

DISTRO

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10 YEARS
LATER

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THE 3-IN-1
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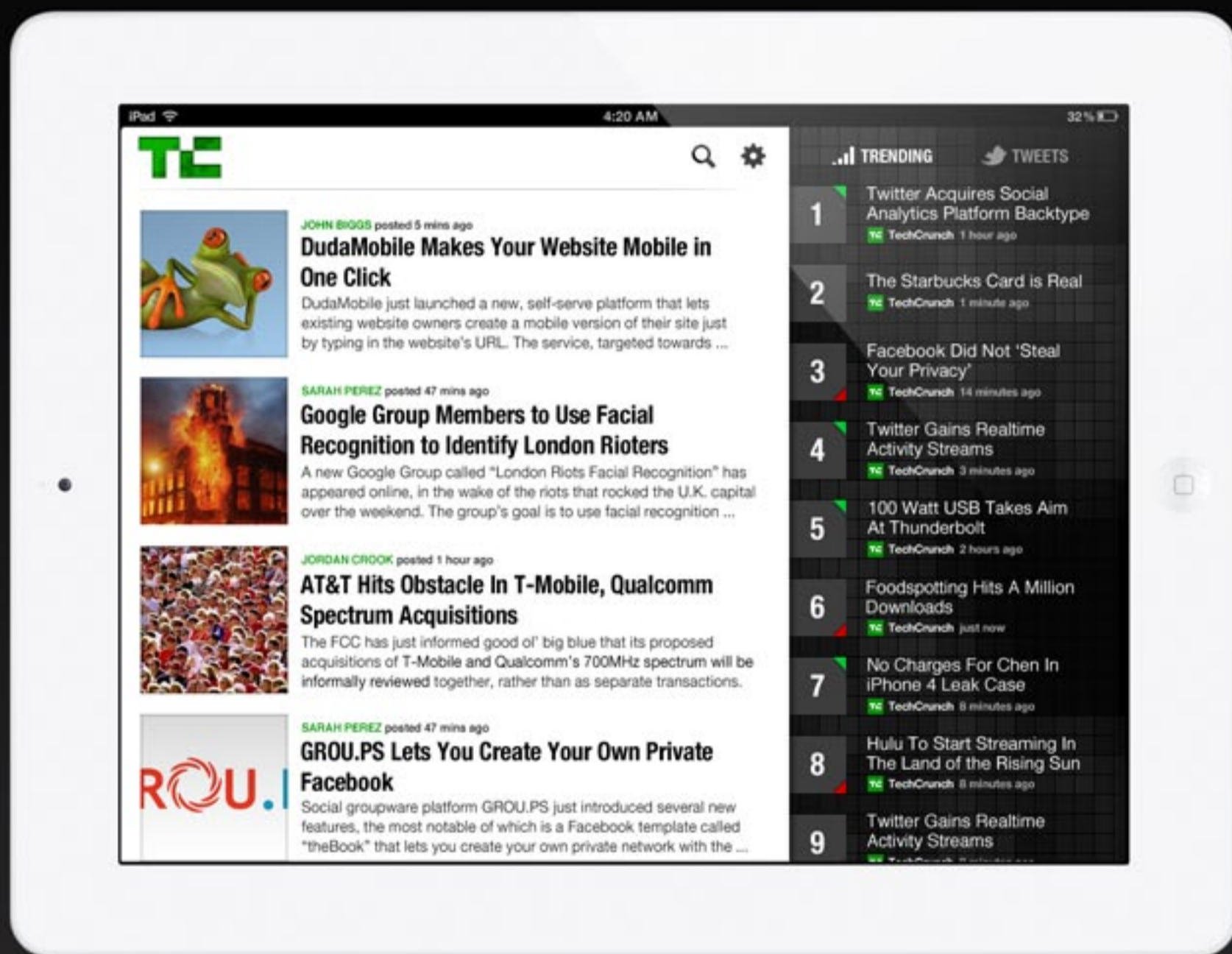


DISSECTING
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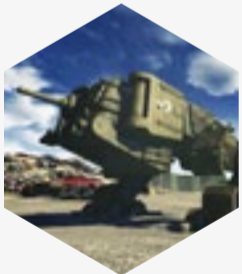
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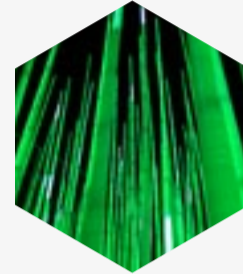
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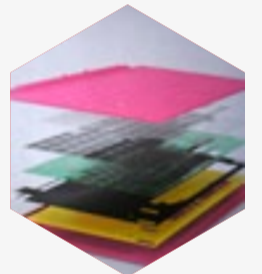
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REHASHED
Windows, Windows, Windows!



TIME MACHINES
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THE EMPIRE STRIKES BACK

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EDITOR'S
LETTER

I know. I wrote an awful, awful lot about Apple last week. This week it's Microsoft's turn and, if all goes according to plan, Google will be up to the plate in the next issue. After that, we can all have fun breaking down which of the three had the most successful month. Right now I'd say we, the gadget lovers, will be the ones winning over the next six months or so, because there's been some great stuff shown off over the past few weeks.

But this week it was Microsoft and various flavors of Windows-powered devices. We'll start with something of a reboot: Surface. Once a big-assed tablet with legs, Surface is now the designation for two tablets, one each for the two major flavors of Windows that Microsoft will be releasing this fall. First is the Surface for Windows RT, a 10.6-inch tablet with a 16:9 HD display and an NVIDIA-made ARM chipset. It's just 9.3mm thick and will be available with either 32 or 64GB of storage.

Need more? You might appreciate the Surface for Windows Pro. Same-size screen but stepping up to a "Full HD" (1080p or greater) resolution and switching over to Intel power inside paired with 64 or 128GB of storage. It's considerably thicker, 13.5mm, and is meant to be more of a productivity-focused laptop replacement than the more limited RT. As such, it'll give you full access to a traditional desktop interface.

What it's missing, of course, is a keyboard, and Microsoft's solution is



Once a big-assed tablet with legs, Surface is now the designation for two tablets, one each for the two major flavors of Windows that Microsoft will be releasing this fall.

novel: a pair of magnetically attached covers with keyboards built in. The first is the Touch Cover, which has light-up keys embossed into the fabric and multi-touch capabilities, meaning you tap away like mad but nothing actually moves. I'm guessing the typing experience here will be similar to the experience on membrane keyboards like that found on the Atari 400 — namely, awful — but I'm eager to try.

The other is called the Type Cover, which has actual, physical keys that move. Obviously those keys are very shallow and the typing feel is going to be limited at best, but it should beat the pants off of tap-tap-tapping away on a capacitive touchscreen.

Sadly there was no word on cost for either of these cases nor, even more tragically, for the tablets they'll attach to. We

were told the RT will be priced comparable to other ARM-powered tablets, which could put it anywhere from \$200 to \$700, while the Pro will be aiming considerably higher, priced at parity with Ultrabooks. That might just mean a price of over \$1,000 — a very difficult sell.

