Measured: Steam Deck OLED's major input lag improvements



Enlarge / The Steam Deck OLED (bottom) sunbathing with its older brother.
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reader comments

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In our review of the Steam Deck OLED last week, we noted that the upgraded 90 Hz screen "has a pretty direct impact on how it feels to play reflex-heavy games." Now, Digital Foundry has used input lag-testing hardware to quantify the precise size of that amorphous feeling, which it found is significant even in games running at 60 fps and below.

Digital Foundry's testing used Nvidia's Latency and Display Analysis Tools running on two reflex-heavy games: *Doom Eternal*

and *Crysis 3 Remastered*. The tool measures the total time between a mouse click and the flash of an on-screen muzzle that indicates a shot being fired—the lower, the better for the game's responsiveness.

Unsurprisingly, the best improvements in input lag were measured when the Steam Deck OLED was running at a full 90 fps. Compared to the 60 fps LCD Steam Deck, input lag was reduced by an average of 26.1 ms for *Doom Eternal* and 32.5 ms for *Crysis 3*. While some of that reduction can be attributed to the shorter time between frame refreshes on the OLED (11.11 ms on the OLED at 90 fps versus 16.66 ms on the LCD at 60 fps), the size of the reduction here amounts to multiple 90 fps frames.

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Somewhat more surprisingly, Digital Foundry's testing found input lag improvements even when both the OLED and the LCD units were set to run at the same frame rate. With both units running at 60 fps, for instance, testing found an 8.5 ms input lag reduction on the OLED for *Doom Eternal* and an 11.3 ms reduction for *Crysis 3*. The lag improvement only increased at lower frame rates, peaking above 20 ms when games ran in the 40 to 45 fps range.

Not a small difference

Those improvements may seem pretty minuscule, especially when compared to minimum human reaction times that generally range from 150 to 200 ms in scientific tests. But even small changes in the lag between an input and a system response can have a strong effect on the feel and "snappiness" of a system, as we've discussed in depth when covering fighting game netcode, classic gaming emulation, and even 8,000 Hz keyboards in the past.

There are some indications that at least part of this hardware difference is dependent on firmware rather than an inherent

limitation of the old Steam Deck LCD screen itself. When testing on an older version of the Steam Deck LCD firmware, Digital Foundry reports that the input lag results were anywhere from 8 to 42.4 ms slower than the results reported above (which compared both units running the same firmware), depending on the game and frame rate tested.

Valve is still rolling out improvements for older LCD Steam Deck units, and the company says it’s continuing to work on improving input lag as well. That gives us some hope that future firmware revisions could reduce response times on LCD Steam Deck displays even further. https://arstechnica.com/?p=1985481