Digital Audiovisual Properties Advanced

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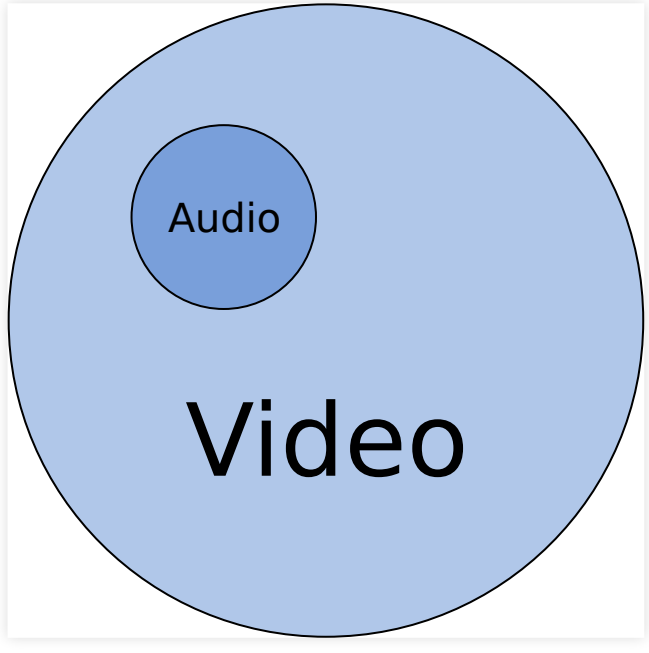
Audio vs. Video



Aspect Ratio

> *Most people only mean/know the "**Display Aspect Ratio**" (DAR).*

- 4:3
- 16:9
- 5:4

DAR... SAR? PAR!

- DAR: **Display** Aspect Ratio
- SAR: **Storage** Aspect Ratio
- PAR: **Pixel** Aspect Ratio

DAR... SAR? PAR!

- DAR: **Display** Aspect Ratio
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Formula: DAR = SAR x PAR

Letterbox

Pillarbox

Windowbox

Anamorphic Video

Format	DAR	SAR	Resolution
Digibeta	16:9	5:4	720 x 576
HDV	16:9	4:3	1440 x 1080

Good to know

DVD SAR = 5:4
So 16:9 is either letterboxed or anamorphic.

HD is always DAR=16:9
4:3 in HD is impossible without editing.

Links

- Aspect Ratio (image) [Wikipedia]
- Pixel Aspect Ratio [Wikipedia]

Interlacing

- 2 fields in one frame
- Field: half of vertical resolution
- Field: twice the time resolution

Top Field

Bottom Field

Links

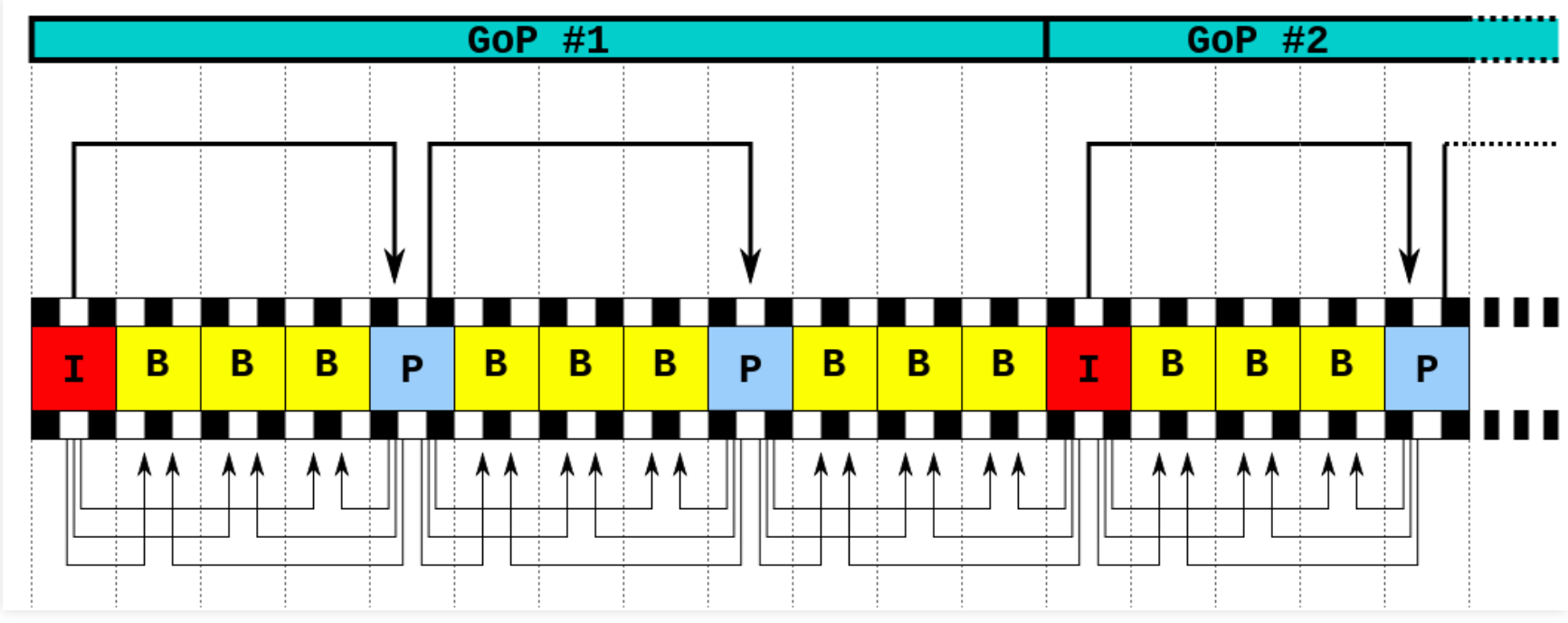
- Wikipedia: "Interlaced Video"
- Videolan Wiki: "Deinterlacing"
- 100fps.org: "What is Deinterlacing? Facts, solutions, examples."
- Lair Of The Multimedia Guru: "Deinterlacing filters"

