SMPTE STANDARD

4320-line and 2160-line Source Image and Ancillary Data Mapping for Quad-link 6G-SDI

Table of Contents

Approved
June 15, 2016

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 2081-12 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 2081-12 defines the mapping of various source images and associated ancillary data into a Quad-link 6 Gb/s [nominal] SDI bit-serial interface.

The general process for creating a quad-link 6G-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.

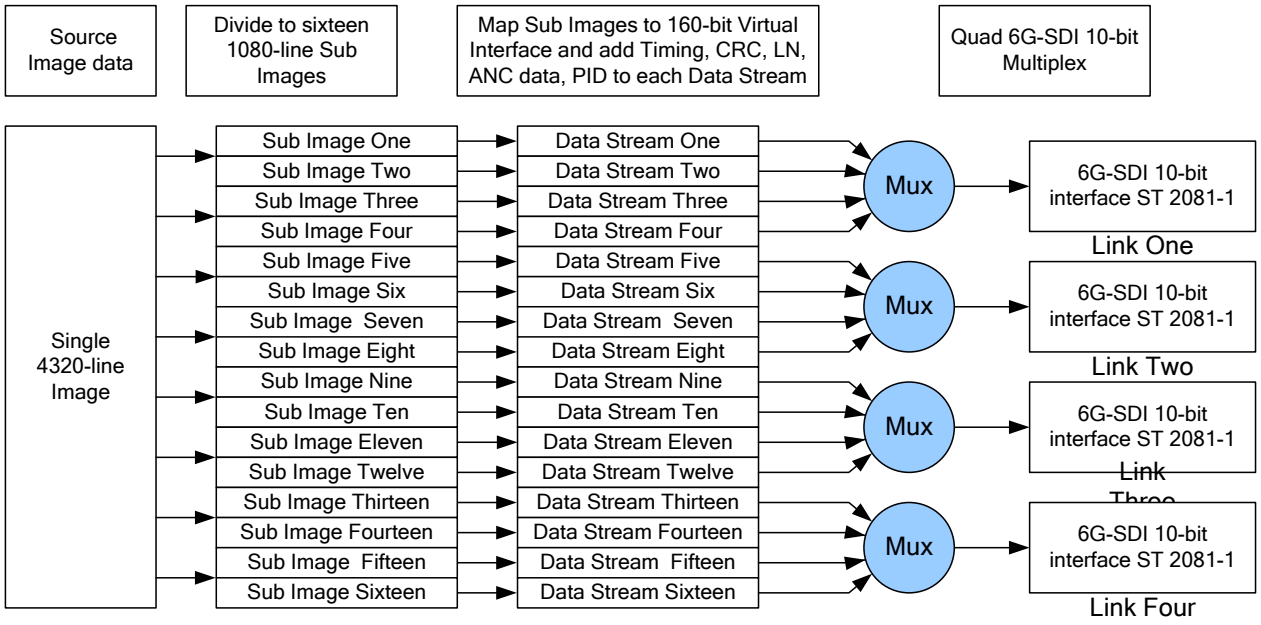

Figure 1 – Carriage of 4320-line Images on a Quad-link 6G interface — generalized process as used for Mode 1

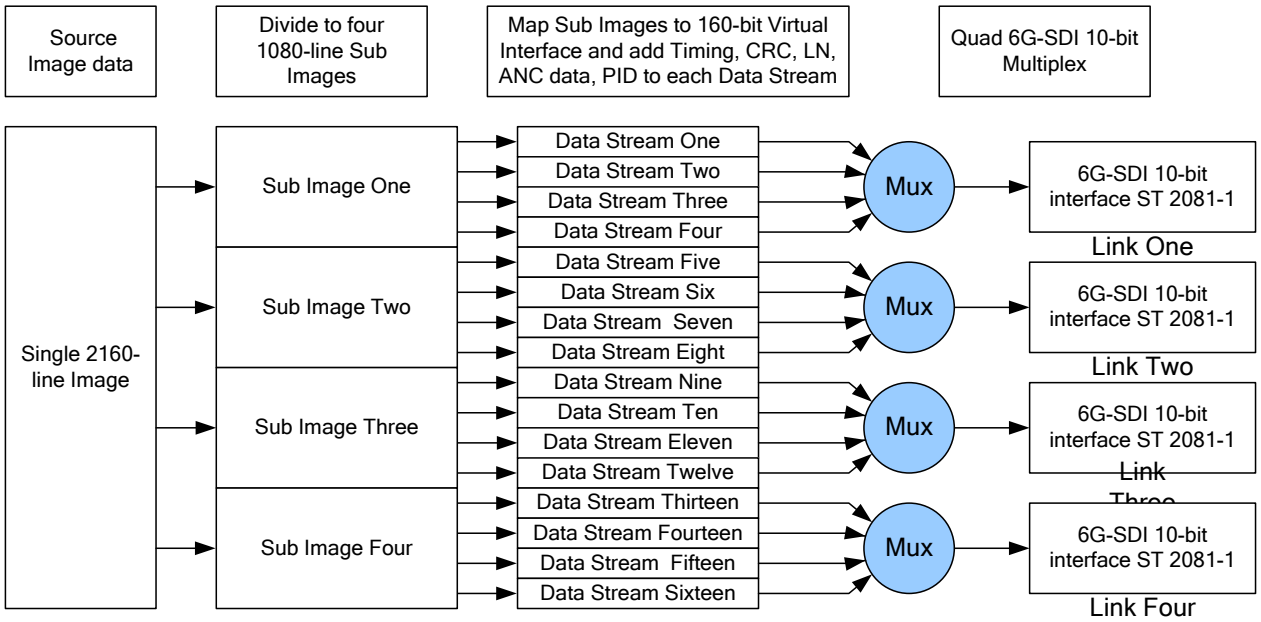

Figure 2 – Carriage of 2160-line Images on a Quad-link 6G interface — generalized process as used for Mode 2 and Mode 3

The source images are divided to 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 then multiplexed onto four 6G-SDI 10-bit interfaces.

The first four data streams are multiplexed in the order data stream four, data stream two, data stream three, data stream one…onto 6G-SDI Link 1.

The second four data streams are multiplexed in the order data stream eight, data stream six, data stream seven, data stream five…onto 6G-SDI Link 2.

The third four data streams are multiplexed in the order data stream twelve, data stream ten, data stream eleven, data stream nine…onto 6G-SDI Link 3.

The fourth four data streams are multiplexed in the order data stream sixteen, data stream fourteen, data stream fifteen, data stream thirteen…onto 6G-SDI Link 4.

1 Scope

This standard defines the mapping of:

- **MODE 1:** 4320-line $Y'C'_BC'_R$ 4:2:2 and 4:2:0 10-bit image formats and ancillary data on a Quad-link 6 Gb/s [nominal] SDI bit-serial interface.
- **MODE 2:** 2160-line $R'G'B'$, $Y'C'_BC'_R$ 4:4:4(:4) 10-bit and 4:4:4 12-bit image formats and ancillary data on a Quad-link 6 Gb/s [nominal] SDI bit-serial interface.
- **MODE 3:** 2160-line $Y'C'_BC'_R$ 4:2:2 and 4:2:0 10-bit Additional Frame Rate Source image formats and ancillary data on a Quad-link 6 Gb/s [nominal] SDI bit-serial interface.

This standard also defines the carriage of the SMPTE ST 352 payload ID's for the Quad-link 6Gb/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.