March 2021
Vol. XXXIII, No 3

KEYSTONE MacCentral

printout

Keystone MacCentral Macintosh Users Group ❖ www.keystonemac.com

March Meeting

This month we plan to discuss

- VPN (**virtual private networks** provide privacy, anonymity and security to users by creating a private network connection across a public network connection),
- Little Snitch (whenever an app attempts to connect to a server on the Internet, Little Snitch shows a connection alert, allowing you to decide whether to allow or deny the connection), and
- Malware in your Mac.

Join our Zoom meeting by clicking on the link in your email from KeyMac. No email? Contact KeystoneMacCentral@mac.com to have the Zoom information sent to you.

Our meetings are virtual meetings via Zoom
on the third Tuesday of each month (except during summer).
The invitation will be sent out prior to each meeting.
Just click on the link at the designated date and time.

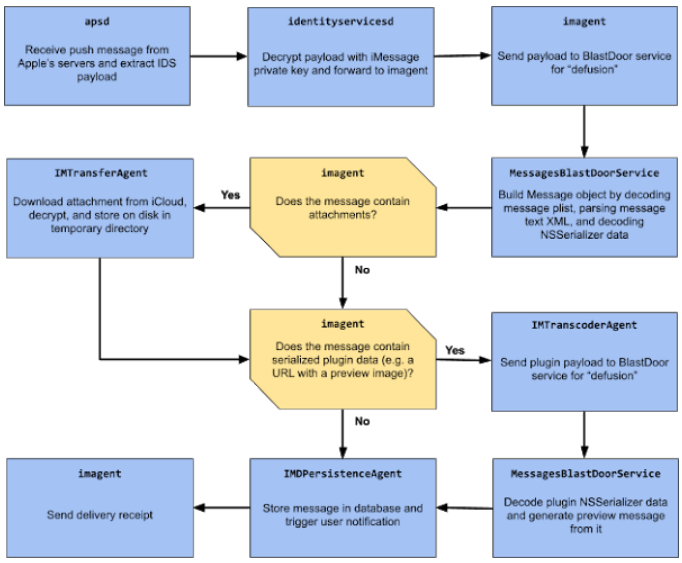
Contents

By Glenn Fleishman

BlastDoor Hardens iMessage Against Malware Assaults

For several years, security researchers have warned about the creaky innards of iMessage, Apple's proprietary end-to-end encrypted message-handling system in iOS, iPadOS, and macOS. But one researcher has announced good news: Apple quietly updated some key components of message handling in iOS/iPadOS 14 and macOS 11 Big Sur in a way that dramatically reduces the chances of an attacker's success.

Last week, Google Project Zero's Samuel Groß published a lengthy and technical blog post explaining his findings. If you recognize Groß's name, that's because he is frequently credited in Apple's security updates with finding bugs, as is the project he works for at Google. If you want the gory details, read his post, but here's the end-user version.



Read on if you don't immediately grasp Project Zero's illustration.

iMessage has reportedly been exploited a number of times in the wild with so-called "zero days," or flaws that can be exploited to gain access to a system, app, or service that its maker isn't yet aware of. The activist researcher organization Citizen Lab released a report on 20 December 2020 about one such attack used extensively in 2020. It appears that iOS 14 stifles that attack.

Google's Groß decompiled and examined the iMessage code in Big Sur and discovered that Apple had replaced iMessage's previous simplified message handling, which had many points of weakness. The new code has a series of components you can think of as a set of scanners and disassembly stations that prevent a bomb from passing into a secure location. Groß says that Apple calls this BlastDoor in its innards. The technology is also present in iOS and iPadOS, as far as he can determine. (iOS and iPadOS are more locked-down than macOS, making it somewhat harder to be sure.)

Before BlastDoor, incoming messages passed through a single monolithic process that handled every message-related task: addressing, integrity, attachments, notification of receipt, and more. If a maliciously crafted message or attachment could crash that message handler, it opened the operating system up to abuse.

Imagine iMessage as an office building protected by an automated, unmonitored package receiving dock with a keyboard to enter a recipient's name and a slot for inserting boxes. Sometimes attackers would do the equivalent of putting chewing gum over a sensor, which confused the system into letting the attacker open a hatch and enter the building—and then open many doors once inside.

iMessage was also susceptible to poking and prodding: an attacker could try different kinds of behavior to see if a message was delivered successfully—if not, that revealed critical information. And an attacker could try to crash the message handler indefinitely, although the device's owner might eventually notice.

