SMPTE STANDARD

4320-line and 2160-line Source Image and Ancillary Data Mapping for Dual-link 12G-SDI

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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.

SMPTE ST 2082-11 Document was prepared by Technology Committee 32NF.

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

SMPTE ST 2082-11 defines the mapping of various source images and associated ancillary data into a Dual-link 12 Gb/s [nominal] SDI bit-serial interface.

The general process for creating a dual-link 12G-SDI is illustrated below in Figures 1 and 2. Detailed definitions of how this process applies to each of the modes defined in the scope follow in other sections of this document.

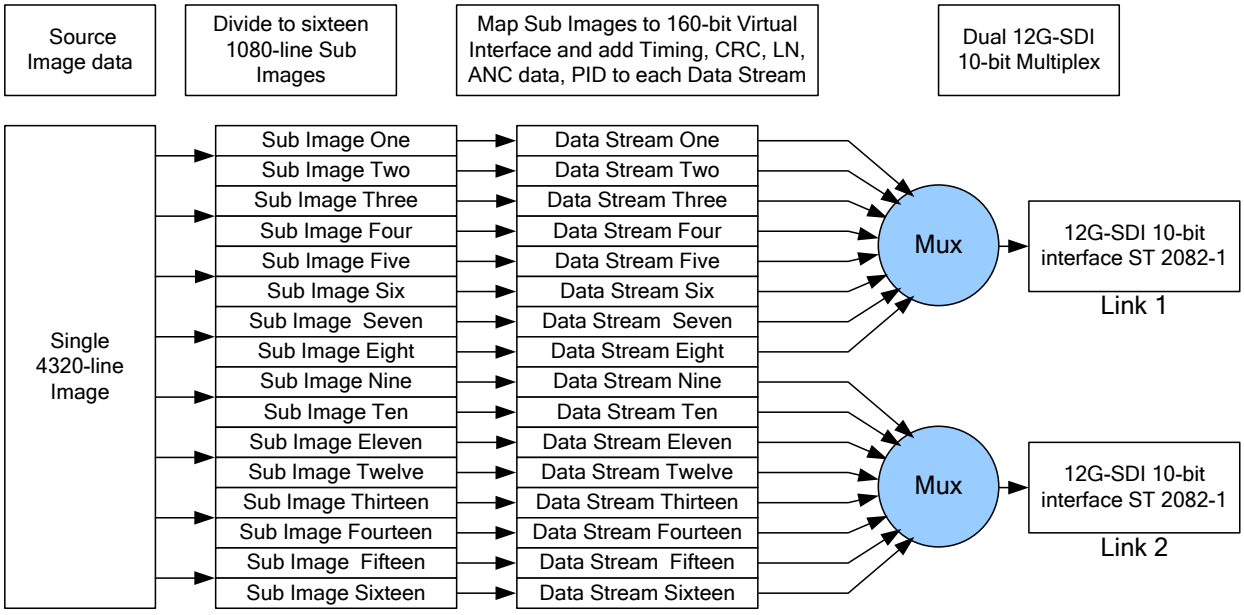

Figure 1 – Carriage of 4320-line images in a Dual-link 12G interface — generalized process as used by Mode 1

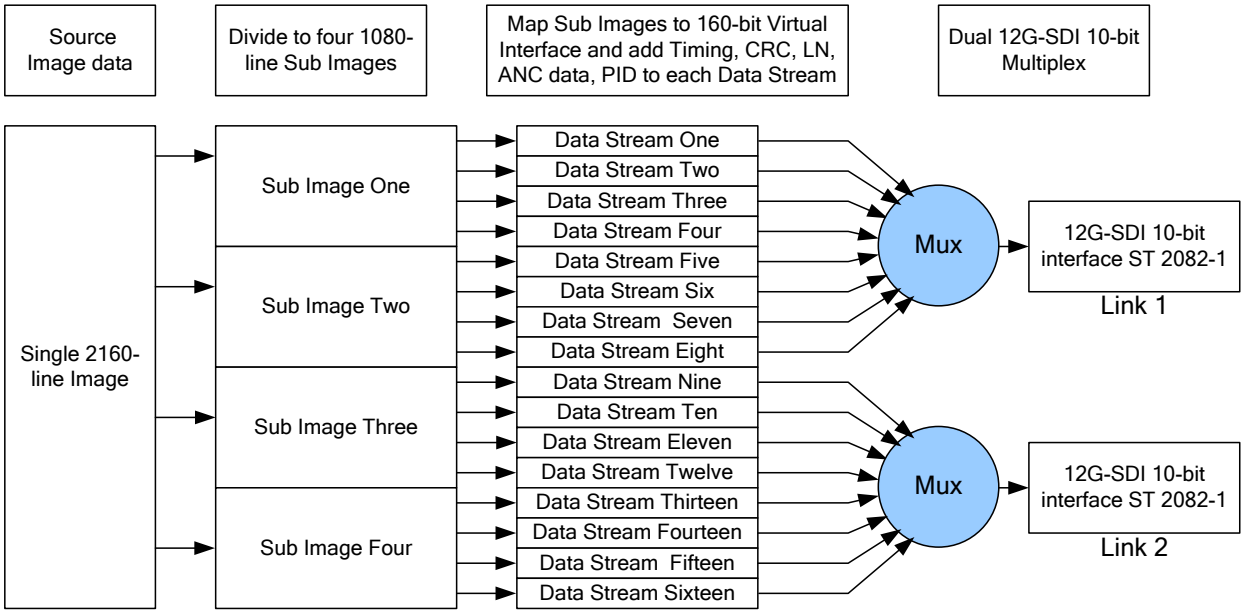

Figure 2 – Carriage of 2160-line images in a Dual-link 12G interface — generalized process as used by Mode 2 and Mode 3

Formatting

The source images are divided into four or sixteen 1080-line sub images as appropriate to the source image format.

The sub images are then mapped on to a 160-bit virtual interface consisting of sixteen 10-bit data streams.

Each 10-bit data stream includes timing and sync words, line numbers, cyclic redundancy codes, ancillary data, including audio, and payload identification packets.

Multiplex

The 160-bit virtual interface is multiplexed onto two 12G-SDI 10-bit interfaces.

The first eight data streams are multiplexed in the order data stream eight, data stream four, data stream six, data stream two, data stream seven, data stream three, data stream five, data stream one …onto 12G-SDI Link 1.

The second eight data streams are multiplexed in the order data stream sixteen, data stream twelve, data stream fourteen, data stream ten, data stream fifteen, data stream eleven, data stream thirteen, data stream nine …onto 12G-SDI Link 2.

1 Scope

This Standard defines the mapping of:

- **MODE 1:** 4320-line Y′C′$_B$C′$_R$ 4:2:2 and 4:2:0 10-bit image formats and ancillary data into a Dual-link 12 Gb/s [nominal] SDI bit-serial interface
- **MODE 2:** 2160-line R′G′B′, Y′C′$_B$C′$_R$ 4:4:4(:4) 10-bit and 4:4:4 12-bit image formats and ancillary data into a Dual-link 12 Gb/s [nominal] SDI bit-serial interface
- **MODE 3:** 2160-line Y′C′$_B$C′$_R$ 4:2:2 and 4:2:0 10-bit Additional Frame Rate Source image formats and ancillary data into a Dual-link 12 Gb/s [nominal] SDI bit-serial interface

This Standard also defines the carriage of the SMPTE ST 352 payload ID's for the Dual-link 12Gb/s SDI interface.

It is not necessary for implementations to include support for all formats that are included in this Standard. Implementers should indicate supported formats in commercial publications.

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