

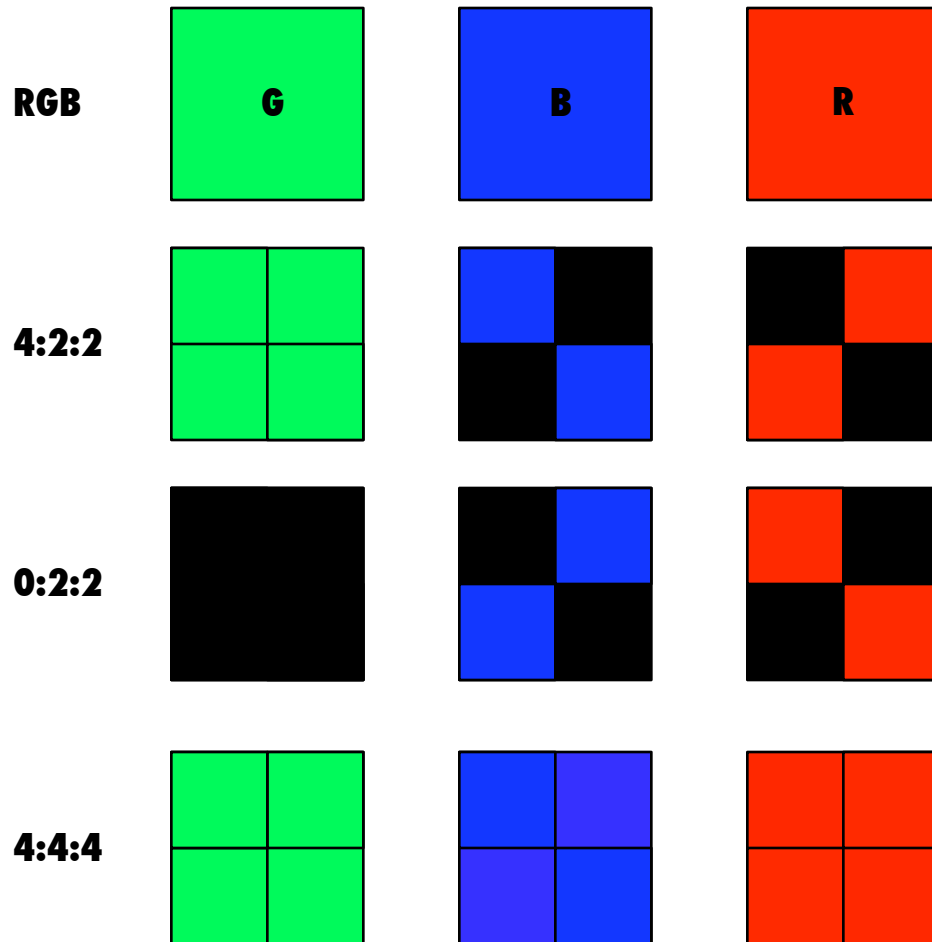
4:4:4 RGB Workflows in Post Production

New Acquisition Formats for Film and TV

**Presented by Joe Beirne
Senior Technical Advisor
PostWorks, NY**

June 28, 2006

4:4:4 RGB Workflows in Post Production



What is 4:4:4?

$$\begin{array}{r}
 4:2:2 \\
 + 0:2:2 \\
 \hline
 4:4:4
 \end{array}$$

4:4:4 RGB Workflows in Post Production

LUT			
In	Out		
50	70	75	65
60	80	85	75
70	90	95	85
80	100	105	95
90	110	115	105

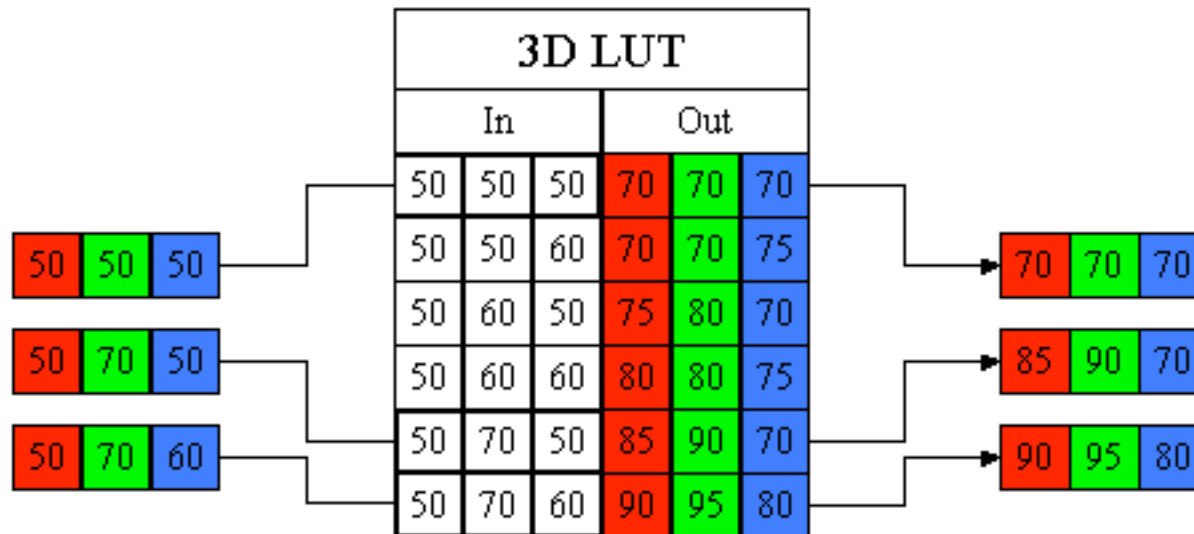
50	50	50
50	70	50
50	70	60

70	75	65
70	95	65
70	95	75

In a **1D LUT** each input value is processed without respect to the values of the other color channels.

