2012. Appendix A provides S-2008-002 for historical reference.

3.2.3 SMPTE ST 2065-4:2013

"Academy TB-2014-006, Informative Notes on SMPTE ST 2065-4 – ACES Image Container File Layout" provides background and contextual information related to SMPTE ST 2065-4:2013.

3.2.4 SMPTE ST 268:2014

"Academy TB-2014-007, Informative Notes on SMPTE ST 268:2014 – File Format for Digital Moving Picture Exchange (DPX) – Amendment 1" provides background and contextual information related to SMPTE ST 268:2014.

3.3 ACES Encodings

3.3.1 ACES2065-1

The document referenced in Section 3.2.1 specifies ACES, the fundamental colorimetric encoding in the Academy Color Encoding System.

3.3.2 ACEScc

"Academy S-2014-003, ACEScc – A Logarithmic Encoding of ACES Data for use within Color Grading Systems" defines a colorimetric encoding appropriate for final color adjustment operations.

3.3.3 ACESproxy

"Academy S-2013-001, ACESproxy – An Integer Log Encoding of ACES Image Data" defines a colorimetric encoding appropriate for on-set preview and on-set look management applications.

3.3.4 ACEScg

"Academy S-2014-004, ACEScg – A Working Space for CGI Render and Compositing" defines a colorimetric encoding appropriate as a working space for use in Computer Generated Imagery (CGI) tools such as compositors, paint and rendering systems.

3.3.5 ASC-CDL Application

"Academy TB-2014-008" describes a recommended method for applying ASC-CDL values to image data in an ACES workflow.

3.4 ACES Containers and Metadata

3.4.1 ACES Image Files

The document referenced in Section 3.2.3 specifies the container format for ACES2065-1 encoded images.

3.4.2 ADX Files

The document referenced in Section 3.2.4 specifies the container format for ADX-encoded images.

3.4.3 ACESclip Files

"Academy TB-2014-009, Academy Color Encoding System (ACES) Clip-level Metadata File Format Definition and Usage"defines an XML-based file format that contains metadata to describe the viewing pipeline for a collection of image files associated with an ACES workflow.

3.4.4 Look Modification Transform Files

"Academy TB-2014-010, Design, Integration and Use of ACES Look Modification Transforms" describes the design, integration and use of ACES Look Modification Transforms (LMTs).

3.4.5 Academy-ASC Common LUT Format Files

"Academy S-2014-006, A Common File Format for Look-Up Tables" specifies an XML-based file format that contains color Look-Up Tables (LUTs). LUTs are used extensively in implementations of and workflows using the Academy Color Encoding System.

3.5 Other

3.5.1 Digital Camera Input Device Transform (IDT) Developers Guide

"Academy P-2013-001, Recommended Procedures for the Creation and Use of Digital Camera System Input Device Transforms (IDTs)" describes methods to create Input Device Transforms for use with the Academy Color Encoding System.