PROLED XDR Display

Technology Overview

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Introduction

Displays are critically important to professionals: video editors, photographers, colorists, 3D animators, and more depend on accurate front-of-screen visuals to bring their work to life. For professionals who work on the move, the need for this level of precision coexists with the key features of a desirable pro laptop: thinness, weight, and all-day battery life. Organic light-emitting diode (OLED) is the display technology best positioned to break through that equation, because every pixel generates its own light and color — no backlight to add thickness, weight, or heat. Tandem OLED goes further: Two electroluminescent-emitting layers work together to deliver higher peak brightness, better power efficiency, and longer panel lifespan than conventional single-emitter OLED. But for years, OLED's own limitations, like pixel-to-pixel variation, low brightness uniformity, burn-in risk, and off-axis color shift, have kept it from reaching its full potential as a pro display.

PROLED XDR display, the best display in a pro laptop, finally overcomes these historic limitations. For the first time, a MacBook Pro display uses tandem OLED technology, delivering up to 1000 nits[1] of sustained full-screen brightness, 2000 nits of peak high dynamic range (HDR) and standard dynamic range (SDR) brightness, and a 10,000,000:1 contrast ratio with accurate, per-pixel black levels. It's driven in real time by an all-new display engine in M5 Pro and M5 Max, which continuously compensates each pixel for content, usage, temperature, and ambient conditions—delivering creative precision out of the box and protecting panel lifespan over time. And a unique manufacturing process ensures panel-to-panel consistency and minimizes off-axis color shift, a first for any OLED laptop.

MacBook Pro with PROLED XDR display is available in two sizes, 14.2-inch or 16.3-inch, with 4.6 mm borders, 254 pixels per inch, and over 1 billion colors, with native support for both P3 and Adobe RGB color gamuts in a single preset. ProMotion technology adapts the refresh rate from 10 to 120Hz, and a nano-texture glass option is available for less-controlled lighting environments. Industry-standard reference modes and custom display calibration make the PROLED XDR display a portable reference monitor and color-grading suite on the go. The result is front-of-screen quality previously possible only on a dedicated reference monitor, now in a pro laptop.

Key Features

14.2-inch or 16.3-inch tandem OLED display

- PROLED XDR display is the first Mac display to use OLED technology — every pixel generates its own light and color, without an LED backlight.
- With 3024-by-1986-pixel resolution on the 14-inch model and 3472-by-2266 on the 16-inch model, both at 254 pixels per inch, the display delivers exceptional detail with 4.6 mm borders.

Extreme Dynamic Range (XDR)

- Up to 1000 nits of sustained full-screen brightness for HDR and SDR content,[1] with advanced thermal management to maintain performance during extended use.
- Up to 2000 nits peak HDR brightness for highlights that pop off the screen.
- A 10,000,000:1 contrast ratio delivers exceptional detail in both brilliant highlights and deep shadows.
- In very bright ambient conditions, SDR brightness extends up to 2000 nits, keeping content visible outdoors.

P3 + Adobe RGB color gamut, 1 billion colors

- Native support for both P3 wide color and Adobe RGB gamuts, delivering over 1 billion colors and smooth gradients for professional color accuracy.
- First portable Mac display to include both P3 and Adobe RGB primaries in a single preset.

120Hz refresh rate with ProMotion

- ProMotion technology adapts the refresh rate from 10 to 120Hz, delivering fast, fluid response while minimizing the energy used when content is idle.
- For filmmakers working with exact frame rates, discrete refresh rates like 47.95Hz, 48Hz, 50Hz, and 59.94Hz can be selected.

Real-time precision from Apple silicon display engine

- OLED is an organic technology, and its performance is naturally influenced by usage over time.
- Advanced, real-time compensation algorithms in the M5 Pro and M5 Max display engine simultaneously respond to content, pixel use, temperature, and ambient environment — maintaining creative precision and delivering longer panel lifespan.

Nano-texture glass option

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

Reference modes

- Industry-standard reference modes, including cinematic standards, photography, print and design, DICOM medical imaging,[2] and dual P3 + Adobe RGB gamut workflows.

