Macworld

SEPTEMBER 2022

THE NEW
MACBOOK AIR:
LIGHT & POWERFUL

AN EXCELLENT COMBINATION
OF SPEED & PORTABILITY

APPLE WATCH SERIES 8 RUMORS
DO THEY POINT TO A NEW DESIGN?
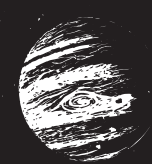
Macworld INCORPORATING MACUSER
SEPTEMBER 2022 CONTENTS

M2 MacBook Air review 46

Five life-changing iOS 16 features 60

Macworld

DON'T SWEAT THE SMALL STUFF, JUST NAIL THE BIG STUFF.

What's another teeny, tiny stain? You've got more important things to think about—like making sure your kids are buckled correctly in the right seat for their age and size.

Check at NHTSA.gov/TheRightSeat

NHTSA

ad COUNCIL

Apple is at the top of its MacBook game—and the best may be yet to come

We live in a wonderful era for Apple laptops. Let's keep the momentum going.

BY JASON SNELL

We live in a wonderful era for Apple laptops. The 14-inch and 16-inch MacBook Pros provide desktop power and stunning HDR displays. The new M2 MacBook Air has now joined the family, with a similar striking design and the Air's trademark smaller size and weight.

After a dark period where Apple struggled with flawed laptop keyboards, a painful transition to USB-C, and an increasingly frustrating relationship with Intel, things haven't looked this bright in

quite some time. That's why, as Apple looks on proudly at the new line of laptops it has fashioned over the past couple of years, I have only one request: More, please.

LAPTOPS ARE THE BEST

Let's start with the facts. For decades, the overall percentage of new Macs sold that are laptops kept going up. The last time Apple specifically broke out desktop and laptop Mac sales figures, laptops were well over two-thirds of Mac sales and headed upward toward three-quarters. For the majority of the Mac's existence, the most common Mac has been a laptop.

As Apple pointed out in its WWDC 2022 keynote, the MacBook Air is Apple's best-selling laptop. And its second-best is the similarly specced 13-inch MacBook Pro (fave. co/3If20PD). Is it any surprise the two most affordable MacBooks are the most popular?

But consider the lack of choice in Apple's laptop line. If you don't want to buy a $1,999-plus MacBook Pro, you can choose from the M2 Air, 2020's M1 Air, or the 13-inch M2 MacBook Pro. That's three 13-inch laptops that are really not very different, right down to their similar weights and sizes. They are three iterations of the same concept.

This is the Mac's most important category. Where's the choice?

ALL LAPTOPS GREAT AND SMALL

That's why I'm encouraged by reports that Apple is considering not one but two new laptops that would appeal to buyers in the sub-$1,999 Mac laptop market.

Let's start with the big one—and I mean that literally. A few reports have suggested that Apple is planning to release a 15-inch laptop as soon as early next year. This laptop is described by some as a "15-inch MacBook Air," but I wouldn't get too hung up on the names supplied by sources in Apple's hardware supply chain.

Apple could do a better job of providing more choices in its laptop lineup.

A laptop big enough to hold a 15-inch screen sure doesn't seem like an *Air,* though, does it? While the MacBook Air brand has been successful for Apple, it doesn't feel like it's portable enough to apply to a bigger and heavier laptop. There are a couple of obvious alternatives, though: It could just be called the MacBook, or perhaps (if Apple wants to extend this new sub-brand a bit more) the MacBook Studio.

There's room in Apple's lineup for a small model like the 11-inch MacBook Air.

Whatever it's called, you can see the appeal: more screen for less! Imagine a product that is able to fit comfortably between the 13-inch MacBook Pro (starting price: $1,299) and the 14-inch MacBook Pro (starting price: $1,999), giving people who would like a bigger screen an option that doesn't require leaping up to the high-end MacBook Pro models. With that $700 gap in price between the 13- and 14-inch MacBook Pro models, there's plenty of room for a larger laptop.

The other rumored model is a laptop even smaller than the 13-inch MacBook Air. If you think the current MacBook Air is small enough, well…that's where you're right. For most people, the 13-inch laptop is the sweet spot. But some of us—and I do

count myself among this number—wouldn't mind it if our laptops were even smaller and lighter than the current Air.

As I wrote early last year (fave.co/ 3S6NfmE), while the 13-inch MacBook Air is smaller than it's ever been, it simply doesn't compare to the ultimate compact Mac laptop, the 12-inch MacBook. That MacBook was nearly a full inch less wide than the Air, and while the M2 MacBook Air weighs 2.7 pounds, the 12-inch MacBook weighed *2.0* pounds.

You can see where the M2 MacBook Air could be shaved down to make a smaller model. The sides of the keyboard were previously home to speaker grilles, but the speakers got moved to the back of the keyboard area. Pull in the laptop so that it's the width of the keyboard, reduce the trackpad's height a little, and use the

thin bezels (with notch) design of the M2 Air's display, and you've got a thinner, lighter Air. I used to use an 11-inch MacBook Air, and I'd love to see a new laptop that can fill that role.

THE OLD WAYS ARE BEST?

One laptop in Apple's current MacBook lineup doesn't get enough notice—which is funny, because I suspect it might be among Apple's best-selling laptops of the next year: the M1 MacBook Air.

Yep, 2020's laptop, the M1 Air, is still kicking around in Apple's product lineup—mostly because it starts at $999, and Apple's not willing to cut into the margins of the M2 Air enough to get it down to that key starting price.

In most years, I'd roll my eyes at the suggestion that Apple was keeping an old Mac model around just to hit a lower price point. Like the M2 MacBook Pro, the M1 MacBook Air has Apple's last-generation design, no MagSafe, and a lesser display. It's old tech being sold alongside new tech. It's a little cringe-worthy, right?

But in this case...I'm going to say no. This is one of the happier side effects of the arrival of Apple silicon: The leap from Intel processors is so great that even the M1 MacBook Air is a spectacular improvement over the older laptops from which most people will be upgrading. If you're coming from, say, a 2018 MacBook Air, you're going to get a computer that is many times faster, with spectacularly better battery life.

Would I rather the M1 Air had been discontinued and the M2 Air slotted in at the same prices? Well, yes, of course I would. But I understand why Apple couldn't do that—and I'm glad that people can still get a great Mac laptop for $999. Or if they choose, they can get an even better MacBook Air starting at $1,199.

MacBook choice is good. Let's see even more of it, Apple. ◼

The M1 MacBook Air is still a great laptop.

Why the 13-inch M2 MacBook Pro is still integral to Apple's lineup

Offering older models at entry-level prices.

BY DAN MOREN

At various points during the past several years, Apple has been rated the most valuable corporation in the world. And it's pretty safe to assume the company didn't get to that point without being strategic about how it positions its products.

One big part of what's made Apple so successful is that the company makes sure it's got products at every price point. No, it doesn't compete in the super-budget department when it comes to devices—Apple is happy to leave those low-margin offerings to the likes of Android phones and Dell PCs—but when it does enter a market, it makes sure it always has a solid spread.

Of course, when you're a company that builds powerful, good-looking devices and

values its profit margins, your options are somewhat limited when it comes to making your devices more affordable. Which has led to a key part of Apple's strategy across all its lineups: in with the old. Apple's made a science out of retaining older products and selling them at lower prices to plug holes in its product lineups, and it's a move that continues to serve the company well.

THIS OLD MAC

On the Mac side, keeping old models around to fit at a particular price point has been something the company's done for a long time. Long after Apple upgraded its laptops to Retina displays and eliminated

The 13-inch M2 MacBook Pro's design dates to the pre–Apple silicon era.

optical drives, it continued to sell one older MacBook Pro model that included the latter but not the former (fave. co/3vk06b9). Likewise, the 21.5-inch iMac with a spinning disc drive made it until last fall (fave.co/3bfvLDP).

More recently, this is why the company's newly released 13-inch MacBook Pro (fave.co/3POoGJc) with the Touch Bar—a laptop whose design dates to the pre–Apple silicon era—just got updated to the M2. And it's why the M1 MacBook Air is still on sale, and why Apple still sells a Mac mini powered by an Intel chip: It's all about price. The new MacBook Air is a beautiful, powerful machine, but its redesigned exterior means it's expensive to make. Apple's done well offering a MacBook Air at a $999 price point—there's a reason it's the most popular laptop the company sells.

Until the company can ramp up production enough of its new MacBook Air to replace both the M1 Air and potentially that 13-inch MacBook Pro, expect the old models to hang around—even if they're outclassed by newer, shinier ones.

Apple offers the 2020 M1 MacBook Air as an affordable $999 option.

iPHONE OF THE PAST

When it comes to its flagship product, Apple's turned the idea of repurposing old devices into an art form. The development of the iPhone SE model was specifically to let the company continue to make older versions of its phones with hardware that it's already been able to produce inexpensively and in large quantities, allowing it to sell them at a lower price point.

The cheapest phone from the current model year that Apple sells is the iPhone 13 mini, which starts at $699. That's cheap as far as a modern iPhone goes, but hardly in the range of those on a tighter budget. Hence the third-generation SE, which remains a slightly tweaked version of the iPhone Apple has effectively been selling since 2014—roughly half the iPhone's lifetime. That SE starts at just $429, substantially cheaper than the 13 mini, not to mention the larger versions of the 13 series (though you can get an iPhone 11 for just $499, albeit with a slower processor and cellular than in the newest SE).

When Apple eventually rolls out a fourth-generation iPhone SE—probably a

The iPhone SE is introduced as a new smartphone but it features older technology.

couple years from now—it will likely transition it over to the modern styling that started with the iPhone X. At that point, *that* design will be seven years old, and it will probably be cheaper for Apple to produce all of its phones in a single design than keep around all the tools and materials to go on building phones based on a design from a decade earlier.

APPLE WATCH AND LEARN

On the Apple Watch side, Apple's taken an interesting mash-up of these prior two approaches. It's kept older models of the Watch on sale—notably the five-year-old Apple Watch Series 3, which is available at the very low price of $199 even though it won't be able to upgrade to this year's version of watchOS.

But simultaneously, the company has tried the SE approach. The Apple Watch SE costs just $80 more than the Series 3, and one has to imagine that Apple very much wanted to get it down to that same price point but was unable to maintain its margins. Given that the SE is basically a slightly retooled Series 4, Apple continues to benefit from its ability to mass-produce an older model without having to add the cost of features like the always-on screen, ECG and blood oxygen sensors, and multiple case materials.

Reports are that this year's Apple Watch will be based around more or less the same processor as that of the last two years, suggesting the technology has stabilized to the point where the company might be able to finally ditch the Series 3—which it absolutely should. But don't expect Apple to move away from the strategy of keeping some stragglers in its lineup: The cost-efficiency factor is just too good. ∎

The Apple Watch Series 3 is cheap but it won't support the next version of watchOS.

Apple's solution for bad Mac webcams shouldn't be the iPhone

This fall, you can finally solve Apple's webcam problem with Continuity Camera and your iPhone. But you shouldn't have to.

BY JASON CROSS

There was a time when Apple really cared about Macs having better video chat quality than any other computer you could buy. Almost 20 years ago, it introduced the iSight (fave.co/3zy4KoC) Firewire webcam, and it was a revelation. For $149 (less than the best webcams today!), it delivered clarity and audio quality far superior to that of all those PC webcams.

Fast-forward 20 years, and Apple's just not keeping pace. The webcams built into Macs these days are fuzzy, grainy, and low-res. Some are still capable of only 720p video, and only the latest models support 1080p. I regularly use a Logitech C920 (fave.co/3BhuQ0f) webcam from *2012* that has the same video resolution, and usually far superior color and clarity. Only now are Mac

1.

M1 MacBook Air

2.

M2 MacBook Air

3.

Logitech C920

webcams getting to be on par with the USB webcam I've used for a decade!

Meanwhile, the front-facing camera on the iPhone has supported 4K resolution since the iPhone 11 and has better clarity, too. Fortunately, when iOS 16 and macOS Ventura are released this fall, you'll be able to seamlessly use your iPhone's rear camera as a wireless webcam, which makes a drastic difference in quality.

COMPARING WEBCAM QUALITY

Apple's latest laptops have upgraded the webcam (Apple calls them FaceTime cameras) to 1080p, and they claim much improved color and clarity thanks to the awesome image processing capabilities of Apple Silicon.

While the processing has definitely made a difference, the resolution really hasn't. When the image is grainy and fuzzy to begin with, pumping up the resolution doesn't really improve things.

Consider these three images taken in my home office, with

regular office light and sunlight filtering in through the blinds. It's not nearly as bright as an office building, but it's not what I would call a "low-light" situation.

See (**1**) the result from the 720p webcam on the M1 MacBook Air (fave. co/3h67n8s). And see (**2**) the result of the 1080p webcam on the M2 MacBook Air (fave. co/3zbn71l; the 14- and 16-inch MacBook Pro, fave.co/3pZlfoR, have the same camera).

It's hard to detect any real improvement there, isn't it? It's a little better, sure, but *still* barely passable. Compare those images against my trusty *10-year-old* Logitech C920 running on a five-year-0old iMac. It's darker, but a bit clearer (**3**).

And with the betas of iOS 16 and macOS Ventura, Continuity Camera lets me use my iPhone 13 camera to produce this vastly superior result (**4**).

What happens if we brighten things up? I set up a very large photography light with diffuser softbox, making my office uncomfortably bright, well beyond

7.

8.

9.

the brightness you can expect in most indoor settings.

Check out the 720p M1 MacBook Air camera (**5**)—not terrible. Then look at the 1080p M2 MacBook Air or M1 MacBook Pro camera (**6**). There's still not a lot of difference between those images, but at least they're finally getting to be roughly on par with the product of my decade-old Logitech C920 and 2017 iMac (**7**). But still, neither one comes close to the quality of the iPhone 13 using Continuity Camera (**8**).

Moving outside, the cameras avail themselves pretty well to the extremely bright conditions. Here's the M1 MacBook Air. It's pretty flat (**9**). And the newer M2 MacBook Air—finally, with *this* much light, we start to see some real difference in color and clarity (**10**).

And the iPhone 13, with iOS 16 and macOS Ventura Continuity Camera, outclasses them all, with good color and contrast and a nice natural depth of field (**11**).

10.
M2 MacBook Air

11.

The new iPhone-as-webcam addition to Continuity Camera coming in iOS 16 and macOS Ventura is a killer feature. Believe me, you're going to want a simple laptop mounting clip for your iPhone. There's definitely some reduction in quality compared to shooting straight on your iPhone—quality is sacrificed in order to wirelessly transfer data to your Mac—but it's a huge upgrade over even Apple's best built-in Mac cameras in nearly all conditions.

Yet it is no substitute for making the integrated Mac cameras a lot better. As easy as this new Continuity Camera feature is, it's still a few steps Apple shouldn't want its users to have to take, and it requires clips or mounts or tripods or whatever to really use well. Besides, when you mount your iPhone to make a Zoom call, you can't actually use it for anything else.

Apple's integrated webcam quality started to fall behind at least five years ago, and while it has made some strides recently, it really is time for the company to aim much higher. It's time to reclaim the "best video quality of any computer" ambition of those original iSight days. And it's time for everyone on the Zoom call to know which person has a Mac, simply because they look so much better than everyone else. ∎

THIS IS A BIGGER ISSUE THAN EVER

Videoconferencing has been growing in popularity for a decade, but the global pandemic and explosion of remote work in 2020 and 2021 has made it a *critical* part of any laptop, as important as a great keyboard or trackpad. Video chats are an integral part of work and play now, whether you're a remote worker or not. It doesn't seem right that those who hop on a FaceTime call with a $2,000 MacBook look so much worse than those with an $800 iPhone.

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WE SAY $AVE IT

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ad COUNCIL

WINDOWS MANAGEMENT SOFTWARE

MOOM: BRING CLICK-AND-DRAG ORDER TO MACOS WINDOWS

BY GLENN FLEISHMAN

Macworld EDITORS' CHOICE

For all the tweaking and features Apple has added to macOS to help us place, resize, and hide windows, there's no way to snap them into standard sizes, resize them against a grid, or save custom window configurations. Moom (fave.co/3PH8c5O) brings these missing features to macOS, allowing you to have the same sort of flexibility for any app that some programs, like Photoshop, allow for windows only within their interface frame.

Moom manages most complexity by exposing its tools through the green zoom button. When you hover over this button on any window, a popup menu shows a
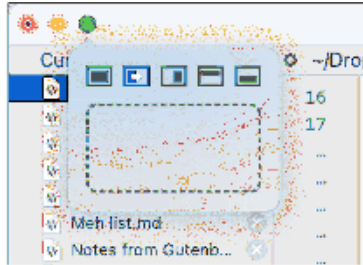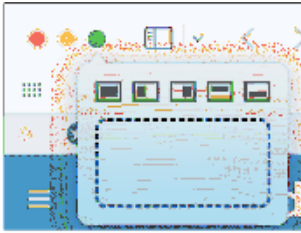
Hover over the zoom button to get Moom controls, here shown with the unit-resize options enabled (left). Drag on a shape to access additional options, including moving the resized window onto another display, with the direction indicated by the arrow.

For instance, you can opt to add a grid that divides the screen in evenly shaped rectangles or a nonoverlapping, tiled hexagon pattern for dragging the window by standard size increments.

Dragging a window to any edge or corner of the display triggers preset sizing operations, like a quarter, half, or full size. You set these in the Mouse preference's Snap to Edge and Corners view, logically enough. Most Moom operations can be reverted by hovering over the zoom button in a window and clicking the undo arrow.

set of standard window shapes: maximized, centered, half screen (top, bottom, left, right), and quarter screen (four corners). Click a button, and the window immediately resizes to the shape and position. Hold Option and the centered and quartered options appear; drag on the shapes, and you can pull them into quarter without Option, or on a multi-display Mac, "throw" them to the display in the direction of an arrow that overlays the window-resizing icon.

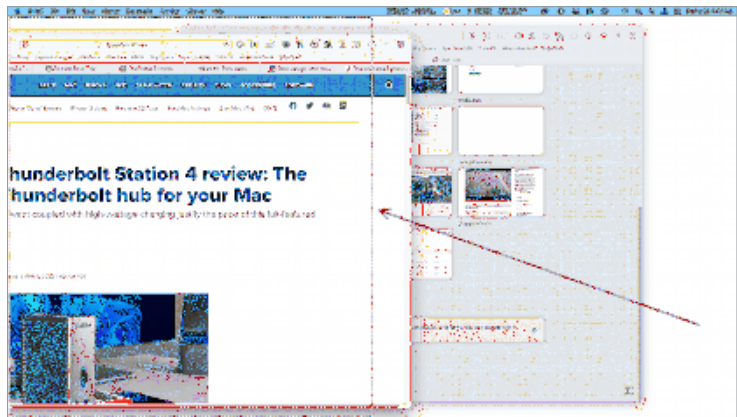Moom lets you create custom layouts you can trigger via a menu or keystroke to shift

You can customize this zoom button hover menu in Moom ➤ Preferences ➤ Mouse ➤ Zoom Button Controls.

Drag a window to an edge or corner to invoke window-resizing actions.

windows into particular configurations. You might want to grow or shrink a window by 50 pixels, move it among multiple displays, center it, or move it to an edge or corner.

There's also an option called Arrange Windows, in which you take a snapshot of currently visible windows across apps. A checkbox, "Ignore obstructed windows," lets you choose whether to capture windows that are not overlapping any other windows or record the positions of all visible windows. This is a perfect way to save your preferred layouts and retrieve them or switch among them.

You can pick this layout from a menu or with a keyboard shortcut. But if you have a multi-display setup that changes regularly, such as with a docked and on-the-go laptop or for presentations, you can choose a trigger for a layout. When the number of displays your Mac is connected to changes, Moom can restore a layout without manual intervention.

While the app relies on a
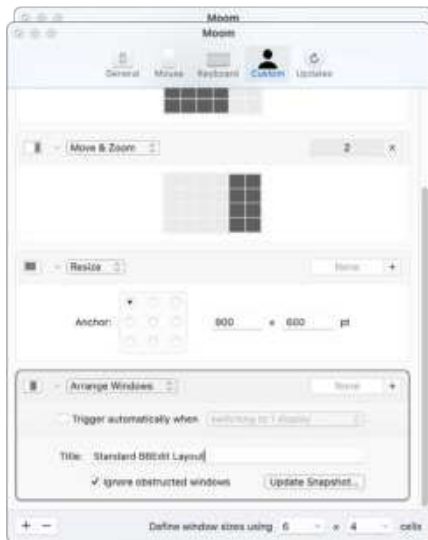
Capture snapshots of your window layouts (left) and then trigger them by keystrokes or the Moom menu (right).

mouse or other pointing input device as installed, you can enable keystroke access to nearly every feature. This lets you invoke Moom and then resize windows by increments and snap windows into various sizes and parts of the display.

Moom has only one missing feature, and it's not a big one. Your settings don't sync across iCloud or other methods. The company offers instructions on copying static settings (fave.co/3z9XFsU).

