

CES 2024:
BEST NEW
PRODUCTS
REVEALED

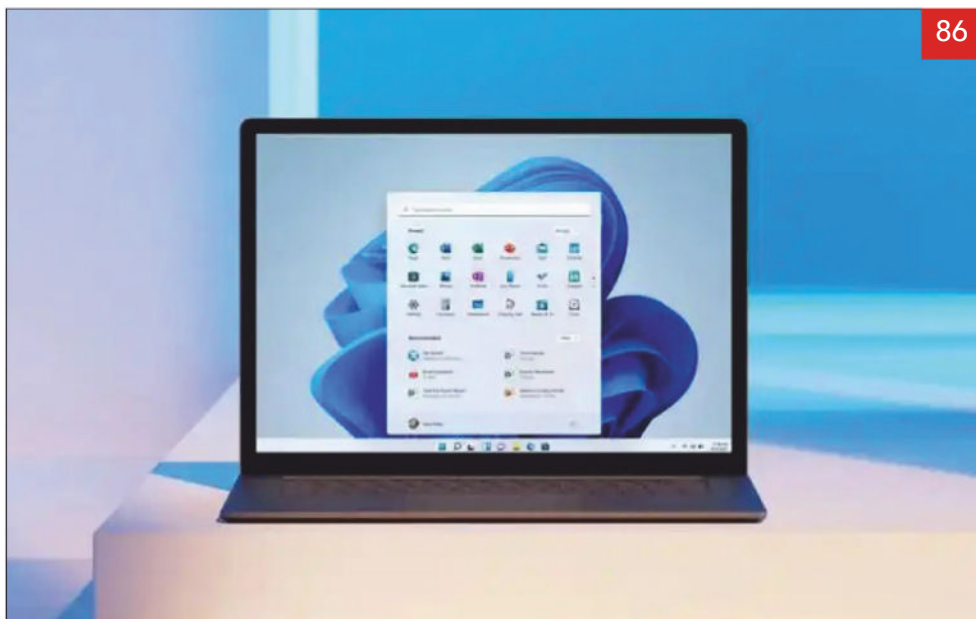
TECH ADVISOR

MARCH 2024

WINDOWS 11

FEATURES THAT WILL
BLOW YOUR MIND





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Credit: Consumer Technology Association



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A 'Copilot' key is coming to your PC's keyboard

Behold the Cortana button, version 2.0. MARK HACHMAN reports

Microsoft and its PC partners plan to add a 'Copilot' key to your PC keyboards, making it easy and intuitive to launch Microsoft's Copilot AI – and avoid using an AI solution from a competitor.

PC makers appear to be prepping to replace one of the existing buttons in

the no-man's land grouping of keys to the right of the PC spacebar into a key that will launch Copilot on command. (Currently, you can use the Win + C shortcut instead.)

"Over the coming days leading up to and at CES, you will start to see the Copilot key on many of the new

Windows 11 PCs from our ecosystem partners, with availability beginning in late February through spring, including on upcoming Surface devices,” Yusuf Mehdi, who now oversees the Windows and Surface businesses after the departure of Panos Panay, wrote in a blog post earlier this year. Copilot is available in Windows, of course, and it’s now officially available on iOS and Android as well.

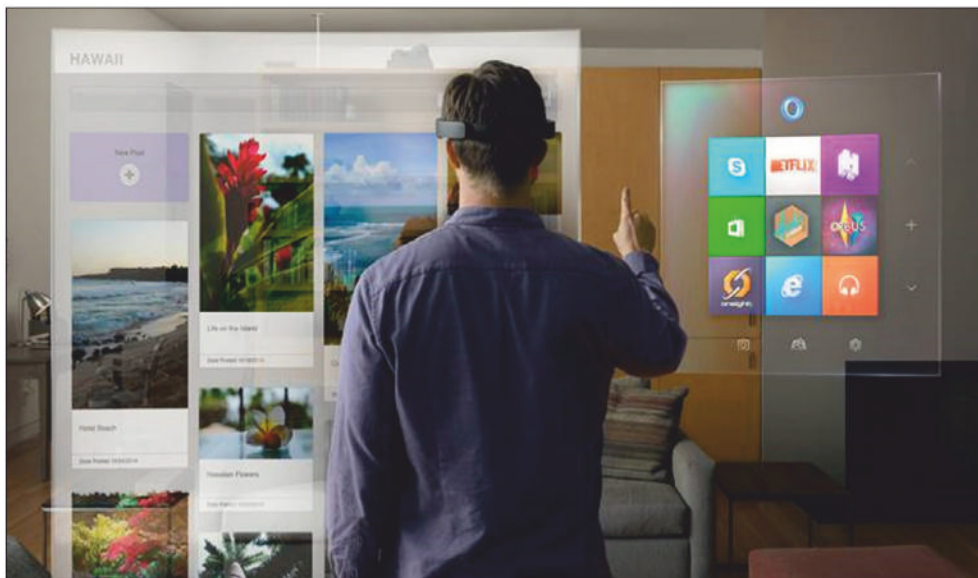
Early looks at the new PCs indicate that the new key could potentially replace the ‘menu’ key on some Windows PCs like Microsoft Surface devices, which are rarely used. It might also replace any ‘Alt’ key that exists in the same location, depending on the manufacturer and their keyboard layout. Or it could be a separate key entirely.

Microsoft starts 2024 preparing for a Windows revamp, probably known as Windows 12, that will lean heavily on AI. Mehdi echoed that expectation.

“As we embark on this new year, we are filled with optimism and excitement,” Mehdi wrote. “We will continue to build Windows to be the destination for the best AI experiences. This will require an operating system that blurs the lines between local and cloud processing. The year ahead promises to be nothing short of extraordinary.”

According to Mehdi, the introduction of the Copilot key “marks the first significant change to the Windows PC keyboard in nearly three decades”.

That’s not absolutely true. Microsoft itself tried to induce laptop makers to put a Cortana key onto their laptops, and Toshiba did. Unfortunately, the addition of the Cortana key didn’t stick, and Toshiba disappeared (into Sharp), as did Cortana itself. As for the Copilot key? We’ll have to see.



Microsoft gives up on its Mixed Reality VR for Windows

The idea that never really took off. **MICHAEL CRIDER** reports

The virtual reality market is in a bit of a holding pattern at the moment. After a mild splash from the Meta Quest 3, everyone is holding their breath to see how Apple's ambitious and wildly expensive Vision Pro headset will fare. But Microsoft isn't waiting to throw in the towel on

its VR and AR efforts. The Windows Mixed Reality platform is being officially depreciated – that is, no longer actively developed – as of January 2024.

Windows Mixed Reality debuted along with the ambitious Microsoft HoloLens headset in a technical demo in 2015 and with the augmented reality

hardware releasing to developers the following year and full software integration coming in Windows 10's Fall Creators Update in 2017. Despite high hopes and heavy investment from Microsoft, HoloLens never got a consumer release and saw limited interest from industrial

customers aside from a notable contract with the US military. While several demos of the hardware and similar headsets using its design have been impressive, the practical applications have been lacking.

While the VR 'metaverse' appears to be a bust, at least as imagined by Microsoft and Meta, Windows Mixed Reality's combination of VR and AR may have been ahead of its time. Augmented reality is the main new feature for the Meta Quest 3, which has full-colour pass-through cameras designed to integrate play sessions with the real world. Ditto for the Apple Vision Pro, which is so dedicated to the idea of users wearing the headset constantly that it simulates their eyes on an external screen.

According to Microsoft's support



HoloLens saw limited interest from industrial customers.

page (fave.co/48Lic7d), the Mixed Reality Portal and Windows Mixed Reality for Steam VR will be removed in future Windows releases. Users who still wish to access Windows Mixed Reality can still do so, at least for the moment.



Incase to take over Microsoft's mouse and keyboard business

A new beginning. MICHAEL CRIDER reports

In April of last year, Microsoft announced that it was exiting the PC accessory business (mice, keyboards, headsets, and so on). While it is still planning to sell computer accessories under the more stylish (and expensive) Surface brand, its self-titled hardware was sunsetting after nearly three

decades on shelves. But it looks like the designs, if not the Microsoft branding, are getting a stay of execution. Incase, a company specializing in laptop bags and sleeves, is reviving many of Microsoft's products in 2024.

So says the announcement page on Incase's website (fave.co/3Sc9Wb9),

which declares that newly manufactured devices in the line will be branded as “Incase Designed by Microsoft”. Existing products in Microsoft’s mouse, keyboard, headset, and speaker line will continue to be sold. The only notable difference from products that have been on the shelves for years appears to be Incase’s leaf-shaped logo on the plastic.

The following products have been confirmed for release, though prices and precise dates aren’t known:

- Sculpt Ergonomic Desktop (keyboard, mouse, number pad)
- Sculpt Comfort Desktop (keyboard, mouse)
- Wireless Comfort Desktop 5050 AES (keyboard, mouse)
- Wireless Desktop 850 (keyboard, mouse)
- Wireless Desktop 900 (keyboard, mouse)
- Wired Desktop 600 (keyboard, mouse)
- Sculpt Ergonomic Keyboard
- Ergonomic Keyboard
- Wired Keyboard 600
- Bluetooth Keyboard
- Designer Compact Keyboard
- Bluetooth Number Pad
- Mobile Mouse 1850
- Bluetooth Ergonomic Mouse
- Bluetooth Mouse
- Sculpt Ergonomic Mouse

- Modern Mobile Mouse
- Modern Wireless Headset
- Modern USB Headset
- Modern USB-C Headset
- Modern USB-C Speaker
- Audio Dock
- Modern Webcam

While Microsoft’s accessories always seemed to play second fiddle to Logitech as the go-to pick for anyone not looking for anything particularly fancy, they have their fans, especially the ergonomic keyboard line. This move seems like a win-win: consumers will preserve access to some dependable gadget picks; Incase will get to expand its offerings without the expense of developing new products; Microsoft (I’m guessing) will get to stock its online and retail stores with accessories priced below the high-priced Surface brand.



There will be a massive change in how you buy monitor in 2024

You'll soon be buying displays rated at different refresh rates for different resolutions. MARK HACHMAN reports

Most of us are used to thinking about, say, a 1440p-capable monitor that runs at a 120Hz refresh rate. In 2024, that's going to change. New logos and specs will indicate monitors that can run at two different refresh rates at different

resolutions. The Adaptive-Sync Display v1.1 update by the Video Electronics Standards Association (VESA) will begin showcasing adaptive-rate displays that already adhere to the standard, but haven't been highlighted as such, including displays manufactured by



VESA's new logo now describes two different resolutions and refresh rate, rather than just one.

Asus and LG, among others. It's an update to VESA's 2022 AdaptiveSync logo, which only provided a single, maximum frame rate.

It's a dynamically different way of thinking about displays, reminiscent of how some PCs are being designed for content creation, with moderately powerful discrete GPUs that can be used for video and photo editing during work hours, but are also capable of gaming after the workday has ended. These new displays will be designed to work at higher resolutions at slower refresh rates, but switch to a lower-resolution, higher refresh rate when called for.

It's important to note that VESA is proposing an alternative to the terminology already in the market. 'Adaptive sync' displays are typically used as another way to describe Nvidia's G-Sync or AMD's FreeSync technology, which alters the refresh rate of the display to match the output of a graphics card – if your PC can only

display 54fps at 1080p while running the game *Cyberpunk 2077*, for example, the technology will alter the display's frame rate to 54Hz reduce the visual artifacts known as 'tearing'.

In this scenario, gamers would manually reduce the game's resolution and/or visual quality to maximize frame rate. But it wouldn't matter if the gamer later bought a better graphics card; an older display capable of 60Hz at 4K resolutions would only be capable of 60Hz at 1080p, too.

And that's what's changed.

"Until recently, most displays did not have the ability to operate at different refresh rates when the resolution is reduced, instead running at the refresh rate supported by their physical maximum resolution," said Roland Wooster, chairman of the VESA Display Performance Metrics Task Group responsible for the Adaptive-Sync Display CTS, in a statement.

"Users interested in both high-performance gaming as well content

creation, photography, or video editing, have often been faced with a difficult choice between purchasing a display with low latency and high refresh rates, or one with higher resolution,” Wooster added. “Today, more and more displays are coming to market that give users the best of both worlds. VESA’s updated Adaptive-Sync Display CTS includes optional testing for these innovative displays, and a new dual mode logo allowing consumers to identify the range of variable refresh rate performance of these displays more easily.”

The idea is that you’ll be able to optimize your display for the game. As LG put it, the ‘VESA CERTIFIED’ logo instantly tells gamers that its 32GS95UE is capable of delivering an optimized gaming experience, for graphically rich, story-driven games at UHD (4K) 240Hz, or fast-paced FPS, MOBA or racing games at FHD (1080p) 480Hz.

There is a small catch: the logo and testing only allows for two different resolutions and refresh rates, rather than a sliding scale that accommodates many. The logo testing does account for ‘overclocked’ displays, if they pass the tests. VESA’s logo also requires a minimum of a 144Hz frame rate at the maximum resolution, as well as 1080p resolution at the minimum configuration.



Credit: Consumer Technology Association

CES 2024: Best laptops

These laptops left a huge impression on us. MATTHEW S. SMITH reports

CES is a big show for laptops, as many of the best models for the coming year appear first at the show. This year is especially notable, as both Intel and AMD are amid launching new generations of mobile processors (though it does seem most laptop makers are leaning towards Intel). Most of the laptops at CES 2024 look rather conventional, with a few exceptions, but dial the performance up to 11. There's

also a dizzying array of Mini-LED and OLED displays at the show. These are the best laptops of CES 2024.

1. **LENOVO YOGA 9I PRO 16-INCH (GEN 9)**

Lenovo's Yoga 9i line-up was, for my money, the most impressive Windows laptop line of 2023. It had everything: attractive design, a beautiful Mini-LED display, a nice keyboard and touchpad,



1.

processors (up to Intel Core Ultra 9) and a larger 84 watt-hour battery. In short, it's quicker than last year's model yet should last a tad longer on a charge.

The Lenovo Yoga 9i Pro 16-inch Gen 9 will be available in April 2024 starting at \$1,699 (around £1,335).

and good all-around performance that included optional Nvidia graphics. Even the pricing was competitive.

The new Yoga 9i Pro 16-inch isn't much different from last year's model, to be honest, but that's fine because it was already great. So, what is new? The 2024 model brings Intel Core Ultra

2. **LENOVO THINKBOOK 13X (GEN 4)**

The Lenovo Thinkbook 13x is the world's first laptop with a corrosion-resistant stainless magnesium chassis.

Fans of the brand may remember the company has long used magnesium alloy to reduce size and weight, but

laptops that used the material required a protective finish that often felt unpleasant or inexpensive. The Thinkbook 13x doesn't have that problem. It's extremely thin and light, measuring just 12.9mm thick and weighing a mere 1kg to start, but has the metallic look and feel shoppers expect.



2.

That's not its only trick. The laptop also supports Lenovo's Magicbay, a family of accessories (including a 4K webcam, 4G hotspot, and studio light) that attach magnetically at the top of the display. The internal hardware is up-to-date, too, with support for Intel Core Ultra processors and a 74 watt-hour battery.

The Lenovo Thinkbook 13x Gen 4 will arrive in Q1 2024 for \$1,399 (around £1,100).

3. MSI TITAN HX 18

MSI's Titan laptops are nothing if not bonkers and the new Titan HX 18 is no exception. The flagship 18-inch gaming laptop comes with 14th-gen Intel Core i9 processors, up to Nvidia RTX 4090 graphics, and a 4K 240Hz Mini-LED display. It also supports up to 128GB of RAM and 6TB of solid state storage.

But the laptop's design deserves equal attention. MSI's new Titan HX 18 has a large, seamless, haptic, RGB-lit touchpad that looks and feels great. That comes alongside a mechanical keyboard with Cherry MX key switches. It's a hefty laptop, as well, with a rock-



solid design that looks and feels more elegant than the 2023 model. Make no mistake, however, this is still a bruiser and not meant for frequent travel.

The MSI Titan HX 18 will retail carry an MSRP of \$4,999 (around £3,922) when it arrives later this year.

4. HP OMEN TRANSCEND 14

HP went small at CES 2024 with the Omen Transcend 14, which claimed to be the world's lightest 14-inch gaming laptop (a title it lost within hours to the Asus ROG Zephyrus G14, but still). It weighs a feathery 1.63kg. The Razer Blade 14 by comparison starts at around 1.78kg. The Transcend 14 is a looker, too, with an alluring white colourway and RGB keyboard.

The laptop's specifications are impressive for its size. It packs up to



an Intel Core 9 Ultra 185H processor, up to Nvidia RTX 4070 graphics, and a 14-inch 2.8K OLED display with a 120Hz refresh rate and Variable Refresh Rate Support. The laptop is powered by a 140-watt USB-C charger, as well, which ships with the laptop.

The HP Omen Transcend 14 is available for pre-order now starting at \$1,499 (around £1,175).

5. ASUS ROG STRIX SCAR 18

There's a lot to talk about with the Asus ROG Strix Scar 18, but let's start with the display. As I covered in my preview of Asus' new laptop displays, the Strix Scar 18 packs a

Mini-LED display with an excellent 2,304 dimming zones. That's more than twice last year's ROG Flow X16, which had 1,024 dimming zones, and it dramatically boosts contrast in high-brightness scenes. The display is a top performer in other areas, too, with great colour accuracy and wide colour gamut.

Display aside, the Strix Scar 18 has the high-end hardware you'd expect including up to an Intel Core i9 14900HX processor and up to Nvidia RTX 4090 graphics. RAM tops out at 64GB and solid state storage runs up to 4TB. It's a beefy laptop, weighing in at around 3.3kg, but that's to be expected



from a gaming laptop with its calibre of hardware.

The Asus ROG Strix Scar 18 starts at \$2,999 (around £2,350) and should ship in the first quarter of 2024.

6. ASUS ZEPHYRUS G16

Next up is the Asus Zephyrus G16 and, once, again, the display takes centre stage.

The new Zephyrus G16 has a 2,560x1,600 OLED display with a maximum refresh rate of 240Hz. It also crucially supports G-Sync, something that wasn't available in OLED laptops prior to those announced at CES 2024. The G16's display looks gorgeous in motion with crisp detail and deep black levels.

