

SMPTE REGISTERED DISCLOSURE DOCUMENT

Material Exchange Format — Mapping and Application of Apple ProRes



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Introduction

This section is entirely informative and does not form an integral part of this Registered Disclosure Document (RDD).

ProRes is a picture-by-picture (intra-frame) compression scheme. This RDD specifies the mapping of ProRes bitstreams (SMPTE RDD 36) into a subset of the MXF Generic Container (SMPTE ST 379-2). This RDD also describes application considerations.

MXF file encoders (file writers) require a ProRes bitstream for each picture, each picture's bitstream length, and additional technical metadata items. This metadata can be provided by a ProRes encoder or an application that synthesizes or acquires a ProRes bitstream from another source.

The goals for this MXF specification are to be straightforward to implement, to be as constrained as possible to maximize interoperability, but to be sufficient for the needs of:

- Video camera recording.
- Use in broadcast environments, including playout servers and asset management systems.
- Use in professional video editing and preview, which require: fast file-open time, efficient file playback, and ability to edit while file is being recorded.
- Compatibility considerations for possible future application efforts such as IMF and AS-11.

References to other documents have the section or table number and the section title or table caption in parentheses.

1 Scope

This Registered Disclosure Document (RDD) specifies the mapping of ProRes bitstreams into a subset of the MXF Generic Container (SMPTE ST 379-2). This document also defines application restrictions. The ProRes bitstream is documented by SMPTE RDD 36:2015. ProRes bitstreams are mapped into a Picture Essence Track of the MXF Generic Container with Frame Wrapping. This RDD defines the KLV coding, the required Keys (Universal Labels) and MXF Picture Essence Descriptor items.

2 Conformance Notation

This RDD uses the conformance notation specified in SMPTE ST 377-1.

3 Normative References

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

SMPTE ST 377-1:2011, Material Exchange Format (MXF) — File Format Specification

Amendment 1:2012 to SMPTE ST 377-1:2011

Amendment 2:2012 to SMPTE ST 377-1:2011

SMPTE ST 379-2:2010, Television — Material Exchange Format (MXF) — MXF Constrained Generic Container

SMPTE ST 2067-5:2013, Interoperable Master Format — Essence Component

Amendment 1:2016 to SMPTE ST 2067-5:2013

4 Glossary of Acronyms, Terms and Data Types

The general glossary of acronyms, terms and data types used in the MXF specification is given in SMPTE ST 377-1 and is supplemented in SMPTE ST 379-2. These glossaries are not repeated here to avoid any divergence of meaning. In this document, terms are used as defined by SMPTE ST 377-1 in preference to any definition specific to SMPTE ST 379-2.

5 ProRes Mapping Specifications and Application Considerations

The ProRes container shall be compliant with SMPTE ST 379-2 with constraints defined in the following sections.

5.1 Essence Containers

5.1.1 Files with a Single Picture Essence Track

A Content Item is comprised of one or more Content Element(s), each of which shall contain a single picture (one full video frame) as illustrated in Figure 1.

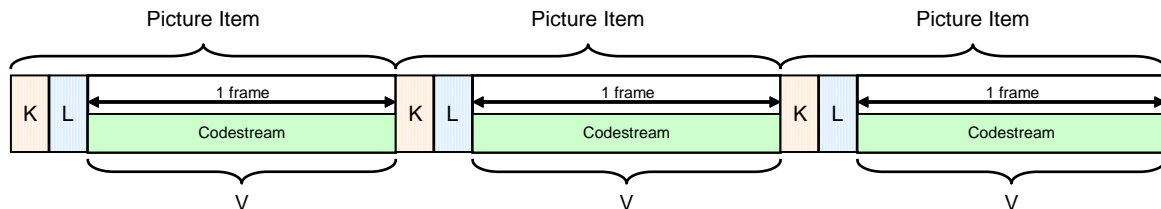


Figure 1 – Frame Wrapping of Picture Elements in the Generic Container

5.1.2 Files with Multiple Essence Tracks

The ProRes pictures may be interleaved with other essence components (Sound or Data) in the Frame Wrapped Essence Container as illustrated in Figure 2. Other essence components shall be as defined by an MXF mapping standard or a SMPTE RDD. All Essence Elements (Generic Container Content Elements) shall be Frame Wrapped. Each Picture (one full video frame) should contain essence data that is independent of adjacent pictures.

Other MXF standards may place additional requirements on the Content Element sequences in a Content Package.

Note: The term Frame Wrapping is defined by SMPTE ST 379-2 as the individual wrapping of one Content Package having a basic sample unit. This basic sample unit is defined by the ProRes bitstream and can be the result of compression of two fields from an interlaced scanned picture or one frame from a progressively scanned picture.