



Australian project

(Information material for negotiations of the representatives of the Moravian Museum with the Australian taker on the purchase of documentary series featuring the Czechoslovak scientific expedition of the Moravian Museum - Anthropos Institute to Australia in 1969)

Nine documentary films:

1st part of the series - ***Through Australia from the South to the North*** (Expedition Rembaranka 1989) – **footage 30:06 min., in colour.** First part of the trip of the Czechoslovak scientific expedition of the Moravian Museum to Australia, the film shows a part of the ride of three expedition vehicles with crews from the South coast over Coober Pedy and the surroundings of Torrens Lake to Alice Springs.

2nd part of the series - ***To the North, to the Arnhem Land*** (Expedition Rembaranka 1969) – **footage 30:16 min., in colour.** Second part of the trip of the Czechoslovak scientific expedition of the Moravian Museum to Australia, the film shows the ride of the expedition vehicles from Alice Springs across the centre of the continent over the tropic to the proximity of Darwin.

3rd part of the series - ***Stone Age People*** (Expedition Rembaranka 1969) – **footage 29:40 min., in colour.** The film depicts the beginning of the expedition in the Arnhem Land in the Northern Territory and besides exploring the relics of an aboriginal hut it describes interesting features of natural environment of the northern part of the Australian continent.

4th part of the series - ***Art of Surviving*** (Expedition Rembaranka 1969) – **footage 24:08 min., in colour.** Encounter with members of the aboriginal family clan Rembaranka and a detailed description of building an aboriginal hut that the Aborigines used to build since time immemorial during their wandering through the bush, description of an interesting way of roasting kangaroo in an underground oven.

5th part of the series - ***In the Gallery of a Natural Man*** (Expedition Rembaranka 1969), **footage 28:04 min., in colour.** The Rembaranka living still in bush perform painting under rock shelters and on specifically prepared eucalyptus bark. Description of ancient rock sites in the aboriginal reservation with relics of original paintings by the Aborigines, several centuries old.

6th part of the series - ***To the Depth of Times*** (Expedition Rembaranka 1969), **footage 23:46 min., in colour.** Reflection over the spiritual, cultural, intellectual and material bequest of the members of aboriginal inhabitants of Australia on the background of the encounter with members of the family clan Rembaranka still wandering through the wild Arnhem Land.

7th part of the series - ***Final Summary*** (Expedition Rembaranka 1969), **footage 58:20 min., in colour.** Feature-length film summarizing all findings learned during the nine-months' journey of the first Czechoslovak scientific expedition of the Moravian Museum to Australia in 1969. The film can be used as a summary in the case that a successive presentation of particular parts is not suitable for various reasons.



8/ *Island amidst a Continent*, footage 30:29 min., black-and-white. Reportage describing the visit of the expedition cameraman in a typical Australian aboriginal cattle station in the outback, the owner (tenant) of which cooperates with the Governmental Committee for the Acculturation of Aborigines and set himself beside other the task to integrate the descendants of original inhabitants of the continent to the majority Australian society.

9/ *Letter from a Stockmen's Camp*, footage 31:56 min., black-and-white. Reportage shot by the expedition cameraman during 24 hours in a typical camp of Australian stockmen in the Northern Territory far away from the civilization. The film describes in an interesting way the everyday life in the camp, both that of white cowboys and the Aborigines, who until recently wandered through the bush and now try to learn the typical Australian craft of cattlemen.

REMARK:

The entire pictorial material was shot in 1969 by the expedition cameraman **Jiří Vrožina** (1938-1993). After his emigration from Czechoslovakia to Australia in 1981 these films were put into the safe of the Czechoslovak Television and hidden from public view. In the 1990s the valuable film material was severely damaged by flooding of the TV archive, partly cut apart and fragments thereof were only recently discovered in Sydney and in Ostrava, unfortunately mostly without soundtrack. Vrožina's then TV colleague - scriptwriter and anchorman **Milan Švihálek** (1944) - reconstructed all pictorial materials with the support of the technician, film editor and sound engineer **Ivan Červenka** (1962) in 2018-2021, step by step added sound with the help of a professional equipment and provided modern comments. All the nine proposed films were produced in cooperation with the Moravian Museum Brno and with its financial support. Currently, all the mentioned movies are gradually broadcasted, nearly half a century after their creation, on the Czech TV, on documentary channel ČT2, and on TV Noe.

The films are tendered to the Australian taker for prices usual on the Czech market, not for international prices. All the films will be supplied in technical HD quality suitable for common professional use.

