SMPTE REGISTERED DISCLOSURE DOCUMENT

Interoperable Master Format — Application DPP (ProRes)

The attached document is a Registered Disclosure Document prepared by the sponsor identified below. It has been examined by the appropriate SMPTE Technology Committee and is believed to contain adequate information to satisfy the objectives defined in the Scope, and to be technically consistent.

This document is NOT a Standard, Recommended Practice or Engineering Guideline and does NOT imply a finding or representation of the Society.

Every attempt has been made to ensure that the information contained in this document is accurate. Errors in this document should be reported to the SMPTE Registered Disclosure Document proponent(s) identified below with a copy to eng@smpte.org.

This specification normatively references SMPTE RDD 45. Implementers should consult that document for IPR licensing details.

All other inquiries in respect of this document, including inquiries as to intellectual property requirements, should be addressed to the SMPTE Registered Disclosure Document proponents identified below.

Proponent contact information:

DPP

200 Gray's Inn Road, London, WC1X 8HF, UK.

Email: info@thedpp.com

Digital Production Partnership Ltd is a UK Registered Company. Company Registration Number: 09478697

North American Broadcasters Association

P.O. Box 500, Station A,

Toronto, ON M5W 1E6 CANADA.

Email: contact@nabanet.com or simplify@nabanet.com

Telephone: +1 416-598-9877

Approved September 16, 2022

Table of Contents Page

Introduction

Building on the pioneering work of SMPTE who created the Interoperable Master Format (IMF) for Feature Films, the DPP and the North American Broadcasters Association (NABA) have collaborated to develop a SMPTE Registered Disclosure Document (RDD) for an IMF Application based on the requirements common to many in the broadcast and online sector. This SMPTE Registered Disclosure Document is based on the image formats referred to in ITU-R BT.2100 and references SMPTE ST 2067 Interoperable Master Format suite of standards and SMPTE RDD 45 Interoperable Master Format – Application ProRes.

Users are advised to refer to any contractual or delivery documentation supplied by the commissioners or distributors or co-producers, before selecting options such as frame rate, image size, colorimetry etc.

1 Scope

This SMPTE Registered Disclosure Document specifies an Application of SMPTE ST 2067 - the Interoperable Master Format. The SMPTE Registered Disclosure Document follows the Image Characteristics, Track File and Composition constraints specified in SMPTE RDD 45, Interoperable Master Format – Application ProRes whenever possible.

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 labelled 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.

A conformant implementation according to this document is one that includes all mandatory provisions ("shall") and, if implemented, all recommended provisions ("should") as described. A conformant implementation need not implement optional provisions ("may") and need not implement them as described.

Unless otherwise specified, the order of precedence of the types of normative information in this document shall be as follows: Normative prose shall be the authoritative definition; Tables shall be next; followed by formal languages; then figures; and then any other language forms.

3 References

3.1 Normative References

The following documents contain provisions, which, through reference in this text, constitute provisions of this SMPTE Registered Disclosure Document. At the time of publication, the editions indicated were valid. This SMPTE Registered Disclosure Document is subject to revision and parties to agreements based on this SMPTE Registered Disclosure Document are encouraged to investigate the possibility of applying the most recent edition of the documents indicated below.

SMPTE RDD 45:2022, Interoperable Master Format – Application ProRes

SMPTE ST 2067-2, Interoperable Master Format – Core Constraints

SMPTE ST 2067-3:2020, Interoperable Master Format - Composition Playlist

Recommendation DPP003 Carriage of AMWA AS-11 Metadata in IMF: thedpp.com/downloads/_m/dpp003

SMPTE ST 377-42, MCA Label Controlled Vocabulary

SMPTE ST 2067-8, Interoperable Master Format – Common Audio Labels

AMWA AS-11 Media Contribution File Format Specifications: amwa.tv/as-11

3.2 Informative References

SMPTE ST 2067-9:2018, Interoperable Master Format – Sidecar Composition Map

SMPTE ER 1006:2021 35PM Study – Automated Processing with IMF OPL for TSP 2121 AMWA AS-11 Applications

Guidance DPP005 IMF Operational Guidance: thedpp.com/downloads/_m/dpp005

Guidance DPP004 IMF QC Workflows: thedpp.com/downloads/_m/dpp004

4 Overall

The normative provisions of SMPTE RDD 45:2022 shall apply in addition to those specified herein, unless specified otherwise.

5 Image Essence

5.1 Constraints

Implementations shall support the combinations of image characteristics listed in Table 1.