Here, the red input value “50” is transformed to a red output value “70”, no matter what the values in the green and blue channels are for that specific input color.

4:4:4 RGB Workflows in Post Production



In a **3D LUT** each input RGB value is processed to correspond to a unique output RGB value.

So a red input value of "50" can produce an output red value of "70", "85" or "90", depending on the simultaneous value of the green and blue inputs for that color triplet.

Greater specificity in the transform produces greater fidelity to the source's original color sensation in the target.

4:4:4 RGB Workflows in Post Production

Sony HDW-5500 HDCAM SR Studio Deck



- Multiple 1080 frame rates: 23.98PsF, 24PsF, 25PsF, 29.97PsF, 50i, 59.94i
- 720P recording and playback (HDCAM-SR only)
- Switchable 4:4:4(x1) /4:2:2(x2)
- MPEG-4 Studio Profile compression @ 440 Mb/second.
- 12-channels, 24-bit, 48kHz audio.
- up to 155 minutes at 1080/24PsF.
- Dynamic Tracking.
- Dynamic Motion Control (DMC) playback.
- Pre-read editing.
- Confidence playback.
- Built-in Tele-File read/write capability.
- Metadata Handling.

4:4:4 RGB Workflows in Post Production

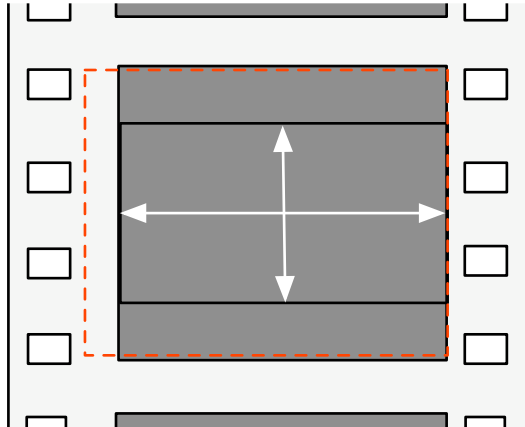
Sony SRW-1 SR Field Recorder



- Can Record up to 50 Minutes at 23.98 fps.
- Records at 440/880 Mb/s.
- A single-cable fibre-optic transmission system carries lossless RGB from the camera to the SRW-1.