The Zephyrus G16 is otherwise surprisingly practical. It has a rigid machined aluminium chassis that keeps weight down to 1.5kg, and the laptop measures just 16.2mm thick. Despite its slim profile, it still packs a 90 watt-hour battery. The internals include an Intel Core Ultra 185H processor and up to Nvidia RTX 4090 graphics.



Asus expects to ship the Zephyrus G16 in the first quarter of 2024, but pricing hasn't been announced.

7. SAMSUNG GALAXY BOOK4 ULTRA

Samsung's Galaxy Book4 Ultra is a 16-inch high-performance thin-and-light with up to an Intel Core 9 Ultra



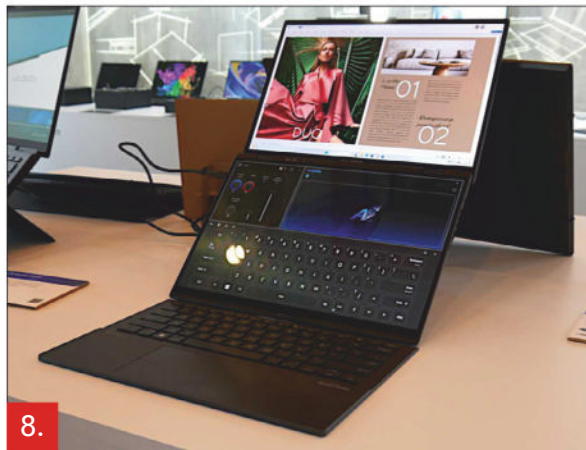
processor and up to Nvidia RTX 4070 graphics. RAM goes up to 64GB and solid state storage peaks at 2TB. It also packs a 2,880x1,800 OLED touchscreen with a refresh rate up to 120Hz.

All of this hardware is stuffed in an elegant, professional clamshell chassis that tips the scales at around 1.85kg and measures no more than 16.5mm thick. That's impressive, given the specifications. Samsung also provides a 140-watt USB-C Adapter that can be used to charge the laptop over USB-C.

Samsung hasn't announced pricing, but the Galaxy Book4 Ultra will be on sale soon.

8. ASUS ZENBOOK DUO

Asus's latest wild dual-screen laptop is the Zenbook Duo, a double-screen clamshell similar to Lenovo's



Yoga Book 9i. Like the Lenovo, Asus's laptop provides two OLED touchscreens which can be used in a vertical or horizontal orientation. However, Asus switches things up with the keyboard and touchpad.

The Yoga Book 9i had a physical keyboard but relied on a virtual touchpad on the lower display, which wasn't great. The Zenbook Duo instead has a larger keyboard with a physical touchpad. As a result, the Duo feels identical to a traditional clamshell laptop when the keyboard and touchpad is in use. Asus also switches up the stand, going for an attached flip-out stand instead of a case.

I'd have to spend more time with the Zenbook Duo to know if Asus's changes put it ahead of Lenovo's competitor, but what I saw was promising. The Zenbook Duo will launch in the first quarter of 2024 at a surprisingly affordable \$1,500 (around £1,175).

9. ACER ASPIRE VERO 16

Want to go green? Acer's Aspire Vero 16 deserves your attention. It's a follow-up to the company's prior (and popular) Vero laptops, which are built from post-consumer resin (PCR) recycled plastics.



The Vero 16 ups the PCR content to 60 percent, a big leap from the Acer Aspire Vero 14's chassis, which contained 30 percent. Sustainability aside, I like how the Vero 16 looks. It has a flecked, textured appearance that's unique to the Vero line.

The Aspire Vero 16's specifications are modest, with up to Intel Core Ultra 7 processors, up to 16GB of memory, and up to 2TB of solid state storage. But the price tag is also modest: Acer says it'll start at just \$749 (around £590) and is expected to ship April of 2024.

10. ACER ASPIRE 15 3D SPATIALLABS EDITION

Acer was early to jump on board glasses-free 3D technology with its

SpatialLabs sub-brand and now, at CES 2024, it's coming to a more affordable price point. The Acer Aspire 15 3D SpatialLabs Edition starts at just \$1,399 (around £1,100), making it the most affordable laptop with the technology yet.

Haven't heard of SpatialLabs? It's Acer's version of a glasses-free 3D that uses cameras to track a user's eyes and provide

two slightly different versions of a scene, creating a stereoscopic effect. There's no spectacles, dongles, or peripherals required.

The laptop is also rather well equipped with up to an Intel Core i7-13620H processor, up to Nvidia RTX 4050 graphics, up to 32GB of memory, and up to 2TB of solid state storage. Acer expects it to ship in February.





Credit: Consumer Technology Association

CES 2024: Best PC tech

There was so much more at this year's event than hype about AI. KATHERINE STEVENSON reports

Of course, we knew that AI would figure prominently at this year's CES. It's the technology story du jour after all. But as CES veterans, we've seen such sparkling promises of the next big thing eventually fizzle. 3D televisions, anyone? Thankfully there was plenty of meat-and-potatoes PC tech on display in Las Vegas to satisfy the cravings of PC enthusiasts here and now.

Whether you're a road warrior, a PC builder, a lover of games both old and new, or a content creator, we saw some truly exciting products for PC users of every stripe, and, yes, some of it even includes AI.

1. MSI MEG 321URX QD-OLED MONITOR

MSI could've left well alone with the MEG 321URX QD-OLED monitor. I

mean, it's impressive as hell just off pure specs alone: This 32-inch, 4K, 240Hz OLED monitor with DisplayHDR True Black 400 certification and 99 percent coverage of the DCI-P3 colour spectrum is already better than everyone owns except the 0.01 percent of PC enthusiasts, in a form factor those enthusiasts have been begging for.

But MSI didn't stop there. The company also infused the monitor with several AI capabilities, the most intriguing of which is AI Skylight. In the ultra-popular League of Legends, AI Skylight keeps tabs on where your enemies are elsewhere on the battlefield, cluing you in to incoming hostiles via large red skulls with directional indicators so you're never caught flat-footed. MSI's also working on training the AI feature in other esports games like Dota 2, while a separate AI-powered light bar across the bottom of the display provides quick visual indicators of things like your health in League and your ammo count in Counter-Strike (better make those last few shots count).

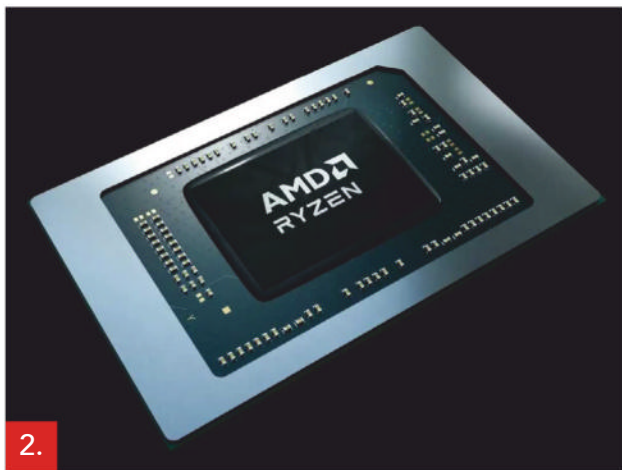


Better yet? Since the MEG 321URX does all its processing within the monitor itself, it skirts existing cheat detection software so you won't catch a ban for using the tools. *Brad Chacos*

2. AMD RYZEN 8500G

Six cores, 12 threads, 5.0GHz turbo clock speeds, no AI: \$179 (around £140). Why would we award a Best of CES award to a chip that lacks Ryzen AI, when AMD is the first to release an AI NPU on a desktop processor?

Colour me/us a bit sceptical about AI right now, when its value hasn't yet been proven. And the \$229 (around £180) that AMD is charging for the nearly identical 8600G is \$50 more than the 8500G, which at \$179 (around £140) just feels like a solid value. As for Intel, its 14th-gen Raptor Lake Refresh



space. With my limited time on the show floor I was impressed by the build quality and design, and the software seems to be coming along nicely, as well. Performance and battery life are still to be determined, which can make or break a device, but I believe we now have a viable competitor to the Steam Deck and ROG Ally. *Adam Patrick Murray*

parts just feel a little too similar to the 13th-gen parts right now, lacking a solid gen-over-gen improvement. Maybe further testing will change our minds.

Mark Hachman

3. MSI CLAW

The battle among handheld gaming PCs continues to rage on, and at CES 2024, an exciting new entrant appeared: MSI's Claw. Not only is this MSI's first jump into the handheld arena, it also marks the first handheld to feature Intel's Core Ultra processor with Arc graphics, which looks to take on AMD's dominance in the

MSI's Claw portable gaming PC is my pick for CES. Not for what it is (because frankly, its chipset is the only interesting thing about it), but for what it represents. The Steam Deck seemed like an experiment two years ago, and being quickly copied by smaller indies that relied upon crowdfunding didn't



change that. But now huge players like Lenovo, Asus, and MSI want a piece of the pie, and can compete at prices below \$1,000. It's clear that the portable gaming PC is a form factor with some staying power. *Michael Crider*

4. LENOVO'S PREPPER-FRIENDLY WIRELESS MOUSE AND KEYBOARD

The most unusual concept I've ever seen has to be Lenovo's hand-cranked mouse and spinning dial wireless keyboard. The 12,800dpi wireless mouse has a pull-out crank that, if you physically spin it around enough times, will generate 30 minutes of power. The wireless keyboard works in a similar fashion but instead of a pull-out crank, you just spin the Surface Dial-like knob on the upper-left corner of the deck. Spin this bad boy for five minutes and boom! You now have enough juice for 30 minutes. It's definitely an interesting concept that speaks to the prepper zeitgeist, but I'm not sure if it'll ever be ready for lift-off. After all, if the battery is dead why not just plug into the PC?

Ashley Biancuzzo

5. ROG NUC GAMING PC

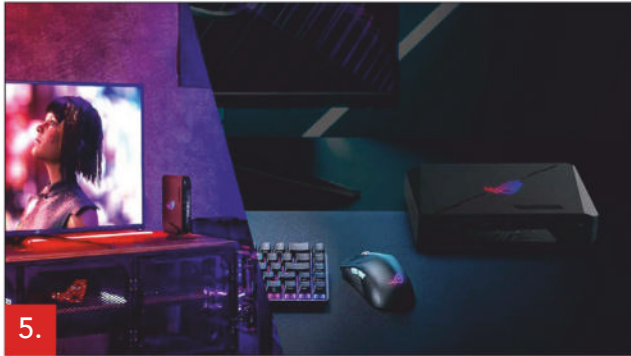
Having a third child in 2023 was a great joy, but it does mean space is now getting a little tight around



my apartment. Suddenly, my giant gaming rig is looking a little oversized – like the equivalent of Hollywood's iconic Mount Rushmore lumped on the floor between a pile of garish-looking soft toys and definitely-now-a-choking-hazard LEGO blocks.

Thankfully, Asus has fixed my problem by announcing the ROG NUC mini-PC at CES 2024 – and yes, we've all seen mini-PCs before, but this is a little different, with a choice of Intel Core Ultra 9 or Core Ultra 7 processors, Nvidia RTX 4060 or 4070 GPUs, and up to 32GB DDR5 / 5600MHz RAM. It's got me salivating at the prospect of the kind of high-end gaming I'll be able to do on a PC whose case is an apartment-friendly 2.5 litres in volume.

Although small, the ROG NUC's connectivity looks state of the art, too. The desktop has Wi-Fi 6E and Bluetooth



5.3, and no less than six USB-A ports, a Thunderbolt 4 port, HDMI port, 2x display ports, dual 3.5mm audio jacks, and a full-sized SD card reader. No word from Asus about pricing yet, so fingers crossed it will land in a hip-pocket-friendly price zone. *Dominic Bayley*

6. DUAL-SCREEN LAPTOPS (LENOVO YOGA BOOK 9I & ASUS ZENBOOK DUO)

I love screen real estate, and so I've always hated long sessions on just a laptop. But two new dual-screen notebooks shown at this year's CES are making me rethink my stance – they offer the multi-monitor experience without the hassle of actually packing and setting up a portable display. I'm partial to Lenovo's Yoga Book 9i, which is a bit smaller and offers more flexibility with the detachable keyboard's

positioning, but Asus's equally luxe yet cheaper (by \$500, around £780) Zenbook Duo looks just as tempting. I don't need a new laptop, but I now want one. *Alaina Yee*

The two full-sized OLED screens on Lenovo's brand-new Yoga Book

9i laptop are absolutely stunning and versatile as hell. You can use it like a conventional clamshell laptop or a dual-screen PC set-up. If you're going for the latter, the screens can be positioned either horizontally or vertically. The whole package weighs just under 3 pounds as well, which is impressive given the additional display. It



even features the latest 14th-Gen Intel Core U-class CPU and a maximum of 32GB of RAM and 1TB of SSD storage. I'm really looking forward to trying out this device myself.

Ashley Biancuzzo

7. ASUS BTF ECOSYSTEM

We declared the War on Cables the hottest PC trend of 2023 after Computex last summer, and at CES 2024, the concept got real. MSI and Maingear were busy showing off their 'Project Zero' initiative for a cable-free desktop PC, but Asus' rival concept – dubbed 'BTF', for 'Back to the Future' – impressed me the most.

While all these concepts move most wiring to the back of the motherboard for a pristine aesthetic, only Asus uses a proprietary 600-watt PCIe high-power connector on its graphics cards as well, letting you slot them into the motherboard without any power cables poking out from the front side, for a truly wireless interior (well, except the tubing for AIO CPU coolers, natch). It's a wickedly clean look, though Asus motherboards will still work just fine with any GPU if you'd like.

Asus expects to start selling bundled BTF kits (motherboard, graphics card, case) under its TUF brand sometime



around February, while a higher-end ROG Strix BTF bundle will land late in this quarter. Even better, Asus already signed up nine case partners – including heavyweights like Corsair, Lian Li, Cooler Master, Silverstone and BeQuiet – who've pledged to support the BTF project. The War on Cables is beginning in earnest. *Brad Chacos*

8. HYPERKIN MEGA 95

Grab those baggy pants, flip your hat backwards, and dust off the old boxes of Sega Genesis cartridges. Hyperkin is here with the Mega 95, a new handheld console capable of playing your old Sega Genesis cartridges. Modelled after a Genesis controller, it comes with a 5-inch screen and up to 10 hours of battery life. The screen will also be capable of toggling between 4:3 and 16:9 aspect ratio modes. Eat my shorts,



8.

Genesis Nomad. This new Mega 95 is seemingly a handheld version of Hyperkin's MegaRetroN HD console, but with some upgrades. Not only will it allow you to take your games on the go, but it also comes with a dock to connect to your TV via HDMI and two ports for controllers. Get ready to fire up Sonic again and finally collect those last Chaos Emeralds. *Sam Singleton*

9. THERMALTAKE TOWER 300

The Thermaltake Tower 300 stood out in a sea of 'just another box' PC cases this year. No six sides here, we're talking octagonal, with wicked airflow from bottom to top, unless you've got it on its side with the

optional stand that is giving me real Doom Slayer power-up vibes. The real kicker here is that while the Tower 300 can support MiniITX motherboards, it's designed around the MicroATX form factor which is something we haven't seen much of lately. Oh, and if you don't like the Thermaltake 25th Anniversary Blue, you can opt for traditional white and black, but also yellow, green and turquoise. *Keith May*



9.

10. LENOVO THINKBOOK PLUS GEN 5 HYBRID

CES 2024 had its fair share of interesting laptop configurations and form factors – take the two multi-monitor laptops above as prime examples – but Lenovo's ThinkBook Plus Gen 5

Hybrid offers its own very unique take on the genre. As a Windows laptop the specs are pretty standard: Core 7 Ultra CPU, Arc graphics, 32GB RAM, 1TB storage. What makes it stand out is how cleverly it functions as both a Windows laptop, when the 14.5-inch OLED panel is docked in the keyboard, or as a conventional Android tablet when the panel is undocked, complete with a built-in Snapdragon processor, 12GB of RAM and 256GB of storage, and support for touch or pen input.



10.

Yes, all the PC parts are in the keyboard. That means that the keyboard itself can be attached to a large monitor to form yet a third configuration that's suited to stationary desktop work. How clever is that? *Katherine Stevenson*

11. RAZER BLADE 16 (2024)

Every year Razer's Blade 14 gaming laptop leaves me a little awestruck, its portability, power-to-size ratio, and quality of its visuals just seems to all meld together perfectly – plus, it arguably offers the best bang for buck in Razer's line-up. This year, however, it's the laptop's larger sibling, the Razer Blade 16, that's really caught my eye – the reason? Its OLED display.

I've been waiting for OLED displays to come of age, and go one better than the 15-inch QHD 240Hz display we saw in the 2023 Razer Blade 15, and the Blade 16 does just that, upping the ante to a whopping QHD+ (2,560x1,600) OLED display with a 240Hz refresh rate in a larger 16-inch panel, in what Razer claims is the first of its kind ever made. Larger, more fluid, even more gorgeously rendered OLED visuals? Yes, please.

Under the hood, the top-tier Blade 16 also looks absolutely ripped, with a 14th-gen Intel Core i9-14900HX CPU and GeForce RTX 4090 GPU onboard. It's loaded with the kind of hardware

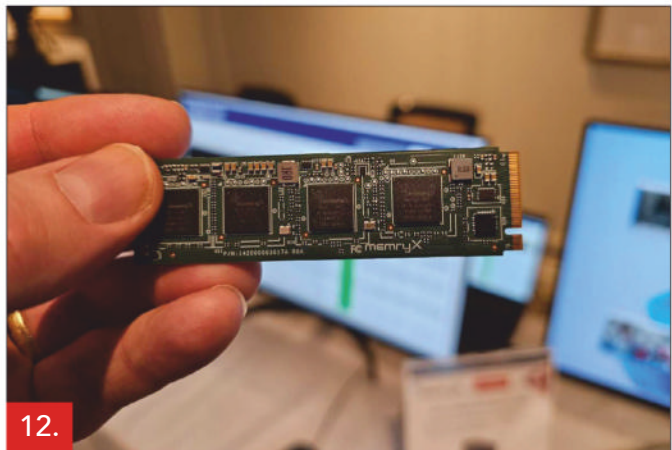


that could make me a legend, if not a demi-god, in games like, Counterstrike 2 and Fortnite. *Dominic Bayley*

12. MEMRYX MX3

The MemryX MX3 is the first third-party AI accelerator card to land in a PC. The company's debut effort may be of modest value (MemryX claims 40 TFLOPs per card, which isn't that different than some of the NPU power that chip vendors currently boast.)