Oh, and in case you were wondering about the *old* Surface devices, the big, heavy, preposterously expensive ones, they'll live on, now called PixelSense. That name comes from the technology that allowed them to detect many forms of touch.

All this was unveiled at a super-secret event in Los Angeles, and then just two days later in San Francisco, Microsoft took the wraps from another of its major creations: Windows Phone 8. The biggest difference is, we've known just about everything there is to know about WP8 since about the beginning of the year, while the Surface tablets were almost completely unexpected.

So what did we learn about Windows Phone 8? Well, a lot. Multi-core support is here, finally, as are higher resolution displays — but sadly they cap out at WXGA. That's 1280 x 768 and lower than some mobile devices already on the market. There's a new, more customizable Start screen and an OS core that's shared with the fully-featured Windows. Yes, one OS to rule



Basically, every Windows Phone sold to date — and all those sold between now and the release of WP8 this fall — is being cast aside, a casualty in the name of progress.

desktops, laptops, tablets and phones — or at least one kernel.


This in theory means a greater ease for developers to port their apps from one to the other and, more importantly, opens the door for developers to write native code in C/C++. Higher performance apps and games will be the result, but there's one very, very negative drawback to all this: no backwards compatibility with current Windows Phone devices.

Basically, every Windows Phone sold to date — and all those sold between now and the release of WP8 this fall — is being cast aside, a casualty in the name of progress. That's unfortunate, to say the least.

Finally, one last bit of non-Microsoft news: SwiftKey for Android devices, my personal favorite aftermarket keyboard, hit version 3.0. Now your flying thumbs need not be both-

ered by reaching for the space bar. It'll just figure out what you mean.

In this week's Distro we have the long-awaited review of the ASUS PadFone. Richard Lai tells you everything you need to know about this single device with multiple personalities. We have my full take of the MacBook Pro with Retina display and Dana Wollman gets you up to speed on the latest MacBook Air. We have our early impressions with the Surface for Windows RT tablet, and Don

Melanson takes a look back at Minority Report 10 years later. Yes, it's been 10 years since Tom Cruise touched and swiped his way into UI designers' hearts. We have a camera-focused IRL, Q&A with Lytro founder Ren Ng and a whole lot more. Kick back, get comfortable and take it all in. 



TIM STEVENS
EDITOR-IN-CHIEF,
ENGADGET



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EYES-ON

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LYTRO

FAST CAPTURE
Tap for detail

Tap for detail



KEEP IT SIMPLE

STAY
FOCUSED

THE DESIGN:
Its simple exterior, made of anodized aluminum and textured rubber, belies the complex processes occurring within. Otherwise known as the world's first commercially available light field

camera, it offers infinite focus in three flavors: graphite and blue for a \$399, 8GB model and electric-red for the \$499, 16GB version.

THE BILL:
Starting at \$399





STAY FOCUSED

Lytro enlists the combination of an f/2.0 8x optical zoom lens, a special light field sensor (capable

of capturing 11 million light rays) and the light field engine, which uses a series of algorithms to process the appropriate data.





KEEP IT SIMPLE

The minimalist theme carries over far beyond Lytro's exterior. There's no physical viewfinder on board,

and while the 1.46-inch touchscreen boasts a rather underwhelming 128 x 128 resolution, it serves as a simple user

interface with a zoom bar up top and the capability to change exposure with a simple tap, among other features.





FAST CAPTURE

In addition to a USB port, the rubber grip plays host to two physical buttons: one for power, which turns the camera on instantly, and another for the shutter, which boasts zero delay due to the lack of an auto-focus motor.



MICROSOFT SURFACE TABLETS

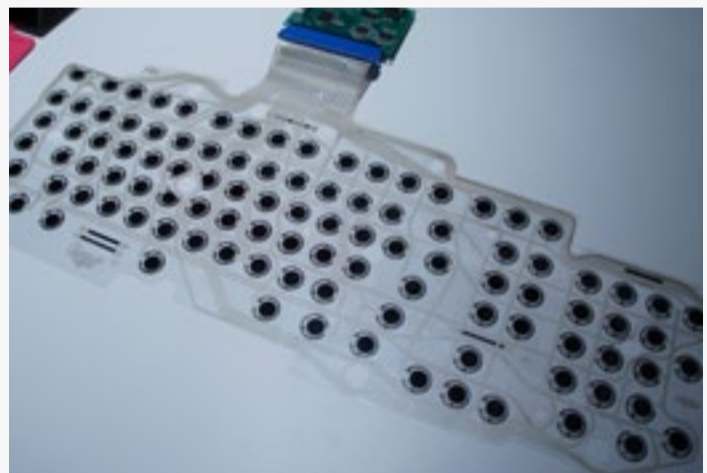
PRICING: N/A

AVAILABILITY: N/A

THE BREAKDOWN: EVEN AFTER SOME BRIEF HANDLING, WE'RE IMPRESSED BY WHAT MICROSOFT'S MANAGED TO PRODUCE.

Microsoft hosted a rather mysterious press event in Los Angeles earlier this week, where it unveiled not just the rumored tablet you were hoping for, but two new slates: Surface for Windows RT, which has an NVIDIA chip inside, and Surface for Windows 8 Pro, which runs off Ultrabook-grade Ivy Bridge processors. Both are made of magnesium and, perhaps most importantly, work with either of two magnetic covers that double as keyboards. No word on pricing — just that Surface for Windows RT will cost about what you'll end up paying for other Windows RT tablets, and that the Pro version will fetch similar prices as Ultrabooks.

The magnesium casing makes it wholly inflexible, and we mean that in the best possible way. As thin and light as it is (9.3mm / 1.49 pounds), there isn't a hint of give. Were it not for fear of scratching that 10.6-inch display (HD on the RT model, Full HD 1080p on the Pro), we wouldn't be too concerned about dropping it. They have a microSD slot, befitting the low-powered consumer tablets, but it also has a USB 2.0 port and HDMI output. You'll get either 32GB or 64GB of built-in storage, along with a 31.5Wh battery.



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HANDS-ON



AUDI A3 E-TRON

PRICING:

N/A

AVAILABILITY: IN DEVELOPMENT

THE BREAKDOWN: THE A3 IS AN ALL-ELECTRIC PLUG-IN THAT'S AS SPORTY AS A MINI COOPER WITHOUT FEELING LIKE A GO-KART.

It's not often that we spend quality time with automobiles, but our motives are usually geared by electricity when we do. Take for instance, the Audi A3 e-tron concept. The A3 e-tron has similar level of sportiness to a Mini Cooper — minus the feeling of being in a go-kart. Unsurprisingly, after about 30 miles of driving we finally got our first warning that the battery was close to drained, meaning that we'd have about 15 miles left. Don't worry, the company will offer roadside assistance, as a normal tow-truck-and-gas-station combo will likely be unable to help.