BlastDoor compartmentalizes, or *sandboxes*, each step in message processing. Sandboxing is a well-known system design technique Apple and many other firms have increasingly engaged in for baseline security.

Consider our package delivery dock in the analogy above. In a sandboxed delivery system, the sender must first enter a sealed compartment and prove they're actually carrying a box. If they fail, the compartment pushes them back out. If they succeed, they have to stick the box into another compartment that doesn't close until it's sure they're out of it, at which point a robot X-rays the box, gently unpacks it, and so forth.

By design, sandboxed components and apps are unable to access files, input/output devices, or other resources outside their little play area. If malicious code causes one component to crash, it takes the sandbox with it, but it's much less likely to affect anything else or produce a useful result that an attacker can use to infer details. No sandbox is perfect, and crackers try to break sandboxes too, not just the code running inside them. But abstracting and isolating actions increases the challenge substantially.

BlastDoor and other new messaging handling elements also have these improvements:

- **Crash monitoring:** The message system can tell when it crashes, which allows it to avoid leaking information about the crash to a malicious sender, and it reports the crash to Apple's central iMessage servers. Senders get a delivery receipt in all cases, instead of only when the message doesn't cause a crash.
- **Obscuring where the message handler runs (iOS/iPadOS):** A lot of exploits involve guessing where in physical memory legitimate code is operating to overwrite it with malicious code. A technique introduced in iOS 14/iPadOS 14 shifts that location around for shared cached data, making it effectively useless—even more so when paired with the previous fix, as an attacker can't use the lack of a delivery receipt to determine if a crash occurred.
- **Exponential throttling:**When one of iMessage's message-handling components starts to crash, a new feature automatically begins increasing the duration before iMessage relaunches the crashed component. So far, that's just for iMessage, but it could be extended to other services. The longer it takes a cracker to cycle through brute force attacks, the less likely they will succeed and the more likely they will be noticed.

Finally, Samuel Groß notes that Apple has implemented—but left inactive—an additional safeguard to protect against a specific form of arbitrary code execution. He speculates that Apple is evaluating the performance impact of this change with the goal of turning it on in the future to further reduce the potential success of attacks.

All that said, you can build all the protections you want, and the bad guys will continue to try to break through them. Make a bomb big enough or focused enough, and it will punch through any blast door. But the idea here is to increase the cost of breaking in—if that bomb requires the resources of a nation-state, you can at least be certain that you're safe from petty criminals. Plus, with iMessage's new crash-reporting capabilities, Apple has a better chance of detecting and defending against new attacks.

By Josh Centers

New Model M Is an American-Made Keyboard That Puts a Spring Back in Your Typing

1984 was a landmark year in computing. It was the debut year of the Macintosh, of course, but it also spawned another piece of timeless computer hardware: the IBM Model M keyboard, which Matt Neuburg argued is the greatest keyboard of all time (see "The Greatest Computer Keyboard of All Time?," 27 February 2009).

The Model M represents a long-gone era of keyboards designed to satisfy typewriter users, featuring satisfyingly clicky buckling-spring keys. In 1992, IBM offloaded most of its keyboard manufacturing to Lexmark, which continued to produce Model M keyboards for Big Blue. The industry eventually moved to cheaper and mushier mechanisms like rubber domes, and Lexmark and IBM both bowed out of the Model M business in the late 1990s. However, a group of Lexmark employees bought the factory in Lexington, Kentucky and formed Unicomp.

Clicky keyboards, once a niche item, have come back into fashion in recent years. They're now so popular that mainstream companies offer mechanical "gaming" keyboards you can buy in many brick-and-mortar stores, even Walmart. Meanwhile, Unicomp has been churning out those classic Model M clicky keyboards since the days of Apple's apparent doom.

Unicomp even makes a Mac-specific model, the Spacesaver M, but I'd be hesitant to recommend it. That's because, over the years, the old Lexmark tooling has worn down, leading to widespread reports of reliability issues and poor fit and finish. Recently, Unicomp invested in brand-new tooling to make the first brand-new Model M in a quarter-century, simply named the New Model M.

I recently found myself in need of a new keyboard. While the Model M wasn't my first keyboard, it was what I used in my high school typing class, and ever since I have longed for that clicky, bouncy, typing thrill.

