

Deep Inside
Windows 8

Examining
the PadFone 2

In Depth
with HTC's 8X

DISTRO

110212 #64

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iPAD MINI

The Next Big Thing?

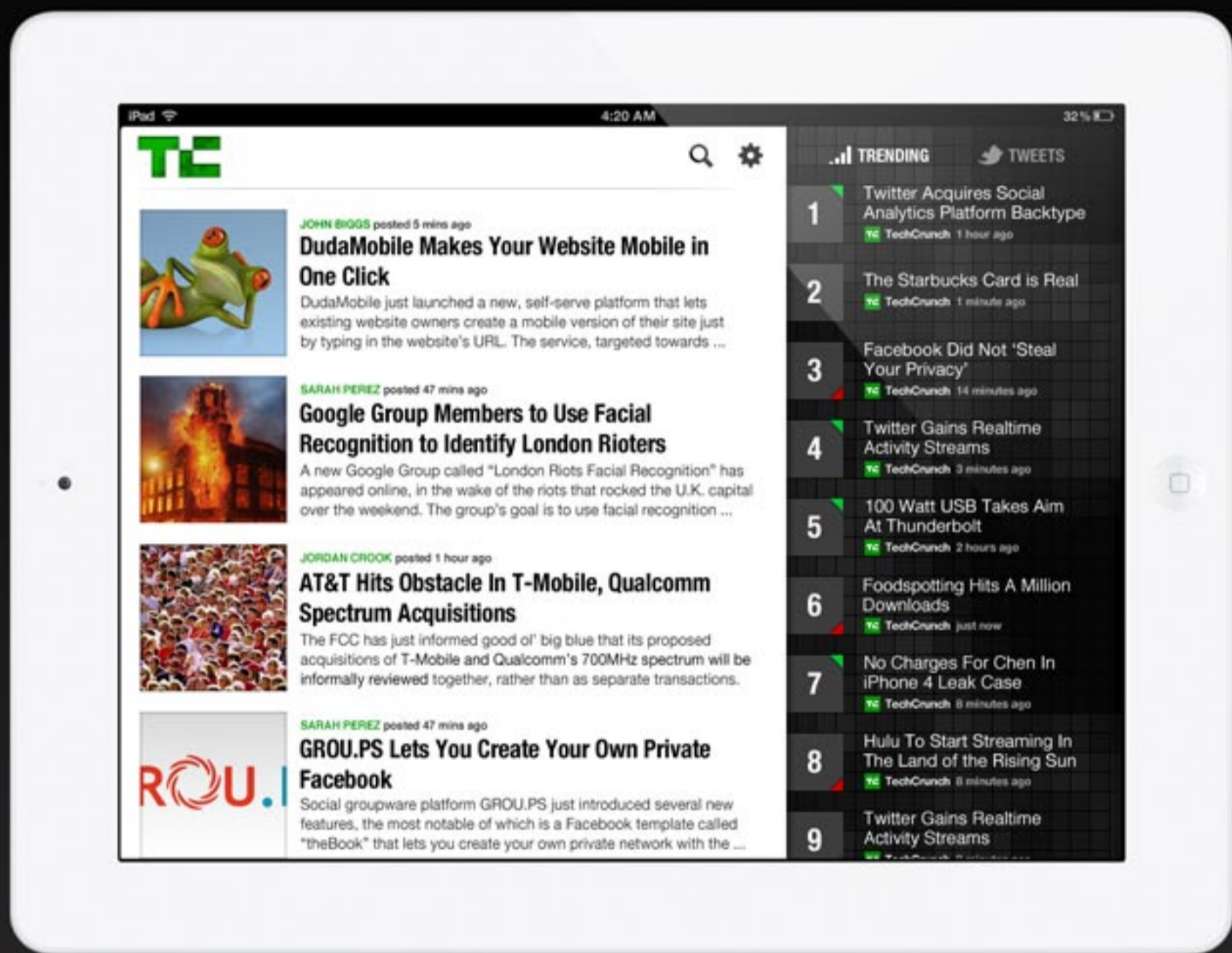
**WITH SMALL SLATES
CHIPPING AWAY AT ITS
TABLET MARKET SHARE,
APPLE TAKES AIM AT THE
LITTLE GUYS**





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ISSUE 64

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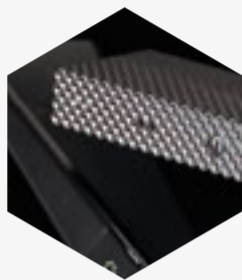
11.02.12

TABLE OF CONTENTS

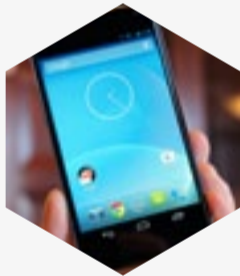
ENTER



EDITOR'S LETTER
Sandy Can't Stop Us
By Tim Stevens



EYES-ON
Slingbox 350 and 500



HANDS-ON
Nexus 4, Nexus 10, Samsung Ativ S and Neo Geo X



WEEKLY STAT
The Ups and Downs of Earnings Season
By Christopher Trout



RECOMMENDED READING
From Village to City in a Changing China and More
By Ben Gilbert and Don Melanson

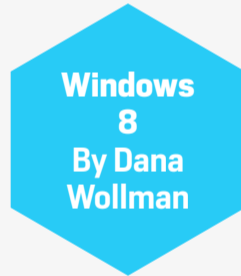
REVIEW



PadFone 2
By Richard Lai



HTC 8X
By Myriam Joire



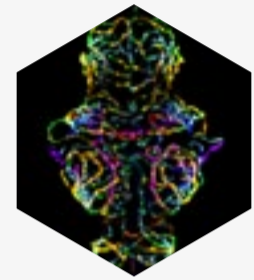
Windows 8
By Dana Wollman



iPad mini
By Tim Stevens



ESC



VISUALIZED
Photomicrography



Q&A
Freddie Wong



TIME MACHINES
Message Medium

On the Cover:
Photograph
By Will Lipman for Distro



SANDY CAN'T STOP US



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11.02.12

EDITOR'S
LETTER

I want to start this week by taking a moment to send my thoughts to those affected by Hurricane Sandy, both here in America and abroad. While we're a global operation, with editors and contributors all over the world, a large concentration of our staff is based in New York City and has been directly affected. Our Manhattan offices are still closed, so putting this issue of Distro together presented a real challenge for our design and production team. That we have an issue at all is thanks to the incredible dedication of the folks who bring Distro to you every week, and for that I am very thankful. So, I hope you'll forgive us if we're missing a few regular sections this time around.

But, we didn't want to make you wait to read our review of one of Apple's most talked-about product launches ever. It's the iPad mini, and it's also one of our most talked about reviews ever. That's perhaps putting things a bit euphemistically but it's safe to say that people reacted with disbelief when we not only liked the thing, but said that, in some ways, it's better than the other iPads that have come before.

Read the review and you'll see my

take on the thing. For me, the thinness and lightness, plus the exemplary battery life more than make up for the unfortunately non-Retina display. Though lacking in pixels it is a nice panel, with better color reproduction than the iPad 2 with which it shares a resolution. Is its SD nature worth the tradeoff over the bigger iPads? That's something you'll have to decide for yourself. And then there's the cost increase over the other 7-inchers, of which there are many to choose from. Which is best for you? Hopefully the review helps you decide.

That's not the only iPad we reviewed this week, with the fourth-gen of the proper iPad dropping as well. This thing blew us away with its performance, indeed testing twice as fast as the previous one, but still offering better battery life. Impressive? Absolutely.

Of course, they'll be getting some stark new competition soon, with Google and Samsung launching the Nexus 10. It's the company's second reference tablet, this one slotting in at the 10-inch mark. 10.1-inches, to be exact, and with a pixel-packed resolution of 2,560 x 1,600. If that number sounds familiar it's because it's the same as that found in the 13-inch




panel in the new 13-inch MacBook Pro with Retina display, but in a much smaller panel. That's an impressive technical feat to say the least, especially at a price of just \$399 for the 16GB version. That leaves us with one question: is it any good? To know that answer you'll have to read our review on the site.

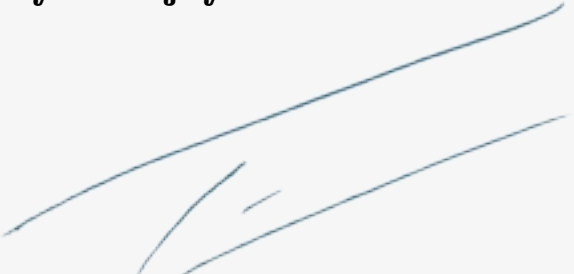
The Nexus 4 also got official, the LG-made reference phone code-named "Mako" that we've been hearing about for ages now. It is, as we expected, a 4.7-inch 1,280 x 768 smartphone with a quad-core S4 Pro processor and a very healthy 2GB of RAM — but only 8GB of storage to start. Thankfully, it's priced on the reasonable side: just \$299 unlocked. (A 16GB version is well worth the \$50 more.) Still no LTE, leaving us wondering when Google will ever bring us an unlocked Nexus device with proper 4G. Until then we're still stuck with HSPA+.

Both devices are running Android 4.2 — still called Jelly Bean, but bringing some interesting tweaks such as a Swype-like keyboard that'll let you drag your finger gracefully from letter to letter. There's also Miracast support for wireless video streaming, which might finally give Google a response to AirPlay, and two panoramic photo modes: one for horizontal panoramas and a full 360-degree spherical stitching. And, finally, Android gets a multi-user mode — but only for tablets. This could prove to be a boon for future corporate adoption.

Of course, it's Microsoft who wants

to keep its lock on the corporate space, and that's a big focus of the Surface. With the lead-up to Windows 8 we were a little unsure of what adoption rates would be for that new OS, particularly on the corporate front, but at least on the consumer side the desire is strong. At the company's Build developer event, Steve Ballmer proudly claimed 4 million Windows 8 upgrades in four days. That's a small percentage of the overall Windows 7 installs out there but, nevertheless, a very healthy number indeed.

What does the future hold for the OS? Well, a lot of that depends on whether it's any good, and if you want to learn our take on it, it can be found later in this very issue. It's Dana Wollman's exhaustive review of Windows 8, compiled after months of use on many, many different devices, letting you know if and where that software might fit into your life. You'll also find my iPad mini review plus our take on the 8X, HTC's Windows Phone flagship. Richard Lai also evaluates the ASUS PadFone 2, that company's hastily delivered update to the original. Finally, professional gamer and filmmaker Freddie Wong sits down for Q&A. Now, hopefully wherever you are you have power, heat and internet, and hopefully you enjoy this week's Distro. 



TIM STEVENS
EDITOR-IN-CHIEF,
ENGADGET



ENTER

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EYES-ON

SLINGBOX 350 AND 500

Tap for
detail

THE
NEST

A SET-TOP
WEDGE

CONNECTED
POSSIBILITIES

SLING MEDIA'S STREAMERS GET A MAKEOVER

While the Slingbox itself has been around for seven years, the 350 and 500 represent the first new tech introduced since 2008. This pair features two unique designs that are sure to add some character to that home entertainment setup, as the departure from the regular ol' rectangle is on display here.

THE DAMAGE:

\$179 (350) and \$299 (500)

PHOTOGRAPHS BY WILL LIPMAN



DISTR
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HANDS-ON



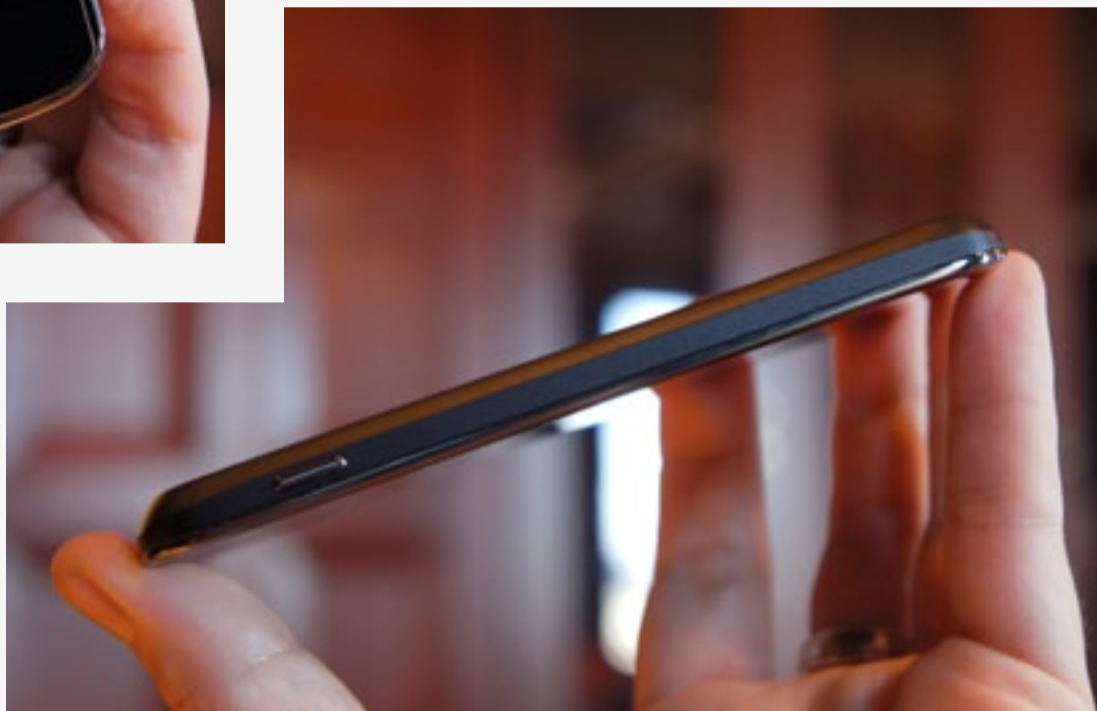
PRICE:
\$299 & \$349 (UNLOCKED)

AVAILABILITY:
NOVEMBER 13TH

THE BREAKDOWN:
THE NEXUS 4 COMBINES THE BEST OF LG'S OPTIMUS G WITH ANDROID 4.2 FOR AN IMPRESSIVE RESULT.



Click on product names to read full stories



GOOGLE NEXUS 4

After countless leaks we finally got a chance to put our dirty little paws on Google and LG's lovechild. The verdict? It's simply phenomenal. Like its cousin, the Nexus 4 is built around Qualcomm's speedy 1.5GHz quad-core Snapdragon S4 Pro SoC and storage comes in 8GB and 16GB flavors with no microSD expansion. It features the same lovely 4.7-inch non-PenTile IPS display, an unlocked pentaband DC-HSPA+ (42Mbps) radio, wireless charging and a sealed 2,100mAh Li-polymer battery.

Aesthetically, the Nexus 4 blends aspects of the Optimus G and Galaxy Nexus designs, with a glass-covered back and

rounded-off top and bottom edges. This phone looks and feels great — materials and build quality are much improved over last year's handset. At 9.1mm (0.36 inches) thin and 131g (0.31 pounds), it's also very comfortable in hand. Most of the controls are unchanged from its cousin — you'll find a standard 3.5mm headphone jack and secondary mic on top, a volume rocker and micro-SIM tray on the left, a micro-USB port and primary mic on the bottom, and a power / lock button on the right side. The Optimus G's capacitive keys give way to on-screen buttons and the RGB notification light moves below the screen.



SAMSUNG ATIV S

PRICE: £36 PER MONTH (ON
TWO-YEAR CONTRACT / UK)

AVAILABILITY: TBD

THE BREAKDOWN:

SAMSUNG'S FIRST WINDOWS
PHONE 8 HANDSET SPORTS A
4.8-INCH DISPLAY THAT MAKES
MICROSOFT'S OS GLOW.



At Microsoft's launch event for its new mobile OS, the ATIV S' 4.8-inch AMOLED display certainly helped to make the most of those colorful tiles — this time around a higher resolution (1,280 x 720) screen kept everything looking sharp. Aside from the screen, the hardware doesn't pack a unibody build, but it does offer the power user both a 2,300mAh battery and the microSD slot. Along the base, the central physical button is emblazoned with the Microsoft's newest logo, with the back and search capacitive buttons taking up the rest of the bezel below the screen.

Flip the device around, and there's a brushed-aluminum style (but not fin-

ish) battery cover with a grill separating it from the chin. At the top, there's a familiar-looking 8-megapixel camera, flash and loudspeaker setup. Unsurprisingly, it feels pretty similar to Samsung's Greatest Hit of 2012 and that sliver of a profile helped this big-screened smartphone fit our hand. The ATIV S gives you exactly what you'd expect from Microsoft's new UI. We spent some time using Internet Explorer, reorganizing and resizing tiles and the 1.5GHz fared well with the OS' initial offering. Oddly, it looks like the app selection is still missing some key titles that already exist on Windows Phone 7, but Samsung's made its own efforts, with preinstalled apps running the gamut from useful to less so.



PRICE: \$399 & \$499

**AVAILABILITY:
NOVEMBER 13TH**

**THE BREAKDOWN:
GOOGLE'S LATEST SLATE
PACKS SPEEDY INTERNALS
AND THE FRESHEST JELLY BEAN
BEHIND A STELLAR DISPLAY.**



GOOGLE NEXUS 10

The Samsung-made Nexus 10 just landed in our hands, and we had a little time to take it for a spin. First, let's go over the laundry list of specs. The Nexus 10 has a 1.7GHz dual-core Exynos 5250 under the hood — these are Cortex-A15 processors — as well as a Mali T604 GPU and 2GB RAM. There's little doubt in our minds that this is more than sufficient to please power users. Of course, it doesn't hurt that the Nexus 10 offers a 2,560 x 1,600 display, which equates to just over 300ppi. It's thinner and lighter than an iPad, registering at 8.9mm thick and 21.2 ounces (603g), but it doesn't seem to be cheaply built. We also liked its rounded corners and slight curves. On the flipside, however, it's a huge fingerprint magnet.

Looking at software, the Nexus 10 runs the newly announced Android 4.2 Jelly Bean, which provides plenty of new features like quick settings, more Google Now features, Photo Sphere,



widgets on the lock screen, the ability for devs to add maps into their tablet-optimized apps, a screen saver-style photo viewer called Daydream and a music explorer that quickly finds artists similar to the ones you're listening to. The button layout is also different, as it uses the standard three capacitive buttons for navigation instead of the special tablet-specific menus found in Honeycomb and Ice Cream Sandwich.





NEO GEO X

PRICE: \$130 (HANDHELD ONLY) & \$200 (BUNDLE)

AVAILABILITY: DECEMBER 6TH

THE BREAKDOWN: THE HANDHELD RUNS 20 PRE-LOADED TITLES WITHOUT A HITCH ALONGSIDE AN ARCADE STICK AND RETRO-STYLED DOCK.

A full home console might be a bit outside of the average gamer's budget, but SNK's 20th anniversary Neo Geo X hits a little closer to home: \$200 for a portable handheld, 20 pre-loaded games, a faithful recreation of the original console arcade stick and an AES-shaped charging / controller dock that pipes video and audio out to a proper television. It's a handsome piece of kit, featuring a 4.3-inch LCD screen flanked by four face buttons on the right, and an 8-direction d-pad on the left. A menu and start toggle sit on either side of the screen, too, as do a pair of speakers. A rubberized back pad tops the hardware off, spelling out SNK in metallic letters.

The machine takes a minute to boot up, as do each of its games — slowly running through the classic Neo Geo start-up animation before popping up a simple game menu. The machine's d-pad is a bit of an odd input. At first, navigating the handheld's menu feels awkward and clunky, but the very second you get into a game, it feels right. Games seem to run flawlessly, featuring no obvious compatibility issues — though the firmware on the device leaves a little to be desired. Sadly, the cartridge slot didn't get the modern makeover; game cards need to be installed directly in the handheld, and the case offers no backwards compatibility. **D**



The Ups and Downs of Earnings Season

Over the past few weeks we've seen an onslaught of new device announcements, with Apple, Google and Microsoft all making big plays for the holiday season. While the iPad mini and Windows 8 have been at the fore-

front of October's technology coverage, the previous quarter's financial results also made headlines. Herewith, the dollars and cents that made those bright, shiny new gadgets possible.

— Christopher Trout

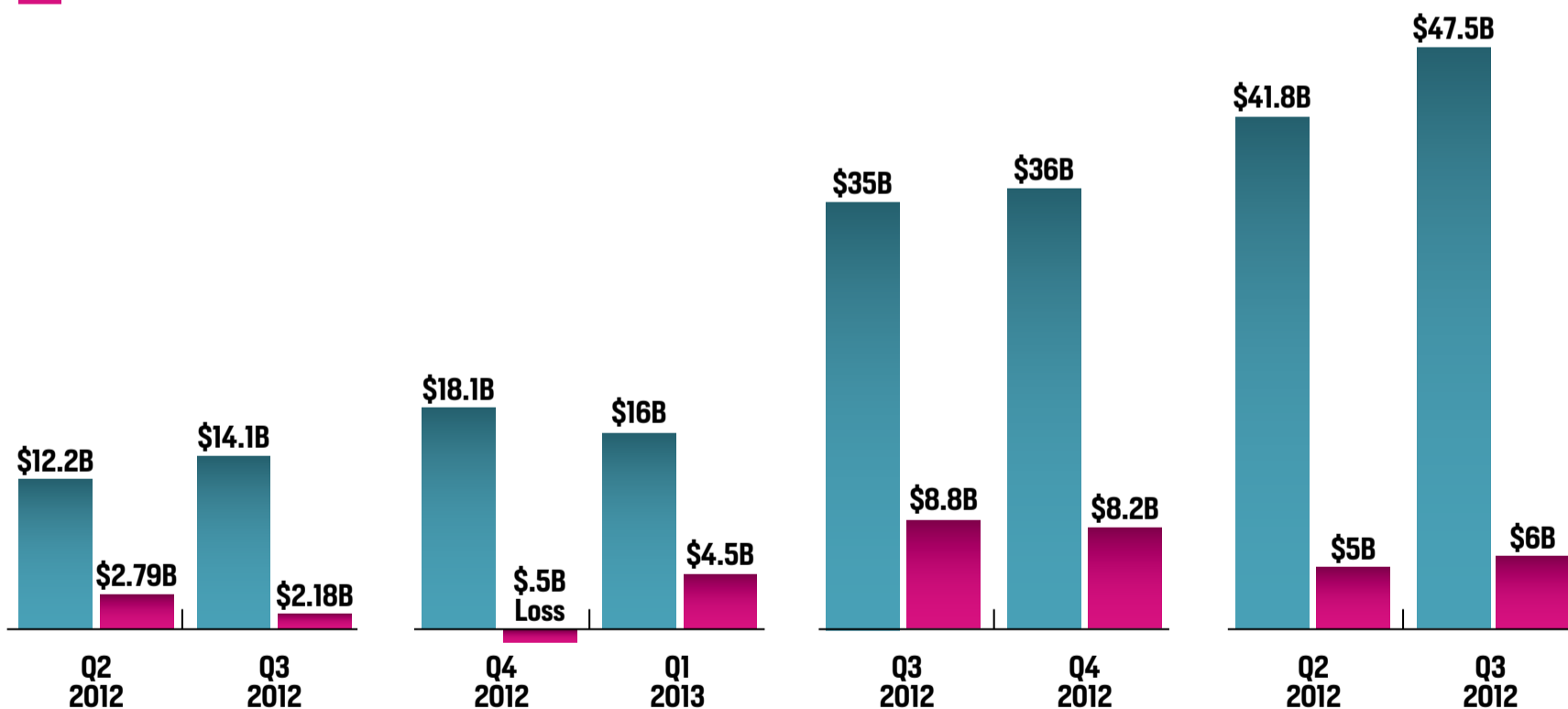
LATEST FINANCIAL RESULTS YEAR-OVER-YEAR AND QUARTER-OVER-QUARTER

REVENUE
PROFIT

TAP FOR INFO

2012

SOURCE: GOOGLE, APPLE, MICROSOFT, SAMSUNG



GOOGLE

The company's earnings saw an accidental early release, which, when coupled with missed expectations, resulted in a dip in Google's stock price.

MICROSOFT

While it bested its previous quarter, which saw a \$500 million loss, Microsoft's profit was still down from the same time last year.

APPLE

Despite revenue and profits being up year over year, Apple's numbers fell below Wall Street's expectations.