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CADILLAC CUE

CUE isn't your typical in-dash GPS nav. It's centered around an 8-inch, 800 x 400 capacitive touch LCD that's completely viewable from both front seats. You can also expect a heads-up display, which outputs key info, including speed limits and collision warnings. Inputting a destination is as simple as typing an address into Google Maps — though CUE uses proprietary NAVTEQ-based tech. The overall experience proved quite smooth, allowing us to focus on the road ahead. As we drove near Union Square to the Financial District, the car let us know when we were cutting things a bit too close, as seat vibrations alerted us to obstacles on either side.

PRICING:
N/A

AVAILABILITY: BASE SYSTEM
STANDARD IN 2012 / 2013 XTS

THE BREAKDOWN: CADILLAC'S
CUE ISN'T YOUR RUN OF THE
MILL IN-DASH GPS NAVIGATION
SYSTEM.



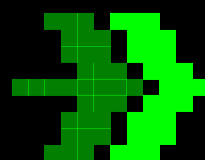
Vintage Apple Prices \$oar

Here's an update for all the collectors of vintage Apple Computer wares out there. If you'll recall, it was a few weeks back when Sotheby's announced it would auction off an Apple I motherboard, cassette interface and its BASIC programming manual, originally set to fetch upwards of \$180,000. This past week, the hand-built piece

of computing history from 1976 was sold to one lucky phone bidder for an even more massive \$374,500. As Apple Insider notes, the computer is one of six that are accounted for out of 50 that are likely still out there — ensuring these will only remain for folks with deep pockets indeed. Past that, a hand-written note from Steve Jobs during his

time at Atari was also on the auction block, garnering \$27,500 even though it was only estimated to sell for less than half that price. Knowing the cost of collecting a premiere piece (arguably) from the fruits of Woz and Jobs, it certainly makes that new MacBook Pro with Retina display seem like a grand bargain in comparison. —By Joe Pollicino

APPLE I AUCTION PRICES



BROKEN GAME, BETTER REVIEWS



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REACTION
TIME

BY LUDWIG KIETZMANN

W “Why don’t you just do your job and review the game? Stop shoving your opinion down our throats!”

That’s one bit of criticism, nested between comments both cordial and caustic, that I sometimes see at the bottom of Joystiq’s thoughtful, pretentious, accurate and downright incorrect reviews (depending on whom you ask). For some, a bit of punditry only pollutes the product evaluation they signed up for. In other words: less thought and more report, please.

That’s not how game reviews work at all — not unless it’s their goal to confirm factual observations about the video game, which is indeed functional and playable from the first-person perspective, and features a sequence of steadily increasing challenges that must be overcome with considered manipulation of the controller’s buttons. And there are graphics!

But the ease at which the mythical

“objective review” is dismissed nearly obscures an unusual facet of writing about games. When critics played *Steel Battalion: Heavy Armor* this week, they encountered a game that had clear, unavoidable faults beyond the usual suspects in level design, storytelling, play mechanisms and emotions evoked by the premise. What happens when the game just fails to function properly?

A lot of low scores, for one thing. *Steel Battalion*, which combines Kinect’s motion-sensitive observation with regular controller input, was thoroughly castigated for turning tank commanders into fumbling buffoons, flailing in a claustrophobic cockpit. While players were torn to shreds by enemy bombardment, the game made a mess of their body language — a swipe here and a dual-hand thrust there were misread, and instead of returning fire, the pilot rocked back and forth in



Making a fool out of the player is always unwise, and *Steel Battalion* paid the price in full when it came time to assign a score at the end.

his chair, opening and closing the front shutter. Just imagine being the wide-eyed co-pilot serving alongside that malfunctioning nutcase.

Making a fool out of the player is always unwise, and *Steel Battalion* paid the price in full when it came time to assign a score at the end. If you bothered to read the text, however, you'd have seen many writers stopping short of simply dismissing Capcom's effort with a carefree wave — either in pursuit of a holistic approach to criticism, or because a wave would just be misinterpreted as a self-destruct signal. Let's just go with the first one for now.

As much as we'd like to distance ourselves from hard, objective statements about a game, especially when the review attempts to inform and entertain in equal measure, there are some elements in this peculiar medium that warrant less personal commentary. There are some things, enmeshed with a game's lowest-level construction, that aren't judged according to

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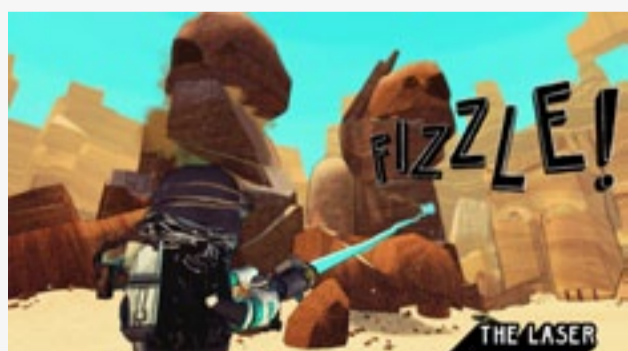
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RESONANCE
PC - \$10



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PC - \$10



taste, preference or experience — and it's up to the critic to inform the player (or potential customer, as it were) about them. It might not seem like critiquing so much as ticking boxes on a report card.

Now, that doesn't mean there's no room for a personal context. If you see some diversity in *Steel Battalion* scores, it's because some writers are more forgiving than others. The mechanical issues are stated, but then the author draws from his or her own personality and tolerance to decide how much those impact the game, and whether it's worth your time, despite whatever faults have been outlined. And that's really the trick for any game critic: to know and describe what you like, what you don't like, and how big the ripples are from either cluster.

I've always attempted to extract lessons from the writings of Roger Ebert, a film critic and author with enough clout to bludgeon even the biggest films into a fine mush. His opinions bubble to the top in uncluttered sentences, and he usually describes just the right bits of a film to let you know exactly what you're in for. I'm not sure he's ever had to account for how a movie responded to him, though,

If you see some diversity in *Steel Battalion* scores, it's because some writers are more forgiving than others.



MAGIC THE GATHERING: DUELS OF THE PLANESWALKERS 2013
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or whether it displayed at the correct framerate. (Aside: Good luck to Peter Jackson, who's attempting to push a version of *The Hobbit* filmed at 48 frames per second, twice that of normal films.)

I, unlike Ebert, am more invested in what makes the medium of games unique. A failed venture like *Steel Battalion* forces critics to evaluate their opinions in light of how games function, and where failure sits between art and commercial product. It's easy to discuss the quality of a plot, or graphics, or dialogue, but it's an ever-present challenge to find a place for those opinions when you have to push buttons — and the subject of your scrutiny has to push back. **D**





What Facebook Knows

by Tom Simonite
Technology Review

Tom Simonite delivered one of the more insightful looks at Facebook as of late with this piece for MIT's *Technology Review*, which examines just how much the social network knows about its users and what it might do with all that information. Central to that effort is the company's Data Science Team run by Cameron Marlow — a group Simonite describes as “a kind of Bell Labs for the social-networking age,” and which is expected to double in size from its current stable of 12 researchers this year. They're the people tasked with learning more about Facebook's users than they explicitly provide: people they might know, products they might be interested in and broader trends that could easily be applied far beyond the social network itself. Given Facebook's size, that's potentially a level of information that no one else is able to provide — so much so that even Marlow admits “it's hard to predict where we'll go.”