Table 1. Image Parameters

Image Frame Width	1920		3840	
Image Frame Height	1080		2160	
Frame Structure	Progressive			
Stereoscopy	Monoscopic Stereoscopic			
Frame Rate	24 24000/1001 25 30 30000/1001 50 60 60000/1001			
Sampling	4:2:2	4:4:4	4:2:2	4:4:4
Quantisation	QE.1	QE.1 QE.2	QE.1	QE.1 QE.2
Color Components	$Y'C_B'C_R'$	R′G′B′	$Y'C_B'C_R'$	R′G′B′
Colorimetry	COLOR.3 COLOR.5 COLOR.7 COLOR.8	 COLOR.5 COLOR.7 COLOR.8	COLOR.3 COLOR.5 COLOR.7 COLOR.8	 COLOR.5 COLOR.7 COLOR.8
Pixel Bit Depth	10	12	10	12

5.2 Coding

5.2.1 COLOR.8 color_primaries, transfer_characteristic and matrix_coefficients

The color_primaries, transfer_characteristic and matrix_coefficients parameters shall be set according to Table 2, when colorimetry is COLOR.8.

Table 2. Color Primaries, Transfer Characteristics and Matrix Coefficients

Colorimetry	color_primaries	transfer_characteristic	matrix_coefficients
COLOR.8	9	18	9

5.2.2 Quantization

COLOR.8 shall be constrained to QE1 quantization only (10 bit 64-940 / 12 bit 256 – 3760).

6 Image Track Files

6.1 Shim Parameters

The shim_id parameters shall be equal to value 2 specified in Table 4.

Other shim parameters shall be equal to those specified in SMPTE RDD 45:2022 Section 6.1.

6.2 Essence

Essence shall conform to section 5.

6.3 Wrapping

Image track parameters shall conform to SMPTE RDD 45:2022 section 6.3.

6.4 Profiles

SMPTE RDD 45:2022 Table 5 Encoding profiles shall be constrained to only those listed in Table 3 below.

Table 3. Coding Profiles

Sampling	ProRes Profile
4:2:2	422 HQ
4:4:4	4444
	4444 XQ

7 Application Identification

The provisions of SMPTE RDD 45:2022 Section 7.1 shall not apply.

The ApplicationIdentification element, as specified in SMPTE ST 2067-2, shall include exactly one instance of one of the values listed in Table 4.

Composition Play List (CPL) Readers/Parsers shall accept either value of Table 4.

CPL Writers shall use only value 2 of Table 4.

Table 4. Application Identification

1)	http://www.digitalproductionpartnership.co.uk/schema/imf/TSP2121-1/2018
2)	http://schema.thedpp.com/imf/RDD59-1/2021

8 Audio

The Multichannel Audio Label values specified in SMPTE ST 377-42 may be used in addition to those specified in SMPTE ST 2067-8, and they shall be treated in the same way. As such, all references to SMPTE ST 2067-8 in SMPTE ST 2067-2 shall be treated as references to both SMPTE ST 2067-8 and SMPTE ST 377-42.

9 Metadata

9.1 ContentKind Element

CPLs carrying the Application Identification entry 2 from Table 4 shall carry the header element “ContentKind”.

Where the CPL is carrying content which can be described using one of the values listed in Table 5, the ContentKind element shall contain that value, along with
“scope” = “http://schema.thedpp.com/imf/RDD59-1/2021#content-kind”

In other cases, an alternative scope and value may be used, including the values from Table 3 or 4 of SMPTE ST 2067-3:2020.

Table 5. ContentKind Values

Value	Description
programme	A television programme, whether one-off or an episode of a larger series.
commercial	Content promoting/advertising a product or service, other than upcoming content.
sponsorship	Content highlighting commercial sponsorship of a programme, usually played immediately before and/or after the programme, and generally considered part of the programme.
infomercial	Also known as teleshopping. Longform content designed to inform or educate the viewer about, and/or to promote, a product or service.
presentation_event	Interstitial content not promoting a specific product, service, or piece of content; including continuity announcements and other viewer information, usually for branding and viewer navigation. Can also refer to in-house/corporate presentations and public service announcements.
promotion	Content promoting other content or offerings, usually from the same content provider; including programmes, channels, seasons, websites, and so on.
music_video	Content featuring performance of a song for promotional or artistic purposes.

9.2 Additional static metadata

Additional static metadata required for creating AMWA AS-11 files from CPLs should be carried in accordance with Recommendation DPP003.

10 Output Profile List (OPL) (Informative)

The processing or transformation of compliant Interoperable Master Packages (IMPs) can be specified by OPLs. Within a given IMP each CPL that conforms to this specification could be referenced by at least one OPL in the same IMP. A usable OPL structure has been defined in SMPTE ER 1006:2021.