Studio Display XDR

Technology Overview

March 2026

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Introduction

Displays are critically important to professionals: video editors, photographers, colorists, medical specialists, and more depend on accurate front-of-screen visuals to bring their work to life. Currently, pro setups include both reference-grade displays and multiple disparate components like high-end monitors paired with video conferencing cameras and audio systems—which complicates workflows and introduces consistency challenges.

Studio Display XDR redefines this paradigm, merging the precision of Apple XDR technology with an all-in-one studio solution. Featuring a 27-inch mini-LED display with 2304 independently controlled dimming zones, up to 1000 nits sustained brightness, and 2000 nits peak HDR,[1] it delivers a 1,000,000:1 contrast ratio and exceptional color accuracy. The display supports both P3 wide color and Adobe RGB color gamuts within a single preset, plus includes reference modes (also known as presets) to support medical imaging workflows.[2] With a 120Hz refresh rate, content in motion is smooth and responsive, and Adaptive Sync precisely matches varying frame rates for full-screen content like games. The integrated 12MP Center Stage camera with computational framing, six-speaker spatial audio system, and studio-quality microphones eliminates the need for peripheral devices. And with Thunderbolt 5 connectivity supporting high-speed accessories or daisy-chaining an additional display, Studio Display XDR empowers every professional to work with seamless precision.

Key Features

27-inch 5K Retina XDR display

- Studio Display XDR features a 27-inch LCD display with edge-to-edge glass and 13.75 mm borders.

- Mini-LED backlight with 2304 independently controlled dimming zones, enabling precise local contrast control and reduced blooming.

- With a 5120-by-2880 resolution and 218 pixels per inch, Studio Display XDR delivers exceptional detail for professional workflows.

P3 + Adobe RGB color gamut, 1 billion colors

- Native support for both P3 wide color and Adobe RGB gamuts, delivering over a billion colors and smooth gradients for professional color accuracy.

Extreme Dynamic Range

- Extreme Dynamic Range takes brightness and contrast to a new level, for images that are truer to life than ever.

- Up to 1000 nits of full-screen brightness for SDR content in bright conditions and 2000 nits peak brightness for HDR, with advanced thermal management to maintain performance during extended use.

- A contrast ratio of 1,000,000:1 ensures exceptional detail in both bright highlights and deep shadows.

Superwide viewing angle

- An Apple-designed, industry-leading polarizer technology maintains color accuracy and contrast for a large viewing angle, ideal for collaborative environments.

Reference modes

- Industry-standard reference modes, including cinematic standards, photography, print and design, DICOM medical imaging, and dual-gamut workflows—with optimizations for faster preset switching.[2]

120Hz refresh rate and Adaptive Sync

- 120Hz refresh rate for fast and fluid response time.

- Adaptive Sync for precise control of frame delivery with full-screen content like gaming when the frame rate varies.

- User-selectable optimization—prioritize low latency for creative workloads or higher temporal quality for cinematic playback.

Thunderbolt 5 connectivity

• Studio Display XDR connects seamlessly to Mac with the included Thunderbolt 5 Pro cable. Connect up to four with certain Mac configurations.

• A second downstream port for high-speed peripherals and daisy-chaining, alongside single-cable host connectivity with 140W power delivery.

Nano-texture glass option

• Standard glass with antireflective coating provides extremely low reflectivity. For less-controlled lighting conditions, an innovative nano-texture glass option scatters light while maintaining color and contrast.

Integrated 12MP Center Stage camera

• Computational video processing delivers automatic framing and Desk View mode for professional video conferencing, with precise color reproduction.

Professional audio system

• Six-speaker spatial audio system with Dolby Atmos support and studio-grade microphone array for crystal-clear sound capture in any environment.

Cohesive Studio Display design

• Studio Display XDR has a stunning design, made to pair perfectly next to Studio Display, ideal for professional workflows that use multiple displays.

Display Technology Deep Dive

The display panel on Studio Display XDR comprises many Apple-designed components that are tightly integrated to produce incredible image fidelity. A mini-LED backlighting system with local dimming provides a 1,000,000:1 contrast ratio and up to 2000 nits peak HDR brightness. The Retina 5K LCD panel powers over 14 million pixels and delivers over 1 billion colors for stunning color accuracy. The entire panel is managed by an all-new custom timing controller that seamlessly synchronizes pixel switching and LED modulation. An industry-leading polarizer with an optimized backlight film architecture provides wide off-axis viewing and is paired with either a standard or nano-texture cover glass to minimize reflectivity.

