

Blackmagicdesign 



Wide Gamut Intermediate

DaVinci Resolve

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English

Leading the Creative Video Revolution

Contents

DaVinci Wide Gamut Intermediate	3
Revision History	3
Summary	3
DaVinci Wide Gamut	3
DaVinci WG Primaries and White Point	4
DaVinci Intermediate (OETF)	4
Parameters	4
Forward OETF	5
Inverse OETF	5
Mapping Values	5
Plots	5

DaVinci Wide Gamut Intermediate

Revision History

Version	Date	Description
1.0	07/08/2020	Initial Release
1.0.1	11/09/2020	Fixed incorrect matrix values

Summary

DaVinci Wide Gamut Intermediate consists of two components:

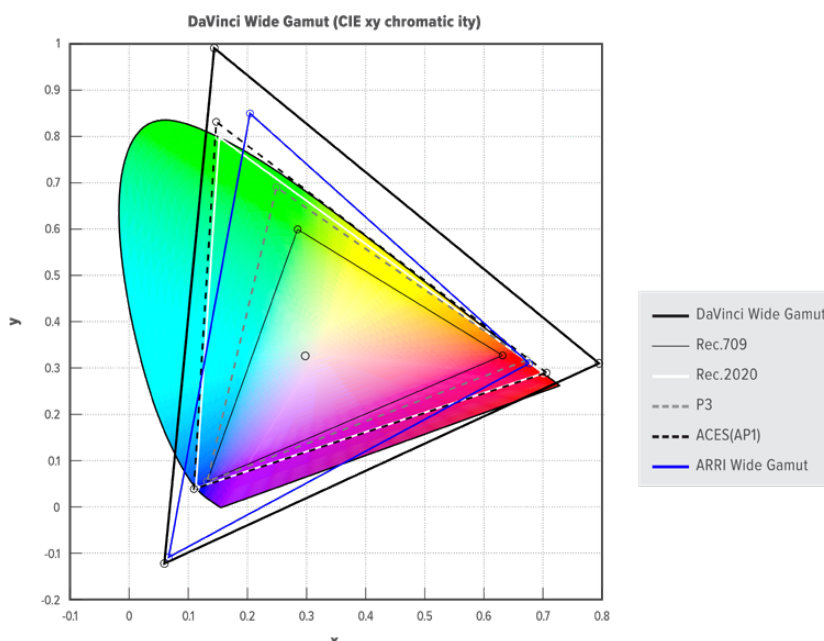
- 1 DaVinci Wide Gamut color space (DWG)**
 - Defined by its primary and white point CIE chromaticity coordinates.
 - This defines the width and shape of the associated gamut volume.
- 2 DaVinci Intermediate OETF (DI)**
 - DI is a log-based transfer function, allowing the encoding of up to 10000nits.
 - This defines the dynamic range (height) and luminance distribution within the encoded gamut volume.

Together these define the gamut volume and luminance distribution of the DaVinci Wide Gamut Intermediate space. Specifications for both are described below.

DaVinci Wide Gamut

DaVinci WG is designed to accommodate the vast majority colors that can be captured using the latest modern cameras and capture devices.

It facilitates the storage and manipulation of *intermediate* image data in modern production pipelines, where imagery is sourced from a large variety of different sources and capture devices while outputs must be provided for both wide gamut (Rec.2020) or regular gamut (Rec.709) display devices.



DaVinci WG Primaries and White Point

DaVinci Wide Gamut is defined by the following CIE 1931 xy chromaticity coordinates:

	x	y
red	0.8000	0.3130
green	0.1618	0.9877
blue	0.0790	-0.1155
white	0.3127	0.3290

The matrices below convert linear DaVinci Wide Gamut RGB data to/from CIE 1931 XYZ:

DaVinci WG RGB -> XYZ matrix		
0.70062239	0.14877482	0.10105872
0.27411851	0.87363190	-0.14775041
-0.09896291	-0.13789533	1.32591599

XYZ -> DaVinci WG RGB matrix		
1.51667204	-0.28147805	-0.14696363
-0.46491710	1.25142378	0.17488461
0.06484905	0.10913934	0.76141462

DaVinci Intermediate (OETF)

DaVinci Intermediate encodes linear light (ie. 18% grey is represented by 0.18) and is defined by the parameters below.

Parameters

Parameter	Value
DI_A	0.0075
DI_B	7.0
DI_C	0.07329248
DI_M	10.44426855
DI_LIN_CUT	0.00262409
DI_LOG_CUT	0.02740668

Linear light values below **DI_LIN_CUT** are encoded linearly with a gradient of **DI_M**.

For a linear light value (L) and encoded value (V), and given the above parameters, DaVinci Intermediate is encoded / decoded using the following equations.

Forward OETF

$$V = (\log_2(L + DI_A) + DI_B) * DI_C \quad \text{for } L > DI_LIN_CUT$$

$$V = L * DI_M \quad \text{for } L \leq DI_LIN_CUT$$

Inverse OETF

$$L = \text{pow}(2.0, (V / DI_C) - DI_B) - DI_A \quad \text{for } V > DI_LOG_CUT$$

$$L = V / DI_M \quad \text{for } V \leq DI_LOG_CUT$$

Mapping Values

DaVinci Intermediate encodes > 9.1 stops above 18% grey.
 Middle (18%) grey is mapped to 0.336043.

Input Nits	Input Value	DaVinci Intermediate Value
-1.0	-0.01	-0.104443
0.0	0.0	0.000000
18.0	0.18	0.336043
100.0	1.0	0.513837
1000.0	10.0	0.756599
4000.0	40.0	0.903125
10000.0	100.0	1.000000

Plots

