

File Size and Checksums

Reto Kromer • AV Preservation by reto.ch

No Time to Wait 9
National Library of Ireland
in Dublin from 15 to 17 October 2025

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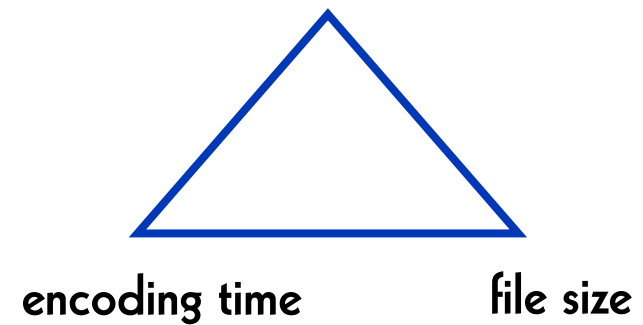
- DPX
- File Size
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DPX

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image quality



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DPX Content (1)

- **log neg encoding**

Cineon Printing Density (CPD/DPX), ARRI log C

- **log RGB encoding or quasi-log encoding**

FilmStream (log₆₀), SI-log (Silicon Imaging, log₉₀), ARRI log F, Panalog, S-log (Sony), REDLOG

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DPX Content (2)

- **gamma encoding or power function encoding**

sRGB, CineGamma, "film rec", hyper-gamma

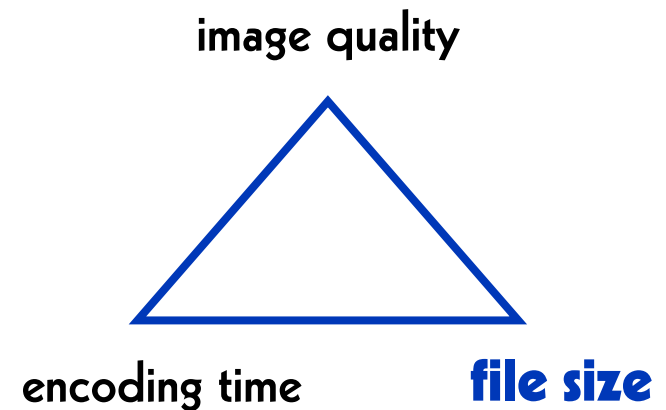
- **scene-linear encoding**

OpenEXR (ACES)

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File Size

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Source

- 2K (2048 × 1536 pixels, i.e. 4:3 aspect ratio)
- 1440 frames, i.e. 1 minute (at 24 frames/second)

Single Images Archive File

18.37 GB	Cineon, 10-bit	.cin
27.53 GB	TIFF, RGB, 16-bit	.tif
25.30 GB	PNG, RGB, 16-bit	.png
18.37 GB	DPX, R'G'B', 10-bit	.dpx
20.67 GB	DPX, R'G'B', 12-bit	.dpx
27.54 GB	DPX, R'G'B', 16-bit	.dpx
27.57 GB	OpenEXR, R'G'B', 16-bit	.exr
55.10 GB	OpenEXR, R'G'B', 32-bit	.exr

Stream Archive File

2.06 GB	ProRes 422 HQ, 10-bit	.mov
2.03 GB	DNxHR HQX, 10-bit	.mxf
4.61 GB	ProRes 4444 XQ, 12-bit	.mov
4.06 GB	DNxHR 444, 12-bit	.mxf
12.34 GB	uncomp., Y'C _B C _R 4:2:2, 10-bit	.avi
12.33 GB	uncomp., Y'C _B C _R 4:2:2, 10-bit	.mov
4.36 GB	FFV1, Y'C _B C _R 4:2:2, 10-bit	.mkv

SMPTE REGISTERED DISCLOSURE DOCUMENT

SMPTE RDD 36:2015

Apple ProRes Bitstream Syntax and Decoding Process



Page 1 of 39 pages

The attached document is a Registered Disclosure Document prepared by the sponsor identified below. It has been examined by the appropriate SMPTE Technology Committee and is believed to contain adequate information to satisfy the objectives defined in the Scope, and to be technically consistent.

This document is NOT a Standard, Recommended Practice or Engineering Guideline, and does NOT imply a finding or representation of the Society.