Mini-LED backlight

Cover glass

Quantum dot-based optical film stack

LCD panel
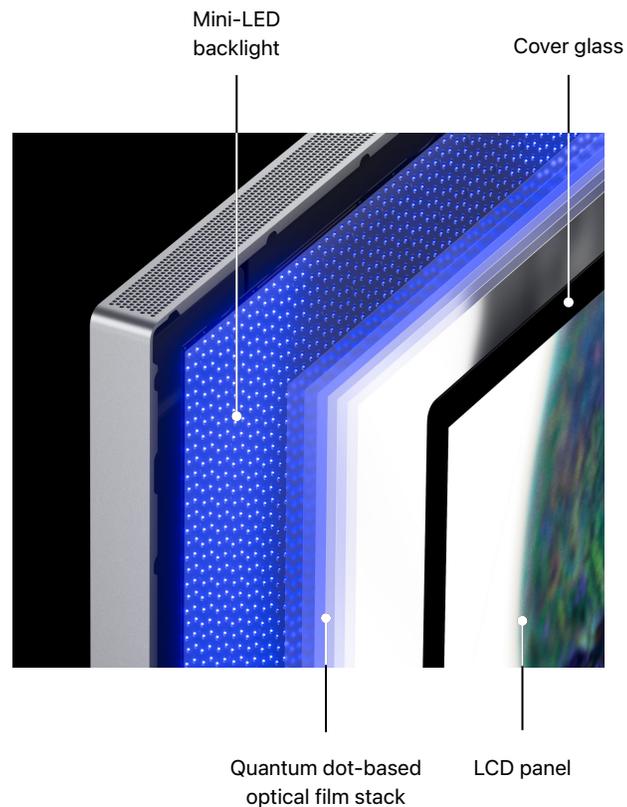
Mini-LED Backlight System

Studio Display XDR employs a proprietary mini-LED backlight system engineered for sustained thermal performance at high brightness levels, consistent off-axis viewing characteristics, and complete resistance to permanent burn-in. Unlike traditional edge-lit LED displays that uniformly diffuse light across the panel, Studio Display XDR utilizes 2304 independently controlled dimming zones. This precise zoning enables brilliant highlights to appear next to profound blacks, achieving an extreme contrast ratio of 1,000,000:1.

The maximum brightness of Studio Display XDR is dynamically managed based on displayed content. It can sustain up to 1000 nits of full-screen brightness indefinitely in environments up to 25°C (77°F), while delivering 2000 nits peak brightness for highlights. This Extreme Dynamic Range (XDR) surpasses conventional HDR standards for professional displays.

To address blooming artifacts common in local dimming systems, where LED zones would otherwise exceed the scale of fine image details, Studio Display XDR applies proprietary light-shaping innovations from MacBook Pro, which preserve image fidelity while maintaining exceptional brightness and contrast. A new machine learning–based content classifier analyzes frames in real time to further reduce the potential for blooming in media.

LCD Panel

Studio Display XDR features a 27-inch IPS LCD panel with oxide TFT technology, delivering precise 5K Retina resolution (5120 by 2880 pixels) at 218 pixels per inch for a total of 14.7 million pixels—providing significantly more workspace than standard 4K displays while maintaining perfect pixel-for-pixel reproduction of 4K content. To achieve smooth, responsive motion, the display supports a 120Hz refresh rate at its full 5K Retina resolution and can precisely vary refresh rates with Adaptive Sync.

The display supports both P3 wide color and Adobe RGB gamuts within a single reference preset, paired with over 1 billion colors and exceptionally smooth gradients even in challenging imagery such as sunsets.

The wide color gamut on Studio Display XDR is enabled by a newly developed cadmium-free quantum dot-based optical film stack, as well as a new set of color filters on the LCD panel itself. The optical film stack includes a color-conversion film that controls precise quantum dot particle size for color consistency and features a unique internal microstructure for long-term performance stability.

Viewing angle is just as important for color accuracy, as off-axis viewing can distort both color and content. This is especially important when multiple people need to view the display, as not everyone can stand on-axis at the same time. For an LCD display, the viewing angle is determined by the panel and backlight system. Studio Display XDR uses an industry-leading horizontal compensation polarizer on IPS LCD plus an optimal backlight optical film architecture to deliver a wide viewing experience.

Timing Controller (TCON)

Timing controllers are generally used to control the timing and display of the pixels on an LCD panel. Studio Display XDR introduces an advanced new Apple-designed TCON, with four processing pipelines, five embedded microcontrollers, and a local frame buffer. The TCON controls the LED and LCD layers of the display separately, treating them as two distinct displays with custom algorithms to seamlessly synchronize them into the final image. It also stores and applies calibration data to the pixels and the individual light characteristics for each of the 2304 LED zones.

Local dimming is controlled at 8x the display's maximum refresh rate to ensure seamless synchronization between LCD pixel switching and LED modulation. The TCON continuously monitors the brightness histogram and performs machine learning–based content analysis to understand the content's blooming potential on the display, then adjusts lighting to minimize bloom. The TCON also detects certain patterns that may be difficult for the LCD panel to display and optimizes the display at the pixel level to minimize artifacts.

The TCON uses its local frame buffer and hardware pipelines in conjunction with all-new algorithms to precisely deliver content to the LCD and backlight. The local frame buffer enables advanced frame scheduling techniques to prevent visual artifacts as the refresh rate varies. It's also used for improved synchronization of the LCD pixels and backlight LEDs. The processing pipelines can be reconfigured depending on the selected display optimization mode, enabling different tradeoffs for different reference modes. Reference modes switch quickly and without interrupting the display's connection to its host, enabled by the TCON's all-new architecture.

Cover Glass

The standard cover glass on Studio Display XDR has an on-axis reflection of 1.65 percent due to a custom antireflective coating that reduces glare by 3x.

A nano-texture version of the cover glass is also available for professionals who work in less-controlled lighting environments and prefer a display with even lower reflectivity. The textured surface is produced via an etching process to create nanostructures on the glass. The result is an innovative matte finish that effectively scatters light reflections to reduce perceived reflectivity while minimizing impact on sharpness, color, and contrast. For information on cleaning your Studio Display XDR, please see the Apple Support article How to clean your nano-texture Apple display.