GOP: Group Of Pictures

The GOP is a group of pictures in a video that are depending on each other.

GOP Frametypes

- **[I]**ntra:
  Independently encoded single frame (aka "keyframe")
- **[P]**redictive-coded:
  Difference-informations to previous I- or P-Frame.
- **[B]**idirectional predictive-coded:
  Difference-informations to previous *and/or subsequent* I- or P-Frame.


GoP #1
GoP #2
I
B
B
B
P
B
B
B
P
B
B
B
I
B
B
B
P

GOP and Recording

- Recording *should* be done with GOP=1.
- This means:
  only I-Frames (=no dependencies between frames).

GOP and Editing

- With GOP = 1: No issues.
- With GOP > 1: Watch out!

btw: Some programs are able to perform "GOP-aware" cuts

Links

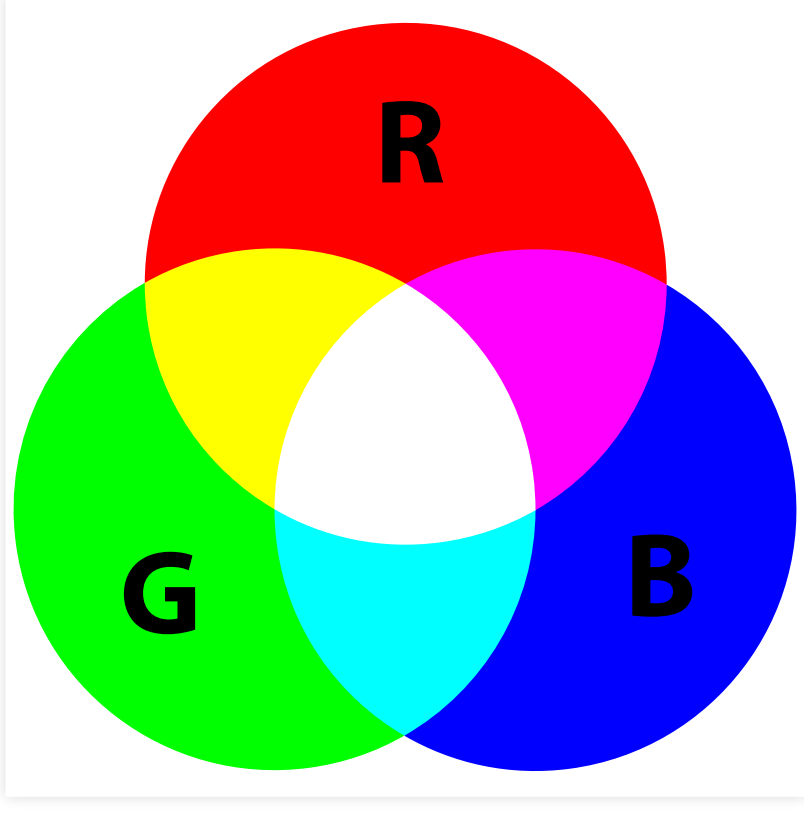
- Wikipedia: "Group of Pictures"

Color models

- RGB (Red-Green-Blue)
- YUV (Luma/Chroma)

Note: Those are just 2 for video. There are more...