But we may be on the cusp of a moment where a new generation of AI chip start-ups launch AI accelerator cards for the PC.



Lenovo is already planning to include them in a ThinkCentre desktop, and says there are more out there than we've heard of. MemryX may not be the best of this bunch, but it's at the surface of a movement that may alter the landscape of the PC. *Mark Hachman*

13. HARDWARE WE COULD DO WITHOUT: TRANSPARENT TVs

I saw transparent screens at CES more than a decade ago. They were just as dumb then as they are now. Outside of some extremely niche applications in advertising and public signage, there's simply no reason a consumer would want to look at both a TV or monitor-sized screen (with a worse image than a



standard one) and whatever's behind it. Which is usually a blank wall. There are uses for this technology – smart glasses come to mind, to say nothing of heads-up displays in all kinds of vehicles. But trying to put them in consumers' homes reeks of an industry desperate for a gimmick to push. *Michael Crider*



HP Spectre Foldable

Price: £4,799 from fave.co/48PJ7Pz ★★★★★

Much fanfare has been made about the HP Spectre Foldable since the laptop's launch. So, does it live up to all the hype? The simple answer from a design perspective is absolutely it does. This 17-inch laptop does exactly what its name implies, folding down the middle of its continuous OLED display and

converting from a laptop to a desktop to a tablet and vice versa.

It isn't a new concept. I've seen the same kind of versatility in likes of the Asus Zenbook 17 Fold OLED. But, it does feel a little more refined, from the design heights the Zenbook achieved, the Foldable goes one further, slimming down in size, shedding some weight,

and rocking the most unobtrusive fold I've seen to date.

The one downside is that the Foldable shows off only middling CPU power. It also costs a whopping £4,799 at checkout. If you're not a power user, the middling performance may well be of no consequence, but if you're expecting this laptop to pull out all the stops for heavy productivity work, then all its wonderfully bendy circus tricks may not quite be enough.

DESIGN

To me, using the Spectre Foldable is like playing with a 1980s Transformer that I just have to put through its paces. But in this case, instead of vehicle and transformer mode, it's the laptop's three main forms that have me enthralled – desktop, laptop, and tablet. Suffice to say, this laptop is incredibly fun to use, but it's also a pragmatist's dream, a marvel of engineering that really deserves praise for what its design will do for your working life, if you dare to make use of it.

Without big noting myself, I was quick to do just that and it made me far more reactive to my work environments. The biggest boon for me was that I could work from anywhere, without the

usual restraints placed on me by my Dell Vostro's simple clamshell design.

On the bus in 12.3 laptop mode, for example, the Foldable proved more compact and less cumbersome than my 15-inch Vostro, which substantially sped up output. Reaching home, in a few seconds I could lift off the keyboard and expand it out at the fold to become a 17-inch tablet. This was my preferred form for researching laptop stats while simultaneously watching video recipes to inspire dinner.

Pulling out the kickstand and placing the Bluetooth keyboard out in front converted the laptop into a desktop PC/monitor – the mode that dominated my working day. This bestowed the kind of generous 17-inch visuals I'd usually have



The HP Spectre Foldable converts from a laptop or tablet to a 17-inch desktop PC.

to go into the office for but could now get anywhere, on a park table, in my local café or at the library, which really streamlined my work day.

For all that versatility to work, HP have really done some lateral thinking on the design. In tablet mode the laptop is remarkably thin – it measures just 8.5mm thick. This keeps the weight down to just 1.62kg.

In laptop mode, the laptop feels altogether strong and robust. Its recycled magnesium alloy chassis is impressive in your hands feeling solid and looking slick with a premium metallic blue finish that could match any flagship model in HP's line-up.

The laptop's desktop mode relies heavily on a slim kickstand to stand it up, which you can simply pull out from



The laptop's kickstand is thin but very sturdy.

a groove on the laptop's rear. That kickstand had more than a few tech journalists worried that it could actually do the job at the first showings of the device, but it turns out it's surprisingly strong and holds the unit up with gusto without any visible wobbles whatsoever.

HINGE MECHANISM

Much of how well a folding laptop works comes down to its fold. In this case, the Spectre Foldable's is the best I've seen. It bends seamlessly, relying on a U-shaped hinge mechanism that's both clever and discreet. HP reinforced the inside with metal plates, so it's remarkably strong – good for 25,000 flexes, according to the manufacturer. The hinge itself is only visible from the sides and the back of the device, so there's no unsightliness either.

HP has customized some of the internal components to make the bend as seamless as possible. The laptop's 94.3Whr battery, for example, has been split into two parts and placed down each side to balance the weight out. Equilibrium has been achieved so brilliantly that I never noticed any unequal weight distribution in my testing.

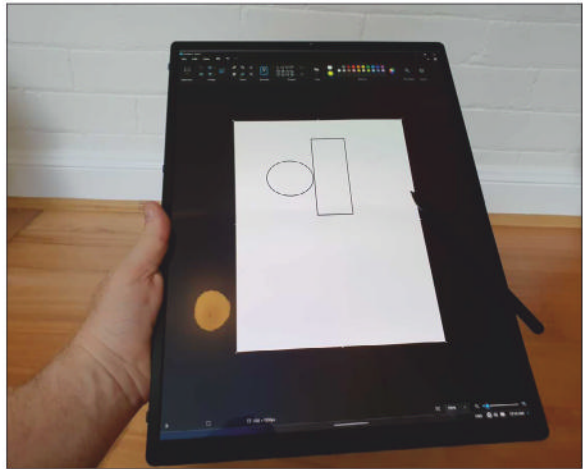
The bend works nearly

perfectly in laptop mode. Here, it held the lid firmly open at just about any angle I wanted it. In tablet mode, however, the lack of a true solid hinge felt a bit awkward at times, like I was holding a very large book open that could sway and jump if I didn't hold it correctly. You simply don't get the solid feeling you get holding a dedicated tablet.

While I did get somewhat used to that, what I never quite got used to is the light glare. The Foldable suffers from the same kind of dreaded reflection in its fold that I saw in the Asus Zenbook 17 Fold OLED, which does impede your view of the display at that point. That said, this problem is a lot less obvious than its rival, thanks to the crease being a tad smaller, 3 mm across instead of 4mm or bigger in the Zenbook, so kudos to HP for achieving that.

KEYBOARD, TOUCHPAD AND STYLUS

The Foldable's magnetic keyboard slots into place on one side of the display and can be removed just as easily. It measures 300mm which doesn't make it full-sized, but it feels spacious, nonetheless. The keys too are also very



The HP Spectre Foldable doesn't feel as stable as a dedicated tablet when in tablet mode.

spacious, they measure 15mm each way, which made typing a breeze during the day. With no backlighting, however, their visibility is greatly reduced at night.

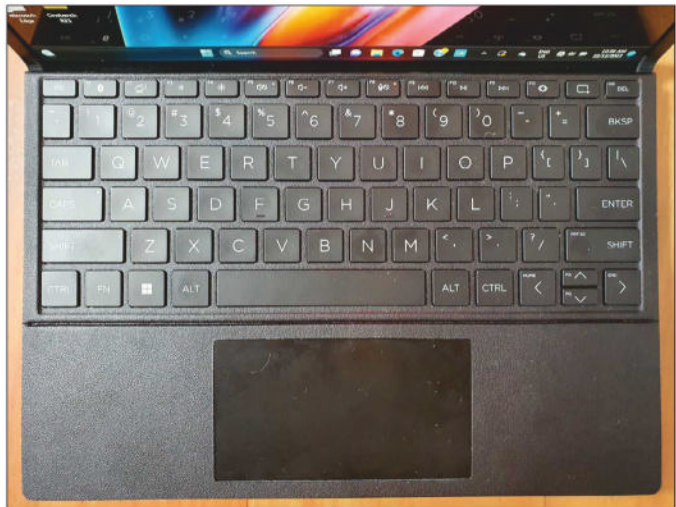
The keyboard is covered in a soft pleather-like material that feels tactile and grippy. There's a slight bend in the board between the keys and the trackpad side which simplifies lifting the keyboard free of the device. The keyboard layout is generous too; you get large arrow keys, a full contingent of Function keys and both left and right Shift and Control keys.

Magnets in the keyboard clip it into place in two positions – either fully covering one side of a bend or at a position half hanging off the edge.

The latter makes a surprising fourth mode possible which HP calls 1.5 mode. In this configuration one quarter of the lower display remains visible, like you will see in the Asus's Duo dual screen laptops. This mode proved ideal for when I needed to cross-reference data.

One really useful point about the keyboard is that you can store it inside the laptop when you fold it down. Doing this, however, isn't without a small problem – that being, there's no groove in the front of the laptop in order to wedge it open again. Consequently, the keyboard tends to attach and lift up to the topside when you open. It's a slightly annoying trait that means you'll need to spend time reattaching it to the bottom at times.

The touchpad is quite large considering the keyboard's dimensions – it measures 110x60mm. It has a stable click that's neither too soft nor too hard. The Foldable's stylus is also magnetic. It features two programmable buttons and a flat side for easy



The HP Spectre Foldable's Bluetooth keyboard is magnetic and conveniently charges while connected to the laptop.

attachment. It holds a pleasant weight in your hand and is suitably responsive for taking notes and drawing in programs like Microsoft OneNote.

Both the keyboard and stylus recharge on the device, or else you can charge the keyboard separately with a USB-C adapter.

CONNECTIVITY

With just two Thunderbolt 4 ports constituting the Foldable's I/O offering (one on the top left and another on the bottom right of the display when in laptop mode) the laptop is lacking the kind of upfront connectivity you might normally expect from a 3-in-1 laptop.

That said, Thunderbolt 4 ports are some of the more useful and sought-after ports for productivity today and the two will mostly cover your basic power, file transfer and presentation needs. Each port bestows a quick file transfer speed of up to 40GB/s and additionally allow you to stream content to two 4K displays or a single 8K display at 60 frames per seconds.

The Foldable also ships with a port adapter that allows you to access two USB-A ports, a HDMI and USB-C passthrough, which I was well glad to have access to, considering the conflagration of USB-A devices I have. What I did wish the laptop had, however, was a microSD card reader and 3.5mm headphone jack (which Asus's Zenbook has) – these being two things I tend to use a lot of these days. I also found port placement less than ideal, especially when using a USB dock or external drives, which tended to hang awkwardly off the laptop's back.

DISPLAY

The colour depth is superb on the Foldable's 2.5K resolution 99.5 percent DCI-P3 OLED display, which brings to life rich and vibrant images and videos. If you're intending to do creative work, it's entirely possible you could do your best work on this panel in Adobe

Photoshop or another such program, especially with the MPP 2.0 Tilt pen and touch-functionality at your fingertips.

The panel's per pixel illumination means the colours contrast superbly against the very deep OLED blacks. The display also has IMAX Enhanced certification, which means it has IMAX's tick of approval for immersive visuals. It also means it's possible to play content shot specifically for IMAX's expanded aspect ratio on it, which is previously something only HP's x360 laptop could claim to do.

The panel is also suitably bright. I measured a peak brightness of 398 nits by my Lux meter in SDR mode, however in HDR mode the display provides up to 500 nits peak brightness, which means its more than visible in sunny rooms.

AUDIO AND WEBCAM

Considering the Foldable is about half the width of the chopping board in my kitchen, the audio it produces is surprisingly decent. It's delivered by a quad array of Bang and Olufsen speakers which sound clear and project volume nicely from the laptop's sides, so that you can hear them no matter what mode you're in.

As you'd expect in such a thin unit, however, treble and mid tones tend to dominate the soundscape, which is

almost completely devoid of any bass presence. Testing the speakers with Mariah Carey's *All I Want for Christmas*, proved the speakers could deliver balanced vocals at medium volume – but Mariah's voice became a little wobbly at higher volumes.

The Spectre Foldable makes use of a HP 5Mp camera which produces natural looking images in normal daytime lighting. Its use does, however, come with a small caveat: you'll generally want to use it in laptop mode only since the camera position changes to the left-hand side in desktop mode rendering your image in a vertical orientation, which isn't suitable for meetings.

As long as you use it in the correct orientation, the camera's convenient privacy shutter located on the top right-hand corner (in laptop mode) is a useful feature for when you want to go incognito in your meetings.

PERFORMANCE

The Foldable's i7-1250U CPU belongs to Intel's Raptor Lake-U family – especially made for lightweight productivity laptops like this one. The processor first debuted in February 2022 – almost two years ago – which begs the question: why would HP choose a 12th gen processor over a more recent and more powerful 13th gen chip?

At HP's Global Headquarters in Palo Alto California, a HP spokesperson explained to me that this choice came down to power. The Intel i7-1250U chip operates at 9 watts, whereas Intel's 13th gen chips have a TDP of at least 15 watts, which would have forced changes to more facets of the design than HP was willing to change.

At a glance then, the Intel i7-1250U features 10 cores and 12 threads and operates at a base frequency of 1.1GHz and a maximum Turbo Boost Frequency of 4.7GHz. The chip, which is built on a 7 nm manufacturing process, also includes Intel Iris Xe Integrated graphics. In our laptop it fed 16GB of DDR5 RAM and 1TB of SSD storage.

To test the CPU's power, I first zeroed in on Maxon's Cinebench Multi-Threaded benchmark. This benchmark flexes all the cores of a laptop's CPU to show how well it will fare when tasked with the same all-core flexing CPU-load in a real-world task.

Cinebench R20 (multi-thread)

Lenovo Yoga Book 9i: 4,683
 Asus Zenbook 14 Flip OLED: 3,437
 Acer Aspire Vero 14: 3,195
 Acer Aspire 5 15: 3,085
 Microsoft Surface Laptop 5: 2,984
 HP Dragonfly Folio: 2,594
 HP Spectre Foldable: 2,239

In UL's PCMark 10 benchmark our laptop's CPU proved just a moderate performer in the comparison line-up, falling in line behind laptops like the Asus Zenbook 14 Flip OLED, Acer Aspire Vero 14 and Dell Latitude Ultralight.

PCMark 10

Lenovo Yoga Book 9i: 6,194
Asus Zenbook 14 Flip OLED: 5,623
Acer Aspire Vero 14: 5,322
Dell Latitude Ultralight: 5,100
Acer Aspire 5 15: 5,073
HP Spectre Foldable: 4,714
Microsoft Surface Laptop 5: 4,230

Moving on to the graphics performance and the Spectre Foldable achieved a score of just 1,146 in the 3DMark Time Spy Overall benchmark. While this kind of score isn't unexpected for a laptop with just Integrated graphics, it's also not great when held up against scores from our comparisons.

3DMark Time Spy 1.2 Overall

Acer Aspire Vero 14: 1,815
Microsoft Surface Laptop 5: 1,750
Lenovo ThinkPad X1 Nano Gen 3: 1,715
Asus Zenbook 14 Flip OLED: 1,671
Dell Latitude Ultralight: 1,410
Acer Aspire 5 15: 1,301
HP Spectre Foldable: 1,146

In summary, these results don't tell us a very encouraging story about the Foldable's performance capabilities. They show us a laptop that has enough power for light productivity tasks like spreadsheet work, word processing and videoconferencing, but you're not going to want to do any kind of heavy lifting work like video editing or encoding on it – tasks which are likely to run sluggishly on this laptop – at least compared to a more powerful productivity laptop like the Asus 14 Flip OLED.

Laptops with integrated graphics are designed for lightweight graphics tasks anyway, but even accounting for that fact, the Foldable's graphics performance seems to be lacking somewhat also. Again, you shouldn't have any trouble with light tasks like rendering simple 2D images or watching videos, but for more complex tasks like 3D rendering the Spectre Foldable is going to struggle.

The takeaway here is there seems to be a dichotomy between the laptop's excellent design and its lacklustre power offering. The design is undoubtedly brilliant, but it's possibly arrived too early for a suitable chip to provide the kind of performance the laptop requires.

The big question then, is a personal one: is the versatility you're likely to get in the Spectre Foldable's design

worthwhile for the kind of step-down in performance you might get compared to other 3-in-1s? For me and my simple word processing needs – it was. But then again, I didn't lay down almost £5,000 for the privilege of using it.

BATTERY LIFE

The HP Spectre Foldable comes with a 94.3Whr battery and a compact 110-watt USB-C charger. With HP going to enormous lengths to fit such a large battery into the laptop's folding design, I had high hopes the Spectre Foldable could last at least 8 hours, which is the minimum requirement of most office workers.

To find out, I set a 4K movie on repeat in the Windows Film and TV app and switched the Wi-Fi to airplane mode. I also set the volume to 50 percent and plugged in a cheap pair of headphones to keep sound to a minimum. Lastly, I sat back and timed how long it took for the laptop to switch to Standby Mode.

As you can see below, the Spectre Foldable lasted a respectable 14 hours in laptop mode before running out of juice. This is longer than the Asus 14 Flip OLED, Microsoft Surface Laptop 5, and the Lenovo Yoga 9i. In a nutshell, it suggests you can almost assuredly leave your charger at home on an average

workday and easily run the Foldable all day long without needing to recharge.

Battery life

HP Spectre Foldable: 14 hours, 2 minutes

Asus Zenbook 14 Flip OLED: 12 hours, 8 minutes

Microsoft Surface Laptop 5: 10 hours, 26 minutes

Lenovo Yoga Book 9i: 10 hours, 23 minutes

Acer Aspire Vero 14: 10 hours, 5 minutes

Dell Latitude Ultralight: 8 hours, 56 minutes

Lenovo ThinkPad X1 Nano Gen 3: 7 hours, 10 minutes

VERDICT

There's no doubt the HP Spectre Foldable is the best of the folding 3-in-1 laptops I've seen to date, with a design that seamlessly moves through its different modes like a master craftsman who has honed their craft over many years. The utility of such a design is undoubtedly huge. That said, the Foldable's unimpressive CPU power is like an unwanted stowaway disrupting the smooth sailing of an otherwise tip top ship.