Light scattering on nano-texture cover glass

Display Characteristics

Every Studio Display XDR undergoes a state-of-the-art factory display calibration process on the assembly line to ensure accuracy of individual pixels and backlight LEDs, with tight calibration control relative to key industry specifications. This process ensures Studio Display XDR has extremely close consistency between units, enabling workflows that require reference displays across multiple parts of the content creation process.

Display Color

Comparison of Gamuts
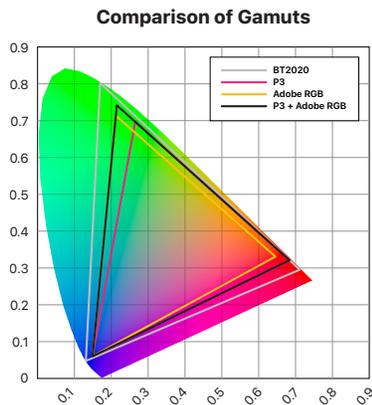
The calibrated LCD panel in Studio Display XDR delivers over 1 billion colors and is the first Apple display to simultaneously include both P3 wide color and Adobe RGB primaries. The expansion of the primaries to cover the Adobe RGB unlocks even deeper greens and cyans than P3 alone, and increases coverage of the BT.2020 color gamut—the color space for Ultra HD content—to 81 percent.

In addition, Studio Display XDR has reference modes that can accurately reproduce a variety of color spaces used by media today, including Adobe RGB, BT.709, BT.601, and sRGB. In color-managed pro applications, Studio Display XDR can work with content encoded in BT.2020. The display will accurately reproduce colors within its native gamut, while allowing BT.2020 color data to be preserved throughout the workflow.

Calibration Space

Apple displays undergo a state-of-the-art calibration process, ensuring visual properties such as luminance, white point, and color gamut are precisely aligned with standard targets. However, as new display technologies—including KSF LED backlighting, QD conversion sheet, and OLED—have emerged, even displays calibrated to identical targets using current standards can exhibit significantly different appearances. This has revealed limitations in the standard colorimetric system derived from the CIE 1931 color-matching functions (CMF), widely used in industry for traditional display calibration.

Color matching functions are mathematical representations of the sensitivity of the human eye to visible light, characterizing how humans perceive color. Apple has developed Apple CMF 2026 to address the limitations of the CIE 1931 CMF, and Studio Display XDR is the first Apple display to support it. Apple CMF 2026 represents a fundamental improvement in how displays are measured and calibrated, addressing systematic appearance mismatches that have persisted throughout the industry. Apple is engaged in standardization efforts through the International Commission on Illumination (CIE) to develop and define an industry-wide standard, improving visual consistency regardless of which manufacturer's display a customer is viewing.

Each Studio Display XDR is individually calibrated with Apple CMF 2026 for the best experience out of the box. Support for CIE 1931 continues to be available in reference presets. To accurately measure the display, the measurement instrument must support and be set to the CMF of the preset being measured. Apple has partnered with calibration instrument and software vendors to add support for Apple CMF 2026. More information on measuring your display can be found here.

Display Brightness

Studio Display XDR can sustain 1000 nits across the entire display indefinitely in environments up to 25° C (77° F) and can achieve a peak brightness of 2000 nits for HDR content over 47 percent of the display. Under typical conditions, Studio Display XDR supports up to 600 nits of SDR brightness. In brighter lighting conditions, the display can increase its SDR brightness up to 1000 nits, keeping content legible. Reference modes set precise SDR and HDR levels to align with industry standards.

120Hz Refresh Rate and Adaptive Sync

Studio Display XDR supports frame rates up to 120Hz for highly responsive and smooth motion. It's also the first Apple display to support Adaptive Sync, the industry standard for delivering variable refresh rates over DisplayPort, allowing it to precisely track the real-time frame rate of content down to 47Hz.

For full-screen media playback, Studio Display XDR automatically aligns with the precise frame rate of all video formats. Whether the content is 23.976 fps North American cinema, 25 fps European broadcast, or emerging high-frame-rate formats, the display adapts to it directly or to a multiple of it. This automatic adaptation preserves the artistic intent of the content creator and maintains optimal motion quality throughout playback.

For gaming, Studio Display XDR tracks dynamically varying, real-time rendered frame rates to deliver an incredibly smooth, low-latency experience. This provides gamers with responsive, fluid visuals regardless of how the frame rate fluctuates during gameplay.

Support for Adaptive Sync represents a significant improvement in how Apple displays handle dynamic content. An advanced frame-scheduling algorithm running on the TCON guarantees Apple industry-leading image quality, preventing the traditional front-of-screen quality risks of variable refresh rates, such as image sticking, color breakup, and flicker. This technology builds upon the foundations established by ProMotion, extending and enhancing those capabilities to meet the unique requirements of a standalone display operating with any Adaptive Sync–compatible host.

Display Optimization Modes

Studio Display XDR can optimize performance for the needs of different workflows. The default mode optimizes for lower latency to balance image quality and responsiveness, resulting in performance similar to other local dimming LCDs from Apple. Reference modes optimize for higher quality, prioritizing temporal image quality and frame timing precision over maximum responsiveness. In this mode, incoming frames are delayed by a small amount to perfectly synchronize the LCD with the backlight. This eliminates the temporal artifacts that can occur with local dimming displays. This added delay is also used to reduce the stutter that can occur from maintaining front-of-screen quality as the refresh rate varies.