Moom costs $10 purchased from its developer, Many Tricks, or $9.99 via the Mac App Store. A trial version includes 100 "Mooms," or 100 windows performed via the app. A countdown appears in the Preferences dialog. ∎

Moom

PRICE
$10

COMPANY
Many Tricks
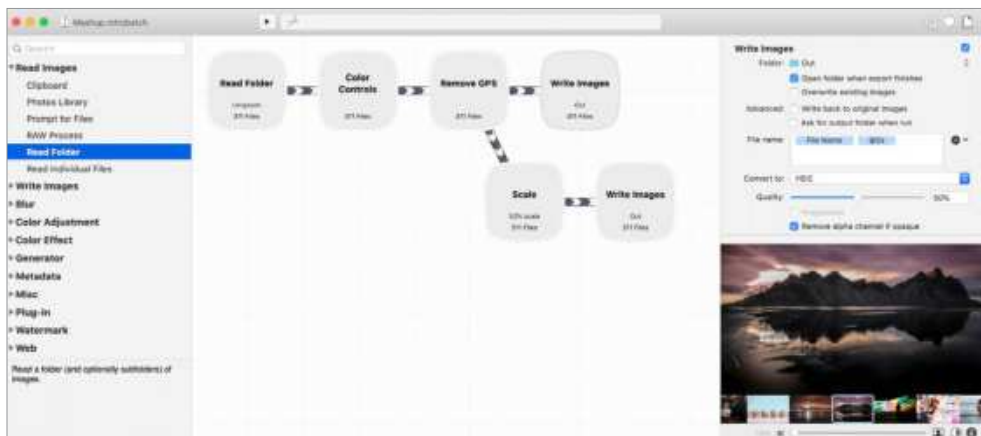
IMAGE PROCESSING SOFTWARE

RETROBATCH: EASY-MADE PROCESS WORKFLOWS FOR IMAGE PROCESSING

BY GLENN FLEISHMAN

Macworld **EDITORS' CHOICE**

If your work—or fun—involves robot-like repetitive actions taken on images, Retrobatch (fave.co/3GIERtM) can put the automation in your workflow and leave you time to handle more creative tasks. The app, in development across 20 years, lets you create processing workflows for simple operations, like adding a border and changing resolution, up through massive chained sets of transformations using rules that let you choose one or more paths for an image to take.

That power is controlled through visual connections, creating a flowchart-like set of connected nodes. Nodes are specialized, like applying an effect or resizing an image. Each node can have multiple inputs or outputs. A typical flow reads images from a source (a folder, a selection dialog, the Photos library, and so on), passes them
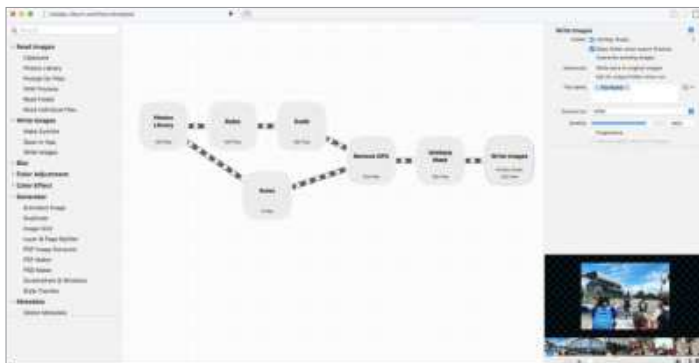
Retrobatch offers drag-and-drop simplicity for creating image-processing workflows, like this one for processing my holiday snaps.

> Apply an unsharp mask (a typical operation to punch up an image)

> Save to a new folder

As you work, Retrobatch performs background preflighting, which tests operations and calculates the number of images that will be processed through each step, providing a count in the node. That lets you preview how your rules will apply to your source images.

through processing and decision-making steps, and then writes the images to the same or different locations. That middle part is where the action happens.

To build a workflow, you create a new Retrobatch document and drag elements from a list on the left side, divided into categories. For instance, if you want to process a bunch of holiday photos you'd already put into an album in Photos to upload to a social network or photo-sharing service, making sure you're not outputting massive files, you might create a workflow that looks like:

> Read Photos album for your holiday trip

> Scale files above two megapixels to no more than two megapixels

> Remove GPS data

Retrobatch includes nodes for adding watermarks, changing color spaces, producing multiple versions of images at different size factors for websites,

A sophisticated workflow processes screenshots in one of five defined ways based on their characteristics to add an appropriate drop shadow with transparency.
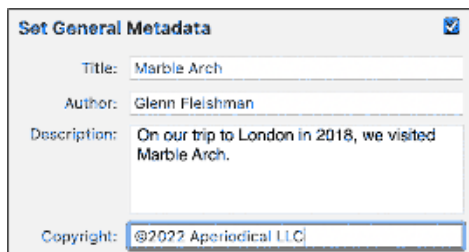
While you can customize a block of metadata for these four fields, you have to create one node each for other metadata items.

exporting to a different file format, creating the equivalent of contact sheets, adding borders and effects, and using criteria to create an "instant alpha," a mask used typically for background transparency. This list just scratches the surface.

As with many apps that use a graphical approach to building sequencing, you might get frustrated when links between nodes don't get made the way you expect. Fortunately, I can offer a simple tip to overcome that: In Retrobatch ➜ Preferences ➜ General, check "Manual connections with control drag."

While Retrobatch comes with several methods of selecting images to process, you can also use Folder Actions (fave. co/3zbZ6Hl) to trigger workflows using a simple AppleScript recipe (fave. co/3OFjkPx). Then just drag

images onto a Finder folder icon to perform common operations.

There are only two notable missing pieces in Retrobatch. First, the app provides granular control over adding and removing image metadata using Remove Specific Metadata and Set Specific Metadata options—but only for single fields or, with Set General Metadata, title, author, description, and copyright. Being able to apply a general location or remove, set, or transform a list of metadata fields at once would be helpful.

Second, the workflow nodes always have the same titles. While you can add a Workflow Notes node in the Retrobatch document to jot down what the sequence does, I'd prefer a way to rename nodes or annotate them, so labels appear in the main view that remind me what I've built.

Retrobatch comes in regular and pro versions, with the latter including scripting, PDF, image classification using machine learning, and other more-advanced features. However, the price difference is just $20: Retrobatch is $29.99; Retrobatch Pro is $49.99. Both versions offer a 14-day free trial. The apps support macOS 10.12 and later.

For anyone who spends more than an hour a week massaging images into a specific shape, Retrobatch will pay for itself almost immediately. ■

Retrobatch

PRICE
$30

COMPANY
Flying Meat

Hot Stuff

KEYCHRON Q8

keychron.com

The Q8 employs the Alice key layout, created by Yuk Tsi. The basic design is a 60 percent layout with the central letters and numbers tilted slightly for an ergonomic cant. The Q8 features a heavy all-aluminum body, a choice of Gateron G Pro switches (linear red, clicky blue, tactile brown), interchangeable hot-swap PCB, high-quality doubleshot keycaps in the OSA profile, RGB lighting, QMK or VIA programming, and a premium gasket mounting. You also get the choice between a circular volume knob or a regular key in its place.**–MICHAEL CRIDER**

Hot Stuff

C-SEED M1

cseed.tv

While extravagantly enormous televisions are nothing new, the M1 beats them all with its dramatic folding and unfolding action. The TV swings up from its base in a massive column, unfolding like a room divider in five different segments. When fully rotated and deployed, it boasts MicroLED screen tech for impressive color vibrancy and contrast, compatible with the HDR10+ standard. The M1 boasts five HDMI inputs and a built-in 2.1 speaker setup with subwoofer (surround sound add-on supported, naturally).**–MICHAEL CRIDER**

CORSAIR XENON 32UHD144

corsair.com

This 32-inch 4K display uses a fast "quantum dot" IPS panel with 1ms response time, has support for Adobe RGB and sRGB color, and comes with two HDMI 2.1 ports, DisplayPort 1.4, a built-in USB-C hub with extra USB-A ports, and a standard VESA mount. In addition to the usual cable routing and various adjustment points, the top of the stand can accept a threaded mount for accessories, including a webcam, a splash light, or even a full-size DSLR camera.

—MICHAEL CRIDER
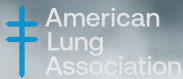
One small reason why I won't be upgrading to an iPhone 14

Apple is retiring the iPhone mini, but its rumored replacement isn't good enough to get me to give up my lovely little handset.

BY JASON SNELL

I come here not to bury the iPhone mini but to praise it. If reports are true, the iPhone 13 mini (fave.co/3OFv5p9) will be the last of its line, replaced by a larger iPhone 14 Max this fall. And as someone who owns and loves an iPhone 13 mini, this makes me sad—sad enough to hold onto my mini for another year.

It seems, however, that not enough people share my love for the iPhone 13 mini for Apple to update it for the iPhone 14 generation. No matter: The iPhone 13 mini is a great device. It's so great, in fact, that I suspect we haven't seen the end of its design yet.

IMAGE: APPLE

IN PRAISE OF THE LITTLE GUY

There's no denying it: People love big phones. The iPhone went on a huge growth tear the moment Apple made it larger with generation 6. Sales figures seem to bear it out. I won't deny that my love of smaller phones makes me a niche iPhone buyer.

But…do people really love big phones? I think they love big screens showing more information and playing bigger movies. I'm not sure they love the extra weight, the extra volume, the extra amount of bulk in the pocket—but it's worth the trade-off for that big, bright screen.

Every year I have the privilege of using all of Apple's iPhones as part of the process of reviewing them. And for the past two years, I've kept coming back to the iPhone mini design.

Users love big screens, but do they really love big phones?

First off, it's a non-Pro iPhone. And while reasonable people can differ, I think that in the iPhone 12 and 13 generations, Apple's iPhone Pro design is worse than that of the non-Pro models. From the bright colors on the back of the devices to the gorgeous anodized aluminum frame, give me the iPhone 13 mini over a duller iPhone 13 Pro any day.

At 5.2 inches tall and 2.5 inches wide, it's small—meaning it fits well in my hand and my pocket—and yet it has a 5.4-inch display that's perfectly capable of giving apps plenty of room to stretch out. It's a look that harkens back to the iPhone 5 era, my favorite era of iPhone design. But the iPhone mini's screen is vastly larger than that on the iPhone 5, thanks to its use of Face ID.

And while battery life on the iPhone mini is undoubtedly less than on other iPhones, I need to point out that Apple did a great job of boosting the battery life on the iPhone 13 models. The iPhone 12 mini's battery life was a little sketchy. The iPhone 13 mini? Not a problem.

Yes, if you use an iPhone mini, you will miss out on some key features of the iPhone Pro models. I'm currently using an iPhone 13 Pro with a beta of iOS 16, and I'm constantly reminded that the cheaper phones don't have ProMotion or that extra camera on the

The iPhone 13 mini's design is so good that it's hard to believe Apple will give it up.

back. And yet, whenever I hold the larger phone in my hand or put it in my pocket, I am turned off by its size. Why carry a brick in your pocket if you don't have to?

IT'S DEAD, JIM

But this is beside the point, right? The iPhone 14 mini is, apparently, not a product that will exist. Now that I've praised the mini, I need to bury it. But...will I?

First, let's consider the report that the iPhone 14 line will only feature a new A16 processor on the Pro phone models. So not only would the regular iPhone 14 models not get access to rumored innovations like an always-on display, they might not be any faster than the current-year models!

I'm sure Apple will make a few upgrades to the iPhone 14 models that will push them slightly past the iPhone 13 in terms of specs, but on the low end, this is potentially the least impressive iPhone upgrade in years. And it means that the iPhone 13 mini will get another year where it's more or less a current phone. I'll take it.

And then there's the inevitable future: I really do believe the iPhone mini design will be back. One possibility is for Apple to simply alternate between iPhone models so that the mini appears one year and the Max the next. It's also not impossible that Apple might just bring the mini design back every few years since it obviously has a following—just not a big one.

Then there's the iPhone SE, which was recently updated to a third-generation model. Using the iPhone mini as the basis of a new iPhone SE would make sense, as the iPhone mini is superior to the current SE in every way. Even though it's slightly smaller, it's got a bigger screen, support for Face ID, and a second rear camera.

The truth is, the iPhone mini is just too good a product—and a size—for Apple to ignore completely. I'm still sad that it's apparently not popular enough to merit a new version every year, but I can't believe it's gone for good. In the meantime, I'll be holding onto my iPhone 13 mini—and waiting on the mini's inevitable return. ■

Do the Apple Watch Series 8 rumors point to a new design?

Unsurprisingly, rumors already abound.

BY DAN MOREN

This fall marks the eighth anniversary of the announcement of Apple's newest major hardware category, the Apple Watch. In that time, it has become the leading example of a wearable device, and though other companies have produced competitors, none of those has quite managed to match the popularity or cachet of the Apple Watch.

The device has evolved too—perhaps not as dramatically as the iPhone did in its first eight years—changing from a do-everything phone replacement on the wrist to one focused on health and fitness… and then back to its phone replacement roots. It's gotten a larger screen, more sensors, and different case materials, but you still can't make your own watch faces.

What's on tap for the Apple Watch this fall? What does Apple, if you'll excuse the

expression, have up its sleeve? Unsurprisingly, rumors already abound (fave.co/3PI265t).

RUGGEDLY HANDSOME

Over the last few years, there's been more than one report that Apple is working on a different version of the Apple Watch: one aimed less at those looking for a fashionable accessory and more at the active users who put their devices through the wringer. Though Apple has lately tried to emphasize just how tough the Apple Watch is (fave.co/3ByMUmC), there's always room for improvement. (As someone who recently broke an Apple Watch, I can report this firsthand.)

The latest rumors suggest that a ruggedized Apple Watch (fave.co/3voOljQ) could make an appearance this fall, featuring a rubberized case that would be less susceptible to dings and nicks and provide better impact resistance for those who take theirs on runs, hikes, and other more adventurous activities.

This, to me, is the future of the Apple Watch: a broader set of models set apart by something more than just styling. A ruggedized Apple Watch would be aimed at a specific market that's not well addressed by the current line-up

of devices and might help bring in entirely new customers who wouldn't previously have considered one. It may even open up Apple to adding entirely new editions of the Apple Watch in the future, exploiting the device's versatility.

IS IT HOT IN HERE?

Another report making the rounds suggests that Apple might incorporate a temperature sensor into the Series 8 Apple Watch. This would likely use infrared temperature measurement and might not give you exact data about your body temperature, telling you only whether it suspected you have a fever and encouraging you to verify with an actual thermometer. (There are, it seems, some limitations to checking temperature via your wrist, depending on whether you're indoors or outdoors, for example.)

It's tough to add new health sensors to the Apple Watch and have them work properly.

Adding more sensors to the Apple Watch has hit some obstacles. For many years there have been suggestions that sensors for blood pressure and blood sugar might be in the works, but both of those have proved tough nuts to crack, in part from a technological perspective, but also in terms of regulatory approval. (There's a reason that Apple describes the blood oxygen functionality on the Series 6 and later as "not intended for medical use, including self-diagnosis or consultation with a doctor, and…only designed for general fitness and wellness purposes.")

However, fever detection as a functionality is not only a feature that is less critical than something like an ECG, but also one with a decidedly practical application, given that we're still (yes, *still*) in the midst of a pandemic in which fevers are a common symptom.

ON THE BIG(GER) SCREEN

If there's one place Apple can't go wrong with the Apple Watch, it's increasing the screen size. I owned a Series 4 for many years and wouldn't have replaced it yet had it not been for that aforementioned unfortunate incident that left me with a cracked display.

I didn't expect to notice a major difference with the Series 7 that I replaced it with, but I've been impressed with what a difference just 20 percent more real estate makes: Everything feels less cramped, more information is available at a glance, and using an onscreen keyboard is weirdly feasible.

So the suggestion that a Series 8 watch might up that by another 5 percent is surprisingly intriguing. It's not so much that it represents a marked increase over the current screen size so much as it shows Apple's commitment to continuing to push just how far its display technology can go. Such an increase would mean that the display is now well over 50 percent larger than the one from the original Apple Watch eight years ago.

Of course, a larger screen could go hand in hand with some more extensive redesign. There have been rumors for a year or more now that a "flat edge" version of the Apple Watch, perhaps more reminiscent of recent iPhone models, could be in the works—not to mention the perennial suggestion that Apple should aim for a round display to replace its rectangular one.

I have to wonder, though: The Apple Watch look has become iconic, no less so than the iPhone's. In eight years the design has gotten a little larger, but it still looks mostly the same. So is now the time for Apple to make a big change to the overall look of its wearable? We'll find out for sure in a couple of months. ∎

How to track a parked car's location on the iPhone

The valuable feature requires privacy permission.

BY GLENN FLEISHMAN

Your iPhone can automatically drop a pin in Apple Maps when you're parking your car. iOS infers this through your connection to your car audio system, relying on Bluetooth or CarPlay. When you disconnect or turn the car off and walk away, the location you left is where your iPhone believes you parked.

However, you might find that this feature isn't working for you, as a family member did. In fact, they couldn't even find the option, which is usually in Settings ➜ Maps as Show Parked Location.

Apple mediates this feature through privacy settings. It requires that you have Settings ➜ Privacy ➜ Location Services

You can set your iPhone to automatically drop a pin in Apple Maps whenever you park your car.
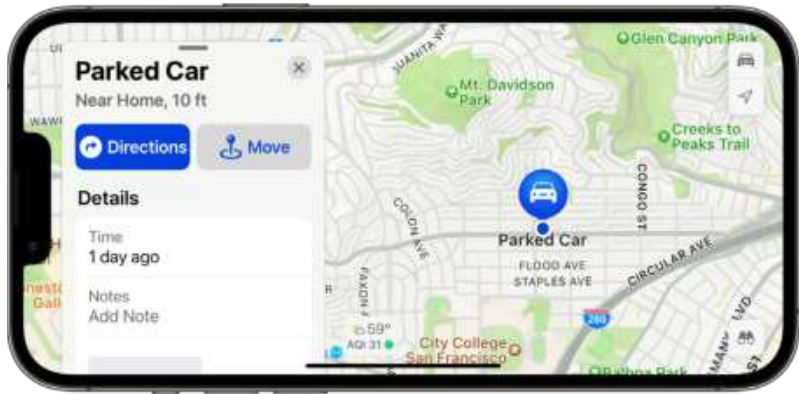
turned on and Settings ➜ Privacy ➜ Location Services ➜ System Services ➜ Significant Locations also set to On.

The reason? Apple derives locations of importance to you through many signals and stores those in Significant Locations. It infers your home, work, school, and other significant places you visit repeatedly. iOS doesn't drop a pin at any regularly visited location.

The notion must be that the feature would be irritating for people who have it turned off, as they would have a pin dropped every time they parked in front of their house or in a work parking lot. Thus, Apple doesn't even make it available. ■
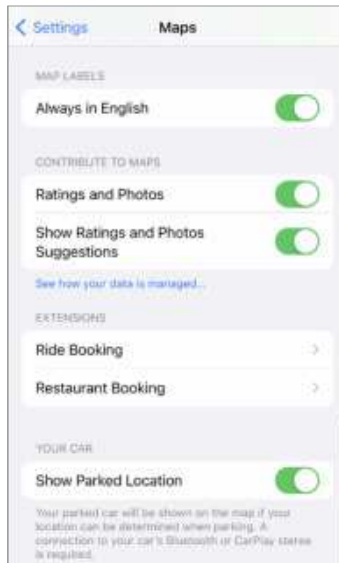
You can only track your location when you park if you have Significant Locations enabled in your Location settings.

YOU MAKE MONEY.

NOW MAKE IT WORK FOR YOU.

Learn how to save for your retirement at **WeSaySaveIt.org**.

WHEN THE GAMES BEGIN.

**NEVER GIVE UP
UNTIL THEY BUCKLE UP.**

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POWER BANK

EXCITRUS 100W MAGNETIC WIRELESS POWER BANK: THE BEST OF WIRELESS AND USB CHARGING IN ONE DEVICE

BY GLENN FLEISHMAN

Macworld EDITORS' CHOICE

Excitrus has hit the target for a near-perfect affordable, high-speed, high-storage USB battery pack. With a capacity of just under 75 watt-hours (Wh) or 20,800 milliampere-hours (mAh), you can recharge a tablet, phone, laptop, and Bluetooth devices across three ports. The power pack includes support for USB Power Delivery protocols, allowing up to 100W on one USB-C port and up to 65W on its second USB-C port. Its sole USB Type-A port delivers up to 18W, and can support the Android-centric QC charging standard.

On top of that, the 100W Magnetic Wireless Power Bank tells you in its name

An LCD displays the battery level and flashes and adds symbols to indicate its status.

iPhone on its magnetic charger. However, 103W combined with 75Wh should be plenty for a traveler trying to get nearly a full day or more out of multiple devices without access to an AC outlet. For comparison, the power pack's battery is about 20 percent more than the built-in capacity in an M1 MacBook Pro.

about a bonus: a 10W magnetically aligned wireless charging target on its top compatible with Apple's MagSafe-capable iPhones. It even recharges itself at a distinctly speedy 65W over one of its USB-C ports.

The power pack comes wrapped (except for a band around its middle) in a forest-green fabric that reminds me of a comfortable shirt. It's pleasant to hold, and the cloth prevents slipping.