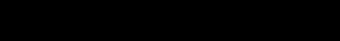

Date of completion of all 9 films: 30 days after the approval of the English text of the commentary by the Australian taker.



Budget of all the 9 films (total footage 4 hours, 48 minutes, 15 seconds (ca 288 minutes):

Translation of 60 standardized pages from Czech to English (tariff 500 CZK per standardized page)	30 000 CZK (2 000 AUD)
Reading of English commentary by a native Australian speaker (9 films)	32 000 CZK (2 100 AUD)
Renting a studio and recording equipment - 12 days (work shifts)	48 000 CZK (3 100 AUD)
Salary of the film editor and sound engineer - 12 dní (work shifts)	36 000 CZK (2 350 AUD)
Inheritance share of the original film authors from the Czechoslovak scientific expedition	45 000 CZK (2 900 AUD)
Production work	36 000 CZK (2 350 AUD)
Overhead costs	61 000 CZK (4 000 AUD)
Professional cooperation	20 000 CZK (1 300 AUD)
Costs of the purchase of the production license from the original owner of the material - Czech TV	110 000 CZK (7 100 AUD)
Total	418 000
CZK	
AUD	27 200

18 January 2022


 Head of the Centre for Cultural Anthropology
 Moravian Museum




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[OUTSOURCING]

PRINT DIGITISATION TECHNICAL CAPTURE REQUIREMENTS

PRESERVATION MASTER FILE (ORIGINAL 100% CAPTURE)

- UNCOMPRESSED TIFF FILE
- RESOLUTION : 400 dpi
- BITH DEPTH : 16 bit
- FILE TYPE : TIFF
- COLOUR PROFILE : ADOBE RGB (1998)
- GRAY GAMMA 2.2 COLOUR SPACE FOR BLACK & WHITE IMAGES
- 10-20mm min BORDER AROUND OUTSIDE OF ITEM BEING SCANNED

ACCESS MASTER FILE DERIVATIVE #1 (EDITED ACCESS COPY)

- UNCOMPRESSED TIFF FILE
- RESOLUTION : 400 dpi
- BITH DEPTH : 8 bit
- FILE TYPE : TIFF
- COLOUR PROFILE : ADOBE RGB (1998)
- GRAY GAMMA 2.2 COLOUR SPACE FOR BLACK & WHITE IMAGES
- 5-10mm BORDER AROUND OUTSIDE OF ITEM BEING SCANNED
- ADJUSTMENTS : DESKEW, STRAIGHTEN, BRIGHTNESS & CONTRAST

ACCESS MASTER FILE DERIVATIVE #2 (COMBINED PDF ACCESS COPY)

- COMBINED PDF RENDITION OF ACCESS MASTER TIFFS (ADOBE ACROBAT)
- OCR PROCESSED FOR TYPED TEXTS (ABBYY FINEREADER)
- TEXT UNDER IMAGE SETTING
- HIGHEST QUALITY OUTPUT SETTING
- 100 % OUTPUT SIZE

CHECKSUM ATTACHMENT PRIOR TO DELIVERY

- MD5 HASH FILE TO BE GENERATED PER FILE





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TECHNICAL STANDARDS - PHOTOGRAPHIC DIGITISATION 2019

PRESERVATION MASTER FILE (CREATED ON THE SCANNER)

- UNCOMPRESSED TIFF FILE
- 16 BITS PER CHANNEL (48 BITS PER PIXEL)
- SMALL BORDER AROUND OUTSIDE OF ITEM BEING DIGITISED (APPROXIMATELY 10% OF TOTAL CAPTURED AREA)
- PRO PHOTO RGB COLOUR SPACE FOR ALL TRANSPARENCY (COLOUR AND BLACK & WHITE)
- PRO PHOTO RGB COLOUR SPACE FOR ALL REFLECTIVE MATERIAL (COLOUR AND BLACK & WHITE)
- CREO DT TIFF FILE FORMAT FOR ALL NEGATIVE MATERIAL (COLOUR AND BLACK & WHITE) WITH NO INVERSION

PRESERVATION MASTER FILE (HASSELBLAD H5D200MS CAMERA CAPTURE)

- ALL PM FILES TO BE EXPORTED FROM FFF RAW FILES TO 16 BITS TIFF FILES (48 BITS PER PIXEL) IN PRO PHOTO RGB COLOUR SPACE

MATERIAL TYPE	RESOLUTION
35MM, MEDIUM, LARGE FORMAT FILM TRANSPARENCY & NEGATIVE	4000 DPI
REFLECTIVE MATERIAL (PRINTS) A5 & LARGER	600 DPI
REFLECTIVE MATERIAL (PRINTS) SMALLER THAN A5	1200 DPI