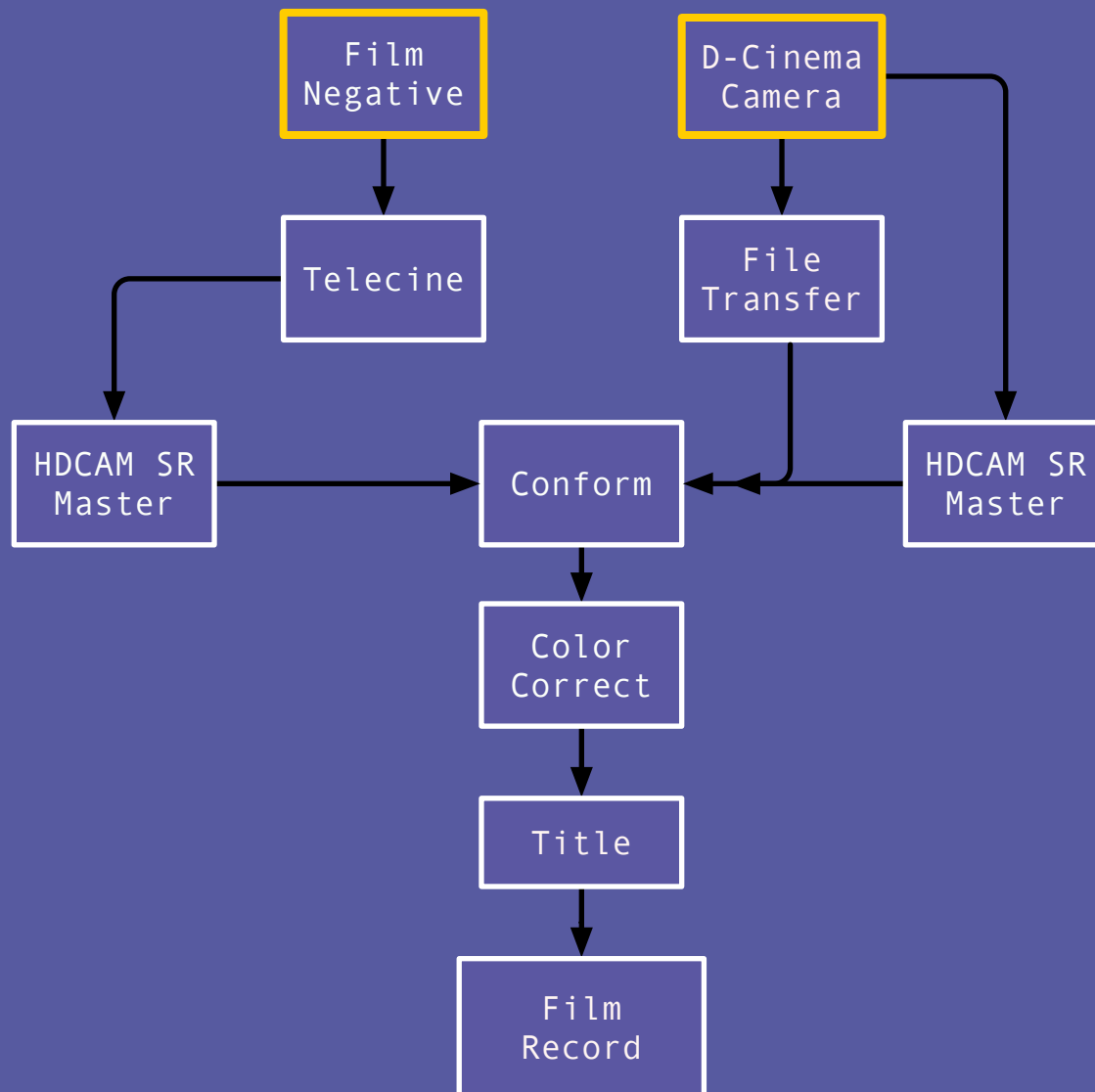
4:4:4 RGB Workflows in Post Production

35mm Projection Aperture Comparison to HD 4:4:4