Secrets We Share with Distant Servers

by Ross Perlin, *Motherboard*

Ross Perlin of *Vice's Motherboard* has done a lot of thinking about something most folks don't put a lot of thought into: their passwords. Described by Perlin as a “small attempt at appreciation,” this essay looks at how passwords have become more secure but less personal over the years, and could soon become a lost art.

Vizio Reboots the PC: A Quiet American Success Story Takes on Sleeping Giants

by Nilay Patel, *The Verge*

Vizio has found considerable success with its TVs and other low-cost electronics in recent years, but it's now making one of the biggest bets in its short history by entering the PC market. In this extensive profile, Nilay Patel looks at how the company got to that point, and how it's doing things differently.

The Highly Productive Habits of Alan Turing

by Matthew Lasar, *Ars Technica*

Alan Turing would have turned 100 on June 23rd, but all of 2012 has turned into a celebration of the computing pioneer. Now *Ars Technica* has chimed in with a look at just what made the man so productive, conveniently broken down into seven key habits that you can try to emulate.

I Sing the Body Electric

by Margaret Wappler

Los Angeles Times Magazine

Tupac Shakur's rebirth as a hologram at this year's Coachella music festival turned quite a few heads, but he's far from the only virtual artist with a big fanbase. Here, Margaret Wappler profiles Japanese pop sensation Hatsune Miku who, unlike Tupac, is a wholly manufactured creation.



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**ASUS
PadFone**



**Apple
MacBook Air
13-Inch**



**Apple
MacBook Pro
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Display**



ASUS PADFONE



The **PadFone** is an innovative step forward for ASUS, but is the world ready for this shape-shifter?
By **Richard Lai**

It's been a long ride for the PadFone. ASUS' last smartphone was the Android 2.1-powered A10 from two years ago, then five months later the company ended its smartphone partnership with Garmin (though they're still friends). The next thing we knew, the outfit was openly considering Windows Phone, but obviously nothing came to fruition despite its E600 engineering units floating about in the wild. Meanwhile, a bunch of Android Eee Pads started entering the market to get a slice of that hot tablet pie.

Eventually, the PadFone shocked the industry



at last year's Computex, but ASUS went on to miss its Christmas launch target, allowing it extra time to rejig the phone's software and design. Then CES and MWC went by, with the latter hosting the official launch event to unveil the PadFone's final design and availability date. This time, the new April target was missed by only three weeks, and shortly afterwards we got hold of our retail unit from Taiwan, which is still the only place where you can get hold of the product.

But enough with the story. What we want to know is whether ASUS' courageous and unique project has all the right ingredients to squeeze itself into a market now dominated by the likes of Apple, Samsung and HTC. Most importantly, will the company set a new trend with this two- or three-in-one form factor — in the same way it did with netbooks — thus taking the Android ecosystem to the next level? Let's see.

HARDWARE

If you've been following this product closely, you should know by now that the full PadFone package — assembled in Pegatron's Shanghai plant — comes in three main parts: the phone, the PadFone Station pad and the PadFone Station keyboard dock. Let's focus on the phone first: in Taiwan, you can buy this HSPA+ handset on its own — for NT\$17,990 — New Taiwanese Dollars — (about US\$610, or US\$580 before tax) without contract. You get a 4.3-inch, 960 x 540 Samsung Super

ASUS has delivered a pleasant surprise with the PadFone's weight.

AMOLED display (with Gorilla Glass plus a hard coat, low reflection film), a dual-core Qualcomm Snapdragon S4 SoC (MSM8260A at 1.5GHz), 1GB LP-DDR2 RAM, an 8-megapixel AF camera with LED flash, a VGA front-facing camera and a removable 3.7V 1,520mAh battery. The Taiwanese version also comes with a generous 32GB of internal eMMC flash storage plus another 32GB of free ASUS Webstorage for three years. You can add even more via microSDXC — that could be an additional 64GB if you're lucky enough to track down one of those unicorn cards.

In terms of dimensions and weight, the PadFone comes in at 128 x 65.4 x 9.2mm (5.0 x 2.6 x 0.4 inches) and 129g (4.6 ounces), making it one of the lighter smartphones in the 4.3-inch class. For comparison, the similarly sized Galaxy S II (international) officially weighs just one gram more, whereas the Sony Xperia S and the Lenovo LePhone K2 take a big jump to 144g and 145g, respectively. Then we go towards the other end of the scale with the 121g LG Optimus L7, the 119.5g HTC One S (also with a 4.3-inch PenTile Super AMOLED screen and MSM8260A chip) and the 103g Panasonic Eluga — though the Eluga does have a much smaller, non-removable battery. For a device featuring an aluminum frame and a



slab of glass, ASUS has delivered a pleasant surprise with the PadFone's weight — after all, the designers do need to keep the overall package as light as possible, but more on that later.

In an era full of flagships with screen sizes above 4.3 inches, going back to grasping this smaller handset actually gave us quite a welcoming sensation, but obviously it wasn't just the size at play here. To achieve this feat, ASUS used a matte aluminum frame to provide a fairly rigid structure. Having it tapered both length-wise and depth-wise makes the phone appear not only slimmer (the actual thickness along the

length of the phone is more consistent than it looks), but also lets our palm wrap around the back cover's rounded sides in a more seamless manner.

Speaking of which, the PadFone's backside sports the same Zen design ID as seen on the Transformer Prime and the Zenbook series. However, the cover isn't metallic, so the spun finish is achieved with circular etches on the slightly flexible plastic, with the camera acting as the “source” of the ripple pattern — this would've looked weird had ASUS stuck with the original off-center camera position. We dig the look and feel here, plus the texture provides

A 4.3-inch screen sits atop a rigid aluminum frame.



the additional benefit of resisting fingerprints. The back cover can be peeled off from the bottom edge, thus exposing the spring-loaded microSD slot, mini-SIM slot and removable battery.

Much like many of the Ice Cream Sandwich phones (including the new trio of Motorola RAZRs in China), the PadFone utilizes the system's virtual soft buttons instead of physical ones. The only facial features on the phone are the shiny earpiece and the VGA camera at the top, as well as the ASUS logo at the bottom. Below that is a black, shiny plastic lip that traces back to the rim around the glass, and all of this is encompassed and accented by the lower silver bezel. If you look closer, though, you'll notice the bezel is segmented around the shiny lip, and that part is actually a silver-painted extension of the black plastic inner frame (right underneath the battery cover) — this is obviously intended for the antenna and the mic. Call us picky, but now and then we cringe at the seam between the metal bezel and its slightly duller plastic counterpart.

