



Plate Capture & Conform

Below is an original GEM-branded guide for cameras and capture formats in virtual production, featuring attached GEM logos for clear branding.

Context and Guidance

Context is vital; this information should be used as reference only, as production details and creative requirements vary with each project. GEM recommends referencing authoritative modules and videos for deeper insights into virtual production practices and camera technology.

GEM-Approved Cameras List

GEM is dedicated to delivering uncompromising image fidelity and cinematic quality. For best results, GEM endorses the use of professional cinema cameras that meet rigorous standards established by top industry bodies. Below is a list of widely recognized cameras that are approved for virtual production and high-quality plate capture in GEM projects:

Brand	Example Models (2025)
ARRI	Alexa LF, Alexa Mini LF, Alexa 65, Alexa 35
RED	Komodo 6K, Epic-W, Scarlet-W, Raven, V-Raptor

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Sony	FX3, FX6, FX9, VENICE, FR7
Canon	EOS C70, C300 Mk III, C500 Mk II, C700 FF
Blackmagic Design	URSA Mini Pro 4.6K G2, URSA Mini 12K
Panasonic	S1H, BS1H, VariCam 35, LT, Pure
Panavision	Millennium DXL2, DXL

These cameras are recognized for their image quality, color handling, dynamic range and compatibility with high-end workflows.

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Capture Specifications

Color Precision

- Minimum 10-bit with 4:2:2 chroma subsampling.
- Higher bit depths and RAW/uncompressed formats prevent banding, posterization and loss of color detail, especially in grading and VFX-heavy projects.

Record Format

- RAW or scene-referred image data is preferred (e.g., REDWideGamutRGB/Log3G10, S-Gamut3/S-Log3, ALEXA Wide Gamut/LogC).

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- When RAW isn't feasible, use lightly compressed codecs (e.g., ALL-Intra, ProRes HQ, XF-AVC).

Data Rate

- Minimum: 240Mbps at 24fps, or 10Mb per frame. Higher rates are required for higher frame rates.
- Avoid low data rates to prevent macroblocking and artifacts.

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Resolution

- Minimum active pixel count: 3840 x 2160 per camera in use.
- The capture resolution should meet or exceed the LED wall resolution, ideally 25% greater in height for pixel mapping.
- Spherical capture is recommended; avoid anamorphic lenses for plate work.

Sensor Readout Speed

- Less than ~18ms for rolling shutter; global shutter sensors preferred to eliminate skew/jello artifacts.
- All GEM-approved cameras meet or exceed minimum readout speeds.

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Camera Array Configurations

- Not always required, but multi-camera arrays increase creative flexibility.
- Overlap: Minimum 25-degree field-of-view overlap (suggested 30%), to ensure smooth plate stitching and prevent gaps or alignment errors.

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Example Arrays

Array	Setup Description
9 cameras	3 front, 5 rear, 1 hood-up
7 cameras	3 front, 3 rear, 1 hood-up
4 cameras	3 front, 1 hood-up

- Fisheye lenses can reduce array size but introduce perspective and distortion challenges.
 - Always capture at your intended production frame rate to avoid motion artifacts and interpolation errors.
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Essential Technical Considerations

- Match exposure, lighting, perspective, motion cadence, and depth of field across cameras and with creative intent.
 - Use sensor sync (Genlock) for arrays to maintain frame alignment.
 - Collect detailed notes/metadata for editorial and VFX teams.
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Output and Color

- Deliver ≥ 10 -bit color, ideally matching source codec if compressed.
- Optimize color pipeline for LED volume: use camera as the colorimeter, calibrate LED panels with tools like OpenVPCal.

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- Provide both stitched and single plates when shooting with arrays, for flexibility in post.
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Key Takeaways

GEM's high-fidelity capture workflow equips filmmakers to deliver stunning visuals for all virtual production content, with robust support, professional equipment, and the best technical practices for creative success.