Optimized for Lower Latency
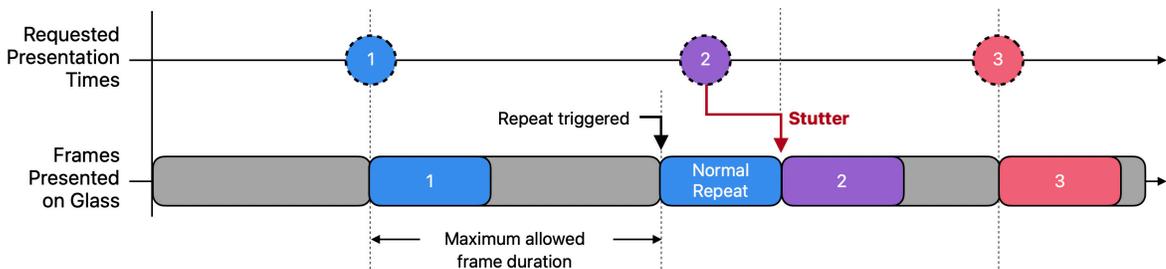
Optimized for Higher Quality
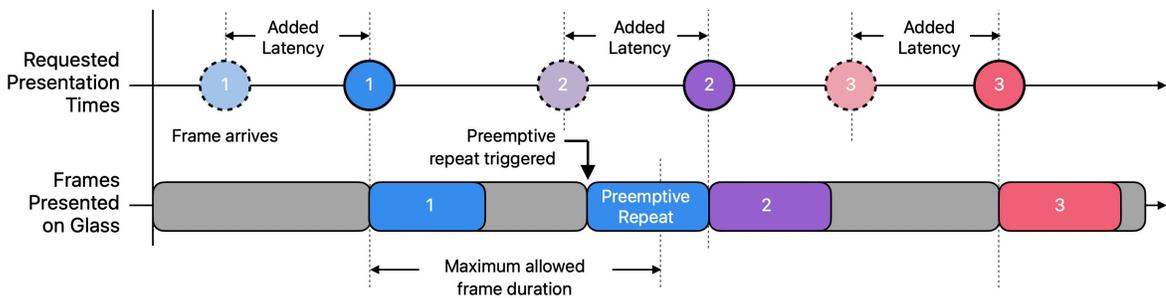
Medical Imaging[2] Expected by April 2026

In a first for Apple displays, Studio Display XDR supports medical imaging for diagnostic radiology when using the new medical imaging presets and Medical Imaging Calibrator within macOS. The feature is intended for trained medical professionals for use in general radiology, excluding mammography. To meet the needs and preferences of radiologists, two new medical imaging reference modes are built into the display, with unique capabilities.

These reference modes use the DICOM Grayscale Standard Display Function (DICOM-GSDF) in accordance with guidelines published by the American Association of Physicists in Medicine (AAPM). The DICOM-GSDF ensures a perceptually linear experience across pixel levels, takes into account the ambient light expected to be reflected off the display, and lifts the black level. In these modes, local dimming is disabled, ensuring highly uniform images without risk of blooming.

Trained medical practitioners can prepare Studio Display XDR for primary diagnostic interpretation of images by following the procedures in the Quality Control (QC) Manual. The procedures describe how to calibrate a medical imaging reference mode using the new Medical Display Calibrator within macOS and a compatible measurement instrument (colorimeter).

Using Studio Display XDR for medical imaging
Medical professionals such as radiologists can enable DICOM medical imaging workflows on Studio Display XDR using the medical imaging presets and the Medical Imaging Calibrator.

Display Luminance Considerations

For medical imaging displays, the ability to correct for luminance variations over time directly impacts their longevity and total cost of ownership. When a display can no longer produce the minimum luminance required, it must be replaced. Studio Display XDR provides a large amount of luminance headroom for the Medical Display Calibrator to maximize display lifetime.

| Reference Mode	Luminance Boost Available
Medical Imaging (DICOM-350 nits)	Up to 3x
Medical Imaging (DICOM-600 nits)	Up to 1.8x

Setting Up Studio Display XDR

Studio Display XDR delivers professional-grade visual fidelity across diverse workspaces—from compact home offices to broadcast production suites—without compromising on precision. Its integrated tilt- and height-adjustable stand, coupled with an optional VESA mount adapter, ensures seamless integration into any studio environment while maintaining ergonomic comfort for extended use.

Workspace Considerations

Front ambient light sensor

Rear ambient light sensor

Tilt- and height-adjustable stand

Dual ambient light sensors dynamically adjust display brightness, black point, and white point (with True Tone enabled) based on surrounding lighting conditions to maintain visual consistency. For best results, avoid placing direct light sources pointed at the display, or directly behind, to prevent unintended calibration shifts.

For content creators working with multiple media standards, Studio Display XDR offers industry-specific reference modes, including DICOM-certified medical imaging and simultaneous P3/Adobe RGB support within a single preset.[2] Reference mode transitions typically occur in under a second, and Adaptive Sync at up to 120Hz can provide smooth playback for both cinematic content and real-time editing workflows.