Leaving that minor niggle aside, we're quite pleased with the rest of the external features — the slots are nicely cut for the micro-HDMI port and the micro-USB port on the left. The finish of the three buttons (power, volume up and volume down along the right) are pretty consistent with the bezel's. You'll also find the 3.5mm headphone jack bang in the middle of the phone's

top side, which is a rare sight in the mobile market these days (the short list also includes Huawei's Ascend Y200; Nokia's Lumia 610 and Lumia 710; and Sony's Xperia neo V, Xperia X10 and Live with Walkman).

Given that the tablet part features an LCD panel, we're still baffled by ASUS' decision to feature a Super AMOLED display on the phone, as opposed to using LCD for the sake of consistency. The PenTile subpixel arrangement is an old issue that we won't bother grumbling about again (LG's already done most of the talking, anyway), though a Plus version of the Super AMOLED panel would have been very welcome. ASUS said it went with AMOLED because it believes that it's "the best solution for [a] phone with high contrast and lightness." It also allowed the company to produce a thinner device. On the bright side, the PadFone offers an "outdoor mode" toggle which boosts the screen brightness, and with that, the Super AMOLED display is quite usable under strong sunlight. For the sake of your battery life, don't forget to disable this feature when you go back inside.

ACCESSORIES

Let's get to the meat then, shall we? While Motorola was the first to deliver a laptop-docking phone, ASUS' implementation is more organic and flexible. Rather than letting you access the device through an Ubuntu-based webtop





The full PadFone package and assembly views.



app on the bigger screen, the PadFone takes advantage of Android 4.0's interchangeability between the phone and tablet UI, meaning you don't need to install a different set of apps just for a separate OS. Also, the Android system and supported apps can switch to the appropriate interface depending on which screen is active; so in theory, it should be a seamless transition from one mode to another, regardless of whether you're working or enjoying multimedia content. As to why we say "in theory," we shall explain later.

As we mentioned earlier, the full PadFone package consists of three main parts: on top of the 32GB PadFone in Taiwan, an additional NT\$6,990 (US\$236) gets you the PadFone Station plus the stylus Bluetooth headset with a soft tip, and another NT\$3,000 (US\$101) gets you the PadFone Sta-

tion Dock. (ASUS also recently outed a display docking monitor, though we've received no word on pricing or availability.) In the US, you can get hold of the PadFone and the PadFone Station together from our friends over at Negri Electronics for US\$860.

PADFONE STATION

The PadFone Station is essentially just an external 10.1-inch, 1280 x 800 IPS display (also with Gorilla Glass and HCLR film, but more prone to attracting fingerprints) and a battery pack for the PadFone, but it also packs a loudspeaker at the back and a 1.3-megapixel camera at the front (better than the phone's VGA counterpart). The circuitry inside is quite a sight: we opened ours up for the sake of curiosity and,



We look inside the PadFone Station. It's jam-packed.



wow, there are quite a lot of wires and ribbons squeezed into the tiny bit of space. Similar to its Transformer cousins, the PadFone's tablet and keyboard dock both pack a 7.4V 24.4Wh battery (each consisting of two 3,300mAh cells in a series). However, since the system's rated at just 3.7V, the effective battery capacity in each PadFone Station part is actually 6,600mAh, hence the difference in figures on the spec sheet and on the battery label.

There are also two noteworthy discoveries inside the PadFone Station that we'd like to share. First, underneath the back chassis, we spotted a dual-GPS antenna implementation which, according to our friends over at *AnandTech*, is a rare sight on mobile devices. ASUS explained to us that one of these Foxconn antennas is for receiving signals for both GPS and GLONASS, and the other one is for transmitting the signal by air, coupling to enhance the GPS performance

in tablet mode. This external GPS structure links back to the Qualcomm RTR8600 multi-band / mode RF transceiver in the phone, so there's no separate GPS chip in the pad — just a low noise amplifier there for the structure. While in most cases our PadFone gets a good GPS lock-on

within about 10 seconds in either mode, it's still a tad quicker and more accurate when the phone's outside the pad. Hey, at least it works!

And while we're talking about antennas, the PadFone Station also has an external 3G antenna (sourced from Inpaq) that traces back to three metal contact pins in the phone chamber, where they touch the metal contacts on the bottom left of the phone. We haven't noticed any significant signal drop when putting the phone into the tablet, so it looks like this feature is serving its purpose well.

The other cool feature inside the PadFone Station is its impressively loud monospeaker — much louder than the ones on the original Transformer and the Transformer Prime. This is all thanks to the ingenuity of ASUS' Golden Ear team who managed to pack a 36mm driver and its own little sound chamber inside such a tight space. We



reached out to the team's senior director Henry Huang, a man who's spent 27 years in the audio industry, to give us a little background on this feature:

"It is a transmission line speaker box design. We arrange a long path for back wave by internal structure and PCB. Transmission line box is unique and expensive design which is rare. Only high-end loudspeakers such as Tannoy Westminster apply this design."

In fact, from what we've learned during our recent tour at ASUS' Taipei headquarters, this is basically what Huang's team implemented across all SonicMaster-certified products (including the Transformer Prime). The team creates as much space as possible for the audio chamber (even the loudspeaker on the PadFone phone has one), and at the same time they employ the biggest possible speaker driver that they can fit in for the sake of better audio reproduction. Huang reminded us that professional grade audio equipment like loudspeakers, amplifiers and turntables are intentionally big and heavy for stability, which was why he took the liberty of criticizing a minuscule Zylux speaker driver that pretty much all of ASUS' competitors use (though funnily enough, Zylux's website lists ASUS as a general customer — awkward!).

With the company placing audio quality before other aspects in some of their product lines, the Golden Ear team doesn't hold

back on the size of the speakers. They'd often debate with the engineers over how much space the audio parts should get in upcoming devices. The engineers would then eventually come up with a solution that Huang claims offers no sacrifices. What's left to do then is to strategically place the speakers to avoid mechanical and electromagnetic interference, because obviously the last thing you want is data loss or annoying noises. The end result is surprisingly loud and punchy sound with very little distortion. Alas, it's a shame that the PadFone Station's speaker is facing away from the user by design, so you'd want to be facing a wall to get the most out of it from the reflection.

WIRED HEADSET

Alternatively, you can just use the PadFone's wired headset. For a pair of free earphones we were blown away by their sound quality. Huang, who's a fan of Sony's high-end headphones, told us that these are just moving-coil earphones but with a super thin diaphragm that offers good bass at this size. As good as they sound, we regret to report there is one major design flaw here. The mic is located at the point where the two channels split up, so we always had to hold it up closer to our mouth for the person on the other end to hear us. Also, the plastic sleeve of the main wire has already come off the mic module after just a few weeks of usage. Hopefully ASUS can address these issues with a new design.





The PadFone's wired earbuds and mic (left) and the super stealthy stylus which doubles as a headset.