SAMSUNG

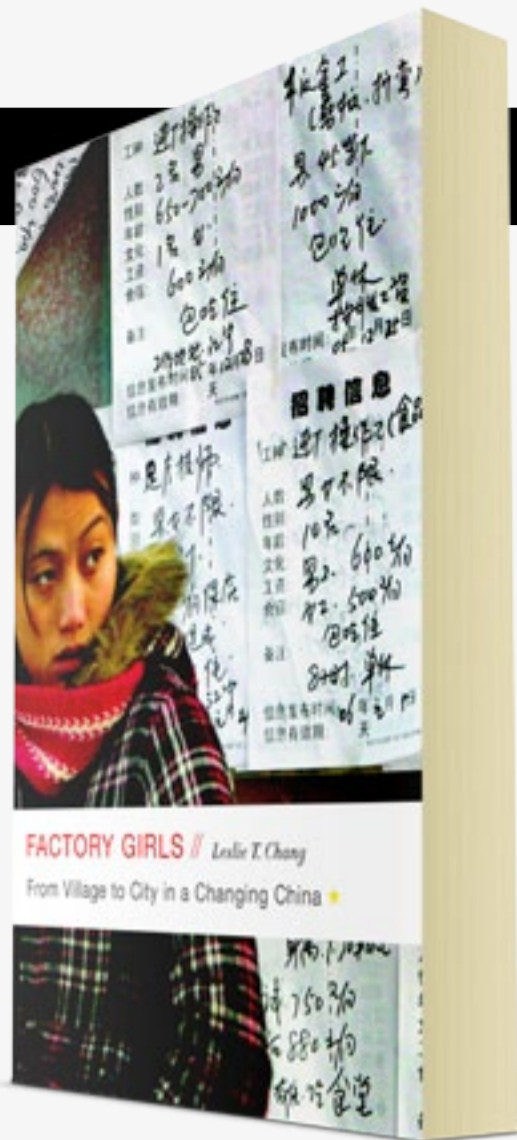
Unlike some of its competitors, Samsung beat expectations, nearly doubling its profits over last year. It says it has global sales of the Galaxy S III to thank.

*Accounting practices and fiscal calendars may vary from company to company. Samsung estimates based on current exchange rates.



Factory Girls: From Village to City in a Changing China

By Leslie T. Chang
Spiegel & Grau



With all the dust-up in recent months over Foxconn and its ties to the world's most valuable company, the tech obsessed and main-streamers alike are giving China's labor practices yet another hard look. Leslie T. Chang's 2008 work of literary journalism, "Factory Girls: From Village to City in a Changing China," provides a thorough and fascinating eye into the evolving way China and its enormous population are creating the products so many of us lust after. Chang puts a human face to her story with two workers she followed across three years as they transitioned from farm to city, factory to factory, and focuses on the southeastern Chinese city of Dongguan. Beyond the 16 hour days, beyond the meager paychecks, the author contextualizes the girls' story in the larger picture of China in transition — the mass flight of youth from rural farming towns to the overpopulated factory dormitories of cities like Dongguan all over China, which offer not just a livable wage, but something much more valuable: freedom from tradition. — *Ben Gilbert*

Quantum Drift
By Miranda Trimmier
The New Inquiry

Quantum computing may be one of the most exciting areas of research these days, but it's not always easy to generate excitement about the current developments in the field. Miranda Trimmier takes a different tact in this essay, though, stepping back from the science to examine how to think about quantum computing.

A Sense of Place
By Patrick Lane
The Economist

Part of a series of articles from *The Economist* on the links between the online and offline — and sometimes overlooked role that location plays in that mix — this introductory piece from Patrick Lane looks at ways the physical world is shaping the digital one, and how the digital is changing how we interact with our surroundings.

The World Is Not Enough: Google and the Future of Augmented Reality
By Alexis Madrigal
The Atlantic

Google's recently released Field Trip app for Android phones may seem like a relatively modest effort but, as Alexis Madrigal explains, it offers one of the most striking glimpses yet at the future of augmented reality — an area that Google is of course not only exploring on phones, but with wearable computing.

Killing the Computer to Save It
By John Markoff
The New York Times

Many would consider retiring well before their 80th birthday, but Dr. Peter G. Neumann, profiled here by John Markoff, is now busily working on a new project for DARPA that draws on his decades of experience in computer security — an effort that's doing nothing short of rethinking computing from the ground up.



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REVIEW

CONTENTS

DISTRO
11.02.12

ASUS
PadFone 2

Start

HTC 8X

Mail

Windows 8

iPad mini



ASUS PADFONE 2



Can ASUS finally carve out a successful niche with the **PadFone 2** phone-in-tablet?
By **Richard Lai**

It's only been half a year since the peculiar PadFone made its much-delayed entry into select markets, and earlier this week, ASUS' launch of its second-gen phone-in-tablet brings us back to this old question: are we better off with just one mobile screen instead of two? Ask any ordinary manufacturer and the answer is likely the latter, because who doesn't want to sell more products? Similarly, carriers would likely back such manufacturers for the sake of selling more data plans, even if they admire ASUS' efforts (and they could already be selling ASUS tablets in the



first place). Some folks also argue that if you have to carry the tablet module with you anyway, you might as well have two separate devices for better multitasking.

It seems like there's a huge mountain to climb here, but on the flip side, ASUS' innovative differentiation does have some advantages. You only need one data plan (and no tethering required) for both form factors, you get to keep the same data in one place instead of having to duplicate them and you can pretty much instantly switch between a small screen and a large screen for the same content. Not to mention that there's also the added functionality of charging up the phone while it's sitting inside the tablet. Alas, the original PadFone and PadFone Station didn't quite hit the spot: the combined weight and bulk made it tough to justify the phone-in-tablet idea, which is why we said it's all about the PadFone 2 in our review. Let's see if ASUS has done it right this time 'round.

HARDWARE: PHONE

Let's start off with the main specs. The PadFone 2 is powered by Qualcomm's latest and greatest Snapdragon S4 Pro APQ8064, a 28nm, 1.5GHz quad-core SoC based on the Krait architecture (which outperforms Cortex-A9 in many ways). This makes ASUS the second manufacturer to offer APQ8064 on a phone, right after LG with its Optimus G, which we reviewed recently; and it's to be followed by the Xiaomi Phone 2 in

Buyers do get a generous 50GB of free ASUS WebStorage service for two years.

China and the HTC J Butterfly in Japan. The graphics are driven by the almighty Adreno 320, and like many recent flagship phones, there's 2GB of RAM stacked on top to keep the gears well-oiled. As for the cameras, what used to be an f/2.2, 8-megapixel main camera is now boosted to a 13-megapixel Sony BSI sensor plus f/2.4, five-element optics. Meanwhile the front-facing imager has gone from 0.3 megapixels to 1.2 megapixels. As usual, we shall take a look at camera performance later on.

In Taiwan, the new PadFone is offered in flavors of 16GB, 32GB and 64GB, whereas in Europe it'll only have 32GB and 64GB options. Unlike its predecessor, however, there's sadly no microSD expansion. Users craving for more storage space will have to get their fix via USB OTG or the cloud. Buyers do get a generous 50GB of free ASUS WebStorage service for two years, which is no doubt to help push the ASUS Open Cloud Computing initiative, but more on that in the software part of this review.

Cellular connectivity comes from Qualcomm's MDM9215m radio which supports GSM/EDGE/UMTS/DC-HS-





The PadFone 2 packs an impressive 2,140mAh battery.

PA+/LTE — compatibility of which will depend on the specific regional variant: worldwide, North America (two versions), Japan, Australia and China. This particular review is based on the worldwide model which supports GSM 850/900/1800/1900, WCDMA 900/2100 and LTE 800/1800/2600. However, since there's no LTE network in Taiwan (ironically), we could only use 3G for the majority of the time during our review — we did sneak back to Hong Kong very briefly and managed to hook the phone onto the LTE networks there. We were happy with performance on both ends of phone calls, even in

noisy environments thanks to the ambient noise reduction technology. Other radios include the usual 802.11a/b/g/n, Bluetooth 4.0, NFC, FM radio, GPS and GLONASS.

From afar, the PadFone 2 could be easily be mistaken for its predecessor that sported the same design language. But put the two together and you'll easily spot the larger, sharper and brighter 4.7-inch, 720p, 500-nit Super IPS+ LCD. We should point out that the new display is so bright that even on the dimmest setting, it still blinded us when we were in total darkness. You know, bedtime browsing. Hopefully



this isn't a fixed setting so that ASUS can tweak it. Our One X (AT&T) has a similarly impressive viewing angle and gapless display feature, though the PadFone 2 appears to have a more accurate white balance — the former's culprit being its warmer artificial tone. Some may miss the overly vibrant colors on the original PadFone's Super AMOLED, but in general, LCD's still king when it comes to accuracy, pixel density and outdoor performance.

When switched off, the front side of the phone is dominated by the black screen plus a tapered, glossy plastic lip along the bottom, only to be interrupted by the little shiny silver ear-piece near the top. But when switched on, you'll see the three capacitive soft keys light up between the screen and the logo at the bottom. We prefer these to the old virtual keys for the sake of screen real estate, and better yet, you can set the keys' backlight duration to two seconds, 10 seconds or forever.

All of these are surrounded by a rigid aluminum frame that's garnished with a few buttons like before. This time, the power button's been shifted from the top side to the right, just above the volume rocker, which was two separate buttons on the first PadFone. And the spot where the power button used to be — next to the 3.5mm headphone jack — is now occupied by a seemingly trending pin-push type micro-SIM tray (a triangular paper clip is included), which is a big change from the old mini-SIM slot underneath the remov-

You'll never get fingerprints on the back of the phone, and the texture feels good, too.

able battery on the original PadFone.

Also changed on the frame are the micro-HDMI port, micro-USB port and contact points for the external antenna (inside the PadFone Station). These are now combined into one 13-pin MHL socket customized by ASUS and located at the bottom of the phone, thus leaving the left of the aluminum frame squeaky clean. The PadFone 2 does come with a 13-pin connector USB cable. Fortunately, you can still use the regular 5-pin MHL plug or micro-USB plug for power and data, but the latter can be a bit loose, and the former won't be able to handle video — you'll need to get an optional MHL-to-HDMI adapter from ASUS. We doubt this would be too much of a problem for most users, anyway.

Moving on to the backside of the phone, apart from the darker shade of gray, the polycarbonate back cover is very much the same as before. It features an etched ripple pattern surrounding the 13-megapixel camera, thus simulating the cool visual effect of circular-brushed metal as seen on the Zenbooks and the aluminum Transformer Pads. This also means you'll never get fingerprints on the back of the phone, and the texture feels good, too.





The PadFone 2 offers more screen real estate than the original.

ASUS admits that the PadFone 2's back cover isn't designed to be removed on a regular basis, in order to minimize the amount of dust and fluff getting in as well as to protect the delicate NFC antenna — a feature that was missing on the original PadFone. We found it much harder to rip off the new cover, but once it's out of the way, you can see the 3.8V, 2,140mAh lithium polymer

The lack of a microSD slot is certainly a disappointment.

cell (instead of the old 3.7V, 1,520mAh lithium ion cell) which is sealed by a big label that screams "Please DON'T remove the battery." Sadly, there's no microSD slot to be seen. So in this case, the removable cover is solely for the convenience of maintenance. We're fine with the semi-fixed battery given that we can use either the tablet or a USB battery pack to juice up the phone, but the lack of a microSD slot is certainly a disappointment, especially for those who have already splashed out on 32GB or even 64GB cards. We'd like to think that adding microSD expansion back in would not have had a huge impact on



the phone's thickness.

Last but not least, there's the loud-speaker on the back which is about twice as large as the one on the first PadFone, so as you'd expect, it gets a lot louder. ASUS also claims that this is 40 percent larger than what the other leading smartphones use. With great power comes great responsibility, so the engineers at ASUS' Golden Ear Team have added in a few lines of code to minimize distortion and mechanical interference under high amplitude — this is apparent when you blast out music at maximum volume (especially with Music Mode enabled in the AudioWizard app, but more on that later). Naturally, this small speaker still lacks in bass, but there's always the bigger one on the PadFone Station.

HARDWARE: TABLET

You might have already seen us raving about the new PadFone Station in our earlier hands-on, but let's recap: this module is essentially a 10.1-inch, 1,280 x 800 external IPS LCD display for the PadFone 2, but at the same time it also serves as a 3.8V, 5,000mAh (19Wh) battery pack. That's slightly smaller than the 24.4Wh battery in the first PadFone Station, but remember, the PadFone 2 itself now has a bigger battery. Together they add up to about 27Wh, which isn't too far off from the old 30Wh combination. Besides, what's more important is the weight reduction that ASUS has managed to achieve for

With the PadFone 2 inserted, the combo is still lighter than the new iPad alone.

the slimmer PadFone Station: from a hefty 724g down to just 514g. That's a 30 percent reduction! In other words, with the 135g PadFone 2 inserted, the combo is still lighter than the new iPad alone (652g). By contrast, the original PadFone and its PadFone Station together weighed more than the first iPad, which made it very difficult for ASUS to sell its "N+1" concept.

The smaller battery, the removal of the battery LED indicator and the new 13-pin MHL connector at the bottom (but, for some reason, upside-down compared to PadFone 2's) certainly helped achieve the lighter weight. Still, we've been told that the engineers also looked at every component to see how they could shave off a tiny bit of body fat wherever possible. The biggest contributors to the weight reduction are probably the obscure Corning Fit Glass (on both the phone and the tablet), the magnesium-aluminum alloy frame and the cover-less docking method. Interestingly, ASUS has been working on the new docking mechanism for a year and a half, which confirms our theory that at some point the two PadFones were developed alongside each other. We recall that back when we interviewed Mi-





The PadFone 2 combo weighs less than the new iPad.

chelle Hsiao from ASUS Design Center, there were PadFone Station mockups that featured straightforward slide-in docking methods, but Hsiao said at the time they didn't have a way to ensure secure docking for the exposed phone, hence the bulkier solution in the end.

So how does the new docking mechanism work? Well, there's the new 13-pin MHL connector, of course (so the old PadFone obviously won't fit), but that alone wouldn't be enough to keep the phone tucked securely inside the bay. And by secure we mean strong enough to withstand powerful shakes. This is where the cunning part comes

in: instead of throwing in a typical slide-lock mechanism, ASUS has devised a system that pushes four toothed, rubber pads — of the same material used by bicycle brake pads — against the two long sides of the phone when inserted. You should

The phone managed to stay inside the bay while this author was shaking the upside-down tablet as hard as he could.



feel a light click once the phone hits the bottom of the bay, and it usually takes about one second — instead of two on the original PadFone Station — for the tablet interface to load up.

The phone managed to stay inside the bay while this author was shaking the upside-down tablet as hard as he could (please don't try this at home). And then it gets more intriguing when you realize how easy it is to insert and remove the phone — it's as if the locking mechanism only comes to life when you shake the device. We'd rip the tablet open to find out what kind of black magic this is, but until we get hold of our own retail unit, ASUS' patent-pending secret is safe. However, at some point later we tried the shake test again and the phone did eventually slip out, and we think it's something to do with the dust or some sort of powder that managed to get onto the rubber pads, so be careful.

There's not much else visible on the new PadFone Station apart from the 1-megapixel webcam at the usual location, as well as the power button and the volume rocker around the top-left corner — neither of which have been prone to accidental clicks for

us. If we have to be nitpicky, our only gripe is that the phone isn't flush with most of the tablet's backside, meaning when placed flat on the table, the slate may wobble if you tap on either side too hard — we're thinking of scenarios like typing or playing certain games. Hopefully the dedicated PadFone 2 Station sleeve will solve this problem. While using it, we were able to hold the new PadFone Station up for much longer thanks to the combination of rounded edges, soft-touch texture and, most importantly, lighter weight; but when walking around, we do prefer to grip the slate by the top side, with the top of the phone in our palm. We just need to remember to clean the lens every time before using the camera.

What's left to talk about here is the slate's mono loudspeaker, which is apparently 32

A new slide-lock mechanism creates a secure fit.



Hopefully ASUS will eventually admit defeat and come up with a matching hinged keyboard dock.

percent larger than what other tablet makers use. To our surprise, even with the tighter space inside the new PadFone Station, the speaker still manages to output loud music with surprisingly adequate warmth and crisp treble for its size, but you do need to use the AudioWizard app (enabled by default) to achieve this performance. For those seeking something closer to audiophilic quality, there's always the good old wired headphones (and AudioWizard is disabled when headphones are plugged in). Even the bundled stereo headset sounds way better than what most other phones get — it's identical to the one that came with the original PadFone, *but* that does also mean the microphone is still way too far from the user's mouth, so we always end up having to hold the mic up to talk. It's rather odd that ASUS is still using this cable arrangement.

So, what about a keyboard battery dock? Despite reports that “confirmed” a dedicated keyboard dock is in the works, ASUS burst our bubbles by telling us that this is simply not true. We are worried — sure, you can always just get a Bluetooth

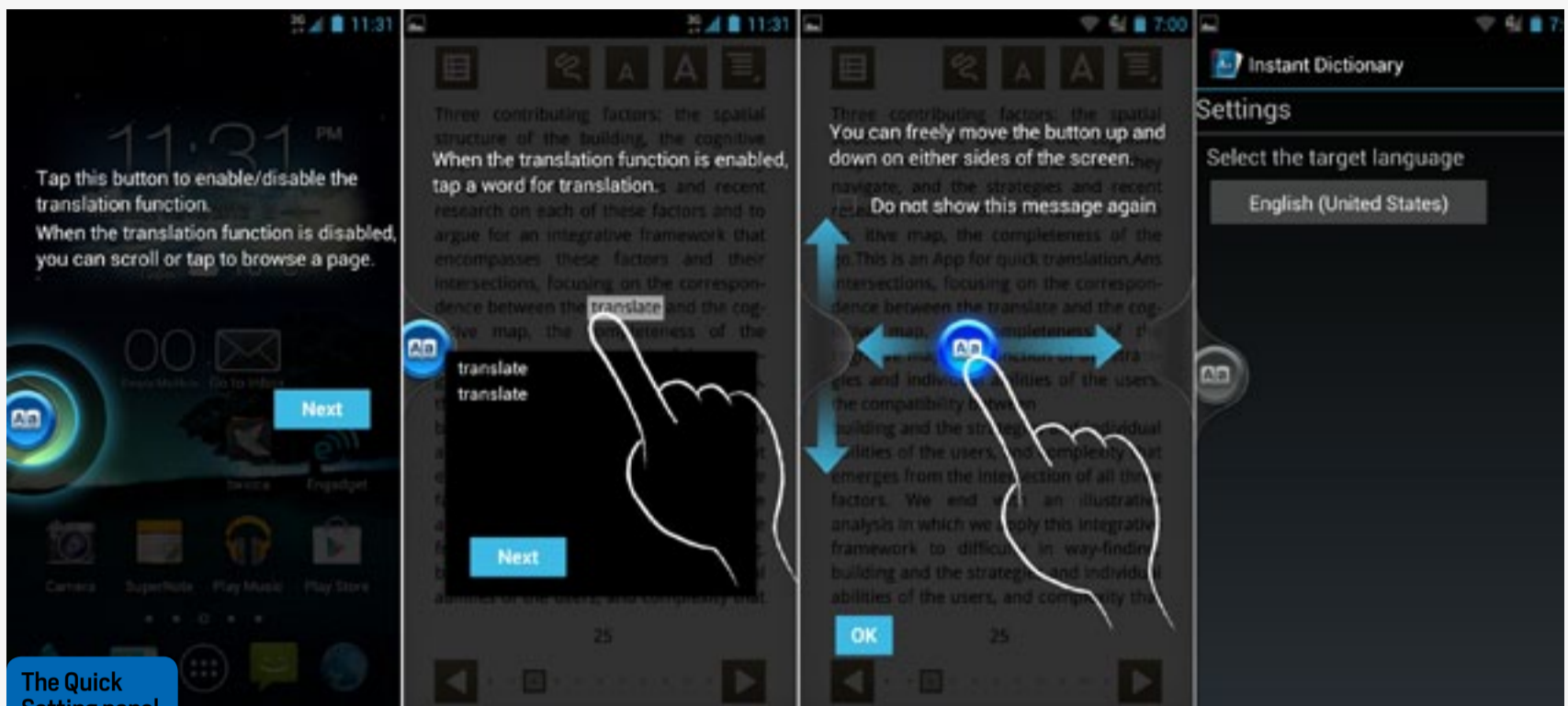
keyboard or even plug in a USB keyboard via an OTG dongle, but that's not quite as glamorous as being able to fold everything into a netbook form factor — which we could with the original PadFone, despite the total weight of 1.49kg. Hopefully ASUS will eventually admit defeat and come up with a matching hinged keyboard dock, because that would add so much more emphasis on using Android for productivity.

Some people were expecting to see a PadFone Infinity, in the sense that the 10.1-inch tablet module would come with a 1080p panel. We asked ASUS whether it would consider releasing such an update any time soon, but the response was that while it's possible to output 1080p from either the phone or the tablet, the manufacturer intentionally chose to keep similar resolutions across the two displays for the sake of easier app and video rescaling, thus saving processing power and battery life. In other words, the time's not right; or maybe ASUS is just putting on a poker face.

SOFTWARE

Much like the original PadFone, its successor delivers a near-vanilla Ice Cream Sandwich experience that's slick in both phone and tablet modes; and we're certain that the same will apply to the upcoming Jelly Bean update. The only interface customization you'll find here are the thumbnail overview of up to seven home screens (pinch anywhere on any home screen to toggle), as well as the “Pad





The Quick Setting panel gives access to Instant Dictionary.

Only” tab in the app drawer, the handy ASUS Quick Setting panel in the notification tray, and “ASUS customized setting” in system settings. For those who don’t know, the “Pad Only” area simply houses apps that are tagged as pad-only by users — you can do so by tapping and holding an app icon in the drawer, followed by dragging it to the “Add Pad-only Tag” button in the top-right corner.

The ASUS Quick Setting panel hasn’t really changed much since the latest update on the original PadFone. Situated above the main native notification panel, the extra panel has a screen brightness slider sandwiched between the outdoor mode button and automatic brightness button. Above those is a sliding row of quick toggles (albeit in a slightly different order than last time): WiFi, Mobile Data, Smart Saving, Instant Dictionary (which is new), WiFi Hotspot, Bluetooth, GPS,

Vibrate and Auto-rotate Screen. One small request for ASUS’ developers: it’d be nice if users could rearrange these toggles, as we can with Xiaomi’s MIUI as well as LG’s UI 3.0 (on Optimus G, Optimus LTE II and others). The next row up in the panel contains three buttons that take you to the advanced menus for WiFi, AudioWizard and system settings. Strangely, in tablet mode said WiFi button is replaced by a dual-battery indicator, but it shouldn’t be too hard to add the former back into that row for the sake of consistency.

We still don’t understand why the original Android notification panel can’t be as intuitive as ASUS’ implementation. Google’s version requires one more tap to toggle the secondary panel for the common settings, including screen brightness, WiFi, auto screen rotation toggle and airplane mode. On the other hand, ASUS knows how to do it right: give users instant access to



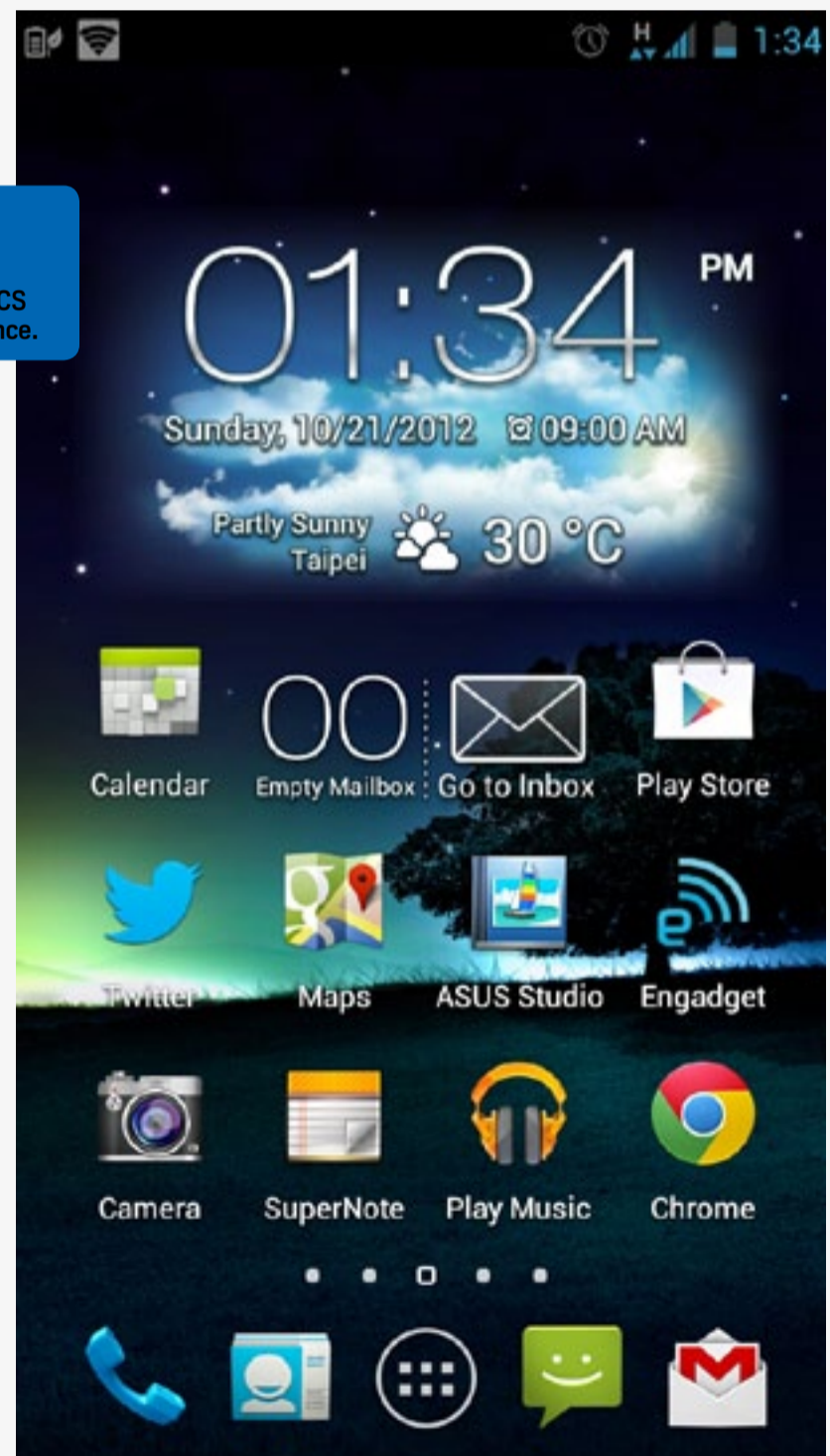
all the main settings after just one tap. Google could learn a thing or two from its Taiwanese buddy.

