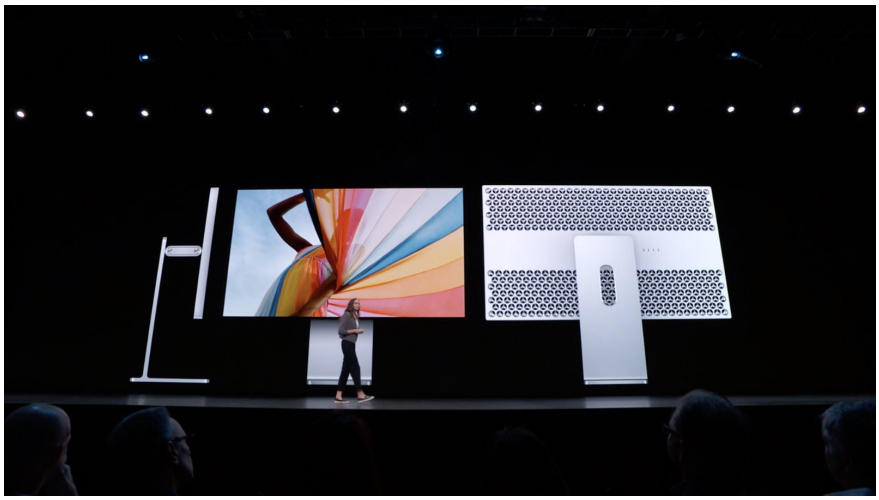
Comparing XDR vs HDR

HDR technology has been a subject of much debate, especially on computer monitors. Most computer monitors lack the brightness to fully utilize the advantages of HDR. Refer to TipsMake's XDR vs HDR comparison article below for a detailed look at XDR vs HDR technology.

At this year's WWDC event, Apple unveiled the new Pro Display XDR, promising improved contrast and brightness. With 6 million pixels distributed across a 31-inch screen (218 pixels per inch), a full-screen brightness of 1,000 nits, and a contrast ratio of 1,000,000:1, Apple explains that XDR stands for Extreme Dynamic Range.



1. Comparing XDR vs HDR

Compared to "standard" high-end displays, XDR displays cost five times more, offering users a superior experience.

With a similar screen size of 32 inches, we can see that the 31-inch Logic 4K Reference Master Monitor, priced at $32,395, offers similar features to Apple's panel but without 6K resolution. In his WWDC keynote speech, Tim Cook stated that the company's goal was simply to create a display device for professionals. Apple also mentioned improvements to HDR technology on the larger Retina display.

HDR is considered the standard and is used throughout the industry, but Apple claims to have surpassed HDR. So what makes XDR superior to the HDR standard?

Firstly, XDR can maintain a screen brightness of 1,000 nits compared to the HDR standard which only maintains around 350 nits on a typical computer monitor .

Even the iMac, one of the brightest computer monitors available, is only half as bright as the new Pro Display XDR. Brightness is extremely important on a monitor because HDR effects cannot be clearly displayed on a dark screen.

The VESA DisplayHDR 1000 standard requires a sustained brightness of 600 nits and a peak brightness of 1000 nits. The XDR display that Apple announced is 60% brighter than a standard DisplayHDR 1000 display in both cases. Since no display other than the reference models mentioned actually reaches a sustained brightness of 600 nits, we have to "trick" the HDR output system or at least simulate the effect. Even most LED TVs don't achieve the same contrast ratio as the Pro DisplayXDR.

According to Apple, HDR is also a way to bring content to life, better reflecting what the human eye can see in the real world. The eye can perceive special reflections, more vibrant and richer colors, and finer details.

Contrast is another factor to consider when comparing XDR vs HDR. Some high-end TVs and even computer monitors are switching to OLED display technology, a type of display that doesn't use backlighting and is capable of displaying colors well with superior depth and high contrast.

So how does Apple's Pro Display XDR achieve a contrast ratio of 1,000,000:1?

Instead of using white LEDs, Apple uses a 576-LED blue array to enhance brightness, and a timing driver employs a volume control algorithm to adjust each LED according to the content. The timing driver adjusts the LEDs at a frequency 10 times higher than the LCD screen's update frequency to reduce latency and ensure smoother playback with sharp, detailed colors. Custom lenses and reflectors are then used to precisely shape and control the light.

The back of the screen is designed with numerous circular holes, which act as heat sinks, doubling the cooling surface area.

Although the TV Logic reference model can reach a maximum brightness of 2,000 nits, 25% brighter than the XDR display's maximum brightness, TV Logic only allows users to use their reference model in well-ventilated areas and requires the use of an external fan if needed. The circular holes designed on the back of the XDR display solve this problem. The display can achieve a maximum brightness of 1600 nits at temperatures below 25 degrees Celsius (77 degrees Fahrenheit).

2. Ultra-wide XDR viewing angle

In addition to HDR compatibility, Apple's Pro Display XDR offers support for a wider color gamut. Both XDR and reference displays like TV Logic are calibrated with high precision, promising the highest possible color quality. Both displays support the P3 color palette with 1.07 billion different colors.

In addition, Apple states that the Pro Display XDR has an ultra-wide viewing angle and 25 times better off-axis contrast than a standard LCD screen. Furthermore, users can pay an extra $1000 for an anti-glare option with the Matte Nano-texture.

Above is a **comparison of XDR vs HDR** . Additionally, if you have any questions or need clarification, such as " What is HDR photography ?", please leave your comments below the article. TipsMake will answer your questions as soon as possible.