ACCESS MASTER FILE (CREATED FROM THE PRESERVATION MASTER FILE IN PHOTOSHOP)

- UNCOMPRESSED TIFF FILE
- 400 DPI
- 16 BITS PER CHANNEL (48 BITS PER PIXEL)
- ADOBE RGB (1998) COLOUR SPACE FOR COLOUR TRANSPARENCY & REFLECTIVE MATERIAL
- GREY GAMMA 2.2 COLOUR SPACE FOR ALL B&W TRANSPARENCY AND NEGATIVE MATERIAL
- TRANSPARENT MATERIAL CROPPED TO 20CM (3150 PIXELS) ON THE SHORT SIDE @ 400 DPI
- REFLECTIVE MATERIAL CROPPED TO ACTUAL SIZE MINUS BORDERS @ 400 DPI
- NEGATIVE MATERIAL TO BE INVERTED TO POSITIVE
- BRIGHTNESS / CONTRAST / COLOUR BALANCE ADJUSTMENTS IF REQUIRED

JPG FILE (DIRECT DERIVATIVE OF THE ACCESS MASTER FILE)

- JPG FILE
- 300 DPI
- 8 BITS PER CHANNEL (24 BITS PER PIXEL)
- 1500 PIXELS ON THE LONGEST SIDE



Sustainability of Digital Formats: Planning for Library of Congress Collections

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Digital Moving-Picture Exchange (DPX), Version 2.0

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Format Description Properties i

- ID: fdd000178
- Short name: DPX_2
- Content categories: moving-image
- Format Category: file-format
- Other facets: unitary, binary, sampled
- Last significant FDD update: 2016-12-13
- Draft status: Full

Identification and description i

Full name	Digital Moving-Picture Exchange (DPX) Format
Description	<p>File format for the exchange of resolution-independent, pixel-based (bitmapped) images, intended for very high quality moving image content for theatrical distribution; DPX masters provide the input for film recording (digital images back to film for projection) or D-Cinema digital projection systems. Each DPX file represents a single image with a single component, e.g., luma, or multiple components, e.g., red, green, blue; or Cb, Y, Cr (chroma-luma data). Many variations in multiple component data are supported. DPX images may be produced by scanning film or by using a camera that produces a DPX output.</p> <p>DPX is intended to carry picture data; its developers assumed that sound would be carried in separate formats, e.g., WAVE files, and this is the general practice. Nevertheless, a few organizations scan an image area large enough to include optical soundtracks and at least one software application (AEO Light) can convert this image data to sound.</p>
Production phase	Typically a middle-state format for material exchange, "post-production" in movie industry parlance, or archiving; in some circumstances may be a initial state format, i.e., "production," when digital cameras are employed.
<i>Relationship to other formats</i>	
Has earlier version	Digital Moving-Picture Exchange (DPX), Version 1.0 1994. See Notes for changes between versions.

Local use i

LC experience or existing holdings	Used for motion picture scanning by the Motion Picture, Broadcasting, and Recorded Sound Division, beginning in 2004.
LC preference	None at this time.