STYLUS HEADSET

While we're on the topic of making phone calls, apart from extracting the phone out of the tablet you can also just use the stylus headset. Packed inside a smooth aluminum shaft, this Bluetooth device claims to sustain seven hours of talk time and can go on standby for 10 days — we'll take ASUS' word on that. Pairing up is done in the same manner as most Bluetooth audio devices, but ASUS has also thrown in an appropriately named "Stylus Headset" app to walk you through the process. With the headset turned off, hold down the circular power button above the volume rocker until the LED flashes red and blue (for about three seconds), and then you should see the stylus show up on the PadFone's scan list. When you get an incoming call the stylus vibrates, then you'll need to figure out how best to place the earpiece on your ear — something that took us a good several seconds for our first few attempts. While this is a cool and convenient feature, we found that our

hands became uncomfortable quite quickly, so we wouldn't recommend this method for super long conversations; or try using an elastic band instead, if you must.

WEIGHT

Enough with audio for now — it's time to go back to the grand scheme of things. According to our scale, our brainless tablet matches the official weight of 724g and our keyboard dock got 635g — just a few grams shy from the similar-looking dock for the OG Transformer. This makes a total of around 1.49kg (about 3.28 pounds) when we put all three PadFone parts together. The phone-in-tablet combo comes in at 854g or 1.88 pounds, making the laptop setup rather top-heavy. Despite the limited hinge angle up to about 100 degrees (at which point that end of the keyboard dock is elevated by the hinge's feet by about 8mm), we still had to be careful to make sure the PadFone laptop didn't tip over our lap or the edge of our bed. Sadly, though,



we've already failed once at the latter. It really doesn't take much to tip the whole thing over, so be very careful.

The aforementioned weight figures are rather hefty for their respective 10.1-inch form factors, especially when you compare them to the 1.1kg / 2.42-pound ZenBook Prime UX21A (an 11-inch Ultrabook) and the 1.123kg / 2.47-pound (docked) or 586g / 1.29-pound (undocked) Transformer Prime. Considering that extra components are needed for housing and connecting the phone, this extra burden is no surprise for a first-of-its-kind device, but it does beg the question as to whether people will tolerate it. Needless to say, you'll probably want to use a backpack rather than a messenger bag for the laptop combo. You could simply leave the keyboard dock at home or in the office if you don't consider yourself a road warrior — hold that thought until we get to the software part later on.

SLEEVE

As for the tablet, we enjoyed the soft-touch finish on the back for a landscape grip and the thicker part of the tablet (formed by the hinged, circular-patterned polycarbonate cover over the phone-docking chamber) for a portrait grip. You'll either have to lean your arm(s) or the device on something, or use the official multi-purpose slide-in "VersaSleeve" (NT\$1,190 or about US\$40; free with the PadFone Station in Hong Kong when it launches there)

to prop it up at two different angles on the table — one for watching video, and one for typing. To our surprise the sleeve works rather well as a stand, but only time will tell how tough its brown 1680D polyester exterior and black velvet lining are.

PADFONE STATION

Apart from the soft-touch finish to match the pad, the keyboard dock is fundamentally identical to the one for the very first Transformer tablet. You get the same 254mm chiclet keyboard (92 percent of the size of a full keyboard) and touchpad with two click buttons, as well as a 40-pin power-only dock connector and a USB 2.0 port (with a magnetic latch) on the left. Another USB port and an SD card reader (now supporting up to SDXC) can be found on the right. We'd even go as far as to say that the keyboard feels just as good as before, though we wish ASUS would one day relocate the lock key — once in a blue moon we'd lock the device by accident while typing, and that tends to happen more often when we let a newbie try our device.

The PadFone Station Dock's aluminum hinge and tablet release latch appear to be identical to the one on the TF101 dock. However, we had to really force our PadFone Station into the latter to just about get a connection, so it's safe to say that the two are officially incompatible. In other words:



BENCHMARK	ASUS PADFONE (PHONE MODE)	HTC ONE S	ASUS PADFONE (DOCKED)	ASUS TRANSFORMER PRIME
QUADRANT (V2)	5354	5053	5318	4137
VELLAMO	2521	2452	2445	1418
ANTUTU	7042	7067	6886	10269
SUNSPIDER 0.9.1 (MS)	1611	1742	1623	1861
GLBENCHMARK EGYPT OFFSCREEN (FPS)	55	57	55	68
CF-BENCH	9571	9547	9456	11861

don't do this at home, kids. While it's disappointing that we're not allowed to re-use the older dock here (be it for the sake of saving money, reducing waste or purely mixing-and-matching patterns), ASUS pointed out that the heavier PadFone tablet does require a stronger hinge.

DOCKING THE PADFONE

Inserting the phone into the PadFone Station is as simple as releasing the station's hinged cover using the latch up top. Then slide the phone into the bay (which has a slick plastic strip on both "walls" to smooth the action) until you feel a soft click akin to that of plugging in a micro-USB cable. Within just over a second after the insertion (regardless of whether the cover is still open), the tablet comes to life with the sweet Ice Cream Sandwich tablet interface. When you're done, just release the cover and push it down to about 90

degrees in order to trigger the phone release mechanism, which is just two little plastic probes that stick out to push up the phone. In fact, you can even just force-pull the phone out by anchoring your thumb on the screen and then gripping the phone with the tips of your fingers — this is, ahem, handy for when you want to extract the phone while keeping the tablet in your bag.

Obviously, the official way is easier, and it really isn't as scary as it sounds as the cover's hinge is pretty strong. Before long we had mastered a single-handed technique: unlatch the cover with one hand (usually just with an index finger), then slide the hand down to push the cover with the middle finger, and then grab the undocked phone out. Pro tip: do this slowly so people around you can watch with awe. Second pro tip: our single-handed technique doesn't work well when the docked PadFone Station is tilted at the maxi-



mum angle, as the slippery feet below the keyboard's hinge are just asking for trouble when you try this trick.

Like the HTC One XL (or simply the One X on AT&T) and One S, the slick PadFone takes advantage of Qualcomm Snapdragon S4's Krait, which is technically a more capable architecture than the Tegra 3's Cortex-A9. That said, after thoroughly comparing the two SoCs, *AnandTech* concluded that each has its own advantage, and it really depends on how heavily threaded the apps are — something that the legendary site doubts would favor phones with quad-core Tegra 3 any time soon. Yet the PadFone is also a tablet (effectively making it the first commercially available Snapdragon S4 tablet) and a netbook. Both form factors are begging for a wider range of applications in order to slowly overtake the

role of conventional PCs. At one point we were even certain that ASUS would launch the PadFone with Tegra 3, which would've given it slightly more graphics oomph than the MSM8260A's Adreno 225 engine (the beefier Adreno 320 will have to wait for the MSM8960 Pro). What officially happened with that plan remains a mystery, but if we must guess, it was probably because ASUS wanted a smooth upgrade path to the PadFone LTE that was also announced at MWC; while Tegra with integrated Icera LTE won't materialize until next year. With that considered, and judging by these scores plus our smooth experience, we think this is a damn good decision, especially for an extremely adventurous product that's never been done by others before.

