

SMPTE STANDARD

D-Cinema Packaging — DCP Operational Constraints for Immersive Audio



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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, Recommended Practices 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 Standards Operations Manual. SMPTE ST 429-19 was prepared by Technology Committee 21DC.

Intellectual Property

At the time of publication, no notice had been received by SMPTE claiming patent rights essential to the implementation of this Engineering Document. 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.

1 Scope

This document specifies the requirements and constraints for a D-Cinema Package (DCP) that contains Immersive Audio (SMPTE ST 2098-2) essence, in addition to the requirements and constraints as defined in SMPTE ST 429-2.

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

Note: All references in this document to other SMPTE documents use the current numbering style (e.g. SMPTE ST 382:2007) although, during a transitional phase, the document as published (printed or PDF) may bear an older designation (such as SMPTE 382M-2007). Documents with the same root number (e.g. 382) and publication year (e.g. 2007) are functionally identical.

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

SMPTE ST 429-2:2018 D-Cinema Packaging — DCP Operational Constraints

SMPTE ST 429-7:2006 D-Cinema Packaging — Composition Playlist

SMPTE ST 429-18:2019 D-Cinema Packaging — Immersive Audio Track File

SMPTE ST 2098-2:2019 Immersive Audio Bitstream Specification

SMPTE ST 430-16:2014 Additional Composition Metadata and Guidelines

SMPTE ST 430-12:2019 D-Cinema Operations — FSK Synchronization Signal

4 Glossary and Acronyms

In addition to the glossary terms and acronyms presented here, the reader should also be aware of terms defined in SMPTE ST 377, SMPTE ST 429-7 and SMPTE ST 428-7.

DCP	Digital Cinema Package
Immersive Audio	SMPTE 2098-2 Essence

5 DCP Constraints

5.1 Packaging Format

All compositions carrying an Immersive Audio essence track shall comply with the SMPTE packaging format as defined by SMPTE ST 429-2.

6 Composition Playlist Constraints

An Immersive Audio Composition shall be defined as any Composition that contains one or more Immersive Audio assets as defined by ST 429-18:2019 D-Cinema Packaging — Immersive Audio Track File.

6.1 Minimum Contents

All reels in a Composition Playlist that contain an Immersive Audio asset shall also contain a MainSound asset, with constraints as noted in Section 7.1.

6.2 Immersive Audio Tracks

Each reel of an Immersive Audio Composition should contain an Immersive Audio element, and each reel in a Composition Playlist that contains an Immersive Audio element, shall refer to a single AuxData track and CPL extension element as defined by ST 429-18:2019 D-Cinema Packaging — Immersive Audio Track File.

To maintain compliance with SMPTE ST 429-2, MainSound tracks shall be present on every reel and contain the same number of channels.

6.3 Additional CPL Metadata Guidelines

If utilizing the additional CPL metadata as defined within SMPTE ST 429-16, the `MainSoundConfiguration` element shall contain the symbol value token “FSKSync” for channel 14.

Additionally, if both an MCA sub descriptor extension within the CPL metadata and MCA sub descriptors within the MainSound track file are present, the UL and Label tokens used shall be defined as per SMPTE ST 430-12.

7 Track File Constraints

7.1 Sound Track Files

7.1.1 Sync Signal

All MainSound assets that are placed in a reel that contains an Immersive Audio asset shall reference a Sound Track File that contains an FSK synchronization signal as described by SMPTE ST 430-12, in container channel 14.

7.1.2 Channel Layout

Sound Track Files referenced by an Immersive Audio Composition shall not contain any essence that makes up the Immersive Sound program. Sound Track Files should only carry channels that do not

contribute to the Immersive Sound program or any defined soundfield. For example, Hearing Impaired tracks, Visually Impaired Narration tracks, or other tracks can be carried in Sound Track Files.

7.1.3 Audio ChannelAssignment

All Sound Track Files shall carry a ChannelAssignment Label indicating Configuration 4 as per SMPTE 429-2.

7.2 Immersive Audio Track Files

7.2.1 Wrapping

Immersive Audio essence shall be wrapped as defined by ST 429-18:2019 D-Cinema Packaging — Immersive Audio Track File.