Sustainability factors i

Disclosure	Open standard. Developed by the Society of Motion Picture and Television Engineers (SMPTE), a member of the American National Standards Institute (ANSI).
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Documentation	SMPTE 268M-2003, <i>SMPTE Standard for File Format for Digital Moving-Picture Exchange (DPX), Version 2.0</i>
Adoption	Reasonably well adopted including US National Archives and Library and Archives Canada . Several film scanners support DPX, and it is offered as an output from ARRI, Kinetta and DALSA cameras among others. ImageMagicK supports editing of DPX files. On the playback side, FFmpeg has good support for DPX. It is not supported currently by popular viewers such as VLC or Windows Media Player.
Licensing and patents	None.
Transparency	Wrapper is transparent; overall transparency depends upon the essence encoding.
Self-documentation	<p>DPX is a pixel-based (raster) file format with attributes defined in a binary file header. Each file represents a single image or single frame of a motion picture or video data stream. Since each DPX frame is "one of tens of thousands" in a motion picture, users will track intellectual/bibliographic metadata separately from the set of DPX files. A DPX file has four sections (including one optional section):</p> <ul style="list-style-type: none"> • <i>Generic image data</i> (including file information, image information, and image orientation information). Within the "Generic image data" section, a set of identified "core" fields is required. This core set comprises a minimum amount of information that a reader needs to read and interpret. A core-compliant reader must read the core fields but not necessarily be able to read non-core fields. A core-compliant writer must fill in the core fields with valid values because blank or undefined values are not permitted. Non-core fields must be filled in with UNDEFINED values if the correct values are not known. In v.1 (268M-1994), this is further outlined in section 3; in v.2 (268M-2003), this is further detailed in section 4. The core fields are: magic number ("SDPX" or "XPDS" - see Signifiers), offset to image data in bytes, version number ("V2.0" for version 2), total image size in bytes (including file header), image orientation, number of image elements, pixels per line, lines per image element, data sign, descriptor, transfer characteristic, colorimetric specification, bit depth, packing, encoding, and offset to data. • <i>Industry Specific Information</i> (motion picture film information, television information) which generally describes the film and camera source from which the image frame data was derived. The motion-picture film information header outlined in section 6.1 includes helpful tags for film-related data including information derived from film edge codes such as film manufacturing ID code, film type, offset in perforations, prefix and count. Other structured data fields include format (e.g. Academy), frame position in sequence (incremental integer sequence of DPX files), sequence length (frames), held count (1 = default), frame rate of original (frames/s), shutter angle of camera in degrees, frame identification (e.g. keyframe), and slate information. • <i>User defined data</i> (optional). Format and structure is not defined in SMPTE ST 268M:2003 to allow for customized information needed by some users but typical uses might be processing logs, etc. • <i>Image data</i>. SMPTE ST 268M:2003 does not include more specific information about the expected contents of this section aside from specifying "Image 8-K blocks are recommended for efficient use of tape-storage devices." See FileFormat.Info for one source of more information.
External dependencies	None
Technical protection considerations	None

Quality and functionality factors 

Moving Image	
Normal rendering	DPX files are not be designed to <i>play</i> in the customary sense. Most applications in which DPX files may be played will be professional; this is not a format intended for desktop PC applications.
Clarity (high image resolution)	Depends upon picture size and bit depth; for uncompressed bitmaps. The format has no limit on picture size (beyond that imposed by the use of 32-bit integers); many motion picture applications work at 2K (2048x1080 pixels) and 4K (4096x2160 pixels) resolution. Several color space implementations are supported. Regarding bit depth (necessary to encompass the wide dynamic or brightness range of actual scenes or images on film), many in the motion picture industry advocate having masters with 16-bit-per-channel linear data, whether RGB, YUV (chrominance-luminance), or some other, e.g., raw data from a Bayer array.
Functionality beyond normal rendering	Not investigated at this time.

File type signifiers and format identifiers 

Tag	Value	Note
Filename extension	dpx	From the specification
Internet Media Type	image/x-dpx	Not registered with IANA. Found on FileSuffix.com
Magic numbers	Hex: 0x53445058 ASCII: SDPX	If big-endian (most significant byte first), from the specification
Magic numbers	Hex: 0x58504453 ASCII: XPDS	If little-endian (least significant byte first), from the specification
Pronom PUID	fmt/541	See http://www.nationalarchives.gov.uk/PRONOM/fmt/541 .
Wikidata Title ID	Q527723	No versions declared. See https://www.wikidata.org/wiki/Q527723 .