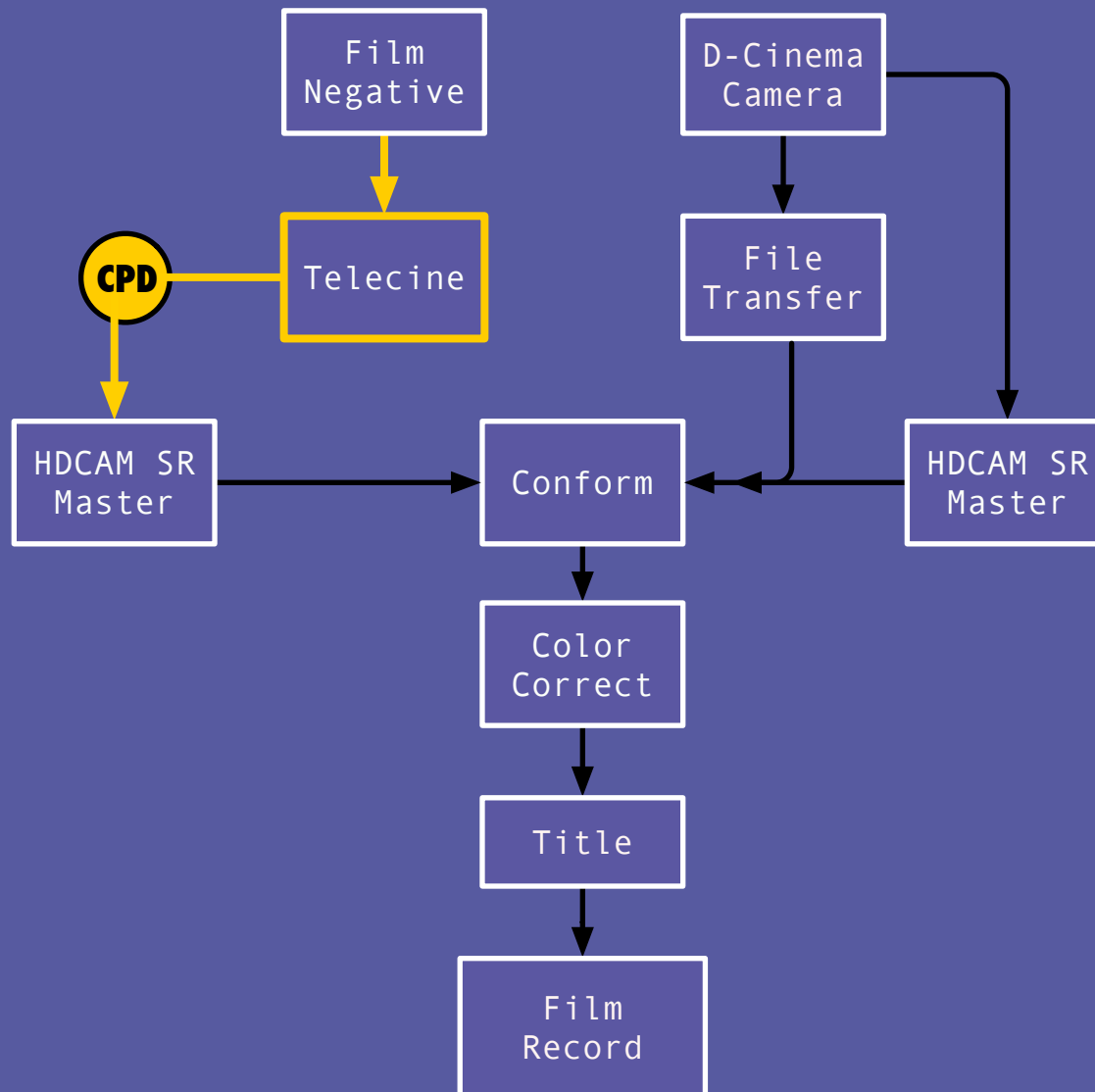
- Area of 2K Scan: 2048 x 1556
(dotted line)
- 2K 1.85 Aperture: 1828 x 988
(white arrows)
- HD 1.85 Image Area: 1920 x 1038