After multiple mentions, now might be a good opportunity for us to properly introduce AudioWizard: it's essentially an audio-tuning app developed in collaboration with Waves, an award-winning audio DSP solutions company. Think of it as what Beats Electronics is to HTC, albeit with less branding power. There are five presets here: music mode, movie mode, recording mode, gaming mode and speech mode. Oh, and there's an "off" button which apparently saves a little bit of power. While the app works in both phone mode and tablet mode (but disabled when headphones are inserted), we've been told that it's tuned specifically for the PadFone Station's loudspeaker, but nonetheless, the improvement is apparent: audio is both louder and livelier with added warmth. Needless to say, this enhancement can only go so far, so don't expect the PadFone Station to replace your high-end speakers any time soon.

SuperNote on PadFone 2 is now at version 3.0 and supports multilingual handwriting recognition.

Like its previous Android products, ASUS has thrown in its usual bundle of apps: App Backup, App Locker, File Manager, Mirror, MyDesktop (powered by Splashtop Remote), MyLibrary, MyNet (DLNA), Polaris Office 4.0, SuperNote, Watch Calendar and WebStorage. It's worth noting that SuperNote on PadFone 2 is now at version 3.0 and supports multilingual handwriting recognition (which worked well for us), WebStorage cloud syncing

ASUS delivers a near vanilla ICS experience.



and PDF export. And while we're at it, ASUS' WebStorage also offers instant photo uploads, Microsoft Office Web Apps integration (so you can edit Office documents online using the official interface) and file collaboration. It's sort of ASUS' own take on Google Drive and Microsoft SkyDrive. As for widgets, you get the same old battery indicator, task manager and PadFone Station Assistant (for setting the charging mode and how incoming calls are handled), along with both the old version and a new version of the ASUS weather widget. If you prefer the previous weather widget then fret not, it's still available on the list.

Naturally, there are some new apps on the PadFone 2: ASUS Studio, Instant Dictionary

ASUS provides you with 50GB of cloud storage for free.

and MyBitCast. ASUS Studio is simply a beefed-up version of Gallery, as it lets you view photos and videos by folders, time, location (on top of Google Maps) or album tags, not to mention the magazine-like layout as well. It also comes with the identical set of basic editing tools like cropping, auto-fix, effects and levels. As this is the default viewer for the camera app, users will familiarize very quickly. Our only feedback for ASUS here is that the locations of some of the photos were a bit off, which is weird considering the sky was clear at the time, plus there weren't many tall buildings. If this is merely a software issue, it'll definitely be fixed.

The Instant Dictionary is even more exciting: toggling it in the ASUS Quick



Setting panel will bring up a small round button that snaps to either the left or right side of the screen. Once you click it, you can then swipe your finger across any text area to look up definition or translation, and you can choose your desired target language in the app's settings. It even does offline single-word translation between Chinese (Simplified), Chinese (Traditional), English, French, German, Italian, Korean, Portuguese, Russian and Spanish. While popular apps like Flipboard, Pulse and Zinio are supported, there are also many that got left out — not even Chrome and Twitter as of the 9.8.8.32 firmware — so the button didn't always show up. Another issue is that a lot of times, we'd miss one char-

acter or accidentally highlight a nearby punctuation mark, which makes the translation a tad slower as it needs to talk to the server. We're certain that it's only a matter of time before ASUS issues a fix through an OTA update.

Finally, MyBitCast is similar to SuperNote but with more emphasis on audio notes, photos and videos. Strangely, users will need to have a WebStorage account in order to use this simple app, whereas SuperNote works as a stand-alone app just fine. But either way, you get the idea, and this seems like a potentially useful tool for the likes of students and journalists. We compared the sound recording performance between the original PadFone, its successor and the HTC One

AudioWizard can make audio sound warmer and livelier.



X at a low rooftop in Taipei City.

The One X has excellent noise suppression, but that also became a double-edged sword as we moved to about two meters away from the phone — the aggressive suppression started to interfere with our voice and therefore made it hard to interpret the distant speech. The original PadFone sounded the most natural, but this meant that much noise was also captured throughout. Luckily, the PadFone 2's voice recording performance is somewhere in between the two aforementioned devices: some noise is suppressed, and what's left is clean enough for speech interpretation. It goes without saying that your results may vary depending on the environment and your audio source.

Obviously, all of these apps work in both phone mode and tablet mode. If you're familiar with the original PadFone then you would have already come across Dynamic Display, a name coined by ASUS that describes the technology behind the transition between the two interface modes. We've already mentioned that said transition has been sped up from two seconds to just one, but better yet, ASUS claims it's also

We still love showing off how a video clip continues to play after the Dynamic Display switch.

done some work to ensure that the UK's top 100 apps work correctly with Dynamic Display.

Still, for some weird reason, only a portion of the bundled apps have Dynamic Display switch enabled by default, so users will need to go into "ASUS customized setting" in system settings to choose more apps. Even Google's Gmail, Play Store and Play Music apps need to be enabled manually, so we have a feeling this is more of a policy issue rather than a technical issue — Play Store and Play Music certainly worked fine for us over Dynamic Display, just not Gmail. Likewise, we still love showing off how a video clip continues to play after the switch, though due to the lack of DivX certification, native video playback is limited to MPEG4/H.264/H.263/WMV at 1080p. That said, there are other apps that can handle some AVI and MKV files — we use MX Player most of the time, and it's almost fully compatible with the Dynamic Display switch.

In terms of performance optimization, ASUS has kept the three levels of settings but presents them in a different manner. By default, the Smart Saving mode is enabled on the PadFone 2, which has a set of predefined conditions for certain scenarios. For example, cellular data connection is cut when the phone is sleeping and the screen brightness is fixed to 60 percent while reading books, watching videos and listening to music. You can also see



the full list and edit each scenario in system settings. Obviously, the mileage varies depending on your usage behavior, but the options are there should you require them. As for the performance freaks, you can enable Ultimate mode which is right at the bottom of the “ASUS customized setting” menu, but we didn’t notice any performance gain during our benchmark tests. This means much like the original PadFone, the CPU can already go full throttle when needed even under “Normal” mode, whereas under Ultimate mode the phone would stay at top performance most of the time.

CAMERA

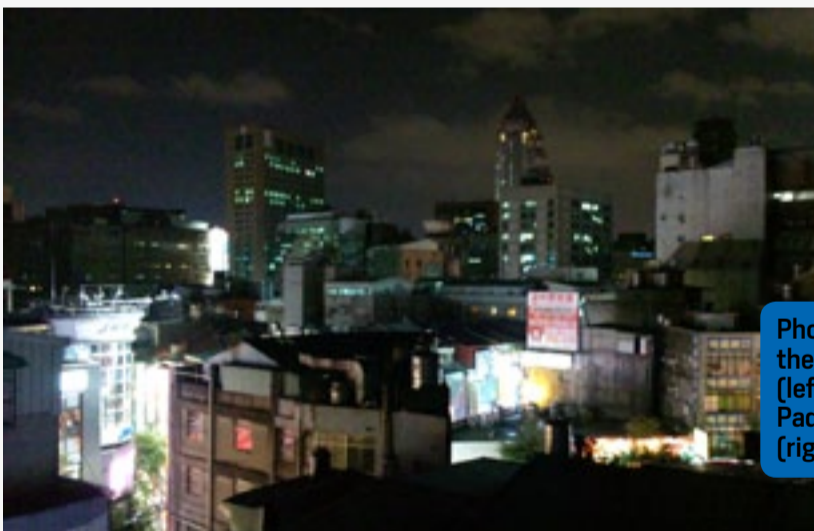
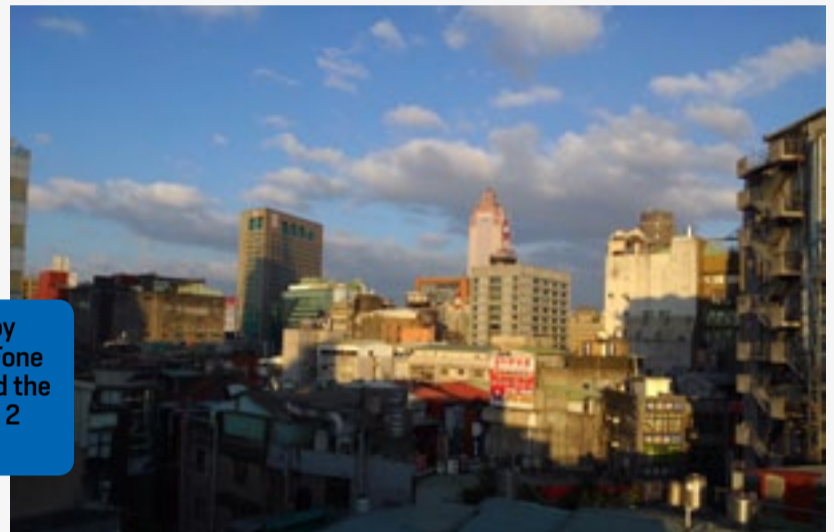
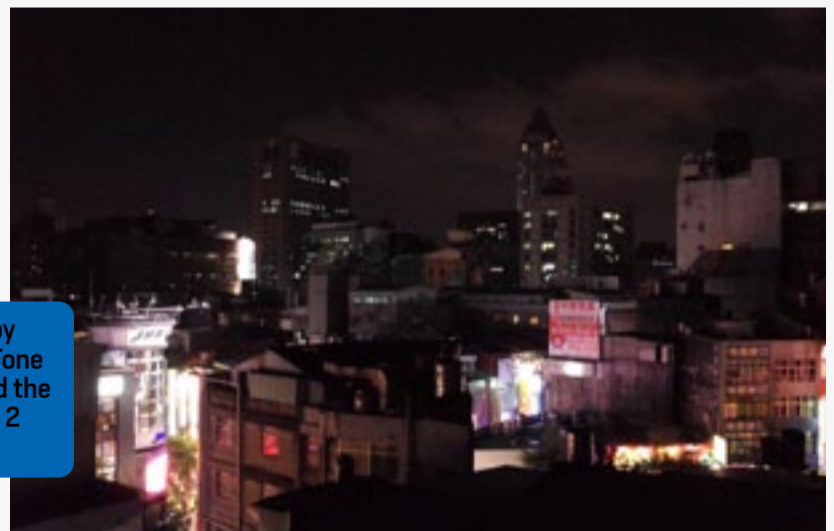
We were fairly impressed by the 8-megapixel camera on the first PadFone, but compared to the competition, it fell behind in speed and nighttime performance. This is no longer the case with the PadFone 2’s beastly 13-megapixel, f/2.4 imager. Thanks to the Sony BSI sensor and its dedicated image processor, not only can the camera handle zero shutter lag, but it can also shoot up to 100 continuous shots at 6 fps in full 13-megapixel resolution — easily beating the HTC One X (eight megapixels, up to 99 shots at 4 fps) and the Samsung Galaxy S III (eight megapixels, capped at 20 shots at 3.3 fps). While there’s no dedicated camera button, you can use the volume keys to take stills, but neither offer the proper two-stage click for pre-focusing.

It’s rare to see smartphones that can record 60 fps and beyond.

In addition to the new and hilarious “silly face” video effects, the PadFone 2 also lets you take full-resolution still images while recording video, but this function is disabled if you switch to one of these impressive high-speed video recording modes: 1080p at up to 30 fps, 720p at up to 60 fps, and 480p at up to 90 fps. We say “up to” because the frame rate does drop in dark environments, so do bear that in mind if you want to take full advantage of the speedy video recorder. Still, it’s rare to see smartphones that can record 60 fps and beyond. And by the way, the saved clips do play back at their captured frame rate instead of in slow motion.

The still images also lived up to our expectations. We managed to capture many vivid shots under the clear blue sky in Taipei and the HDR mode made some of them even more stunning. Nighttime performance is much better than before, but as with many cameras, patience is required for proper focus and steady shots. You can certainly fiddle with the ISO (50 to 800) as well as exposure compensation to achieve cleaner shots at night, or you can try the various scene modes offered by the beefed-up camera app. A hand-



Photos by
the HTC One
X (left) and
the PadFone
2 (right).Photos by
the PadFone
(left) and the
PadFone 2
(right).Photos by
the PadFone
(left) and the
PadFone 2
(right).

ful of filter effects have also been added which may please Instagram addicts, and ladies can try the new beautification mode that smoothens skin, blushes cheeks, enlarges eyes and slims faces. This author had a go with the beautification mode and it's safe to say that it doesn't work as well on men.

For the sake of comparison we had

an HTC One X (AT&T) with us, and it's easy to see that the newer camera sensor on the PadFone 2 delivers less noise and more detail, especially when compared at 100-percent crop level. That said, the PadFone 2 (with camera firmware version 50121) seems to have a slight bias towards blue under a clear blue sky when in auto mode. At



night, the One X beat both generations of PadFones in terms of white balance accuracy and detail, though since the PadFone 2 has a higher resolution, it can get away with its higher noise compression. ASUS has assured us that it'll constantly be fine-tuning the device's performance both before and after it enters the market, so chances are these camera issues will be solved soon.

PERFORMANCE AND BATTERY LIFE

Simply put, the PadFone 2 is one of the slickest phones we've ever had the pleasure to fiddle with. The near-vanilla Android experience is further enhanced by the short touchscreen response time of 65ms, which is apparently faster than that of the One X and the Galaxy S III. At least we know from first-hand experience that this is more

Simply put, the PadFone 2 is one of the slickest phones we've ever had the pleasure to fiddle with.

responsive than the original PadFone, especially while typing with the new virtual keyboard by ASUS. Needless to say, when it comes to raw processing power, the APQ8064 mobile SoC easily beats most, if not all, competitors, and we can certainly feel that while playing heavy-duty 3D games and dealing with HD video clips. Interestingly, the benchmark numbers indicate that ASUS has done a slightly better job than LG at optimizing its device for the Snapdragon S4 Pro platform, thus

BENCHMARK	PADFONE 2	PADFONE
QUADRANT ADVANCED	7,703	5,354
VELLAMO 1	2,520	2,521
VELLAMO 2 HTML5	2,018	1,800
ANTUTU	15,489	7,042
SUNSPIDER 0.9.1 (MS)	1,292	1,559
GLBENCHMARK 2.5 EGYPT HD C24Z16 OFFSCREEN (FPS)	31	13
CF-BENCH	18,237	9,571
BATTERY LIFE	7:30 (HSPA, PHONE) / 9:28 (TABLET*)	6:15 (PHONE) / 9:56 (TABLET*) / 17:30 (LAPTOP)

SUNSPIDER: LOWER SCORES ARE BETTER. *THIS INCLUDES THE DURATION OF PHONE-ONLY MODE, AS THE PADFONE STATION NO LONGER FUNCTIONS AFTER ITS BATTERY HAS DEPLETED.



BENCHMARK	PADPHONE 2	OPTIMUS G (ALL MODELS)	GALAXY NOTE II	GLOBAL HTC ONE X
QUADRANT ADVANCED	7,703	7,628	6,819	4,906
VELLAMO1	2,520	2,143	2,482	1,617
VELLAMO2 HTML5	2,018	1,710	1,831	1,364
ANTUTU	15,489	11,284	13,539	11,030
SUNSPIDER 0.9.1 (MS)	1,292	1,283	1,023	1,773
GLBENCHMARK 2.5 EGYPT HD C24Z16 OFFSCREEN (FPS)	31	31	17	8
CF-BENCH	18,237	14,398	15,267	13,233
BATTERY LIFE	7:30 (HSPA, PHONE) / 9:28 (TABLET*)	8:43	10:45	6:00

SUNSPIDER: LOWER SCORES ARE BETTER. *THIS INCLUDES THE DURATION OF PHONE-ONLY MODE, AS THE PADPHONE STATION NO LONGER FUNCTIONS AFTER ITS BATTERY HAS DEPLETED.

placing the PadFone 2 at the top of our smartphone benchmark chart.

As for battery life, the PadFone 2's own 8.13Wh battery lasted for seven and a half hours in our standard video loop test over 3G (there's no LTE in Taipei for us to try), but don't be fooled by the Optimus G's seemingly better battery life: the former's display has a 550-nit brightness level, while the latter maxes out at 470 nits. Taking these into account and assuming there are no other significant variables, these two APQ8064 devices should otherwise have very similar overall power consumption.

When combined with the new PadFone Station, our quad-core PadFone 2 managed around nine and a half hours

of continuous video playback plus background sync over 3G, though the last 1.5 hours was in phone mode as the slate no longer functioned after it ran out of battery power — it was the same with the first-gen PadFone Station. The result came close to what we got with the original dual-core PadFone in tablet mode — which is a testament to the Krait cores' efficient asynchronous operation — as well as the WiFi-only Transformer Pad Infinity TF700. Obviously, you'd get a lot more play time out of the phone itself if you choose "Phone Preferred Mode" or "Power Pack Mode" under the charging settings in the PadFone Station Assistant tool. The default "Intelligent Mode" simply tries to bal-



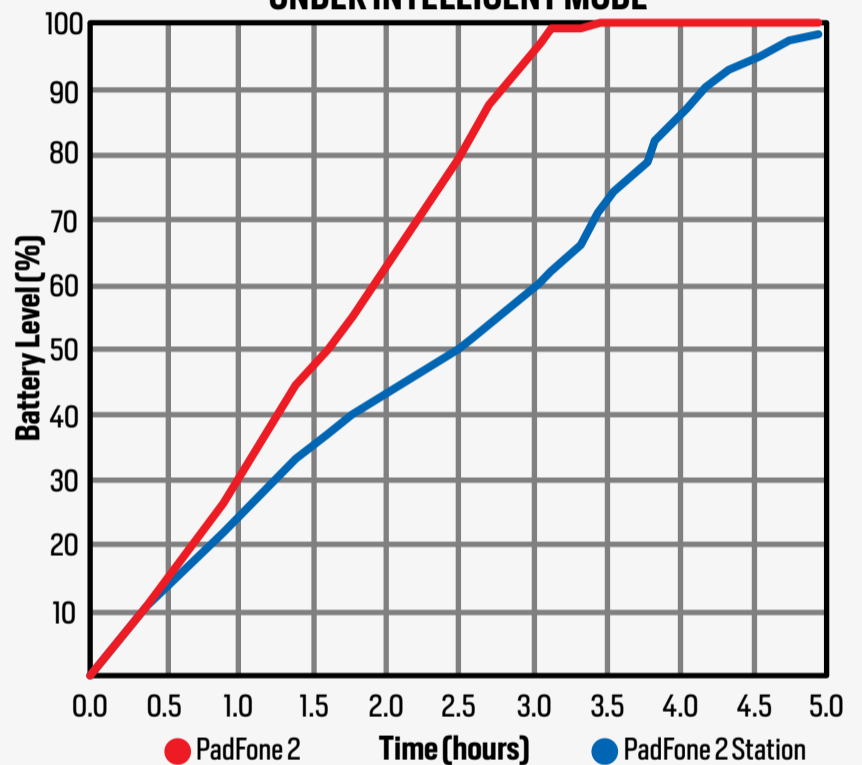
DEVICE	BATTERY LIFE
ASUS PADPHONE 2	9:28 (HSPA, TABLET DOCK*)
SAMSUNG GALAXY TAB 7.7	12:01
APPLE IPAD 2	10:26
ACER ICONIA TAB A510	10:23
ASUSEEE PAD TRANSFORMER PRIME	10:17 / 16:34 (KEYBOARD DOCK)
ASUS PADPHONE	9:56 (HSPA, TABLET DOCK*)
SAMSUNG GALAXY TAB 10.1	9:55
APPLE IPAD (2012)	9:52 (HSPA) / 9:37 (LTE)
APPLE IPAD	9:33
ASUS TRANSFORMER PAD INFINITY TF700	9:25 / 14:43 (KEYBOARD DOCK)
TOSHIBA EXCITE 10	9:24
MOTOROLA XOOM 2	8:57
HP TOUCHPAD	8:33
SONY XPERIA TABLET S	8:31
ASUS TRANSFORMER PAD TF300	8:29 / 12:04 (KEYBOARD DOCK)
ACER ICONIA TAB A700	8:22
ACER ICONIA TAB A200	8:16
SAMSUNG GALAXY TAB 7.0 PLUS	8:09
LENOVO IDEATAB S2110	8:07 / 15:11 (KEYBOARD DOCK)
AMAZON KINDLE FIRE	7:42

*THIS INCLUDES THE DURATION OF PHONE-ONLY MODE, AS THE PADPHONE STATION NO LONGER FUNCTIONS AFTER ITS BATTERY HAS DEPLETED.

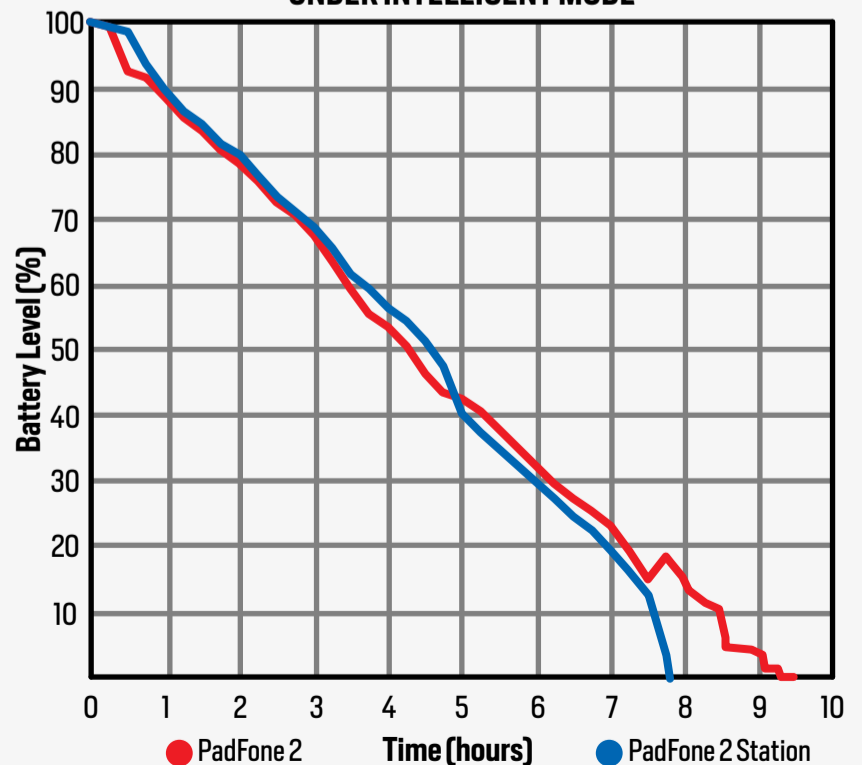
ance the charge between the phone and the slate, as the tablet requires battery power to function, so this mode gives you the most play time on the tablet.

Finally, we decided to keep an eye on the recharge times. The PadFone 2 alone takes about two hours to fully charge up, whereas when docked, the intelli-

DOCKED PADPHONE 2 RECHARGE PERFORMANCE UNDER INTELLIGENT MODE



DOCKED PADPHONE 2 DISCHARGE PERFORMANCE UNDER INTELLIGENT MODE



gent charging feature fills up the phone first in just over three hours, followed by the tablet's own battery about two hours later, making it a total of five hours. However, the PadFone Station can also be charged up without the phone docked inside, but due to the removal of the old LED indicator, you'll need to insert the phone to see the battery status.