Display Technology Deep Dive

PROLED XDR display on MacBook Pro comprises many innovative, Apple-designed components that are tightly integrated, combined with extremely precise factory calibration, to produce unparalleled front-of-screen performance in a pro laptop. The tandem OLED panel — two stacked electroluminescent-emitting layers — delivers an extraordinary 10,000,000:1 contrast ratio, up to 2000 nits of peak brightness, and self-emissive pixels that eliminate the blooming and halo artifacts introduced by other display technologies. And the entire panel is driven by the display engine in M5 Pro and M5 Max, which continuously compensates every pixel in real time for content, usage, temperature, and ambient conditions. An industry-leading low-reflectivity panel design and antireflective coating on the cover glass minimize distracting reflections, and a rigid stiffener keeps the panel perfectly flat to maintain uniformity and prevent mechanical distortion.



Figure 1. Display stack

Tandem OLED Display Panel

OLED displays work differently from the liquid crystal displays (LCDs) that have dominated portable computing. In an LCD, a backlight behind the panel pushes light through liquid crystals; in an OLED, every pixel is self-emissive — each generates its own light and color. That single difference is transformative: A pixel that should be black shows a true black. The result on the PROLED XDR display is a 10,000,000:1 contrast ratio, exceptional black-level accuracy, and essentially no blooming or halo around bright elements.

But OLED has traditionally been a technology of trade-offs. Organic emitters age as they are used, pixels vary from one to the next, and single-layer OLED panels have historically struggled to sustain high brightness for long periods. The tandem OLED panel in PROLED XDR display addresses these trade-offs at the panel level.

Tandem OLED stacks two electroluminescent-emitting layers, and the panel uses the light from both. Because the two layers share the work of producing each pixel's light, each layer operates at a reduced current. The result is higher peak brightness, better power efficiency, and longer panel lifespan — more of what OLED does best, with less of what ages it.

The panel also incorporates several additional innovations that resolve the remaining deficiencies of traditional OLED:

- **A precision transistor layer.** Every OLED pixel is driven by a transistor that controls the current to its emitter. The panel leverages an industry-first full oxide transistor layer, driving every pixel with the precision that professional color work demands.
- **Low reflectance, from the inside out.** Reflections come from two places: light bouncing within the panel, and light bouncing off the cover glass. The panel is designed to minimize internal reflections from the emitters themselves, and the cover glass adds a custom antireflective coating on top — delivering industry-leading low reflectance.
- **A rigid support structure.** A stiffener sits behind the back glass, supporting the panel and eliminating the mechanical distortion that can bend light and the image in a large, thin OLED.

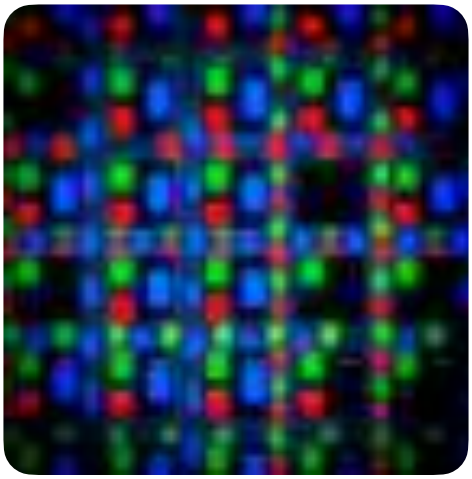


Figure 2. Tandem OLED panel

Cover Glass

The standard cover glass on PROLED XDR display has a reflectance of 1.00 percent, far lower than traditional OLED displays, due to a custom antireflective coating that reduces glare. For professionals who work in less-controlled lighting environments and prefer a display with even lower perceived reflectance, a nano-texture version of the cover glass is available. The textured surface is produced via an etching process that creates nano-structures on the glass. The result is an innovative matte finish that scatters light reflections while minimizing impact on sharpness, color, and contrast. For information on cleaning your display, please see the Apple Support article, "How to clean your Mac's display."

