

## Glossary of Technical Terms

- **10-bit Color Depth:** Refers to the ability of a display or signal path to represent 1,024 ( $2^{10}$ ) shades per primary color channel (Red, Green, Blue), resulting in over a billion possible colors. Crucial for smooth gradients and avoiding color banding, especially in HDR.
- **Camera Calibration:** The process of adjusting camera settings (like white balance, color matrix, gamma) to ensure accurate representation of color, tone, and exposure, especially in relation to a specific display (like an LED wall) or lighting environment.
- **Clipping:** The loss of image detail in the brightest areas (highlight clipping) or darkest areas (shadow clipping/crushing) when the signal exceeds the display or recording medium's capacity.
- **Color Banding:** Visible stepping or distinct bands in areas of smooth tonal transition (like skies or gradients), often caused by insufficient color depth (e.g., 8-bit vs 10-bit).
- **Color Chart:** A physical card or chart (e.g., X-Rite ColorChecker, DSC Labs ChromaDuMonde) featuring standardized color patches used as a reference for calibrating camera color response and ensuring color accuracy.
- **Color Depth:** See *10-bit Color Depth*. Represents the number of bits used to define each color channel in a digital image.
- **Color Matrix:** A set of parameters within a camera or processing system that defines how the primary colors (RGB) are mixed and adjusted to create the final image colors. Used for fine-tuning color rendition.
- **Color Profile:** A data file that characterizes the specific color behavior of a device (camera, monitor, LED wall), defining its gamut and tonal response.
- **Color Space:** Defines the range (gamut) and interpretation of colors within a system. Examples include Rec.709 (SDR standard) and Rec.2020 (HDR standard).
- **CRI (Color Rendering Index):** A quantitative measure of a light source's ability to faithfully reveal the colors of various objects compared to a natural or reference light source. Higher CRI values indicate better color accuracy.
- **D65 (Daylight 6500K):** A standard white point reference corresponding to mid-day daylight color temperature (approximately 6500 Kelvin). Commonly used as a target for display calibration.
- **DisplayPort (DP):** A digital display interface standard used for connecting video

sources to displays, known for high bandwidth capabilities suitable for high resolutions, refresh rates, and color depths.

- **DMX (Digital Multiplex):** A standard protocol for controlling stage lighting, dimmers, and effects equipment, allowing real-time adjustments from a lighting console or software.
- **EOTF (Electro-Optical Transfer Function):** Defines how digital video signal values are converted into visible light levels by a display. Examples include Gamma 2.4 (SDR), PQ (HDR), and HLG (HDR).
- **False Color:** An exposure monitoring tool that displays specific luminance ranges within an image as different, distinct colors, making it easy to identify overexposed or underexposed areas.
- **Frame Lock / Frame Synchronization:** A technique using hardware (like NVIDIA Quadro Sync) to synchronize the display output refresh cycles across multiple GPUs and displays, ensuring they update simultaneously to prevent tearing or misalignment. Often used in conjunction with Genlock.
- **Gamma:** A curve defining the relationship between the input signal values and the output brightness (luminance) of a display or camera. It affects the contrast and tonal range, particularly in the mid-tones. Gamma 2.4 is a common standard for SDR.
- **Genlock (Generator Lock):** A common timing signal used to synchronize multiple video devices (cameras, switchers, LED processors, render engines) to the same frame rate and phase, preventing visual artifacts like tearing or rolling bars.
- **GPU (Graphics Processing Unit):** A specialized processor designed to accelerate the creation and rendering of images, video, and animations. Essential for real-time rendering in virtual production.
- **Gray Card:** A card displaying a standardized neutral gray tone (typically 18% reflectance) used as a reference target for setting accurate white balance and exposure in cameras.
- **HDR (High Dynamic Range):** A technology that allows for a wider range of luminance (brighter highlights, darker shadows) and often a wider color gamut compared to traditional standards, resulting in more realistic and impactful images.
- **HLG (Hybrid Log-Gamma):** An HDR standard (and EOTF) designed for broadcast compatibility, allowing a single signal to be displayed acceptably on both HDR and SDR screens.
- **IRE:** A unit used primarily on waveform monitors to measure the relative level of a

video signal, typically ranging from 0 (black) to 100 (white) in SDR systems.