With the COVID-19 pandemic and subsequent lockdowns having a catastrophic impact on small businesses, I've made it something of a New Year's resolution to do more to support small local businesses. The Unicomp factory is only 3 hours north of my house, so I figured even if I wasn't totally happy with the keyboard, I'd at least be doing my part to support one of the few computer peripheral manufacturers still making products in the United States.

The New Model M(ac Keyboard)

I nearly ordered a stock New Model M with Windows keys and all the trappings of a PC keyboard. After all, I don't look at my keyboard all that much, so I don't care that much if my Command key is emblazoned with the Saint Hannes cross, a Windows logo, or a Linux penguin. Regardless, you can swap out the keycaps, and Unicomp sells a variety of keycaps.

My hangup was the Mac-specific keys along the top row that let me control brightness, volume, Mission Control, and other functions. Plus the base model lacked the Function key seen on Apple keyboards. Sure, I could reprogram something to take its place, but I decided that it would make my life substantially easier to have a keyboard with a Mac layout.

I contacted Unicomp support in mid-December to see if they would be willing to build me a New Model M with the same layout as the Spacesaver M. I knew Unicomp had been hit especially hard

by COVID-19, delaying the upcoming Mini M keyboard that was due in March 2020, so I didn't get my hopes up. However, they responded quickly, telling me that they could do a custom keyboard in mid-January and to contact them again then.

Flash forward to mid-January, and I got in touch with Unicomp support again to see if they could build my custom New Model M. They said yes, and gave me instructions on how to order it:

1. Add the New Model M to your shopping cart.

2. Add two $10 customization fees.

3. In the Customization field, specify Mac layout.

The checkout process was pretty clunky, and the total cost after customizations and shipping was $145.87. That's pricey, but no more so than many high-end mechanical keyboards currently on the market.

I was told it might take up to two weeks to build and ship my keyboard, but it shipped in just three days and arrived the day after it was shipped, likely due to my close proximity.

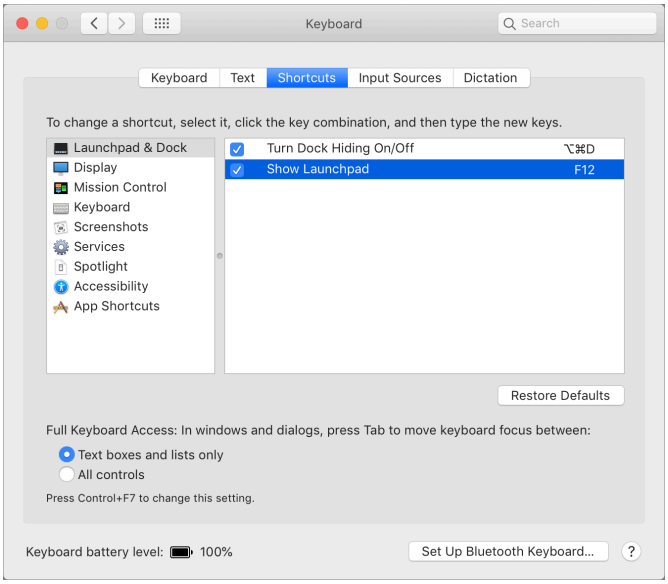
The keyboard I'm now typing on may very well be unique: a New Model M with a Mac layout.

The New Model M Mac Layout

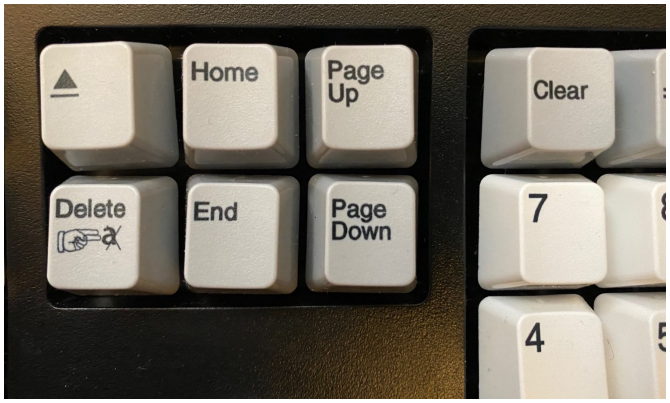
The New Model M's utilitarian industrial design won't win any style awards. It features a simple black base, with a mix of white and gray keys. The Mac variant is pretty bare bones. It includes all the keys you would expect in a full-size Mac keyboard —Command, Option, Function, brightness, etc.— but don't expect Susan Kare-designed icons on the keycaps. Special keys like Command and Exposé have simple text labels, while brightness, volume, and media keys have generic pictographs.