Display Engine

The entire panel is managed by an all-new display engine in M5 Pro and M5 Max. Because OLED is an organic technology, no two pixels are identical when they come off the manufacturing line, and no pixel stays identical for the life of the panel: Performance is naturally influenced by usage, time, and temperature. The display engine treats the panel as a continuously evolving surface and compensates in real time, responding simultaneously to what is displayed on screen, how each pixel is being used, the panel's temperature, and the ambient environment.

Core display engine capabilities:

- **Uniformity compensation** maintains smooth, even luminance and color across the panel at every brightness level, so gradients and solid fields stay clearly defined whether the display is at 1 nit or 1000.
- **Dynamic compensation** intelligently manages the drive signal to each pixel, smoothing content transitions and improving low-light performance.
- **Pixel calibration** individually tunes each pixel so that color and brightness accuracy is consistent across the entire panel, out of the box.
- **Burn-in mitigation** continuously monitors each pixel's usage and applies compensation pixel by pixel to reduce long-term burn-in, helping the display maintain its precision and appearance over the life of the machine.

Factory calibration and the display engine work together: Calibration establishes the panel's individual characteristics, and the display engine keeps it true as the panel and the world around it change.

Pixel Response Time

Traditional LCD displays rely on liquid crystals to steer light. Liquid crystals take time to rotate, typically milliseconds, so rapidly changing images can smear, producing the motion blur and ghosting that makes fast content look soft.

OLED pixels are self-emissive, so they don't wait for a crystal to rotate. PROLED XDR display switches pixels on and off in the microsecond range, an order of magnitude faster than LCD. The result is significantly improved motion clarity: Fast action in video, game, and scrolling content renders sharp, without the trailing that characterizes slower panel technologies.

Viewing Angle

Off-axis viewing can distort both color and content. This is common for a laptop, where it's frequently viewed off-axis, by a user leaning in, or by a colleague looking over a shoulder. PROLED XDR display offers a significantly wider high-fidelity viewing angle than its LCD predecessors, reaching 89° left, right, up, and down. This is enabled by the OLED panel's self-emissive pixels, which remove the dependency on liquid crystals and the angular limitations they introduce, together with a panel architecture designed to control off-axis color behavior.

Display Characteristics

Every PROLED XDR display undergoes a state-of-the-art factory calibration process to ensure accuracy of individual pixels, with tight control. The process includes display color calibration to ensure P3 and Adobe RGB gamut coverage; gamma calibration to ensure accurate luminance response, including up to the 2000-nit peak; and uniformity compensation to ensure consistent brightness and color across the entire panel. These calibrations underpin every capability described below — and because the calibrations are stored and applied in conjunction with the display engine, they keep working as the panel ages.

Display Color

The calibrated OLED panel in PROLED XDR display delivers over 1 billion colors and is the first portable Apple display to simultaneously include both P3 wide color and Adobe RGB color primaries. The expansion of the primaries to cover 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, the display 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, the display can work with content encoded in BT.2020: It accurately reproduces colors within its native gamut while allowing BT.2020 color data to be preserved throughout the workflow.

