

SMPTE OVERVIEW

12G-SDI Bit-Serial Interfaces — Overview for the SMPTE ST 2082 Document Suite



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Document Overview

The SMPTE ST 2082 suite of documents defines the mapping of various source image formats onto a single-link, dual-link and quad-link serial digital interface operating at a nominal rate of 12 Gb/s. This informative “roadmap” describes the documents in the SMPTE ST 2082 suite.

The SMPTE ST 2082 series specify a common virtual interface that is carried on electrical physical interfaces which are also defined in the document suite and on optical physical interfaces.

The diagram of Figure 1 illustrates a simplified ‘Image mapping data flow’ roadmap for the 12G-SDI profile as defined by the ST 2082 document suite. The individual roadmaps of the SMPTE ST 2082 standards include additional details of reference standards.

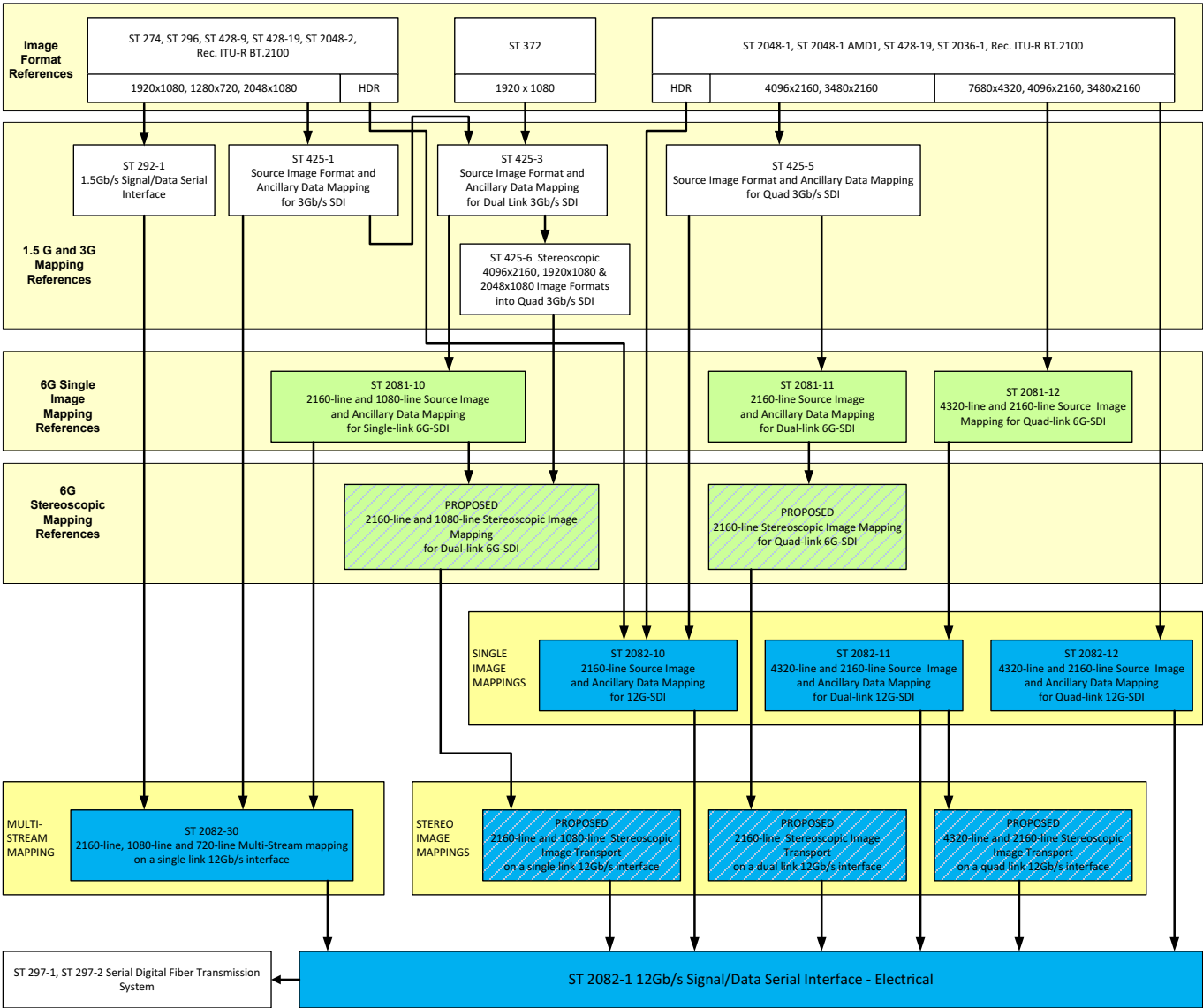


Figure 1 – 12G-SDI Profile

1 SMPTE ST 2082-1 – 12 Gb/s Signal/Data Serial Interface — Electrical

This standard defines a bit-serial data structure, electrical signal and coaxial cable interface for the transport of signals with a total payload of 11.88 Gb/s or 11.88/1.001 Gb/s.

This standard also specifies the electrical and physical characteristics of coaxial cables and connectors.

2 SMPTE ST 2082-10 – 2160-line and 1080-line Source Image and Ancillary Data Mapping for 12G-SDI

This standard defines the carriage of 2160-line and 1080-line image formats and associated ancillary data into a Single-link 12 Gb/s [nominal] SDI bit-serial interface as follows:

- **MODE 1:** 2160-line Standard Dynamic Range (SDR) and High Dynamic Range (HDR) Source image formats and ancillary data into a 12G-SDI 10-bit interface as defined in section 6 Single-link 12G-SDI 10-bit Multiplex