- **Latency:** The time delay between an input signal or action (e.g., camera movement) and the corresponding output or response (e.g., the image updating on the LED wall). Low latency is critical for virtual production.
- **LED Wall:** A large display screen composed of numerous individual Light Emitting Diode (LED) panels, used in virtual production to display background environments in real-time.
- **LUT (Look-Up Table):** A file containing a predefined set of data used to transform color and tonal values in an image. Used for color space conversions, calibration adjustments, or applying creative looks.
- **Moiré Pattern:** An undesirable interference pattern that appears as wavy or geometric lines when a camera captures a subject with fine, repeating details (like the pixel grid of an LED wall) that conflict with the camera sensor's own grid.
- **Nits (cd/m<sup>2</sup>):** A unit of luminance, measuring the brightness of a display surface (candela per square meter). Used to specify LED wall brightness, especially for HDR targets.
- **Pixel Pitch:** The physical distance between the centers of adjacent pixels on an LED panel, typically measured in millimeters. Smaller pixel pitches result in higher resolution but can increase the risk of moiré.
- **PQ (Perceptual Quantizer) / ST 2084:** An HDR standard (and EOTF) designed to map digital code values to absolute luminance levels based on human visual perception, allowing for very bright highlights.
- **Rec.709:** The international standard color space and gamma specification for HDTV (SDR). Defines the range of colors and tonal response for standard broadcast and video content.
- **Rec.2020:** The standard color space specification for Ultra HD television, including HDR. It defines a significantly wider range of colors than Rec.709.
- **SDI (Serial Digital Interface):** A family of professional digital video interfaces primarily used in broadcast and production environments, transmitted over coaxial cable with BNC connectors.
- **SDR (Standard Dynamic Range):** Refers to traditional video standards (like Rec.709) with a limited range of brightness and color compared to HDR.
- **Shutter Angle:** A camera setting originating from film cameras, representing the duration the sensor is exposed relative to the frame rate (e.g., a 180° angle at 24fps means a 1/48s exposure). Affects motion blur and interaction with display refresh rates.

- **Spectrometer:** An instrument used to measure the spectral properties of light, providing highly accurate measurements of color temperature and spectral power distribution, useful for precise calibration and matching light sources.
- **SSI (Spectral Similarity Index):** A metric comparing the spectral power distribution of a test light source to a reference illuminant (like daylight or tungsten), indicating how well the test light's spectrum matches the reference. Useful for ensuring consistent color rendering between different types of lights.
- **TLCI (Television Lighting Consistency Index):** A standard used to measure the quality of a light source specifically for how well it renders colors on video cameras, providing an alternative or supplement to CRI.
- **Vectorscope:** An oscilloscope used in video production to visualize the color information (hue and saturation) of a signal, often displaying targets for standard colors and skin tones.
- **Video Processor (LED Processor):** A specialized hardware device that receives the video signal (from a GPU or other source), processes it, and distributes it correctly across the individual panels of an LED wall, handling scaling, color calibration, and brightness control.
- **Virtual Production:** A filmmaking technique that utilizes real-time technologies, often involving LED walls displaying computer-generated environments, to capture visual effects in-camera during principal photography.
- **VRAM (Video RAM):** Dedicated memory located on a GPU used to store textures, frame buffers, and other graphical data needed for real-time rendering. Sufficient VRAM is crucial for handling complex scenes and high resolutions.
- **Waveform Monitor:** An oscilloscope used in video production to display and measure the luminance (brightness) levels of a video signal relative to time or horizontal position across the frame. Essential for setting exposure and checking contrast.
- **White Balance (WB):** A camera setting that adjusts the overall color balance of an image so that objects appearing white in person are rendered white in the image, neutralizing color casts from different light sources.