Comparison of Gamuts

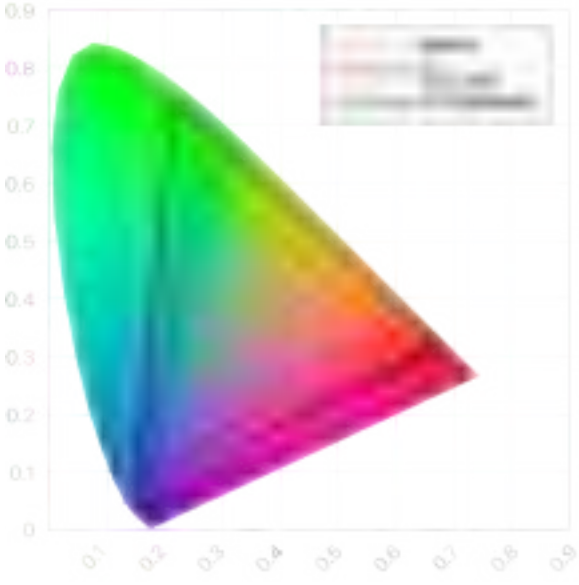


Figure 3. P3 + Adobe RGB color gamut

Calibration Space

Each PROLED XDR display is individually calibrated with Apple CMF 2026 for the best experience out of the box, with continued support for CIE 1931 in reference presets.[3] Apple CMF 2026 more precisely aligns the appearance of the display with an ideal D65 illuminant — the standard reference for white — and significantly improves appearance matching across display technologies, which is important for workflows that use multiple displays side by side.

Color-matching functions (CMF) are mathematical representations of the sensitivity of the human eye to visible light, characterizing how humans perceive color. First introduced with Studio Display XDR, Apple CMF 2026 addresses the limitations of the standard colorimetric system derived from the CIE 1931 CMF, which has been widely used in industry for traditional display calibration. 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 sheets, and OLED — have emerged, even displays calibrated to identical targets using current standards can exhibit significantly different appearances. 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 JTC22 of 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.

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

Display brightness on PROLED XDR display has two components: the SDR level, which governs how standard dynamic range content is rendered, and an extended dynamic range (EDR) level, which governs how far above SDR brightness the display can go to render HDR highlights.

The display supports a minimum configurable SDR brightness of 1 nit — just above perfect black — and a nominal maximum SDR brightness of 1000 nits. This range is sustainable with full-screen content in environments up to 25° C (77° F). The display supports up to 2000 nits of peak brightness for HDR content.

The display offers an EDR headroom of up to 16 times the SDR level — four stops of additional brightness for highlights. At 100 nits of SDR, that yields a peak of 1600 nits; once the SDR level reaches 125 nits, HDR content can reach the full 2000-nit peak. When only SDR content is present, or when the display is in a reference SDR mode, the EDR level is effectively 1x — so SDR content is always rendered exactly as specified.

In very bright ambient conditions, the display's SDR range extends beyond its nominal 1000-nit maximum, up to an absolute ceiling of 2000 nits. This keeps content visible when the display is viewed outdoors in bright light.

Adaptive Brightness

When "Automatically adjust brightness" is enabled in System Settings, the display continuously adjusts screen brightness and content contrast in response to the ambient environment, so content looks consistent across a wide range of conditions, from a dark studio to daylight.

The adaptive policy balances more than ambient light: It factors in display power draw and its effect on battery life, the organic panel's long-term burn-in risk, and the user's own brightness preferences, learned from past adjustments. In practice, the maximum brightness available at the top of the brightness slider is a function of the ambient environment, along a curve tuned to balance visual experience, battery life, and display longevity. In indoor and some outdoor environments, the maximum accessible SDR brightness is up to 50 percent higher than on comparable recent MacBook Pro displays.

Ambient Adaptation

With True Tone, the display uses dual ambient light sensors to gauge the brightness and color of the surrounding lighting. This information is used to automatically adjust screen brightness and white point, keeping the display's appearance consistent as lighting conditions change. Automatic brightness adjustment and True Tone can be disabled in Displays preferences.

120Hz Refresh Rate and ProMotion

PROLED XDR display supports ProMotion, delivering frame rates up to 120Hz for smooth motion and highly responsive interactions while preserving battery life. ProMotion also allows the display to adapt its refresh rate to better match the frame rate of content — down to 10Hz when the display is idle, minimizing the energy used to show a still image.

For full-screen media playback, the display automatically aligns with the frame rate of the content, whether 23.976 fps cinema, 25 fps European broadcast, or higher. This preserves the artistic intent of the content creator while optimizing power efficiency.

For gaming, the display tracks dynamically varying frame rates to deliver a smooth, low-latency experience — responsive, fluid visuals regardless of how the frame rate fluctuates during play.

