Dolby Vision Recommended Source Formats

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1 Introduction

Dolby Laboratories recommends using certain types of source material for creating high quality Dolby Vision content.

In general, the best source material for Dolby Vision best retains the native color gamut and original dynamic range of the content at the time of its origination.

2 Original camera footage

For mastering first run movies in Dolby Vision, the original camera raw files or original film scans are ideal.

- Film: Original Camera Negative (OCN)
- Digital: Camera RAW

The following original (film scan or digital camera raw) sources (in order of preference), without color-correction, are recommended for Dolby Vision mastering.

<table>
<tr><th>Film source</th><th>Digital source</th></tr>
<tr><td>Negative scans
Scanned at 16-bit log or ADX OpenEXR
Scanned at 10-bit log</td><td>Digital Camera RAW*</td></tr>
<tr><td rowspan="3">IP (Inter-positive) scans
Scanned at 16-bit log or ADX OpenEXR
Scanned at 10-bit log IP scans</td><td>Debayered digital camera images: 16-bit log or OpenEXR</td></tr>
<tr><td>Alexa-ProRes (12-bit 444)</td></tr>
<tr><td>ProRes-444 (this is not ideal and the results cannot always be guaranteed)</td></tr>
</table>

*RAW refers to image pixels that are generated directly from a digital motion picture camera before any debayer operations are performed on it. Currently, digital cameras can capture 13-15 stops of dynamic range depending on the make and model. Therefore, camera RAW images, like scans from an original film negative, have a lot of dynamic range that can deliver very good results in Dolby Vision.

3 Color corrected archive

When remastering projects without access to the original camera originated source, consider using the color corrected output of the Digital Intermediate (DI) process.

Note that these sources must be created without any range limiting LUTs (Look Up Tables), show LUTs, or film-out LUTs that may be baked into the content during the DI process. Such LUTs or transforms could clip or compress the highlight and/or shadow detail in the image, thus compromising the resulting Dolby Vision content.

You can use movies released as film prints in the form of cut reels in one of these formats:

- Color-corrected 12bit log DPX16 or TIFF16 files from the DI output
- Color-corrected 10-bit log DPX16 or TIFF16 files from DI output
- Uncorrected 12bit log DPX16 or TIFF16 files from the DI output
- Uncorrected 10-bit log DPX16 or TIFF16 files from DI output
- High quality scans of the printed Negative from the DI output (this is not ideal and the results cannot always be guaranteed)

Material from sources other than these may not produce visually compelling results in Dolby Vision. For example, HDCAMSR sources may prove to be extremely challenging when trying to create Dolby Vision content that is visibly better than the SDR version. Dolby Vision imagery must have deep shadows and bright highlights with saturated colors. The extended contrast and wider color gamut will result in captivating content that is noticeably superior to the SDR version. For Dolby Vision tests and re-mastering projects, content owners should provide a master color reference (DCDM/DCP, Blu-ray master or broadcast master) for use as a color guide.

4 Shooting notes

Here are some notes from an ASC cinematographer about shooting for Dolby Vision.

- For Dolby Vision, the basic exposure range should be 8 stops (plus and minus 4 stops from mid-grey). You can then reproduce all scene elements within that 8-stop range, from shadow to highlight, without any adjustment. A character can therefore walk from shadow to sunlight and the exposure will hold and look balanced without adjustment during the shoot.
  Beyond 8 stops, going up to plus 6 and down to minus 6, a total of 12 stops, Dolby Vision allows you to see into the toe and shoulder although some scene elements may begin to roll off.
- Make sure not to clip the highlights, especially across large areas of the frame. It is possible to put the mid-tones a little lower than usual to gain additional headroom and still preserve a lot of shadow detail. High end, digital motion picture cameras have very good noise characteristics which allow for a little under exposure.
- Image formats:
  - It is ideal to have an RGB 4:4:4 (12-bit or 16-bit) pipeline all the way from production through post production to final delivery.
  - It is always recommended to preserve all the image quality in the original camera raw throughout the production and post production process. Camera raw may be converted to other image formats for convenience and efficiency.
- Use the following image formats, listed in order of preference:
  - OpenEXR (16-bit linear float)
  - 16-bit DPX or TIFF
  - 12-bit log (in a 16-bit container)
  - 10-bit log DPX

These formats are also ideal for Visual Effects work that delivers optimal results in Dolby Vision.