4:4:4 RGB Workflows in Post Production



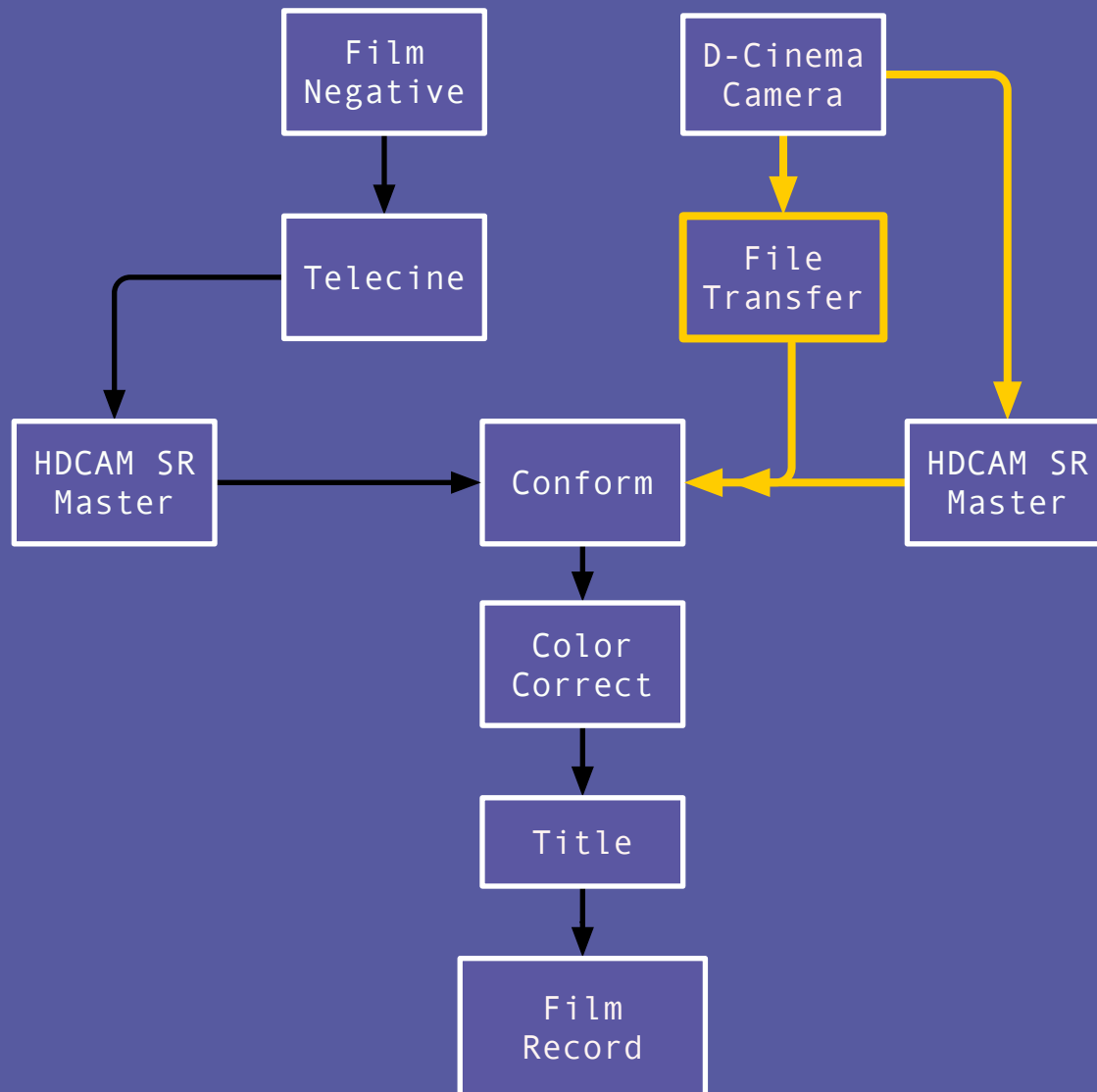
Sources Can be Film or D-Cinema Camera (eg: Viper, Arri D20, Genesis, Sony F950, etc.)

4:4:4 RGB Workflows in Post Production



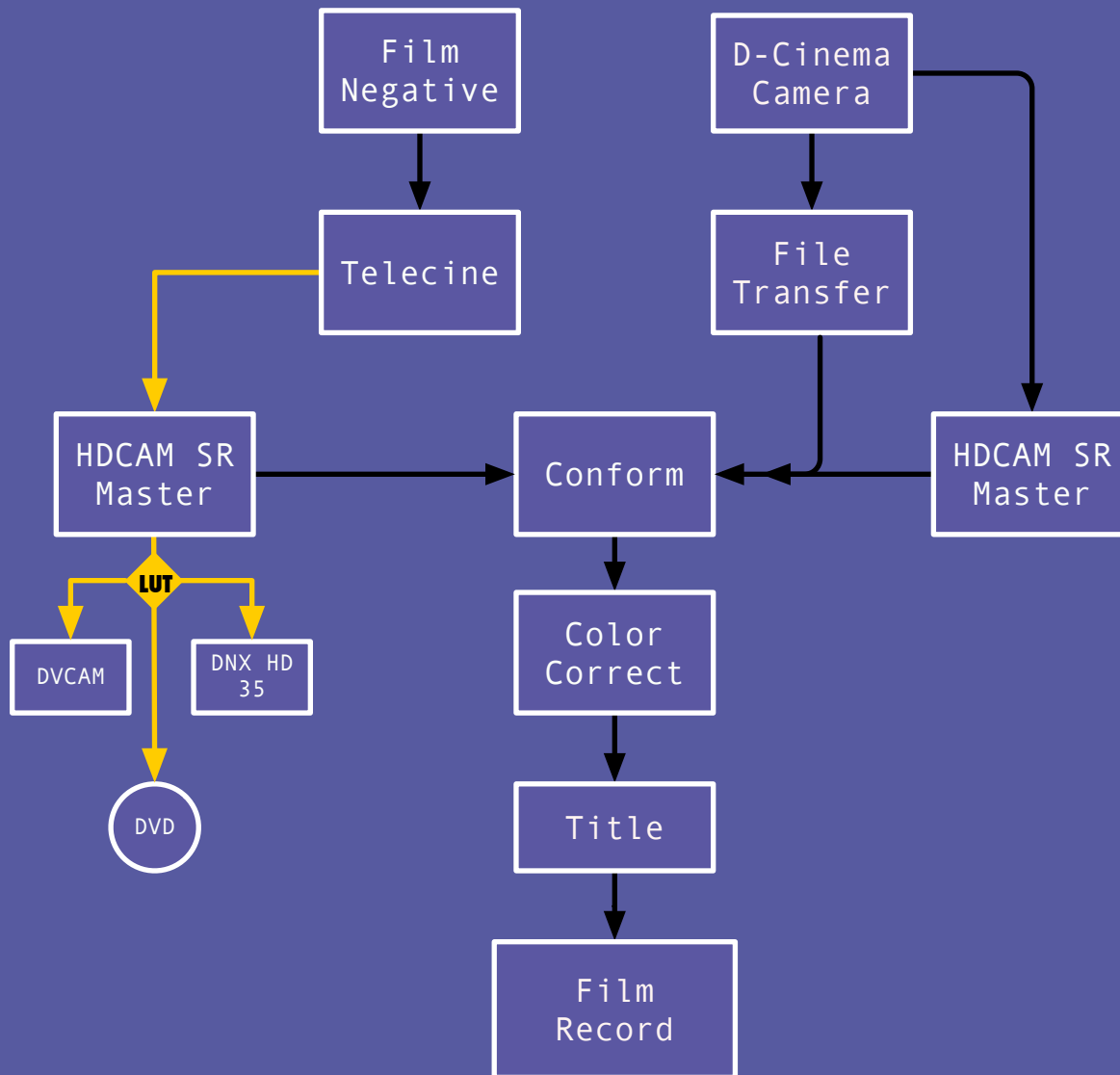
CPD (Cineon Printer Density) Output from Spirit 2K/4K