Notes 

General	<p>The European PRESTO project supported efforts to preserve broadcast content via digitization. A PRESTO report on a file format conversion software issued in 2002 includes two statements that pertain to DPX: "Currently the DPX file format has become an industry standard for film production. It supports resolution independence (spatial and densitometric), but does not meet the requirements of broadcasters because, for instance, it does not contain sound data or metadata. Film is stored as a number of single uncompressed image files. The MXF format intends to overcome these limitations by, for instance, support of metadata and by support of film structure information (shot information)." (p. 2)</p> <p>The PRESTO report also includes a paragraph that indicates one application's approach to naming with one-frame-at-a-time formats like DPX, a critical issue since 30 minutes of film contains 43,200 frames and 30 minutes of video contains about 54,000: "Both input and output image sequences are expected to be stored as a number of files in the same directory in one of the following image formats: TIFF, PNM, SGI, RGB, DPX. Interlaced image sequences [video fields] are expected to be stored as a sequence of images containing two woven fields. The filename is assumed</p>
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	<p>to be in the format <i>name.n.ext</i>, where <i>n</i> is the frame number with up to 8 digits and <i>ext</i> is the file extension. The number of digits in the frame number has to be constant for all frames of one sequence." (p. 13) Frank Wylie of the Library of Congress Film Preservation Laboratory confirms that most DPX-capable applications provide this type of filenames as the default.</p>
<p>History</p>	<p>Stream and File Formats: Where Are We Now? states that DPX "was developed several years ago to support the transfer of uncompressed images between telecine machines. It was later used for synthetic image file transfers." The Wikipedia article on DPX reports (on December 5, 2013): "The DPX file format was originally derived from Kodak Cineon open file format (.cin file extension) used for digital images generated by Kodak's original film scanner." This format was referred to as <i>Cineon</i>.</p> <p>As near as the authors have been able to determine, the content differences between DPX v.1 (SMPTE 268M-1994) and DPX v.2 (SMPTE 268M-2003) specifications are, in summary, updating references to other SMPTE standards and assigning previously reserved file space for specific purposes. This document does not detail all the changes in references to external SMPTE or other standards. However the substantive content changes between the v.1 and v.2 standards are listed below:</p> <ul style="list-style-type: none"> • DPX v.2 (SMPTE 268M-2003) specification includes more definitions including ones for: 3.2 image file size, 3.7 image element data structure, 3.31 X scanned size, 3.32 Y scanned size, 3.33 film edge code information, 3.40 SMPTE time code, 3.41 SMPTE user bits, 3.44 horizontal sampling rate (Hz), 3.45 vertical sampling rate (Hz), 3.52 integration time. • In DPX v.1 (SMPTE 268M-1994) Section 5.3 (Image Orientation Information), Field 42, Offset 1636, Length 28 is reserved for future use. In DPX v.2 (SMPTE 268M-2003) Section 5.3 (Image Source Information Header), Field 42, Offset 1636 is reassigned for Data Structure for additional source image information including Field 42.1, Offset 1636, Length 4 Type R32 = X scanned size; Field 42.2, Offset 1640, Length 4 Type R32 = Y scanned size; Field 42.3, Offset 1644, Length 20 Type TBD = Reserved for future use. In addition, these terms were added to the definitions. • In DPX v.2 (SMPTE 268M-2003) Table 3B (Component Data Packing Method), values for Field 21 have expanded to include method A (value 1) and method B (value 2) where as in DPX v.1 (SMPTE 268M-1994), there was only value 1. Method A: "Filling method A is normal: padding bits precede data within 32-bit word boundaries (10-bit image components) or within 16-bit word boundaries (12-bit image components). See Annex C, figs C.3 and C.4." Method B: "Filling method B is now non-standard: padding bits follow data within word boundaries. See Annex C, figs C.7/C.8." Note that this also affects the specification in other places. • In DPX v.2 (SMPTE 268M-2003) Table 4 (Video Signal Standard), additional code values for signal standards are added from values previously reserved for future use. New values include: 153 = YCBCR 1125-line, 2:1 interlace, 16:9 aspect ratio (SMPTE 240M) and 203=YCBCR 1125-line, 1:1 progressive, 16:9 aspect ratio (SMPTE 274M). Reserved values are adjusted to: 154–199= Reserved for future high-definition interlace and 204 – 254= Reserved for future high-definition progressive. • Table 6 (Time code and user bits) is a new addition to DPX v.2 (SMPTE 268M-2003). • In DPX v.2 (SMPTE 268M-2003), the Annexes are reordered due to the introduction of a new Annex A (informational): Structure of 268M file and representation in document.

- In DPX v.2 (SMPTE 268M-2003), Annex C (informative) Data Packing Diagrams - Including "Method A" Filling and Annex C (informative) Data Packing "Method B" are revised to reflect the changes in Field 21 (see above).
- In DPX v.2 (SMPTE 268M-2003), Annex D (informative) Relationship of metadata items to SMPTE metadata dictionary RP 210 is a new addition.

Moreover, Amendment 1 to DPX v.2 (SMPTE 268M-2003), was published in 2012. A summary of key changes are listed below:

- Inclusion of a normative reference to SMPTE ST 2065-3, Academy Density Exchange Encoding (ADX) Encoding Academy Printing Density (APD) Values which is a component of the [Academy Color Encoding System \(ACES\)](#) organized by the Academy of Motion Picture Arts and Sciences.
- In Tables 5A (Transfer Characteristics) and 5B (Colorimetric Specification), code value 13 which was previously reserved for future use has been revised to refer to SMPTE ST 2065-3, Academy Density Exchange Encoding (ADX).
- Table 7 in SMPTE 268M:2003, previously reserved for User Defined Data, is significantly revised to include header fields and value pairs for ADX values.

Finally, the [SMPTE Standards Quarterly Report](#) from March 2015 indicates that the latest revision of the DPX v. 2 standard, SMPTE ST 268:2014 was found to contain "significant errors ...[and] a corrected version is being put together." The authors of this website will wait until a stable version is released before conducting any analysis.