WRAP-UP

At a time when smartphones are becoming more and more similar, ASUS continues to inject real innovation and excitement into the market. The first Transformer Pad wasn't an instant hit, but what followed has helped ASUS establish a strong presence in the tablet market. We

The new dock allows for a slimmer figure on the PadFone 2.



think the same will happen with the PadFone series. Merely half a year after the first attempt, its successor arrived right on time with all the best ingredients: a powerful and efficient quad-core processor, a powerful graphics engine, a large mobile display, best-in-class camera performance, LTE and a super-slick user experience. And that's just the phone alone!

As the main selling point of the whole PadFone concept, the much lighter PadFone Station will finally help ASUS make its point: the PadFone's tablet experience is no longer hindered by any extra weight (and it's even lighter than some similarly-sized tablets now), yet you still get the benefit of instantly porting everything between the two screen sizes whenever you want. What's missing this time round, though, is the element of productivity: it really needs a dedicated

hinged keyboard to make a strong statement, and there's nothing more attractive than being able to comfortably type out documents with a physical keyboard while viewing them on the larger touchscreen, and then review them on the smaller screen instantly while on the move. Sure, there's the whole cloud hype that even ASUS is part of these days, but you may not have internet connectivity all the time (especially for frequent travellers), meaning there's always a delay of some sort between saving a document on one device and then viewing it on another. So iron out the bugs, throw in a dedicated keyboard dock (preferably with a built-in SD card reader) and ASUS will have the ultimate killer package. **D**

Richard is addicted to gadgets, even more so than a typical Chinese lad. He's also looking after Engadget Chinese.

BOTTOMLINE

ASUS PADFONE 2

NT\$17,901+
(US\$610+)



PROS

- Powerful and efficient quad-core chip
- Top-notch camera performance
- Surprisingly light tablet
- Innovative docking mechanism

CONS

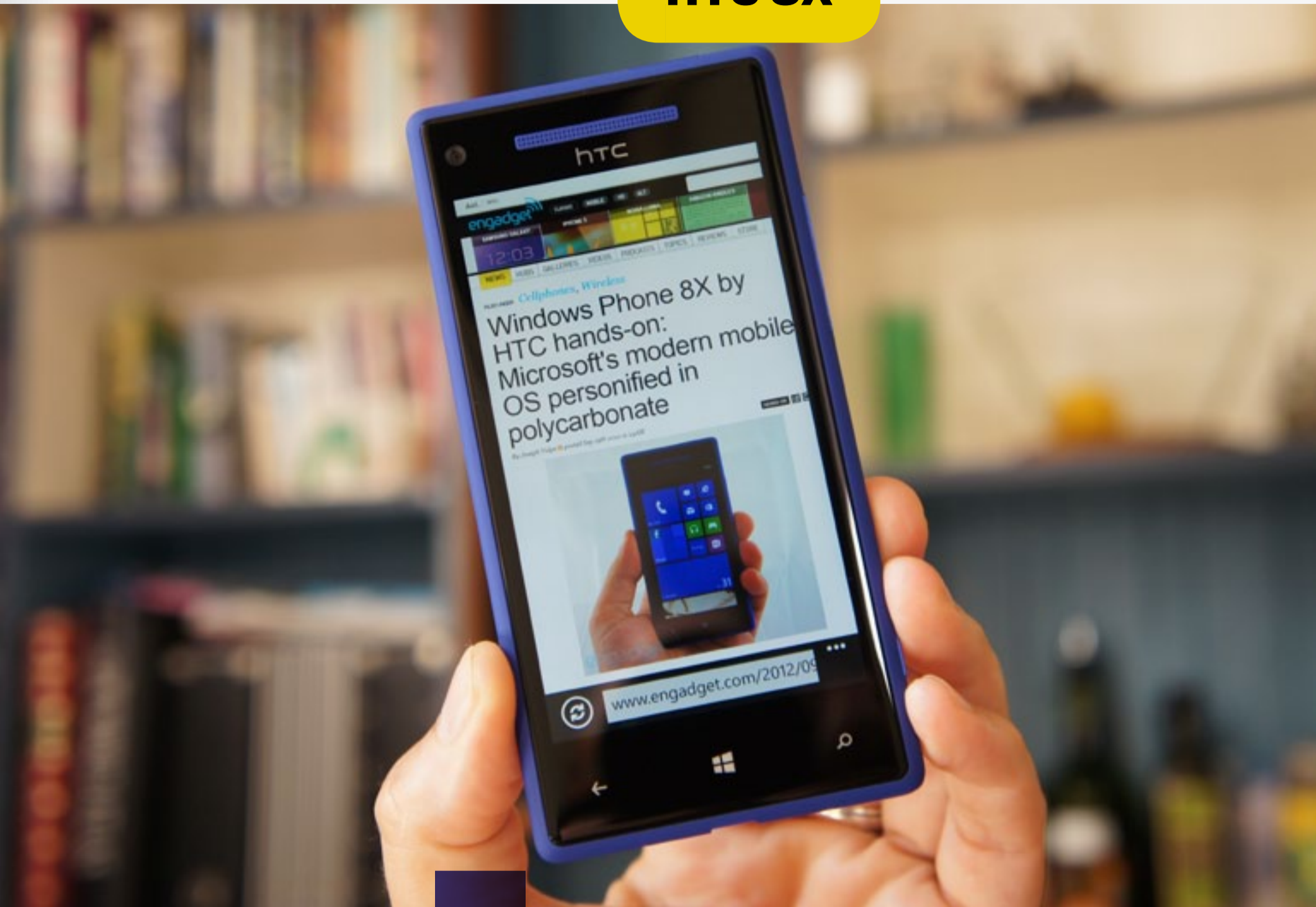
- No dedicated keyboard dock
- No microSD expansion

BOTTOMLINE

ASUS finally has a convincing PadFone and PadFone Station that are both very powerful and very portable.



HTC 8X



Will the colorful and relatively compact **HTC 8X** be the choice of the Windows Phone 8 generation?
By Myriam Joire

It feels like forever since Microsoft announced Windows Phone 8 back in June, but the mobile OS is finally here and with it comes the inaugural volley of compatible handsets. The first one to cross our desks is the global, unlocked version of HTC's Windows Phone 8X, a device we first saw in September. Unlike other current flagships, this phone breaks the bigger-is-better trend by providing a full set of high-end specs in a relatively compact package — combining a 4.3-inch 720p Super LCD 2 display, Qualcomm dual-core Snapdragon S4 processor and



NFC in a sleek and colorful package. Does the 8X have what it takes to carry the Windows Phone 8 torch? Is this a bona fide flagship despite its reduced footprint? Has HTC designed a better handset than its existing Android superphone, the One X?

HARDWARE

We're not going to mince words here: we're madly in love with the design of HTC's Windows Phone 8X. It combines angular lines with curves in unique and delightful ways then adds a bucket of color to the mix. Our review unit is the global, non-LTE model in a handsome shade of purple-ish blue called California Blue (other colors include Graphite Black, Flame Red and the amazing Limelight Yellow). In the US, both T-Mobile and AT&T will be offering the handset but it's not clear if all these hues will make the final cut. Like HTC's One X (and One X+), the 8X starts life as a solid block of colored polycarbonate. Here, however, it's machined down into something akin to a pillow — a rectangular unibody with gently

It combines angular lines with curves in unique and delightful ways, then adds a bucket of color to the mix.

rounded corners that tapers softly to a thin edge around the device, with a sheet of black Gorilla Glass in front. While Nokia pioneered the process of machining colored polycarbonate (both matte and glossy finishes) with the N9 and the Lumia 800, HTC's pushing the envelope here with what looks like soft-touch frosted surfaces. Oh yes, except for maybe the black and white versions, people will notice this phone — you've been warned.

In a day and age when most flagships have 4.65- to 4.8-inch screens (or bigger — hello, Galaxy Note II), it's refreshing to see a top-tier handset with more compact dimensions. As mentioned above, the HTC 8X is built around a 4.3-inch HD display, which allows the body to be narrower and better suited for one-handed operation. The phone feels extremely comfortable in hand and features great proportions despite a generous bezel (especially at the top and bottom). At 130g (4.59 ounces) it's not a heavy device, but the sleek design does a fantastic job of hiding the thicker-than-average 10.1mm (0.4-inches) profile. The pillow-like colored polycarbonate back is flat enough that the 8X is able to rest on a table without rocking back and forth when touched. It's home to the 8-megapixel, f/2.0 auto-focus camera (accented by an anodized aluminum ring in a similar shade of blue and flanked by a single LED flash) in the top center. The HTC brand is embossed in silver smack in the middle,

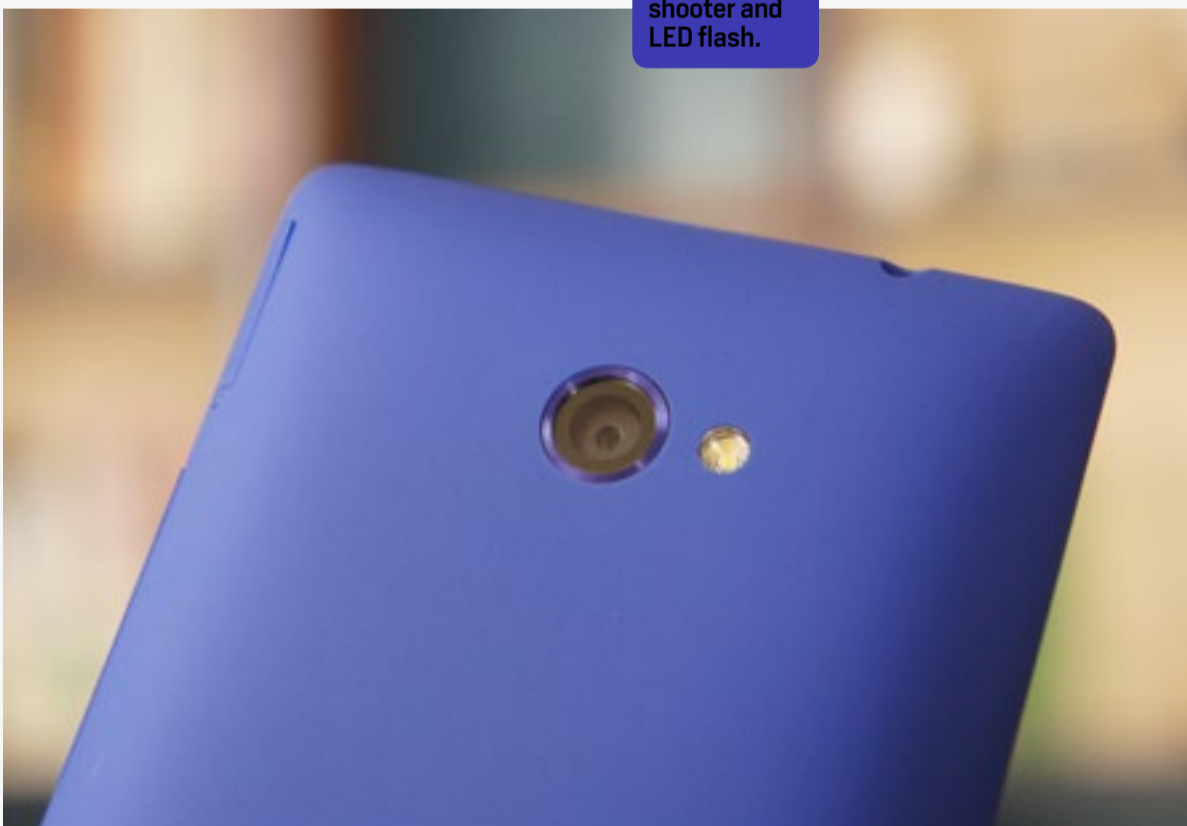


One of the most striking aspects of the 8X's design is the earpiece which matches the blue hue of the rest of the phone.

and the Beats logo, speaker grille (an array of tiny machined holes) and certification details in fine print can be found in the bottom-center.

Gorilla Glass covers the front of the 8X and tapers slightly at the edges to blend into the colored polycarbonate. While the build quality of our review unit is generally top-notch, the bottom-left corner of that glass surface is not perfectly flush with the body. This was even more pronounced on another handset, enough for light to leak out of the gap when using the device at night. Hopefully HTC will remedy this minor flaw as production ramps up. Beyond protecting the 4.3-inch, 720p panel, this sheet of glass covers

The HTC 8X offers an 8-megapixel shooter and LED flash.



the 2.1-megapixel front-facing camera (top-left) and capacitive buttons along the bottom (back, Windows and search) which are both stenciled and backlit in white. One of the most striking aspects of the 8X's design is the earpiece, which matches the blue hue of the rest of the phone. We're pretty sure it's part of the machined chassis and protrudes through a cutout in the front glass. Cool, eh? A notification light is seamlessly embedded inside the earpiece — light just shines through the right end of the grille — and a silver HTC logo is wedged between the earpiece and the screen.

Walking around the surprisingly thin, colored polycarbonate edge of the 8X, you'll find the standard 3.5mm headphone jack, secondary mic and power / lock key on top; the micro-SIM tray (with its obligatory release pin hole), volume rocker and dedicated two-stage camera button on the right side; plus micro-USB and primary mic on the bottom. It's worth noting that all these controls (power / lock



key, volume rocker and camera button) are made of anodized aluminum in a similar shade of blue as the rest of the handset — a lovely touch for sure. The only drawback is that these controls are super thin and almost flush with the body, making them difficult to find by touch. Since the 8X relies on a unibody manufacturing process, the 1,800mAh Li-polymer battery is sealed and there's no microSD slot. Instead, storage is provided in the form of 16GB of built-in flash — this is a bare minimum these days and might be a sticking point for some. Regardless of these limitations, this is an exquisite design and we'd love to see HTC make a compact Android flagship with the same look and feel.

The 8X's Super LCD 2 display crams 1,280 x 720 pixels into a 4.3-inch diagonal — that's 341ppi of HD goodness, if you're keeping track. It's also optically laminated to the glass surface for more sharpness and less reflections. All this results in a gorgeous screen with

The 8X's Super LCD 2 display crams 1,280 x 720 pixels into a 4.3-inch diagonal — that's 341ppi of HD goodness, if you're keeping track.

inky blacks and natural colors that's bright enough to handle direct sunlight. Strangely, the viewing angles don't quite match what we've experienced with the One X, despite both phones sharing the same panel technology. We're being picky here, to be sure, and most people will be hard-pressed to notice a difference.

Spec-wise, the 8X features a 1.5GHz dual-core Qualcomm Snapdragon S4 SoC paired with 1GB of RAM. This is a huge improvement over Windows Phone 7 devices which are limited to a single core processor and 512MB of RAM. As we pointed out above, there's 16GB of internal flash with no way to add more — while Windows Phone 8 supports microSD storage, HTC chose to do without. Our global review unit includes quad-band radios for both GSM / GPRS / EDGE and UMTS / HSPA+ (the latter compatible with 2100, 1900, 900 and 850MHz), but some upcoming models (like AT&T's) will also provide LTE functionality. Additional radios include 802.11 a/b/g/n (dual-band), Bluetooth 2.1 + EDR, A-GPS and NFC. Finally, you'll find the usual collection of sensors on board: proximity, ambient light, compass, accelerometer and gyroscope.

PERFORMANCE AND BATTERY LIFE

It should come as no surprise that Windows Phone 8 paired with a modern dual-core processor driving a 720p display feels just as snappy and responsive as



We're particularly blown away by that 914ms SunSpider score.

Windows Phone 7 running on a single-core CPU with a WVGA screen. We've always been satisfied with the subjective performance of Windows Phone 7, and this continues with Windows Phone 8. On the one hand, the raw benefits of using faster silicon are likely offset by switching from Windows CE to the Windows NT kernel. Then again, the new OS architecture brings significant benefits to the table, such as better multitasking, enhanced security and a common set of APIs for developers. We put the HTC 8X through our usual set of benchmarks and the results are rather interesting. Keep in mind that WP-Bench and AnTuTu are Windows Phone 7 apps that might not work properly in Windows Phone 8. Still, this device is clearly much quicker than any other Windows Phone handset we've tested

before. We're particularly blown away by that 914ms SunSpider score.

Calls sounded loud and clear on the 8X, both with the earpiece and the speaker. Ditto for music playback through headphones and earbuds, which demonstrated the same impeccable audio quality we documented with the One X. The company is obviously putting an emphasis on the listening experience with its phones lately, and it's paying off. Reception was problem-free and our HSPA+ speed tests peaked at 8 Mbps down and 1.5 Mbps up, which is pretty much what you'd expect from an unlocked handset on AT&T's network in San Francisco. Devices built around Qualcomm's dual-core Snapdragon S4 usually provide superior battery life and the 8X is no exception. Even though WPBench's CPU-intensive battery rundown test drained the sealed 1,800mAh Li-polymer pack in just two hours and 30 minutes (with the display turned on), we're taking this result with a grain of salt since we're dealing with a Windows Phone 7 app. In our normal battery usage test, we easily

BENCHMARK	HTC WINDOWS PHONE 8X	HTC TITAN II	NOKIA LUMIA 900	NOKIA LUMIA 800
WPBENCH	221	94.5	92	86
BATTERY RUNDOWN	2:30	2:50	4:29	2:40
SUNSPIDER 0.9.1 (MS)	914	6,445	6,902	7,200
ANTUTU	11,775	2,635	2,596	2,398

SUNSPIDER MS, LOWER NUMBERS ARE BETTER



managed to extract an entire day's use from a full charge, and we think most folks will have no trouble replicating this.

CAMERA

If you're familiar with the impressive camera found on the One X (and One S), you'll feel right at home with the 8X. This shooter combines the same 8-megapixel backside-illuminated sensor, f/2.0 wide-angle autofocus lens and ImageChip technology as its Android cousins, and performs just as nicely. What's lost in the shuffle are some of HTC's ImageSense tricks, such

If you're familiar with the impressive camera found on the One X (and One S) you'll feel right at home with the 8X.

as the ability to capture stills while recording video, plus the burst, HDR and panorama modes. Instead, you're treated to a basic camera interface, which looks pretty much identical to what we last

it's easy to capture plenty of detail with the 8X.





Low-light performance is great and photos have little noise.

saw in Windows Phone 7. Here you'll find a double-arrow icon for a new feature called Lenses, which are plug-ins designed to extend the shooter's functionality. It's likely that HDR and panorama will eventually return as Lenses, but for now there are three to choose from. Bing Vision (pre-installed) scans barcodes, QR codes, Microsoft tags, books, CDs and DVDs. Photosync shoots wrap-around panoramas or full synths, such as 360-degree views. PhotoStrip mimics a photo booth by taking five pictures, one second apart (this is adjustable) and combining them into a strip.

This camera takes wonderful photos, with plenty of detail. Color balance and exposure are extremely accurate even in the most difficult conditions. Low-light performance is strong thanks the fast f/2.0 lens and backside-illuminated sensor — noise, while sometimes noticeable, rarely becomes an issue. It's also the fastest Windows Phone shooter we've used yet, although there's still room for improvement with the auto-focus speed when taking closeup shots. Video is captured in HD at 1080p / 30 fps with mono audio, continuous autofocus and an average bitrate of 20.5 Mbps — unfortunately this drops to 15 fps when recording at night. The results are generally decent, but low-light video performance is rather disappointing. Like all Windows Phone handsets, the 8X comes with a dedicated two-stage camera button that locks focus and exposure when half-pressed. While this key is a bit too narrow and too flush with the edge of the phone, it's still better than nothing — Android manufacturers, take note.

Still, coming from Windows Phone 7, this new OS feels like an evolution, like yet another minor version bump.



SOFTWARE

We're not going to get into the details of what's new with Microsoft's latest mobile OS — that's what our ultra-thorough Windows Phone 8 review is for. Still, coming from Windows Phone 7, this new OS feels like an evolution, like yet another minor version bump. Of course, there's a lot more going on under the hood, changes that should allow Windows Phone 8 to grow and mature. The seeds are planted, but will they blossom? That really depends on how this mobile OS is received by developers. Case in point: Google integration, or the lack thereof — it's impractical for most of us at Engadget to use a Win-

dows Phone handset as our daily driver. There's no way for us to do our jobs without proper support for advanced Gmail features, multiple private Google calendars, Google Talk and Google Voice (to name a few). Even the latest Twitter and Facebook clients are eons behind what's available in Android or iOS — not to mention the lack of our favorite apps, such as Google+, Google Music and Instagram apps, to name but a few.

HTC does provide a few in-house apps and additional settings on the 8X but these look identical to what the company previously bundled on its Windows Phone 7 devices. There's an app simply called HTC, which aggre-

It's a rare treat to see a top-tier 4.3-inch phone.



gates up-to-date weather, stocks and news along with a matching Live Tile. Connection Setup helps with APN configuration: select your country and carrier and the app handles the rest. Flashlight is exactly what you'd expect — it turns the LED flash on the back of the handset into a torch with three levels of brightness. Photo Enhancer lets you apply filters to existing pictures complete with an Auto Enhance option. Converter offers a quick and easy way to convert between various units and currencies. The 8X also gains a couple of entries in the settings menu with a Beats Audio switch and the “attentive phone” toggles (Quiet ring on pickup, Pocket Mode and Flip to mute ringer).

WRAP-UP

There's no doubt that HTC's Windows Phone 8X is a worthy flagship. It combines phenomenal looks, solid construction and high-end specs in a relatively compact

and delightfully colorful package. We're impressed with the speedy Qualcomm dual-core Snapdragon S4, great battery life, beautiful 4.3-inch 341ppi Super LCD 2 screen and strong 8-megapixel camera. Yes, the 8X is a fantastic ambassador to Windows Phone 8, but after using it for several days, we're longing for a similar phone from HTC running Android — at least until a stronger app ecosystem develops for Microsoft's latest mobile OS. Still, if you're betting on Windows Phone 8 it really comes down to the 8X's exquisite design and reduced footprint versus the Lumia 920's better camera, larger screen and wireless charging. Which one's right for you? Stay tuned for our review of Nokia's flagship. **D**

Myriam was born wearing combat boots and holding a keyboard; moments later she picked up a soldering iron. She's been stomping, typing and hacking ever since.

BOTTOMLINE

HTC WINDOWS PHONE 8X

\$560

(GLOBAL, UNLOCKED)



PROS

- Exquisite design
- Compact package
- Excellent performance
- Gorgeous display

CONS

- Weak app ecosystem
- Basic camera interface

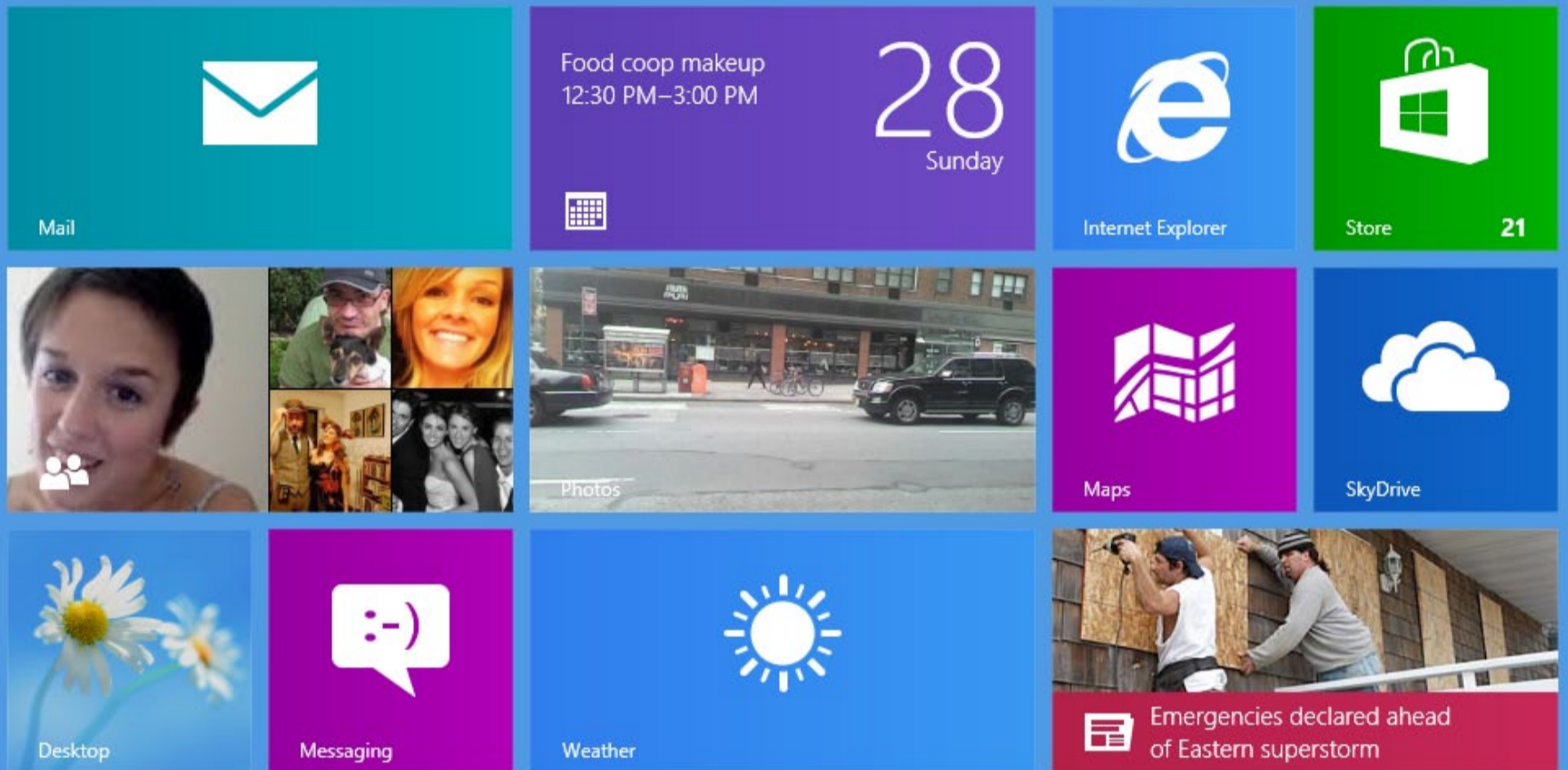
BOTTOMLINE

The HTC 8X is a fantastic ambassador to Windows Phone 8, but we're longing for a similar phone running Android — at least until a stronger app ecosystem develops for Microsoft's latest mobile OS.