The only significant limitation of this power pack is that its maximum simultaneous output is 103W. No device will likely charge at the full rate of each port if you plug in a laptop, iPad, and another device, maxing out its USB ports, and plop an

In testing, the battery lived up to its promises: It charged an iPhone at full speed, filled an M1 MacBook Air from 25 to 75 percent in about an hour at 45W (the laptop's maximum), and recharged from empty to full in about an hour and a half

The Excitrus 100W power bank can charge an iPhone wirelessly via MagSafe-compatible charging, including a printed plus sign (+) for alignment and magnets in the casing.

attached to a high-wattage USB-C power adapter. I encountered no anomalies, and it felt only slightly warm to the touch at any point.

The power bank is compact and inexpensive on a per-watt basis, too.

Three USB ports allow maximum charging for all kinds of devices.

It weighs in at 20 ounces (546g) and 7.5×3.25×1 inches (190×82.5×25.5mm), and has a retail price tag of $99.99. The Excitrus 100W power pack compares favorably to the ZMI PowerPack No. 20, a previous top pick that has about 20 percent more capacity and more than twice the maximum power output, and weighs only slightly more, for $149.

While charging or recharging, a small LCD area on the side displays the current charged percentage of the battery in numbers. A lightning bolt, the percentage sign, and a digit of capacity appear or flash to indicate various states in a compact fashion. For instance, while the power pack is charging an iPhone wirelessly, a lightning bolt flashes.

To avoid unintentional charging and accidental battery draining, Excitrus offers off and sleep settings. Holding down its Mode Button for three seconds powers down the power pack; sleep mode engages in 30 seconds and keeps the battery in something like a standby state. In some cases, you may need to press the Mode button to start wireless charging. For low-power Bluetooth devices, such as headphones and some smartwatches, Excitrus lets you invoke a special mode by pressing the Mode button twice.

BOTTOM LINE

Any regular traveler would benefit from adding the Excitrus 100W Magnetic Wireless Power Bank to their kit. At just over a pound, it's worth the weight to add flexible, high-wattage charging plus wireless iPhone charging in a single affordable package. ∎

Excitrus 100W Magnetic Wireless Portable Charger

PROS
- MagSafe-compatible 10W wireless charging.
- Laptop-scale power output over USB-C, up to 100W.

CONS
- Maximum simultaneous power output limited to 103W.

PRICE
$99

COMPANY
Excitrus

TAGVAULT: PET: ATTACH AN AIRTAG TO YOUR PET'S COLLAR

BY GLENN FLEISHMAN

Macworld EDITORS' CHOICE

Almost as soon as the AirTag appeared, people asked whether it was a good approach to tracking pets. Absolutely—with the proviso that there was no good way to attach an AirTag to most pet collars. A keychain case would tangle, potentially trapping your pet in a crevice or exposing the AirTag to damage or loss—or just worrying the pet with the extra weight on its collar.

ElevationLab's TagVault: Pet (fave.co/3zMXO7b) is part of its rugged waterproof AirTag case series, bringing the same attention to detail it has with its TagVault: Keychain. Like that case, the TagVault: Pet uses screws with the small Torx T6 star-shaped drive for the portion that contains the AirTag and maintains the waterproof seal. The kit includes a steel Torx T6 L-shaped wrench with screw tips on both ends.

As with its other TagVault products, the case only slightly muffles the sound, but the hard plastic doesn't block signals for Bluetooth (for the Find My network) or ultrawideband (for Precision Finding). It also makes the AirTag nondescript, potentially preventing a petnapper from understanding its tracking purpose.

The pet version's case has two additional screws on the side opposite those that seal the case. These screws are piercing, self-tapping screws with a T10 slot. They're used to hold a hard plastic anchor to provide further stability when attached. The packaging includes a small visual instruction guide.

No awl, nail, or drill is required to use the screws with any collar up to 0.2 inches (5 mm). ElevationLab recommends using the AirTag collar case only with pets weighing about 10 lbs (4.5 kg) or more. On a smaller animal or narrow collar, the case could protrude enough to bother the pet.

The company provides a T10 screwdriver to offer the torque necessary to attach the anchor. I tested attaching the tag to a 0.1-inch nylon braided collar, and it took just a couple of minutes and a little elbow grease to secure the screws through the anchor. The orientation of the case is such that you can remove the AirTag to change its battery without detaching the case from the collar.

The TagVault: Pet can be removed, although it will leave small holes in leather, cork, or other solid-material collars. In a braided collar, the holes are hardly noticeable after removing the case.

Because the case is intended for pets, ElevationLab has a simple guarantee on its site: "We designed this to be overbuilt, but if your dog somehow destroys it, we will replace it." (Larger cats aren't mentioned.)

BOTTOM LINE

The waterproof TagVault: Pet should help you keep track of your domesticated companion through fog, rain, puddles, and lakes, as long as they're not too far away from their humans with Apple devices. ∎

TagVault

PROS
- Self-tapping screws for collar attachment.
- Rugged hard plastic design is waterproof.

CONS
- Bulky for smaller animals.
- Permanent holes in collar.

PRICE
$19

COMPANY
Elevation Lab
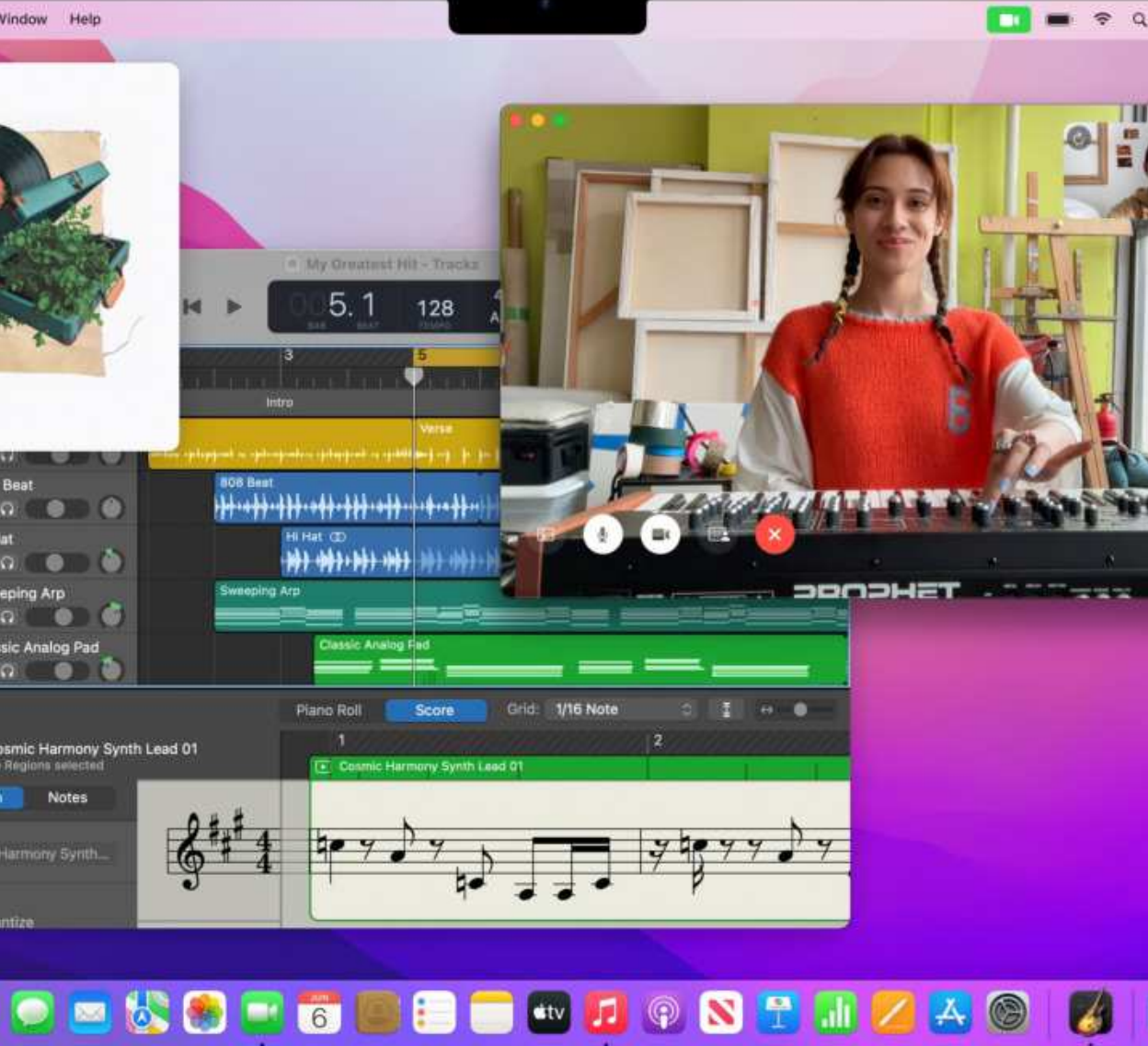
M2 MACBOOK AIR REVIEW:

APPLE'S EVERYDAY LAPTOP HAS ITS GOLDILOCKS MOMENT

英文杂志全球首发QQ群:737981167

THE POPULAR ULTRAPORTABLE IS JUST RIGHT FOR NEARLY EVERY USER.

BY JASON CROSS
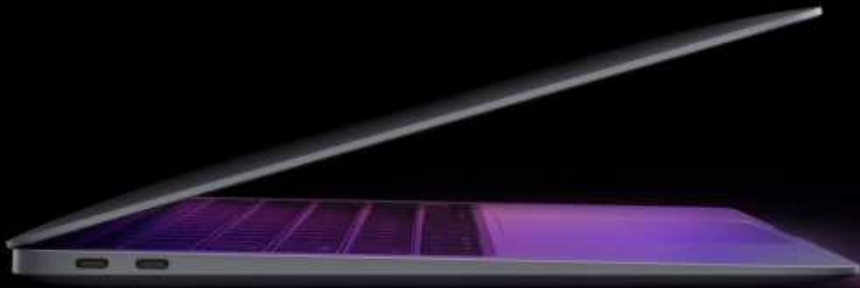
Macworld EDITORS' CHOICE

So you're ready to buy a new laptop. What do you need it for? What do you *really* need it for?

It's tempting to look at a top-of-the-line model, but most of us aren't doing complex professional video edits on 4K video, heavy-duty scientific work, or really big coding projects every day. Most of us spend our time with some browser tabs open, a handful of apps for email and messaging, editing photos or maybe some simple videos, watching streaming video, that sort of thing.

If you're a gamer that wants to play the latest games, our sister site, PCWorld, can

point you in the direction of a Windows laptop (fave.co/3byqLKC), but for everyone else—everyone who doesn't use their laptop for very intensive tasks all day long—the MacBook Air is exactly what you need.

Newly redesigned for the first time in years, the M2 MacBook Air has more than enough muscle to make quick work of everyday tasks, but it's wonderfully thin and light with a big, beautiful display and killer battery life. It's not quite as affordable

PODCAST: IS THE NEW M2 MACBOOK AIR WORTH THE MONEY?
Listen now at fave.co/3zm43NG

as it used to be, but it's a lot less expensive than a 14-inch MacBook Pro (fave.co/3pZlfoR) and it's still the best Mac laptop choice for most people.

DESIGN IMPROVEMENTS, BUT NO SURPRISES

The MacBook Air has essentially had the same profile since around 2010, when Apple introduced the tapered aluminum unibody design. Eight years later it got a few tweaks (the display got a Retina upgrade and thinner black bezels, and the ports switched over to USB-C), but the MacBook Air has essentially looked the same for over a decade.

The new M2 MacBook Air finally gives us a different, if not new, design. The new body is flat, with flat sides and a slightly thicker lid. It's just as wide as the old MacBook Air (just under 12 inches) and only 1/10 of an inch deeper. It's quite thin—thinner than the thickest part of the old Air, but much thicker than the thin tapered edge of its immediate predecessor.

As a result, even though this new design technically has less volume than the old one, it doesn't feel smaller. It feels just slightly larger and about the same weight. The smooth curve around the bottom edge feels better in the hand than the sharp edge of the old design.

It's a little disappointing to see the essential "Air-ness" taken out of the design; it's just like the MacBook Pro, but squashed thinner. But it's hard to argue that it doesn't look and feel good, and is still unmistakably a MacBook.

The display is larger—13.6 inches rather than 13.3—thanks mostly to smaller bezels around it. It's a much more modern look than the old Air, though there are competing laptops with thinner bezels. The keyboard and trackpad are more or less the same (if it ain't broke...), but the half-height Function row has been expanded to full-height keys. And the speaker grilles on the side of the

The new Air is just a tiny bit bigger than the old one, and thinner than the old Air at its thickest point. It feels about the same.

The display is just a few percent larger, but the narrower bezels help create the illusion that it's more than just a 0.3-inch difference.

keyboard are gone too, resulting in a much cleaner aesthetic.

Apple has changed up the colors a little, too. Silver and Space Gray (still a fairly light shade of gray) are sticking around, but the old gold color is gone. In its place are two new colors: Starlight and Midnight, as seen on the iPhone SE and Apple Watch Series 7. Starlight is basically a bright silver with a hint of gold to it, and Midnight is a very dark gray with just a bit of blue. They're both quite nice, but Midnight is going to be a runaway hit. (Note to Apple: *People want a black laptop*.)

You'll still find two USB 4/ Thunderbolt ports on the left, which is a little sparse, though the addition of a MagSafe charging

port definitely helps. It's a welcome return after years of USB-C-only charging. The headphone jack on the right now supports high-impedance headphones as well.

You'll notice the display has a notch in which the 1080p webcam resides, just as it does on the 14-inch and 16-inch MacBook Pro. It's honestly not very distracting and actually adds screen real estate rather than taking it away since the area *below* the notch is the standard 16:10 Mac display ratio, and the notch and menu bar extend up above it, adding 64 rows of

You get the same two USB 4 / Thunderbolt ports as on the old Air, but the return of MagSafe means they're both available all the time.

The new Air has a notch just like the new MacBook Pro, and it really isn't very distracting in practice. One wonders why it's so big, though.

pixels. The display is otherwise the same as that on the old MacBook Air, only it gets 25 percent brighter (up to 500 nits). It's a nice display, but nowhere in the league of the XDR ProMotion displays on the high-end Pro laptops.

STILL A DISAPPOINTING WEBCAM

I wish I had good things to say about the new 1080p webcam, but I don't. Sure, 1080p sounds like a step up from the old 720p webcam, but in practice, it's still extremely grainy and performs terribly in low light.

Even in relatively good office light, images will be full of noise and grain. Apple's processing has improved over the years, but it's still not a very good overall experience. Resolution isn't everything; it's likely that Apple simply needs a much better sensor and lens system.

Fortunately, a new feature coming to iOS 16 and macOS Ventura this fall called

In all but the brightest light, the M2's webcam...

...looks a lot like the M1's webcam.

Continuity Camera with your iPhone (in iOS 16 and macOS Ventura) produces much better results.

Continuity Camera will let you use your iPhone as a webcam in nearly any Mac app that uses the standard webcam frameworks. It makes a shocking difference, as you can see above.

The new Air has a four-speaker array that sounds pretty great for a laptop this size, better even than the two speakers in the M1 MacBook Air. The three-mic array doesn't seem any different—it's still great for video calls and the like, but you wouldn't want to use it for music recording.

SOME ENTRY-LEVEL CAVEATS

We already got a look at what to expect from the new M2 processor in our review of the upgraded 13-inch MacBook Pro (fave.co/3POoGJc). The M2 in the MacBook Air is no different, so you can

expect approximately the same performance here.

Our configuration of the MacBook Air has the following specs and is priced at $1,899:

> M2 SoC with 8 CPU cores

> 10-core GPU

> 16GB of unified memory

> 1TB SSD

There are three things to note before we get to the numbers. First, the MacBook Air's new design is still totally fanless. That means blissful silence, but it also means that under sustained heavy workloads it will not be able to achieve quite the same performance as the MacBook Pro, which has a fan to keep the processor cooler. The difference is small (a few percent), and only noticeable in particular circumstances that hammer on the processor for an extended time, but it's there.

Second, the entry-level MacBook Air has only 8 of the M2's 10 GPU cores enabled. You can expect that configuration to exhibit around 20 percent lower graphics performance than what you see here.

And finally, if you get the entry-level model with 256GB of storage, Apple has

GEEKBENCH 5
Single-core

MacBook Air (2022) M2 8-Core	1,927
MacBook Pro (2022) M2 8-Core	1,943
MacBook Air (2020) M1 8-Core	1,730
14-inch MacBook Pro (2021) M1 Pro 10-Core	1,761

HIGHER SCORES ARE BETTER

GEEKBENCH 5
Multi-core

MacBook Air (2022) M2 8-Core	8,959
MacBook Pro (2022) M2 8-Core	8,908
MacBook Air (2020) M1 8-Core	7,454
14-inch MacBook Pro (2021) M1 Pro 10-Core	9,944

HIGHER SCORES ARE BETTER

confirmed you're getting the same single 256GB chip as in the M2 MacBook Pro, which will reduce speeds by as much as 50 percent compared to models with more storage. We suggest avoiding the 256GB models, not only for that reason but also because you'll probably be running out of storage sooner than your think.

EXPECTED PERFORMANCE GAINS

Let's start off with Geekbench 5 CPU performance numbers, which are a common measure of peak CPU performance for both a single core and all cores. As you can see, the M2 MacBook Air delivers peak performance right in line with the M2 MacBook Pro, and a bit better than the M1. It's a nice improvement, but it's not on par with the higher-end M1 Pro and Max processors (fave.co/3SloEKQ).

Cinebench R23 uses the CPU to perform ray-traced rendering on a static scene, and the test runs through several loops to measure sustained performance.
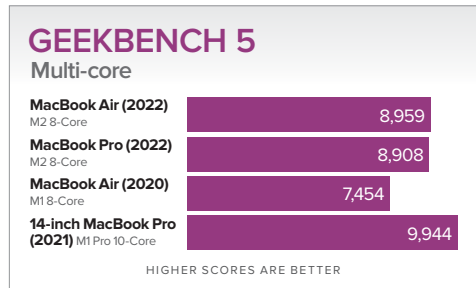
Here, you can see that the active cooling of the MacBook Pro makes a difference. While the new MacBook Air is 15 percent faster than the M1 model, it's still 10 percent slower than the M2 MacBook Pro.

Although the MacBook Air is not really meant for those who work in Final Cut Pro

CINEBENCH R23
Single-core

MacBook Air (2022) M2 8-Core	1,584
MacBook Pro (2022) M2 8-Core	1,623
MacBook Air (2020) M1 8-Core	1,496
14-inch MacBook Pro (2021) M1 Pro 10-Core	1,526

HIGHER SCORES ARE BETTER

CINEBENCH R23
Multi-core

MacBook Air (2022) M2 8-Core	7,887
MacBook Pro (2022) M2 8-Core	8,733
MacBook Air (2020) M1 8-Core	6,838
14-inch MacBook Pro (2021) M1 Pro 10-Core	9,428

HIGHER SCORES ARE BETTER

or Adobe Premiere all day, it's certainly reasonable to expect everyday users to do a little light video editing in iMovie. In our tests, we take an extended 4K video clip and perform video stabilization on it, and then export it at full resolution in both ProRes and H.264.

EXPORT 4K FILE
Best (ProRes); seconds

MacBook Air (2022) M2 8-Core	123
MacBook Pro (2022) M2 8-Core	123
MacBook Air (2020) M1 8-Core	289
14-inch MacBook Pro (2021) M1 Pro 10-Core	66

SHORTER SCORES ARE BETTER

EXPORT 4K FILE
High; seconds

MacBook Air (2022) M2 8-Core	286
MacBook Pro (2022) M2 8-Core	284
MacBook Air (2020) M1 8-Core	243
14-inch MacBook Pro (2021) M1 Pro 10-Core	271

SHORTER SCORES ARE BETTER

STABILIZE SHAKY VIDEO
Seconds

MacBook Air (2022) M2 8-Core	288
MacBook Pro (2022) M2 8-Core	271
MacBook Air (2020) M1 8-Core	393
14-inch MacBook Pro (2021) M1 Pro 10-Core	231

SHORTER SCORES ARE BETTER

Here, we start to see a marked difference between the M1 and M2. The M2's video hardware supports encoding and decoding ProRes, which makes a huge difference when exporting in that format. Performance is once again similar to that of the M2 MacBook Pro, sometimes just a tiny bit slower (perhaps thanks to the MacBook Pro's fan).