In most usage scenarios, the fans are inaudible from the user position, operating at up to 16 dBA in typical room conditions. In contrast, most reference displays operate at much higher decibel levels, up to 40 dBA in some models.
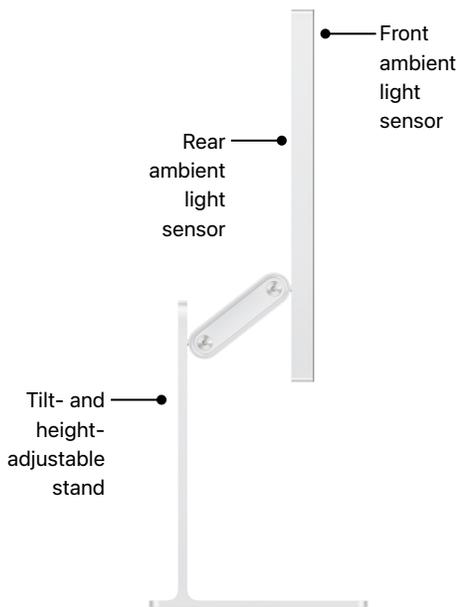
Connections and Compatibility

Thunderbolt 5 ports (x2)

USB-C ports (x2)

Studio Display XDR features powerful Thunderbolt 5 connectivity, with one upstream port for connecting the host and a dedicated downstream port for high-speed peripherals or daisy-chaining additional displays. This Thunderbolt 5 connection also delivers up to 140W power delivery to charge a Mac laptop. That's enough to power a 16-inch MacBook Pro during an intensive workload, or quickly charge. The dual-port design reduces the need for separate hubs, allowing professionals to connect external SSDs, capture cards, or secondary displays directly through the display while maintaining consistent performance.
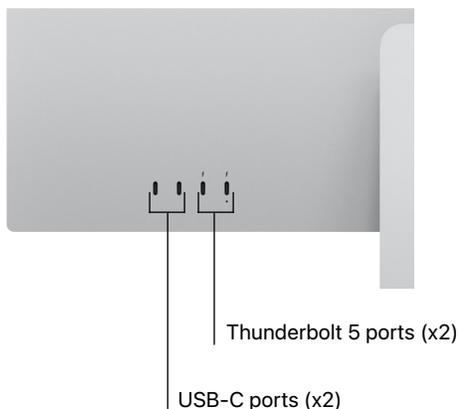
Studio Display XDR is fully compatible with all Mac models featuring Thunderbolt 3 or later ports. When paired with Apple silicon–based systems, it automatically leverages the advanced color management in macOS for seamless reference mode switching. In Windows and Linux environments, the display uses VESA DisplayID and Extended Display Identification Data (EDID) to communicate capabilities and optimize resolution settings through USB-C Alt Mode or Thunderbolt 5 connectivity. While the display retains its full color gamut on macOS, reference modes will report BT.2020 capability to non-macOS hosts with color space limited to P3 due to system-level constraints.

Stand and Mount Options

Studio Display XDR comes standard with a tilt- and height-adjustable stand that makes every adjustment of your display feel seamless, with –5° to +25° precision tilting and 120 mm of height adjustment to adapt to any viewing condition. And for pros who have unique mounting setups for their displays or need to use the display in portrait orientation, an optional VESA mount adapter is available to configure at time of purchase.

Tilt-and-Height Stand Design
The arm on the tilt- and height-adjustable stand is designed to make Studio Display XDR feel weightless while adjusting it.
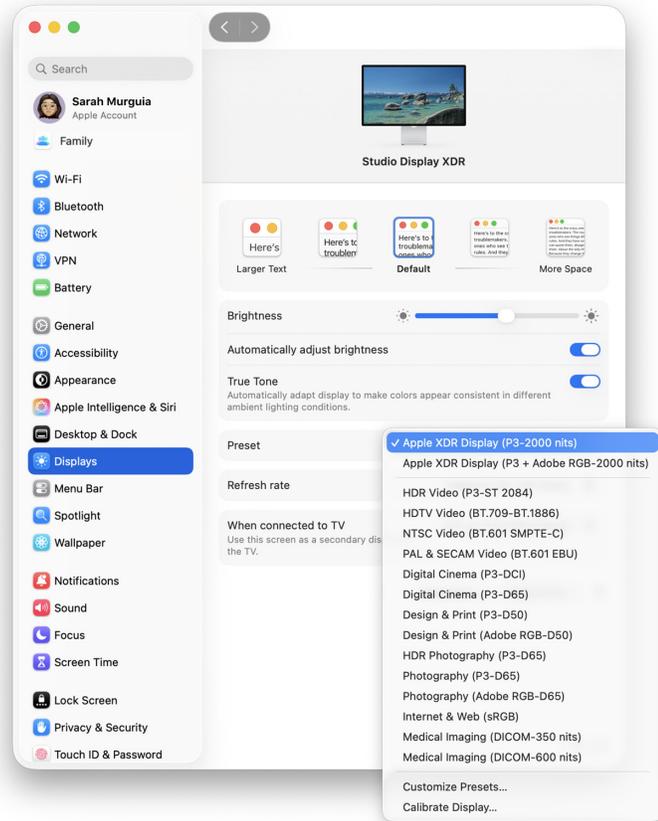
Using Reference Modes

When performing color-critical content work on Studio Display XDR, it's recommended that you use the reference mode associated with your media type to achieve more exacting results. When a reference mode is selected, the display relies on its sophisticated calibration algorithm to appropriately adjust its color primaries, white point, transfer function (gamma), and luminance.

It's important to follow industry specifications for the viewing environment associated with each media type, as several reference modes are designed to work only in those specified conditions.