Medical Imaging

PROLED XDR supports medical imaging for non-diagnostic review using its built-in medical imaging reference modes.[2] To meet the needs and preferences of radiologists, two 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. Because every OLED pixel is self-emissive and individually compensated, the display presents the perceptually uniform grayscale that the standard demands without the artifacts a local-dimming backlight can introduce.

Reference Mode	Luminance Boost Available
Medical Imaging (DICOM-350 nits)	Up to 3.2x
Medical Imaging (DICOM-600 nits)	Up to 1.8x

Using Reference Modes

When performing color-critical content work on the PROLED XDR display, select 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 best in those specified conditions.

Switching between reference modes is extremely quick on MacBook Pro 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 the PROLED XDR display 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 affect sustained brightness. A Reference Status Indicator  in the menu bar will indicate when the display can no longer thermally 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
Peak HDR Luminance	2000 nits peak (XDR)
Peak SDR Luminance	Up to 2000 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
Peak HDR Luminance	2000 nits peak (XDR)
Peak SDR Luminance	Up to 2000 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)[1] 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
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
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
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
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
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
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
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 (Adobe RGB-D50)

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
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 viewing environments.

Color Primaries	P3 (wide color)
White Point	D65
Calibration Space[3]	CIE 1931
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 white point. 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
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 (Adobe RGB-D65)

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

Color Primaries	Adobe RGB
White Point	D65
Calibration Space[3]	CIE 1931
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
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. This reference mode is not approved for diagnostic use.

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. This reference mode is not approved for diagnostic use.

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 MacBook Pro with PROLED XDR Display 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 the PROLED XDR display with the Pro Display Calibrator.

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. This recalibration applies to all presets and can be further adjusted over time using Visual Fine-Tune or Fine-Tune Calibration.



Technical Support

Every MacBook Pro 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.[4] For additional information on AppleCare coverage, please visit the AppleCare MacBook Pro support page.

Technical Specifications

Display	**PROLED XDR display** **14.2-inch (diagonal) or 16.3-inch (diagonal) Tandem OLED display** • 14-inch model: 3024 by 1986 with 254 pixels per inch (PPI) • 16-inch model: 3472 by 2266 with 254 pixels per inch (PPI) • Brightness: 1000 nits sustained HDR and SDR, 2000 nits peak HDR and SDR • Contrast ratio: 10,000,000:1 • Color: P3 + Adobe RGB wide color gamuts, over 1 billion colors • Fully laminated; 1.00% reflectance (typical, SCI) • Nano-texture glass option
Technology	**Tandem OLED** • Display engine in M5 Pro and M5 Max with real-time per-pixel compensation • True Tone technology with ambient light sensors (ALS) to ensure an accurate viewing experience in any ambient lighting condition
Refresh Rates	**Promotion (10–120 Hz)** 47.95Hz 48.00Hz 50.00Hz 59.94Hz 60.00Hz 120.00Hz
Reference Modes	**Available reference modes:** • Apple XDR Display (P3-2000 nits) • Apple XDR Display (P3 + Adobe RGB-2000 nits) • HDR Video (P3-ST 2084) • NTSC Video (BT.601 SMPTE-C) • Digital Cinema (P3-DCI) • Design and Print (P3-D50) • Design and Print (Adobe RGB-D50) • Internet and Web (sRGB) • HDTV Video (BT.709-BT.1886) • PAL and SECAM Video (BT.601 EBU) • Digital Cinema (P3-D65) • HDR Photography (P3-D65) • Photography (P3-D65) • Photography (Adobe RGB-D65) • Medical Imaging (DICOM-350 nits)[2] • Medical Imaging (DICOM-600 nits)[2]

[1]In temperatures less than 25° C. [2]The medical imaging reference modes are intended for use by trained medical professionals for non-diagnostic review only. They are not approved for diagnostic interpretation and are not intended for use in mammography. [3]To accurately measure the white point and luminance, your instrument must use the same calibration space as the preset (CIE 1931 or Apple CMF 2026). [4]Not available in all countries. Please refer to your country's AppleCare product website for specific information about rights provided by consumer law, AppleCare+ service fees, terms and conditions, and product purchase information.

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