Let's take a look at a different video test, this time using the popular Handbrake tool. We use Handbrake 1.5 to transcode Blender's free *Tears of Steel* video (fave. co/2SWqjfx) from 4K to a 1080p H.265 file. When using just the CPU cores, it finished almost 33 percent faster than the M1

HANDBRAKE 1.5
H.265 x265; seconds

MacBook Air (2022) M2 8-Core	934
MacBook Pro (2022) M2 8-Core	935
MacBook Air (2020) M1 8-Core	1,415
14-inch MacBook Pro (2021) M1 Pro 10-Core	675

SHORTER SCORES ARE BETTER

HANDBRAKE 1.5
H.265 VideoToolbox

MacBook Air (2022) M2 8-Core	255
MacBook Pro (2022) M2 8-Core	250
MacBook Air (2020) M1 8-Core	326
14-inch MacBook Pro (2021) M1 Pro 10-Core	190

SHORTER SCORES ARE BETTER

BLACKMAGIC DISK TEST
Read; MB/s

MacBook Air (2022) M2 8-Core	2,790
MacBook Pro (2022) M2 8-Core	2,776
MacBook Air (2020) M1 8-Core	2,768
14-inch MacBook Pro (2021) M1 Pro 10-Core	5,797

HIGHER SCORES ARE BETTER

BLACKMAGIC DISK TEST
Write; MB/s

MacBook Air (2022) M2 8-Core	3,216
MacBook Pro (2022) M2 8-Core	3,022
MacBook Air (2020) M1 8-Core	2,462
14-inch MacBook Pro (2021) M1 Pro 10-Core	5,321

HIGHER SCORES ARE BETTER

MacBook Air. When using the hardware encoder, that time gets cut down a lot, and the M2 MacBook Air is about 21 percent faster than its predecessor.

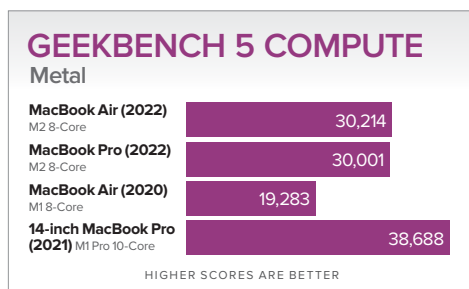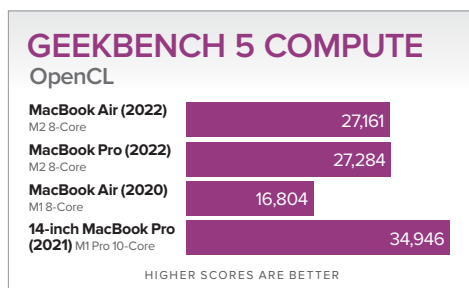Apple does not play around when it comes to SSD performance. Our Blackmagic Disk Speed Test shows just under 3 GB/sec of read performance (about the same as for the M1) and just over 3GB/sec of write performance (about a 30 percent improvement). It's not a groundbreaking change, but it's quite good for a thin and light notebook. (Note, though, that performance for the 256GB model will be reduced by up to half.)

The Geekbench 5 Compute scores use the GPU to perform special-purpose computation tasks like facial recognition, depth of field, or horizon detection. It can use either the OpenCL or Apple's Metal API. It's a quick test, so it's not surprising that scores are right in line with the M2 MacBook Pro. It's almost 60 percent faster than the old M1 MacBook Air (hardly a

surprise given that was the entry-level model with 7 GPU cores), and about 40 percent faster than the "full" M1 with 8 GPU cores in the M1 MacBook Pro.

A MacBook Air has never been a great gaming laptop, and even the improvements

GEEKBENCH 5 COMPUTE
OpenCL

MacBook Air (2022) M2 8-Core	27,161
MacBook Pro (2022) M2 8-Core	27,284
MacBook Air (2020) M1 8-Core	16,804
14-inch MacBook Pro (2021) M1 Pro 10-Core	34,946

HIGHER SCORES ARE BETTER

GEEKBENCH 5 COMPUTE
Metal

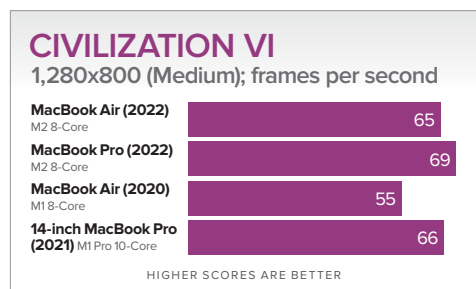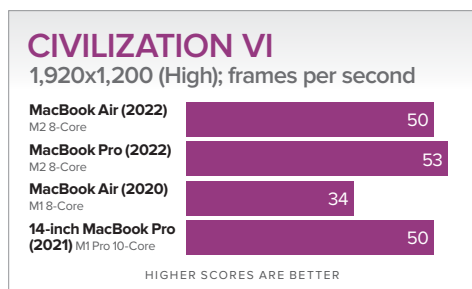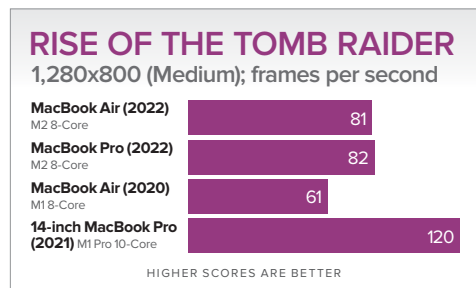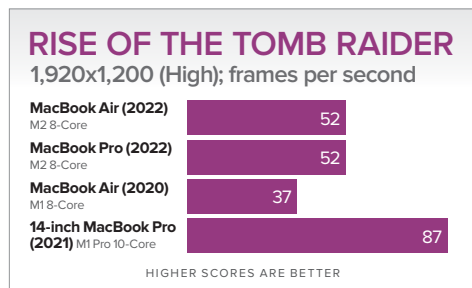|	
MacBook Air (2022) M2 8-Core	30,214
MacBook Pro (2022) M2 8-Core	30,001
MacBook Air (2020) M1 8-Core	19,283
14-inch MacBook Pro (2021) M1 Pro 10-Core	38,688

HIGHER SCORES ARE BETTER

we find in the M2 don't change that. But it's interesting to see how much better it is at running premium games than the M1.
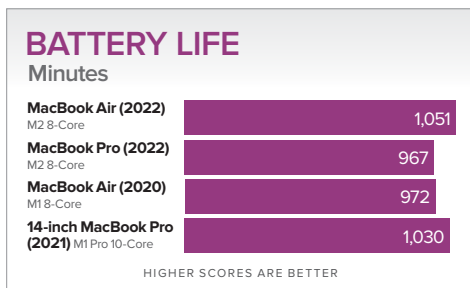
The M2 MacBook Air, with a full 10-core GPU, is roughly 40% faster than the M1 Air with 7 GPU cores in *Rise of the Tomb Raider*, and between 20-50 percent faster in *Civilization VI*, depending on the settings. That's the good news. The bad news is that neither of these games delivered a solid 60 frames per second without seriously compromised visual settings. Don't expect gaming miracles out of a fanless ultraportable laptop and you won't be disappointed, I guess.

AWESOME BATTERY LIFE AND FASTER CHARGING

Apple claims up to 18 hours of movie playback with the M2 MacBook Air, about the same as for the M1 model and a couple of hours less than for the M2 MacBook Pro, which has a larger battery. That wasn't quite our experience, but it's close. With the display set at 150 nits and playing back a movie on an endless loop in the TV app, our battery lasted 17.5 hours—very close enough to Apple's 18-hour claim. It also outstrips the M1 MacBook Air and M2 MacBook Pro by almost an hour and a half.

In regular daily use, battery life is just as great. It's a weird feeling, opening up

RISE OF THE TOMB RAIDER
1,920x1,200 (High); frames per second

MacBook Air (2022) M2 8-Core	52
MacBook Pro (2022) M2 8-Core	52
MacBook Air (2020) M1 8-Core	37
14-inch MacBook Pro (2021) M1 Pro 10-Core	87

HIGHER SCORES ARE BETTER

RISE OF THE TOMB RAIDER
1,280x800 (Medium); frames per second

MacBook Air (2022) M2 8-Core	81
MacBook Pro (2022) M2 8-Core	82
MacBook Air (2020) M1 8-Core	61
14-inch MacBook Pro (2021) M1 Pro 10-Core	120

HIGHER SCORES ARE BETTER

CIVILIZATION VI
1,920x1,200 (High); frames per second

MacBook Air (2022) M2 8-Core	50
MacBook Pro (2022) M2 8-Core	53
MacBook Air (2020) M1 8-Core	34
14-inch MacBook Pro (2021) M1 Pro 10-Core	50

HIGHER SCORES ARE BETTER

CIVILIZATION VI
1,280x800 (Medium); frames per second

MacBook Air (2022) M2 8-Core	65
MacBook Pro (2022) M2 8-Core	69
MacBook Air (2020) M1 8-Core	55
14-inch MacBook Pro (2021) M1 Pro 10-Core	66

HIGHER SCORES ARE BETTER

BATTERY LIFE
Minutes

MacBook Air (2022) M2 8-Core	1,051
MacBook Pro (2022) M2 8-Core	967
MacBook Air (2020) M1 8-Core	972
14-inch MacBook Pro (2021) M1 Pro 10-Core	1,030

HIGHER SCORES ARE BETTER

your laptop and doing work for 20 minutes and seeing that the battery percentage hasn't changed even a single percent, but that's how it is with Apple silicon. Obviously battery life varies based on what you're doing, but for this laptop's target market—the everyday home and productivity user—it's hard to think that you'll ever have to charge up before the day is done.

When you finally do plug in, you'll be glad to see that Apple has amped up charging speed if you have a good USB-C power adapter. With the 35W dual-port adapter that comes with all models of the Air aside from the entry-level model (another reason not to buy it), I got back about a 10 percent charge every 10 minutes. When I swapped out for Apple's 61W USB-C Power Adapter, I went from 25 percent to 72 percent in 30 minutes, essentially confirming Apple's "50 percent in 30 minutes" claim.

BOTTOM LINE

For most of us, the new M2 MacBook Air is all the laptop we'll ever need. Unless you do some seriously high-end video editing or other computationally intensive work all the time, you have no need for MacBook Pro. Sure, the extra ports of a Pro might seem handy, and the HDR ProMotion display is really nice, but you're paying a lot more for power you'll never need, not to mention lugging around a bigger, thicker, heavier laptop.

Apple's new MacBook Air isn't a revelation, but it's a nice upgrade over the previous model. The larger, brighter display with thinner bezels is a nice improvement, MagSafe charging is back, and it's got frankly incredible performance for a 2.7-pound computer that can do well over a full

The M2 MacBook Air comes with a nice braided MagSafe cable and compact 35W dual-USB-C Power Adapter (in all but the base configuration).

For most people, the new M2 MacBook Air is all the laptop they will ever need.

day of real work on a single charge.

It's got a great keyboard and trackpad, as well as really good speakers and mics, for a laptop this size, and you don't have to worry about fan noise because *there is no fan*. I wish the webcam was better—it's just serviceable, which makes it the worst aspect of this entire laptop. Touch ID works well, but it's time for Face ID on Macs, too. And any advanced display technology—HDR, ProMotion, whatever—would have been welcome in a laptop in this price range.

But it's a great laptop overall, and a bright start for this new MacBook Air design, which is likely going to be with

us for years to come. I think most users would prefer this over the M2 13-inch MacBook Pro (fave.co/3POoGJc), which has fewer features, a dated design, and a negligible performance benefit.

As I said, steer clear of the 256GB version, as the storage performance is much slower and you only get an 8-core GPU (256GB probably isn't enough space for the next few years anyway). The $1,499 model with a 10-core GPU, 8 gigs of RAM, and 512GB SSD is the sweet spot, and those with a little extra money to spend should probably opt for 16GB of RAM at $200 more. ■

♦♦♦♦½

M2 MacBook Air

PROS
- Improved display with thinner bezels.
- Full-size function row.
- Killer battery life.

CONS
- Webcam still disappoints.
- The price has gone up.

PRICE
$1,199

COMPANY
Apple

WHEN IT COMES TO MAKING PLANS
YOU'RE THE BEST

MAKE A PLAN
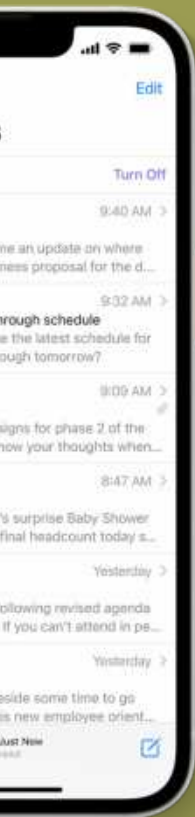*TO PROTECT YOU AND
YOUR LOVED ONES FROM
A NATURAL DISASTER*

✓ **Sign up**
for local weather and
emergency alerts

✓ **Prepare**
an emergency kit

✓ **Make**
a family
communications plan

Get started at ready.gov/plan

Ready   FEMA   ad COUNCIL

FIVE LIFE-CHANGING
iOS 16 FEATU
YOU'LL USE—AND LOVE

iOS 16 IS FULL OF NEW
FEATURES, BUT THESE ARE
GOING TO CHANGE HOW
YOU USE YOUR IPHONE ON
A DAILY BASIS.

BY ROMAN LOYOLA

URES

E—EVERY SINGLE DAY

When iOS 16 (fave.co/3BziW1V) is released this fall, it's going to change the way hundreds of millions of people use their iPhones. No, there aren't any wholesale changes to the entire iPhone interface, so it's not like you'll suddenly have to unlearn the last 10 years of iPhone interface evolution. But there are scores of new features, some big and some rather small (fave.co/3SIpt6o), that will come into play nearly every time you pick up your phone.

These five features in particular will become a part of the way millions of people use their iPhones every single day. They're so useful, or just so integrated into the basic iPhone experience, that they're likely to quickly become a staple of the iPhone experience—the sort of thing we just come to associate with the platform.

CUSTOM LOCK SCREENS

After you update to iOS 16, you'll be greeted by this massive change every time you pick up your iPhone—even before you unlock it.

The new Lock Screen is customizable and attractive, and has more useful information than ever. And with the awesome photo treatments, linked Focus modes, and Photo Shuffle, it's going to dynamically change throughout the day, too.

It used to be that everyone with an iPhone had the same lock screen, only with a different wallpaper, usually obscured by a massive list of notifications. Your Lock Screen's transformation into a truly personalizable, *useful* piece of smartphone real estate is a sea change.

With iOS 16, your iPhone will be more personal and useful from the instant you pick it up.

Check out all of the ways that you can customize your Lock Screen (fave. co/3Sp3EmA) before you get it on your iPhone—and trust us, you will never want to go back.

EDITING AND UNSENDING MESSAGES

Those "blue bubble" iMessages are about to get even more valuable. With iOS 16, you can edit an iMessage up to 15 minutes after you send it (it will be marked "edited" on their screen)—perfect for fixing typos or clearing up the meaning of a message that was maybe a little too brief.

Send a message to the wrong thread? We've all been there. Finally, with iOS 16, you can unsend it.

Of course, if you can edit a message, you could just edit away *everything*, effectively deleting it. So Apple lets you simply "unsend" iMessages, too. Again, you only have 15 minutes to do this, but it's a great feature if you've ever replied to the wrong thread before.

There has been some concern about the potential use of these features for abuse, so we wouldn't be surprised if the time window gets a little narrower, or if it

becomes something you can opt out of. Even if those changes arrive, this is a long-overdue feature that will still be super useful for almost everyone. Before you get the feature on your phone, you can learn how to edit and unsend iMessages (fave. co/3JojGch).

HAPTIC KEYBOARD

It's a small thing…a barely noticeable new toggle hidden away in the Sound and Haptics menu in Settings. But the new keyboard haptics in iOS 16 make a huge

difference in the way it feels to type on your iPhone.

When you get the update this fall, you'll want to turn it on (fave.co/3OPAKcc) (assuming Apple doesn't turn it on by default) and try it out for a couple of days. Then try turning it off to feel the difference. Its absence makes your iPhone feel so clumsy and lifeless! This is one of those things Android phones, and even some third-party iPhone keyboards, have had for ages, but this change to Apple's built-in keyboard will make using your iPhone more pleasant every time you touch the keyboard.

The new keyboard haptics in iOS 16 make a huge difference in how it feels to type on your iPhone.
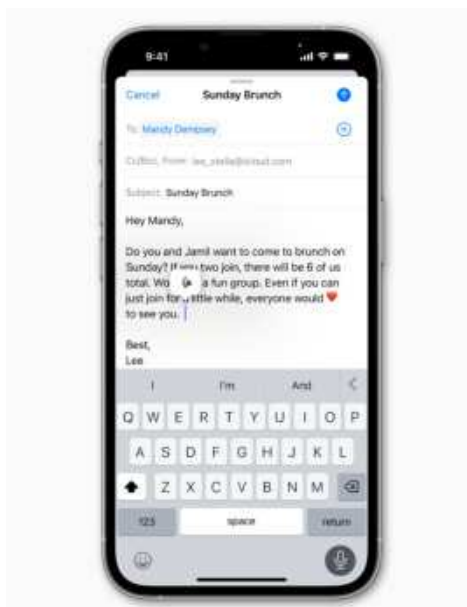
DICTATION WITH VOICE AND KEYBOARD

Speaking of the typing experience, the new dictation in iOS 16 is really something else. Plenty of people already use iPhone dictation all the time while others never touch it, but when iOS 16 lands on your iPhone, everyone is going to want to use it.

For one, Dictation is faster and more accurate, and will automatically add punctuation (commas, periods, and question marks, anyway). You can also add lots of different emoji through dictation. But what really changes the game is that

Dictation gets a huge boost in iOS 16. If you weren't a fan before, you'll want to give it another try.

the keyboard remains visible and active while you're dictating. You can speak, switch to typing, and go back to speaking, all without missing a beat.

Will it make errors? Yes, all the time (though less often than it does in iOS 15). But now you can quickly tap a mis-dictated word and correct it with either your voice or the keyboard, then tap back at the end of your text to continue talking.

The entire name of the game with dictation is: Does it take less time to fix the dictation errors and shortcomings than it would to simply type everything? With iOS 16, that ratio gets *a lot* better, and it's going to make dictation a great way to enter text for a lot more people.

5. GRABBING SUBJECTS OUT OF IMAGES

This feature is so slick, and so easy, it's going to be used all the time in social media and Messages. Just tap a photo—*any* photo—and drag the subject out of it, leaving the background behind. Seriously, that's all you need to do (fave. co/3bsV2e2).

There can sometimes be a few nuances to this, especially if you're trying to save the image for later. And while it works with any image, it really does need a distinct difference between subject and background to work its best.

Still, this is one of those "it's like magic"
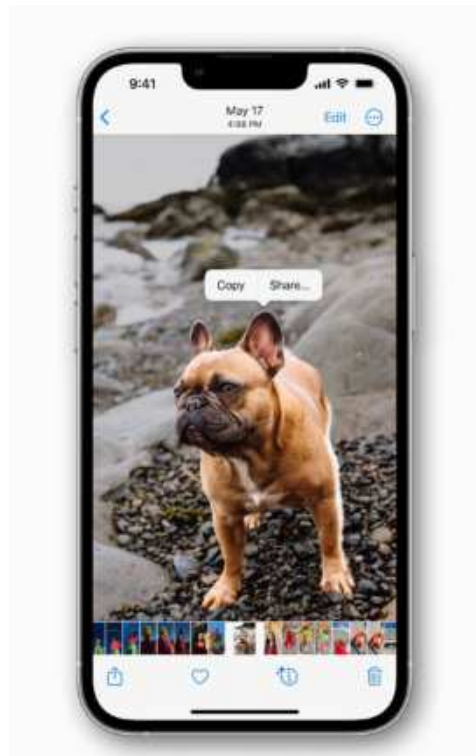
iOS 16 lets you take the subject out of any image, even on the web, and copy, share, save, or drag it into other apps. Everyone will love this feature.

things that, while definitely not something Apple *invented*, is going to be so thoroughly built into the operating system that it's going to *feel* like an Apple thing.

It requires at least an iPhone with an A12 Bionic processor, which means an iPhone XS or newer. But by the time iOS 16 is released this fall, that will mean it is supported on iPhones up to four years old. ◾

Veterans,
when you're struggling,
soon becomes
later becomes
someday becomes
...*when?*

Don't wait. **Reach out.**

Whatever you're going through,
you don't have to do it alone.

Find resources at **VA.GOV/REACH**

ad COUNCIL

VA | U.S. Department
of Veterans Affairs

How much storage should you leave unused on a Mac's SSD?

Recommendations vary enormously because the amount of free space to leave depends
on your drive's purpose. But there's an easy decision tree you can follow.

BY GLENN FLEISHMAN

If you've looked into how much storage space to keep unused on an SSD, you likely came across recommendations ranging from 0 to 50 percent and may be frustrated about how to sort out the right number. When you have a 1TB or 2TB drive, keeping even 20 percent (200GB or 400GB) unused might seem both wasteful and costly.

For most consumer uses and even many professional ones, you can err on the low side of empty storage, down to even filling a drive up to what you might have thought was 100 percent full,

depending on how you use the SSD now and plan to in the future. You may decide after reading this column not to worry about free space at all or opt to keep empty nearly 30 percent of your SSD.

Let's start with the gory details. (If you want to avoid those and skip to our advice, go to the section after the one below.)

WHY AN SSD NEEDS EMPTY SPACE

SSDs are quiet, low power, long lasting, and resilient, but they will eventually fail, just like a hard disk drive (HDD), although in a very different fashion. This analysis from storage and backup firm Backblaze from 2019 (fave.co/3bob6h5) offers a thorough, not-too-technical read about the differences between the two kinds of storage.