In terms of size, the New Model M is a beast. It's 17.9 inches (45.5 cm) wide, 7.5 inches (19 cm) deep, and 1.96 (5 cm) inches high, and weighs 3 pounds 11 ounces (about 1.7 kg). The number pad makes the keyboard especially wide, so it might get in the way if you keep your keyboard and pointing device side-by-side. I prefer to put the keyboard in my lap, so that's not an issue for me.

The New Model M worked with my iMac out of the box. Volume, brightness, and media keys worked perfectly, as did Exposé. I had to program the Dashboard key to trigger Launchpad in System Preferences > Keyboard > Shortcuts (interestingly, the Dashboard key registers as F12).



One odd thing is that Unicomp replaced the Insert key with Eject, something I didn't notice until I tried to press Insert while typing on my ThinkPad and the DVD tray popped out. Another oddity, though it's standard on full-sized Mac keyboards, is that there is no Num Lock key on the number pad. Instead, it's replaced by a Clear key. Also, I'm amused by the little pictograph of finger guns slaying the letter "a" on the Delete key.



If you're debating between the standard layout or dropping an extra $20 on the Mac layout, I think the extra money is worth it if the main computer you'll be using the keyboard with is a Mac.

Typing on the New Model M

Let's talk about what's really important: what is it like to type on the New Model M? It's difficult to convey such an experience in text, but I'll do my best.

It's important to note that the Model M is **not** a mechanical keyboard! Instead, it uses a buckling spring mechanism, which is a much older design than the traditional mechanical keyboard mechanism. The chief difference between the two is the size of the spring. In a buckling spring keyboard, you press a keycap, which presses a spring that sits directly on a lever that actuates the keypress. In a mechanical keyboard, a little bit of plastic actuates the keypress, with the spring simply returning the key to its original position.

In a buckling spring mechanism, the spring is the star of the show. If you pull off one of the keycaps you can see the spring sitting in its well.

The functional difference is that a buckling key's springs have a certain "springiness" that mechanical keys do not. It's hard to convey, but the keys make a slight "sproing" sound as you type. It's not particularly loud, though it's definitely not silent. I don't worry about waking up the kids when they're sleeping in the next room, and it seems quieter than Adam Engst's old reliable Das Keyboard, which sounds like horses stampeding when we're on Slack calls. I made a video of me typing on the New Model M so you can get a sense of the sound.

https://www.youtube.com/watch?v=u39sDlCh9Vc

Buckling springs have a reputation for requiring a lot of force. I was worried about that because my forearm muscles tend to get painfully tense when pressing buttons repeatedly, which is why I use a vertical mouse and rarely play games on computers anymore (see "Anker's Vertical Mouse Provides Cheap RSI Relief," 7 December 2018). However, I have not been bothered at all by the activation force necessary for the New Model M.

In fact, I find the keys to be quite light to press. The spring offers enough resistance so you won't accidentally activate a key just by touching its keycap, but once you decide to press a key, it moves ever so slightly before that ever-so-satisfying click. I estimate the actual activation travel to be about the same as Apple's Magic Keyboard.

The additional travel between the click and the key bottoming out helps cushion your fingers. When I typed with Apple keyboards, I sometimes experienced pain in my fingertips from where they

were constantly smashing into the keyboard. I have no such pain with the New Model M.

When I was between keyboards, I used a super-cheap Walmart keyboard that was so mushy it was like typing on mashed potatoes. It was a strain on my forearms because it felt like my fingers were working in mud. I can't say the New Model M has eliminated my forearm pain, but it aggravates it the least of all the keyboards I've tried.

Nitpicks

I like typing with this keyboard, but nothing's perfect. For one, while aesthetics are subjective, I find the New Model M ugly. But perhaps more offensive than the overall aesthetic is the use of bright blue LEDs for the Caps Lock and Function indicator lights. Maybe it's just my highly sensitive eyes, but I find blue LEDs to be entirely too bright, and they're totally overused in computer components these days.