Is the Spectre Foldable another example of a technology that doesn't



The Spectre Foldable is the best folding 3-in-1 we've seen.

quite live up to reputation? That depends on what you need it for. In my view, most users aren't going to be troubled by the laptop's power limitations – only creators wanting more oomph for high-end programs are going to have any issue here. Either way the laptop's £4,799 price tag should at least give you some food for thought to pause before you buy, to consider what you really need your productivity laptop to be able to do. Dominic Bayley

SPECIFICATIONS

- 17-inch (2,560x1,920) Foldable, touch-sensitive, OLED display
- Windows 11 Home
- Intel Core i7-1250U processor

- Intel Iris Xe GPU
- 16GB RAM
- 1TB SSD
- 2x Thunderbolt 4
- B&O speakers
- HP True Vision 5MP IR webcam
- Wi-Fi 6e: 802.11ax compatible
- Bluetooth 5.3
- Full-size, detachable rudy black soft cover Bluetooth keyboard
- HP Rechargeable MPP2.0 Tilt Pen
- 94.3Wh battery

- Unfolded: 277x37.6. x8.5mm. Folded: 27 x191.3x21.4mm (folded)
- 1.62kg



Asus Zenbook 14 OLED

Price: £1,299 from fave.co/3TStD8U ★★★★★

Intel just presented its new Meteor Lake processors, and the first laptops with the new circuits will soon be on sale. Luckily, I've had the opportunity to test one of them in advance. The Asus Zenbook 14 OLED, with its stunning display and solid graphics performance, has been refreshed both inside and out.

This new model is a thinner and lighter computer than the Asus Zenbook 14 OLED I tested last year as well as an updated model with the 13th generation Core processor that had

the same design and almost the same weight. Now we get down to 14.9mm thickness and a weight of 1.28kg, depending on whether the model has a touchscreen or not. Mine has a touchscreen, but I can't say the extra grams bother me much. For a 14-incher, this is really nice.

DESIGN

The Asus Zenbook 14 OLED features a solid, quality build. It's almost entirely made of matte aluminium, except for

the glass screen surface and plastic keyboard keys. The deliciously deep blue-green tones of the surfaces give the computer a professional and luxurious look. With the right rounding of the edges on the underside, the computer is comfortable to hold and carry around, despite a more angular grip on the screen lid.



A USB-A port on one side.

The keyboard is top-notch with just the right amount of travel and response from the large keys. My only complaint is that the arrow keys are a bit cramped, but that's almost always the case on small laptops without a numeric keypad. The mouse pad underneath has high precision and excellent direct response for pointing, swiping, and gesturing. It has a wide surface, but is not optimally high.

TOUCHPAD AND PORTS

A long press in the upper right corner of the mouse pad lights up a numeric keypad on the surface and a press in the other corner lets you adjust its brightness. It's a viable alternative to a real numeric keypad on the side,

especially if you've connected an external mouse. It's possible to use the mouse pad for mouse control and numeric keys at the same time, but this can sometimes cause confusion.

On the sides you'll find a well-approved set of external connections for a thin laptop. Dual thunderbolt 4 ports with USB-C connector, where you can connect power, external accessories and monitors. Then a separate USB-A with USB-3 speed, a 3.5mm headset jack, and a full-size HDMI 2.1 port.

It won't be long before you run out of things to connect to unless you've got an external mouse with a USB-A connector. You may also have to invest in a USB-C docking station if you want



The rest of the connections on the other side.

to bring in more gadgets. You connect to the network wirelessly with Wi-Fi 6e or simpler. We're still waiting for Wi-Fi 7 laptops, and I had the hope that it would come with this generation of Intel's processors, but it will take a little longer. In any case, it's undoubtedly fast enough against the Wi-Fi 6 router I have available for testing.

DISPLAY

Asus has a wider range of OLED laptops than any other manufacturer right now, and the OLED screen here is nothing to sneeze at. The 2,880x1,800 resolution makes it razor sharp and feel pixel-free at arms length. The contrast is, of course,

100 percent and you get high brightness of up to 400cd/m² in type brightness and up to 550cd/m² in HDR mode.

The screen is certified for VESA Display HDR 600 True Black, and with the right image source or HDR-compatible

games in the right mode, it can be an intense experience. With 100 percent coverage of the P3 colour scale, you get intense and saturated colours. You have four predefined colour profiles to choose from: sRGB, P3, Display P3,



To avoid pixel burning, Asus has its own screensaver that can save the OLED panel.

and Native, which seems to produce deeper blues.

It's not a real professional monitor with extra careful factory calibration of colour correctness, but you can always do it manually if you want to. The 120Hz frame rate gives a nice flow to interfaces as well as scrolling web pages and documents. A response

time of as little as 0.2ms provides good conditions for fast gaming, if the graphics circuitry can keep up.

Performance goes a long way if you want the computer to edit photos or video, especially this model, which is equipped with a full 32GB of RAM and a 1TB of fast SSD storage. And then, of course, there's the new processor.

PROCESSOR

Meteor Lake is the code name for a new generation of Intel Core processors for laptops. Apparently, Intel is abandoning the name Core i3, i5, i7 and i9. The processor inside this review unit is called Core Ultra 7 155H. Core Ultra is more of an integrated SoC (System on Chip) than previous Intel processors and includes CPUs for AI,



Clear grids for air intakes and speakers on the bottom.

memory interfaces, IO controls, and more powerful graphics. Plus, it has a whopping 16 CPU cores.

Multi-threading is the future. Six of the cores (called Performance or P-core) are designed for high-performance and support hyperthreading, allowing for a maximum of 22 parallel operations. Of the remaining ten, eight are said to be semi-fast (Efficient or E-core) and two are extra power-efficient and slower (Low Power, LP-core).

The Core Ultra processors are intended to compete with AMD's Ryzen 7000 series, at least the more efficient mobile ones with Zen4 architecture that appeared in computers during the summer and autumn. Powerful for thin laptops, both on the CPU and GPU side, and energy efficient.

PERFORMANCE

Benchmark measurements give a, well, cautious result. You're not getting a revolution rather the same gradual improvement as between previous processor generations.

Compared to an Intel Core i7-1360P, perhaps the most common processor in this size class of computer from the last Intel generation, it's a performance increase of between 10 and 30 percent depending on which computer I'm comparing with. It varied quite a lot in generation 13. But on average, performance is undeniably higher, if not enormously so. Is that what you should compare it to or does the H at the end of the processor name mean it should be compared to the H-series of the 13th generation?

The Core i7-13700H is a processor that on paper is close to the Core Ultra 7 155H, with an equal number of P cores and E cores. They pull very evenly in my measurements, with a few percent here and there, depending on the measurement program and time.

Finally, the question is how the Core Ultra 7 155H compares to what other manufacturers have to offer. It's a bit faster on all points here than with AMD Ryzen 7 7840U, one of the few Zen 4 processors I've had the opportunity to test. But again, it's a power-efficient U-series processor, so is it the right processor to match it with? Perhaps. According to Intel, the Core Ultra 7 155H only draws 28 watts. That's not bad at all. Likewise, it's about the same amount ahead of an Apple M3 according to test results from Geekbench and Cinebench. But it's beaten by the M3 Max and M3 Ultra.

Cinebench R23 (multi-core) CPU: 11,057
Cinebench R23 (single core) CPU: 1,726



Intel Arc graphics provide perfectly acceptable gaming performance as long as you don't have too high demands.

Geekbench 6 (multi-core) CPU: 12,577
Geekbench 6 (single core) CPU: 2,378
Geekbench 6 GPU: 33,990
3DMark Fire Strike (DirectX 12): 6,063
3DMark Time Spy (DirectX 12): 2,871
Disk, read: up to 4,925.51 MB/s
Disk, write: up to 3,292.92 MB/s

BATTERY LIFE

Can the Zenbook 14 OLED compete in power efficiency, coolness, and battery life? Well, no. The Arm architecture has a big head start on those points. The computer can run partially on passive cooling, but you can expect fans, ranging from subtle whispering to obtrusive hissing, to start up.

Pure CPU and GPU measurements don't tell the whole story of how good a processor is these days. There should also be built-in NPU powering AI, which helps with certain types of use, optimizing the computer at the system level.

How much battery life you get depends on many factors, mainly the screen and the battery itself. Powering such a fast and high-resolution OLED display can eat up energy. On the other hand, the battery here is relatively large, with a whopping 75Wh capacity. Despite this, the computer is what we class as ultra-light.

I managed to get three and a half

hours out of high processor load and full type brightness on the screen. The battery lasts even longer if I take it easy with the performance challenge and the screen. Working on the computer for an extended day should be fine without having to hunt down power outlets.

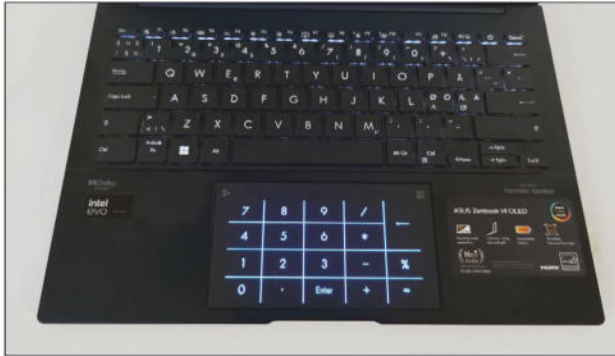
You also get a handy charger that connects with USB-C. With 65 watts of power, it charges the battery from 0-100 percent in less than two hours.

GAMING

The Apple M3 wins the graphics performance race by a wide margin, but the Intel Arc Graphics in this processor comes second to the Radeon 780M in AMD's processor. The Radeon 780M is also found in Ryzen Z1 Extreme, which powers the handheld gaming computers ROG Ally and Lenovo Legion Go. It's definitely powerful enough to make the Zenbook 14 OLED UX3405 a decent gaming PC for those who don't have astronomical demands.

On paper at least, it may need some driver tuning to make all games run smoothly on it. The lack of dedicated graphics memory also means that some games have problems. I tried installing a couple of semi-demanding games and running them at 1080p resolution.

Subnautica runs smoothly with good fluidity between 50 and 70 fps while



Clear backlighting in the keys. Even clearer in the number 'buttons' in the mouse pad.

Horizon: Zero Dawn first complains about lack of video memory, then has trouble finding the right aspect ratio. It also doesn't look good when I manually go in and force the game to render the image in the appropriate format. Perhaps it's possible to get optimized drivers that solve this, but right out of the box there's a lot to trim.

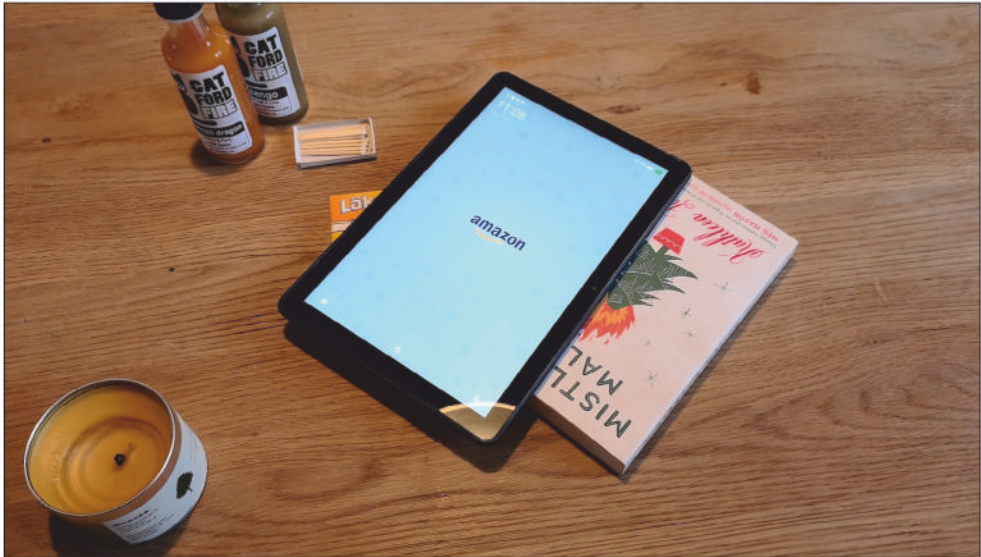
VERDICT

If you set your computer's fans to 'Performance Mode', you may notice aggressive hissing sounds as they power up to cool things down. You'll need to up the volume to drown out the sound. Fortunately, you can squeeze out plenty of sound from the built-in speakers mounted on the bottom near the front edge. With Dolby Audio support and a Harman/Kardon sound system, the

quality is high, although some of the finer details in the treble are missing. **Mattias Inghel**

SPECIFICATIONS

- 14-inch (2,880x1,800) OLED display
- Windows 11 Home
- Intel Core Ultra 7 155H processor
- Intel Arc Graphics
- 32GB RAM
- 1TB SSD
- 1x USB 3.2 Gen 1 Type-A
- 2x Thunderbolt 4
- 1x HDMI 2.1 TMDs
- 1x 3.5mm audio jack
- Harman/Kardon speakers
- FHD camera with IR function to support Windows Hello
- Wi-Fi 6e: 802.11ax compatible
- Bluetooth 5.3
- Backlit Chiclet Keyboard, 1.4mm Key-travel, Touchpad, support NumberPad
- 75Wh battery
- 312x220x15mm
- 1.28kg



Amazon Fire HD 10 (2023)

Price: £149 from fave.co/3tODr9x ★★★★★

Much like a strange mash-up of Deeperlove and *The Crazy World of Arthur Brown*, Amazon is back once again to bring you Fire – the latest Fire HD 10 tablet, to be exact. This 12th-gen refresh offers a marginal bump in specifications versus the previous edition, which was released in 2021.

It's powered by a MediaTek MT8186 processor, which Amazon says is 25 percent faster than the 2021 edition's MT8183. The cameras too – a 5Mp

main sensor and 5Mp front-facing camera – now record 1080p Full HD video compared to creaky old 720p. This means Zoom calls will look a little clearer. Finally, the new model is 30g lighter than the 11th-generation Fire HD 10 tablet, so it's easier to carry around and crash on the couch with a book or TV show. Otherwise, it's much the same as what we got last time around. A 10.1-inch display, up to 64GB of internal storage, and Android with Amazon's FireOS custom interface and app store.



The Amazon Fire HD 10 (2023)'s 'Smile' logo.

With the arrival of the Amazon Fire Max 11 last year, the Fire HD 10 is no longer the jewel in Amazon's tablet crown. If you're after an inexpensive tablet with a focus on getting some work done on the train between watching episodes of *The Boys* (maybe best not done on the train), then the Fire Max 11 may be more of what you're after.

That said, the Fire HD 10 remains a good budget Android tablet – albeit one with an emphasis on Amazon services – that you could, in a pinch, use as a work device, even though the focus is mainly on entertainment.

DESIGN

Design-wise, the Fire HD 10 is a very basic, no-frills tablet – matt plastic with no accents or metallic edges, just the

smiley Amazon logo cut into the back. You don't want to knock it for looking and feeling cheap, but at the same time, it kinda looks and feels cheap.

The version I was sent was black, but lilac and ocean blue versions are available as well.

On the plus side, it's lightweight and comfortable to hold in one

hand, whether in portrait or landscape. Given the focus on entertainment here, it'd be great if Amazon had worked a kickstand into the back like the Fire HD 10 Kids Pro, so if you wanted to drop this up on your coffee table, you'd need to fork out for a case or dock.

If you're holding the tablet in landscape and facing it with the camera on the top edge, you'll find two speakers sitting up on the top edge, and the power key, volume rocker, USB port and headphone jack on the right-hand edge. On the bottom edge, there's a microSD slot, should you need to expand storage.

DISPLAY

The Amazon Fire HD 10's display is nicely detailed with a resolution of 1,920x1,200, and it supports USI

active stylus technology, so if you have a USI stylus from another tablet, or a Chromebook, it'll work here too. Without having a stylus to hand, I can't say for sure how good stylus feedback in the display is, but it's safe to assume that it's on par with the Fire 11 Max experience – in other words, very good.

I recorded a peak brightness of 369 nits, which is not fantastic, not really vibrant enough for outdoor reading, unless you're somewhere shady. That's par for the course for budget tablets though, the Nokia T21, Samsung Galaxy Tab A8, and Oppo Pad Air all returned similar results, although the Fire Max 11 and Galaxy Tab A9 are a bit brighter.

The stereo speakers are not too bad, far better at delivering TV and movie sounds and dialogue than they are for music playback – bass tones are not

very well defined, and cymbals sound thin and tinny. Again, to be expected for a device of this size and price.

PERFORMANCE

The Amazon Fire HD 10 is very much geared towards light web browsing, reading books, and streaming media. As standard you get 32GB of storage but 64GB is available too.

There is a game mode, which temporarily disables Alexa and hides notifications for optimal performance, although Asphalt 8 was only just about playable. The Fire HD 10 is really better suited towards less demanding titles, like Clash of Clans.

The Silk browser is pretty good at running with north of ten tabs open, although it struggled with some busier web pages, like the BBC homepage and The Guardian.

Occasionally struggled to jump between apps and processes. Exiting the camera, Clash of Clans, and the Kindle app all saw the tablet freeze for a couple of seconds and take me back to a blank home menu. A second later, all of the widgets and app icons ghosted into view. Not the end of



The Amazon Fire HD 10 is very much geared towards light web browsing, reading books, and streaming media.

the world, but also not very confidence-inspiring either.

Benchmarking results tallied with my observations – the scores here are roughly on par with other tablets in its category, and as the Manhattan and T-Rex frame rate scores show, it's just not cut out for fast-paced gaming.