An HDD has lots of internal moving and spinning parts, while an SSD is solid state, and everything occurs as the result of an electrical operation within the drive's chips. More specifically, reading data from an SSD memory cell uses very low voltage and incurs no real wear; writing data requires higher voltages that eventually wear out the storage bits.

SSDs have an estimated finite number of times each cell can be written along with an overall anticipated total writes to the drive over its lifetime. On an HDD, because data writes involve magnetic

changes, the same level of wear doesn't occur for updating files at an identical location on a disk. (You can use a utility like DriveDx [fave.co/3zMtl3L] to provide an ongoing estimate of the remaining lifetime on an SSD or HDD. However, it has some Apple-related limitations on monitoring external drives [fave.co/3QcWT59].)

SSD firmware works to rotate through memory cells, units that store 1 to 4 bits each, and level the wear across the entire drive. Otherwise, a frequently used cell would burn out far in advance of other cells. Every time you save a document, copy files, or otherwise cause data to be written to an SSD, or whenever the operating system takes an automated action of the same sort, the cells that the SSD writes to are entirely different from where the previous data was stored. The SSD firmware tracks all this—it's seamless to the operating system and you.

Complicating this is that SSDs group memory cells into larger units known as *pages*, and pages are grouped into *blocks*. Depending on the SSD's chips' design, a page might hold 2K to 16K and a block might be between 256K and 4MB. Because of how free storage is distributed, whenever an SSD writes data, it may be able to write just a page's worth, or it might be required to write an entire block—so a single bit of data changed could mean writing as much as 4MB.
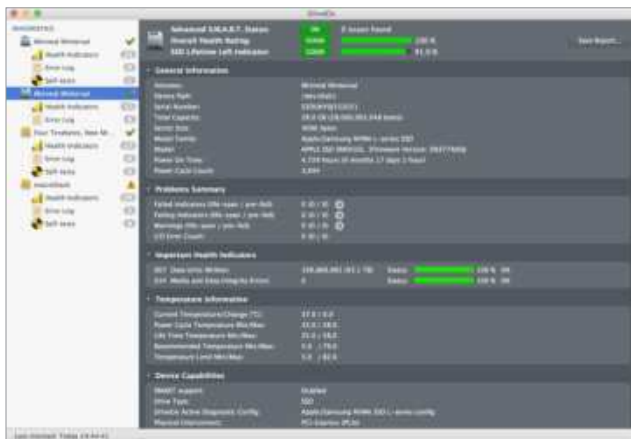
DriveDx exposes diagnostic and routine data about your connected drives.

OVERPROVISION: SPACE TO EXTEND AN SSD'S LIFE

That overhead, coupled with some cells failing early, led manufacturers to *overprovision* the storage by building in extra capacity you (and the operating system) never see. This invisible portion allows an SSD to write smaller pages more frequently than bigger blocks, preserving its overall lifespan. An article at drive maker Seagate likens it to the 15-square game (fave.co/3zkkied).

This overprovisioned storage is hidden in drive marketing by exploiting the difference between powers of two and powers of 10. A "500GB" drive offers 500 billion bytes of storage. However, memory chips are denominated in powers of 2. The closest value to a billion is a "gibibyte" or

GiB, based on units of 1024 (2^10): 1 GiB is 1,073,741,824 bytes. A 500GiB drive holds 537GB of storage, but you only see 500GB—that extra 37GB is the *inherent* overprovisioned amount for the drive.

For most consumer purposes, even when an SSD is your startup volume, you could hit 100 percent usage of an SSD's storage as shown available in the Finder and still experience a long and happy life from your drive.

SSDs have an estimated lifespan in typical use of about 5 to 10 years based on a number called terabytes written (TBW), reflecting how a drive should function with well-distributed write operations through a certain amount of data. With Samsung's affordable T7 external drive series (fave.co/3POE3BN), the 1TB model has a 360TBW value, equal to an average of 200GB of data written every day across 5 years. Higher capacities have higher TBW numbers as they're expected to experience more writes relative to their size.

Samsung also offers a brief and understandable white paper on overprovisioning (fave.co/3Q4Fuvw) aimed at data-center users, which has an

incredibly useful three-line chart that lets you decode the utility of having more unused storage on a drive. These factors are critical in data centers where SSDs experience far heavier quantities of writes than on a personal computer.

> With no overprovisioning, something only available in data-center-oriented drives with no secret SSD stash, the lifetime factor is shown as 1.

> Shift up to 6.7 percent, the amount that Samsung and other SSD makers bake into their consumer drives, and the lifetime factor more than doubles to 2.09. That's the baseline used for Samsung's TBW figures for its consumer-level SSDs.

> Preserve a total of 28 percent, and the factor jumps to 5.22. That could extend the life of a drive that might last 5 years to about 12 years. But it's more likely you'd want that overhead on an SSD you use far more intensively for file writing than an average user, such as one used with daily live recording or audio and video editing.

How much storage should you set aside as empty? Let's look at that.

HOW MUCH TO OVERPROVISION

Here's a quick rundown of some recommendations for overprovisioning, excluding the 7 percent or so built into Apple, Samsung, and other consumer-oriented SSDs:

> 5 to 20 percent for a Mac startup volume or external drive, depending on intensity of usage

> A higher percentage could be warranted for M1-series Macs

> Close to 0 percent for external drives used mostly for offloading data that's then read later but rarely rewritten
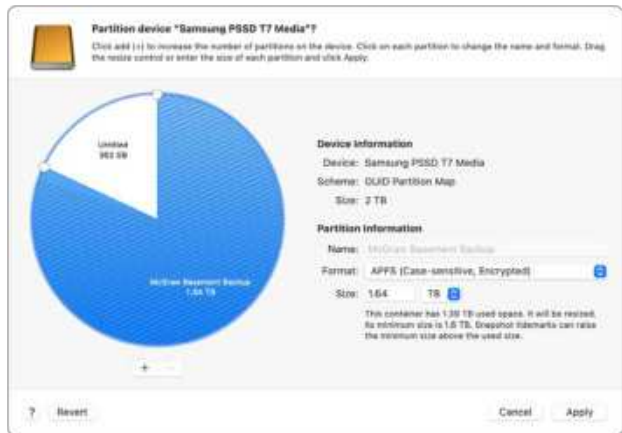

Samsung's 1TB T7 external drive has a 360TBW value, equal to an average of 200GB of data written every day across 5 years.

A startup volume on a Mac will experience many more write operations than most external drives. You might opt to always keep a significant fraction of your startup volume empty, from 5 to 20 percent on top

of the inherent amount built into the drive. I'd settle for the lower range for typical use and the higher end if you use software that's constantly writing and moving files to the drive.

It's always a good idea to keep at least some storage free for a macOS startup volume, anyway. Apple will fill up empty space on the main volume partition as necessary for temporary files, swap files (used when memory is under pressure to write data to the drive), and Time Machine snapshots before they are transferred to a Time Machine volume. Unused storage on an SSD is treated as free space: for the purpose of writing data, storage that the operating system hasn't allocated counts toward overprovisioning.

You can manually add an empty partition to provide unallocated storage an SSD will use for overprovisioning.

There's an extra bit of worry in keeping the built-in SSD on M1-series Mac happy for as long as possible. Apple engineered the M1-series chips so that a Mac cannot boot if its internal SSD has failed (fave.co/3zhO3MO), as it stores the provisioning information required to authorize starting up from an external drive. If your internal SSD fails prematurely, you can't simply switch to an external SSD as you could with an Intel Mac. Factor that into your usage.

On an external SSD not used to start up your Mac, you should make your decision also based on its intensity of use. If you're offloading data to an SSD or using it as a Time Machine volume, which adds data incrementally and overwrites only as necessary, you can push close to full utilization without worrying about reducing lifespan. With a drive used mostly for reading data, it will experience very little wear.

However, if your external drive is thrashed with reads and writes all the time—particularly for large files that are erased, modified, or moved—you should preserve a margin, perhaps even a significant one, unless you'd rather use all its space and budget for a faster replacement cycle. ∎

Meross Smart Wi-Fi Surge Protector: Inexpensive, but...

This affordable power strip features three smart outlets and USB charging, but the company needs to provide more details to merit serious consideration.

BY GLENN FLEISHMAN

S mart outlets can be useful as part of smart-home scenes: When the last person in your family has left the house, some lights, appliances, or other devices turn off automatically, and the reverse happens when you return. When you go on vacation, a schedule has smart outlets simulate the pattern of an occupied home to deter burglars.

When you want more than one smart outlet in a certain place in your house, however, many designs take up the space of two AC outlets. You can purchase a two-outlet version of smart plugs, but it's still limiting. Meross Technology tries to overcome multiple limitations with its Smart Wi-Fi Surge Protector (fave.co/3biALYo), and it succeeds—at least from an interface and feature perspective.

This surge protector has three independently controllable AC outlets and a bank of four USB ports, controlled as a group. Each AC outlet is sufficiently well spaced to allow standard plugs and fairly large DC adapters. The power strip includes a 6-foot (1.8-meter) power cord with a standard three-prong outlet. (This model is available in US and UK versions with the appropriate plug end.)

The AC side of the surge protector reveals one of the unit's weaknesses: documentation. The well-designed manual written in slightly erratic English includes no technical specifications whatsoever. The box the unit comes in says that each AC outlet may only have up to 10 amps' worth of power draw, which is about 1,200 watts with U.S. voltage, and all the AC outlets can't exceed 13 amps (about 1,600W). The company's website, however, simply notes 15A (1800W) maximum load. Few devices in the home besides toaster ovens and space heaters would hit that kind of wattage, but it's still confusing.

The USB bank is much simpler: Each port can draw 5 volts at up to 2.4A (12W) up to a combined maximum across the four of 5 volts at 4A (20W). This is sufficient to run smaller USB devices and charge smartphones and tablets at a moderate pace.

WHERE'S THE THIRD-PARTY CERTIFICATION?

I was unable to find in the documentation, box labeling, or website any details about clamping voltage, the level at which surge protection kicks in to suppress voltage overages. This is a critical bit of information that

purchasers should at least be aware of. We generally recommend a clamping voltage of 330V on more expensive surge protectors and UPS power-backup units, and 500V on simpler power strips, enough to deflect most or all damage.

I can usually dig this data out of a company's product filing with a laboratory that tests the product and then offers a label if it meets the grade. Unfortunately, Meross lacks a UL (Underwriters Lab) or other international certification mark. My general policy is not to recommend electrical devices that haven't passed some sort of testing. My editor emailed the company's public-relations contact twice to solicit this information, but received no response by press time.

The Meross Smart Wi-Fi Surge Protector has three well-spaced outlets, but competing specs printed on the product's box and displayed on the company's website leave us confused as to the strip's maximum rated power draw.

The Meross Smart Wi-Fi Surge Protector has four USB-A charging ports that can deliver 5 volts at 2.4 amps (12 watts) each, up to a maximum of 5 volts at 4 amps (20 watts) across the four. There are no USB-C charging ports.

Meross provides maximum compatibility by including Amazon Alexa, Apple HomeKit, and Google Assistant support. When pairing with HomeKit, the Meross device provided one of the best and most trouble-free experiences I've had. You can have the surge protector appear as a single item in the Home app in iOS, iPadOS, and macOS, and then press and hold or double-click its entry to control or set automations for each outlet and the USB bank. You can also choose to have each of those items appear as separate entries.

This surge protector includes a standard warranty against defects and failure, but Meross doesn't include a reimbursement policy if the device fails to protect connected equipment. Most surge protectors have such a policy, but they often contain constraints and limited periods of time to file claims that make it hard to know if they represent more than marketing. Still, if you absolutely want a connected equipment warranty as part of your purchase, Meross doesn't offer one.

BOTTOM LINE

The Meross Smart Wi-Fi Surge Protector has quite a bit going for it: three controllable AC outlets, sufficient charging wattage on USB ports, a long cord, and compatibility across three major smart-device ecosystems. The lack of electrical lab certification and a failure to provide baseline specifications, however, means that even at its price, I can't recommend it. ∎

½

Meross Smart Wi-Fi Surge Protector

PROS
- Three independently controlled smart electrical outlets.
- Compatible with Amazon Alexa, Google Assistant, Apple Siri, and Samsung SmartThings.
- Easy pairing with HomeKit.

CONS
- Skimpy product specifications.
- No UL or other third-party electrical certifications.

PRICE
$34

COMPANY
Meross Technology

What to do when your Mac says Wi-Fi hardware isn't installed

You know you've got Wi-Fi hardware in your Mac, so why is macOS claiming it's not there? Here are some solutions.

BY GLENN FLEISHMAN

Every Mac sold since the mid-2000s with few exceptions included a Wi-Fi card, module, or chip that's part of the motherboard. Thus, it's surprising to any Mac user who fires up their Mac or is in the middle of using it when they see a

message that reads "Wi-Fi: No hardware installed" in the system Wi-Fi menu; equally vexing is "Wi-Fi: Not configured" when you've made no changes and were just using it. In both cases, a hardware problem could be the root. But you should run through other troubleshooting steps first.
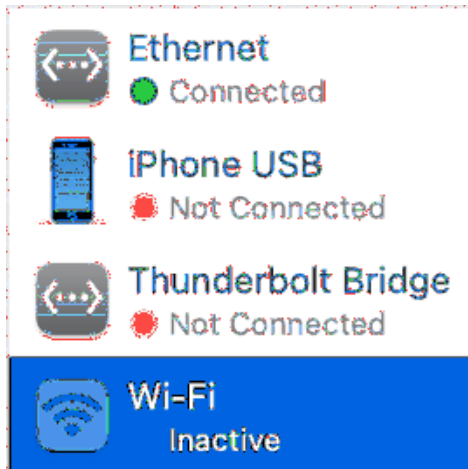
Wi-Fi that has been disabled in System Preferences appears as Inactive.

FIX WI-FI: NOT CONFIGURED

It's possible that network settings were disrupted or corrupted, disabling Wi-Fi access in a way that can be easily fixed through the Network preferences pane. To find out if that's the case, follow these steps:

> Go to System Preferences ➜ Network.

> Select the Wi-Fi adapter in the list at left. It will be grayed out and have the label Inactive beneath it.

> From the gear menu, select Make Service Active.

> Click Apply.

An exclamation mark inside the Wi-Fi fan will disappear, and your computer will scan for networks or connect to a known one.

For more advice on fixing Wi-Fi problems on a Mac, read "How to fix Wi-Fi on a Mac" (fave.co/3oK1U9R) and "How to improve WiFi signal" (fave.co/3Ji4QUF).

CHECK FOR HARDWARE FAULTS

If hardware is the issue, the Wi-Fi drop-down menu may inaccurately read "Wi-Fi: No hardware installed," though readers have seen "not configured" and other errors as well. There could be a low-level configuration issue or a hardware problem, and you should eliminate configuration issues first.

Try these troubleshooting steps in order:

Restart your Mac: This clears the state in many cases.

Start in safe mode: Safe mode fires up a limited number of services in macOS and could reveal a conflict. See Apple's steps (fave.co/3zpVt0s) to start up in safe mode.

Create a new user in macOS: Sometimes the problem is with a user account. Try creating a new user in macOS, restarting, and logging into that new user account. Does Wi-Fi work now? Then there's something corrupted in the other user's low-level settings that may require reinstalling macOS. (You can find the instructions to create a new user in this column, fave.co/3zpco3p.)

Remove the Wi-Fi network entry and restore it: The column "How to fix a

missing Wi-Fi entry in macOS" provides the steps (fave.co/3BBSULL).

Clear the hardware state (Intel Macs): On Intel Macs, you can reset the System Management Controller (SMC). That solves the problem for some users. (Apple silicon M-series Macs have no SMC to reset.)

Reinstall macOS: Make a Time Machine or other complete backup of your Mac, restart into macOS recovery, and reinstall macOS (fave.co/3vuaH3v). This is a non-destructive installation, but you need a backup in case things go wrong.

If none of the above solves the problems, it's time to hit the repair shop. If your Mac remains under warranty, keep details of your testing handy and call for a repair. If it's out of warranty, the repair may be expensive as with most Macs released in the last 10 to 15 years, a complete motherboard replacement may be required. You might get by with a hardware solution, described next.

OPT FOR A HARDWARE WI-FI REPLACEMENT

If your Mac runs macOS 10.15 Catalina or earlier, you can purchase an inexpensive third-party Wi-Fi USB dongle, such as the Edimax AC1200 (fave.co/3Btq2VT), which comes with drivers from the maker for OS X and macOS through Sierra, or the faster 802.11ac (Wi-Fi 5) TP-Link Archer T3U (through 10.14) or T3U Plus (through 10.15).

For those using a more recent version of macOS or who want driver-free access to 802.11ac or 802.11ax (Wi-Fi 5 or 6), a USB-C adapter, mini-dock, or full-size dock with gigabit ethernet can pair with a wireless bridge. This is less convenient for a laptop, but a reasonable option for a desktop Mac that can't plug in via ethernet directly. Many low-cost, high-performance wireless bridges can connect to a network as if the bridge were a regular Wi-Fi adapter. ◼

Edimax's AC1200 comes with drivers for OS X and macOS.

How to switch to single-page view in MS Word and the Preview app

You can scroll infinitely or use a page-by-page mode.

BY GLENN FLEISHMAN

D ecades ago, early "personal" word processors were ungainly dedicated computers. Yet they introduced a strikingly modern notion we continue to use: infinite scroll. Instead of being locked to a page as with a typewriter and paper, a word processor uncoupled a flow of words from pagination.

Modern users can find somewhat the same split in many apps, and some readers find themselves caught in the wrong mode. Here's how to switch between a continuous-scroll mode and a page-oriented view in Microsoft Word and the Preview app. (Why not include Pages? Because Pages is *always* in a continuous scroll preview mode with page breaks—

essentially the Print Layout mode of Word, described next.)

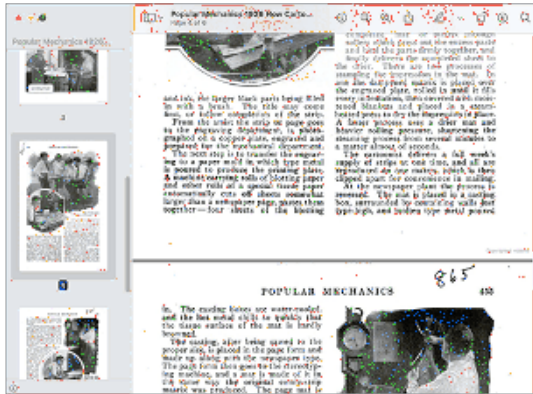## HOW TO SWITCH TO SINGLE-PAGE VIEW IN MICROSOFT WORD

Word offers a choice between Print Layout and Draft. With a document open, click the View menu. You can now click either Print Layout at the far-right edge of the ribbon toolbar or click Draft just a couple of icons to its right. These choices are repeated at the bottom of the page in the status bar: Click the icon that looks like a page for Page Layout or the one that looks like a paragraph with uneven right-hand lines for Draft.

You can also switch to Print Layout by clicking the One Page, Multiple Pages, or Page Width icons toward the middle of the ribbon. These options resize or reshuffle pages to fit in the window: One Page and Multiple Pages zooms to a single page or two pages side by side; Page Width zooms to fit the column width to the window's width. Word is always "what you see is what you get" (WYSIWYG): the text size, styles,

width, and other elements appear exactly as they would in print, even if you're not looking at separate pages. You can use the Outline mode to focus on paragraphs or points without most of the line and page formatting of Print Layout or Draft.
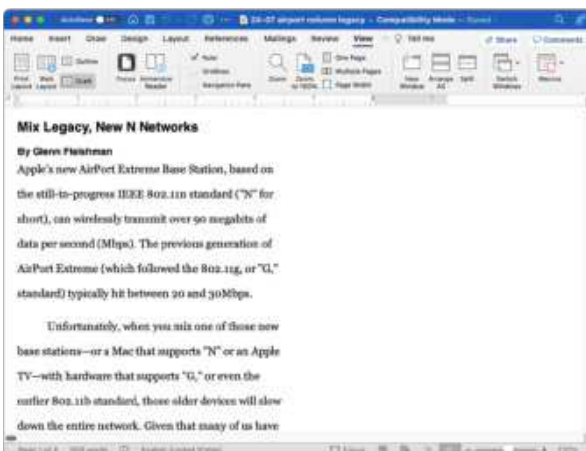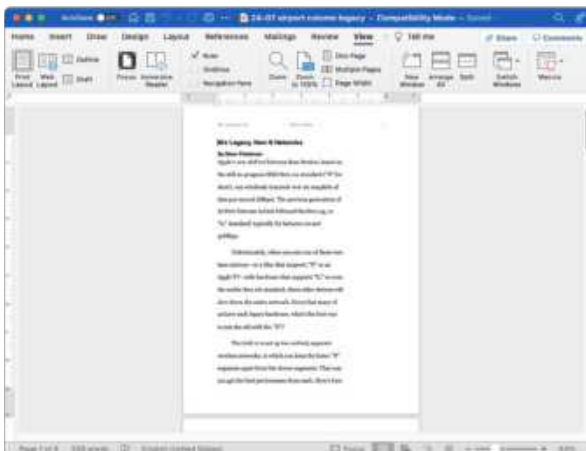
Word offers a page-based Print Layout that's somewhat page-focused, and a less page-dependent Draft view.

