

SMPTE STANDARD



VC-5 Video Essence – Part 5: Layers

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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 its Standards Operations Manual. This SMPTE Engineering Document 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 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.

Introduction

This section is entirely informative and does not form an integral part of this Engineering Document.

SMPTE ST 2073-1, ST 2073-3, and ST 2973-4 define the representation of a single image in a bitstream.

One or more images compatible with SMPTE ST 2073-1, ST 2073-3, or ST 2073-4 can be represented in a single VC-5 bitstream using the extensions defined in this standard.

This standard enables multiple images to be represented in a VC-5 bitstream. Each individual image in the bitstream is called a layer. Each layer can be decoded into a separate image. Layers can be used to represent stereo images, bracketed exposures, interlaced fields, and tiled images, among other use cases. An image repacking process (for example as described in SMPTE ST 2073-1) can compose images from multiple layers into a single displayable image.

1 Scope

This standard defines extensions to ST 2073-1 to support the representation of multiple images in a single VC-5 bitstream. Each of the individual images is called a layer. All layers present in the bitstream have the same width, height, number of channels, and image format.

This standard defines mechanisms for representing stereo images, multiple exposure values, interlaced fields, and tiled images in a single bitstream.

This standard is backward compatible such that a decoder that does not support these extensions will decode the first layer in the bitstream into a single displayable image.

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.

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; then formal languages; then figures; and then any other language forms.

3 Normative References

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

SMPTE ST 2073-1:2014 VC-5 Video Essence. Part 1: Elementary Bitstream.

SMPTE ST 2073-3:201x VC-5 Video Essence. Part 3: Image Formats.

SMPTE ST 2073-4:201x VC-5 Video Essence. Part 4: Subsampled Color Difference Components.

4 Terms and Definitions

For the purposes of this document, the following terms and definitions apply.

4.1 Layers

Independently decodable images that share a common bitstream header.

5 Layer Syntax and Structure

5.1 Layer Overview

This standard extends other VC-5 standards to allow multiple images to be represented in a single bitstream by encoding each individual image as a separate layer (Figure 1). This standard is backward compatible with other VC-5 standards: A decoder that is not compliant with this standard will decode the first layer and ignore the remaining layers.