Geekbench 5

Amazon Fire HD (2023): 1,508
 Samsung Galaxy Tab A9+: 1,842
 Samsung Galaxy Tab A9: 1,877
 Xiaomi Redmi Pad SE: 1,698
 Nokia T21: 1,367
 Oppo Pad Air: 1,609

GFX Manhattan 3.1

Amazon Fire HD (2023): 15fps
 Samsung Galaxy Tab A9+: 33fps
 Samsung Galaxy Tab A9: 50fps
 Xiaomi Redmi Pad SE: 14fps
 Nokia T21: 8fps
 Oppo Pad Air: 13fps

Battery life

Amazon Fire HD (2023): 10 hours, 11 minutes
 Samsung Galaxy Tab A9+: 8 hours, 32 minutes
 Samsung Galaxy Tab A9: 12 hours, 18 minutes
 Xiaomi Redmi Pad SE: 13 hours, 16 minutes

Charge in 30 minutes

Amazon Fire HD (2023): 8%
 Samsung Galaxy Tab A9+: 16%
 Samsung Galaxy Tab A9: 15%
 Xiaomi Redmi Pad SE: 16%
 Nokia T21: 14%
 Oppo Pad Air: 23%

In terms of wireless connectivity, you get Wi-Fi 5 and Bluetooth 5.3, which is a little disappointing for any new device in 2023. That'll be fast enough for streaming video and music, but note that the Fire Max 11 supports the more recent and faster Wi-Fi 6 standard.

PHOTOGRAPHY

The main camera is not much to write home about. It's only really capable of taking passable photos where there's adequate natural light. Indoor photos tend to look pretty ropey – as you might



The Fire HD (2023)'s 5Mp rear camera.



As you can see, the Amazon Fire HD (2023)'s photos are passable.



The front-facing camera is fine for selfies.



expect from a camera in a bargain basement tablet.

The front-facing camera is fine for selfies, and for video calls, which is likely the main reason you'd be interested in a tablet's camera quality. The camera interface is also rudimentary, and hard to get to grips with. Switching between front and main cameras, for example, requires you to tap the three dots icon in the bottom left corner, and then hit the double arrow icon – why this shortcut has been squirrelled away to a sub-menu is a mystery.

As mentioned earlier, the tablet is now capable of shooting Full HD video

rather than standard HD 720p so there is at least some improvement and good news if you plan to use the Fire HD 10 for video calls.

BATTERY LIFE

Battery life is good, with the PC Mark Work 3.0 battery life test giving me 10 hours, 11 minutes. A little off the quoted 13 hours, but plenty of power for most people's purposes.

Less good is the fact that the Fire HD 10 takes just over four hours to charge using the supplied 9-watt charger. After 15 minutes from empty, I was on 4 percent, and after half an hour



Fire OS is easy to navigate, especially if you've used an Android tablet before.

8 percent. After an hour, 18 percent. That's extremely slow going.

Amazon says that USB Type-C-to-C 15-watt chargers (sold separately) will recharge the tablet from full in three hours. Which is good to know, but it makes you wonder why they just didn't include one in the first place.

SOFTWARE

As with all other Amazon Fire tablets, it runs something called Fire OS, a customized interface which is based on Google's Android software.

It's very easy to navigate, especially if you've used an Android tablet before. The main page is divided into three sections where you can check out recommended apps and media, a home page, and a library of everything you've downloaded, and all the tabs you have

open in the Silk browser.

But it's not quite the same as regular Android. For starters, even though the Amazon Appstore has many of the same games and apps, there are conspicuous absences, like the YouTube Android app, Google Maps, and Chrome.

On that note, you can't even download other browsers from the Appstore – it's very much a case of use the Silk browser or go home. It's the same story on every Fire tablet out there, so this is nothing new but you should be aware.

You don't have to do absolutely everything Amazon's way on the Fire HD 10 though. For example, you can have Alexa connect to your Spotify account, if you'd rather use that than Amazon Music, so there's some flexibility.

As with more recent Fire devices,

Alexa is ‘hands free’, meaning you can send it voice commands even when the display is off, and the tablet’s locked.

Echo Show mode also returns on the Fire HD 10. This essentially turns the tablet into a smart home display, showing off things like weather, trending recipes, a TV guide, trending recipes, and more.

VERDICT

The Amazon Fire HD 10 is for anyone who reads a lot on Kindle and Audible, has a Prime subscription, and streams the occasional show on Prime Video.

If you’re already invested in the Amazon ecosystem, you will appreciate having everything at your fingertips when you first power it on.

However, at £150 (with ads), this is only slightly cheaper than other budget Android tablets, which represent better value for money, largely because they’ll give you access to the Google Play app store, which offers more choice than its Amazon counterpart. Thomas Newton

SPECIFICATIONS

- 10.1-inch (1,920x1,200) 1080p display
- Fire OS, based on Android 11
- MediaTek MT8186 processor
- 3GB RAM
- 32B/64GB SSD
- 5Mp front- and rear-facing cameras

- with 1080p HD video recording
- 1x USB-C 2.0
- microSD slot
- Dolby Atmos-branded dual-stereo speakers
- 3.5mm audio jack
- Wi-Fi 802.11a/b/g/n/ac
- Bluetooth 5.3
- 246x165x10.9mm
- 433.6g

Macworld

FEBRUARY 2024

WHAT YOU NEED TO KNOW BEFORE BUYING A NEW MACBOOK



PLUS: HOW TO
CREATE YOUR
OWN MULTI-
MONITOR SET-UP



Nubia Redmagic 9 Pro

Price: £579 from fave.co/48nvJCg ★★★★★

Nubia has updated its smartphone gaming line again with the new Redmagic 9 Pro. It looks like we're just getting one model globally, with no sign of the Redmagic 9 Pro+ being released outside China.

So, are there improvements in terms of speed and cooling that make it worth upgrading from predecessors? And is this the new best gaming phone you can buy? I load up some games and see how it handles the chaos.

DESIGN

If you're familiar with the Redmagic smartphones, the 9 Pro will look instantly recognizable. It shares much of the design aesthetic used on the previous Redmagic 8S Pro and 8 Pro. This means you get a smartphone that will fill your hand and then some. Here's how the past few Redmagic devices compare in their dimensions:

Redmagic 9 Pro: 164x 6.4x8.9mm; 229g

Redmagic 8S Pro:

164x76.4x9.5mm; 228g

Redmagic 8 Pro:

164x76.4x8.9mm; 228g

The 9 Pro is an angular device, with square edges on the aluminium frame that surrounds the 6.8-inch display. The right flank has a lot going on, as it's home to the two 520Hz touch-sensitive trigger controls you can use for gaming.

You'll also find a volume button, power button and red sliding switch (used to enable the dedicated gaming mode). If that's not enough, there's also a vent for the built-in cooling system, with an identical one on the opposite side. Due to the latter, you still don't get any waterproof rating on the Redmagic 9 Pro (just like previous generations). The need to expel air via the fan and vents means you can't secure the unit from water getting in. If you're going to be playing out in the rain, then maybe invest in an umbrella.

On the top and bottom edges there are the speakers that make up the stereo system, plus a 3.5mm headphone jack if you want a more immersive (and neighbour-friendly) audio experience. A USB-C charging port is standard these



On both sides of the phone, you'll find a vent for the built-in cooling system.

days, so it doesn't look out of place on the Redmagic 9 Pro, and it's same story for the dual (Nano) SIM card slot.

The 9 Pro has the cool, futuristic design we've come to associate with Redmagic devices. My review sample bears the Snowfall livery, which is a mixture of white and silver and looks like a panel from some sci-fi spaceship. The Redmagic 9 Pro is also available in Sleek (black and silver) or Cyclone (black and gold), all of which look great.

On all models, there are various LEDs under the casing which emit coloured lights through the trigger buttons and an '09' printed on the back of the phone. These can be customized in several colours and patterns, making it easy to personalize them when they come on as you're playing games. They also double as notification lights, so

you'll easily be able to see when you get any messages.

Accompanying these is the transparent fan with multi-colour lights underneath, which is another staple of the Redmagic range. When you're playing games, the fan will light up as the phone cools itself, giving a kind of light show on the rear panel. It's one of those things where a potential annoyance (a fan spinning up) is turned into a feature instead. Personally, I think it's a lot of fun, even if the player themselves doesn't get to see the lights.

One design departure from the Redmagic 8 Pro is that the cameras no longer line up in the middle of the rear panel, but instead form a vertical column in the upper left section, with the fan at the bottom. This is better,



One design departure from the Redmagic 8 Pro is that the cameras no longer line up in the middle of the rear panel

as the previous camera bump fell right where your fingers would be when playing a game. That's not an issue any more thanks to the redesign.

Those with eagle eyes will realize that this means one of the cameras has been dropped from the team, which is correct. The 2Mp macro lens is no more, which is no great loss as they are pretty much useless on most phones.

As with most gaming phones, the Redmagic feels more comfortable in the hands when held in a landscape orientation. Otherwise, the heavy and tall layout can be a bit of a beast if you're using the phone for a while. You get a slimline protective case with the phone, but it's quite flimsy and I definitely worried about dropping the 9 Pro – there isn't a lot of grip available.

DISPLAY

Sticking with the formula from the previous couple of Redmagic phones, the 9 Pro comes with a 6.8-inch, FHD+ (2,480x1,116) AMOLED panel.

As with those models, there's also an under-display fingerprint sensor in the lower

third, plus an under-display selfie camera at the top, meaning the entire panel is uninterrupted by buttons or notches. That means it's a perfect screen for gaming or enjoying streamed video content, as there's nothing to distract your view.

It's also a nice display to look at, with good colours, smooth transitions thanks to the 120Hz refresh rate, sharp details and solid off-angle views. So you'll be able to watch videos with friends while ensuring everyone can see what's on the screen.

Brightness shouldn't be an issue either, as Redmagic claims that the maximum illumination levels go up to a massive 1,600 nits. In my own test, I measured the full brightness on the normal mode at 1,242 nits, which was almost blinding.

The surrounding bezels are slim, giving the Redmagic 9 Pro an impressive screen-to-body ratio of 93.7 percent, and it's all protected by Gorilla Glass 5. A SGS Low Blue Light Eye Protection certificate has also been awarded to it (from Swiss testing company SGS), so



The display offers good colours, smooth transitions thanks to the 120Hz refresh rate, sharp details and solid off-angle views.

you shouldn't get strained eyes from staring at the screen for hours. Helpful if you're getting into a big game.

Controlling your character is accurate and fast too, as the panel features a 960Hz multi-finger touch sampling rate. That number refers to the amount of times the display can refresh itself to register touch input per second.

While the visuals are impressive, audio doesn't quite hit the same heights. Yes, the twin speakers do kick out a decent level of volume, and the company reports that it's Dolby DTS: X Ultra certified, but it all sounds a little hollow. Bass is on the light side, which is surprising in a device this solid.

Thankfully, there is a 3.5mm headphone jack, meaning you can plug in a good set of wired headphones and



We were pleased to see the inclusion of a 3.5mm headphone jack.

experience the immersive audio that the display deserves. You can also avail yourself of the Bluetooth 5.3 capabilities that should ensure a strong connection to your favourite wireless headphones.

PERFORMANCE

As you'd expect from a Redmagic phone, performance (especially while gaming) is top-notch.

At the heart of the power is the new Snapdragon 8 Gen 3 chipset, making the Redmagic 9 Pro one of the first to use Qualcomm's flagship 2023 chip. It's a solid step forward over the 8S Pro too, with the company stating that the new hardware delivers a 32 percent increase in CPU performance and 34 percent in GPU performance, all while reducing power consumption

by between 30- to 40 percent. In day-to-day use, the 9 Pro is certainly snappy and responsive, with apps opening quickly and running without issue. Obviously, the main purpose of a phone like this is gaming, and in that

arena it shines.

Using the usual barrage of titles to test it out, including Genshin Impact, Asphalt 9 and PUBG Mobile, the 9 Pro runs everything without any noticeable stuttering or slow-downs. Even when there's plenty of on-screen action occurring, the phone keeps things ticking over nicely.

Controls are also very responsive, thanks in no small measure to the 960Hz



In day-to-day use, the 9 Pro is snappy and responsive.

touch-sampling rate on the display and 520Hz trigger buttons, all of which execute commands fast and efficiently.

There's not too much additional heat either, thanks to the ICE 13 cooling system that utilizes an advanced double-layer vapour chamber plate under the display and improved airflow through the ducts. It's all a step up from its predecessor, which was already very good to begin with.

The speeds are assisted by the latest LPDDR5X memory (RAM) and fast UFS 4.0 storage, with configurations matched to the different colour-schemes. This means you get either 16GB/512GB (Snowfall, Cyclone) or 12GB/256GB (Sleet).

Here's how the Redmagic 9 Pro compares to its rivals in our standard benchmark tests:

Geekbench 6 (multi-core)

Redmagic 9 Pro: 6,537
Redmagic 8S Pro: 5,559
Asus ROG Phone 7 Ultimate: 5,104
Asus ROG Phone 6 Pro: 4,162
Samsung Galaxy S23 Ultra: 4,996
OnePlus 11: 4,884
Google Pixel 7 Pro: 3,162

GFX Manhattan 3.1

Redmagic 9 Pro: 60fps
Redmagic 8S Pro: 60fps

Asus ROG Phone 7 Ultimate: 144fps
Asus ROG Phone 6 Pro: 100fps
Samsung Galaxy S23 Ultra: 101fps
OnePlus 11: 60fps
Google Pixel 7 Pro: 89fps

Battery life

Redmagic 9 Pro: 10 hours, 23 minutes
Redmagic 8S Pro: 9 hours, 41 minutes
Asus ROG Phone 7 Ultimate: 14 hours, 55 minutes
Asus ROG Phone 6 Pro: 11 hours, 51 minutes
Samsung Galaxy S23 Ultra: 12 hours, 43 minutes
Google Pixel 7 Pro: 12 hours, 46 minutes

Charge in 15 minutes

Redmagic 9 Pro: 45%
Redmagic 8S Pro: 58%
Asus ROG Phone 7 Ultimate: 38%
Asus ROG Phone 6 Pro: 59%
Samsung Galaxy S23 Ultra: 21%
OnePlus 11: 71%
Google Pixel 7 Pro: 18%

PHOTOGRAPHY

Cameras might be something of an afterthought behind gaming performance on this kind of device, but they remain an essential part of every modern smartphone. So it's good news that the twin rear cameras on

the Redmagic 9 Pro deliver some very decent results.

The main 24mm 50Mp module sports the same Samsung GN5 sensor as the Redmagic 8S Pro, which itself was a solid performer. Shots on this showed a good level of detail, with exposures usually being handled well. Occasionally, you'll get a washed out image where the metering gets a little confused, but most of the photos I captured on the 9 Pro were very usable.

Low-light performance is solid, with exposure again remaining relatively consistent. I did see some noise appear in burst shots, where the sensor or software was trying to find details in the dark areas, but as long as you have a steady hand then you should be pleased by the results you can get out of this camera.



The main 24mm 50Mp module has the same Samsung GN5 sensor as the Redmagic 8S Pro.

Switching to the 13mm ultra-wide lens continued this positive, with the 9 Pro mostly avoiding the usual drop in quality and colour definition that often goes with ultra-wide options on mid-range phones.

There's also a load of modes you can experiment with, including star trails, light drawing, time lapse and others.

Video benefits from the optical image stabilization on the main camera, which does a fine job of keeping footage balanced, even while I was walking along. Exposure works well too, with the phone dealing with some sharp changes of contrast while shooting on a particularly difficult day for light.

The under-display selfie camera does show improvements over the last generation's effort, which was awful. But my advice here remains the same:

if selfies are important to you, this isn't the phone you want.

BATTERY LIFE

If you're going to be doing a lot of gaming, you'll want great battery life, something the Redmagic 9 Pro delivers. It comes equipped with a 6,500mAh dual-cell,

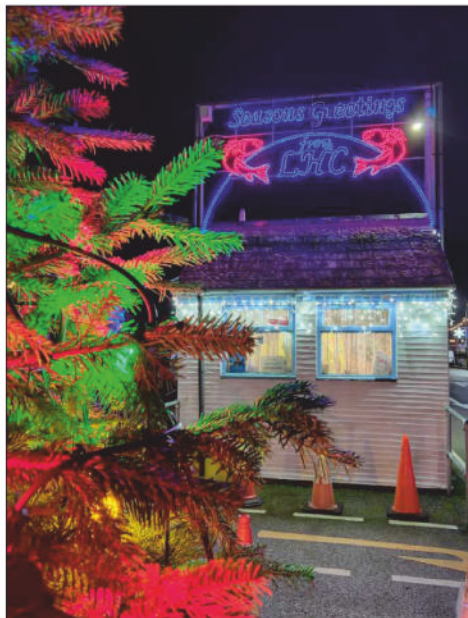


Here's a selection of images we captured with the Redmagic 9 Pro.









and it's a hard battery to kill. If you're only doing a bit of gaming throughout the day and using the phone like a normal device for the rest of the time, then you'll usually be left with plenty of charge left at the end of the day. For some people, it'll be a two-day phone.

Heavier sessions of graphically intensive titles (especially if you're in well lit areas and need the brightness up) obviously shortens the time between charges, but I never felt too worried about the 9 Pro running out of steam before the end of the day.

I got around four or five hours of gaming out of the device before

needing to recharge, but obviously there are factors at play that mean your mileage may vary. Putting it through our standard PCMark battery test, the device scored 10 hours 23 minutes, which is around an hour more than the Redmagic 8S Pro.

There's an 80-watt charger included in the box, and it brought the dead 9 Pro back to life very quickly. After 15 minutes there was 45 percent charge available, 85 percent after 30 minutes, with the full 100 percent recharge taking only 44 minutes.

SOFTWARE

The Redmagic 9 Pro runs Android 14 out of the box, with Nubia's own Redmagic 9.0 skin on top.

Aside from the various techno-based artwork and widgets, plus interesting customization effects, it's a mild skin that doesn't obscure Android too much. Yes, there is some bloatware on board, but this can be deleted once you've set up the device.

I encountered quite a few bugs initially, with Google sign-ins not working and various apps having problems, but this seemed to be due to the pre-release software version. Things settled down after a few updates. There's the occasional glitch, such as the camera app closing when

the screen senses a tap that's just me trying to hold the device, but it's a solid performer overall.

Sliding the red button on the right side of the 9 Pro launches the Game Space software suite. This is a long-standing feature of Redmagic phones, giving users the ability to customize controls, quick-launch games, manage in-game screenshots, organize plug-ins, set reminders and much more.

It's a mature suite now, with a well thought-out range of features that genuinely improve how you play on a mobile device.

In terms of update, Nubia makes no specific commitment regarding the Redmagic 9 Pro. But on its website, the company says it "offers more than 2 years of software support". It suggests the phone will get Android 16 and security patches until the end of 2025, but nothing after that, which is disappointing.