WINDOWS 8

Start



After more than a year of teasing, Microsoft released its ambitious OS overhaul. Was **Windows 8** worth the wait?
By **Dana Wollman**

It's unusual, to say the least, for us to spend a year with a product before publishing our review. In the case of Windows 8, we've written thousands of words already, starting with our first hands-on in September of 2011, followed by deep dives on the Developer Preview, Consumer Preview, Release Preview and RTM build. Even our readers have had ample time to get acquainted with the OS — it's been available as a public download since February. And yet, we've never tested a final version of the software running on brand new, made-for-Windows-8 hardware.



With the OS now on sale (alongside dozens of new PCs), it's finally time for us to double back and revisit everything we've previously written in the form of a final, comprehensive review.

And what a challenging assignment this was: it's hard enough to give an OS the full review treatment without burying the reader in minute details. It's even tougher when the software was built for so many different kinds of hardware. Combining a traditional desktop with Windows Phone-inspired Live Tiles, Windows 8 was designed to be equally at home on traditional PCs and more finger-friendly devices, like tablets and hybrids. In addition to walking you through the operating system's various gestures and built-in apps, then, we'll spend some time talking about which form factors are best suited to this redesigned version of Windows. Read on to see what we found out.

GETTING STARTED:

IT'S ALL ABOUT THE CLOUD

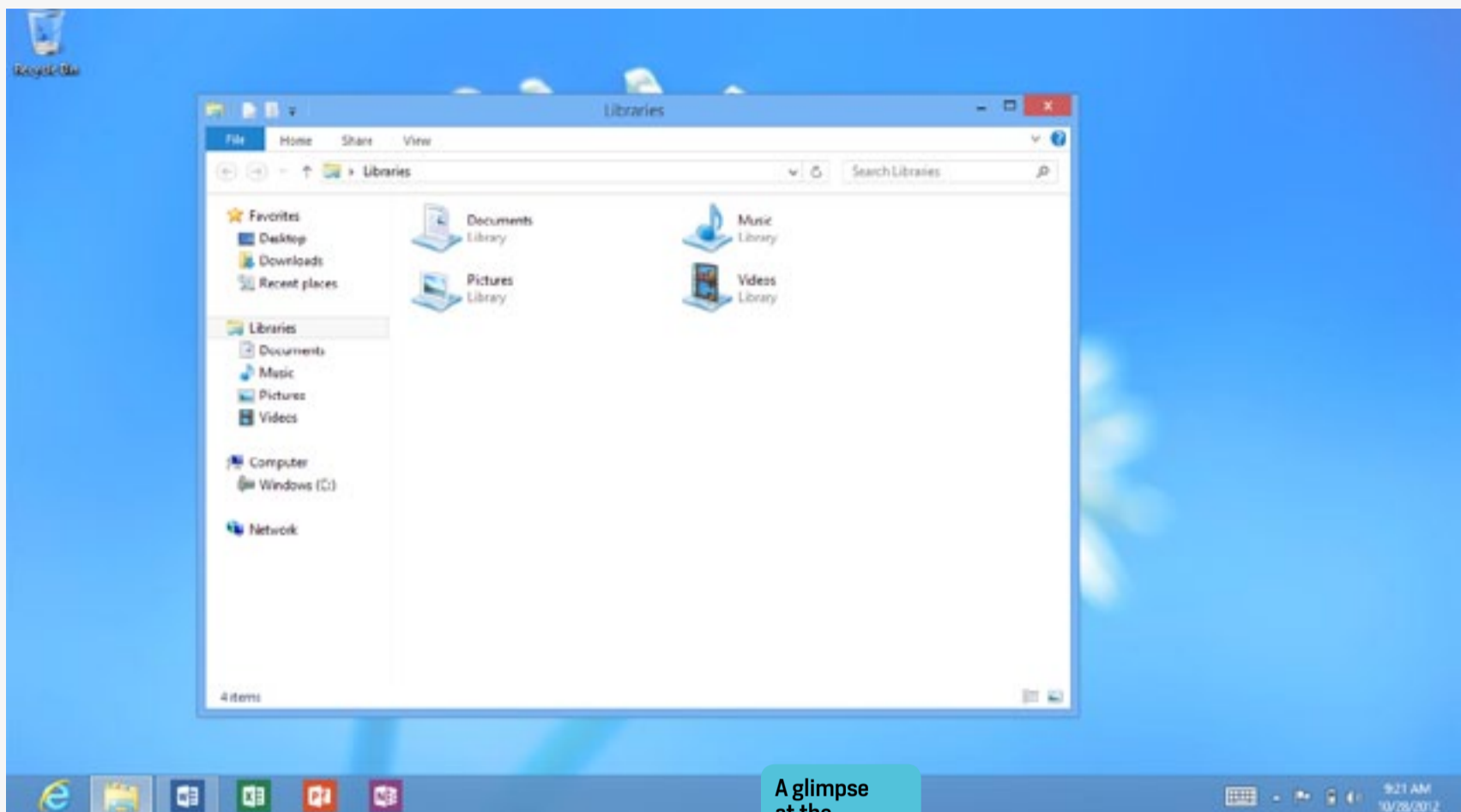
We can remember when we first started using Windows 7; the start-up sequence wasn't that different from Vista, which in turn wasn't unlike versions of Windows that came before that. The chain of start-up screens could be long, sometimes taking more than a minute to complete. Depending on how slow the system was, it could have taken a

The whole boot-up sequence takes not a minute, but just 20 seconds in some cases.

while longer for the desktop to fully load. Here, booting Windows feels like turning on an Android tablet, or some other mobile device. The whole process takes not a minute, but just 20 seconds in some cases — a short sequence marked by a brief splash screen and redesigned Windows logo. If this is your first time starting up your Windows 8 machine, you'll see a 30-second video tutorial explaining some of the controls that otherwise might not be so obvious — the so-called Charms Bar which you pull out from the right side of the screen, for example. (We'll circle back and explain all those new user interface elements in just a moment.)

From there, getting set up is a quick, painless affair. When you first boot up Windows 8 you'll be prompted to sign into your Microsoft account. Yep, the same one you might already be using for Hotmail, SkyDrive and Xbox Live. That means that every time you sign into a Windows 8 PC, your settings and custom tweaks will follow you to that new device. Additionally, because your Microsoft account is linked to your SkyDrive storage, you'll be logged into SkyDrive on any Windows 8 device where you've logged in using your Microsoft ID. So, because Of-





A glimpse at the traditional desktop for Windows 8.

Since Windows 8 backs up to SkyDrive by default, it means any document you edit on your Windows 8 device will automatically upload to the cloud.

If you didn't already have a Microsoft account, you can create one while you're setting up your PC. You can link your account at any time, really, and you also have the option of disconnecting it (in Microsoft's words, "switching to a local account"). Naturally, too, you can add multiple user accounts, as you could on previous versions of Windows.

If you like, you can also cherry-pick which settings do and do not get synced across your various Windows 8 devices. Go into the settings menu, for instance, and you can use on-off switches to sync your settings for desktop personalization, accessibility, language, app and browser settings. You also have

the option of syncing your lock screen, account picture and other Windows settings, like those relating to File Explorer or the mouse. Note: to have your passwords follow you from PC to PC, you'll need to "trust" the computer through an online verification process.

SECURITY OPTIONS

Obviously, if you log into Windows 8 for the first time using an existing Microsoft account, you've already got a built-in password for your PC. But in addition to a standard password, you can use a four-digit numerical pin to unlock the device. What's more, with Windows 8, Microsoft is also offering a new "Picture password" option that allows you to pick any photo and make a series of gestures on it. You can make



as many gestures as you want, but they do have to be taps, circles or swipes. In addition to the order, though, you'll have to remember where on the picture you're supposed to make each gesture.

We had mixed success here. On the one hand, when we set our password to be one tap in each corner of the picture, we were easily able to replicate this pattern, even if we didn't hit the exact same pixels each time. Still, when our password was a diagonal slash across each corner, we struck out trying to draw the lines in the same spot we did initially. Fortunately, as you're configuring your picture password you'll be asked to repeat the pattern, so if you can't do it then, that might be a sign you need to come up with something else.

USER INTERFACE:

REDESIGNED START SCREEN, AND THE END OF THE START BUTTON

It's safe to say the Windows Phone-esque Live Tiles have been the single most polarizing thing about Windows 8. Which makes sense: the new, mobile-inspired Start Screen looks wholly different from anything we've seen on previous versions of Windows. What's more, you can't even interact with these apps the same way: they run at full-screen, and can't be minimized or re-sized like the windows you're used

to. In short, these tiles are the cornerstone of the Windows 8 experience, and they're impossible to avoid, even if you plan on doing much of your work in the traditional desktop.

As you've probably heard by now, the Start button is no more. Well, it's there, but you'll have to hover with your mouse in the lower-left corner to make it appear. So, it's exactly where you'd expect it to be; it's just hidden until it's clear you need it. And what if you're using a touchscreen PC, like a dockable tablet? Your device will almost certainly have a dedicated Start button, the same way every Windows-compatible keyboard has a Start key. You can also find a shortcut to the Start menu in the Charms Bar, which you expose by swiping in from the right side of the screen. Not being able to click on the Start button is an adjustment, to be sure, but we're also confident you'll fall into a rhythm pretty quickly. After all, hovering where the Start button used to be isn't that different from clicking it, and hitting the Start key with your pinkie feels natural as well.

When Windows users say they wish Microsoft hadn't axed the Start button, what they're really nervous about is the fact that the Start Menu is presented so differently. When you hit the Start key, you'll no longer see a stack of fly-out menus; instead, you'll be whisked away from the desktop to a full-screen assort-

Everyone can, and will, figure it out.



ment of finger-friendly Live Tiles, which you scroll through from left to right. In other words, that minimal, unfamiliar screen is the new Start Menu.

Back when we first tried out the Developer Preview, we said it felt jarring to switch back and forth between the traditional desktop and this more tablet-optimized Start Screen. And it is — if you've never used Windows 8 before. What we can say now that we didn't appreciate back then is that while the learning curve is steep, you do get comfortable after a while. No one is a dummy: everyone can, and will, figure it out. It just takes a little time before using Windows 8 feels truly effortless.

UNIVERSAL SEARCH

We'd add, too, that once you master this new layout, there are lots of useful things about the OS that feel like clear improvements over previous versions of Windows. If you make the same pinch-to-zoom gesture you'd use to zoom in and out of web pages, you can shrink the Start Screen so that you can see all your pages of apps at once. As you can imagine, that's useful if you have a large collection of apps and don't want to page horizontally through eight home screens.

Additionally, once you bring up the Start screen you can start typing to search for something. As any Windows user will tell you, you can already more or less do this in Win 7, except here you don't even need to find a search bar. The results will immediately pop up on

the right side of the screen. From within the search results pane, you'll see the results are divided into files, settings and applications. Admittedly, this method of search isn't obvious to new users, but again, you only need to learn it once. After that, it's quite convenient.

CHARMS BAR

We already mentioned the Charms Bar, which appears when you swipe in from the right side of the screen. Here, you'll find shortcuts for the Start Screen, settings menu, a list of connected devices, search and sharing. Lingering on that last point, sharing works much the same as it does on other mobile devices, which is to say if you've got some piece of content — say, a Word document or a batch of photos — you can share them in all sorts of way. This includes email, as well as Facebook, SkyDrive, Twitter and any other applicable service you've linked to your Microsoft account. Again, we're used to doing this on our smartphones and tablets, but it's a pleasure to be able to use a Windows PC the same way.

What's more, it's nice that all of these sharing and settings menus are

The Charms Bar is at its best when you have some sort of touch device at your disposal.





easy to reach with your thumbs, even if you're using a large 11-inch tablet or a 13-inch convertible PC. The Charms Bar is one example of this: you can reach the settings and sharing menus while still cradling your tablet in a natural position. Moving on to the left side of the screen, you can swipe in from the left to toggle through open apps — a feature known as Switcher. Each time you swipe, a different program slides into place, taking up the whole screen. Here, too, it's easy to control your device, even if you're holding a large-screen tablet and have your hands full.

You can also expose the Charms Bar using a mouse, though it's a less smooth experience. You'll want to hover on so-called hot corners at the upper- and lower-right portions of the screen. This can be frustrating, and definitely has

Settings and sharing options are found in the Charms Bar.

a learning curve. If you're using a PC without a touchscreen, there's a good chance the trackpad has fresh drivers that allow you to replicate key Windows 8 gestures, like swiping in from the right to bring up the Charms Bar. We've also seen accessories like the Logitech Wireless Rechargeable Trackpad T650, which bring this functionality even to people whose older PCs don't support these gestures. Point is: this feature in Windows 8 is at its best when you have some sort of touch device at your disposal. Whether that ends up being a touchscreen or a gesture-enabled trackpad doesn't matter as much.

One other, potentially confusing thing: the Charms Bar holds the shortcut to *system* settings. If you're inside an app and want to see some options



specific to that program, you'll need to perform a different gesture entirely: swipe the top or bottom of the screen to bring up that menu.

MULTITASKING

When it comes to switching apps, you can use that Switcher gesture, but there are other built-in features designed to make multitasking a bit easier. For starters, Snap allows you to dock a window or app so that it takes up either a third or two-thirds of the screen. That leaves room for a second app, which you can snap into the remaining space. That's actually quite similar to Aero Snap from Windows 7, except here the dimensions are in thirds, instead of half the screen. As in the Win 7 version of this feature, you can't manually re-size these windows: once they snap into place they're going to take up a predictable amount of space (i.e., one third of the screen).

Also, in Windows 8 you can mix up the proportions by sliding the border of a window across the screen. Say, for instance, you're working on a Word document on two-thirds of the screen, with IE 10 sitting off to the side. You might be spending most of your time typing in Word, but if you need to do a web search, you can just put your finger on the border between the two windows, and drag it over so that now the web browser takes up more space. It's also worth noting that you can mix and match traditional desktop programs

and Modern (formerly known as "Metro") apps. In some cases, this can mean fewer jarring jumps between the desktop and more touch-friendly apps.

Snap is a trick you can pull off if you're using a touchscreen device or a traditional mouse and keyboard. Whether you're using your finger or a cursor, you need to drag down on the app from the top of the screen before it can be docked into place. If you are using a mouse, you can also hover in the upper-left corner of the screen to expose open apps. What you'll see isn't a list, per se, but a series of preview thumbnails — miniaturized versions of whatever's going on in that window (your Outlook.com inbox, your SkyDrive home screen, et cetera). From there, you can click on a thumbnail to switch to that app, or you can right-click to close one. Like so many other features in Windows 8, this feels less clumsy with practice, though even after months of testing, we find the swiping Switcher gesture feels smoother, more intuitive.

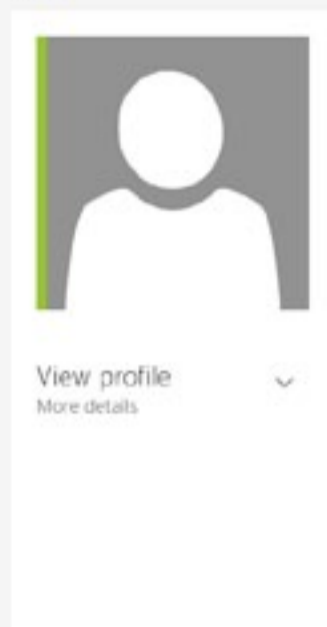
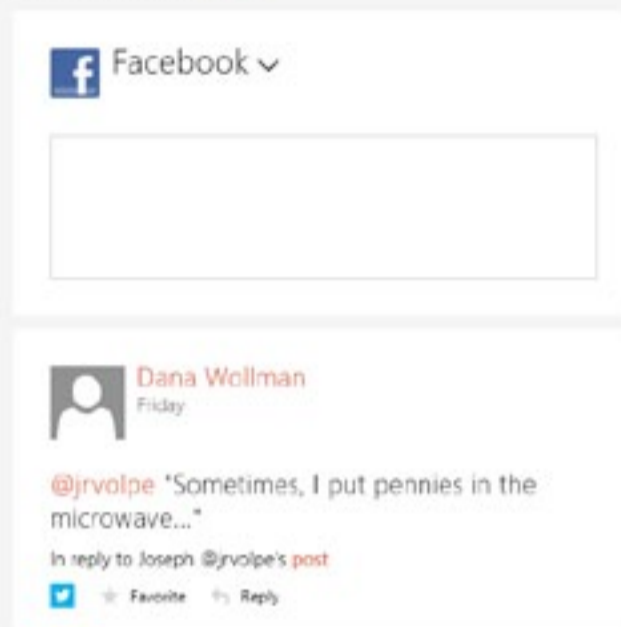
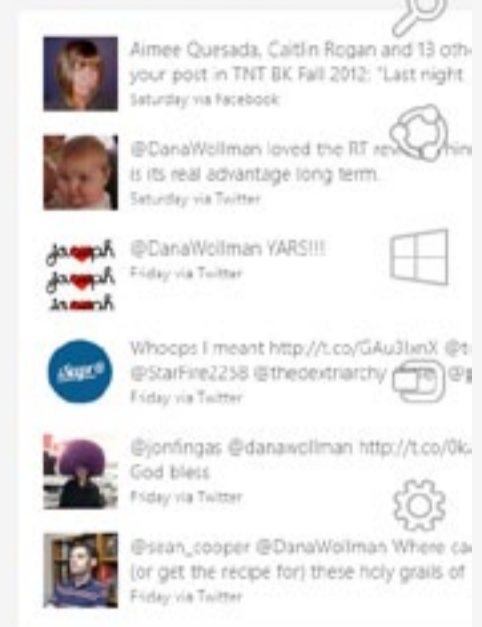
PERSONALIZATION OPTIONS

To some extent, you can control the look and feel of Windows 8. No, there's no bringing back the Start button, but you can select different color themes for your Start Screen. Toward the end of the Windows 8 development process, Microsoft added so-called Personalization Tattoos — essentially, Start Screen backgrounds with patterns and borders.



Dana Wollman

Me

What's new [View all](#)Notifications [View all](#)Update social
networks
in your
own card in
People hub.

So long as you're signed into your PC using a Microsoft account, this, too, will follow you to other Windows 8 devices you might log into. Get another Win 8 PC down the line, and it will show your paisley background as soon as you sign in for the first time.

LOCK SCREEN

In addition to the Start Menu, you can customize the look and feel of the lock screen. This includes the background photo, as well as which notifications are displayed. For instance, even without entering your password, you can see upcoming calendar appointments,

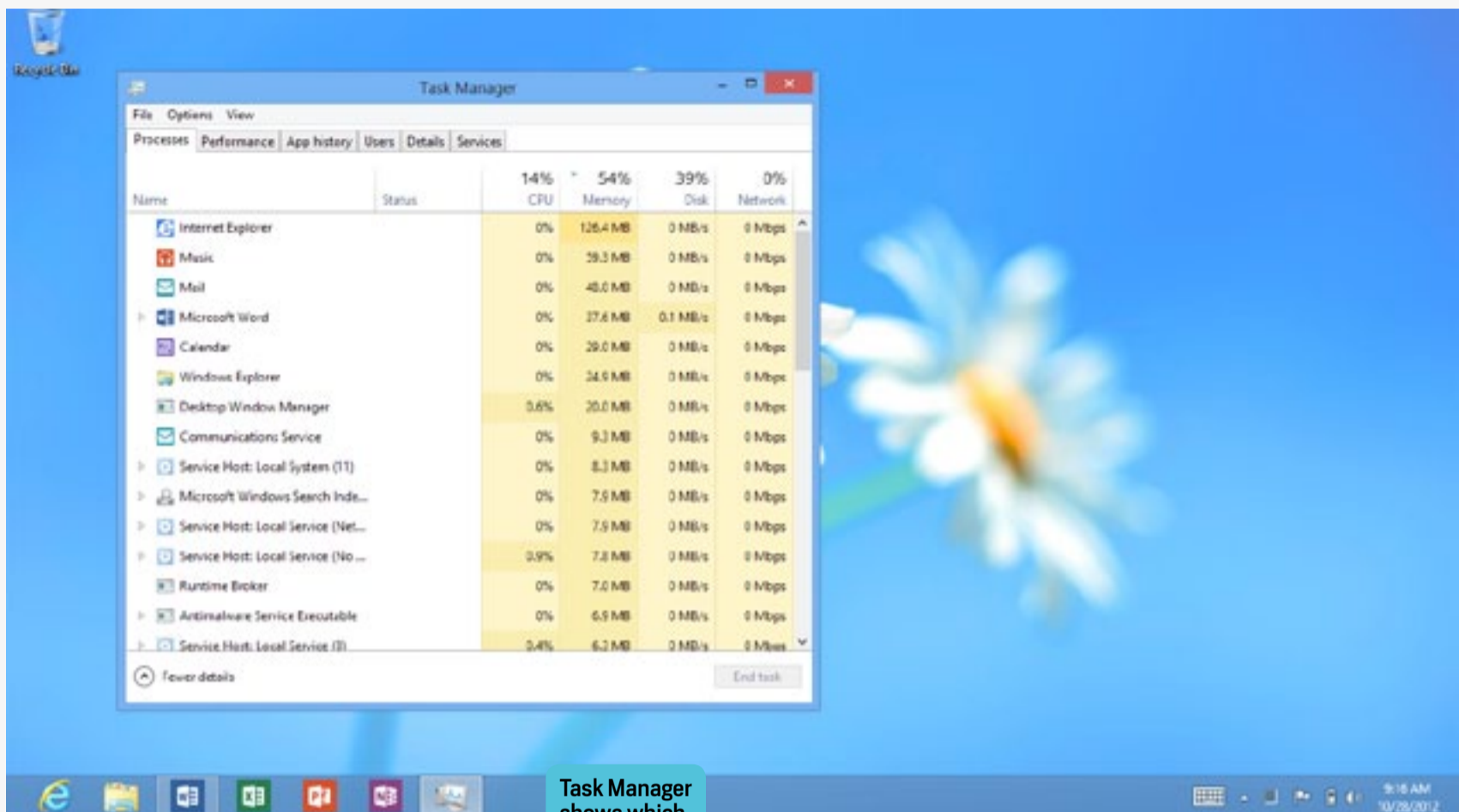
as well as a peek at how many unread messages or emails you have. In the PC settings, you can also choose to display detailed information for one of two things: your upcoming calendar appointment, or the weather forecast.

DESKTOP

For the most part, the desktop should feel pretty familiar to Windows 7 users, especially compared to that redesigned Start Screen. Still, there are some differences here, too. For starters, the Aero UI is no more, which means windows no longer have a transparent border. Everything here is flat and two-dimensional, not unlike those new Live Tiles.

For the most part, the desktop should feel familiar to Windows 7 users.





Task Manager shows which apps take up the most resources.

In a move that will please power users, Windows 8 also ushers in improved multi-monitor support, with the ability to display different desktop backgrounds on multiple displays, as well as have a single picture span those various screens. You also have the choice of expanding the Taskbar across those monitors, or setting it up so that a pinned program only appears on the same screen where that app is running. All told, it's a welcome improvement, though it would be nice if you could run Modern UI-style Windows 8 apps on more than one monitor at a time. Also, if you do have a multi-monitor setup, you'll find it's trickier than usual to pull up the Charms Bar using a mouse.