Switching between reference modes is extremely quick on Studio Display XDR and can be managed through Displays preferences on macOS. If you need to switch between modes frequently, you can set specific modes to be easily accessible from the Displays menu on the right side of the menu bar.

Although Studio Display XDR can sustain 1000 nits of brightness across the entire screen indefinitely in environments up to 25° C (77° F), nit ranges higher than 1000 or environments warmer than 25° C may have an impact on sustained brightness. A Reference Status Indicator ⬒ in the menu bar will indicate when the display is unable to sustain the desired brightness required by the image content in the currently selected reference mode.

Built-in Reference Modes

Apple XDR Display (P3-2000 nits)

Configures the display for general use in office and home environments. This mode is based on the wide color P3 color primaries used by Apple displays and includes high dynamic range support up to 2000 nits (peak).

Color Primaries	P3 (wide color)
White Point	D65
Calibration Space[3]	Apple CMF 2026
Transfer Functions	SDR: Gamma 2.20 (power-law curve) HDR: Perceptual Quantizer (PQ)
Peak HDR Luminance	2000 nits peak (XDR)
Peak SDR Luminance	Up to 1000 nits, based on brightness control and ambient lighting conditions
Brightness Control	User selectable
Automatic Adjustments	HDR tone mapping, screen brightness, and white point (True Tone) are automatically adjusted for ambient lighting conditions in macOS. Automatic brightness adjustment and True Tone can be disabled in Displays preferences.

Apple XDR Display (P3 + Adobe RGB-2000 nits)

Configures the display for general use in office and home environments. This mode includes both P3 and Adobe RGB color primaries to support a variety of creative and productivity workflows and includes high dynamic range support up to 2000 nits (peak).

Color Primaries	P3 + Adobe RGB (wide color)
White Point	D65
Calibration Space[3]	Apple CMF 2026
Transfer Function	SDR: Gamma 2.20 (power-law curve) HDR: Perceptual Quantizer (PQ)
Peak HDR Luminance	2000 nits peak (XDR)
Peak SDR Luminance	Up to 1000 nits, based on brightness control and ambient lighting conditions
Brightness Control	User selectable
Automatic Adjustments	HDR tone mapping, screen brightness, and white point (True Tone) are automatically adjusted for ambient lighting conditions in macOS. Automatic brightness adjustment and True Tone can be disabled in Displays preferences.

HDR Video (P3-ST 2084)

Configures the display for 4K or ultra high-definition video production workflows up to 1000 nits (full-screen sustained) using the wide color P3 primaries and the high dynamic range SMPTE ST-2084 EOTF. This mode is for use in a controlled viewing environment set up per ITU-R BT.2100.

Color Primaries	P3 (wide color)
White Point	D65
Calibration Space[3]	CIE 1931
Transfer Functions	SDR: Gamma 2.20 (power-law curve) HDR: Perceptual Quantizer (PQ)
Peak HDR Luminance	1000 nits (full screen)
Peak SDR Luminance	100 nits
Brightness Control	Fixed at 100 nits
Automatic Adjustments	None, all controls are fixed for use in controlled viewing conditions (16 lux)

HDTV Video (BT.709-BT.1886)

Configures the display for high-definition video production workflows targeting the ITU-R BT.709 and BT.1886 recommendations. This mode is for use in a controlled viewing environment set up per ITU-R BT.2035.

Color Primaries	Rec.709
White Point	D65
Calibration Space[3]	CIE 1931
Transfer Function	BT.1886
Peak SDR Luminance	100 nits
Brightness Control	Fixed at 100 nits
Automatic Adjustments	None, all controls are fixed for use in controlled viewing conditions (10 lux)

NTSC Video (BT.601 SMPTE-C)

Configures the display for standard definition or archival video production workflows targeting the ITU-R BT.601 recommendation and SMPTE-C color primaries. This mode is for use in a controlled viewing environment set up per ITU-R BT.2035.

Color Primaries	SMPTE-C
White Point	D65
Calibration Space[3]	CIE 1931
Transfer Function	BT.1886
Peak SDR Luminance	100 nits
Brightness Control	Fixed at 100 nits
Automatic Adjustments	None, all controls are fixed for use in controlled viewing conditions (10 lux)

PAL and SECAM Video (BT.601 EBU)

Configures the display for standard definition or archival video production workflows targeting the ITU-R BT.601 recommendation and EBU Tech 3213 color primaries. This mode is for use in a controlled viewing environment set up per ITU-R BT.2035.

Color Primaries	EBU
White Point	D65
Calibration Space[3]	CIE 1931
Transfer Function	BT.1886
Peak SDR Luminance	100 nits
Brightness Control	Fixed at 100 nits
Automatic Adjustments	None, all controls are fixed for use in controlled viewing conditions (10 lux)

Digital Cinema (P3-DCI)

Configures the display for motion picture and post-production workflows using the P3 theatrical color space and digital cinema white point. This mode is for use in a controlled viewing environment set up per SMPTE RP 431-2:2011.

Color Primaries	P3 (wide color)
White Point	DCI
Calibration Space[3]	CIE 1931
Transfer Function	Gamma 2.60 (power-law curve)
Peak SDR Luminance	48 nits
Brightness Control	Fixed at 48 nits
Automatic Adjustments	None, all controls are fixed for use in controlled viewing conditions (0.03 lux)

Digital Cinema (P3-D65)

Configures the display for motion picture and post-production workflows using the P3 theatrical color space with the D65 white point. This mode is for use in a controlled viewing environment set up per SMPTE RP 431-2:2011.