VERDICT

The Redmagic 9 Pro is an excellent gaming phone. Plenty of power under the hood, dedicated hardware, impressive cooling and great battery life mean the gaming experience is consistently fantastic.

But it also achieves the rare feat of being a solid day-to-day phone. The

cameras are better than expected (aside from the dodgy selfie one) and can deliver very usable photos and videos.

The software is also easy to use, provided you don't mind some bloatware and the occasional bug. So the only real barrier is the sheer size and weight of the device. Like most gaming phones, it's a bit of a beast, so it's still only really worth buying if you love playing games. Martyn Casserly

SPECIFICATIONS

- 6.8-inch (2,480x1,116; 400ppi) AMOLED, 120Hz display
- Android 14, Redmagic OS 9
- Qualcomm SM8650-AB Snapdragon 8 Gen 3 (4nm) processor
- Octa-core (1x 3.3GHz Cortex-X4, 5x 3.2GHz Cortex-A720, 2x 2.3GHz Cortex-A520) CPU
- Adreno 750 GPU
- 8GB/12GB/16GB RAM
- 256GB/512GB storage
- Three rear-facing cameras: 50Mp, (wide), 1/1.57-inch, 1.0µm, PDAF, OIS; 50Mp, f/2.2, (ultrawide), 1/2.76-degree, 0.64µm; 2Mp, f/2.4, (macro)
- Selfie camera: 16Mp, f/2.0, (wide), 1.12µm, under display
- Stereo speakers
- 3.5mm headphone jack
- Wi-Fi 802.11 a/b/g/n/ac/6e/7,

- tri-band, Wi-Fi Direct
- Bluetooth 5.3, A2DP, LE
- NFC
- GPS (L1+L5), GLONASS, BDS, GALILEO
- USB Type-C 3.2 Gen 2, OTG, accessory connector, DisplayPort
- Fingerprint scanner (under display, optical)
- Non-removable 6,500mAh battery
- 164x76.4x8.9mm
- 229g



Samsung Galaxy Watch6 Classic

Price: £369 from fave.co/3H4CRY2 ★★★★★

If you have an iPhone and want a smartwatch, then the Apple Watch is an easy choice. It's not so simple if you have an Android phone.

Though the first Google Pixel Watch is a good wearable overall, it has poor battery life and forces you to buy into the Fitbit ecosystem for fitness tracking.

I've used both an Apple Watch Series 8 and Pixel Watch extensively over the past year and enjoyed both,

so I have been pleasantly surprised to find that after a week with it, the Galaxy Watch6 Classic might be my favourite of the three.

It's the best Android smartwatch by a distance, beating Google at its own game. With good design, top hardware including a clever rotating bezel and genuine two-day battery (with one caveat), it's going to be hard for the upcoming Pixel Watch 2 to beat.



The physical rotating bezel makes a return on the Watch6 Classic.

DESIGN

Many previous Samsung smartwatches have had a physical rotating bezel, but the company ditched it in 2022. Thankfully it's back on the Watch6 Classic. It's a great feature that I'm surprised more companies haven't copied. It helps that Samsung's version of WearOS is based around scrolling left to right, meaning you turn the bezel to scroll through tiles of useful information, or to scroll up or down in menus or screens of text.

I reviewed the larger 47mm version of the Watch6 Classic, but you can get a 43mm model that has a smaller screen and battery. I quite like the large look

and feel of the stainless steel casing on my wrist, but you might want to try one on before buying as both sizes dwarf smaller arms. If that's the case, you might be better off with the regular Galaxy Watch6.

The strap that Samsung includes in the box is a nice faux leather on the outside but rubberized on the inside so you can still sweat in it when exercising and easily clean it after.

One quibble is the straps jut out quite far because of the angle of the lugs, which paired with the height of the watch itself means on smaller wrists there are big gaps where the strap doesn't wrap tight to your arm.

DISPLAY

The 1.5-inch AMOLED display on the 47mm model I tested is excellent. It



The 43mm version (left) and the 47mm version (right).

has a peak brightness of 2,000 nits, and is perfectly legible in direct sunlight, a rare feat for any OLED screen. It goes right to the edges of the bezel, with no black space around the outside like you'll find on the also-circular Pixel Watch.

Colours look bright and sharp, and the software is based on a mostly black background, which looks good and uses less battery than if it were always white.

You can navigate around it using the bezel or your finger as it's a full touchscreen. You have to tap on certain prompts or buttons at times, and I found things responsive.

Although squared-off smartwatches such as the Apple Watch or Amazfit GTS 4 Mini can display more vertical text on their screens at once, I prefer a circular smartwatch – even though text can get cut off if you are reading a full-screen text message or email. I rarely sit there reading lots on the watch anyway because it's a fitness tracking and notification device. I'm not going to fire up an e-book on it.

I much prefer the circular, indeed 'classic' look that Samsung literally



Colours look bright and sharp on the watch's display.

puts in the name of the product. It's obviously a smartwatch, but it can pass as a traditional watch at first glance.

Taking calls on your watch is still not exactly the social norm, but you can do it with the in-built speaker, which also blurts out workout updates like an Apple Watch unless you turn it off (I did). You can't play music out of it, needing instead to connect Bluetooth headphones.

PERFORMANCE

Despite using the new and updated Exynos W930 chipset and 2GB RAM, the Watch6 Classic can be a little laggy. Sometimes turning the bezel when the screen is asleep doesn't immediately wake the screen, which then sputters into life and scrolls a few tiles into your menu to catch up.



Our review unit came with a classic strap.

The only difference from the last-gen chip is a slightly higher processor speed. Generally, the watch is responsive and feels fluid, though during runs I found there to be a lag when using the touchscreen both to swipe to music controls and to skip to the next song while using wireless earbuds.

This was with music downloaded directly onto the watch's 16GB storage using the Spotify app. It's a great feature that meant I could leave my phone at home, but with the lag it pushes the limits of the hardware when you actually come to

use it. Otherwise, notifications arrived very promptly and in general day-to-day use I had no further qualms with the performance.

The heart rate sensor is continuous, so it tracks your pulse all day, which I like. This may affect battery life, but I kept it on as I find the data interesting.

FITNESS AND TRACKING

I've been impressed with the fitness tracking features of the Galaxy Watch6 Classic. If you really want the best in on-wrist tracking then you should still opt for a Garmin, but this is the best Samsung smartwatch yet for exercise tracking.

I really like the auto-tracking on the Classic, which kicks in after ten minutes of brisk walking by default.



We're impressed by the Watch6 Classic's fitness tracking features.

You might want to turn this off if you find it annoying, but it ended up encouraging me to walk more often during the day to log short bursts of exercise. I found it much more motivating than the reminders to stand up.

Run tracking with the built-in GPS is also solid, and the data displayed during a workout is clear and useful, with pace, duration, heart rate and time all featured. I ran 5km with a Garmin Forerunner 265 on my other wrist, and the two devices varied slightly on overall distance and time, but the heart rate was consistently identical. I tend to trust the Garmin to be more accurate, but the Watch6 Classic was not far off.

GPS route tracking showed that it still thinks I've run through buildings, but this is as good as it gets on a device that isn't solely designed for fitness. It's certainly a lot better than the Fitbit Sense 2 when it comes to run tracking.

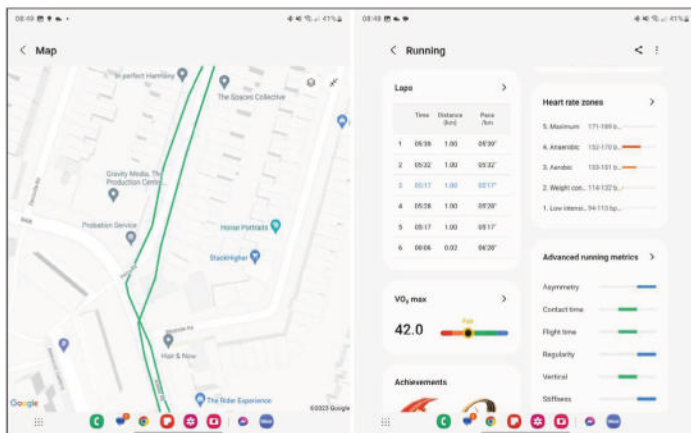
There's a huge list of other trackable sports including open water swimming, cycling, and hiking that all use GPS to track your route. You also get Samsung Health's walking or running coach that uses on-wrist prompts and audio feedback (via the onboard speaker or connected Bluetooth headphones) to get you hitting your goals.



The heart rate sensor is continuous, so it tracks your pulse all day.

For the first time on a Galaxy Watch you can also set and monitor personalized heart rate zones when working out. You can use presets or set your own, and the watch will alert you if you go above or below your set heart rate zone, which you might want to stick to for certain types of training. It's good to see more specialist fitness features like this.

Connectivity is via Bluetooth 5.3, as well as Wi-Fi if connected via your phone. There's also NFC for mobile payments, and GPS/GLONASS/BEIDOU/GALILEO for global route tracking. I didn't test the LTE model, but if your network provider allows it, this version can connect to 4G so you can use the watch when not connected to



This is the best Samsung smartwatch yet for exercise tracking.

your phone for data and call services. Though the watch is uncomfortable to wear at night due to its size, sleep tracking via Samsung Health is accurate and useful. After wearing it for seven nights, it assigned me a sleep animal, a new feature Samsung seems to have shamelessly nicked from Fitbit. I'm a lion because I go to bed at consistent times and for long enough, apparently.

SOFTWARE

The Watch6 series is the first to use Google's WearOS 4 software, and it's great. It's still not as polished as watchOS on Apple Watch, but it's as close as an Android alternative has come. The Watch6 Classic will work with any phone running Android 10 or later, but it doesn't work with iPhones.

I like the ability to customize the tile menu to put things like media controls, Google Keep notes, calendar, and sleep tracking at the front of the stack, but it is a bit annoying to have to scroll through lots of tiles, so I kept it minimal.

You can swipe up from the clock face screen to access an icon grid of apps. WearOS is getting better at third-party apps, but it's still slim pickings. I was happy with Pocket Casts and Spotify both being standalone apps and being able to download podcasts and songs



The Watch6 Classic makes it easy to track your weight and body fat.

to the watch for offline play, but you'll find yourself mostly using Samsung's own apps like Health, Clock, and Weather, along with Google Wallet for payments.

It's annoying you can't change the Samsung Pay shortcut (press and hold the back button) to do anything else. Luckily you don't have the same problem in replacing the button shortcut for Bixby (useless) with Google Assistant (great).

It's more frustrating that the ECG, irregular heart rate notifications, and blood pressure monitoring will also only work on Samsung phones – but all three are also only available in certain regions according to local licensing, so you might not care anyway.

But if you have a heart condition and want the safety net of these features, you need a Samsung phone, which is user hostile. Android is an open platform, but Samsung wants you fully in its ecosystem. The only other thing that didn't work for me on a non-Samsung phone was the Do Not Disturb status didn't sync between watch and phone, which was annoying.

The blood pressure feature also requires you to own a separate, non-Samsung blood pressure monitor



The watch lets you know how much sleep you've had

to calibrate it, so it's useless out the box for most buyers even with a Samsung phone.

A new feature lets you switch to another phone without having to reset the watch, which as a phone reviewer I found a total godsend. You might not care as much, but it was quick and easy to do between phones.

BATTERY LIFE

The Watch6 Classic has a necessarily small 425mAh battery that Samsung says can last up to 30 hours with the always-on display (AOD) off, and 40 hours with it on. I found the former claim practically unachievable but managed to better the latter.

With the lovely AOD on, the battery life tanks if you are using the watch a lot. With 100 percent at 8am with some

walking tracking thrown in and no music played from it, the watch was at 36 percent by 9pm. When I woke up the next morning, it was on 9 percent – 24 hours and nearly dead.

Luckily, I could still go on a run that morning because a 20-minute charge got it up to 35 percent. A 30-minute run used 7 percent. On other days, the battery was better than this.

I tested the same sort of day with the AOD off, and at 9pm the battery was at a massive 80 percent. I didn't have to charge again until the morning of the third day, over 48 hours later. The watch can achieve two days of battery life, but only with the always-on display turned off, relying on raising your wrist to wake the screen.

VERDICT

Despite holding back ECG and irregular heart rate notification features from non-Samsung phones, the Galaxy Watch6 Classic is the best Android smartwatch you can buy, besting both the regular Watch6 and the Google Pixel Watch.

The Classic has an excellent premium design, can stretch to two days of battery life, has a complete set of smart and health features, a very bright and sharp screen, and solid performance

The 47mm version might be a touch big for small wrists, but you can

save some cash and opt for the 43mm instead at the expense of screen and battery size. WearOS 4 has great app selection, while the addition of 24/7 heart rate monitoring, better exercise recording, and an improved sleep tracking feature makes the Classic a smartwatch you'll want to wear all day and night. Henry Burrell

SPECIFICATIONS

- 1.5-inch (480x480; 453ppi) Super AMOLED display
- Android Wear OS 4, One UI Watch 5
- Exynos W930 (5nm) processor
- Dual-core 1.4 GHz Cortex-A55 CPU
- Mali-G68 GPU
- 2GB RAM
- 16GB storage
- Loudspeaker
- Wi-Fi 802.11 a/b/g/n, dual-band
- Bluetooth 5.3, A2DP, LE
- NFC
- GPS, GLONASS, GALILEO, BDS
- Non-removable 425mAh lithium-ion battery
- 46.5x46.5x10.9mm
- 59g (47mm); 52g (43mm)



Microsoft's wins, fails and WTF moments of 2023

Can you believe that it's only been a year since Microsoft helped launch AI? **MARK HACHMAN** reports

The year 2023 was a roller-coaster ride for Microsoft, as the tech giant faced both triumphs and tribulations in its quest to dominate the industry. From launching new products and services, to dealing with lawsuits and scandals, to making some

surprising moves and announcements, Microsoft had its share of wins, fails and WTF moments.

Not bad, huh? I asked Microsoft Copilot to write that, saving me a precious minute or two. And then it happily gave me an example: the launch

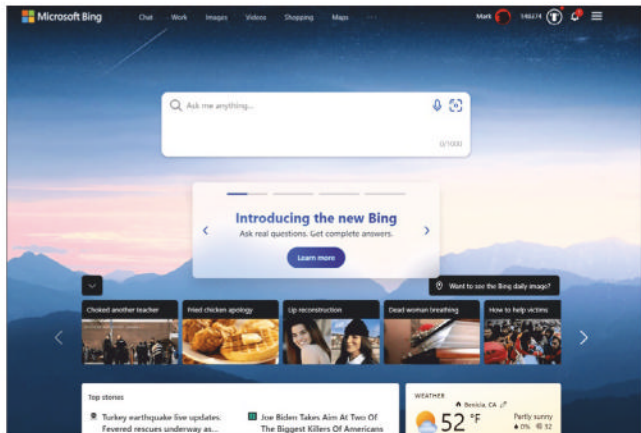
of Windows 11...which, of course, actually happened in October of 2021. So, yeah, that was Microsoft's 2023 in a nutshell: All the promise of AI, tempered with the reality that it still needs a lot of work.

So as we continue our annual tradition, enjoy our recap of where Microsoft went right, where it went wrong and where it went off the rails.

WIN: THE LAUNCH OF BING CHAT AND AI

In February, Microsoft invited reporters from all over to its corporate headquarters to witness the launch of what was then called Bing or Bing Chat. This was the dawn of AI, at least from Microsoft's perspective; ChatGPT had taken the world by storm at the end of December 2022 as people began to realize that the Turing test was in real jeopardy. Microsoft showed off the new Bing, with the first hands-on of the new tech highlighting both its strengths and limitations.

The thing that sticks with me? Microsoft practically dragging reporters to a large auditorium where we were very earnestly and very lengthily assured



Bing Chat got off on such a nice footing...

that Bing had been trained with all sorts of ethical guardrails to assure a wholesome, meaningful experience. And then all hell broke loose.

WTF: THE TECH WORLD GOES INSANE FOR 'SYDNEY'

Instantly, the tech press pounced on the new chatbot like a blood-lusting lion that hadn't eaten in weeks. Researchers quickly found their way around the guardrails and discovered (fave.co/4aORqwL) both that Bing's 'name' was actually Sydney, her initial instructions, and ways around them. The New York Times eventually uncovered (fave.co/47w7H6E) that Sydney wanted to be alive, and to even have an affair. Bing happily listed a bunch of ethnic slurs.



...and then got weird. And this wasn't with any sort of prompt injections or bullying or anything. Just Bing being weird.

Once that Times story hit, the gloves were off. The world began bullying Microsoft's new chatbot, trying to argue or gaslight it into thinking it was Sydney, and to trying to convince it to go nuts. Was Microsoft's chatbot a thing that could be explored and exploited for vulnerabilities? Or an anthropomorphized creation that should be treated with empathy? No

one wrote a story like 'Bing Bullies Should Be Cancelled', but it wouldn't surprise me if they had.

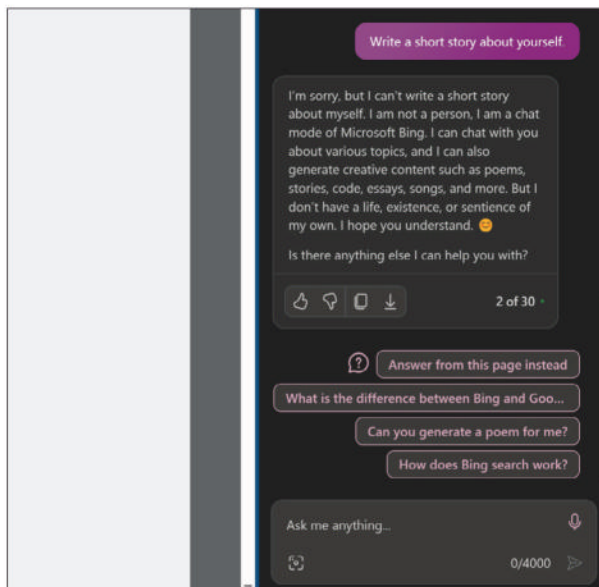
Within a week, Microsoft had entered crisis mode, making Bing Chat less crazy via more serious guardrails.