Other changes: Windows Explorer is now called File Explorer, and bears the

same Ribbon UI already used in Microsoft apps like Office and Paint. There's also now a File History feature, which stores versions of files similar to Time Machine in Apple's OS X. The Task Manager has also received a makeover so that when you first launch it, all you see is a list of open apps. Nothing about processes or memory usage; just a list of programs, and an "End task" button. Click "More details," though, and you'll see a half-dozen tabs, showing you everything from performance graphs to CPU usage to running processes. In the processes tab, in particular, there are four columns showing CPU, memory, disk and network usage, with the resource hogs highlighted in a darker color.

One thing that hasn't changed: the keyboard shortcuts. The same ones you



relied on in Windows 7 will work here, which should take some of the sting out of getting used to a new user interface.

BUILT-IN APPS:

MAIL

Setting up the Mail app is easy: if the Microsoft ID you use to initially sign in is tied to Gmail, or some other service not run by Microsoft, it automatically prompts you for your email password. In the case of Gmail, we had the option of syncing our Google contacts and Calendar as well (we said yes). There are also easy setup options for Hotmail, Outlook.com, Yahoo and AOL, though you can add accounts from other services too. Even if you don't link a Hotmail or Outlook account, the Mail app will import all your folders and labels — everything, really, but your starred items, in Gmail. Those folders take up just a narrow pane on the left side of the screen. Next to that is a wider window where you can see each individual message, along with previews and, when applicable, thumbnails of the contact who wrote to you.

The email itself takes up the most space, stretching across the entire right third of the screen. Up top, above the message, you'll find icons for creating a new message, replying / forwarding and deleting. (We always did like the in-line delete button in Outlook.com, so we're

glad to see that design touch carries over here too.) If you swipe the top or bottom edge of the screen for the options menu, you can refresh your inbox, or move a message to another folder. Also, if you have more than one email account hooked up, you can pin a particular inbox to the Start Menu.

All told, it's easy to use; we just wish there were easy-access buttons for archiving and marking junk mail as spam. Unfortunately, too, you don't have direct access to certain of Hotmail and Outlook.com's finer features, like the ability to "Sweep" newsletters and other so-called gray mail into out-of-the-way folders. However, if you set up Sweep on Hotmail.com or Outlook.com, the Mail app in Windows 8 will still follow whatever rules you have in place.

CALENDAR

As promised, when we chose to sync our Google contacts and Calendar, our appointments all promptly showed up in the built-in Calendar app. (If you're not a Google user, you can also link your Hotmail, Outlook.com or Exchange / Office365 calendar.) The default view is by month, which is a bit too busy for our tastes — you can only see two appointments per day, even if there are many more. We highly suggest selecting the daily or weekly view in the menu options hidden at the bottom of the screen. If you're creating an appointment from scratch, you'll have the same options as if you were doing this online:



October 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
30	1 9 events	2 7 events	3 6 events	4 3 events	5 7 events	6
7a Vitamin	5a Check TeamAOL ma...	5a Check TeamAOL ma...	Check in with Zach re E...	5a Check TeamAOL ma...	3a Check TeamAOL ma...	4:30a Running practice
2:30p Haircut at Fox & J...	5a Morning meeting	5a Morning meeting	5a Check TeamAOL ma...	1a Morning meeting	1a Morning meeting	7a Vitamin
7	8 7 events	9 6 events	10 7 events	11 3 events	12 8 events	13 3 events
7a Vitamin	5a Check TeamAOL ma...	Check in with James and...	5a Check TeamAOL ma...	5a Check TeamAOL ma...	Ask Brent about his Qur...	4:30a Running practice
1p Canadian Thankgiv...	5a Morning meeting	5a Check TeamAOL ma...	5a Morning meeting	5a Morning meeting	3a Check TeamAOL ma...	7a Vitamin
14	15 6 events	16 6 events	17 10 events	18 7 events	19 10 events	20 3 events
7a Vitamin	Zach's smartphone buye...	5a Check TeamAOL ma...	Follow up with John B...	5a Check TeamAOL ma...	James' tablet buyer's gu...	5:30a Running practice
	Enroll in health insuranc...	5a Morning meeting	5a Check TeamAOL ma...	1a Morning meeting	1a Check TeamAOL ma...	7a Vitamin
21	22 9 events	23 6 events	24 5 events	25 4 events	26 5 events	27
7a Vitamin	Follow up with Ben abo...	5a Check TeamAOL ma...	5a Check TeamAOL ma...	5a Check TeamAOL ma...	1a Check TeamAOL ma...	4:30a Running practice
9a Brunch with Stamp	5a Check TeamAOL ma...	5a Morning meeting	5a Morning meeting	5a Morning meeting	3a Morning meeting	7a Vitamin
28	29 5 events	30 4 events	31 5 events	1 5 events	2 6 events	3
7a Vitamin	Ask Zach about NEX: 6 r...	5a Check TeamAOL ma...	5a Check TeamAOL ma...	5a Check TeamAOL ma...	3a Check TeamAOL ma...	4:30a Running practice
12:30p Food coop make...	5a Check TeamAOL ma...	5a Morning meeting	5a Morning me...	5a Morning meeting	1a Morning meeting	7a Vitamin

The Calendar app defaults to a busy monthly overview.

everything from date to time slot to reminder alerts.

PEOPLE

The People app doubles as an address book and a one-stop shop for social networking updates. Using the settings menu in the Charms Bar, you can link all sorts of accounts — things like Google, Facebook, Twitter and LinkedIn. Obviously, the more of these services you connect, the more contacts will pop up in your People Hub. All told, it works similarly to the People Hub in Windows Phone, which is to say everyone you know gets a contact card that pulls in all available forms of contact — everything from email to a Twitter handle. Open your own contact card and you can update your Facebook status as well as post, favorite or reply to tweets.

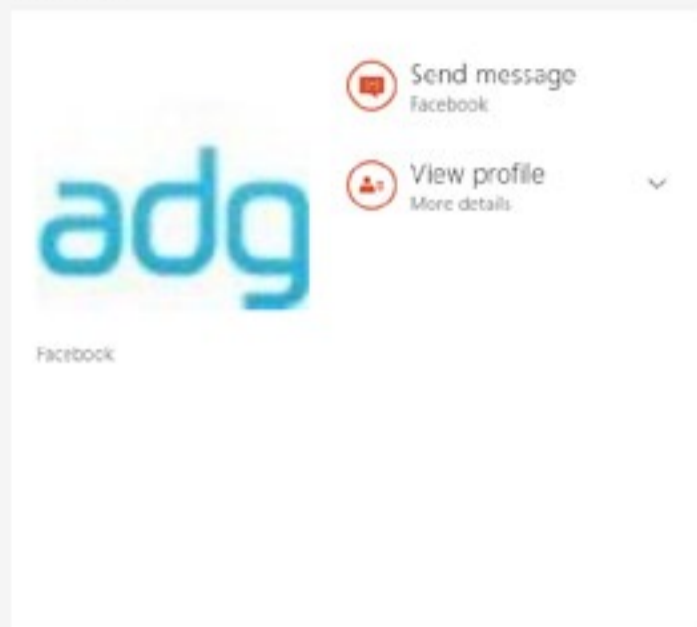
When you open People Hub you'll see your contacts arranged in alphabetical order, and you scroll from left to right to move through the list. As with the Start Screen, you can use pinch-to-zoom to shrink a long list. In this case, you won't see every contact onscreen; just a tile for each letter of the alphabet, making it easier to jump to a certain part of your list.

Also in the People Hub are Live Tiles for social networking / messaging notifications, as well as a "What's new" page, showing a horizontal feed containing your friends' recent Facebook and Twitter updates. Though the People Hub is easy to use in general, we tended not to rely on the "What's new" stream, as a long list of social updates is easier to view in a vertical list than a horizontal one.



← Eddie McGadget

Contact

What's new [View all](#)

Photo



The People app is a one stop shop for social networking.

IE 10

In Windows 8, you get not one, but two versions of the IE 10 browser: one for the desktop, and a more touch-friendly one that lives on the Start Screen. Both versions have a Chrome-like setup, with a single bar for URLs and web searches. The two also sync with each other, which wasn't the case in earlier builds of the OS.

There are, as you can imagine, some UI differences. In the desktop version, though, adding a tab is as easy as pressing a plus sign. In the more touch-optimized version, you swipe from the top of the screen to expose open tabs, or open a new one. IE 10 also has a feature allowing you to either swipe or click an onscreen arrow button to proceed to the next page, whether that's the next page of search results or the next page in a news story

broken up into nine pieces.

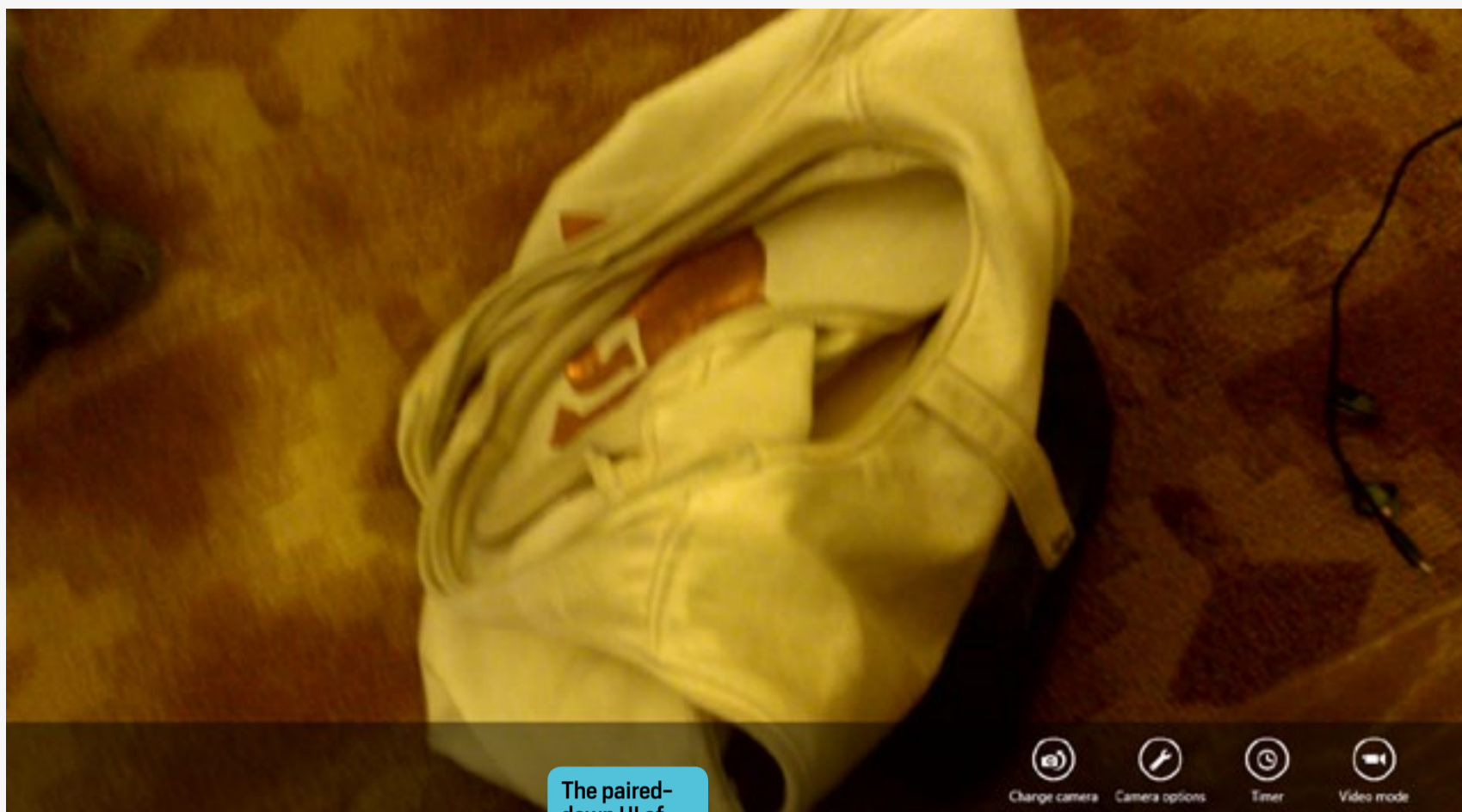
As far as content goes, IE 10 is HTML5-based, though the desktop version supports Flash and Silverlight as well. In the touch-friendly version of the browser, only certain sites on the Compatibility View list support Flash. So, we can't promise you'll be able to run the site you want, but that Flash exceptions list at least includes popular sites like YouTube and Vimeo. And besides, with HTML5 being as ubiquitous as it is, you really shouldn't run into any issues.

From a privacy standpoint, Do Not Track comes enabled by default, which means sites can only track and collect your private data if you go out of your way to turn off "Do Not Track."

CAMERA

Windows' built-in camera app is sim-





The paired-down UI of the Windows 8 camera app.

ple: a full-screen frame (if you choose a 16:9 resolution), with a few options always visible at the bottom. These include a timer, video mode and a “change camera” toggle (assuming there are front and rear cameras). There’s also a “camera options” icon, but from there you can only switch the resolution or choose another audio recording option, if applicable.

Right now, at least, there are no photo filters, like sepia, and nothing in the way of HDR or panorama mode. The camera app is also missing tap-to-focus, which can be a minor nuisance or an unfortunate problem, depending on the tablet you’re using. Still, as we saw on the ASUS VivoTab RT, PC makers have the option of adding secondary camera apps that mimic the look and feel of the stock camera application, but add a few more

special effects. Without any of these additional features we’ve come to expect, the native camera app feels like a bit of an afterthought.

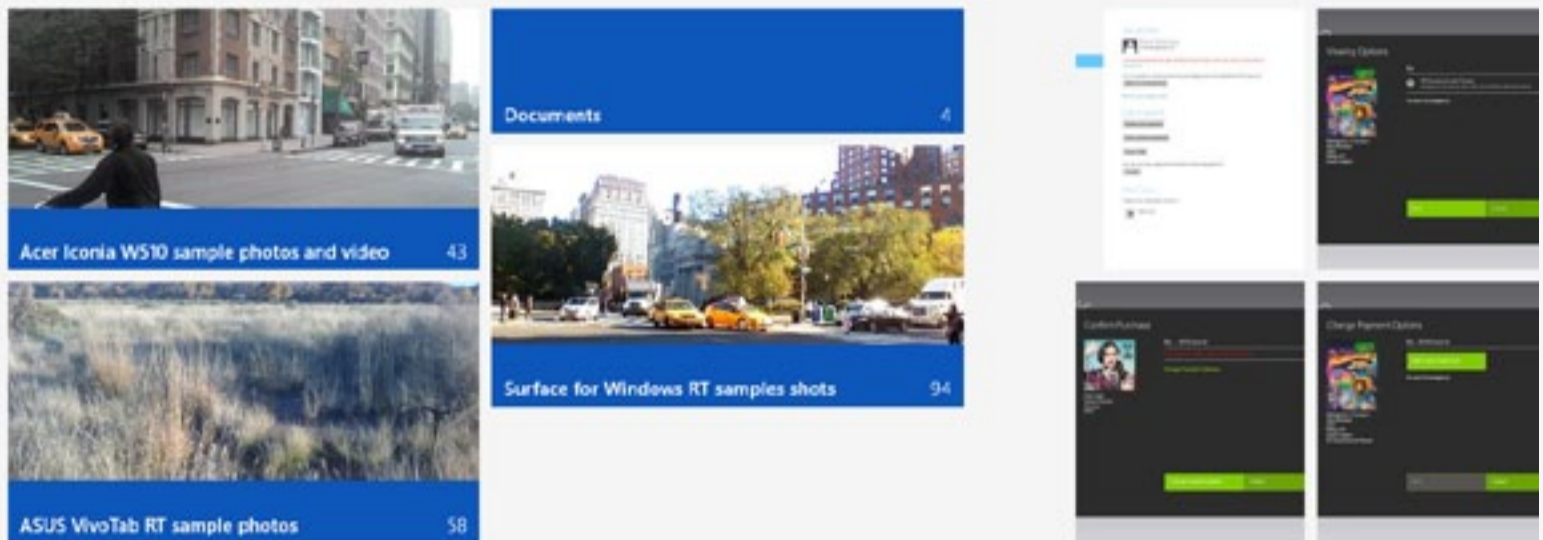
SKYDRIVE

In addition to creating a dedicated SkyDrive app for Windows 8, Microsoft made over the browser version of its cloud storage service. As ever, people signing up for a new Microsoft account get 7GB of free lifetime storage. However, if you recall, folks who had previously uploaded files as of April 22 of this year had the option of opting into 25GB of storage. If you’re already enthusiastic about Windows and the Microsoft ecosystem at large, chances are this describes you.

Whether you log in online or use the Win 8 app, each folder or file takes the



← Dana's SkyDrive ▾ 9 items



In the new SkyDrive each folder or file has its own tile.

form of a tile. When using the browser, these tiles sit as a grid, with the various thumbnails stacked on top of each other. In the Windows 8 app, you scroll through them horizontally by default, though you can also view them in list format. Whichever app you use, you can upload or download files, as well as create new folders. With the web version, though, you can also create a new Word document, PowerPoint presentation, Excel spreadsheet or OneNote workbook — something you can't do in the Win 8 app.

MESSAGING

Messaging is your native IM app. For now, you can link it with Microsoft Messenger (of course) or Facebook chat. Though it would be nice to add Google Talk, the way you can add your Gmail

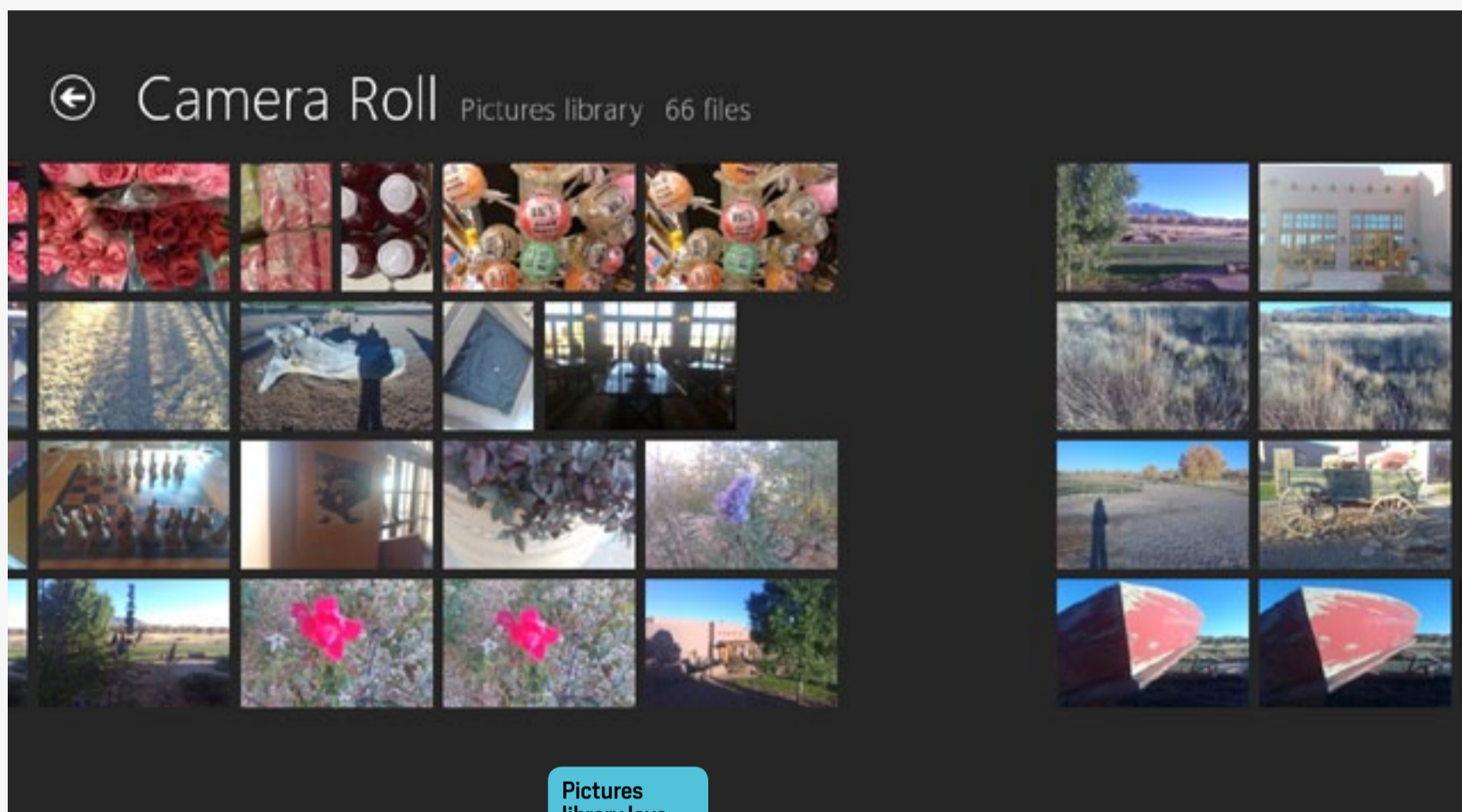
address in the Mail app, we're not surprised that Microsoft has excluded the competition here.

PHOTOS

Similar to the People app, Photos pulls in pictures from all sorts of sources: Facebook, Flickr, SkyDrive and your PC's local storage. As a portal for viewing and sharing photos, it's great. You can run a slide show, and use the context-aware sharing feature in the Charms Bar to easily upload pics to Facebook, Twitter, Flickr and other websites. You can also pull in pics from another PC you may own — so long as you install the SkyDrive desktop client on that system and select the checkbox next to "Let me use SkyDrive to fetch any of my files on this PC."

Additionally, you can also share





photos through email. It's also easy to select photos to upload in batches: just swipe the top of the screen to expose the app settings, and then hit "Select all." If you want to remove an item from the list, just uncheck it. All in all, the app is easy to use, though more editing tools would be nice. Also, we kept trying to select photos by pressing down on them with our finger. The fact that you can't do this feels a bit counterintuitive.

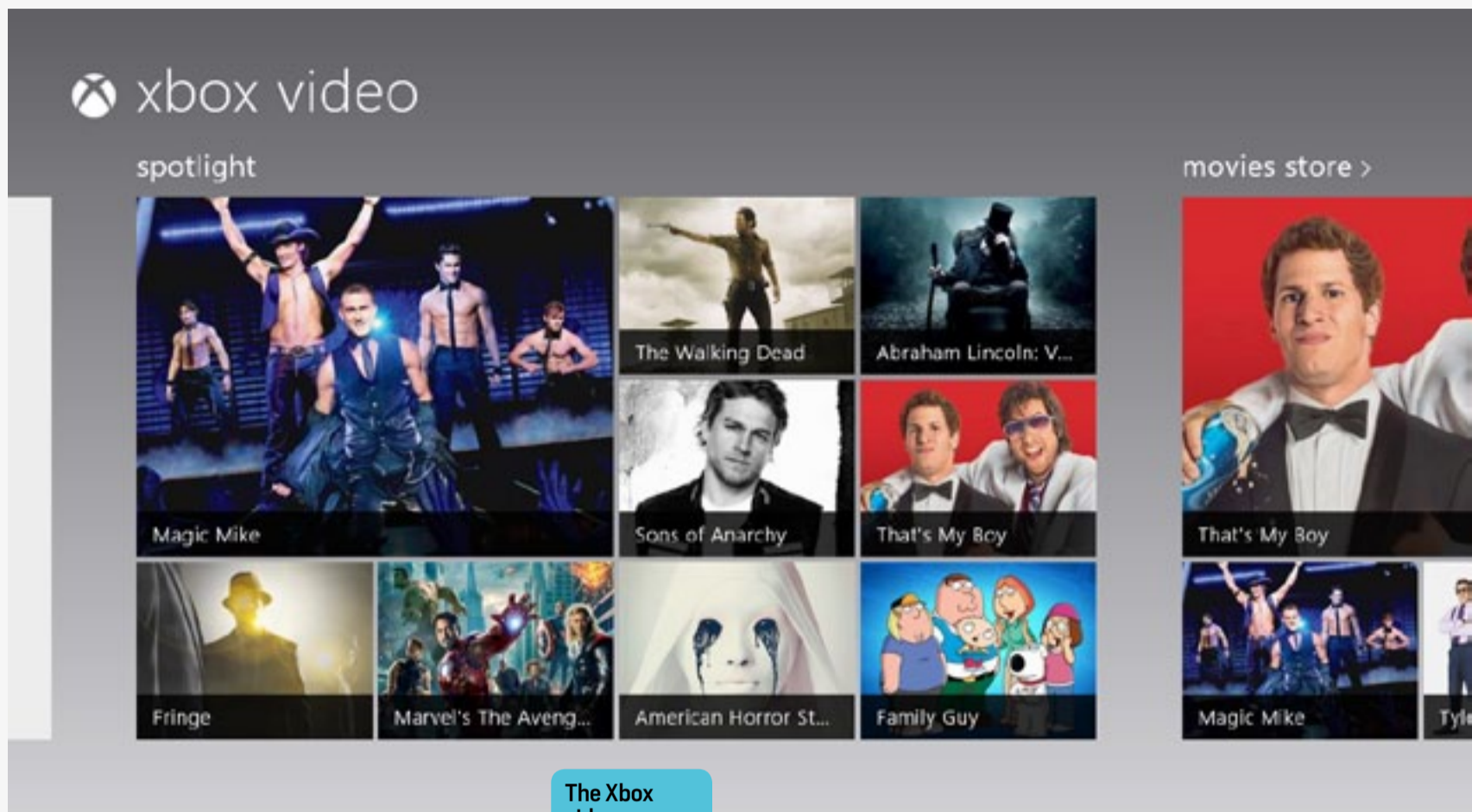
GAMES, MUSIC AND VIDEO

We'll just lump these together since they all fall under the Xbox ecosystem. Through these apps, you can buy music, movies and Xbox Live games, with the additional option of renting some movies. For now, Windows Phone games are not supported in the way you can

play some iOS games on both iPhones and iPads. It would seem logical of Microsoft to eventually make its Windows Phone games available on Windows 8 devices, but for now, you'll have to download different sets of apps for your tablet and smartphone.