If you care about n-key rollover, the New Model M is not the keyboard for you. Many keyboards stop reliably registering key presses when too many keys are pressed at the same time. You can test this on your current keyboard by holding down both Shift keys with your pinkies and typing:

THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG

When I do this on the New Model M, I get:

TE UIC RWN JUS VER TE LAY DG

That's pretty bad, but again, it primarily concerns gamers, who might have to hold down several keys at once. The Apple Magic Keyboard performs about the same:

H CK BN FX JMPS V H LAZ DG

Keyboards that feature n-key rollover have no limit to how many keys you can press at once. N-key rollover is often confused with ghosting, which is when phantom keypresses occur when multiple keys are pressed down. For example, you press "n" and "k" at the same time and then "i" also appears in whatever you're typing. Many times when keyboard makers advertise "anti-ghosting" they really mean some sort of key rollover. Linus Sebastian explains the differences in this video.

The long-delayed Mini M, if it ever ships, will sport one feature I wish the New Model M had: a detachable USB cable. In my experience, the first thing to go on long-term use items like this is the cable (like on my Sony MDR-V6 headphones from 2007), so I'd like to be able to replace it easily.

There are a few things about the New Model M that are inferior to the old Model Ms I used in high school. There is a slight creak when I squeeze either side of the keyboard. The original Model Ms were rock solid, presumably because they had been carved from stone. However, this doesn't make any difference when typing. Another downgrade is the use of single-piece keycaps. The old Model M models had an external shell over each key that easily popped on and off, so you could change a key's look without removing the entire key and possibly messing up the spring

mechanism. On the New Model M, you have to remove the entire key. Again, this is a nitpick.

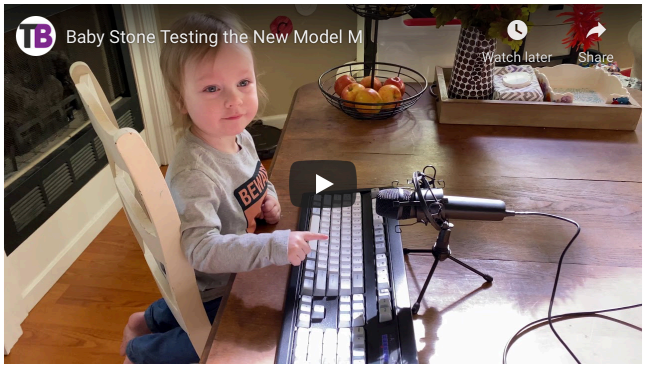
A final small issue I have that may become larger in the long run is the sharp edges on the Command key. Since the side of my left thumb often rides against the corner of that key, the edge irritates my thumb. It'd be nice to have chamfered edges on the Control, Option, and Command keys.

Final Verdict

If I didn't love the New Model M, I could at least console myself with the fact that I had thrown some money to a small, somewhat local business. But I do love it! While it won't win beauty contests or video game tournaments, it's a joy to type with. And I'm typing all day, every day.

There is a theory called the Lindy effect, which states that the longer a non-perishable thing lasts, the longer it is likely to last. For example, if a book has been in publication for 50 years, it's reasonable to assume that it will be in publication for another 50 years. By that measure, the 37-year-old Model M is indeed "lindy." It's a timeless design, and I'm glad Unicomp is carrying on the tradition.

Finally, I'll leave you a video of my youngest son helping me record keyboard sounds.



By Jeff Porten

CES 2021

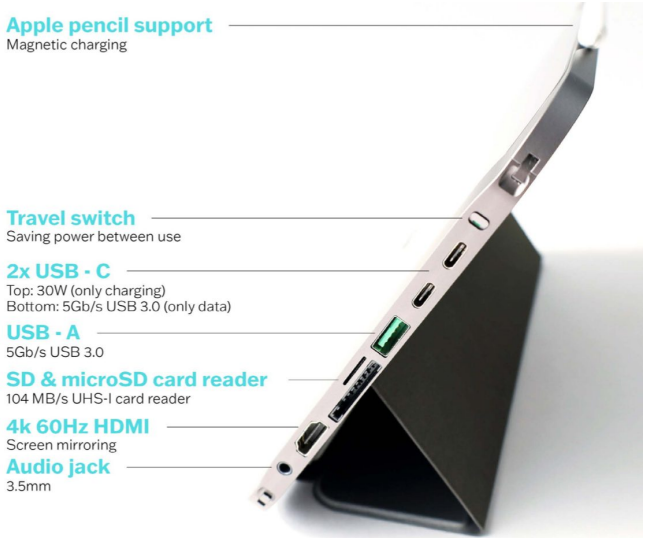
Eureka Park, the startup section of CES, is one of my favorite breakouts within the show. If you have an affection for scrappy tech companies that consist of two guys in a garage with half a prototype and big dreams, you can't do better than Eureka Park. You'll see the wildest ideas alongside downright bizarre ones, and you can tell at a glance from the quality of the presentation whether a company has some venture capital or needs to get lucky at a blackjack table to buy airfare home.