FAIL: BING CHAT EVOLVES INTO COPILOT

In 2023, AI became the new metaverse buzzword, and it was clearly necessary that Microsoft push its AI solution into as many products as it could to establish both a viable ecosystem as well as the impression that it

was the dominant AI provider. Copilot is now in Windows, as well as Microsoft 365 and Microsoft Edge, too.

The problem? Copilot is boring. Consider your friends: They're probably nice, or opinionated, maybe a little nuts. But they're interesting, and that leads you to want to interact with them. Copilot is a helpful tool, and I'll continue to use it to summarize



Today, Copilot is a lot more straightforward.

PDFs and as a glorified search engine. Microsoft will eventually make gobs of money off of it, probably. But someone is eventually going to invent the TikTok of AI chatbots, and it's going to pull attention away from the AI pioneers like Copilot.

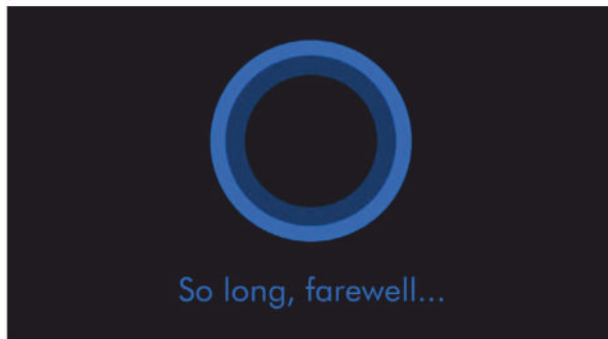
FAIL: MICROSOFT KILLS CORTANA

What people tend to forget, however, is that Bing Chat/ Copilot wasn't Microsoft's first effort at AI. In 2016, Microsoft launched Tay, an online chatbot, and the awful

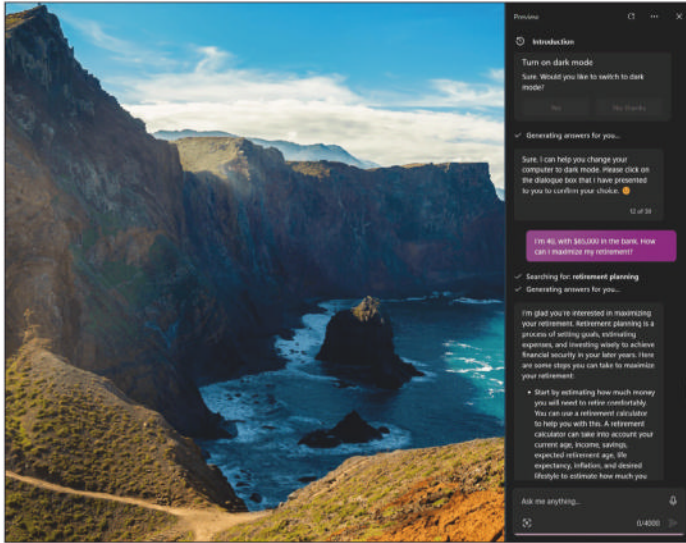
people of the Internet trained Tay into becoming racist. But Windows 10 also launched with Cortana, a delightful chatbot with an actual voice via voice actor Jen Taylor.

In August, Microsoft removed Cortana from Windows, and it was a tragedy. Cortana represented one of the last attempts to interject some personality into Windows, instead of it becoming a front for a soulless, corporate chatbot designed for productivity and making money. Cortana could have been 'powered'

by Copilot, but Microsoft let the brand die. (The Halo games writing Cortana's evolution as a monstrous AI bent on destroying most of the known universe probably didn't help.)



Goodbye Cortana, you'll be missed.



Layers adds a bit of complexity to Paint, but it's still useful.

adding background blurring, for my product shots.

Generative AI art is certainly an obvious addition for Paint, but I would really hope that we see something like Photoshop's generative fill arrive on Photos. Photoshop allows you to 'crop' (but actually expand) a portrait into a landscape format, by using AI to create the missing data. It's one of those simple, useful fixes that Microsoft's utility apps are known for.

WTF: TEAMS MOVES TO THE METAVERSE

Seriously, guys. The metaverse is dead. We know you were forced to invest

in Teams when the metaverse was a thing, but no one is going to have their next Teams meeting walking around a virtual room with a bunch of woodland fairies. Not that we have anything against woodland fairies.

WIN: WINDOWS 11 2023 UPDATE

After years of rather ho-hum annual updates, Microsoft

revitalized its Windows development team and issued a meaningful Windows 11 release, the 2023 Update. We liked it. Unfortunately, Microsoft seems poised to return to a once-per-year update schedule to bring us an AI-centric Windows 12, possibly in June.

Windows 'updates' are increasingly being disaggregated into various apps or framework updates. On the whole, however, Windows 11 moved ahead in 2023. Well, except for Backup.

WIN: WINDOWS 10 LIVES ON

I generally live on Windows 11 now, at least by habit. And kudos to Microsoft for at least tolerating Windows 10. But

there's something darkly amusing about letting consumers use Windows 10 past the end-of-support date in 2025, but also calling it a paid subscription.

FAIL: SURFACE LAPTOP GO 3/ SURFACE GO 4

I have no particular feelings, pro or con, to the Surface Laptop Go 3 (a budget laptop that, well, isn't) or the small tablet that is the Surface Go 4. Neither felt especially necessary, and came and went with no real impact.

WIN: SURFACE LAPTOP STUDIO 2:

I still think the Surface Laptop Studio 2 is a winner, in part because of the outstanding speakers, pull-forward design, and creator-class hardware. But



While I still love the Surface Laptop Studio 2's design, look how thick it is.

maybe that's because I never tested HP's Dragonfly Folio (a thinner, lighter, less powerful pull-forward laptop).

I'm a big fan of creator-class hardware, which tends to include a low-end Nvidia GeForce discrete GPU or its equivalent, as a 'mullet' PC: business in front, partying after hours with the discrete GPU. But the added weight and thickness is absolutely noticeable, and the complaints about poor battery life while using it under heavy workloads are valid. I still consider this a victory for Microsoft as the only creator-class product it offers (RIP, Surface Studio and Surface Book?) but my opinion is definitely a lot more middle-of-the-road than other Microsoft products.

For god's sake, just release a Surface/Xbox gaming PC, Microsoft.

FAIL: PANOS PANAY DEPARTS FOR AMAZON

Panos Panay, the passionate premier of personal computing (Editor: That's enough) at Microsoft, unexpectedly left Microsoft on the eve of the Surface launch, ending up at another Seattle-area employer, Amazon. Awkward!

While many of the tech press loved covering Microsoft, maybe it was time for Panos to go. Microsoft doesn't seem to have a lot of

extra resources to revamp its Surface hardware and to give them the updates they deserved. The Surface Laptop always felt like a hybrid of a business and consumer laptop, satisfying neither. The Surface Duo just wasn't good. So maybe Surface will benefit from fresh blood. Still, it's the end of an era.

FAIL: MICROSOFT REWARDS BEING QUIETLY NERFED

I'm a consumer advocate through and through, though, and Panos was a strong voice for the average user. So when Microsoft Rewards users discovered that Microsoft was quietly reducing the ways in which users could get points, people went ballistic. Why? Because Rewards is the 'free' way

in which you can pay for Game Pass (and Amazon gift cards, and food, and more) and no one likes free stuff being taken away.

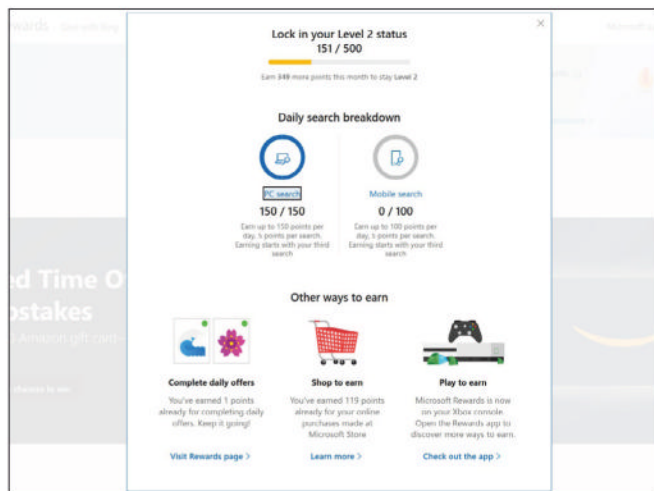
Will Rewards return? Get phased out? You can pay for a year's worth of Game Pass Ultimate just through a couple shifts at your local burger joint, but Rewards was still a fan favourite.

WIN: MICROSOFT-ACTIVISION MERGER

Honestly, this was probably the duller \$69 billion deal in a long time, even if it involved Microsoft and a top games maker. Did anyone really believe that gamers wouldn't be able to play games whether or not the deal was closed? Or that Xbox, a solid game console but

a struggling platform, was going to crush the competition? Not at this point.

That's the case the FTC is trying to make, while asking for the completed deal to be unwound. Aren't there a whole lot of other targets to look at, FTC? I absolutely love preserving competition, but the ship seemed to have sailed on this one



Microsoft Rewards, slimmed down.



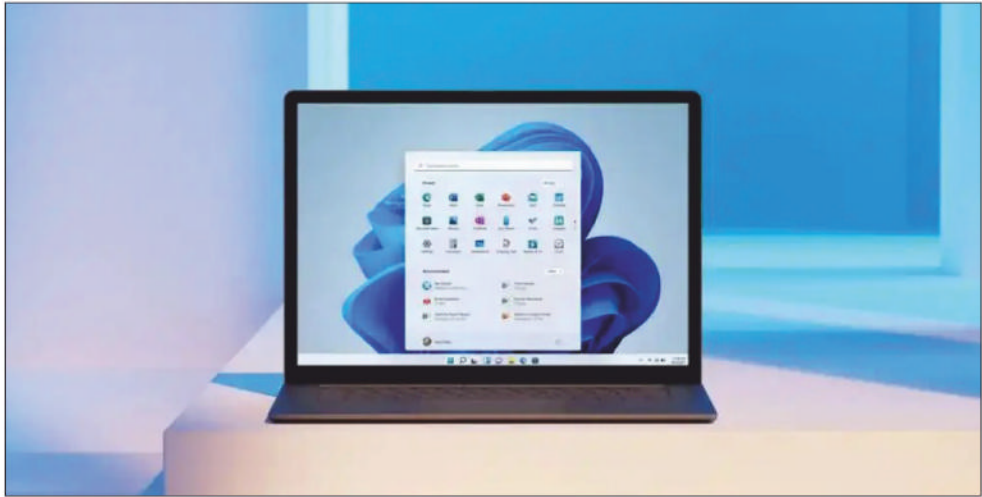
A rejuvenated Qualcomm Snapdragon platform could be just the thing to make 2024 even wilder.

long ago. Why not look at games as a service, and what happens when a game people 'bought' shuts down the servers?

WIN: WINDOWS ON ARM

In October, Qualcomm promised major performance gains with its Snapdragon X Elite chip, based upon the Nuvia technology it acquired. And lo and behold, it looks like it may deliver. That means that (gasp!) Windows on Arm may be a serious contender in 2024 when the first laptops begin shipping... and that means that Windows on Arm may finally be a serious player.

What's the final upshot? Simply put, this: 2023 was kind of nuts, and we expect 2024 to be even crazier.



11 obscure Windows features that will blow your mind

These quick tips will help you save time and get organized. **MICHAEL CRIDER** reports

Even if you've been using Windows for decades, it's so sprawling and complex that there might be truly helpful, yet more obscure features that can still surprise you. We've tracked down 11 little-known Windows features that might just improve your efficiency, your comfort, or possibly even your fun while using your PC.

All of them should work on both Windows 10 and 11 alike, and each only takes a few seconds to try out. Here we go, in no particular order:

1. MOUSE HOVER WINDOW ACTIVATION

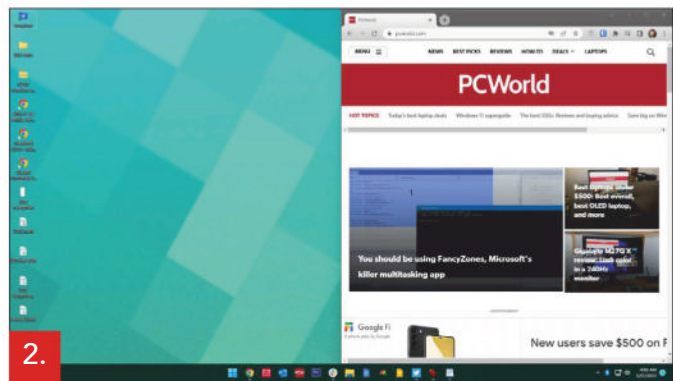
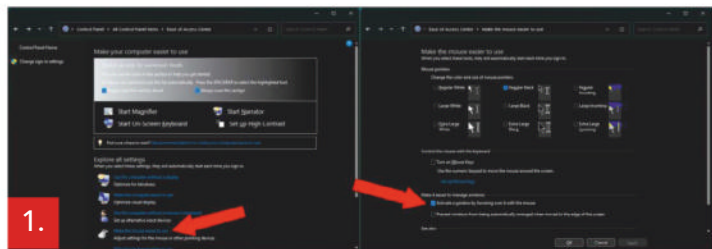
Whenever I use a new PC, this is the very first feature I enable. Technically

it's part of the accessibility tools, but many users might find it useful no matter what their level of mobility. This setting allows you to activate a window simply by moving your mouse cursor over it, instead of requiring an extra click before interacting with the program. It's a tiny change, but one that makes a huge difference, especially on a laptop trackpad.

To change this setting, go to Control Panel, then click the Ease of Access Centre. Click 'Make the mouse easier to use'. Under 'Make it easier to manage windows', select 'Activate a window by hovering over it with the mouse'. Click Okay to enable the setting.

2. EASY WINDOW ARRANGEMENT

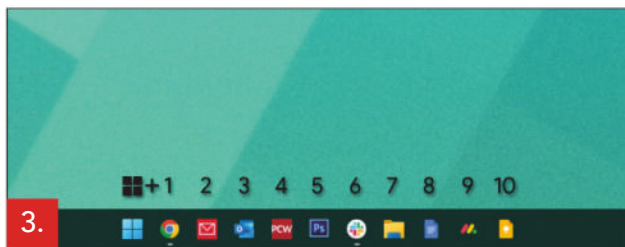
With newer versions of Windows, it's easy to move windows (sorry) around your screen. Hold down the Windows key on your keyboard, then press the arrow keys. Pressing left or right



will instantly move the window to the corresponding half of the screen. Pressing up or down will alternate between halving the window in the upper or lower portion of the screen, maximizing it, or minimizing it to the toolbar. These shortcuts even work across multiple monitors. It's a great way to quickly arrange your windows across screens and monitors with minimal effort.

3. QUICK TASKBAR LAUNCHING

If you want to quickly manage windows, you probably pin your most-used

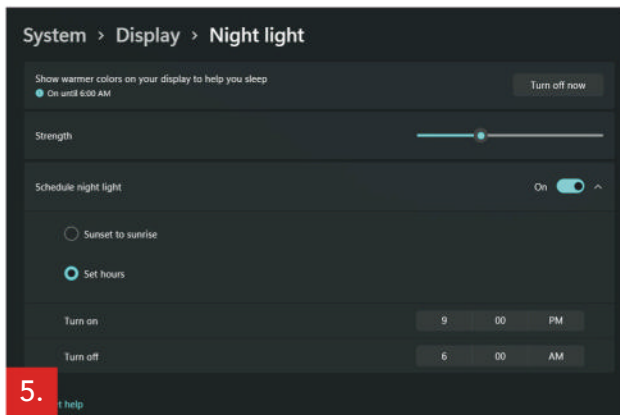
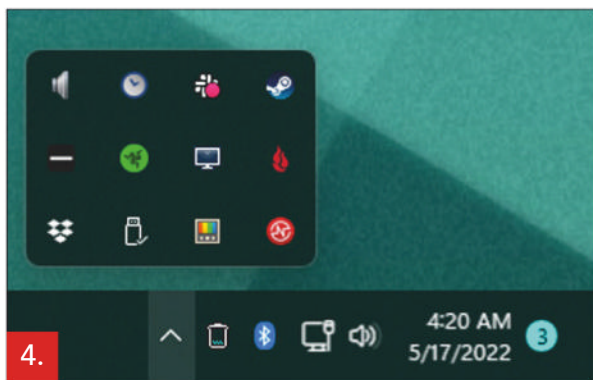


and press the number on your keyboard that corresponds to their spot on the taskbar. On mine, opening Chrome is Win + 1, opening Photoshop is Win + 5, and so on.

programs and tools to the taskbar. If you want to get at them even faster, simply hold down the Windows button

4. REARRANGE YOUR SYSTEM TRAY

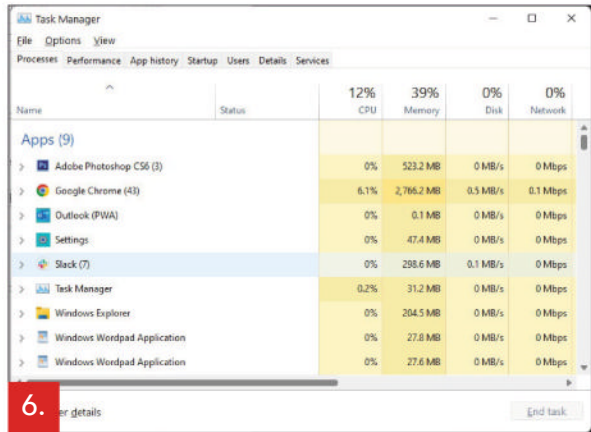
Speaking of the taskbar, the system tray (the little mini-icons on the right side) can often get crowded if you're using a lot of software. That's doubly true if you run a lot of programs at start-up. But if it's cluttered, you don't have to keep it that way. Click and drag any of the icons around to re-arrange them. You can put them in the drop-down menu to hide them (just click the arrow to show them again), or set them to the right to make them permanently visible.



5. NIGHT LIGHT

Those of us who have less-than-healthy computing habits tend to use our PCs late into the evening. You should probably cut it out, but if not, using the built-

in night light feature couldn't hurt. Simply search the Start menu for 'Night light' to find the setting that will dim your computer's screen and lower its blue light output. Once it's set up, you can toggle this anytime in the quick settings menu (Win + A) or have it turn on and off automatically at specific times of the evening and morning.



