

Factors to Consider When Buying a Gaming Monitor

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PC gamers put heavy demands on their monitors. The games are visually complex—so large, high-resolution displays are required for realistic gameplay. Imagery changes rapidly thanks to advanced graphics processors (GPUs), so it's important that the monitor can keep up and avoid frame disruptions. And, the games are competitive—even a minor glitch due to an ill-matched monitor could cost a player his or her virtual life.

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How does a monitor affect game performance?

With so much action centered on the controller or keyboard in the player's hands, it's easy to forget that each wrist and finger movement is dictated almost entirely by what can be seen on the monitor. If the display freezes or skips at a critical time, or if blur makes precision aiming impossible, a player could quickly get knocked out of the game.

What are the monitor specifications that relate to skipping, blurring, and other in-game issues?

- **Display resolution.** It's possible to play games on a standard HD monitor (720p), but most gamers demand at least Full HD (1080p) for sufficient clarity, aiming, etc. Gaming monitors with QHD (1440p) and UHD (2160p) resolutions are also available, but need to be paired with advanced GPUs to get the most out of their high-resolution screens.
- **Refresh rate.** For typical gaming, the minimum refresh rate (i.e., how quickly the display can change the color of an individual pixel) is 60Hz. But 120Hz is far superior for competitive players, particularly if the game is in 3D. There are also 144Hz models that many gamers prefer, not just for the slightly faster rate but because they max out the refresh capabilities of DVI-D connections carrying 1080p video, a popular combination.

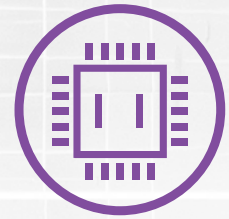


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- **Response time.** Everyday monitors are sufficient if they offer response times (i.e., the time it takes to move from one still image to the next) in the 6ms-8ms range. Gamers typically demand response times of 5ms or less. Models with response times as low as 1ms are also available for the hardcore gamer.
- **Connection options.** Unless you're buying a new monitor and game box or gaming PC at the same time, the connection option you choose for your gaming monitor will need to match the output(s) of your existing system. The typical options, which vary by manufacturer, are HDMI, DVI-D, and DisplayPort. A newer, multi-functional connection option, USB Type-C (USB-C), is also being offered and can transmit signals compatible with the earlier formats without the need for adapters.



What are “tearing” and “stuttering” and how do they impact game play?

Gamers are vexed, in particular, by two troublesome monitor performance issues—tearing and stuttering. Tearing occurs when a single frame shows parts of two or more different frames. Tearing is sometimes caused when frames-per-second (FPS) performance drops below the standard 60 FPS required to smoothly display on-screen action. Stuttering occurs when the generation of new frames is sometimes disrupted by slow rendering (or other processing problems), but the monitor continues to refresh at its standard rate, causing frames that appear to repeat or get skipped.

What monitor technologies work to reduce tearing and stuttering?

Generally speaking, tearing and stuttering diminish as the refresh rate of a display increases, but the problems still persist even in rapid-refresh models. Manufacturers have designed adaptive synchronization solutions to help combat these problems. In simplest terms, these technologies force the monitor to adapt its refresh rate and other settings on-the-fly, to meet the performance of the graphics processor unit (GPU), rather than refreshing at the standard rate and potentially creating visual disruptions. Be aware that synchronization solutions are specific to the GPUs of their manufacturers. So, if you're matching a new monitor to your existing PC, make sure the synchronization technology you choose matches the GPU you are using.

What other monitor features should be considered?

Beyond the four key specification categories described above (resolution, refresh rate, response time, and connection options), there are a number of other features gaming monitor buyers should consider:

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- **High Dynamic Range (HDR).** A selection of monitors boasting HDR capabilities have recently entered the marketplace. HDR monitors can display many more shades and hues thanks to their use of 10-bit color rather than 8-bit color (which in itself was an advance over older, 6-bit color monitors).
- **Ergonomic stands.** Game players spend long hours in front of their screens and should look for monitors with extensive ergonomic adjustability so they can select their preferred height (higher/lower), tilt (forward/backward), swivel (right/left) and pivot (horizontal/vertical).
- **Edgeless/borderless.** For gamers who use multi-monitor set-ups, edgeless or borderless displays (sometimes called thin bezel or frameless) can be useful because they have little to no plastic bezel around the edges on three sides (some on all four).
- **Visual comfort.** Monitors that earn TUV Eye Comfort Certification are confirmed to minimize blue light and flicker. They also have wide viewing angles and ergonomic adjustability, so users can modify their physical positions to reduce reflections and glare.
- **Webcams and speakers.** Most serious gamers have already invested in external webcams and speakers. However, these devices don't diminish the quality of built-in webcams, and monitors with an audio line out can provide an alternate method of connecting external speakers.

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