That is, that's how it works most years. This year's entirely virtual CES has upended the usual filters. Physical booths are expensive and make it easy to get a feel for how likely a company is to be around in a year. Online booths are cheaper, and the CES website format makes them all look similar. There are still cues whether a company has competent public relations support, but the amount of time it takes to make a first impression has gone up from several seconds to a few minutes—instead of a glance at a booth, I'm double-clicking on PDFs if the three-sentence description sounds at all interesting. And while the number of exhibitors this year is down from over 20,000 to under 2000, over 600 of them come up in a search for Eureka Park booths—way too many to get the comprehensive grasp of the entire section that I can get on the show floor.

It makes me look forward to a live CES next year—but if they continue doing online exhibits as a hybrid, I truly hope CTA comes up with a better presentation.

Fledging Hubble iPad Case

I have to hand it to Fledging, because it has a lineup of three products that range from the unlikely to the supposedly impossible. In the unlikely category: the Hubble iPad Air or Pro case, an aluminum enclosure that adds two USB-C ports (one for data, one for charging), a USB-A port, both SD and microSD card readers, and HDMI output to your previously port-limited iPad. There's even a 3.5mm microphone jack. It's available now for $99.99 for the 11-inch models or $109.99 for the 12.9-inch Pro, but with shipping delays due to backorders.



MacBook Pro Internal SSDs

On the impossible side of things: an internal SSD upgrade for a 2016–2018 MacBook Pro. The Feather M17 SSD comes with all the tools necessary to pop open that MacBook that Apple told you could never be upgraded, although the upgrade process may not be for the faint of heart. (I don't associate "this may take more force than expected" with a low-stress process.) The sales page lists sizes from 256 GB to 2 TB ranging in price from $87.99 to $384.99, but at press time, everything larger than 512 GB is sold out.

ChargeASAP Omega 200-Watt GaN Charger

All gallium nitride (GaN) chargers are small enough to be in "you have to see it to believe it" territory, but even so, a credit-card-sized charger that can handle two MacBook Pros

simultaneously is noteworthy. ChargeASAP's Omega charger line comes in 65-watt, 100-watt, and 200-watt capacities, with the 200-watt version including four ports for simultaneous charging through two USB-C and two USB-A cables. It will also fast-charge an iPad at 20 watts. The 200-watt charger weighs under 8 ounces (220 grams) and will retail for $149 when it ships this month; it's available now on IndieGogo for $100 with few remaining.

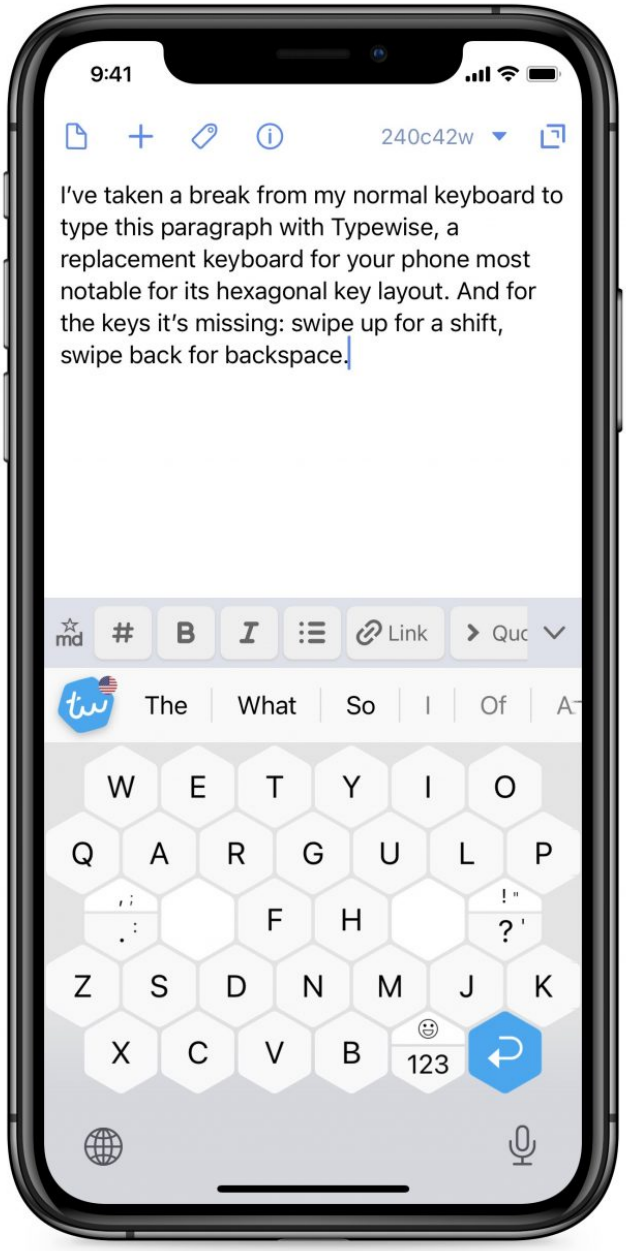
Kensington StudioDock iPad Docking Station