4:4:4 RGB Workflows in Post Production



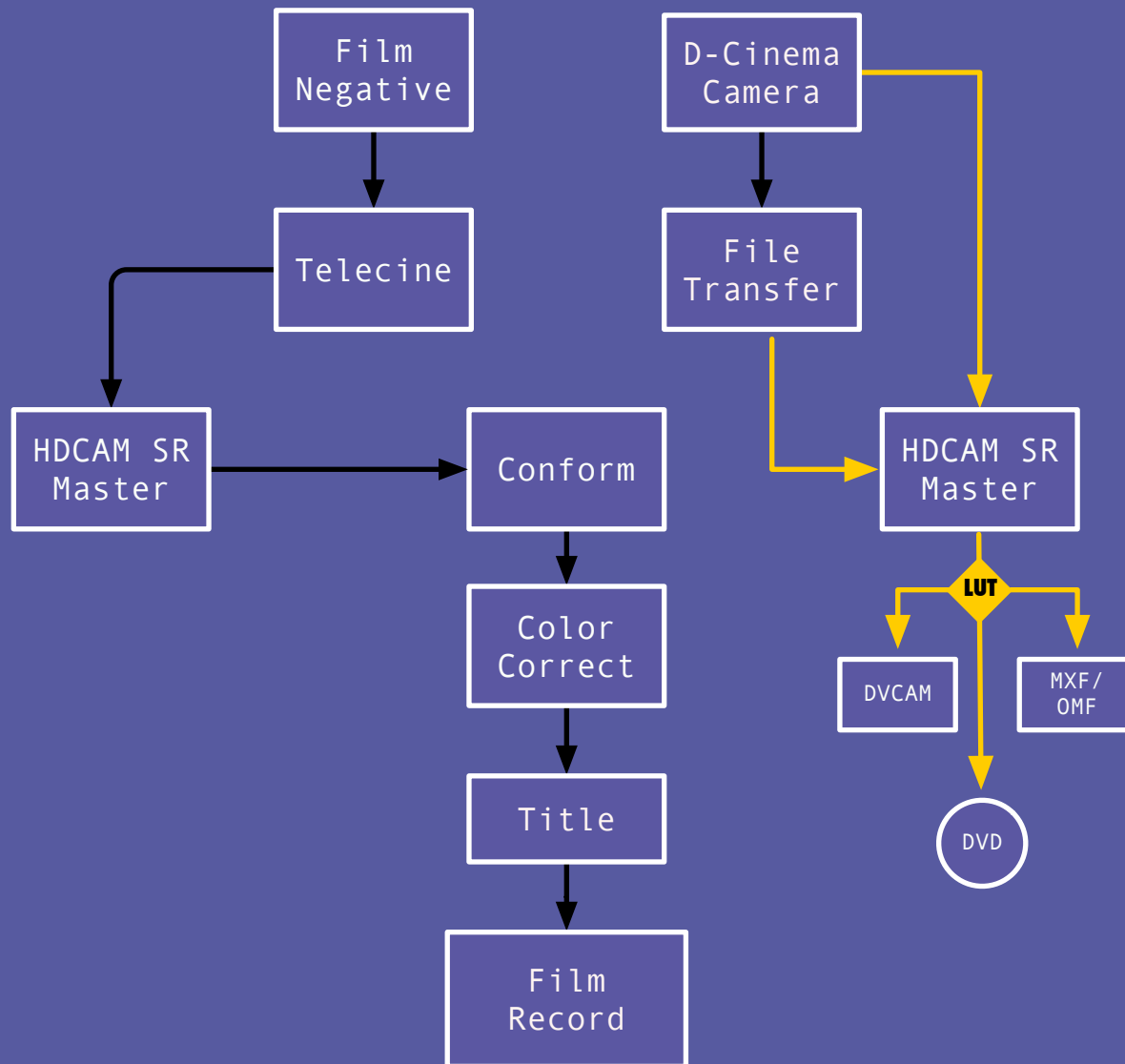
Direct Ingest from
Tape or Data Drive

4:4:4 RGB Workflows in Post Production



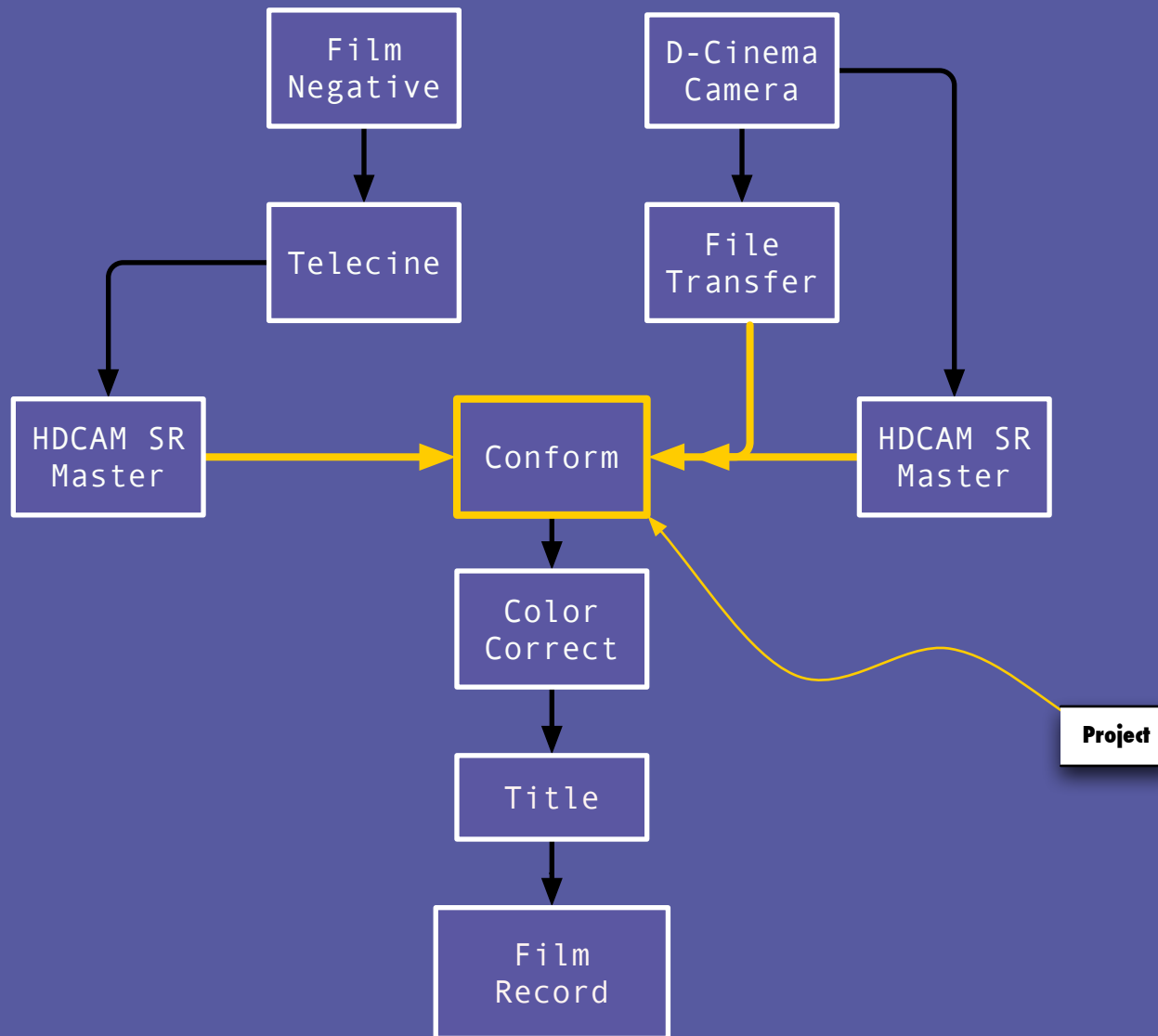
Dailies/Edit
Masters via
Technical Corrected
Master using Log/
Lin 3D Viewing LUT