Color Primaries	P3 (wide color)
White Point	D65
Calibration Space[3]	CIE 1931
Transfer Function	Gamma 2.60 (power-law curve)
Peak SDR Luminance	48 nits
Brightness Control	Fixed at 48 nits
Automatic Adjustments	None, all controls are fixed for use in controlled viewing conditions (0.03 lux)

Design and Print (P3-D50)

Configures the display for graphic design, printing, and publishing workflows that use wide color P3 primaries. This mode also uses the D50 white point typically used to evaluate the color of printed output. It is for use in a controlled viewing environment set up in accordance with ISO 3664:2009.

Color Primaries	P3 (wide color)
White Point	D50
Calibration Space[3]	CIE 1931
Transfer Function	Gamma 2.20 (power-law curve)
Peak SDR Luminance	160 nits
Brightness Control	Fixed at 160 nits
Automatic Adjustments	None, all controls are fixed for use in controlled viewing conditions (32 lux)

Design and Print (P3-Adobe RGB)

Configures the display for graphic design, printing, and publishing workflows that use Adobe RGB color primaries. This mode also uses the D50 white point typically used to evaluate the color of printed output. It is for use in a controlled viewing environment set up in accordance with ISO 3664:2009.

Color Primaries	Adobe RGB
White Point	D50
Calibration Space[3]	CIE 1931
Transfer Function	Gamma 2.20 (power-law curve)
Peak SDR Luminance	160 nits
Brightness Control	Fixed at 160 nits
Automatic Adjustments	None, all controls are fixed for use in controlled viewing conditions (32 lux)

HDR Photography (P3-D65)

Configures the display for HDR digital photography workflows. This mode uses wide color P3 primaries with the D65 white point typically used for screen-based viewing. It is for use in appropriately set up and controlled environments.

Color Primaries	P3 (wide color)
White Point	D65
Calibration Space[3]	CIE 1931
Transfer Functions	SDR: Gamma 2.20 (power-law curve) HDR: Perceptual Quantizer (PQ)
Peak HDR Luminance	1624 nits
Peak SDR Luminance	203 nits
Brightness Control	Fixed at 203 nits
Automatic Adjustments	None, all controls are fixed for use in controlled viewing conditions (64 lux)

Photography (P3-D65)

Configures the display for SDR photography workflows that use wide color P3 primaries with the D65 whitepoint. It is for use in appropriately set up and controlled viewing environments.

Color Primaries	P3 (wide color)
White Point	D65
Calibration Space[3]	CIE 1931
Transfer Function	Gamma 2.20 (power-law curve)
Peak SDR Luminance	160 nits
Brightness Control	Fixed at 160 nits
Automatic Adjustments	None, all controls are fixed for use in controlled viewing conditions (64 lux)

Photography (P3-Adobe RGB)

Configures the display for SDR photography workflows that use Adobe RGB primaries with the D65 whitepoint. It is for use in appropriately set up and controlled viewing environments.

Color Primaries	Adobe RGB
White Point	D65
Calibration Space[3]	CIE 1931
Transfer Function	Gamma 2.20 (power-law curve)
Peak SDR Luminance	160 nits
Brightness Control	Fixed at 160 nits
Automatic Adjustments	None, all controls are fixed for use in controlled viewing conditions (64 lux)

Internet and Web (sRGB)

Configures the display for content creation workflows targeting web or other internet-based use cases. This mode uses the broadly supported sRGB (IEC 61966-2-1:1999) color space per the W3C CSS Color Module Level 3 recommendation. It is for appropriately set up and controlled viewing environments.

Color Primaries	sRGB
White Point	D65
Calibration Space[3]	CIE 1931
Transfer Function	sRGB ICC V2
Peak SDR Luminance	80 nits
Brightness Control	Fixed at 80 nits
Automatic Adjustments	None, all controls are fixed for use in controlled viewing conditions (64 lux)

Medical Imaging (DICOM-350 nits)

Configures the display for use in medical imaging workflows, following AAPM TG270 recommendations for general radiology. This mode uses the DICOM-GSDF transfer function designed for a controlled 25 lux ambient viewing environment with a 350:1 luminance ratio and peak luminance of 350 nits. Diagnostic use requires the display has been calibrated using the Medical Imaging Calibrator on macOS and paired with a compatible DICOM viewer.[2]

Color Primaries	P3 (wide color)
White Point	D65
Calibration Space[3]	CIE 1931
Transfer Function	DICOM-GSDF
Peak SDR Luminance	350 nits
Brightness Control	Fixed at 350 nits
Automatic Adjustments	None, all controls are fixed for use in controlled viewing conditions (25 lux)

Medical Imaging (DICOM-600 nits)

Configures the display for use in medical imaging workflows, following AAPM TG18 recommendations for general radiology. This mode uses the DICOM-GSDF transfer function designed for a controlled 25 lux ambient viewing environment with a 600:1 luminance ratio and peak luminance of 600 nits. Diagnostic use requires the display has been calibrated using the Medical Imaging Calibrator on macOS and paired with a compatible DICOM viewer.[2]

Color Primaries	P3 (wide color)
White Point	D65
Calibration Space[3]	CIE 1931
Transfer Function	DICOM-GSDF
Peak SDR Luminance	600 nits
Brightness Control	Fixed at 600 nits
Automatic Adjustments	None, all controls are fixed for use in controlled viewing conditions (25 lux)

Custom Reference Modes

While Studio Display XDR ships with a variety of reference modes for common media types, you may have different workflow needs. You can create custom reference modes by selecting from several color gamut, white point, and transfer function options. These custom reference modes are stored on the display and are made available to any host that connects to it. You can even export, share, and import custom reference modes for easy deployment across your facility.