[Federal Agencies Digital Guidelines Initiative Audio-Visual Working Group](#) has drafting guidelines for embedding metadata in the DPX header. The draft guidelines outline FADGI implementations of the SMPTE Core fields as well as other elements *Strongly Recommended*, *Recommended* or *Optional* for FADGI use. The non-Core fields take advantage of existing header structures as well as define new metadata elements for the User Defined fields to document, among other things, digitization process history. The draft guidelines and supporting documents are now available for public comment through February 2017.

Format specifications i

- ST 268:2014, File Format for Digital Moving-Picture Exchange (DPX), Version 2.0 ([Abstract](#)). (Found to contain significant errors and is under revision)
- ST 268:2003, SMPTE Standard for File Format for Digital Moving-Picture Exchange (DPX), Version 2.0 ([Abstract](#))
- Amendment 1:2012 to ST 268:2003, File Format for Digital Moving Picture Exchange (DPX) - Amendment 1 ([Abstract and full text](#))
- ST 268:1994, SMPTE Standard for File Format for Digital Moving-Picture Exchange (DPX), Version 1.0. No longer available for purchase from SMPTE.

Useful references

URLs

- [Cineon Image File Format Draft](http://www.cineon.com/ff_draft.php) (http://www.cineon.com/ff_draft.php).
- [Stream and File Formats: Where Are We Now?](http://citeseer.ist.psu.edu/viewdoc/summary?doi=10.1.1.201.9925) (<http://citeseer.ist.psu.edu/viewdoc/summary?doi=10.1.1.201.9925>). White paper by Bob Edge. Cached by Citeseer.
- [PRESTO report: High-Quality Format Conversion Software](http://presto.joanneum.at/Public/D5_3.pdf) (http://presto.joanneum.at/Public/D5_3.pdf). On file

format conversion software.

- [Wikipedia entry on DPX](https://en.wikipedia.org/wiki/DPX) (https://en.wikipedia.org/wiki/DPX).
- [DPX File Format Summary](http://www.fileformat.info/format/dpx/egff.htm) (http://www.fileformat.info/format/dpx/egff.htm). Detailed information on file structure.
- [Archiveteam.org's entry for DPX](http://fileformats.archiveteam.org/wiki/DPX) (http://fileformats.archiveteam.org/wiki/DPX). Includes links to sample files
- [The art of digital color. By Mike Seymour. August 23, 2011](https://www.fxguide.com/featured/the-art-of-digital-color/) (https://www.fxguide.com/featured/the-art-of-digital-color/). In fxguide. Article relates to DPX, Cineon, and OpenEXR formats.
- [Understanding Cineon. By Richard Patterson. 10/2/2001](http://www.digital-intermediate.co.uk/film/pdf/Cineon.pdf) (http://www.digital-intermediate.co.uk/film/pdf/Cineon.pdf).
- [PRONOM entry for fmt/541](http://www.nationalarchives.gov.uk/pronom/fmt/541) (http://www.nationalarchives.gov.uk/pronom/fmt/541). Information in PRONOM from UK National Archives about DPX version 2. PUID: fmt/541.
- [WikiData entry for Q527723](https://www.wikidata.org/wiki/Q527723) (https://www.wikidata.org/wiki/Q527723). Information in WikiData about DPX (no versions declared). WikiData Title ID: Q527723.

Last Updated: 08/14/2017

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Motion JPEG 2000 File Format

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Format Description Properties i

- ID: fdd000127
- Short name: MJP2_FF
- Content categories: moving-image
- Format Category: file-format
- Other facets: unitary, binary, sampled
- Last significant FDD update: 2012-01-11
- Draft status: Full

Identification and description i

Full name	ISO/IEC 15444-3:2007. Information technology -- JPEG 2000 image coding system -- Motion JPEG 2000 (formal name); Motion JPEG 2000 (common name)
Description	Object-oriented file wrapper designed for time-based audio-visual information, including video, audio, and other <i>tracks</i> . In contrast to the temporal or inter-frame compression found in formats like MPEG-2 , MPEG-4_V , and MPEG-4_AVC , MJP2 frames are represented as separate entities encoded with J2K_C (lossy or lossless). The standard permits creators to declare <i>profiles</i> ; the main specification defines the <i>Simple Profile</i> (described in the Notes to this description), while amendment 1 specifies two archive-oriented profiles. Amendment 1 also includes an annex that highlights the format's value to an archive that plans to ingest instances of digital cinema packages DCP_1_0 and its successors as standardized by SMPTE. Although the format is oriented to newer progressive-scan video streams and "the use of interlaced material is not recommended" (annex E.2), the specification's annex D provides guidance on the inclusion of interlaced streams.
Production phase	Generally used for middle- and final-state archiving or end-user delivery.
<i>Relationship to other formats</i>	
Subtype of	ISO_BMFF , ISO Base Media File Format
Has subtype	Motion JPEG 2000 Simple Profile, not described at this site at this time
Has subtype	Motion JPEG 2000 Motion Picture Archive Preservation Format Profile, not described at this site at this time
Has subtype	Motion JPEG 2000 Motion Picture Archive Access Format Profile, not described at this site at this time