4:4:4 RGB Workflows in Post Production



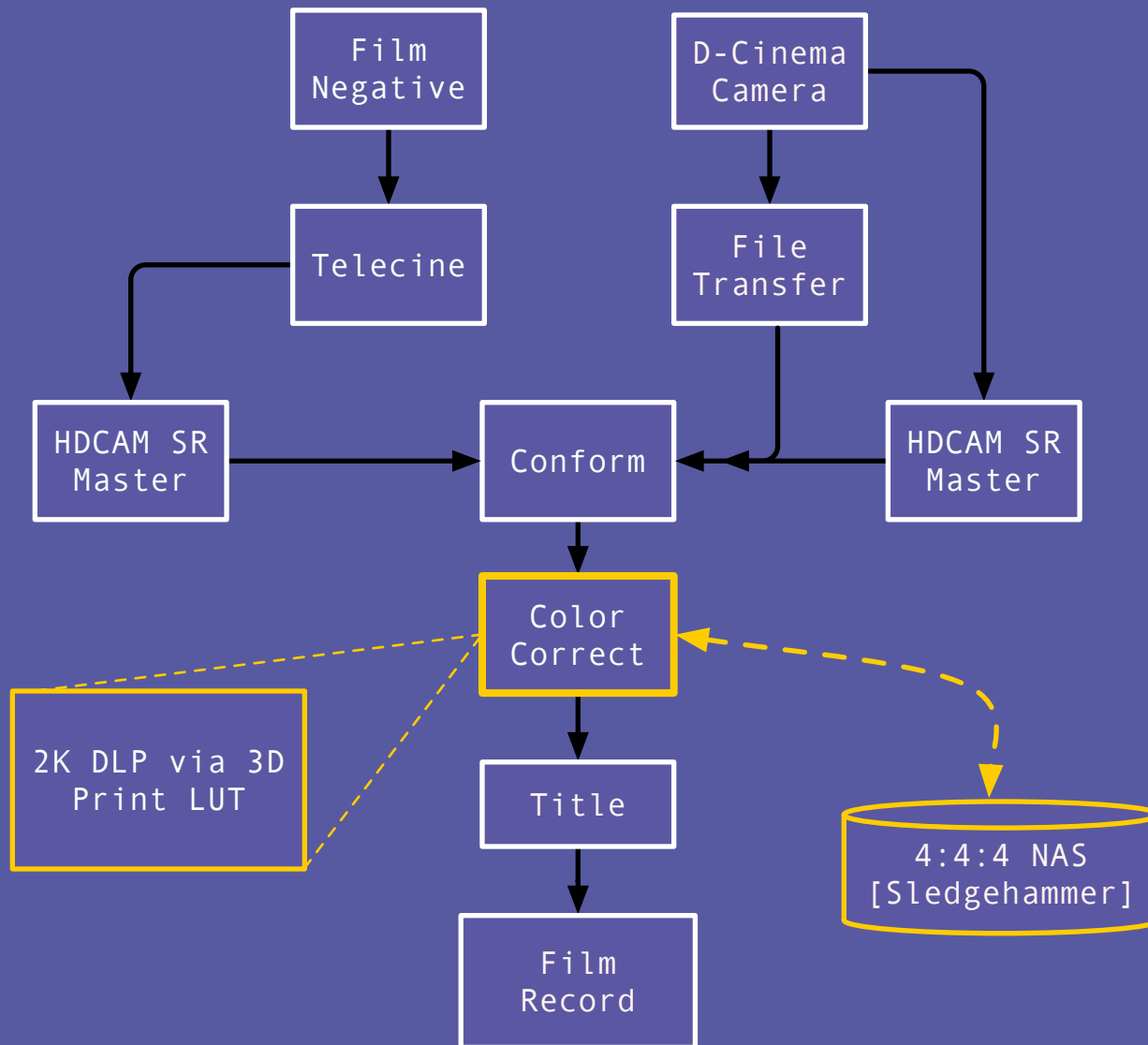
Dailies/Edit
Masters via Custom
3D Viewing LUTs
(possibly
established on set)

4:4:4 RGB Workflows in Post Production



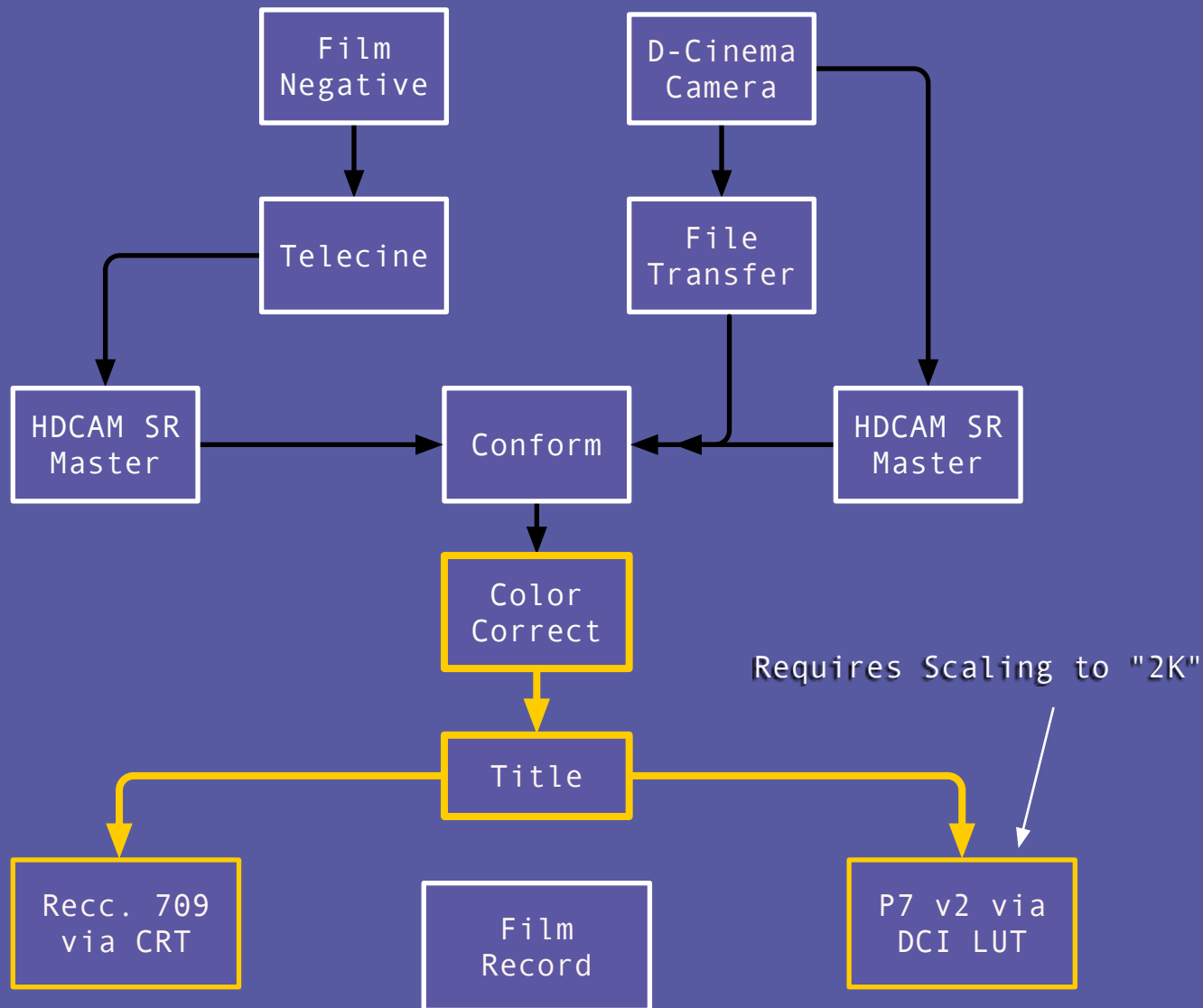
Non-Linear Conform
via Quantel iQ or
Avid DS Nitris in
4:4:4

