



VIDEO SERVICES FORUM

Video Services Forum (VSF) Technical Recommendation TR-10-15 Part 1

Internet Protocol Media Experience (IPMX):
JPEG XS Codec Requirements for Compressed
Video



September 22, 2026

This work is licensed under the Creative Commons Attribution-NoDerivatives 4.0 International License. To view a copy of this license, visit <https://creativecommons.org/licenses/by-nd/4.0/>

or send a letter to Creative Commons, PO Box 1866, Mountain View, CA 94042, USA.



<http://www.videoservicesforum.org>

INTELLECTUAL PROPERTY RIGHTS

RECIPIENTS OF THIS DOCUMENT ARE REQUESTED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT CLAIMS OR OTHER INTELLECTUAL PROPERTY RIGHTS OF WHICH THEY MAY BE AWARE THAT MIGHT BE INFRINGED BY ANY IMPLEMENTATION OF THE RECOMMENDATION SET FORTH IN THIS DOCUMENT, AND TO PROVIDE SUPPORTING DOCUMENTATION.

THIS RECOMMENDATION IS BEING OFFERED WITHOUT ANY WARRANTY WHATSOEVER, AND IN PARTICULAR, ANY WARRANTY OF NONINFRINGEMENT IS EXPRESSLY DISCLAIMED. ANY USE OF THIS RECOMMENDATION SHALL BE MADE ENTIRELY AT THE IMPLEMENTER'S OWN RISK, AND NEITHER THE FORUM, NOR ANY OF ITS MEMBERS OR SUBMITTERS, SHALL HAVE ANY LIABILITY WHATSOEVER TO ANY IMPLEMENTER OR THIRD PARTY FOR ANY DAMAGES OF ANY NATURE WHATSOEVER, DIRECTLY OR INDIRECTLY, ARISING FROM THE USE OF THIS RECOMMENDATION.

LIMITATION OF LIABILITY

VSF SHALL NOT BE LIABLE FOR ANY AND ALL DAMAGES, DIRECT OR INDIRECT, ARISING FROM OR RELATING TO ANY USE OF THE CONTENTS CONTAINED HEREIN, INCLUDING WITHOUT LIMITATION ANY AND ALL INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING DAMAGES FOR LOSS OF BUSINESS, LOSS OF PROFITS, LITIGATION, OR THE LIKE), WHETHER BASED UPON BREACH OF CONTRACT, BREACH OF WARRANTY, TORT (INCLUDING NEGLIGENCE), PRODUCT LIABILITY OR OTHERWISE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH

DAMAGES. THE FOREGOING NEGATION OF DAMAGES IS A FUNDAMENTAL ELEMENT OF THE USE OF THE CONTENTS HEREOF, AND THESE CONTENTS WOULD NOT BE PUBLISHED BY VSF WITHOUT SUCH LIMITATIONS.

Executive Summary

Internet Protocol Media Experience (IPMX) was created to foster the adoption of open standards-based protocols for interoperability over IP in the media and entertainment and professional audio/video industries. IPMX is based on the SMPTE ST 2110 standard and as such the VSF TR-10 suite of Technical Recommendations is a set of differences between SMPTE ST 2110 and IPMX.

This Technical Recommendation documents the minimum requirements for an IPMX device with respect to the use of the JPEG XS video codec in TR-10-11 streaming use-cases.

Table of Contents

1	Introduction (Informative)	5
2	Contributors	5
3	About the Video Services Forum.....	5
4	Conformance Notation.....	6
5	Normative References.....	8
6	Definitions.....	8
7	General Provisions	8
7.1	SubLevel	9
8	IPMX JPEG XS Profile (IPMX-JPEG-XS).....	9
8.1	IPMX JPEG XS TDC Profile Mode (IPMX-JPEG-XS-TDC)	10
9	JPEG XS Media Info Block.....	10
9.1	Example	12

1 Introduction (Informative)

IPMX, which stands for Internet Protocol Media Experience, is based on two families of specifications. The SMPTE ST 2110 Professional Media Over Managed IP Networks suite of standards for the transport of video, audio, and ancillary/control signals over IP networks, and the NMOS REST APIs from AMWA, which provide discovery, connection management, and control.

IPMX is an accessible, open standard that meets the needs of professional and consumer video and audio users in a wide variety of contexts while giving manufacturers and developers what they need to build low-latency, interoperable, IP based audiovisual products or applications.

This document covers the JPEG XS video codec requirements for IPMX. Other aspects of the IPMX system and their individual requirements are documented in other parts of this Technical Recommendation.