Local use i

LC experience or existing holdings	None
LC preference	For preservation reformatting, the Library of Congress' Packard Campus for Audio-Visual Conservation has chosen MXF_OP1a_JP2_LL (lossless JPEG 2000 wrapped in MXF operational pattern 1a).

Sustainability factors ⁱ

Disclosure	Open standard. Developed jointly by the Moving Picture Experts Group (MPEG), a working groups within the ISO/IEC committee structure formally known as ISO/IEC JTC 1/SC 29.
Documentation	ISO/IEC 15444-3:2007. Information technology -- JPEG 2000 image coding system: Motion JPEG 2000. Also ISO/IEC 15444-3:2007, Amendment 1 (2010): Additional profiles for archiving applications.
Adoption	No adoption by broadcasters or other media-industry professionals known to the compiler of this description; comments welcome . There are, however, in Chapter 6 of Using IDL , from software vendor ITT Visual Information Solutions, instructions for the creation of Motion JPEG 2000 animations using the IDL programming language (used primarily for scientific visualization).
Licensing and patents	Annex H of the standard reports that "compliance with this document may involve the use of a patent concerning JPEG 2000," "the holder of this patent right . . . is willing to negotiate licences under reasonable and non-discriminatory terms." The patent holder is identified as Sony Corporation. For additional information, see also ISO_BMFF .
Transparency	Depends upon tools to read; will require sophistication to build tools.
Self-documentation	The structure includes <i>boxes</i> and headers that contain the technical metadata needed to manage the media streams. There are many types of boxes and headers, including this example : "Motion JPEG 2000 video is stored in tracks . . . the exact format of the video is declared by the sample description." Sample descriptions are the topic of section 6.1 of the standard.
External dependencies	None.
Technical protection considerations	See ISO_BMFF .

Quality and functionality factors ⁱ

<i>Moving Image</i>	
Normal rendering	Good support. The format supports <i>timescales</i> that manage the playout of time-based media streams.
Clarity (high image resolution)	Excellent potential; the outcome will depend on the type and extent of compression, and the encoder used.
Functionality beyond normal rendering	The specification discusses features like <i>composition</i> (the mixing or matrixing of tracks), <i>random access</i> , and <i>fragmented movie files</i> . Options for 3D picture data not investigated for this description.
<i>Sound</i>	
Normal rendering	Good support.
Fidelity (high audio resolution)	Excellent; the format supports LPCM encoding (as "raw" or "twos-complement" data) with no stated limit on sampling or bit depth. The simple profile, however, is limited to a single audio track, not to exceed 48 kHz and 16 bits. The format also supports tracks using any encoding specified in MPEG-4; for information, see MP4_FF_2 .
Multiple channels	The support for multiple tracks permits the use of multiple audio streams and/or individual streams encoded in structures like 5.1 (e.g., AAC_MP4 from the MPEG-4 family).
Support for user-defined sounds, samples, and patches	Not investigated for this description.
Functionality beyond normal	See beyond-normal-rendering note in the video section above.

rendering

File type signifiers and format identifiers i

Tag	Value	Note
Filename extension	mj2 mjp2	From the specification; <i>mj2</i> is preferred.
Internet Media Type	video/mj2	From http://www.ietf.org/rfc/rfc3745.txt
Magic numbers	12 byte string: X'0000 000C 6A50 2020 0D0A 870A'	"For all JPEG-2000 family files," from http://www.ietf.org/rfc/rfc3745.txt
File type brand (ISO Base Media File Format)	mjp2	In the ISO_BMFF file type box, "indicates unrestricted conformance to this specification," from Annex A of the specification.
File type brand (ISO Base Media File Format)	mj2s	In the ISO_BMFF file type box, "indicates indicates the simple Motion JPEG2000 profile," from Annex A of the specification.
File type brand (ISO Base Media File Format)	mpap	From amendment 1, brand for the Motion JPEG 2000 Motion Picture Archive Preservation Format.
File type brand (ISO Base Media File Format)	mpaa	From amendment 1, brand for the Motion JPEG 2000 Motion Picture Archive Access Format.
Pronom PUID	fmt/337	See http://www.nationalarchives.gov.uk/PRONOM/fmt/337 .
Wikidata Title ID	Q3273017	See https://www.wikidata.org/wiki/Q3273017 .

