Hasselblad X2D II: Why Your RAW Files Drop to 14-Bit in Continuous Mode (And When It Matters)

I discovered this by accident.

For years - going back to my DSLR days - I've shot in continuous drive mode as a matter of habit. The logic is simple: when you press the shutter release, there's always a chance, however slight, that the motion of your finger induces camera movement. In continuous mode, the second frame in a short burst shouldn't have this problem, and a third frame provides insurance. With digital, there's no film cost, so why not?

This habit followed me to the X2D II. The camera was set to continuous, and for reasons I don't recall, I found myself in the Quality menu. That's when I noticed the 16-BIT toggle was off — and grayed out. I couldn't change it.

It took me a moment to understand what I was seeing. The X2D II is marketed as a 16-bit camera. It's one of the reasons people buy it. But here I was, locked out of that setting, with no on-screen explanation as to why.

The answer, it turns out, is buried in the manual - not under Drive Modes, where you'd expect it, but in the Quality Settings section. And once you understand what's happening, you realize this is a deliberate trade-off rather than a bug. But the way it's documented makes it easy to miss entirely.

This post explains what the X2D II actually does with bit depth, why Hasselblad likely made this choice, whether the difference matters in practice, and how the camera compares to its competitors. If you've ever wondered why your files might not be what you expected, this should help.

What the X2D II Actually Does

The behavior is straightforward once you know it exists:

In single-shot mode, the X2D II records 16-bit RAW files. This is the full bit depth the sensor supports, and it's the setting most X2D II owners assume they're always getting.

In Continuous drive mode, the camera automatically switches to 14-bit capture. The 16-bit option becomes unavailable.[^1] Other multi-shot modes - including Interval, Exposure Bracketing, and Focus Bracketing - retain access to 16-bit capture.

The only visual indication of this change appears in **Menu → Quality → Bit Depth**, where the setting displays "14-bit" and is grayed out. The camera does not warn you when you select a continuous drive mode. There's no pop-up, no icon change on the top display, and no mention in the Drive Modes section of the interface.

The manual does document this behavior, but only in the Quality Settings section:

> "In Continuous drive mode, the bit depth is set to 14 bit by default, and 16 bit cannot be used."[^1]

If you're reading the manual sequentially or jumping straight to Drive Modes to understand your options, you'd have no reason to encounter this information. The relationship between drive mode and bit depth simply isn't surfaced where most users would look for it.

Why Hasselblad Likely Made This Trade-Off

Hasselblad hasn't published a detailed technical explanation, but the reasoning appears to be about sensor readout speed.

Reading 100 megapixels of data off a sensor takes time. Reading 16 bits per pixel takes longer than reading 14 bits per pixel. In continuous shooting, this difference affects how quickly the camera can capture the next frame and how long the viewfinder blacks out between exposures.

The X2D II's own FAQ hints at this logic:

> "Choose 14-bit color depth to keep outstanding color while increasing the continuous shooting rate. Use 16-bit to increase the number of tonal nuances in color for natural transitions."[^2]

The manual reinforces the point:

> "Using 14 bit, users can experience faster capture and decreased blackout time between shots."[^1]

This is a defensible engineering decision. Blackout time matters to photographers - it's one of the most common complaints about mirrorless cameras, and reducing it improves the shooting experience. If the trade-off is invisible to final image quality (more on that shortly), then optimizing for responsiveness makes sense.

What's less defensible is the lack of user choice. The camera doesn't offer a "16-bit continuous (slower)" option. You get the speed improvement whether you want it or not. For photographers who would happily accept longer blackout times in exchange for maximum data capture, this feels like a decision that should have been left to the user.

One curious detail: **file sizes remain the same regardless of bit depth**. The manual notes that "files for both two settings have the same size in storage."[^1] This suggests the RAW container is always sized for 16-bit data, with the 14-bit values simply not using the full available space. It's a minor point, but it means you're not even saving storage by dropping to 14-bit.

[^1]: X2D II 100C User Manual v1.0, p. 53
[^2]: Hasselblad, "X2D 100C - FAQ," hasselblad.com

Does the Difference Actually Matter?

This is where things get interesting - and where the answer is more nuanced than you might expect.

The Numbers Sound Significant

On paper, the difference between 14-bit and 16-bit is substantial:

- **14-bit** provides 16,384 tonal levels per channel
- **16-bit** provides 65,536 tonal levels per channel

That's a 4× difference in tonal resolution. Marketing materials love this comparison. Hasselblad's own product page notes that 16-bit color depth "can deliver 281 trillion colors, 64 times higher than 14-bit."[^3]

With numbers like that, you'd expect the difference to be obvious. But in photographic practice, it rarely is.

