Display Color Space Configuration

Purpose

CGI Studio can configure the output color space of an OpenGL ES display. The configuration is exposed in Scene Composer through Candera device metainfo and is stored with the display asset for use by the target application.

This feature can also be used to configure HDR and wide-gamut display output on supported target platforms. HDR output requires compatible EGL extensions, graphics drivers, operating system support, and display hardware.

> **Important:** Scene Composer currently previews only standard dynamic range (SDR) output on the Windows host. Selecting an HDR or wide-gamut color space configures the target output, but does not provide an accurate host preview.

Configure a display in Scene Composer

1. Open the solution with the OpenGL ES device package that is used by the target.
2. In the Scene Composer, select **View > Libraries > RenderTargets**. In the RenderTarget panel, select the HDR10-capable Display.
3. In the Properties panel, expand **Editing Utilities**.
4. Set **GlColorSpace** to the color space expected by the physical display, compositor, and target graphics stack.
5. Save the solution and rebuild the target assets.
6. Run the application on the target and check the device log and the physical output. Do not approve HDR or wide-gamut output from the Scene Composer host preview alone.

`EglGlColorSpaceLinear` is the default and should remain selected unless the complete target display pipeline is configured for another color space.

Available values

Scene Composer value	Intended output	Required EGL surface format
`EglGlColorSpaceLinear`	Default linear SDR	RGBA8 fixed point, 32 bpp

Scene Composer value	Intended output	Required EGL surface format
`EglGlColorSpaceSrgb`	sRGB SDR	RGBA8 fixed point, 32 bpp
`EglGlColorSpaceBt2020Linear`	Linear BT.2020	RGBA16F half float, 64 bpp
`EglGlColorSpaceBT2020Pq`	BT.2020 with PQ transfer	RGB10_A2 fixed point, 32 bpp
`EglGlColorSpaceBT2020Hlg`	BT.2020 with HLG transfer	RGB10_A2 fixed point, 32 bpp
`EglGlColorSpaceScrgbLinear`	Linear scRGB	RGBA16F half float, 64 bpp
`EglGlColorSpaceDisplayP3Linear`	Linear Display P3	RGBA16F half float, 64 bpp
`EglGlColorSpaceDisplayP3`	Display P3	RGB10_A2 fixed point, 32 bpp
`EglGlColorSpaceDisplayP3Passthrough`	Display P3 pass-through surface	RGB10_A2 fixed point, 32 bpp
`EglGlColorSpaceScrgb`	scRGB	RGBA16F half float, 64 bpp

The feature requests RGB10_A2 fixed point or RGBA16F half float surfaces, not full 32-bit floating-point color components.

Target requirements

Color-space selection is conditional on the target EGL implementation, window system, compositor, display controller, and panel. Before using a non-default value, verify all of the following:

- `EGL_KHR_gl_colorspace` is available for color-space surface attributes.
- The EGL extension for the selected color space is available. Depending on the selection, this is one of the `EGL_EXT_gl_colorspace_*` extensions for BT.2020, Display P3, or scRGB.
- `EGL_EXT_pixel_format_float` and a matching RGBA16F window configuration are available for the four half-float values.
- A matching RGB10_A2 window configuration is available for PQ, HLG, and the non-linear Display P3 values.
- The target device package's EGL configuration does not override the required channel sizes or component type with incompatible values.
- The operating system or compositor accepts the requested surface color space and drives the physical display in the corresponding mode.

Linear and sRGB transfer handling is delegated to EGL/OpenGL. For the other values, Candera's final window-surface shader applies the required gamut and/or transfer conversion before presentation. This also applies when display warping is enabled.

Fallback and verification

At startup, Candera queries the EGL extensions, selects a compatible window configuration, creates the surface with `EGL_GL_COLORSPACE_KHR`, and queries the created surface. Unsupported requests fall back to a linear SDR surface where possible and produce a device log message.

Check the target log for these entries:

- `EGL_GL_COLORSPACE_KHR` reports the color space of the created surface.
- `EGL_BUFFER_SIZE`, `EGL_RED_SIZE`, `EGL_GREEN_SIZE`, `EGL_BLUE_SIZE`, and `EGL_ALPHA_SIZE` report the selected surface format.
- A message containing `falling back to linear color space`, `falling back to SDR`, or `could not be set` means that the requested output is not active.

For HDR validation, use known reference content and verify the signal at the physical target display or with suitable display-analysis equipment. A successful asset build or a changed appearance in an SDR preview is not proof that the requested target mode is active.

Current limitations

- The Windows host used by Scene Composer supports SDR output only. Its `cgi_studio_3psw/src/OpenGLES/Win32/OpenGLAdapter` implementation reports no EGL extensions and does not support `EGL_GL_COLORSPACE_KHR` surface selection, RGB10_A2 HDR surfaces, or RGBA16F half-float window surfaces.
- Consequently, Scene Composer falls back to its default SDR surface for every HDR or wide-gamut selection. The selected property still configures generated target assets.
- Actual target support is driver- and platform-dependent. A value appearing in the Scene Composer list does not guarantee that the target EGL stack supports it.
- Wayland implementations may ignore linear and sRGB color-space surface attributes. Verify compositor behavior on the target platform.
- This setting controls the output surface and final output conversion. It does not by itself convert source assets, assign color profiles to textures, enable an HDR operating-system mode, or calibrate the display.

Revision #3
Created 2026-09-04 00:56:02 UTC by Kanai Tomoaki
Updated 2026-09-09 10:17:15 UTC by Kanai Tomoaki