Notes i

General	<p>An early expression of the connection between MJ2_FF and digital cinema is provided by Siegfried Foessel's 2002 slide show Motion JPEG2000 and Digital Cinema. In 2005, Glenn Pearson, associated with the National Library of Medicine, organized a symposium on Motion JPEG 2000 and its relevance to video reformatting (generally understood as having analog videotapes as a source); in the same year, Pearson and Michael Gill co-published an analytic paper on the format.</p> <p>The Motion JPEG 200 Simple Profile includes the following elements:</p> <ul style="list-style-type: none"> • Exactly one video track is present. • At most a single audio track, using only 8 or 16-bit raw audio, is present. • Each track shall have exactly one sample description, used by all samples. • The sample rate of the audio, if present, shall not exceed 48 kHz. • The frame rate of the video shall not exceed 30 frames per second. • The video codestream profile shall be profile O for both the motion sequence and the still image, if present.
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	<ul style="list-style-type: none"> • The file is self-contained; no data references are used, and therefore all media data is contained within the single file. • The media data in the Media Data Box(es) is placed within the box(es) in temporal order. • If more than one track is present, the media data for the tracks is interleaved, with a granularity no greater than the greater of (a) the duration of a single 'sample' (in file format terms) or (b) one second. • The transformation matrices used are restricted to uniform scaling and rotation by multiples of 90 degrees.
History	The underlying ISO_BMCC format and this subtype owe a strong debt to Apple's QuickTime .

Format specifications i

- [Motion JPEG2000 Final Committee Draft 1.0](http://www.jpeg.org/public/fcd15444-3.pdf) (http://www.jpeg.org/public/fcd15444-3.pdf). This document may have substantive differences from the standard published by ISO. ISO
- ISO/IEC 15444-3:2007. Information technology -- JPEG 2000 image coding system: Motion JPEG 2000. Also ISO/IEC 15444-3:2007, Amendment 1 (2010): Additional profiles for archiving applications.

Useful references

URLs

- [Video Archivists 2005](https://web.archive.org/web/20160521213409/https://ceb.nlm.nih.gov/VideoArchivists2005/) (https://web.archive.org/web/20160521213409/https://ceb.nlm.nih.gov/VideoArchivists2005/). Web site about 2005 National Library of Medicine meeting that featured discussion of Motion JPEG 2000. Now only available through Internet Archive.
- [An Evaluation of Motion JPEG 2000 for Video Archiving](https://web.archive.org/web/20130513021757/http://archive.nlm.nih.gov/pubs/pearson/MJ2_video_archiving.pdf) (https://web.archive.org/web/20130513021757/http://archive.nlm.nih.gov/pubs/pearson/MJ2_video_archiving.pdf). Paper by Glenn Pearson and Michael Gill (NLM). Now available through Internet Archive.
- [Motion JPEG2000 and Digital Cinema \(2002\)](http://www.jpeg.org/public/DCINEMA-JPEG2000.ppt) (http://www.jpeg.org/public/DCINEMA-JPEG2000.ppt). PowerPoint presentation by Siegfried Foessel, Fraunhofer IIS, Erlangen, Germany.
- [RFC 3745 - MIME Type Registrations for JPEG 2000 \(ISO/IEC 15444\)](http://www.ietf.org/rfc/rfc3745.txt) (http://www.ietf.org/rfc/rfc3745.txt).
- [Using IDL](http://www.harrisgeospatial.com/docs/pdf/using.pdf) (http://www.harrisgeospatial.com/docs/pdf/using.pdf). See Chapter 6, Animations. The IDL tools provided include one capable of making Motion JPEG 2000 animations.
- [PRONOM entry for fmt/337](http://www.nationalarchives.gov.uk/pronom/fmt/337) (http://www.nationalarchives.gov.uk/pronom/fmt/337). Information in PRONOM from UK National Archives about MJ2. PUID: fmt/337.
- [Wikidata entry for Q527723](https://www.wikidata.org/wiki/Q527723) (https://www.wikidata.org/wiki/Q527723). Information in Wikidata about DPX. Wikidata Title ID: Q527723.

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