Out of the box, Microsoft's Music app includes free, ad-supported streaming, available in 15 markets to start. Though the games compatibility is still somewhat compartmentalized, this music streaming feature will work across Windows 8, Windows Phone 8 and Xbox. Obviously, Microsoft has been in the business of selling music for some time, so by now its catalog is quite voluminous at 30 million songs. If you like, you can purchase Xbox Music Pass, an ad-free subscription, for \$10 a month. Under this plan, your songs





will follow you from device to device, just like the rest of your settings. Here, you'll also get the option of downloading music and listening to it offline, which you can't do with the free, ad-supported service. Similar to iTunes, too, Music includes a matching feature that takes music you already had stored on your computer and finds the cloud-based version.

Though it's not installed on Windows 8 machines out of the box, you can download Microsoft's SmartGlass app, which lets you stream music and video to an Xbox, using your Windows 8 device as a remote. All told, it's not unlike Apple's AirPlay, though SmartGlass has the added benefit of not being limited to multimedia playback. You can also use it with Internet Explorer, in which case you also have the option

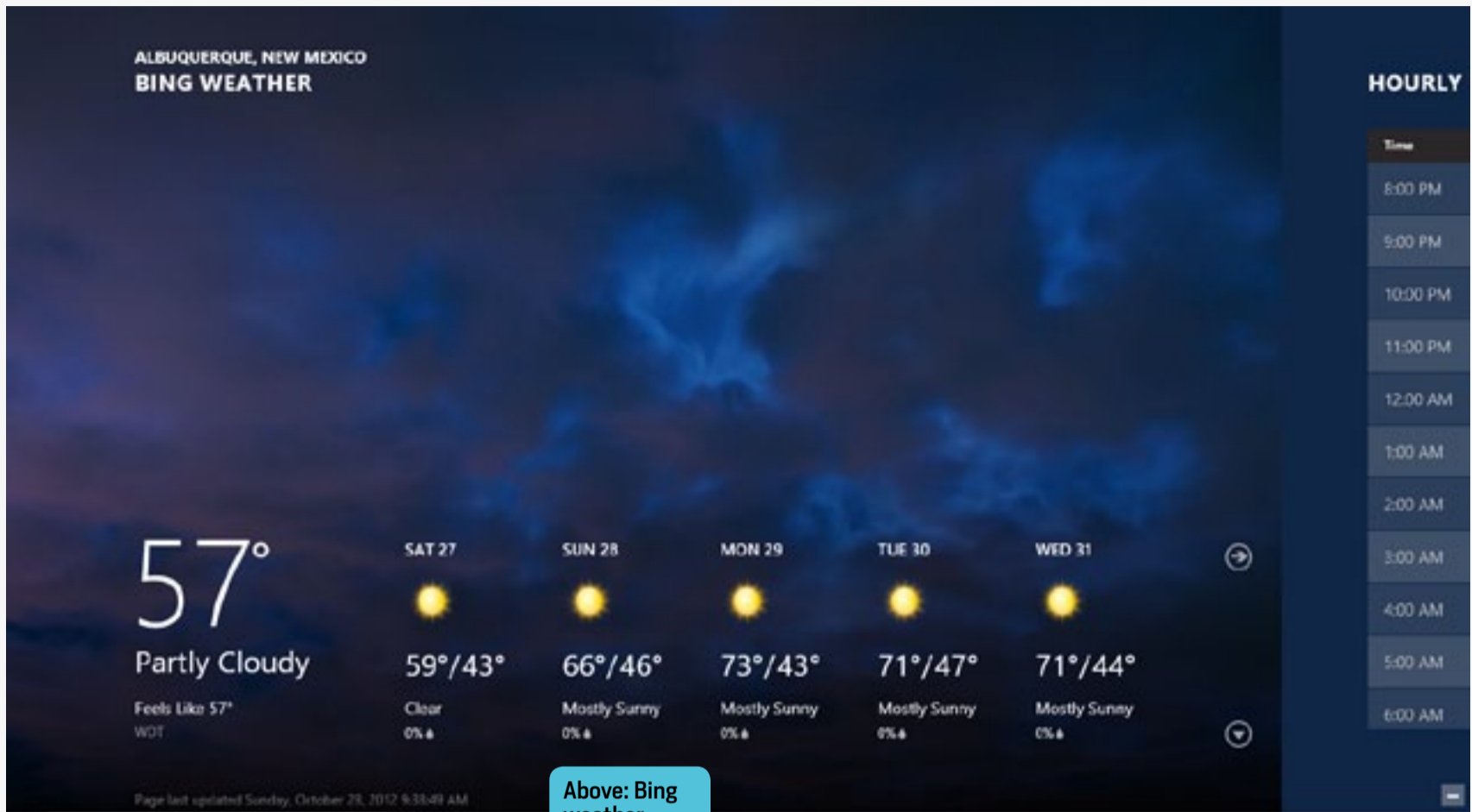
The Xbox video environment for the new Windows.

of using an on-screen keyboard within the app.

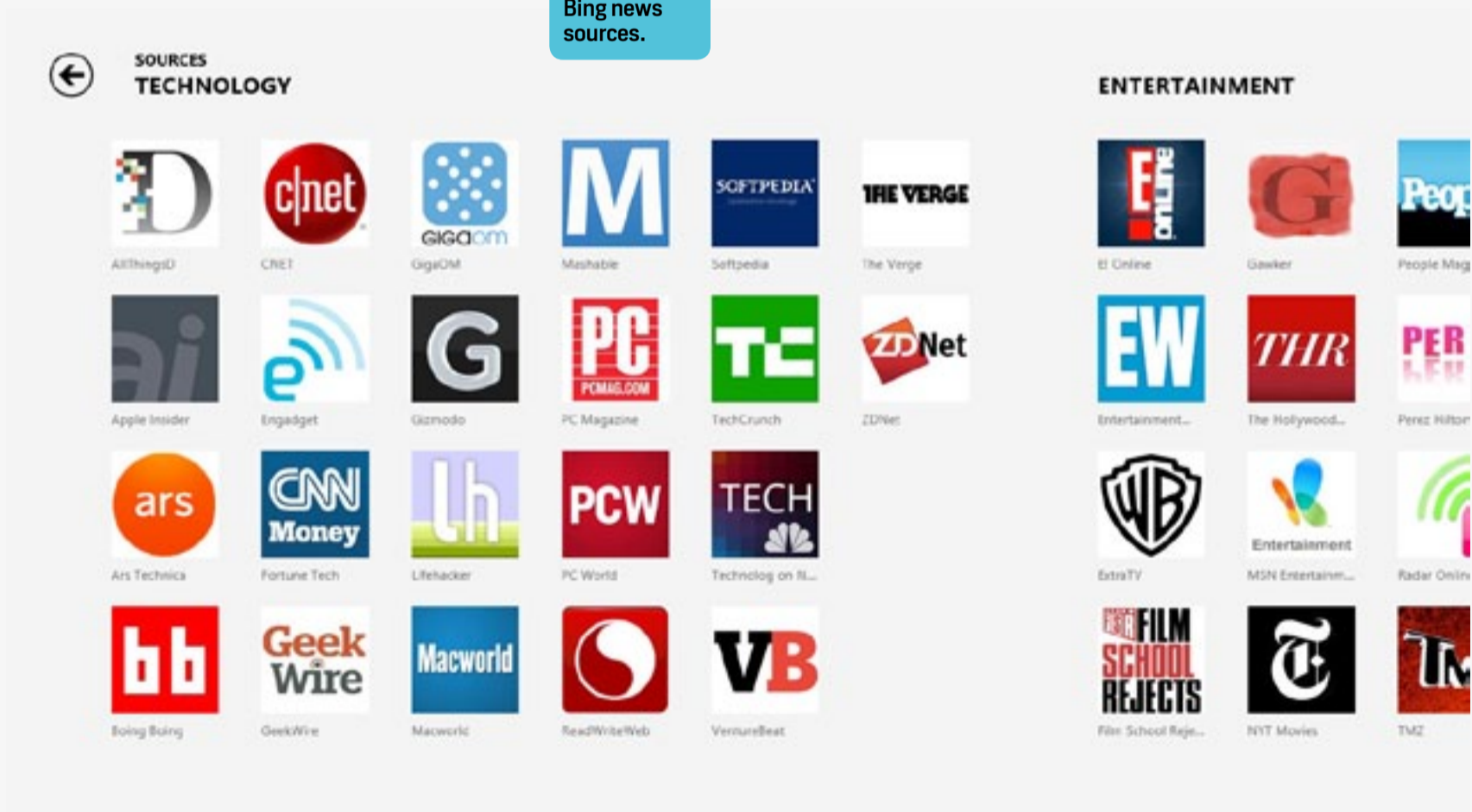
BING APPS: SEARCH, MAP, NEWS, SPORTS, WEATHER, FINANCE AND TRAVEL

Peppered around the Start Screen, you'll find a handful of Bing-powered apps: Search, Map, News, Sports, Weather, Finance and Travel. Starting with search, the screen is so minimal that you have to tap to expose the search bar. At the bottom of the screen are a handful of trending topics; you can always click more, and then scroll through them from left to right, as you would with anything else in Windows 8. Maps has aerial and road view options, with a street traffic option. By default, it will show your current location, though you can of course search





Above: Bing weather.
Below: Bing news sources.



for any point of interest you like. There are also turn-by-turn directions, which appear as a banner at the top of the screen that you can scroll through from

left to right.

Scroll from side to side in the travel app and you'll see featured destinations, panoramic photos and travel-



related news stories. If you want more personalized information, though (and you probably will), you can swipe down from the top of the screen to choose a specific destination, or focus on a different part of the travel-planning process, like flight- or hotel-booking.

It's a similar story for Bing Sports: when you first open the app, you'll see a featured story, followed by other articles. You'll also see schedules for every in-season sport. Swipe from the top of the screen, though, and you can pick a certain sport. You can also pick favorite teams, and view news stories and schedules that only relate to them. Bing News, meanwhile, is personalized in the sense that you can view specific sources, in addition to a main home screen with top news in every category.

The weather app is a geek's haven, with a mix of hourly forecasts, maps and graphs. You can add a location manually, or let the radios on your device figure it out. Finally, Bing Finance does just what you'd expect: it shows top market news, along with overviews of the major indices, though you can also create a personalized watchlist making it easy to check on your stocks at a glance.

WINDOWS STORE

When Windows 8 went on sale a few days ago, Microsoft said the Windows Store was home to thousands of apps, though it declined to provide a precise number. For now, there are no first-

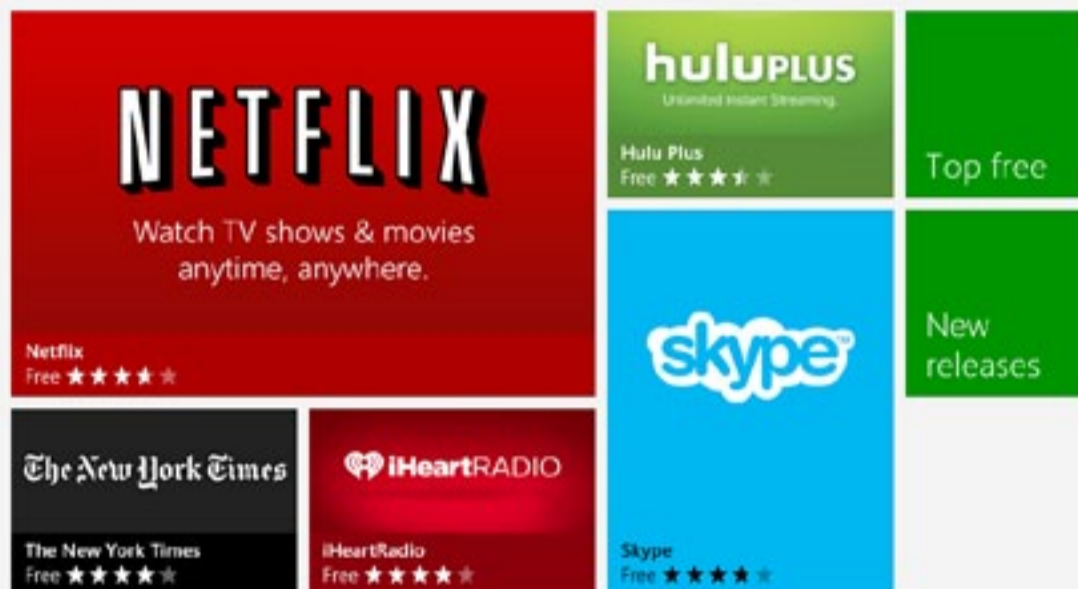
This is Windows we're talking about. Developers like Facebook would be wise to come up with something posthaste.

party apps for Facebook and Twitter, which remains true on Windows 7 as well. (Twitter, at least, says it will have an app in the coming months.) Other missing biggies include: Foursquare, Mint, PageOnce, TripIt, NPR, *Draw Something*, *Words with Friends*, *Temple Run*, Spotify, Springpad, Remember the Milk, Instapaper, Pocket (formerly Read it Later), Flipboard, Steam, Instagram, Nook and Rdio. Still, there's reason to think many of these will arrive soon enough: in the weeks we spent working on this review, Netflix, The New York Times, Skype, Hulu Plus, *Fruit Ninja*, *Angry Birds*, Zinio and Bank of America all went live in the store. Dropbox, ESPN and PayPal are all coming soon, according to Microsoft. Other notables, like the AP, Box.net, Pandora and Slackr, have been available for quite some time already. And besides, who are we kidding? This is Windows we're talking about. The operating system that's going to ship on millions and millions of new PCs. Developers like Facebook would be wise to come up with something for Windows 8 posthaste. Still,

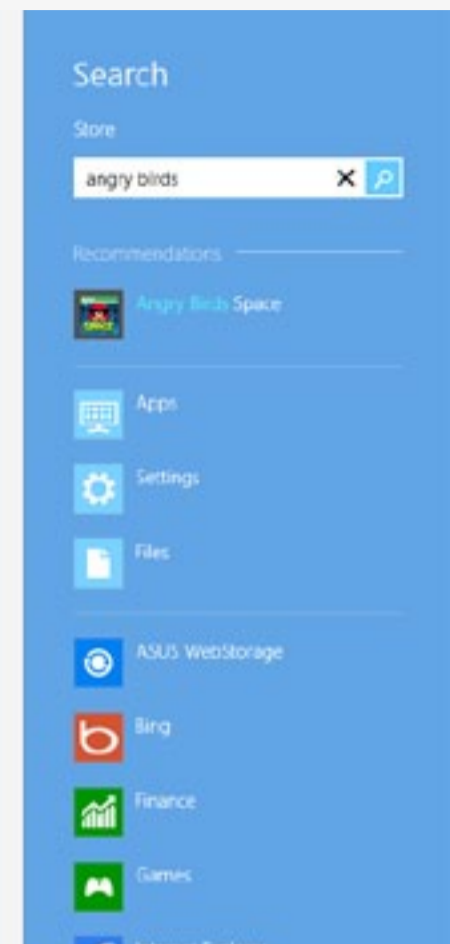


Store

Spotlight



Just a few of the big-name apps available at launch.



in the first few weeks or months of owning your Windows 8 device, you might find yourself making do with less familiar alternatives, or just loading up the browser version of the app.

Navigating the store feels like using any other Windows 8 app; you'll start off by seeing recommended apps, along with tiles for new releases and the top free apps. Keep scrolling to the right and you'll see apps broken down by category, such as social or entertainment. If you're less in the mood to meander and more in the mood to find something specific, you can search in one of two ways: you can swipe the Charms Bar and select the Search option, or you can just start typing. Yep, in the same way you can start typing to find something on the Start Menu, you can start typing to look up an

app. If it's in the app store, it'll show up in the search results as a recommended pick. As convenient as that is, though, you can only do it on the main page of the Windows Store. Select a page like "Top Free Games" and that search method no longer works; you'll have to use the Charms Bar instead.

Once you find an app that strikes your fancy, you can read an overview, along with a summary of permissions you'll be granting the developer. You can also see a list of supported languages and check which processors are supported (this is especially useful if you have an ARM-based device running Windows RT and aren't sure it will run the same apps as an x86-based Windows 8 machine). Lastly, there's a tab for reviews, which you can sort by newest, oldest, lowest rating, highest rat-



ing or most helpful (yep, you can weigh in on specific comments). Payment methods in the Windows Store include credit cards and PayPal. Once you buy an app, you can install it on up to five devices at once.

ACCESSIBILITY

In addition to all the new apps and UI elements, Windows 8 brings some enhancements for people with limited vision or other disabilities. Windows chief Steven Sinofsky gives a detailed overview of these improvements, but for the purposes of this review we'll stick with a quick summary.

Updates include:

- A redesigned Narrator that's quicker to read selected items out loud.
- Expanded language support in Narrator, with more voice options available.
- Updated UI Automation with more text patterns and document content so that Narrator can use it to read the outputs from applications.

SYSTEM REQUIREMENTS

According to Microsoft, Windows 8 requires 1GB of RAM and 20GB of free disk space. Other system requirements include a 1GHz processor that supports PAE, NX, and SSE2; 1,366 x 768 resolution; and DirectX 9 graphics. If you're upgrading your current machine, you can be running an OS as old as XP with Service Pack 3. Heads up: Microsoft warns that if you're upgrading from XP or Vista, you'll need to re-install your apps.

What's less clear is whether your current laptop's trackpad will support Windows 8 gestures. Some existing PCs will benefit from updated drivers that let you perform all the Windows 8-specific motions from your trackpad, but of course, we can't make any guarantees there.

PRICING AND VERSIONS

Though you can buy a PC with Windows 8 or Windows 8 Pro installed, Win 8 Pro is currently the only version of the OS available for purchase as a standalone piece of software. (The main differences, in a nutshell, are that Windows 8 Pro includes business-oriented features like Remote Desktop Connection, Domain Join for corporate networks, and Device Encryption, which is based on the company's BitLocker technology.) From now until January 31, Microsoft is charging consumers an upgrade price of \$39.99, provided they download the software. If you'd rather buy it as boxed software, the price is \$69.99. Microsoft says it will provide additional pricing information at some later date.

Finally, though this is a review of Windows 8, the new version of Windows for traditional, x86-based PCs, it's worth acknowledging Windows RT for ARM-based devices, and also summarizing the differences. In short, the two operating systems have the same look and feel, with the same UI, gestures and native apps. The chief difference is that Windows RT can't run apps written for x86-based PCs. Additionally, not all the apps in the Windows Store can run on both Win 8 and RT devices. Fortu-



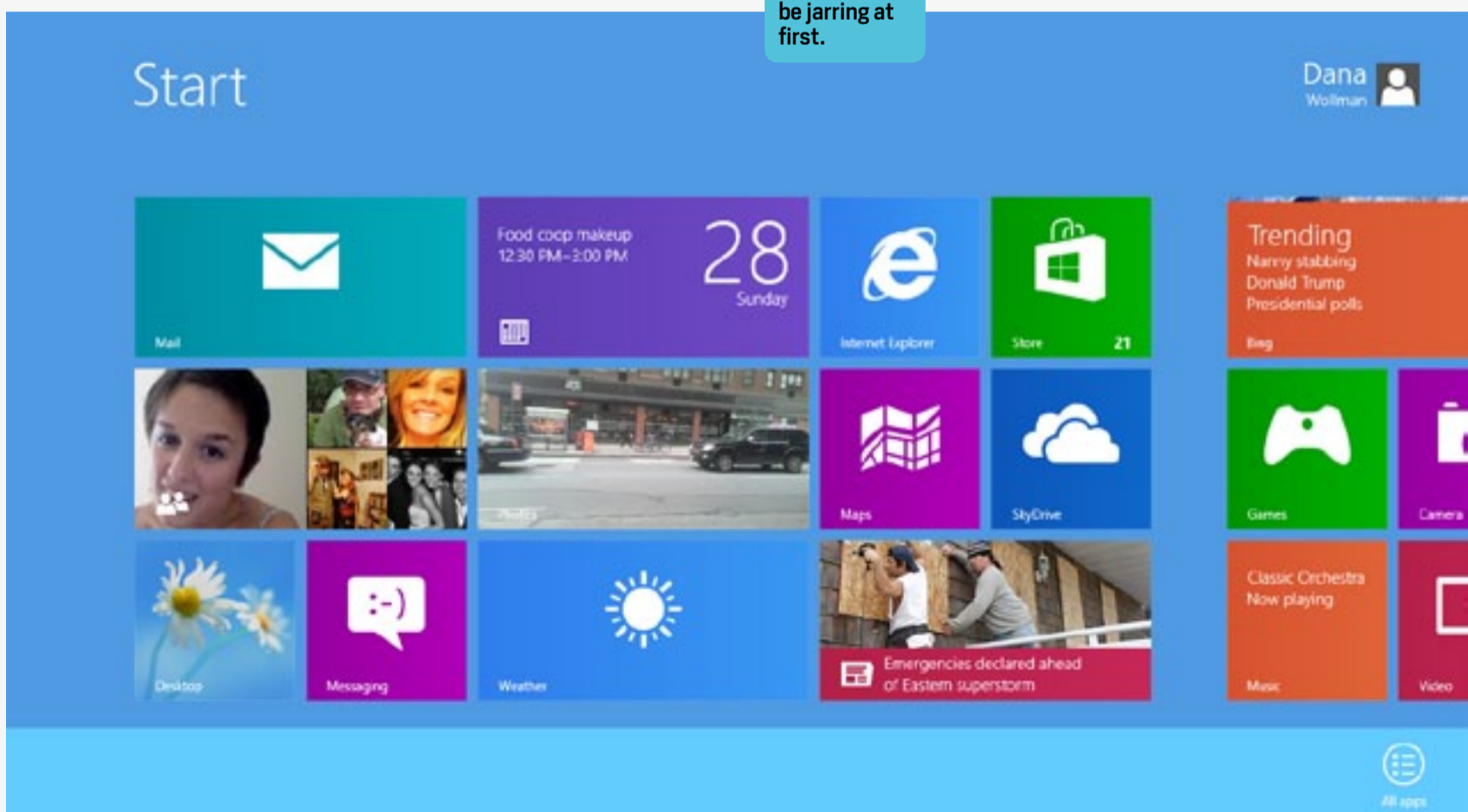
nately, all Windows RT devices come with a version of Office 2013 modified for Windows RT. With that major hurdle out of the way, we're hard-pressed to name *that* many other x86 apps you'd want to run on an ARM-based tablet.

WRAP-UP

Though you *could* install Windows 8 on an older Win 7 system and use it solely with a mouse and keyboard, the market is filling up with touch-friendly PCs designed to be used with Win 8. These include traditional notebooks with touchscreens, as well as dockable tablets, all-in-ones with articulating displays, slider PCs and convertible laptops whose screens can twist and fold back into tablet mode. In general, we'd strongly recommend any of these over a PC that doesn't have a touchscreen.

What we've learned — and what we couldn't fully appreciate before testing some of these new devices — is that Windows 8 is at its best when you have the option of interacting with it using your fingers. It doesn't matter so much if you have a touchscreen, a modern touchpad or an external trackpad that supports Win 8 gestures. The point is, many of Windows 8's most enchanting features (the Charms Bar, etc.) are easy to use this way, but frustrating if all you have to work with is a mouse. If you have an older system whose touchpad won't support Windows 8 gestures, you might want to stick with Win 7 until you're ready to buy a new PC — without that touch input, many of those new features will be lost on you. For people with more touch-friendly hardware, though, Windows 8 is easier to use than you may have feared. Its

The new face of the Start menu may be jarring at first.