- **Mode 2:** 1080-line High Frame Rate (HFR) Standard Dynamic Range (SDR) and High Dynamic Range (HDR) Source formats and ancillary data into a 12G-SDI 10-bit interface as defined in section 6 Single-link 12G-SDI 10-bit Multiplex

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

2.1 SMPTE ST 2082-10 Supported Image Formats

UHDTV1 and 4K Digital Cinematography Production, SDR and HDR			
Reference Standard	Image Format	Signal Format Sampling Structure/pixel Depth	Frame Rate
SMPTE ST 2036-1 Rec. ITU-R BT.2100	3840 × 2160	4:2:2 (Y'C _B C _R)/10-bit 4:2:2 (I _{C_T} C _P ^{*4})/10-bit, 4:2:0 (Y'C _B C _R)/10-bit 4:2:0 (I _{C_T} C _P ^{*4})/10-bit	50, 60/1.001 and 60 frames progressive
SMPTE ST 2048-1	4096 × 2160 ^{*2}	4:2:2 (Y'C _B C _R)/10-bit	48/1.001, 48, 50, 60/1.001 and 60 frames progressive
SMPTE ST 2036-1 Rec. ITU-R BT.2100	3840 × 2160	4:4:4 (R'G'B')/10-bit 4:4:4:4 (R'G'B'+A ^{*3})/10-bit	24/1.001, 24, 25, 30/1.001 and 30 Progressive
SMPTE ST 2048-1	4096 × 2160 ^{*2}	4:4:4 (R'G'B') ^{*1} , 4:4:4:4 (R'G'B'+A ^{*3})/10-bit	
SMPTE ST 2036-1 Rec. ITU-R BT.2100	3840 × 2160	4:4:4 (Y'C _B C _R)/10-bit 4:4:4:4 (Y'C _B C _R +A ^{*3})/10-bit 4:4:4 (I _{C_T} C _P ^{*4})/10-bit 4:4:4:4 (I _{C_T} C _P ^{*4} +A ^{*3})/10-bit	
SMPTE ST 2048-1	4096 × 2160 ^{*2}	4:4:4 (Y'C _B C _R) 4:4:4:4 (Y'C _B C _R +A ^{*3})/10-bit	
SMPTE ST 2036-1 Rec. ITU-R BT.2100	3840 × 2160	4:4:4 (R'G'B')/12-bit	
SMPTE ST 2048-1	4096 × 2160 ^{*2}	4:4:4 (R'G'B') ^{*1} /12-bit	
SMPTE ST 2036-1 Rec. ITU-R BT.2100	3840 × 2160	4:4:4 (Y'C _B C _R)/12-bit 4:4:4 (I _{C_T} C _P ^{*4})/12-bit	
SMPTE ST 2048-1	4096 × 2160 ^{*2}	4:4:4 (Y'C _B C _R)/12-bit	
SMPTE ST 2036-1 Rec. ITU-R BT.2100	3840 × 2160	4:2:2 (Y'C _B C _R)/12-bit 4:2:2 (Y'C _B C _R +A ^{*3})/12-bit 4:2:2 (I _{C_T} C _P ^{*4})/12-bit 4:2:2 (I _{C_T} C _P ^{*4} +A ^{*3})/12-bit	