As you may have seen in our Transformer reviews, it requires a fair

amount of patience when grilling these multi-battery devices to test their endurance. So you can imagine the pain — or joy, depending on how you look at it — we went through with the whole PadFone package. As mentioned earlier, the phone itself houses a removable 3.7V 1,520mAh battery, and that got us



The PadFone sports a decent 1,520mAh battery.

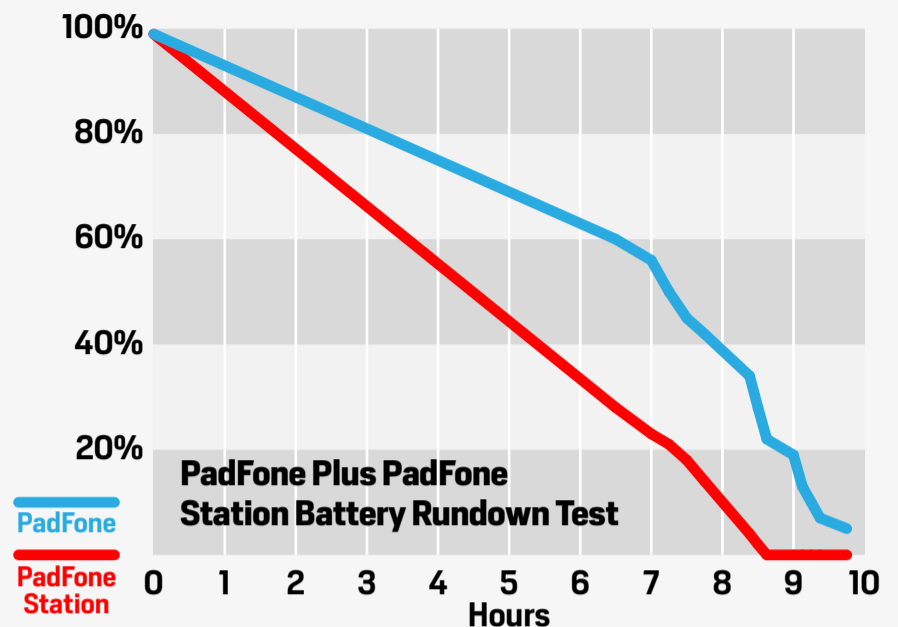
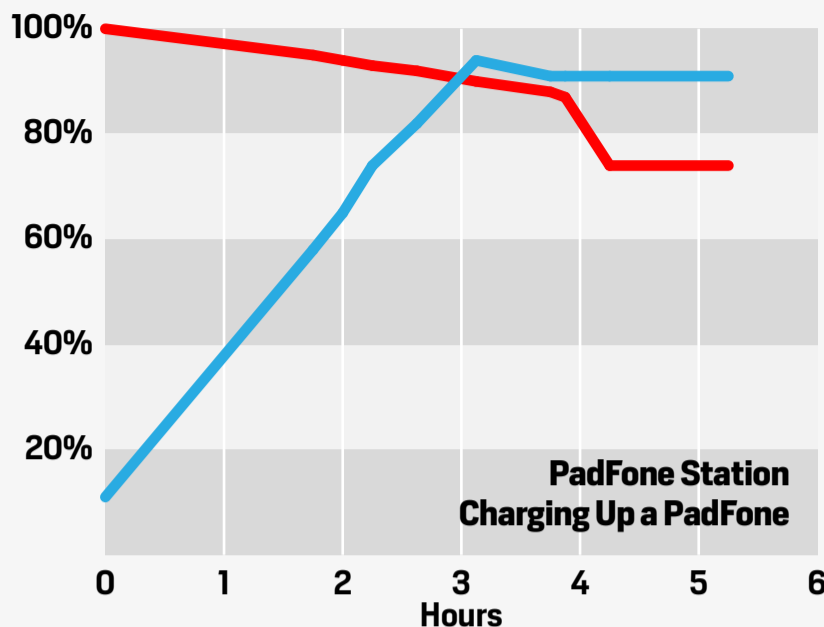


PHONE	BATTERY LIFE
ASUS PADFONE	6:15
MOTOROLA RAZR MAXX	4:30
SAMSUNG GALAXY S BLAZE 4G	11:20
SAMSUNG STRATOSPHERE	10:00
SAMSUNG GALAXY NOTE (INT'L)	09:36
HTC ONE S (INT'L / T-MOBILE)	8:30 / 9:10
Samsung Galaxy S III	9:02
HTC One X (AT&T)	08:55
HTC EVO 4G LTE (Sprint)	8:55
Samsung Captivate Glide	8:30
Motorola Droid 4	7:15
Prada phone by LG 3.0	7:00
Huawei Ascend P1	6:40
Galaxy Nexus (Verizon)	6:15
HTC One X	6:00
Xiaomi Phone	5:40
Meizu MX	5:30
LG Viper 4G LTE	4:49
Panasonic Eluga	4:30

TABLET	BATTERY LIFE
ASUS PADFONE (TABLET MODE* / LAPTOP MODE*)	9:56 / 17:30
ASUS EEE PAD TRANSFORMER PRIME (UNDOCKED / DOCKED)	10:17 / 16:34
ASUS TRANSFORMER PAD TF300 (UNDOCKED / DOCKED)	8:29 / 12:04
SAMSUNG GALAXY TAB 7.7	12:01
APPLE IPAD 2	10:26
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
HP TouchPad	8:33
Barnes & Noble Nook Tablet	8:20
Lenovo IdeaPad K1	8:20
Motorola Xoom	8:20
Acer Iconia Tab A200	8:16
Samsung Galaxy Tab 7.0 Plus	8:09
Lenovo ThinkPad Tablet	8:00
Amazon Kindle Fire	7:42
Samsung Galaxy Tab 2 7.0	7:38

*BATTERY LIFE OF TABLET MODE AND LAPTOP MODE INCLUDE PHONE-ONLY TIME AFTER BATTERY IS DEPLETED ON THE PADFONE STATION. THE PADFONE STATION DOES NOT OPERATE ONCE IT RUNS OUT OF BATTERY.





through about six hours and 15 minutes in our standard rundown test (that's with a video looping, a 3G data connection, WiFi enabled but not connected, brightness fixed at 50 percent and some specific background sync settings).

Yikes, that's almost three hours short of what we got from the similarly specced HTC One S — same display panel, same SoC, just with 130mAh more battery juice. We imagine this likely has more to do with the way ASUS set its power management profiles. For this test, we used balanced mode, which still keeps the CPU clocked at 1.5GHz max, but the system processes with both cores less often than it does in performance mode. As for power saving mode, ASUS told us the CPU is capped at a surprisingly high 1.2GHz and the display brightness is set to 90 percent by default — same as balanced mode (but we changed it back to 50 percent and made sure it was non-outdoor mode for the test, obviously).