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USA

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Access Files

DaVinci Resolve 20.2.1

130.3 MB	2K, H.264	.mkv
65.9 MB	2K, H.265	.mkv

FFmpeg 8.0

-c:v libx264 -profile veryslow -crf 21

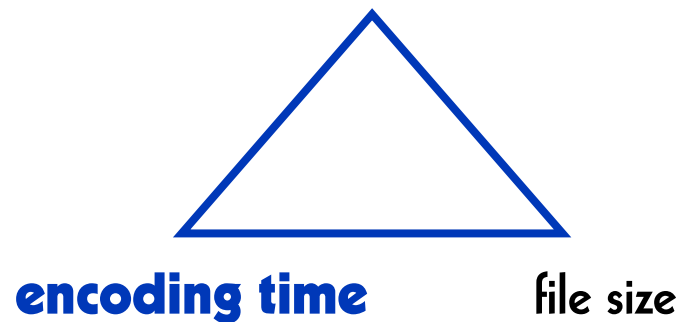
92.9 MB	2K, H.264	.mp4
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Checksums

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image quality



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Checksums

cryptographic

- MD5
- SHA-1
- SHA-256
- SHA-512

non-cryptographic

- CRC-32
- xxHash 32
- xxHash 64
- xxHash 128

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Checksum Benchmarking

```
1 #!/usr/bin/env bash
2
3 # This script uses the 'make_manifest' from our open-source set
4 # 'Bash Scripts for Audio-Visual Preservation', available at:
5 # https://avpres.net/Bash_AVpres/
6
7 declare -a list=(md5 sha1 sha256 sha512 crc32 xxh32 xxh64 xxh128)
8
9 for algorithm in "${list[@]"; do
10     echo
11     echo "${algorithm}"
12     date +%T
13     make_manifest -i ~/Desktop/FFmpeg_TEST --algorithm=${algorithm}
14     date +%T
15 done
16
```

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Results

MD5

07:23 = 100 %

CRC-32

01:14 = 17 %

SHA-1

02:53 = 39 %

xxHash 32

01:46 = 24 %

SHA-256

02:50 = 38 %

xxHash 64

01:06 = 15 %

SHA-512

03:59 = 54 %

xxHash 128

01:06 = 15 %

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RAWcooked

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Disclaimer (1)

AV Preservation by reto.ch sponsored
MediaArea.org for the design and programming
of the RAWcooked tool:

- in 2018 to allow the core development and the release of the starting version 18.10
- in 2023 for the upgrade to version 23.03
- in 2025 for the GPU support of FFV1

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Disclaimer (2)

AV Preservation by reto.ch sponsored
MediaArea.org for the organisation of the “No
Time to Wait” conferences:

- EUR 2000 from 2017 to 2022 (except in 2020)
- EUR 1000 from 2023 to 2026

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No Time to Wait

- Berlin 2016
- Wien 2017
- London 2018
- Budapest 2019
- [Hilversum] 2021
- Den Haag 2022
- Praha 2023
- Karlsruhe 2024
- Dublin 2025

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A Bridge

RAWcooked (command-line interface)

→ mediaarea.net/RAWcooked

```
# encode
rawcooked input_folder

# decode
rawcooked rawcooked_input_file.mkv

# get help
rawcooked -h
man rawcooked
```

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RAWcooked

- encoding into Matroska container using FFV1 video codec and FLAC audio codec
- significantly fewer files
- all metadata preserved
- decoding with bit-by-bit reversibility
- possibility to embed sidecar files such as checksum manifest, LUT, XML and PDF
- compatibility with media players

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```
-bash
Licensed DPX flavors:
Yes DPX/Raw/RGB/8bit/U/LE
Yes DPX/Raw/RGB/10bit/U/LE/FilledA
Yes DPX/Raw/RGB/10bit/U/BE/FilledA
Yes DPX/Raw/RGB/12bit/U/LE/FilledA
Yes DPX/Raw/RGB/12bit/U/BE/Packed
Yes DPX/Raw/RGB/12bit/U/BE/FilledA
Yes DPX/Raw/RGB/16bit/U/LE
Yes DPX/Raw/RGB/16bit/U/BE
Yes DPX/Raw/RGBA/8bit/U/LE
Yes DPX/Raw/RGBA/10bit/U/LE/FilledA
Yes DPX/Raw/RGBA/10bit/U/BE/FilledA
Yes DPX/Raw/RGBA/12bit/U/LE/FilledA
Yes DPX/Raw/RGBA/12bit/U/BE/Packed
Yes DPX/Raw/RGBA/12bit/U/BE/FilledA
Yes DPX/Raw/RGBA/16bit/U/LE
Yes DPX/Raw/RGBA/16bit/U/BE
Yes DPX/Raw/Y/8bit/U/LE
Yes DPX/Raw/Y/10bit/U/BE/FilledA
Yes DPX/Raw/Y/10bit/U/BE/FilledB
Yes DPX/Raw/Y/12bit/U/BE/Packed
Yes DPX/Raw/Y/16bit/U/LE
Yes DPX/Raw/Y/16bit/U/BE
Licensed TIFF flavors:
```

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