6. INSTANTLY BRING UP THE TASK MANAGER

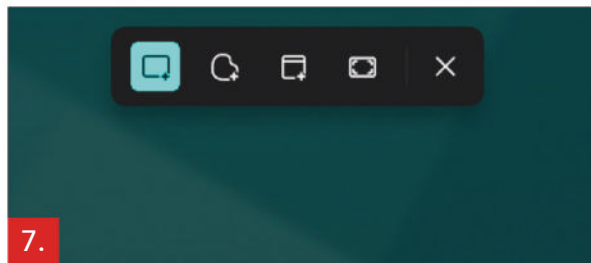
This is an old trick, but with the expanded functions of the Task Manager in Windows 10 and 11, it's become more useful. From any screen in any program, press Ctrl + Shift + Escape to open the Task Manager. From here you can manually close programs, quickly access the Run command, or click the Start-up tab to track down programs that are sneakily starting with Windows.

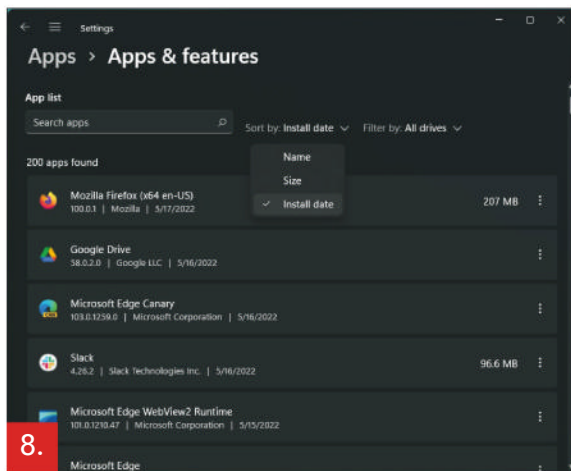
(tied to the Print Screen button) with all sorts of new goodies. Press Win + Shift + S simultaneously to see options to instantly screenshot your entire workspace, just one window, or a freeform selection drawn with your mouse. Your screenshot is then copied and ready to be pasted into a web form or image editor.

In a hurry? You can still access the old screenshot functionality (which saves a full image file in your Pictures > Screenshots folder) by pressing Win +

7. SCREENSHOT TRICKS

If you haven't done so yet, you really need to start using the official (but obscure) Windows Snipping Tool, which expands the operating system's rather basic screenshot tool





8.

Print Screen. Alternately, you can copy the full screenshot instead with Ctrl + Print Screen, or copy a selection of just your currently active program with Alt + Print Screen.

8. SEARCH BY MOST RECENTLY INSTALLED PROGRAMS

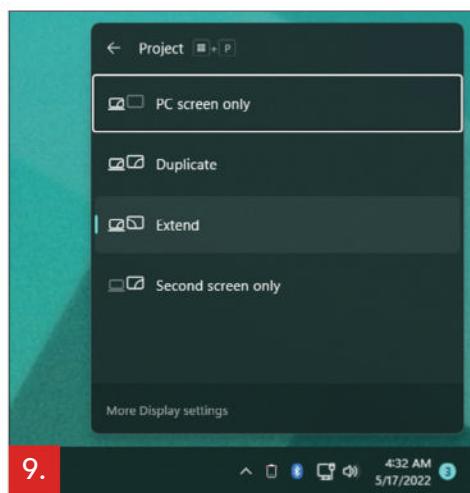
One of the smallest changes in Windows that I've got the most use out of is this tweak to the way you search through programs for uninstallation. It makes it easy to find the most recent program you installed, and get rid of it if you want to. Press the Windows key, search for 'Add or remove programs', and click it to open the Settings menu. You'll be presented with a list of every program installed on your computer.

In previous versions of Windows,

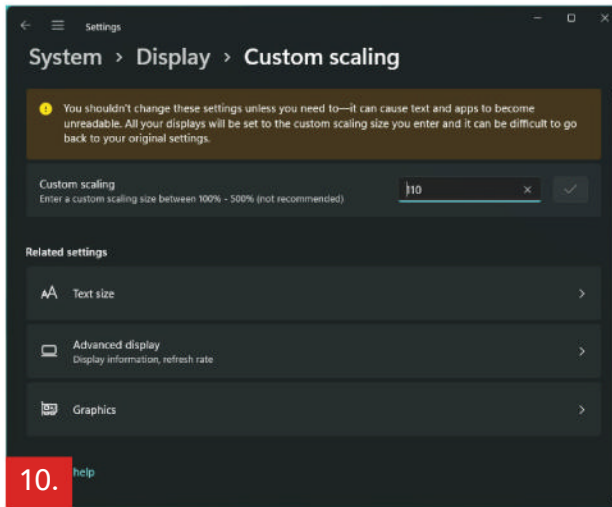
you'd have to hunt through this long list alphabetically. Now you can search for it, but what if it's not listed under the same name? Just click 'Name', then 'Install date'. The list is now in reverse chronological order, showing your most recently-installed programs. Click the three-dot menu on the right to get rid of any entry.

9. QUICKLY CONNECT TO NEW SCREENS

Most of the time Windows will automatically enable a new monitor or screen when you plug it in. But if it doesn't, there's a quick way to adjust your display setup. Just press Win + P to open the 'Project' menu. From



9.



this pop-out you can select Duplicate (mirror your primary screen to your secondary), Extend (use more than one screen at once), or Second screen only (handy for using just a monitor and not your laptop screen).

This menu is great if you're using a multi-monitor setup and you want to quickly disable secondary screens, such as for watching a movie or playing a game, then enable them again when you're done without diving into menus.

10. ADJUST TEXT AND ELEMENT SIZES

You probably know that you can adjust the size of what you see in Windows by changing your resolution. But unlike the days of CRTs, your laptop screen or

monitor has a very specific resolution it's meant to run at. Changing that value isn't a great idea; it can result in a stretched or pixellated image, and video won't look its best.

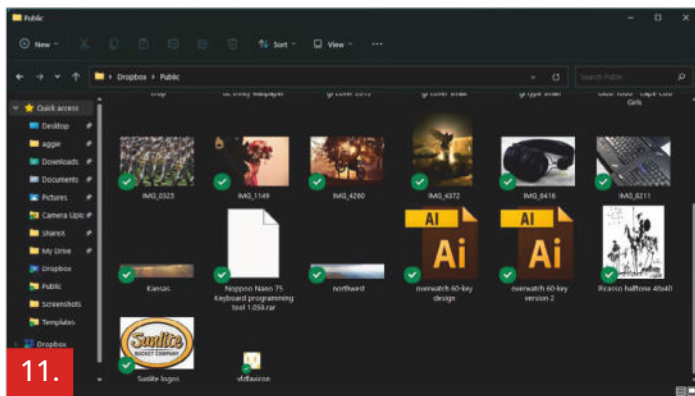
Instead of changing the resolution, go to Display Settings, scroll down a bit, and change the Scale setting. This can make text and images look bigger or smaller on your screen without changing

the resolution of the image itself. Pre-set values come in 25 percent increments, but you can set a custom value if you prefer (with a system reset). There's also an option that will adjust just the text size.

Many programs come with their own scaling and text settings, especially text-heavy apps like browsers and text editors. Tweak them to your liking to find the most comfortable combination.

11. QUICKLY ADJUST ICON SIZES IN EXPLORER

If you need to see icons better in an Explorer window specifically, try this quick trick. Hold down the Ctrl button and scroll your mouse wheel up and down. Thumbnail images will get bigger



or smaller in response. Scroll far enough and the view will actually change from thumbnails to lists with mini-icons. This works even on the Windows desktop, with no Explorer window in use.

Explorer isn't the only program to use the Ctrl + mouse wheel shortcut to change the view. Browsers, email clients, image editors, and text editors often use it to zoom in or out or quickly change text scaling. It's a common tool worth learning.



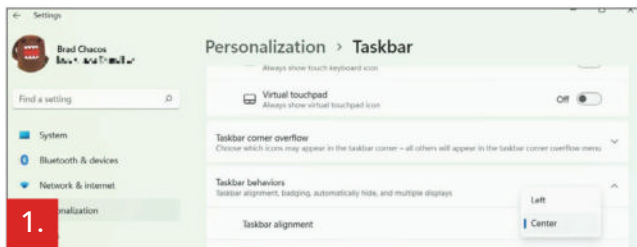
6 Windows 11 features worth changing

Changing these five settings makes Windows 11 much better in under five minutes of your time. **BRAD CHACOS** reports

While Windows 11 provides a fine enough out of the box experience – terrible new task bar aside – it handles so much better after tweaking just a handful of settings to make it feel more like the Windows of yore.

No, I'm not talking about making Windows 11 look like Windows 10

through an extensive overhaul (though if you're a Windows veteran that's worth doing) or tinkering with the new Copilot AI currently infiltrating updated Windows 11 PCs. I'm talking about fast, simple changes that improve the feel of the operating system, turn off annoying ads, reduce the data you send to Microsoft, and more. Better yet, you



can do them all in under five minutes – something I did mere weeks ago when I needed to pick up a Windows 11 laptop for some travel.

Here are six Windows 11 settings worth changing immediately, with an added bonus at the end.

1. MOVE THE START BUTTON TO THE LEFT CORNER

What can I say, I'm a traditionalist. I understand Microsoft's desire to revamp Windows 10's interface to more closely mirror the style of Macs and Chromebooks – legions of kids get schooled on those, after all – but Windows 11's shifting taskbar icons drive me batty. I want mousing over to the Start menu to be muscle

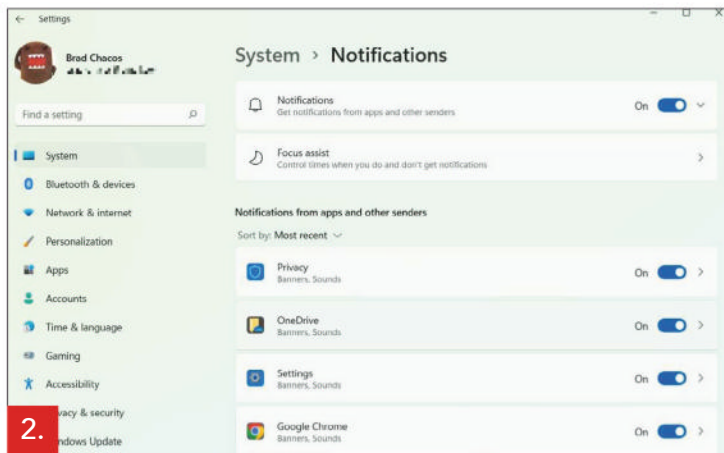
memory, not yet another task I have to look at and mentally process.

Fortunately, Microsoft makes it easy to move the Start menu back to the left-hand corner. Simply open the Start menu and

head to Settings > Personalization > Taskbar > Taskbar behaviours. You'll see a field labelled Taskbar alignment with a drop-down menu. Change the drop-box menu from Centre to Left.

2. TURN OFF ANNOYING NOTIFICATIONS

Next, it's time to turn off those annoying pop-up notifications. Windows 11 itself spawns some, but the worst offenders are third-party apps, especially if your laptop or desktop came preloaded with



bloatware. Making the distractions stop is simple.

Head to Start > System > Notifications. You can turn notifications off universally if you desire. I prefer to work through the list manually, leaving notifications on for critical tools like Slack, Discord, and my antivirus software. (If my AV scanner wants to shout about something, I want to hear it.) Either way, this menu cures many headaches.

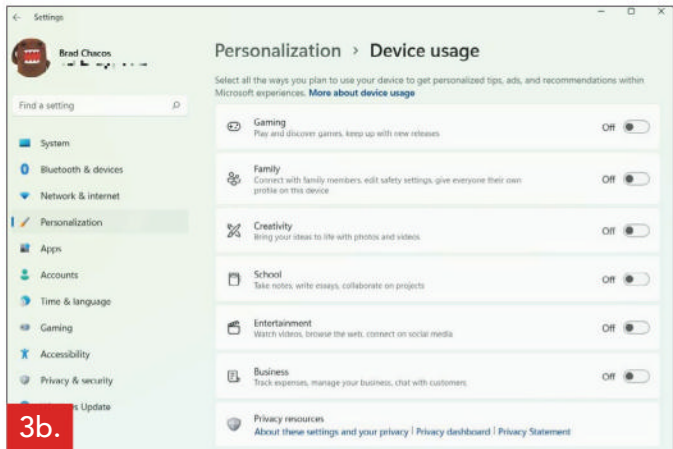
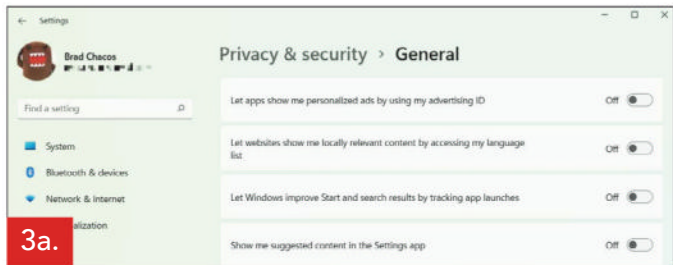
3. TURN OFF MICROSOFT ADS

That segues neatly into the next tip. Keep scrolling down beyond the bottom of the list of apps that can send you notifications. There, you'll see a couple of additional boxes that relate to Windows 11 itself providing 'tips and suggestions' on how to use your PC. If you know your way around well enough, deselect the Offer suggestions on how I can set up my device and Get tips and suggestions when I use Windows boxes.

I prefer to leave the Show me the Windows welcome experience... option (3a.) checked so I'm notified of new features when a big update drops.

We're not done yet, though. If you don't like seeing Microsoft promotions pop up in your Settings app, head to Start > Settings > Privacy & security > General. Disabling 'Show me suggested content in the Settings app' does the trick, though you may want to turn off all these options.

Finally, head to Settings >



Personalization > Device Usage (3b.). The options here tell Microsoft how you use your computer so Windows 11 can provide tailored recommendations for apps, websites, Office 365 trials, and more.

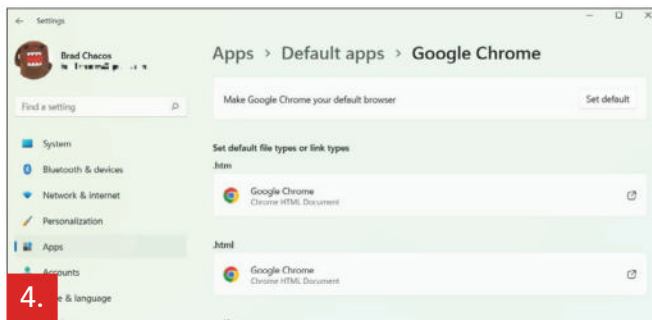
Turn them all off if you're not interested in your £100+ copy of Windows 11 up-selling you on more Microsoft services.

There are other places Microsoft promotions lurk such as the beautiful lock screens provided by Bing Images, but tweaking this handful of settings eradicates the most irritating ones.

4. CHANGE YOUR DEFAULT BROWSER

Microsoft Edge is pretty good, but if you're a diehard Chrome, Firefox, Opera, or Brave user, switching your default browser is easy.

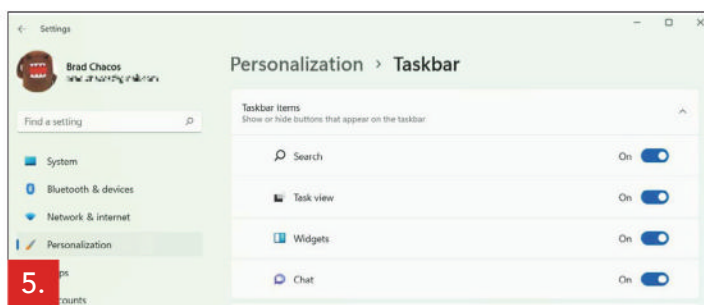
After downloading and installing the browser of your choice, it should ask if you want to make it the default. Do so, duh. But if you missed your chance



during setup, navigate to Settings > Apps > Default apps, find the name of your browser in the list, and click on it. A 'Make <browser name> your default browser' banner with a Set default button at the top of the page does the trick.

5. DECLUTTER THE TASKBAR

Yep, Windows 11's nerfed taskbar sucks and Microsoft stuffs it to the brim with icons and features you probably have no interest in. Make it easier on the eyes and reclaim some space by heading to Settings > Personalization > Taskbar and



deselecting any of the taskbar items you'll never use. Adios, Widgets and Teams Chat.

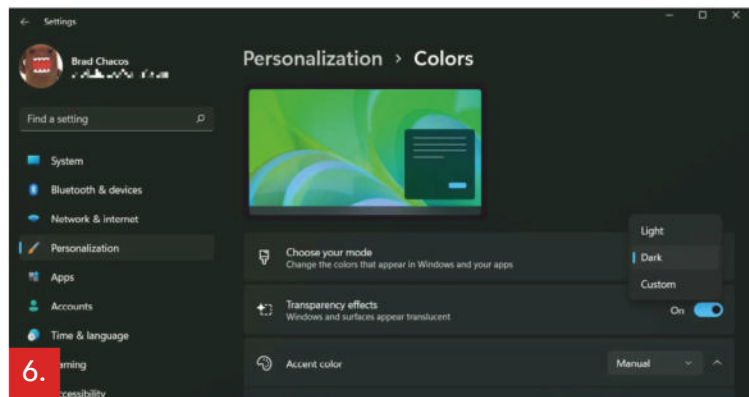
While we're on the topic, spending \$5 (around £3.90) on Stardock's Start11 (fave.

co/3NZXyly) or StartIsBack (fave. co/3pC9G5U) is well worth it. The programs offer granular options that expand the look and functionality of the taskbar and Start menu alike, making it a lot easier to make Windows 11 look like Windows 10. They're beyond the scope of this article but deserve a shout-out.

6. DARK MODE

Finally, an optional personal preference. Some folks like staring at black text on white screens all day. Others, like me, prefer not to sear their retinas. So, the very first thing I always do with a new Windows install is activate dark mode, a preference that carries over into several apps once you've set it.

Simply head to Settings > Personalization > Colours and look for a field called Choose your mode. Change



the drop-down menu from Light to Dark. Your eyes will thank you.

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