Why It Usually Doesn't Matter

The issue is that cameras don't capture data with 16-bit precision in the first place.

Every digital sensor has a noise floor - a baseline level of random signal variation that exists regardless of exposure. This noise comes from multiple sources: thermal activity in the sensor, electronic interference in the readout circuitry, and the fundamental physics of photon arrival (shot noise).

For the X2D II's sensor, as with most modern medium format sensors, this noise floor sits well above the threshold where 14-bit versus 16-bit quantization would make a visible difference. The extra two bits of precision in a 16-bit file are, in practice, encoding noise rather than meaningful image data.

Jim Kasson, whose technical analysis of medium format cameras is among the most rigorous available, has written extensively on this topic. His conclusion is blunt:

> "The 16-bit RAW format in cameras like the GFX 100 series and Hasselblad X2D is more about marketing than measurable photographic benefit. While there is no harm in storing images in 16-bit format, it offers little to no advantage over 14-bit for dynamic range, tonal smoothness, or color accuracy."[^4]

DPReview's testing of the Fujifilm GFX 100 (which uses a related sensor) found "less than a 0.1EV difference in DR between 16-bit and 14-bit mode, because the camera's pixels aren't producing a signal that warrants the additional encoding precision."[^5]

The Spinal Tap Problem

Kasson illustrated this with a parody that's worth quoting in full:

> **Nigel:** This one here - this is the RAW file. Not just any RAW file. This one's 16-bit.
>
> **Marty:** Right. And what's the advantage?
>
> **Nigel:** Well, most people shoot in 14-bit, right? You got your shadows, your highlights... but 14 bits only gives you 16,384 levels. This - this gives you 65,536.
>
> **Marty:** Uh huh. But isn't the sensor noise floor higher than the 14-bit quantization? I mean, can you really see any difference?
>
> **Nigel:** *(nods slowly)* No. But it's two bits more, innit?
>
> **Marty:** Why not just process the data better at 14 bits?
>
> **Nigel:** *(pause)* But this goes to sixteen.[^4]

The reference is to *This Is Spinal Tap*, where a guitarist explains that his amplifier is superior because "these go to eleven." The joke, of course, is that the number on the dial is meaningless if the underlying capability is the same.

When It Might Actually Matter

That said, there are edge cases where the extra bit depth could theoretically help:

Extreme shadow recovery. If you're regularly underexposing by 4–6 stops to protect highlights, then pulling deep shadows aggressively in post, the additional tonal resolution in the shadows might reduce banding. In practice, noise usually overwhelms any banding you'd see, but the theoretical benefit exists.

Scientific or archival imaging. If maximum data capture is the goal regardless of visible output - for instance, in technical reproduction or forensic documentation - then capturing every bit the sensor offers has value even if you can't see the difference.

Smooth gradient subjects. Clear skies, studio backdrops, and other subjects with very gradual tonal transitions are where banding would first appear. In 14-bit capture pushed hard in post, these are the areas most likely to show artifacts.

For most photography - landscapes, portraits, street, travel - the difference is invisible in final output, especially once images are converted to 8-bit sRGB for web delivery or standard printing.

My Take

I understand the technical arguments. I've read Kasson's analysis and I don't dispute the physics.

But I often shoot in high-contrast conditions where I expose for highlights and expect to recover shadows in post. In that workflow, I'd rather have the extra headroom in the deep shadows, even if the practical benefit is marginal. And philosophically, I'd prefer to make that trade-off myself rather than have the camera decide for me.

The fact that 16-bit is a headline feature of the X2D II - and that you don't always get it - sits slightly uncomfortably, even knowing it probably doesn't matter.

[^3]: Hasselblad, "X2D 100C," hasselblad.com (product page)
[^4]: Jim Kasson, "The 16-Bit Fallacy: Why More Isn't Always Better in Medium Format Cameras," blog.kasson.com, May 2025
[^5]: DPReview, "Fujifilm GFX 100 Review," August 2019

How Other Medium Format Cameras Handle This

The X2D II isn't alone in dropping bit depth during continuous shooting. This appears to be an industry-wide constraint driven by the same sensor readout limitations.