4:4:4 RGB Workflows in Post Production



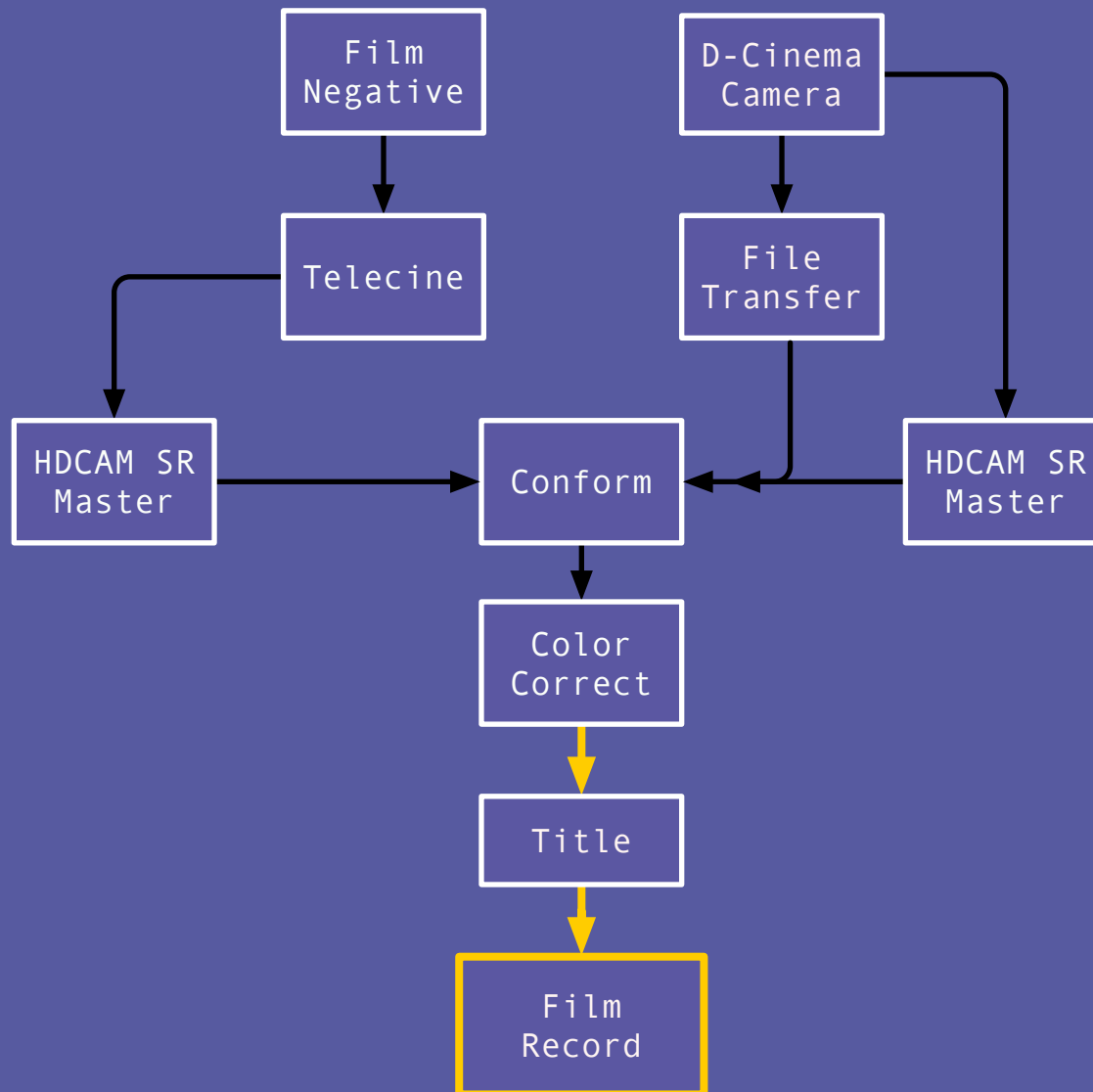
Color Correct on Pandora Pogle or DaVinci 2K via High Speed NAS or SR Sub-Masters

4:4:4 RGB Workflows in Post Production



HD Deliverables
output with
Downstream Color-
Correction

4:4:4 RGB Workflows in Post Production



Record on ArriLaser
Film Recorder via
10bit Log Loader
LUT

4:4:4 RGB Workflows in Post Production

Drive-based vs. Tape-based Workflows

HDD: Free Form ('Open')
Random Access
Logical Protection: Check Sum + RAID
High Cost per bit
Integrates into IT Infrastructure
Can be Fast or Slow
Directory Structure Vulnerable
Frames can be Arbitrary Size and Aspect

Tape: Low Inertia
Low Cost per bit
Transparent (...somewhat)
Evolved Metadata Links (Timecode/VANC)
Integrates into Post Infrastructure
(Deck is 'Intelligent' Drive)
Usually Compressed - Always 1920 x 1080

Both have Operational Efficiencies.

Neither is Archival nor Human-Readable.