Kensington's StudioDock turns a 12.9-inch iPad Pro, 11-inch iPad Pro, or 11-inch iPad Air into a desktop computer reminiscent of an iMac. It mounts your iPad on a magnetic plate that keeps it wirelessly charged, and a single USB-C connection splits out into a USB-C port, three USB-A ports, a 3.5 mm audio jack, and Gigabit Ethernet on the back of the dock. There's also an HDMI 2.0 port (for driving an external monitor) and a high-speed SD card reader. The base of the stand doubles as a wireless charging pad for your iPhone and AirPods, and an optional side mount will be available later this year to charge your Apple Watch. Pre-orders are being taken now for March 2021 delivery. The StudioDock 12.9-inch model costs $399.99, with the 11-inch model priced at $379.99.

Mudra Band Gesture Control for Apple Watch

If you're a frequent user of your Apple Watch, you might consider Wearable Devices' Mudra Band to be a bit magical. The Mudra Band has eight sensors on the inside of the band that sense gestures you make with your hand, so instead of manipulating the screen with your other hand, you can make a gesture with the hand the watch is on. Flick in midair to dismiss an incoming call, or pinch thumb-to-forefinger to silence an alarm. An accompanying app enables assigning custom gestures to actions on the watch. Mudra Band costs $179, comes in black or white, and is due to ship in March 2021. The company knows this sounds like you're risking your money on a product that may never ship, because as an introductory video repeats several times, "It already works!

Typewise iPhone Keyboard



I've taken a break from my normal keyboard to type this paragraph with Typewise, a replacement software keyboard for your phone most notable for its large hexagonal key layout. And for the keys it's missing: swipe up for a shift, swipe left for backspace. A longer swipe left deletes multiple characters, and if you go too far, you can swipe right to restore them. Thoughtful touches like these make switching easier than it might be, but the learning curve is still steep. As you can see from the screenshot, despite my best intentions, I

switched back to my trusty Mac keyboard after the first two sentences. Typewise says that it takes most people about a week to get the hang of it, after which they type with 93% accuracy (19% better than "regular" keyboards, whatever those are). Typewise is also of interest if you're perturbed by keyboards talking to services in the cloud: no text data is ever transmitted, all autocorrect learning is local, and the only time a network connection is made is for voice transcription (which you can turn off). Typewise is a free download from the App Store and includes a 7-day free trial; after that, you can stick to basic features or subscribe for $1.99 per month or $9.49 per year. A $25 lifetime subscription is coming soon.

Apple Updates

macOS Catalina 10.15.7 Supplemental Update 2
Feb 8, 2021 — 1.35 GB

System Requirements
– macOS 10.15

macOS Catalina 10.15.7 supplemental update addresses an issue that may prevent the battery from charging in some 2016 and 2017 MacBook Pro models.

Security Update 2021-002 (Mojave)
Feb 8, 2021 — 1.63 GB

System Requirements
– macOS 10.14

Security Update 2021-002 is recommended for all users and improves the security of macOS.

Security Update 2021-001 (Mojave)
Feb 5, 2021 — 1.75 GB

System Requirements
– macOS Mojave

Security Update 2021-001 is recommended for all users and improves the security of macOS.

Security Update 2021-001 (Catalina)
Feb 5, 2021 — 1.35 GB

System Requirements
– macOS Catalina

Security Update 2021-001 is recommended for all users and improves the security of macOS.