2 Contributors

The following individuals participated in the Video Services Forum IPMX working group that developed this technical recommendation.

Alain Bouchard (Matrox)	Kyle Wilken (Cobalt Digital)
Amanda Douglass (Macnica)	Leigh Whitcomb (Meinberg)
Andre Testa (Matrox)	Paulo Francisco (Evertz)
Andreas Hildebrand (RAVENNA)	Phil Bernal (PB Technologies Group)
Dan Holland (DHC)	Raymond Hermans (Adeas)
Danny Pierini (Matrox)	Ryan Wallenberg (Cobalt)
Hung Lam (EvertzAV)	Tim Bruylants (intoPIX)
Jack Douglass (PacketStorm)	
Jean Lapierre (Matrox)	
Jean-Jacques Osytiguy (Matrox)	
Jed Deame (Nextera)	
Jeroen Steendam (DekTec)	

3 About the Video Services Forum

The Video Services Forum, Inc. (www.videoservicesforum.org) is an international association dedicated to video transport technologies, interoperability, quality metrics and education. The VSF is composed of [service providers, users and manufacturers](#). The organization's activities include:

- providing forums to identify issues involving the development, engineering, installation, testing and maintenance of audio and video services;
- exchanging non-proprietary information to promote the development of video transport service technology and to foster resolution of issues common to the video services industry;

- identification of video services applications and educational services utilizing video transport services;
- promoting interoperability and encouraging technical standards for national and international standards bodies.

The VSF is an association incorporated under the Not For Profit Corporation Law of the State of New York. [Membership](#) is open to businesses, public sector organizations and individuals worldwide. For more information on the Video Services Forum or this document, please call +1 929-279-1995 or e-mail opsmgr@videoservicesforum.org.

4 Conformance Notation

Normative text describes elements of the design that are indispensable or contain the conformance language keywords: "shall," "should," or "may."

Informative text 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 and 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 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.

5 Normative References

- TR-10-1:2024 Internet Protocol Media Experience (IPMX): System Timing and Definitions
- TR-10-11:2022 Internet Protocol Media Experience (IPMX): Constant Bit-Rate Compressed Video
- Internet Engineering Task Force (IETF) RFC 3550 RTP: A Transport Protocol for Real-Time Applications available at <https://www.ietf.org/rfc/rfc3550.txt>
- Internet Engineering Task Force (IETF) RFC 9134 ¹ RTP Payload Format for ISO/IEC 21122 (JPEG XS) available at <https://datatracker.ietf.org/doc/html/rfc9134>
- BCP-004-01 NMOS Receiver Capabilities available at <https://specs.amwa.tv/bcp-004-01>
- BCP-004-02 NMOS Sender Capabilities available at <https://specs.amwa.tv/bcp-004-02>
- BCP-006-01 NMOS With JPEG XS available at <https://specs.amwa.tv/bcp-006-01>
- TR-08 "Transport of JPEG XS Video in ST 2110-22" available at https://static.vsf.tv/download/technical_recommendations/VSF_TR-08_2026-05-26.pdf
- ISO/IEC 21122-1:2024: "Information technology — JPEG XS low-latency lightweight image coding system — Part 1: Core coding system"
- ISO/IEC 21122-2:2024: "Information technology — JPEG XS low-latency lightweight image coding system — Part 2: Profiles and buffer models"

6 Definitions

For the purposes of this document, the terms, and definitions of VSF TR-10-1 and the following apply.

NMOS	AMWA Networked Media Open Specifications
JPEG XS Sender	An IPMX Sender configured to produce a JPEG XS coded stream.
JPEG XS Receiver	An IPMX Receiver capable of consuming a JPEG XS coded stream.
TDC	JPEG XS Temporal Differential Coding

7 General Provisions

An IPMX Sender producing a JPEG XS coded stream shall comply with the VSF TR-10-11 Technical Recommendation and section 8.1 of the VSF TR-08 Technical Recommendation.

The video signal shall be compressed using a JPEG XS codec that conforms to the ISO/IEC 21122-1 and ISO/IEC 21122-2 (JPEG XS) specifications.

¹ An update for RFC 9134 will be published as a new RFC with a new number. It will contain clarifications regarding interlace video, add support for the TDC profile, and integrate the errata of RFC 9134, while it maintains backward compatibility for XS High. RFC 9134 remains a valid normative reference when a TDC profile is not used. For TDC profile information the RFC draft is available here <https://datatracker.ietf.org/doc/draft-ietf-avtcore-rtp-jpegxs-3ed/01/>.