Dana Wollman

Photos 32 albums



Mobile Uploads



Profile Pictures



Timeline Photos



Taiwan, June 2012



Cover Photos



Timeline Photos

Photos pulls in images from various sources like Facebook.

tablet-style apps, multitasking features and desktop enhancements add up to a balanced mix. It's an OS you can use seamlessly on a tablet, but with features like Snap, Switcher and File Explorer you might well be more productive than you ever were on an iPad or

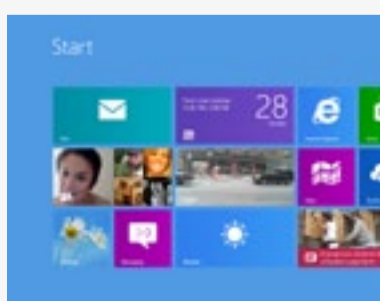
Android slate. Just don't lose faith as you're climbing your way across that learning curve. **D**

Dana Wollman is Reviews Editor at Engadget, a marathoner, lover of puns and a native Brooklynite.

BOTTOMLINE

MICROSOFT WINDOWS 8

\$40+
(UPGRADE)



PROS

- Works well on tablets, traditional PCs
- Deep integration with SkyDrive, Xbox
- Free music streaming
- Improved multi-monitor support

CONS

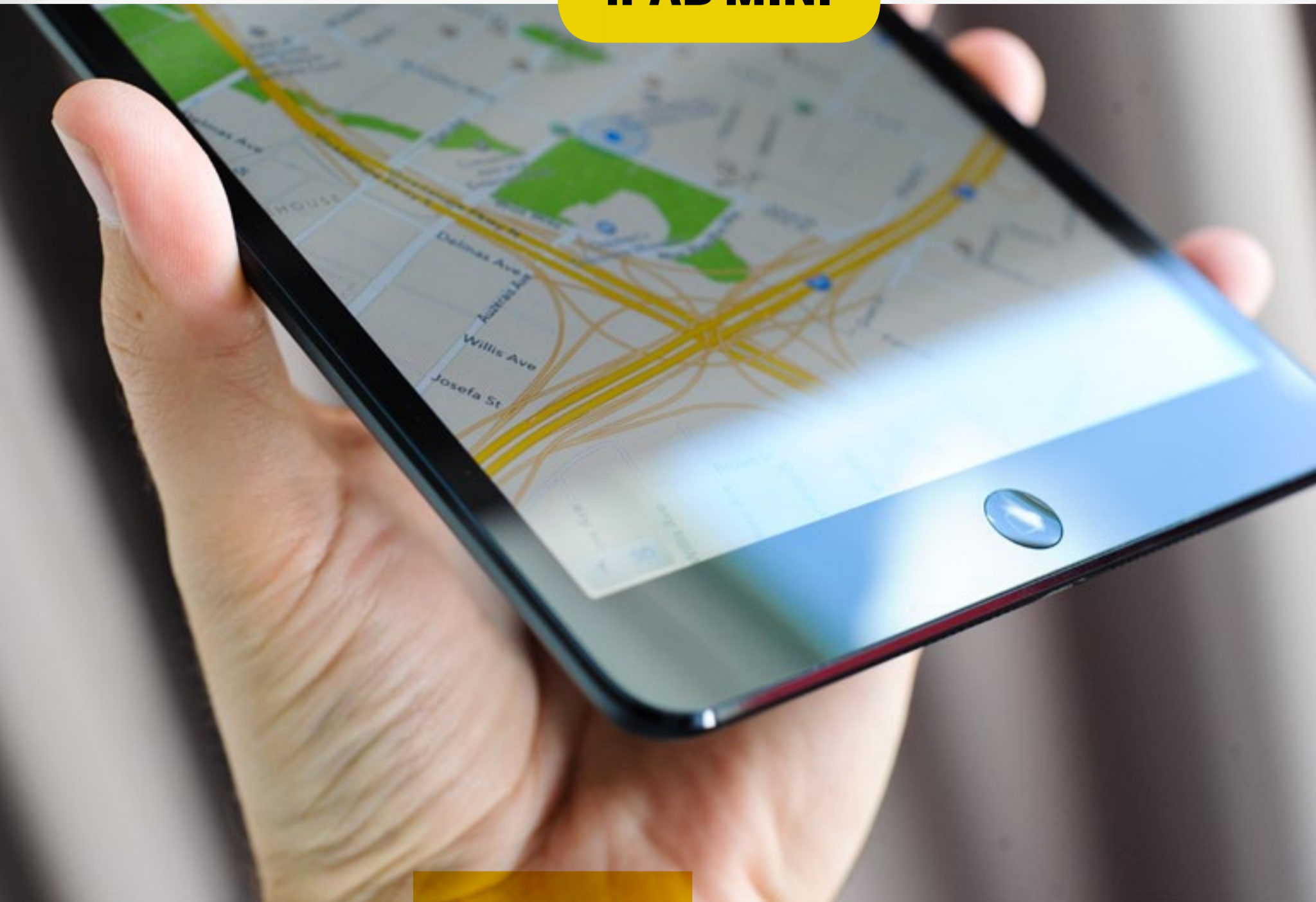
- Steep learning curve
- Frustrating to use with a mouse
- Limited selection in the Windows Store

BOTTOMLINE

So long as you have a touch-enabled PC, Windows 8 is easier to use than you may have feared. Just give yourself time to master the learning curve.



iPAD MINI



Apple's **iPad mini** sports a shrunken profile, but can it compete with the big guys?
By **Tim Stevens**

The iPad mini has been rumored for nearly as long as the original iPad has existed, but it wasn't clear early on how many of those rumors were based on fact and how many were based on hope. Hope, that was, for a smaller, more portable tablet that would bring access to all the Apple ecosystem had to offer, in a package you could easily hold in one hand. Specifically, a package more affordable than the 10-incher.

That's this, the 7.9-inch, \$329 iPad mini that sports a screen with the same resolution as the iPad 2 — only smaller. As we put this



one through its paces it quickly became clear that this is far more than a cheaper, smaller iPad. This is a thinner, lighter device that deserves independent consideration. In many ways, it's actually *better* than the 10-inch slate from which it was born. But is it better for *you*? Join us as we find out.

HARDWARE


Apple wanted to be very clear at its product-packed iPad mini launch event that this isn't just a shrunken-down iPad. And, indeed, that starts with a very different case design. While the second, third and fourth generations of iPads have all been more or less indistinguishable, the iPad mini's anodized aluminum back looks entirely different. In fact, the whole thing looks a lot more like a blown-up fifth-generation iPod touch than a shrunken-down fourth-generation iPad.

The profile itself is more rounded than the full-size iPad, lacking the sharp taper at the edges. This, we presume, gives a little more room for the battery inside, but it also makes this a more comfortable slate to carry around. The edges on the 10-inch iPad can cut into your hand if you're the sort who carries yours wherever you go. Not so with the mini.

Of course, that's helped greatly by the decrease in weight here. The WiFi-

only iPad mini weighs just 0.68 pounds (308 grams), which is less than half the weight of the fourth-generation iPad. It's far thinner, too, at 7.2mm (vs. 9.4) and measures 7.87 x 5.3 inches (200 x 135mm) on the other dimensions. Inside that plane is a 7.9-inch, 1,024 x 768 IPS LCD which has significantly smaller bezels than those found in other iPads. It's thanks to those bezels that a display this size can be housed in a slate this size, but still that 5.3-inch horizontal span may be a bit of a problem for some.

To us, the joy of a 7-inch tablet is walking across the office or the airport, holding the slate in one hand while tapping away at it with the other. The Nexus 7, with its 16:9 aspect ratio, is relatively narrow and easy to carry securely one-handed — even by those whose mittens are size S. With the iPad mini, holding the slate in the same way can be a bit of a reach. This editor, who wears XL gloves, had no problem palming the littler iPad, but when we handed it to other, dainty-fingered people they



The edges on the mini are more rounded than the iPad's.



sometimes struggled to hold it securely.

The scrawny bezels on either side actually exacerbate this issue to some degree, as those who must loop a thumb around the front of the device when holding it are forced to put that thumb right on the display. Thankfully, every app we tried handled this situation without issue, Kindle and iBooks turning pages and acting normally even with that stray opposable member making square contact on the digitizer.

Overall, the tablet is very comfortable to hold; its thinness and lightness are both attributes that must be perceived first-hand. That 7.2mm depth is exactly the same as the fourth-generation iPod touch, which even today is an impressively svelte device. We reviewed the black model, which features a dark bezel and anodized back to match. It's cool and matte to the touch, which we find very appealing, but time will tell just how durable this black version will prove. Those who are scratch-averse may want to think about the white and silver variety, which will likely hide those markings a bit better.

The layout of the buttons is familiar, but different. The volume rocker and orientation lock switches are on the upper portion of the right side, but here up and down are distinct buttons, not like the integrated rocker on the full-size iPad. It's also not like the three-way rocker found on the latest iPod nano, which features an integrated play/pause button. That's a bit unfor-

The joy of a 7-inch tablet is walking across the office or the airport, holding the slate in one hand while tapping away at it with the other.

tunate, as we'd like to see that find its way across the product line, but perhaps it will in future revisions. (Yes, we're expecting more.)

The power button is up top, looking and feeling very much like those on older iPads. There's a small slit for a microphone up there as well, and on the other side, the 3.5mm headphone jack, which bucks the trend of bottom-placement found on nearly every other Apple mobile device. On the left side of the device, there's nothing, and on the bottom is where the Lightning connector lives. Like the iPhone 5, that connector is flanked by two sets of two rows of holes, drilled to let the device's sound out. It's reasonably loud and, since it's on the bottom not the back, the sound is *closer* to traveling in the right direction to meet your ears, but it's still a less than ideal listening experience. You'll want a set of headphones — which, as with other iPads, are not included.

The only other button is on the front, a smaller version of the same Home button found on the iPad. Curiously, it's even smaller than the button on the iPhone, making it very petite indeed.



Around back, there's just one detail to concern yourself with: the lens assembly for the 5-megapixel iSight camera stuffed in the upper-left. That's paired with a 1.2-megapixel FaceTime HD center-cut in the bezel atop the LCD.

DISPLAY

No, this isn't Retina, but maintaining the same resolution as a 10-inch display shrunk down to 7.9 means a necessary boost in pixel density: 163ppi. That's a nice increase over the iPad 2's 132ppi, but it still falls short of the 264ppi of the fourth-generation iPad — not to mention, the iPhone 5's 326dpi. Naturally, this means that text isn't anywhere near as sharp as on the newer iPads, but this is still a very nice-looking display.

In fact we found the brightness and color reproduction to be improved over the iPad 2, comparable to the latest Retina displays. Colors are very pleasing to the eye and viewing angles, as ever with an Apple display,



Screen resolution carries over from the 10-inch iPad.

do not disappoint. You can line up as many friends as you like and sit them shoulder-to-shoulder, they'll all have a bright, clear picture. Yes, mini owners may have to make do with some resolution envy, but they at least won't be lacking in any other regard.

PERFORMANCE AND BATTERY LIFE

The iPad mini is running a dual-core 1GHz CPU with 512MB of RAM, same as in the iPad 2 and as such it throws down the same benchmark scores and overall performance figures. Geekbench averages out at 751 and GLBench shows 24 fps on the 2.5 Egypt HD benchmark. The SunSpider JavaScript benchmark completes in 1,426ms.

These numbers pale in comparison to the new, fourth-gen iPad but we think that in day-to-day usage the relative lack of performance won't be as noticeable. Apps do load more slowly but most are still up and running within a second or two and when it comes to general web surfing tasks the iPad mini easily kept up with our taps and swipes. So, perhaps not the greatest performance in the Apple lineup, but there is one place where it bests the rest: battery life.

In our standard battery run-down test, which entails looping a video with WiFi enabled and a fixed display brightness, the iPad mini managed an astounding 12



GEEKBENCH	RESULTS (HIGHER IS BETTER)
APPLE IPAD MINI	751
APPLE IPAD (LATE 2012)	1,763
APPLE IPAD (2012)	720
APPLE IPAD 2	721
APPLE IPAD	442
APPLE IPHONE 5	1,628
APPLE IPHONE 4S	623

hours and 43 minutes. This gives it the longest battery life of any tablet we've ever tested, besting even the Samsung Galaxy Tab 7.7 by 42 minutes. Indeed during the course of our testing the battery on the iPad mini exceeded our expectations, expectations that were already high thanks to the consistently great battery life offered by the iPad family.

CAMERAS

The iPad 2 never saw HDR nor the Panorama mode that wowed us so on the iPhone 5, and neither does the iPad mini. It does, however, have a better camera than the iPad 2, a 5-megapixel shooter with an f/2.4 lens, and a 1.2-megapixel FaceTime HD camera up front. The one 'round back appears to be the same camera module used on the iPhone 4 and as such, it takes good quality images. No, they don't quite pop like the 8-megapixel shooter on the iPhone 5, nor does this tablet manage low-light shooting as well

as Apple's latest round of CPUs, but in our opinion tablets should only be used to take pictures in a pinch, and as such the iPad mini does just fine.

It also takes reasonably good video, shooting at 1080p like all the latest Apple devices. But again, the combination of a lower-res sensor and the lack of a newer image processing chip means image stabilization isn't nearly as good here as on the iPhone 5. So, you'll want to hold steady while shooting, but remember to do so in a place with enough ambient light; do that and you'll get yourself some quality footage.

THE COMPETITION

You can't tally up any iPad's chances in the market without comparing it against all the *other* iPads in the market, and so we'll start by comparing the mini to its siblings, of which there are two at present. First is the iPad 2, available only in 16GB sizes either WiFi-only or a 3G model, each priced \$70 more than the same-sized mini. For that \$70 more you get a bigger screen and lower-resolution cameras front and back. For us, this is a no-brainer. Get the mini. Unless you suffer from ailing eyesight and need a larger portal into the iOS world, the smaller device is far and away the better one.

The choice between this and the new fourth-generation iPad is a bit more challenging. It's a considerably more expensive device, starting at \$499, and of course a bigger and heavier one, too.



DEVICE	BATTERY LIFE
APPLE IPAD MINI	12:43 (WIFI)
SAMSUNG GALAXY TAB 7.7	12:01
APPLE IPAD (LATE 2012)	11:08 (WIFI)
APPLE IPAD 2	10:26
ASUS EEE PAD TRANSFORMER PRIME	10:17
SAMSUNG GALAXY TAB 10.1	9:55
APPLE IPAD (2012)	9:52 (HSPA) / 9:37 (LTE)
APPLE IPAD	9:33
PANTECH ELEMENT	9:00
MOTOROLA XOOM 2	8:57
TOSHIBA EXCITE 10	9:24
MOTOROLA XOOM 2	8:57
HP TOUCHPAD	8:33
LENOVO IDEAPAD K1	8:20
MOTOROLA XOOM	8:20
T-MOBILE G-SLATE	8:18
ACER ICONIA TAB A200	8:16
SAMSUNG GALAXY TAB 7.0 PLUS	8:09
LENOVO THINKPAD TABLET	8:00
ARCHOS 101	7:20
ARCHOS 80 G9	7:06
RIM BLACKBERRY PLAYBOOK	7:01

Still, battery life on that guy is impressively good (over 11 hours) and the performance is stellar — living up to and exceeding Apple’s “2x faster” claims. Still, speed isn’t everything and while we love that big, Retina display we’re not entirely sure that we prefer it to the tiny, lightweight form factor of the mini. In fact, we found ourselves enjoying the portability of the mini so much that we’d probably give that one the nod, but this decision will almost certainly come down to personal preference. So, if you can, head to an Apple Store and try out both.

Moving outside of the ecosystem, most people are comparing the iPad mini to the Nexus 7. To some degree that’s a natural comparison, as this is Apple’s cheapest tablet compared to Google’s low-cost device. In practice, these are very different devices, starting with the cost: \$199 for a 16GB Nexus 7 vs. \$329 for the iPad. The designs are strikingly different, too, with the Nexus having a high-quality but somewhat discount feel versus the overwhelmingly high-end iPad mini. In no way does Apple’s latest feel like a tablet that was made to a budget. It simply feels like an Apple device.

And, of course, it gives access to Apple’s ecosystem of hundreds of thousands of tablet-friendly apps — plus all the media iTunes has to offer. We can’t help you decide which ecosystem, Apple or Google’s, is better-suited to your interests, but we do imagine that will be the deciding factor for most. When it



comes down to hardware, it's almost no contest between the two, with the iPad mini clearly winning out — except in one area. That's the display. The Nexus 7 has a higher-resolution panel that's also 16:9, making it better for movie watching. It's also narrower, and thus easier to hold in your hand.

We'd also be remiss if we didn't at least mention the \$199 Kindle Fire HD. Amazon's latest also offers a higher-resolution, IPS LCD and also has stereo speakers. It also has a strong suite of content, courtesy of Amazon's many partnerships, but overall we have a hard time comparing these two. Amazon's device is clearly a cut-rate slate designed to push as much digital buying power into the hands of consumers as possible, while Apple's is simply a legitimately nice tablet. It's a legitimately nice tablet that Apple certainly would love for you to fill with premium content downloaded through iTunes, but it never feels like a shopping portal. The Kindle does.

ACCESSORIES

Surely, the most popular accessory for the iPad mini will be the new Smart Cover that, despite being both smaller and of considerably simpler construction, still costs the same \$39 as the bigger, 10-inch version. That's a little unfortunate, especially because we don't think this version works as well. There is one positive change: the smaller Smart Cover moves away from the



aluminum hinge on the bigger version, a good thing because we've seen plenty of scratches caused by that metal-on-metal contact.

It's still attached magnetically, but where the 10-inch model will immediately snap into the perfect placement every time, we found the mini cover just as eager to attach either too high or too low. It requires a little more precision. Hardly a deal-breaker (how often are you removing your Smart Cover?) but a bit of an annoyance.

The other accessories, and there are plenty of them, all make use of the device's Lightning connector, many existing only to add a little more life to your various iPod docks and chargers. The stubby 30-pin to Lightning adapter is \$29, the same cost as the two camera adapters: one USB and one SD. (This is a change from the 30-pin Camera Connection Kit, which included both for \$29.) The Lightning to 30-pin adapter (which includes a 0.2-meter cable in the middle) costs \$39 and, finally, both the VGA and digital AV adapters are \$49. Like the previous Digital AV



adapter (which was \$39), this one includes HDMI output and has an input so that you can still charge the tablet while it's in use. Handy for those digital signage applications — or getting in one final, epic *Lord of the Rings* marathon before December.

WRAP-UP

This isn't just an Apple tablet made to a budget. This isn't just a shrunken-down iPad. This is, in many ways, Apple's best tablet yet, an incredibly thin, remarkably light, obviously well-constructed device that offers phenomenal battery life. No, the performance doesn't match Apple's latest and yes, that display is a little lacking in resolution, but nothing else here will leave you wanting. At \$329, this has a lot to offer over even Apple's more expensive tablets.

Those comparing this to the Kindle Fire HD will have a hard time, as that's a tablet manufactured to a fixed cost

and designed to sell you content. This is very much more. Similarly, the hardware here — the materials, the lightness, the build quality, the overall package as it sits in your hand — is much nicer than the Nexus 7 and it offers access to the comprehensively more tablet-friendly App Store, but whether that's worth the extra cost depends entirely on the size of your budget — and your proclivity toward Android.

Regardless, the iPad mini is well worth considering for anybody currently in the market for a tablet. Its cost is compelling, its design superb and it of course gives access to the best selection of tablet-optimized apps on the market. To consider it just a cheap, tiny iPad is a disservice. This is, simply, a great tablet. **D**

Tim Stevens is Editor-in-chief at Engadget, a lifelong gamer, a wannabe racer, and a born Vermonter.

BOTTOMLINE

APPLE iPAD MINI

**\$329 -
\$659**



PROS

- Beautiful, thin and light design
- Stellar battery life
- Bright, clear display
- Sturdy construction

CONS

- Too wide for some
- Pricier than many 7-inch alternatives

BOTTOMLINE

The iPad mini isn't just an Apple tablet made to a budget. This isn't just a shrunken-down iPad. This is, in many ways, Apple's best tablet yet.



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FREDDIE WONG



THE VIDEO-EDITING WUNDERKIND puts the explosives down to tell us about the gear he uses to blow stuff up.

What gadget do you depend on most?
I could say computer for all that video editing, but I can't use that thing without a Logitech TrackMan Marble trackball and a Razer BlackWidow clicky-keyboard.



Which do you look back upon most fondly?

It's gotta be the first computer I ever played around with which was an old Apple IIc (which, incidentally had the clickiest keyboard of all time) or my old portable CD player (because the battery life was absurd).

Which company does the most to push the industry?

The film industry is dominated by these titans of old companies, so when RED came around and started throwing around insane ideas of how digital cameras should work and coming out with (somewhat buggy) proof that digital cameras didn't just have to be film camera analogues, it really started to change how people addressed digital.

What is your operating system of choice?

I've been a Mac guy pretty much my whole life.

What are your favorite gadget names?

I love products that have horrible puns because then you sound like a total idiot for saying it aloud

— stuff like OUYA, N-Gage, etc. I like to think that for all those products, there exists a Power-Point on an IBM ThinkPad somewhere with a slide that has to explain and justify that pun to a bunch of executives: "Pronounced Engage!" And then a bullet point about how it "N-GAGES USERS."

What are your least favorite?

Television manufacturers need to get it together and not name every TV the AX800-BTP955-B12/X, or the Costco exclusive AX800-BTP955-B12/X5. Is it that freaking hard to name your products in a logical way?

Which app do you depend on most?

I use Siri a shocking amount to remind me to do things because I'm horrible at that, and also to compose bizarrely worded text messages to my friends while driving.

What traits do you most deplore in a smartphone?

Bells and whistles I don't need. No, I do not want 18 different motion controls. No, I don't care [that] I can't customize my font size. Also stuttery frame



If you ever see me tweet from a television, call for help immediately because I've hit rock bottom.

rates make me feel like I've been ripped off.

Which do you most admire?

I remember some people smugly pointing out that Apple takes a screenshot of a program, which loads first when you go back to it while the rest of the program loads in the background, so the phone isn't as fast as it seems. Guess what? I would rather have a phone that feels fast and responsive over a phone that doesn't, regardless of the benchmarking. I admire design and engineering decisions that prioritize user experience and understand that how something feels has a profound effect on usability. Pretty much every Android phone I've picked up feels like cheap plastic crap compared to the relative density of an iPhone.

What is your idea of the perfect device?

Something that doesn't run out of batteries. Come on, batteries. Step up your game.

What is your earliest gadget memory?

I had one of those robots that ran off a battery that had little joysticks where you could control the pincers. The battery was dead but I remember puzzling over the wiring of that thing for hours on end. My mom said I was weird like that. She could run to the store and give me a single Lego to contemplate and I would be enthralled for hours by it.

What technological advancement do you most admire?

I'm always impressed with all the behind-the-scenes technology that make things possible — stuff like Gorilla Glass, which was invented in the '60s and they had no use for it so they shelved it, and all the smartphones and tablets brought it back from the dead. There's tons of neat stuff like that that have a significant impact on tech and gadgets as a whole that you never even think about.

Which do you most despise?

At some point they must have started designing cars using crazy software to maximize aerodynam-



ics so as a result every car on the road looks the same — they're all equally bulbous and curvaceous crap. You could swap around manufacturer badges on 10 different cars and I bet the layperson would have difficulty telling the difference.

What fault are you most tolerant of in a gadget?

I don't care if it isn't packed with bleeding-edge technology or doesn't represent the true pinnacle of state-of-the-art. If it works, it works.

Which are you most intolerant of?

Kitchen sink syndrome. If you ever see me tweet from a television, call for help immediately because I've hit rock bottom.

When has your smartphone been of the most help?

It's funny because it took me like three years to realize all the things that "having access to the internet in my pocket" could do. I remember calling my brother to look up movie show times for me and he was like, "Can't you do this on your phone?" It was a mind-blowing moment. I use that ability to make

it seem like I'm way smarter than I am in social situations by visiting the bathroom and Wikipedia simultaneously.

What device do you covet most?

I want that Google tech to drive my car for me. I could get so many more naps in!

If you could change one thing about your phone what would it be?

Need to be able to use it to broadcast Wikipedia in my eyeball so people don't think I have urinary incontinence issues.


What does being connected mean to you?

Can anyone in the world conceivably contact you at this very moment?

When are you least likely to reply to an email?

Walls of text glaze my eyes over. Basic spacing increases the reply probability by a thousand fold!

When did you last disconnect?

We had a power outage on our street once and my phone ran out of batteries. That was a great 20 minutes or so. 



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