Color Model: RGB



Color Model: YUV

Bits Per Component/Sample

Color Components

- RGB: Red, Green, Blue
- YUV: Y', Cb, Cr

Bits Per Component/Sample

BPC	Gray shades	Pixel	Byte(s)
8	2^8 = [0..255]	24 Bits	3 Bytes
10	2^10 = [0..1023]	30 Bits	6|4 Bytes
16	2^16 = [0..65535]	48 Bits	6 Bytes

Chroma Subsampling

The color information in YUV is stored in a reduced resolution.

This principle originates from analog transmission and was kept in digital, because it allows smaller data sizes.

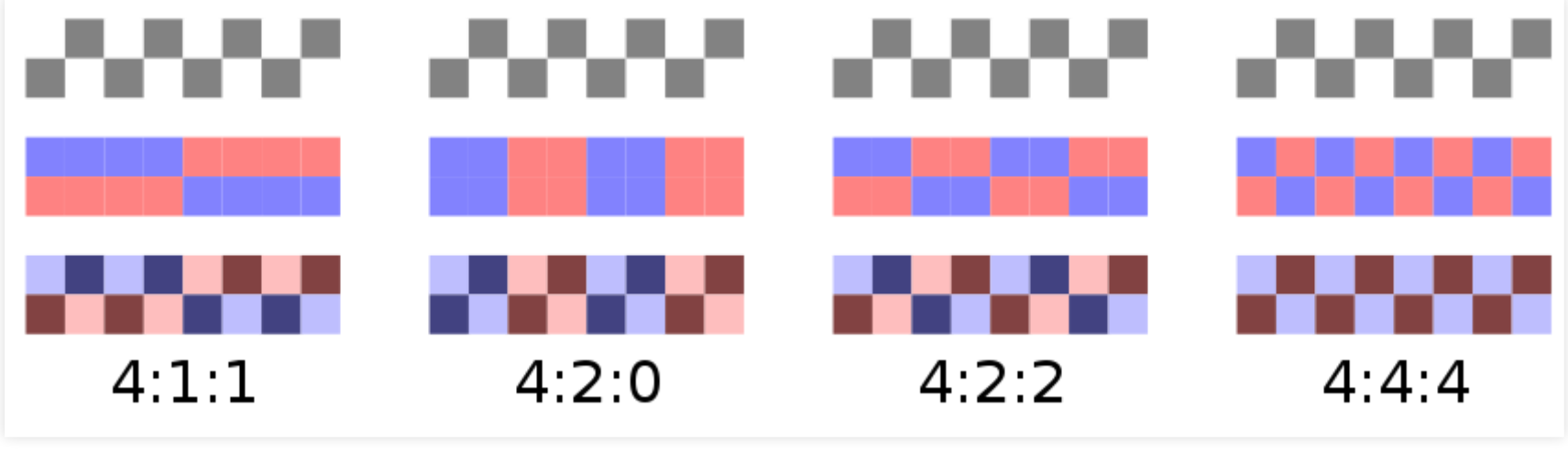
"J:a:b" Notation

J: Horiz. sampling reference (usually "4").

a: Number of color samples in 1st row of J pixels.

b: Number of change in color samples between 1st / 2nd row of J pixels.

Chroma Subsampling

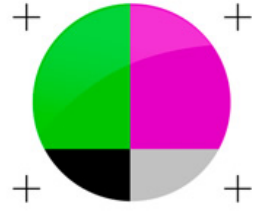


Confusion / FUD?

Unrivaled Video Quality

DeckLink lets you work with compressed video formats such as ProRes and DNxHD as well as 10-bit uncompressed video. When working with uncompressed video, all images are a mathematically perfect pixel-for-pixel clone of the source, without any generational loss, so you have the confidence you're working at the absolute highest quality possible.

Get sharper keying with green screens, cleaner compositions, superior color correction and more! Support for industry leading file formats ensures that you can maintain high quality throughout post production should you need to use video compression.



4:4:4

4:2:2

Source (22.Dec.2013)
http://www.blackmagicdesign.com/products/decklink
http://www.blackmagicdesign.com/media/5278706/quality.jpg

Diskspace

BPC	Subsampling	Speicherplatz
8	4:2:2	1.16 / 1.74 GB
10	4:2:2	1.45 / 2.17 GB
16	4:2:2	2.32 / 3.48 GB

Links

- Wikipedia: "Chroma subsampling"
- Wikipedia: "YCbCr"
- Wikipedia "RGB color model"

Questions?

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