Preview can scroll PDF pages continuously (top) or view as window-locked single pages (middle) or two-page spreads (bottom).

HOW TO SWITCH TO SINGLE-PAGE VIEW IN MICROSOFT WORD PREVIEW

While you can't use Preview for word processing, it still follows the conventional of infinite scroll and page view with a PDF. From the View menu, you can choose the following:
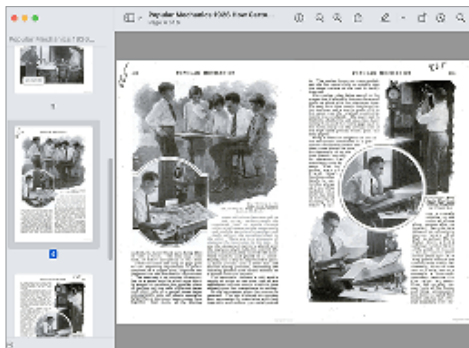
> Continuous Scroll (Command-1) fits the width of the PDF to the window's width. The Page Up and Page Down keys or the scroll bar move through the document without breaks. Drag the window narrower or larger, and the enlargement factor matches. You can separately use Command-minus and Command-plus or the magnifying-glass icons in the toolbar to resize separately from dragging after opening the document. Choose Zoom ➡ Fit to Width (Command-9) to reset.

> Single Page (Command-2) frames each page in the PDF as a single item within the window. Resizing the window changes the magnification as with Continuous Scroll, but always retains a single page. You can also use Fit to Width to restore the window-size view.

> Two Pages (Command-3) places PDF pages side by side, often useful for documents or books designed to work with a two-page spread when created for print. ◼

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>> How a silver lining forms

>> It starts at sea.
>> Tropical waters heat up.
>> Warm air soars skyward.
>> Cold air rushes to the void.
>> Cold air warms up.
>> Cycle repeats.
>> Faster and faster—a 50,000 foot engine of air.
>> At seventy four miles per hour it earns a name.
>> Harvey, Irma, Katrina.
>> Then landfall.
>> Roads rendered useless.
>> Buildings destroyed.
>> Families stranded.
>> But for a brief moment,
>> A silver lining appears.
>> People see neighbors instead of strangers.
>> And labels that divide are forgotten.

>> But when rains ease,
>> when clouds part,
>> silver linings need not fade.

>> Let's embrace our shared humanity.
>> Let's connect with one another.
>> Let's find our love for each other.
>> Every single day.

>> Come together at lovehasnolabels.com

love
has
no
labels

ad
COUNCIL

How Bluetooth LE Audio could amp up the next generation of AirPods

Bluetooth audio is about to level up with new technologies that will hopefully find their way into Apple products soon.

BY JASON CROSS

You may have noticed that nearly all modern iPhones and AirPods list support for Bluetooth 5.0 (the first-gen AirPods supported by Bluetooth 4.2). You might surmise, then, that audio streams are being sent using a modern, advanced Bluetooth connection. Not so fast on that assumption!

With nearly all headphones (and phones, tablets, or laptops) that list Bluetooth 5.0 on the spec sheet, that's not the case at all. The core Bluetooth audio standards used for nearly all wireless

audio are based on what they call "Bluetooth Classic," the foundation of which is Bluetooth 2.1 + EDR. That spec is around 15 years old, and while Bluetooth technology has gone through a bunch of changes and improvements since then, most of those improvements have been to enhance

Even the AirPods Max don't take full advantage of Bluetooth 5.

things *other than* the standard audio transmission used for music and calls.

More than two years ago, the Bluetooth SIG (special interest group) ratified a new Bluetooth 5.2 standard, and at the same time it introduced a new audio spec: LE Audio. (The LE stands for Low Energy.) Part of the LE Audio spec is a new audio compression codec: LC3. Together, these two technologies are poised to give wireless earbuds and headphones a massive leap forward in performance and features. Here's what you need to know.

LE AUDIO

The big innovation of Bluetooth 4.0 was something called "Bluetooth Low Energy," an entirely new protocol made to provide low-latency, high-bandwidth connections using very little power. It evolved over the next few releases, finally getting all the features required for today's Internet of Things devices in Bluetooth 5.0. It's Bluetooth LE that makes AirTags possible, for example.

But the primary audio stack used for streaming music or making phone calls is still based on the old, slower, power-hungry Bluetooth 2.1 + EDR spec. These audio specifications are known as "Bluetooth Classic." LE Audio builds a new next-generation audio stack on top of Bluetooth LE. Support for LE Audio requires the new Bluetooth Core Specification introduced in Bluetooth 5.2, but it is not necessary to enable all Bluetooth 5.2 devices to support LE Audio.

Many "Bluetooth 5" earbuds and headsets may be capable of Bluetooth 5

support, but they hardly make use of it. At most, they'll use a Bluetooth LE connection for things like device discovery and pairing, or for data like reporting battery state. When audio data is transferred, it uses the old Bluetooth Classic frameworks. Apple doesn't disclose exactly how AirPods work, but this is what we believe to be the case with them as well.

With LE Audio, all audio streams can be transferred using Bluetooth LE. This has the potential to have a big impact on battery life, extending it by as much as 50% or more in supported devices. But there are three other important features built into LE Audio that can really change the game for wireless audio.

Multi-stream audio: Bluetooth Classic supports a single audio stream for each source and sink (a source is something like your iPhone or laptop, a sink is a device like headphones or speakers). So to get stereo in a pair of true wireless earbuds, your iPhone will send a single stream to one earbud, which would then set up its own secondary link to the other earbud and forward the stream along. Then each earbud essentially filters out the left or right channel to play back the correct one. It's a neat hack to work around the limitations of a 15-year-old standard, but a better way is sorely needed.

With LE Audio, the source device can send multiple separate independent streams to sink devices, and have them be very highly synchronized (within tens of microseconds). So your left earbud makes a connection to your phone and receives a stream of just the left audio channel, and your right earbud makes another connection to your phone to
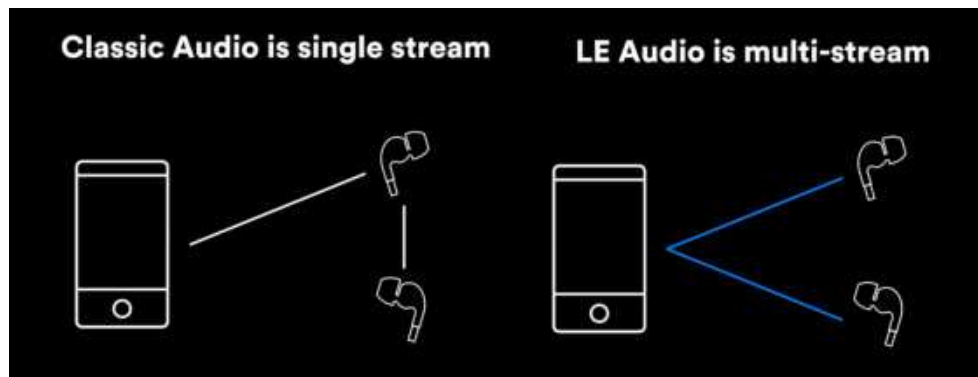
Instead of the hacks used today for wireless earbuds, LE Audio supports multiple independent streams and multiple simultaneous connections.

receive a stream of just the right audio channel, all synced up.

Broadcast and multipoint audio: Bluetooth Classic supports a single source device (your phone or laptop) and a single sink device (headphones or speakers). Clever developers have found some limited ways around this, but it has always been sort of a hack.

LE Audio supports more connection configurations, including mesh networks, one-to-many, and many-to-one connections. So you could have a single device send audio out to multiple sets of headphones at once. Or you could have earbuds that are connected to both your phone and laptop *simultaneously*. That's not seamless switching, but true multiple source audio.

What's more, the spec builds in a technology that the Bluetooth SIG has branded *Auracast*. This is a way for a source to broadcast out a signal that many users can "join" at once. Necessary info about the streams is sent out to your Bluetooth source device (like your phone or laptop), which tells your paired sink (your earbuds or headphones) how to receive the correct audio stream.

Imagine that you're sitting in a movie theater and you take out your phone,

A fake example from the Bluetooth SIG of what it might be like to be at an airport where multiple broadcasts are available to join.

which shows several broadcasts available nearby—multiple language audio tracks for the film you're about to watch, for instance. You select the language you want, and your paired earbuds automatically start receiving the proper audio broadcast stream. And this feature could be available to everyone in the theater simultaneously. The same concept could revolutionize seminars and other large-scale presentations.

Or consider a gym, which could offer multiple music "stations" for customers to

tune into with their Bluetooth headphones instead of blasting music with speakers over the sound of the banging weights and whirring ellipticals. It could also broadcast the audio from the mounted TVs on Bluetooth channels. Just pull out your phone and pick the music or TV audio you want to listen to, and your phone tells your earbuds how to connect to the gym's broadcast system, after which they'll directly receive independent streams straight from the source.

In addition to joining with a menu on your phone or laptop, you'll be able to join broadcasts by scanning a QR code or tapping on an NFC tag.

LC3 codec: Bluetooth Classic only requires support for a single form of audio compression: the SBC codec (short for low-complexity subband codec). Other codecs may be supported (Apple uses AAC, and many others use Qualcomm's AptX or Sony's LDAC), but they're entirely optional. LE Audio requires a new low-complexity codec, LC3, that should be *much* better.

THE LC3 CODEC

LC3 (short for low-complexity communications codec) is important enough to warrant a little further explanation. It's technically just another way to compress audio, like SBC, AAC, AptX, MP3, and LDAC. It is not, as some

have claimed, a "lossless" audio codec. But supporting it is a mandatory part of the LE Audio spec, and it's a huge improvement over the old mandatory codec, SBC.

As with all lossy audio compression, it sounds better when you use a higher bitrate. But it's much more advanced than SBC, while maintaining very simple decoding complexity that results in better battery life. It's also much lower latency—we don't have real-world figures just yet, but codecs like SBC and AAC often have a total latency of over 200ms, while LC3 has a default frame time of only 10ms, so even with a full encoding and decoding pipeline the latency is likely to be well under 100ms.

The Bluetooth SIG only really compares LC3 against SBC, its old mandatory codec, and finds that it has superior sound quality at half the bitrate or less. You can listen to a side-by-side example below. We recommend you use wired headphones, *not* Bluetooth headphones!

Later experiments among audio enthusiasts have shown that LC3 doesn't quite match the quality of a really good AAC encoder at the same bitrate, but it gets fairly close, while featuring much lower latency and complexity.

Of course, just as with Bluetooth Classic, device makers won't have to use

LC3 compression all the time. It must be supported in the product to be a certified LE Audio device, but other optional codecs like AAC or AptX can still be used.
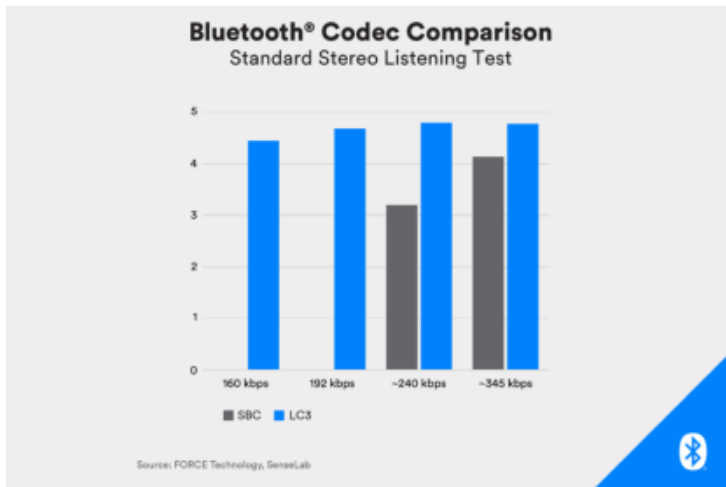
In other words, Apple might stick with AAC compression in future products that support LE Audio, but if the quality of LC3 is close enough, it might instead opt to use that for communication with AirPods in order to improve battery life and latency.

At least you'll know any product you buy that supports LE Audio will have the ability to use LC3. So a future iPhone connecting to a future car audio system, for example, may sound a lot better than the default SBC codec you sometimes get today. The lowest common denominator is getting much better, especially at really low bitrates, and that's good for everyone.

WILL LE AUDIO COME TO iPHONES AND AIRPODS?

Of course the big question is: When will Apple jump on the LE Audio bandwagon? Currently, the Bluetooth 5.2 spec and LE Audio are supported in Android 13, but not in any headphones I could find. Some claim Bluetooth 5.2 support, but that's a foundation that is required for LE Audio—it doesn't actually guarantee support for it. Qualcomm only just this year started shipping connectivity chips for devices and a platform for earbuds (QCC5171 and QCC307x) that include support for LE Audio. So it's coming, and soon, but it's anyone's guess as to when it might show up in an Apple product.

Certainly, for source devices like iPhones, iPads, and Macs, new hardware will be required. It's highly unlikely that Bluetooth 5.2 support and LE Audio can be added in a

In the Bluetooth SIG's own commissioned study, LC3 outperforms SBC at less than half the bitrate. It may not beat AAC or AptX, but it's a huge improvement for the minimum required codec.

firmware update. It's unclear if the current H1 processor found in third-generation AirPods, AirPods Pro, and AirPods Max are capable of being upgraded to support the spec, but it's doubtful.

However, some have claimed that a beta firmware update for the AirPods Max, coinciding with the Developer beta of iOS 16, has enabled support for the LC3 codec on that device. This isn't necessarily an indication that LE Audio is coming to them—it is entirely possible to use the LC3 codec with Bluetooth Classic, in the same way that Apple chooses to use AAC now instead of the SBC codec. You don't get all the other benefits of LE Audio, but the switch to a lower-complexity and lower-latency codec might improve battery life or have other benefits.

It really seems like more of a question of *when* rather than *if* Apple products will support LE Audio. It's the first major overhaul of the Bluetooth audio standards in nearly 20 years, and has major benefits for all. LE Audio and LC3 do everything that A2DP (Advanced Audio Distribution Profile, the current audio-streaming

Could the upcoming second-generation AirPods Pro use Bluetooth LE Audio?

Bluetooth technology) and HFP (Hands-Free Profile, the current Bluetooth tech for making hands-free calls in cars and the like) can do, only better—and they can do a whole lot more too.

Within a year or two, LE Audio will be a part of nearly all popular wireless chipsets and their software stacks, and commonplace among at least premium Android devices and many new cars. Without it, Apple risks being left behind, and while it might find its own proprietary way to include similar features in future AirPods, it would be a terrible idea for iPhones to be stuck using Bluetooth Classic when connected to any non-Apple device. ■

Mark Levinson No. 5909 headphone: More than luxurious

The luxury brand wows with its first headphone, but its price tag isn't for the faint of heart.

BY THEO NICOLAKIS

Macworld EDITORS' CHOICE

Mark Levinson is to audio what Lamborghini, Porsche, and Ferrari are to automobiles. The high-end brand, named after its legendary founder, has left an indelible mark with audio products priced in the four and five figures.

The Mark Levinson team is looking to add a new—and admittedly atypical—product to that legacy: the $999 No. 5909 wireless noise-cancelling headphone. This is the first headphone model Mark Levinson has ever produced, and it's designed for the busy professional or passionate listener.

What makes this headphone special isn't necessarily its pedigree, premium materials, onboard tech, or noise-

cancelling performance (though it has all of those, too). Rather, what's notable is the No. 5909's voicing to the so-called Harman target curve for headphones. The result? A gorgeous headphone worthy of the Levinson heritage that will exceed the sonic expectations of even the most demanding music lover.

INDUSTRIAL DESIGN

The unboxing experience, followed by the first time you pick up the No. 5909, seductively whispers luxury audio. The headphones come in three color options: Pearl black, ice pewter, and radiant red, the latter of which was the color of my review sample. Levinson fans will note that the color combinations are a direct nod to the classic Levinson color motifs. Mark Levinson audio gear is distinguished by its black and gray industrial design with red accents.

The No. 5909's headband is wrapped in premium leather. The headband's leather top side is rugged while the leather underside is incredibly soft and supple. While the padding doesn't seem generous, I never felt that the headband exerted any unusual or uncomfortable pressure even after long listening sessions.

The matte-black anodized aluminum arms extend smoothly—there's no cheap click-stop here. Best of all, the arms stay firmly in place.

The ear pads are likewise enveloped in soft leather. They were incredibly comfortable on my ears. As you'd expect in a luxury headphone, the leather ear pads are replaceable.

The ear cups are painted in a high-quality, automotive-grade metallic paint. The high gloss look of my radiant red review pair was gorgeous. The beveled edge of the Mark Levinson medallion on the ear cups is tinted red in a further nod to the brand's visual design heritage.

The ear cups fold flat for easy storage and travel. At no time did I feel as though the headphones exerted unusual pressure around my ears.

The metallic paint job on the Mark Levinson No. 5909 is just what you'd expect to see on a luxury item such as this.

The right ear cup houses the USB-C charging port and controls in a typical three-button array of volume up, play/pause, and volume down. The Levinson design team gave the play/pause button a slight bump, so you can distinguish it easily by feel and get your orientation for the volume buttons. The play/pause button has four additional functions. First, it doubles as the answer/end call function for a paired smartphone. Pressing it twice skips forward. Pressing it three times skips back. Pressing and holding the button activates the voice assistant on your smart device.

The left ear cup houses two buttons. The lower button powers up the headphones and the upper button toggles between passive, noise-cancelling, and ambient-aware modes. The ergonomics of the buttons are near perfect and conform to the natural orientation of your thumb on the ear cup.

The Mark Levinson No. 5909 comes with a generous collection of accessories, including a zippered, hardback carrying case emblazoned with the Mark Levinson logo. The hard case maintains its shape when empty and doesn't fold flat like the one that comes with Sony's WH-1000XM5. That means it does take up space in a backpack or suitcase when empty.

Both the case and the zipper are coated, seemingly to protect the headphones from an errant spill. Inside the case, there's a zippered compartment with ample space for cables and accessories. You don't need to worry about cables falling out or getting tangled in some pocket. It's a minor but oh-so-great feature.

Speaking of cables, the Levinson come with a 1.25 meter USB-C-to-USB-C charging cable that does double duty as a digital connection to a computer for music playback. There are two USB-C-to-3.5mm cables for connecting to analog sources: a 4-meter cable and a 1.25-meter cable. The 4-meter cable is ideal for using the headphones with a headphone amp or other desktop source. Also included is a USB-C-to-USB-A adapter,

The Mark Levinson No. 5909 ear cups fold flat for storage in their hardback travel case.

The Mark Levinson No. 5909 have a USB-C port for charging, but the headphone can also function as a USB audio device. A USB-C-to-3.5mm audio cable for connection to an analog audio source is also provided.

a ⅛-to-¼-inch adapter for connecting to headphone amplifiers, and an airplane audio adapter. A Mark Levinson–branded polishing cloth caps things off.

Under the hood, the Mark Levinson No. 5909 feature Beryllium-coated (not pure Beryllium) drivers. The base material is PET (polyethylene terephthalate) that a Mark Levinson representative said is a strong, lightweight, shatterproof, recyclable, and highly sustainable material. The motor magnet material is neodymium.

Driver materials are incredibly important to a speaker or headphone's performance. Beryllium is prized for its combination of lightness, rigidity, and superior pistonic performance. Beryllium drivers typically don't have breakup in the

audible frequency range. Mark Levinson's high-end loudspeaker sibling, Revel Speakers, reserves Beryllium for its top-of-the-line models.

Battery life is perfect for the executive road warrior. The Mark Levinson No. 5909 is rated to deliver up to 34 hours of playback time without ANC and up to 30 hours with ANC enabled. You can take a transatlantic or transpacific flight roundtrip without ever having to worry about charging the No. 5909. With their power-save feature enabled, I charged the Levinson headphones maybe once or twice a week—and that was using them extensively for videoconferencing calls in addition to music and entertainment.

The Levinson sport four microphones in each ear cup, two for phone calls and two for active noise cancellation. You'll have confidence taking or making calls. The No. 5909 come standard with Bluetooth 5.1. Connectivity with my iPhone 12 Pro (which sports Bluetooth 5.0) was outstanding. I could go 90 feet from my iPhone, including between floors, without missing a beat.

I did come across one annoying feature: If you're making a phone call, the

The Mark Levinson No. 5909 is outfitted with microphones inside and outside of each ear cup, four for phone calls and four for active noise cancellation.

Levinson activate their ambient-aware mode and won't allow you to switch to noise-cancellation or passive mode during the call. That's fine in most cases, but if I took a call in a modestly noisy environment, such as an airport or on New York streets, I found this function problematic as the outside noise battled with the caller's voice.

USING THE MARK LEVINSON NO. 5909 WIRED AND WIRELESS

The Mark Levinson No. 5909 headphones feature Qualcomm's QCC5124 DAC. The No. 5909 take no prisoners with their refreshingly thorough support of all modern high-res streaming codecs. Sony's

LDAC high-res audio codec is on board, as is Qualcomm's flagship aptX Adaptive and Apple's AAC. LDAC can stream up to 96kHz/24-bit audio at rates as high as 990Kbps over a Bluetooth connection. No matter your preferred streaming source, the Levinson will ensure you'll get the optimum connection for the best possible sound.