Custom Calibration

Many professional workflows also incorporate display recalibration into the production process to validate screen-to-screen accuracy and consistency over time. Apple provides three methods to adjust the calibrated performance of Studio Display XDR with the Pro Display Calibrator. All of these methods save their calibration to the display itself.
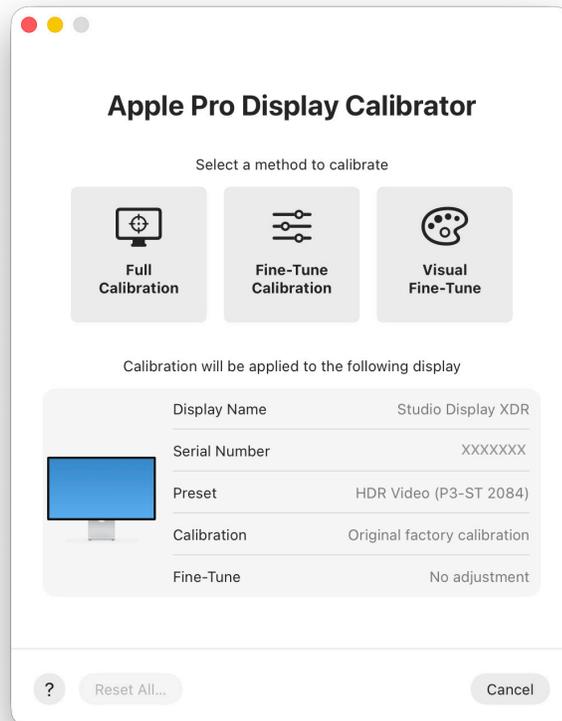
With Visual Fine-Tune, you can adjust the white point of your display using a color grid to match other displays. If you have a measurement instrument, you can use Fine-Tune Calibration to quickly adjust the white point and luminance[3] to the expected values of your target based on measurement results. These features create separate adjustments for each preset.

Full Calibration recalibrates the white point, primaries, luminance, and gamma response of your display with a compatible spectroradiometer.[4] This recalibration applies to all presets and can be further adjusted over time using Visual Fine-Tune or Fine-Tune Calibration.

Technical Support

Every Studio Display XDR comes with a one-year limited warranty from Apple and up to 90 days of complimentary technical support. By adding AppleCare+, you can extend your coverage, giving you unlimited accidental damage protection. You'll also enjoy priority access to Apple experts whenever you need help. In addition to bringing in your device for service, you can schedule an onsite service appointment in many countries where Apple-certified technicians will come to your location. AppleCare+ covers repairs or replacements, including parts and service, by Apple-authorized technicians using genuine Apple parts.[5] For additional information on AppleCare coverage, please visit the [AppleCare display support page](#).

Technical Specifications

Display	**Retina 5K XDR Display**
	27-inch (diagonal) IPS LCD display with oxide TFT technology
	Resolution: 5120 by 2880 pixels (14.7 million pixels) at 218 pixels per inch (ppi)
	Aspect ratio: 16:9
	Brightness: 1000 nits sustained SDR, 2000 nits peak HDR
	Contrast ratio: 1,000,000:1
	Color: P3 + Adobe RGB wide color gamut, over 1 billion colors
	Viewing angle: 89° left, 89° right, 89° up, 89° down
	Fully laminated; 1.65% reflectivity (typical, SCI)
Technology	Mini-LED backlighting system using 2304 full array local dimming zones
	Apple-designed timing controller (TCON) chip engineered to precisely control high-speed modulation of both 14.7 million LCD pixels and 2304 LEDs in backlight for seamless synchronization
	True Tone technology with dual ambient light sensors (ALS) design to ensure an accurate viewing experience in any ambient lighting condition

Refresh Rates	Adaptive (47–120 Hz)		
	47.95Hz	48.00Hz	50.00Hz
	59.94Hz	60.00Hz	120.00Hz

Reference Modes	**Available reference modes:**

XDR Display (P3-2000 nits)	HDTV Video (BT.709-BT.1886)
XDR Display (P3 + Adobe RGB-2000 nits)	PAL and SECAM Video (BT.601 EBU)
	Digital Cinema (P3-D65)
HDR Video (P3-ST 2084)	HDR Photography (P3-D65)
NTSC Video (BT.601 SMPTE-C)	Photography (P3-D65)
Digital Cinema (P3-DCI)	Photography (Adobe RGB-D65)
Design and Print (P3-D50)	Medical Imaging (DICOM-350 nits)[2]
Design and Print (Adobe RGB-D50)	Medical Imaging (DICOM-600 nits)[2]
Internet and Web (sRGB)	

Size and Weight	Width: 24.5 inches (62.3 cm)	Height: 23.0 inches (58.3 cm)
	Depth: 8.4 inches (21.4 cm)	Weight: 18.7 pounds (8.5 kg)[6]