Fujifilm GFX 100 / GFX 100S: These cameras behave similarly to the X2D II. 16-bit capture is available only in single-shot mode; continuous shooting drops to 14-bit. Fujifilm is reasonably clear about this in their documentation.[^6]

Fujifilm GFX 100 II: This is where things get more interesting - and arguably worse. Independent testing by Jim Kasson found that the GFX 100 II appears to drop to *12-bit* capture in its high-speed continuous mode (CH), not 14-bit as the file metadata suggests. When PetaPixel asked Fujifilm to confirm this, the company replied that the information was "proprietary" and they were "unable to share additional details."[^7]

By comparison, the X2D II's behavior is both better documented and less aggressive. You're getting 14-bit in continuous mode, not 12-bit, and Hasselblad at least acknowledges the limitation in their manual and FAQ - even if the placement of that information leaves something to be desired.

If you're choosing between medium format systems and continuous shooting matters to your work, this is worth factoring into your decision. The X2D II is actually well-behaved by the standards of its competitors.

[^6]: Fujifilm GFX 100 / GFX 100S user manuals and menu system
[^7]: PetaPixel, "Fujifilm Isn't Telling the Whole Truth About the GFX 100 II," October 2023

The Real Issue: Discoverability

Having spent time with this topic, I've come to think the bit depth change itself isn't the problem. It's a reasonable engineering trade-off, and for most photographers, the practical impact is negligible.

The problem is how it's communicated - or rather, how it isn't.

The UI doesn't warn you. When you select Continuous drive mode, there's no indication that your bit depth has changed. The only way to know is to navigate to Menu → Quality → Bit Depth and notice it's grayed out.

The manual buries the information. The relationship between drive mode and bit depth is documented only in the Quality Settings section, not under Drive Modes. If you're trying to understand what each drive mode does, you won't encounter this detail.

There's no option to override it. Even if you understand the trade-off and would prefer 16-bit capture with slower continuous performance, you can't make that choice. The camera decides for you.

For a camera at this price point, aimed at photographers who care deeply about image quality and workflow control, this feels like an oversight in user experience design. Not a dealbreaker — but the kind of rough edge that better documentation would smooth over.

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How to Verify What You're Getting

If you want to confirm your current bit depth setting:

1. Navigate to **Menu → Quality → Bit Depth**
2. If the setting shows "16-bit" and is selectable, you're not in Continuous drive mode and can capture at full bit depth
3. If the setting shows "14-bit" and is grayed out, you're in Continuous drive mode and the camera has switched to 14-bit capture

You can also check after the fact by examining your RAW files in software that displays bit depth metadata, though the X2D II's file container may report 16-bit regardless of actual capture depth (since file sizes are identical).

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Bottom Line

The X2D II automatically reduces bit depth from 16-bit to 14-bit when you use Continuous drive mode. This is documented in the manual, but not prominently, and the camera provides no warning when it happens.

For most photography, the difference is invisible. The physics of sensor noise means those extra two bits aren't encoding meaningful image data in typical shooting conditions.

For workflows involving extreme shadow recovery, scientific documentation, or maximum-data-capture principles, the limitation may be worth considering. And for photographers who simply want control over their own files, the lack of an override option is a valid frustration.

The X2D II remains an exceptional camera. But if you've been shooting in continuous mode assuming you're always getting 16-bit files, now you know you're not - and where to look if you want to change that.

References

1. X2D II 100C User Manual v1.0, p. 53: "In Continuous drive mode, the bit depth is set to 14 bit by default, and 16 bit cannot be used." and "Using 14 bit, users can experience faster capture and decreased blackout time between shots. Files for both two settings have the same size in storage."
2. Hasselblad, "X2D 100C - FAQ," hasselblad.com: "Choose 14-bit color depth to keep outstanding color while increasing the continuous shooting rate. Use 16-bit to increase the number of tonal nuances in color for natural transitions."
3. Hasselblad, "X2D 100C" product page, hasselblad.com: "16-bit color depth can deliver 281 trillion colors, 64 times higher than 14-bit."
4. Jim Kasson, "The 16-Bit Fallacy: Why More Isn't Always Better in Medium Format Cameras," blog.kasson.com, May 2025. Includes technical analysis of bit depth limitations and the Spinal Tap parody.
5. DPReview, "Fujifilm GFX 100 Review," August 2019: "Our testing shows there to be less than a 0.1EV difference in DR between 16-bit and 14-bit mode, because the camera's pixels aren't producing a signal that warrants the additional encoding precision."
6. Fujifilm GFX 100 / GFX 100S documentation confirms 16-bit capture limited to single-shot mode.
7. PetaPixel, "Fujifilm Isn't Telling the Whole Truth About the GFX 100 II," October 2023: Reports on Jim Kasson's testing showing apparent 12-bit capture in CH continuous mode, and Fujifilm's refusal to confirm details.