		4:2:0 (Y'C _B C _R)/12-bit 4:2:0 (Y'C _B C _R +A ³)/12-bit 4:2:0 (IC _{TC} P ^{*4})/12-bit 4:2:0 (IC _{TC} P ^{*4} +A ³)/12-bit	
SMPTE ST 2048-1	4096 × 2160 ^{*2}	4:2:2 (Y'C _B C _R)/12-bit	
SMPTE ST 2048-1	4096 × 2160 ^{*2}	4:2:2:4 (Y'C _B C _R +A ³)/12-bit	
HFR HDTV and 2K Digital Cinematography Production, SDR and HDR			
Reference Standard	Image Format	Signal Format Sampling Structure/pixel Depth	Frame Rate
Rec. ITU-R BT.2100	1920 x 1080	4:4:4 (R'G'B')/10-bit 4:4:4:4 (R'G'B'+A ³)/10-bit 4:4:4 (Y'C _B C _R)/10-bit 4:4:4:4 (Y'C _B C _R +A ³)/10-bit 4:4:4 (IC _{TC} P ^{*4})/10-bit 4:4:4:4 (IC _{TC} P ^{*4} +A ³)/10-bit	120 frames progressive
			120/1.001 frames progressive
			100 frames progressive
SMPTE ST 2048-1	2048 x 1080 ^{*2}	4:4:4 (R'G'B' ^{*1})/10-bit, 4:4:4:4 (R'G'B' ^{*1} +A ³)/10-bit, 4:4:4 (Y'C _B C _R)/10-bit, 4:4:4:4 (Y'C _B C _R +A ³)/10-bit	120 frames progressive
			120/1.001 frames progressive
			100 frames progressive
			96 frames progressive
			96/1.001 frames progressive
Rec. ITU-R BT.2100	1920 x 1080	4:4:4 (R'G'B' ^{*1})/12-bit, 4:4:4 (Y'C _B C _R)/12-bit 4:4:4 (IC _{TC} P ^{*4})/12-bit	120 frames progressive
			120/1.001 frames progressive
			100 frames progressive
SMPTE ST 2048-1	2048 x 1080 ^{*2}	4:4:4 (R'G'B' ^{*1})/12-bit, 4:4:4 (Y'C _B C _R)/12-bit	120 frames progressive
			120/1.001 frames progressive
			100 frames progressive
			96 frames progressive
			96/1.001 frames progressive
Rec. ITU-R BT.2100	1920 x 1080	4:2:2 (Y'C _B C _R)/12-bit 4:2:2:4 (Y'C _B C _R +A ³)/12-bit 4:2:2 (IC _{TC} P ^{*4})/12-bit 4:2:2:4 (IC _{TC} P ^{*4} +A ³)/12-bit 4:2:0 (Y'C _B C _R)/12-bit 4:2:0 (IC _{TC} P ^{*4})/12-bit	120 frames progressive
			120/1.001 frames progressive
			100 frames progressive
SMPTE ST 2048-1	2048 x 1080 ^{*2}	4:2:2 (Y'C _B C _R)/12-bit	120 frames progressive
			120/1.001 frames progressive