There are three distinct wired modes, which is a unique feature of the No. 5909. The first is active analog audio mode, which works with the USB-C-to-3.5mm cable. It processes the audio signal through the No. 5909's internal EQ and allows you to cycle through ANC and transparency modes. The headphones must be powered up before you plug in the cable to enable this mode.

The second mode is active USB digital audio. Starting with the headphone turned on, you use the USB-C-to-USB-C cable and listen digitally direct from your computer or digital source. The EQ will use the last setting in the Mark Levinson mobile app. The ANC button will cycle through the modes, and the headphone will charge its battery while you listen.

The third and final mode is pure passive analog. This delivers the widest

frequency response, from 10Hz to 40kHz. Passive analog engages when the battery is dead, or when you plug in the USB-C-to-3.5mm cable with the headphones turned off. This bypasses all EQ, and the ANC toggle switch on the left ear cup will not work.

ONBOARD TECH AND THE MARK LEVINSON APP

High-end audio gear—Mark Levinson products in particular—typically eschew bells and whistles, flashy features, and anything that might taint the audio signal path. As a result, the Mark Levinson companion app has a Spartan feature set compared to some of its competitors. The app tells you the headphones' current charge and gives you the option to select noise-cancelling or ambient-aware modes, set the auto-off timer, enable on-head detection, and, perhaps most important, set the Harman target curve bass contour.

On-head detection, off by default in the app, proved buggy for me. When I enabled it, I found that music had a tendency to pause, even though I was still wearing the headphones. I gave up on it and kept the feature off during my review period.

NOISE-CANCELLING PERFORMANCE

The No. 5909 sports three noise-cancelling modes: high, adaptive, and low. The high and low settings maintain a constant level of noise cancelling, while the adaptive mode automatically adjusts noise-cancelling intensity based on the level of noise in your outside environment.

I used the Mark Levinson No. 5909's noise-cancelling features extensively over several months. I took the headphones with me on a cross-country flight from NY to LA as well as on the NY subway and Manhattan's busy streets.

The No. 5909's noise-cancelling prowess is strong and an able companion to the road warrior, although I would rank them behind Sony's WH-1000XM5, which

The Mark Levinson No. 5909 were comfortable to wear for long listening sessions, even with the surprisingly thin padding on the headband.

are simply the best noise-cancelling headphones I've reviewed to date.

WHAT IS THE HARMAN TARGET CURVE FOR HEADPHONES?

One of the main selling points of the Mark Levinson No. 5909 is their precision tuning against the Harman target curve for headphones. The Harman target curve is one of the reasons why the Levinson sound so good.

As recently as a decade ago, our understanding of listeners' headphone preferences and the measurements that would best predict them were still in their infancy. That all changed thanks to Dr. Sean Olive and the world-renowned research team at Harman International. This is the same team whose pioneering research, led by Dr. Floyd Toole in the 1980s, gave us the definitive guide for the acoustics and psychoacoustics of loudspeakers, and Todd Welti's subsequent research in the 2000s that determined the ideal number of subwoofers in a rectangular room and their optimal locations.

The headphone research led by Dr. Sean Olive over the past decade is what yielded the "Harman target curve for headphones." The company calls the Harman curve the "acoustic equivalent [of] a universally satisfying audio 'recipe' that a vast majority of listeners will enjoy."

The Harman target curve is a sound curve that both trained and untrained listeners preferred for headphone listening. Perhaps unsurprisingly, this response curve closely resembles the in-room response of an accurate loudspeaker in a semi-reflective room, as shown from Dr. Toole's research.

What's perhaps most notable is that preference for the Harman target curve transcends age, geographic location, listener training, and gender. Dr. Olive's research results further showed that 64 percent of listeners preferred the Harman target curve, while 21 percent (typically listeners over 50 or women with a preference for classical music) preferred the Harman target curve with less bass, and 15 percent (typically younger listeners who were fans of rock and rap) with more bass.

Realizing that some listeners fall into these subgroups, the No. 5909 companion app allows you to alter the headphone's target response to match the bass response preference in accordance with Harman's research results.

LISTENING TESTS

I ran the gamut with various connection methods with the Mark Levinson No. 5909 headphones: an iPhone 12 Pro, a Fiio M9 hi-res DAP with LDAC, via USB-C to my 16-inch Intel MacBook Pro, and wired with my Monoprice Monolith

The Mark Levinson No. 5909 exhibit first-rate build quality.

desktop balanced headphone amplifier with THX AAA technology. My Roon Nucleus server, Tidal, and Apple Music provided the source material.

Let me cut to the chase: These are the best-sounding noise-cancelling headphones I've ever reviewed. You'll put these headphones on and want to listen to your favorite songs all over again.

The Levinson's penchant for rendering a dimensional soundstage is uncanny. Songs like Adele's "River Lea," Norah Jones "Don't Know Why," Katie Melua's "If You Were a Sailboat," and Michael Jackson's "Smooth Criminal" broke free from the typical headphone incarceration. Listening to a song you've heard hundreds of times through the No. 5909 will make you feel as though you're experiencing that song for the first time.

Vocals were pristine, with near-perfect timbral accuracy. They were rendered with the clarity, detail, and flat-out hair-raising purity that you'd experience from a high-end loudspeaker. For example, Elaine Paige's iconic rendition of "Memory," from Cats, played through the No. 5909 was intimate, energetic, and intoxicating.

The refinement extends to instruments, which were placed firmly in space and time. There is no muddiness, smearing, or anything to get between you and the music. Notes come across with texture and detail that other noise-cancelling headphones can't match. Discerning music lovers will relish being able to do a deep dive into the micro dynamics of their favorite music.

Songs like Imelda May's "Call Me," Birdy's "Open Your Heart," or Yo-Yo Ma's rendition of Ennio Morricone's "Dinner," from Lady Caliph, played through the No. 5909 delivered their full intimacy and emotional energy.

The Levinson loved to play big and bold with orchestral works, such as Hungarian Rhapsody No. 2 in C-Sharp Minor, conducted by Leopold Stokowski,

You can purchase replacement memory foam ear cups for the Mark Levinson No. 5909 should they become damaged or worn over time.

which delivered the grand staging, transparency, detail, and dynamics that makes classical works shine.

Bass lines are authoritative, pistonic, and under absolute control. I played my typical repertoire of bass tests over and over, shaking my head in astonishment. The No. 5909 delivered the deep bass lines on Bonnie McKee's "Trouble" and Lorde's "Royals" with authority. Bass on Holly Cole's "I Can See Clearly Now" and the O-Zone Percussion Group's "Jazz Variants" were ridiculously clean, textured, and delivered without any hint of bass bloat, all while keeping vocals and accompanying instruments

clearly articulated.

The refinement and control you'll find in the Mark Levinson No. 5909 allows the listener to move toward a deeper musical experience, appreciate the complexity of musical layers, and unfold many more details in the music.

BOTTOM LINE

If you're looking for what is arguably the best-sounding pair of noise-cancelling headphones on the market today, and you aren't intimidated by their $999 price tag, look no further than the Mark Levinson No. 5909. They are the pinnacle expression of the science of headphone sound.

These are luxurious headphones with premium build quality worthy of the Levinson heritage and will satisfy the most demanding music lover. A few functional quirks aside, if strong noise-cancelling performance and pristine sound are the top of your priorities, and you don't care for extraneous bells and whistles, then the Mark Levinson No. 5909 deserve the top spot on your list. ◼

Mark Levinson No. 5909

PROS
• Best-in-class audio performance.
• Excellent noise cancellation.
• Premium materials and build quality.

CONS
• Noise cancelling can't be engaged during phone calls.
• Buggy on-head detection.

PRICE
$999

COMPANY
Mark Levinson

iFi Go Bar: Everything you expect from Hi-Res audio

This mobile device is a worthy addition to the incredibly competitive category of dongle-sized, device-powered, headphone-amp/DAC combos.

BY JAMES BARBER

f you're interested in the Hi-Res audio files streamed by Apple Music, Qobuz, or Tidal, wireless Bluetooth headphones can't yet deliver your music in its full-resolution glory; you'll need to use wired headphones with your streaming source.

If that source is an iOS or Android device, you'll *also* need a device to take over the digital-to-analog signal conversion and give the audio signal a boost. The iFi Go is a combination DAC and headphone amp that delivers that upgraded audio in a compact package.

The iFi Go is approximately the size of a pack of gum and it's that small size that a big part of its allure—and a substantial reason for its relatively high price. That compact profile also means that there's no

battery in the DAC, so you'll be drawing power from your phone's battery.

HOW IS THE IFI GO BAR BUILT?

The exact dimensions are 2.6x0.9x0.5 inches with a weight of just 1 ounce. There's a chamfered edge on the top of the unit, so it's not quite a perfect rectangle. The case is made from an aluminum alloy with a black finish.

There's also a limited-edition iFi Go Bar 10th Anniversary Limited Edition that retails for $499. The chassis on *that* model is copper, which is then gold-plated for a distinctive look. The unit weighs 2.26 ounces—more than double the standard version's weight—but is still remarkably light.

Inside, the digital-to-analog conversion is powered by a 32-bit Cirrus Logic DAC chipset and iFi's 16-core XMOS chip.

The iFi Go Bar includes jacks for 3.5mm or 4.4mm headphone connectors.

There's a GMT (Global Master Timing) femto-precision clock and an intelligent memory buffer to help eliminate jitter.

The Go Bar will handle pretty much whatever formats you throw at it. There's ultra-res PCM up to 32-bit/384kHz via USB, native Direct Stream Digital playback up to DSD256, up to 2x Digital eXtreme Definition DXD playback, and full MQA decoding.

Aside from controlling the volume from the Go Bar, you can adjust the output signal by engaging iFi's XSpace and XBass features, along with Turbo Mode. XSpace is a processing effect designed to deliver a wider soundstage, while XBass not surprisingly boosts the bass. Turbo Mode gives a 6dB signal boost.

There are two headphone jacks, a 4.4mm fully balanced output and what iFi calls 3.5mm S-Balanced (fave. co/3zNXO6Y) output. There's a USB-C port on the other end, and the iFi Go ships with a USB-C-to-Lightning connector for iPhone users, a USB-C-to-USB-C connector for Android users and a USB-C-to-USB-A adapter for computers.

You get a leather travel case with pockets for the Go Bar and your connector cable. There's a belt loop on the back side and a snap closure. Even if you're not going to put it on a belt next to your pager or phone case, it's

nice to have a case to protect the finish when it's in a pocket or a bag.

WHAT CONTROLS ARE ON THE IFI GO BAR?

The side of the Go Bar has an IE Match switch to attenuate the power output for either the 4.4mm or 3.5mm jacks. There are two buttons to adjust the headphone output volume, which is 100 percent controlled on the iFi Go Bar and not on the source device. Pressing both volume buttons for 2 seconds turns Turbo Mode on or off. There's also a button to engage iFi's XSpace and XBass features.

The iFi Go Bar features indicator lights on its bottom side for 44.1/48kHZ,

The iFi Go Bar comes with a case and cables to connect to devices with Lightning or USB-C connections. There's also an adapter for USB-A computer connections.

The iFi Go Bar controls include a switch to adjust output for 3.5mm or 4.4mm headphone connectors.

88.2/96kHz, 176.4/192kHz, 352.8/384kHz, DSD 64/128, DSD 256, and MQA playback resolutions. There are also lights to show when XSpace and XBass are turned on.

The matte finish on the standard Go Bar is incredibly nice, and to keep the sleek look, designers decided to add the printed IDs for the playback resolution in a gloss finish that's virtually the same color and in an extremely small font. You'll need at least a direct light source to read the details and quite possibly some kind of magnification. Adding the detailed and labeled output information is a real plus, but iFi almost defeats the move by making it so hard to read.

WHAT DOES THE GO BAR SOUND LIKE?

I tested the iFi Go Bar with an iPhone using the USB-C-to-Lightning adapter that comes with the iFi Go. I used Focal Celestee headphones, Periodic Audio Carbon in-ear monitors, and less-than-$100 Sony MDR-7506 headphones. I also compared the Go Bar to the recently reviewed Questyle M15 (fave.co/3BwxYpi) and the AudioQuest Dragonfly Cobalt (fave.co/3d3bcLH) dongle-style DACs.

No matter what volume you were enjoying before you unplugged your iFi Go, it's going to play back at a safe, low volume whenever the DAC is first plugged in. That's a positive safety feature, and one that should be applauded and appreciated. That doesn't make it any less

frustrating when your headphones come unplugged, and you want to get back to the music but first must figure out the right volume level again.

As I started this final testing for this review, Qobuz suggested I check out its 96kHz Hi-Res version of Deep Purple's classic 1972 LP *Machine Head*, the summer soundtrack for stoner kids 50 years ago this year. The iFi Go revealed scores of musical details in "Highway Star" that never came through on the 8-track tape, especially the way Jon Lord's distorted Hammond organ parts effectively double Ritchie Blackmore's guitars.

That detail is a strong selling point for the Go Bar, but the whole listening experience seemed a bit underpowered until I turned on XSpace, XBass, and Turbo Mode at the same time. Those settings made Deep Purple truly rock, but they were overwhelming on a more subtle recording, like the latest 96kHz remaster of *The Buena Vista Social Club*, which definitely sounded better with all three turned off.

Things get a bit more complicated when comparing the Go Bar to the Questyle M15 and the Dragonfly Cobalt. While the Go Bar offers impressive detail, the M15 is

I tested the iFi Go Bar with an iPhone using the USB-C-to-Lightning adapter that comes with the iFi Go.

slightly but noticeably more detailed. The Cobalt reproduces low-end sounds better than either of the others and offers a similar level of audio detail.

The Questyle M15 may sound the best of the three, but it lacks the detailed audio playback readings offered by the other two, as well as the ability to tweak settings beyond a gain switch. The Cobalt doesn't have any adjustment capabilities and only supports headphones with a 3.5mm connector.

The iFi Go Bar has the most configurability and would have the most detailed settings readout if the print on the dongle wasn't so hard to read. It's the same price as the Dragonfly Cobalt and $80 more expensive than the Questyle M15.

BOTTOM LINE

If you prefer the features and design of the iFi Go Bar, it's an outstanding choice. The differences between the Go Bar's audio quality and what you'll get from the Questyle M15 or the Dragonfly Cobalt

The iFi Go Bar comes with a portable case with pockets for the DAC and for the cable you use to connect to your phone.

isn't dramatic and, since all three are so good, your personal preferences might differ from mine.

The included case and iOS cable make this a strong value proposition for iPhone users, since the Dragonfly requires a $38 adapter and the Questyle M15 needs a $20 Lightning cable that's not included with the DAC.

If only someone on the development team had raised a hand and pointed out how hard it is to read the printing on the device, the Go Bar design could have been fixed and we'd be looking at the best-resolution readout we've seen to date. ■

iFi Go Bar

PROS
• Volume is controlled by the iFi Go and not the audio source.
• Small size makes it easy to carry with a phone.

CONS
• Streaming-quality indicators are hard to read.
• Volume must be reset each time a user plugs it in.

PRICE
$329

COMPANY
iFi

LG S95QR soundbar:
Top-notch Dolby Atmos sound

With its five up-firing height drivers, the LG S95QR can't be beat in terms of
Dolby Atmos and DTS:X performance.

BY BEN PATTERSON

LG raises the immersion bar with the S95QR, a Dolby Atmos/DTS:X soundbar with not two, not four, but five up-firing drivers, including one for the center channel. LG's new flagship soundbar for 2022 does a superb job of peppering the room with surround and

height effects, putting you in a bubble of thrillingly immersive sound, while the additional center height driver shores up the dialogue.

The LG S95QR also arrives with AirPlay 2 and Chromecast support, not to mention an AI-powered room correction tool that adjusts the soundbar's audio according to

your home theater's acoustics.

On the downside, I had a tough time getting the LG S95QR to connect to my Wi-Fi network (I eventually succeeded after several tries), and the power cords for the two rear speakers are way, way too short. Finally, the LG S95QR comes with a lofty $1,800 price tag (although LG was offering a $300 price drop at press time).

The LG S95QR's center height driver helps to bolster dialogue.

HOW MANY CHANNELS DOES THE LG S95QR SUPPORT?

The LG S95QR is a 9.1.5-channel soundbar, which is unusual as far as soundbar channel configurations go.

That .5 at the end refers to the number of height channels, and typically that figure is either .2, denoting left and right height channels, or .4, for left, right, left-rear and right-rear. But the LG S95QR adds a fifth height channel for the center, with the idea being that the center height driver (which, like the other height speakers, bounces height cues off the ceiling) will help boost overall height cues as well as enhance the clarity of dialogue. We'll see—and hear—a little later if that extra height channel pays off.

Besides the height channels, the LG S95QR boasts three front-facing channels (for the left, right, and center), four side-facing channels (two in the front and two for the rear), and two surround channels, giving us the 9 in the soundbar's 9.1.5-channel configuration. Finally, the wireless subwoofer supplies the low-frequency .1 channel.

HOW MANY HDMI INPUTS DOES THE LG S95QR HAVE?

The LG S95QR comes with three HDMI ports, including two HDMI inputs and an output that doubles as an HDMI-eARC interface. That HDMI-eARC port lets you connect your TV to the soundbar via a single HDMI cable, sending audio (including lossless Dolby TrueHD and DTS-HD Master Audio tracks) from all

The LG S95QR comes with two HDMI inputs and an HDMI-eARC port; there's also a USB port that allows for high-res audio playback.

your TV's connected playback devices (such as 4K Blu-ray players, game consoles, and streaming video players) down to the soundbar.

If you'd rather connect your video sources directly to the LG S95QR, you can do so using the two HDMI inputs, and then send both video and audio to your TV via the HDMI output port (4K video passthrough including Dolby Vision, VRR, and low-latency mode is supported). In general terms, it's great to see a high-end soundbar that still bothers with extra HDMI inputs; more and more manufacturers (such as Bose, Bowers & Wilkins, and Sonos) are eschewing HDMI inputs in favor of a single HDMI-eARC connector.

Also on board is an optical (Toslink) input for older, HDMI-less TVs, along with a

USB port that supports audio files (including FLAC, AAC, and WAV formats at up to 24bit/96kHz resolution) on an external drive.

HOW EASY IS SETUP FOR THE LG S95QR?

Physical setup for the LG S95QR isn't that difficult, although I ran into some speed bumps with the rear speakers and Wi-Fi configuration.

Measuring 47.2x2.5x5.3 inches (WxHxD) and tipping the scales at 11.1 pounds, the LG S95QR's main soundbar housing is big, wide, and hefty, although at just 2.5 inches high, it should be short enough to fit beneath most TVs without blocking the bottom of the screen. An alternative to placing the LG S95QR in front of your TV is mounting it *under* your set, and a wall-mount kit (complete with brackets and screws) is included.

The 22.1-pound, 15.9x7.9x15.9-inch (HxWxD) subwoofer is pretty big as far as soundbar subwoofers go, and it's tethered by a five-foot power cord. Short as the power cord is, it should be sufficient for placing the soundbar behind your TV or near (but not too near) to the sofa.

The two rear speakers come with the same five-foot power cords as the subwoofer, which makes placement tricky

unless you have plenty of wall outlets nearby. Of course, you could always use extension cords, but a better option would be for LG to simply include longer power cables.

Wireless setup for the LG S95QR turned out to be a pain. The LG Sound Bar mobile app had no trouble detecting the soundbar, but after five tries it failed to connect the unit to my dual-band Wi-Fi network. After more fussing, I managed to connect the LG S95QR as an AirPlay 2 speaker using my iPhone, but the wireless setup process was anything but seamless.

A final step is running LG's AI Room Calibration Pro feature, which adjusts the soundbar's audio according to the acoustics in your room. The process only takes a few minutes, and it involves the soundbar listening to a series of loud
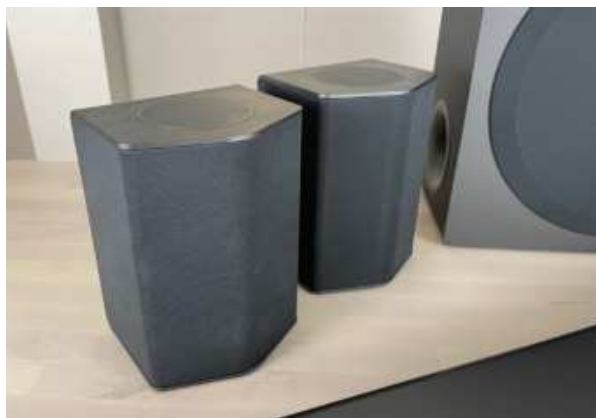
The LG S95QR's rear speakers come with power cords that are way too short.

beeps, blurps, and other tones through a built-in microphone. Room calibration is a feature we've seen in plenty of other high-end soundbars (including models from Samsung and Sonos), and it's great that LG has checked this particular box.

DOES THE LG S95QR HAVE A REMOTE?

The LG S95QR's remote is the same revamped wand that LG packs in its other recent soundbars, and its sleek, ergonomic design is a major improvement over older LG soundbar remotes.