An IPMX Sender producing a JPEG XS coded stream shall comply with the NMOS BCP-006-01 specification.

The JPEG XS coded stream shall be encapsulated into RTP using the payload format described in RFC 9134.

An IPMX Receiver shall communicate its capabilities for the “video/jxsv” media type through BCP-004-01, Receiver Capabilities.

An IPMX Sender shall communicate its capabilities for the “video/jxsv” media type through BCP-004-02, Sender Capabilities. An IPMX Sender may publish partial capabilities.

Note: Partial capabilities can occur when certain parameters depend on variable external conditions (e.g., detected signal characteristics), and are therefore not fully determinable at all times.

7.1 SubLevel

The **sublevel** requirements of VSF TR-08 section 8.1 are amended by the following ones for bit rates above 4 bpp; all other items in section 8.1 remain unchanged.:

- A JPEG XS Sender may set the Sublevel to bpp values above Sublev4bpp.
- A JPEG XS Sender may support compression bit rates above 4 bpp.
- A JPEG XS Receiver may support compression bit rates above 4 bpp.

Note: Unlike VSF TR-08, which restricts sublevels to Sublev3bpp and Sublev4bpp, IPMX explicitly allows the use of sublevels above 4 bpp. This extension provides additional flexibility for higher quality or lower compression use cases, while ensuring interoperability at ≤ 4 bpp where all implementations are required to conform.

8 IPMX JPEG XS Profile (IPMX-JPEG-XS)

A JPEG XS Sender compliant with the IPMX-JPEG-XS Profile shall support the High444.12 profile (from ISO/IEC 21122-2) with either of the following configurations, as defined in TR-08 section 8.1.1:

- 3 color components, 10-bit, with a 4:2:2 YCbCr sampling,
- 3 color components, 8-bit, with a 4:4:4 RGB sampling.

A JPEG XS Sender may support additional profiles, color samplings, and bit depths beyond these minimum requirements.

A JPEG XS Receiver compliant with the IPMX-JPEG-XS Profile shall support the High444.12 profile (from ISO/IEC 21122-2) with both of the following configurations, as defined in TR-08 section 8.1.1:

- 3 color components, 10-bit, with a 4:2:2 YCbCr sampling,
- 3 color components, 8-bit, with a 4:4:4 RGB sampling.

A JPEG XS Receiver may support additional profiles, color samplings, and bit depths beyond these minimum requirements.

8.1 IPMX JPEG XS TDC Profile Mode (IPMX-JPEG-XS-TDC)

A JPEG XS Sender compliant with the IPMX-JPEG-XS-TDC Profile Mode shall support the IPMX-JPEG-XS Profile.

A JPEG XS Sender compliant with the IPMX-JPEG-XS-TDC Profile Mode shall support the TDC444.12 profile (from ISO/IEC 21122-2) with either of the following configurations, as defined in TR-08 section 8.1.1:

- 3 color components, 10-bit, with a 4:2:2 YCbCr sampling,
- 3 color components, 8-bit, with a 4:4:4 RGB sampling.

A JPEG XS Sender may support additional profiles, color samplings, and bit depths beyond these minimum requirements.

A JPEG XS Receiver compliant with the IPMX-JPEG-XS-TDC Profile Mode shall support the TDC444.12 profile (from ISO/IEC 21122-2) with both of the following configurations, as defined in TR-08 section 8.1.1:

- 3 color components, 10-bit, with a 4:2:2 YCbCr sampling,
- 3 color components, 8-bit, with a 4:4:4 RGB sampling.

A JPEG XS Receiver may support additional profiles, color samplings, and bit depths beyond these minimum requirements.

9 JPEG XS Media Info Block

A JPEG XS coded stream shall carry, in the RTCP Sender Report, an additional Media Info Block of type 0x0008, immediately following the Media Info Block of type 0x0003 described in TR-10-11.

The Media Info Block of type 0x0008 carries JPEG XS codec-specific information in the following binary format. Multi-bytes fields are expressed in network byte order (big-endian).

9.1 Example

Example: “packetmode=0; profile=High444.12; level=2k-1; sublevel=Sublev3bpp;
transmode=1”

```
+=====+
| Media Info Block type = 0x0008|   Media Info Block length = 2 |
+-----+
|1|0|0 0 0 0 0 0 0 0 0 0 0 0 0 0|0 1 0 0 1 0 1 0 0 1 0 0 0 0 0 0|
+-----+
|0 0 0 1 0 0 0 0 0 0 0 0 0 0 1 0 0|0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0|
+-----+
```