Besides the four-way navigation pad, there are also buttons for trimming speaker levels and accessing the soundbar's settings menu, along with volume mute, sound mode, and Bluetooth buttons. Unfortunately, the volume up-down buttons are inconveniently placed in the top-left corner of the remote, meaning you'll need to stretch your thumb to reach them.

You can also control the soundbar with the capacitive touch buttons on top of the main housing (with buttons for power, input select, volume up/down, play/pause, Bluetooth, and Wi-Fi). Likewise, the LG Sound Bar app offers access to all the LG S95QR's modes and

Your thumb really has to stretch to reach the volume up/down buttons.

settings, along with plenty of options for trimming speaker levels.

DOES THE LG S95QR SUPPORT AIRPLAY 2, CHROMECAST, AND BLUETOOTH?

The LG S95QR offers both AirPlay 2 and Chromecast, meaning you can cast audio to the soundbar via Android phones, Apple devices, and any Chromecast-enabled app.

The soundbar also supports Spotify Connect and Bluetooth 5.0, including the SBC and AAC Bluetooth codecs. Unfortunately, the LG S95QR doesn't support any high-resolution Bluetooth codecs, such as Qualcomm's aptX Adaptive (the recent Bowers & Wilkins

Panorama 3 [fave.co/3OSTSWA] does support the aptX Adaptive codec, which support wireless hi-res audio streaming).

DOES THE LG S95QR WORK WITH ALEXA OR GOOGLE ASSISTANT?

The LG S95QR works with both Alexa and Google Assistant. Once you've connected the soundbar to either or both of those voice assistants, you can control the unit by speaking commands to a nearby smart speaker, such as "Alexa, play Taylor Swift on the LG soundbar" or "Hey Google, turn the volume up on the LG soundbar."

But while the LG S95QR does work with Alexa and Google Assistant, it doesn't have either of those voice assistants built in, meaning you won't be able to speak voice commands to the soundbar itself.

WHAT SOUND MODES DOES THE LG S95QR HAVE?

Among the sound modes you can pick on the LG S95QR are the typical Standard, Cinema, Sports, and Game modes found on other soundbars, but LG adds a couple other intelligent sound modes into the mix: AI Sound Pro, which delivers "customized" sound aided by artificial intelligence, and a Music mode augmented by DSP (digital

signal processing) technology in partnership with Meridian Audio.

After a fair amount of experimentation, I found AI Sound Pro (which I've tested on other LG soundbars) to be quite effective at automatically tweaking the audio depending on what you're listening to, while Music did a nice job of warming up music tracks. If you prefer a set-it-and-forget-it approach, sticking with AI Sound Pro would be a smart choice.

The LG S95QR also has a night mode that compresses the soundbar's dynamic range for late-night listening sessions, while a Clear Voice mode boosts the dialogue volume.

HOW DOES THE LG S95QR SOUND?

Sonically, the LG S95QR performed like a champ, delivering the most immersive Dolby Atmos and DTS:X audio I've ever heard from a soundbar (granted, I have yet to test Samsung's new 2022 flagship, the 11.1.4-channel HW-Q990B).

Listening to the 4K Blu-ray of *Star Wars: The Empire Strikes Back*, there were Dolby Atmos height cues all over the place, such as when an Imperial Walker implodes from above and when the Rebel base on Hoth creaks and shudders while under Imperial attack. The center height speaker paid off, delivering clear, crisp dialogue. Overall, I felt like I was in an immersive bubble of dynamic sound.

Moving on to the UHD of *Apollo 13* and its DTS:X soundtrack, the rumble of the *Saturn V* sounded deep and powerful yet never boomy, while the sound of the rocket's billowing exhaust seemed to roll into the room and around my head. Even better, as the spacecraft lifted off from the launch pad, I could clearly hear height effects from the right-rear speaker as the ship disappeared into the ride side of the frame. In fact, throughout my testing, I noticed a precision and directionality in both Dolby Atmos and

The LG S95QR has an optical input in addition to its HDMI ports.

DTS:X height effects that's absent in many competing soundbars.

I also dipped into 1978's *Superman* on the iTunes Stores, and I got a kick out of the Atmos-enabled title credits as they swooshed up, over, and across the screen, while John Williams' score sounded crisp, full, and musical. I also loved the solid—but not boomy—"thunk" of Richard Donner's "directed by" credit.

Switching from the AI Sound Pro mode to the Meridian-enhanced Music mode, I teed up Bruce Springsteen's *The Ghost of Tom Joad* on Apple Music, and I was impressed by the wide soundstage and precise placement of the instrumentation. I also enjoyed Billie Eilish's "Oxytocin" in Dolby Atmos, although for once I found the track a tad boomy; trimming the woofer levels brought the bass back into check. Ravel's solo piano works performed by Bertrand Chamayou for Erato sounded clean and atmospheric in its Atmos mix, while a 24-bit/96kHz track of Chet Baker's "Solar" played from a USB stick fairly shimmered.

So, is the LG S95QR the best soundbar I ever heard? In terms of Dolby Atmos and DTS:X performance, yes; I wrote the word "wow" in my testing notes more than once, for what it's worth. I have heard soundbars from Samsung and Vizio that arguably packed more punch and excitement, but in terms of pure immersion, the LG S95QR is tops in my book.

BOTTOM LINE

I certainly have my quibbles with the LG S95QR. Connecting the soundbar to my Wi-Fi network was a royal pain, although it's a process that (hopefully) you'll only have to go through once. Ditto for dealing with the short power cables on the rear speakers, which you could always elongate with extension cords—but you shouldn't really have to.

Once you have those annoying setup issues ironed out, the LG S95QR delivers a powerhouse Dolby Atmos/DTS:X experience, while AirPlay 2 and Chromecast means you'll be able to cast audio from your choice of streaming music services. And don't forget the USB port, which supports hi-res audio playback. The $1,800 price tag is certainly steep, but we're already seeing price cuts—and personally, I'd rather spend more on a top-performing soundbar than skimp on an underperformer. ◼

LG S95QR

PROS
- Terrific Dolby Atmos and DTS:X performance.
- Center up-firing driver bolsters dialogue.
- AirPlay 2 and Chromecast support.

CONS
- Glitchy Wi-Fi setup.
- Power cords for rear speakers are too short.

PRICE
$1,800

COMPANY
LG

YOU
MAKE
MONEY.

NOW MAKE IT
WORK FOR YOU.

Learn how to save for your
retirement at **WeSaySaveIt.org**.

WE SAY
$AVE IT

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ad
COUNCIL

WOMEN ARE 80% MORE LIKELY TO BE POOR IN RETIREMENT BECAUSE THEY'RE TOLD,

"TALKING ABOUT MONEY IS IN POOR TASTE."

WE SAY $AVE IT™

Learn how to save for your retirement at **WeSaySaveIt.org**.

National Institute on Retirement Security, 2016.

ad COUNCIL

AARP®

Mac 911

Solutions to your most vexing Mac problems.

BY GLENN FLEISHMAN

HOW TO AVOID BACKUP BLOWOUTS BY DISABLING iCLOUD OPTIMIZED STORAGE ON YOUR MAC

In macOS you can choose to optimize your usage of local storage by having your Mac automatically offload files it is already syncing to iCloud Drive, iCloud Photos, and other services. The logic is that you might have limited local storage and dozens to hundreds of gigabytes of data you don't need access to all the time, such as filed documents and photos from years past.

You want them available on demand—with an active internet connection—but not necessarily filling your drive.

However, there's a big catch: So-called optimized files are backed up only in iCloud. Because there's only a local placeholder for the synced file, Time Machine, third-party sync and backup software, and internet-hosted backup services cannot make copies.

You might decide that's OK! You trust the integrity of Apple's data centers and the quality of their operations. While Apple

doesn't offer insight into how it protects your data, it's definitely the case that the copy has multiple copies of your data stored in three or more different locations to avoid the risk of data loss due to hardware, fire or other accident, natural disaster, or a cyber or real-world attack.

Even if that's enough for you, still read on to make sure that your backup strategy is effective.

The drawbacks of relying on iCloud-only offloaded files

Making iCloud your only copy for synced data that's pushed off your drives or devices for optimization has drawbacks:

You lose access to iCloud: You could be locked out, have equipment stolen, have your account hijacked, or be blocked by Apple, and, despite the lack of legitimacy involved, never recover access. (You can mitigate some of this risk by enabling the iCloud Recovery Data Service.)

You delete items and don't realize it until it's too late: iCloud doesn't retain deleted items for long. Both iCloud Drive (fave.co/3BAkiJJ) and iCloud Photos (fave. co/3oLTA9p) have Recently Deleted collections (a folder and an album, respectively), but their contents empty automatically after 30 days.

**It's time to restore:** Unless you have a high-speed, uncapped, no-overage-charges internet connection, if you have to restore your files by resyncing to iCloud with a new Mac or a new drive, it could take days or weeks with hundreds of gigabytes of data. With a local Time Machine volume, it might be hours.

You run into inexplicable failures: One Macworld reader recently reported that their daughter lost a number of music files, despite having Sync Library enabled in Music and an iTunes Match subscription. Even with Apple's help, they were able to restore only a fraction of the lost files, despite having experienced going through this before: In a previous failure, all files were restored. It's unclear what happened, but these synced files so far remain missing.

You can "game" optimization in one specific way, though you can't guarantee it will work to back up all the files you want: The most recent files you create or modify will almost always be backed up quickly by Time Machine or an online service that frequently checks for modified files. That will leave you with an archived copy *before* macOS could decide to remove the file for optimization.

The best way to ensure you have a full backup with this method is to *not enable any optimization* until you have your first complete backup performed on all the services you plan to use.

This strategy won't work if you have to reset a Time Machine backup or other archive, or if you swap among Time
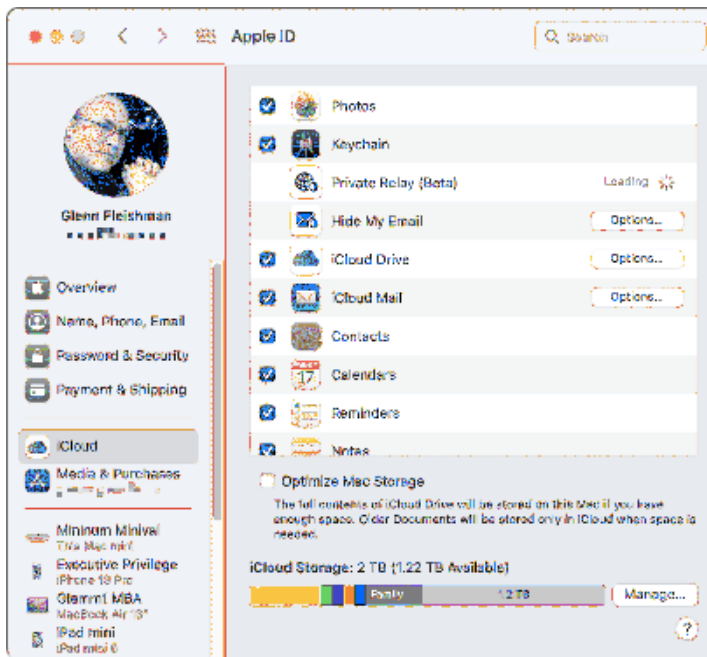
Control whether your Mac storage is "optimized" in the iCloud portion of the Apple ID preference pane.

Optimize Mac Storage controls iCloud Drive storage management.

> In the Photos app in Photos ➔ Preferences ➔ iCloud, you can enable iCloud Photos, but opt between "Download Originals to this Mac" and "Optimize Mac Storage." I have a desktop and laptop Mac, and I added a 1TB external lower-speed SSD for my Photos library specifically to always retain a full-resolution local copy; see this column (fave.co/3GoLIBZ). (You can choose a similar option in iOS and iPadOS in Settings ➔ *account name* ➔ iCloud ➔ Photos, but the backup process is quite different.)

> In the Music app, go to Music ➔ Preferences ➔ General to opt to Sync Library. If you have an active Apple Music subscription or iTunes Match subscription, any unique songs stored on your Mac will be synced (and potentially matched) to iCloud, too. (This 2015

Machine volumes to keep an onsite and offsite set. In those cases, you have to disable optimization to create a fresh complete starting backup, which may take a lot of time and bandwidth to achieve.

Manage optimization controls

If you want to enable or disable optimization, here's where you can find the controls in macOS:

> In System Preferences ➔ Apple ID ➔ iCloud (Catalina or later) or in the iCloud preference pane (Mojave or earlier),

column on syncing music with iCloud remains helpful; fave.co/3ORa6zO.)

How Apple could help

Apple could alleviate some of the drawbacks I mentioned without putting our data or our privacy at risk:

> Integrate iCloud and local Time Machine backups so that a synced file, image, video, or song was validated as backed up on a Time Machine volume and marked to prevent deletion from that volume before it was removed from local storage.

> Create a backup framework for developers to offer the same feature in their software.

> Allow internet-backup services to connect directly to our iCloud storage with appropriate authorization and authentication to back up files exclusively stored in iCloud after being "optimized."

HOW TO OPEN A STUBBORN EMAIL ATTACHMENT IN MAIL ON YOUR MAC

Mail has stymied some people after they upgrade macOS and try to open attachments. Instead of the attachment opening in the appropriate application, an app claims "you don't have permission to view it" or "access to file name was denied." However, if you drag the file out of Mail onto the Desktop or into another Finder window, you find you can open it without any error.

If you're running macOS 11 Big Sur, make sure you have installed the 11.6.7 update released June 9, 2022 (fave.co/3brNgkv), which fixes some attachment problems in Mail.

If you're using a different version of macOS or that Big Sur update didn't fix your problem, the solution may be as simple as fixing permissions on the deeply nested folder that Mail uses to hold attachments.
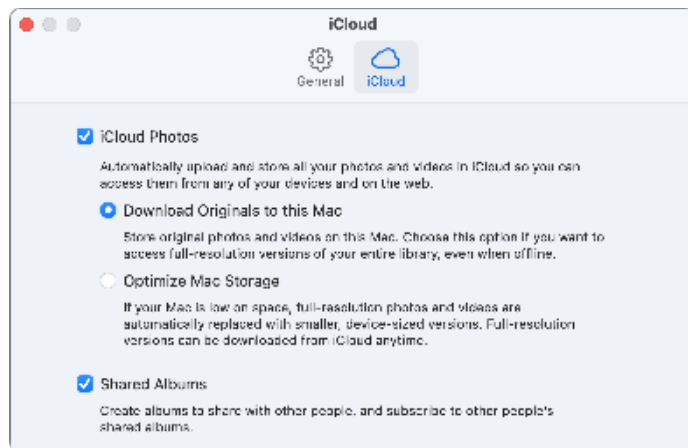
Photos has a separate control for managing whether images and videos can be offloaded and represented as thumbnails.
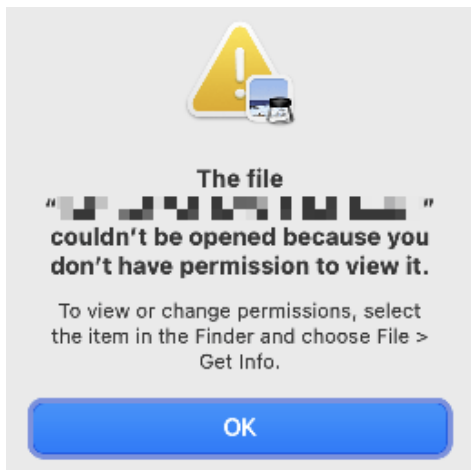
This message indicates something is wrong with the Mail Downloads folder's permissions.

Here's how to proceed:

1. In the Finder, choose Go ➜ Go To Folder.

2. Paste in the following: **~/Library/Containers/com.apple.mail/Data/Library/**.

3. Select the folder Mail Downloads.

Use Get Info to examine permissions for the folder (left) and then fix them.

4. Choose File ➜ Get Info.

Under Sharing & Permissions, you should see name (Me) and Read & Write next to it. If you do not, click the lock in the lower-right corner of the Get Info window and authenticate as requested by macOS.
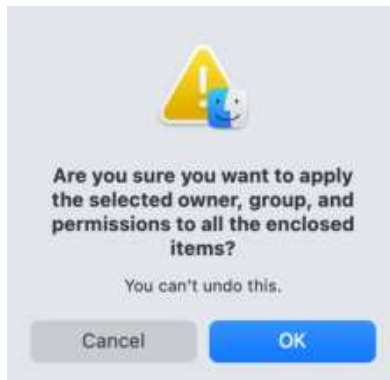
Then perform one of the following actions in the Get Info window's Sharing & Permissions section:

> Click the popup under Privilege next to the name (Me) entry and then choose Read & Write.

> If your name doesn't appear in the Name column, click the plus sign (+), choose your name, and click Select. Then select Read & Write in the Privilege column to its right.

Now click the circled "more" button (an ellipsis in a circle) at the bottom, choose "Apply to Enclosed Items," and click OK to confirm the choice.

This should solve the permissions issue for most people. If that doesn't work, try restarting into macOS Recovery and running Disk Utility's Disk First Aid as described in these steps (fave.co/ 3cOqF1M). If that still

doesn't solve the Mail attachments problem, I suggest a nondestructive reinstallation of macOS in place (fave. co/3vuaH3v). Make sure you create a full Time Machine or similar backup before reinstalling macOS.

WANT TO CHANGE A MAC'S DRIVE ICON? SOME LIMITS APPLY

macOS lets you set custom icons for drives (fave.co/3oNpq5P) and folders, a nice way to customize and distinguish otherwise identical items from one another. But you might find that some drives resist change. Here are the various types of drives where you can't change the icon:

ExFat: Drives formatted with the ExFAT filesystem, used as a compatible format for Windows and Mac files, typically won't accept custom icons. Some people have come up with complicated workarounds that may involve erasing the drive. It doesn't seem worth it and doesn't always work.

Time Machine volumes: Volumes dedicated to Time Machine in the Finder will always override whatever icon you choose, resetting to the Time Machine drive icon the next time macOS performs a backup to the disk. This is distinct from volumes set for network sharing as Time Machine destinations (fave.co/3BBfWCq), which can retain a custom icon.

HOW TO MIGRATE ONE USER TO ANOTHER MAC

Migration Assistant has long provided a straightforward way to move your macOS setup from one Mac to another. Instead of performing a fresh setup and copying files, Migration Assistant can move over all your files, users, applications, and preferences. Restart after migrating, and the experience is often just like the one on your old Mac.

But what if you want to move just a single user over? Mac 911 receives emails from readers who are consolidating from multiple computers to a single one and want to retain separate accounts for family members "joining" the shared Mac.

Fortunately, Migration Assistant makes this simple, too. Before starting, make sure both Macs are as up to date with macOS

as possible, at least within their current version. Apple continuously improves Migration Assistant, so having the most recent version of macOS available on both Macs can provide a cleaner experience.

Now connect the two Macs via a Thunderbolt cable if possible for best performance. A gigabit ethernet cable is often the second-fastest method, while being on the same Wi-Fi network is the third. The time difference can be so huge that it may be worth ordering a Thunderbolt cable and waiting for it to arrive. (See this previous Mac 911 column on checking the connection method Migration Assistant has selected; fave.co/3JskTPF.)

Next, launch Migration Assistant. The app works in either direction, so you can start from either machine:

> On a Mac you want to migrate an account to, select "From a Mac, Time Machine backup or Startup disk."

> Or, on a Mac you want to migrate an account from, select "To another Mac."

Click Continue.

Select the other Mac when prompted and click Continue. You can select what to migrate. Since you just want to migrate one or more accounts, uncheck everything except the listed user(s) you want to move over. Click Continue and wait for completion.

When Migration Assistant has finished, log out of the current account on the Mac you migrated an account (or accounts) to, then log in to the migrated account with the password for the account on the other Mac.

You can also enable fast-user switching in System Preferences ➔ Users & Groups by clicking Login Options. Check "Show fast user switching menu as," and this appears in the system menu. Select a migration account to log into it. ■
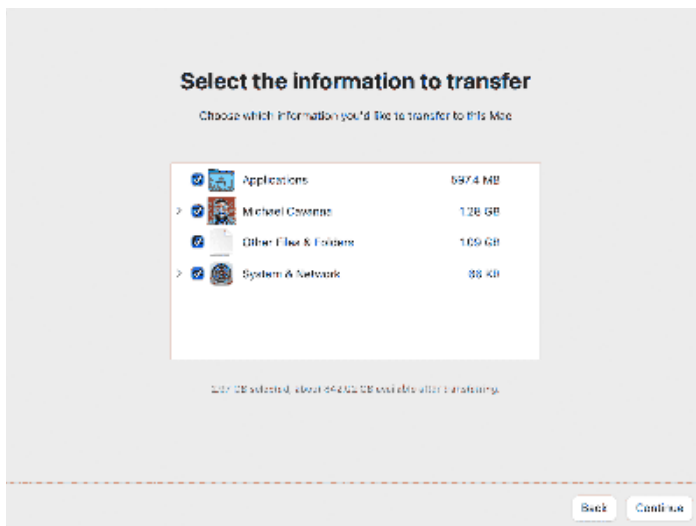
Migration Assistant gives you an option as to what to import—choose only the user or users you want.

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