Going back to those official real-life figures we obtained a while back, it's interesting to see how ASUS' lab only

got about 2.6 hours and 2.1 hours on the phone alone for continuous web browsing over WiFi and 3G, respectively. By comparison, we got around 6.25 hours with our video loop test plus 3G data connection. That's almost three times as much stamina than what ASUS got out of its 3G browsing test! Our money's on the Super AMOLED panel sucking up all the power for the web pages' white backgrounds (again, a drawback that's been cheekily pointed out by LG). It's a good thing, then, that the larger PadFone Station — naturally the eye-friendlier option for web browsing — uses an LCD panel instead. Well, not that ASUS has a choice until someone makes an affordable 10-inch OLED panel.

Despite the outcome of the rundown tests from us and ASUS, the PadFone's battery performed very well under our normal usage and easily lasted a full day. We also recall one night when we forgot to plug the phone into a charger before going to bed, but when we woke up about eight hours later it had



only drained about 10 percent of battery, presumably mostly due to its WiFi connection. We also tested constantly listening to music from the phone while using its personal hotspot for our laptop (mainly for Twitter, Facebook, typing and the occasional random YouTube clips for giggles), and that lasted for three hours and 50 minutes. Needless to say, you'd get a lot more hotspot time if you utilize the pad and the keyboard dock as well.

Speaking of which, with the same battery rundown test, we got just under 10 hours out of the tablet combo, whereas the laptop combo pumped out 17.5 hours. Coincidentally, neither are far off the official claims for continuous web browsing over WiFi (and they're respectively about one hour and three hours more than ASUS' 3G figures). However, there is a caveat with these numbers: the PadFone Station pad fails to operate once it runs out of its own battery, so the aforementioned figures actually include the duration of the phone running on its own using its remaining battery juice. This is also why, by default, you're given the intelligent charging mode, so that when the keyboard dock still has battery juice, it keeps the PadFone at no less than 90 percent battery level, with the pad's battery level staying pretty much untouched if full. However, if the pad's battery is significantly lower than the keyboard's, then the latter will share the love with the former as well. When

the keyboard's battery is exhausted, the system will lower the minimum threshold of the phone's battery level so that the pad can operate longer. On the contrary, the charging pack mode simply prioritizes all the battery power to the phone, but again starting with the keyboard dock's battery.

For those interested, here's a brief breakdown of what we got from the intelligent charging mode corresponding to the graphs we've included. In our tablet combo the PadFone Station gave up at about eight hours and 45 minutes into the 10-hour rundown test, leaving the phone with 28 percent battery left. In our laptop combo the PadFone Station died at about 14 hours into the 17.5-hour test, but somehow the phone had 55 percent battery left. In the tablet mode rundown chart, despite the lack of samples in the early hours, you can still see how the intelligent mode's bias towards the phone keeps it alive for a wee bit longer after the PadFone Station gives up.

Later on we inserted our almost-depleted phone into a fully charged PadFone Station, and about three hours later the phone went from 11 percent to 94 percent, with the pad at 90 percent.

**The PadFone's
8-megapixel camera
does a solid job all
around.**



CAMERA

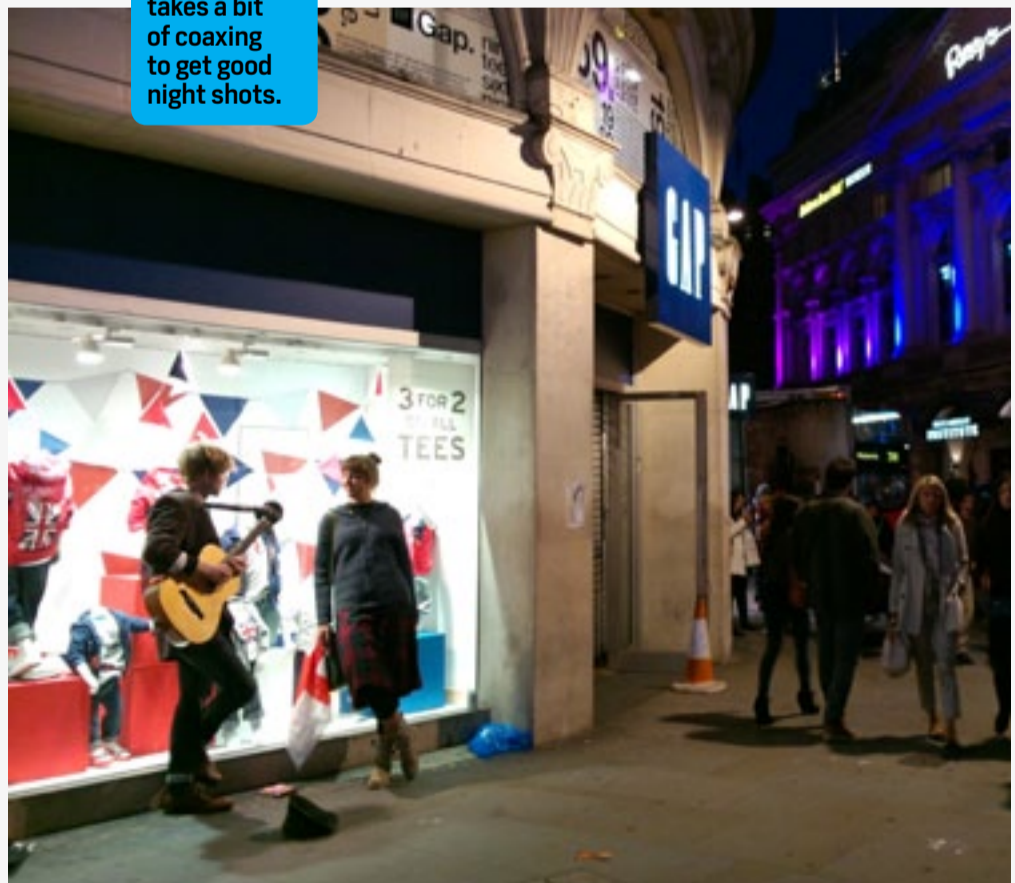
The PadFone's 8-megapixel (3264 x 2448, 4:3) f/2.2 camera does a solid job all around, offering good color reproduction in most cases and can easily handle macro shots, while night shots depend on the environment. For instance, streets with some lit signs look great in our photos, though we still needed several tries in order to get rid of the blurriness or find the right focus. Most of the time we just ended up manually boosting the ISO for the sake of speed and steadiness, or used the night scene mode to extend the exposure time (as long as we had somewhere to lean our phone against). It's also safe to say that the less dense PenTile subpixel layout made it a tad more difficult to check the pictures' sharpness, so be sure to double check your important shots in the gallery. Another hitch is that when taking pictures with a white, cloudy sky in the backdrop, we often had to manually increase the exposure level rather than tapping the appropriate focus area to make this adjustment — 'tis a widespread issue amongst Android devices. We've tried the backlight scene mode as well, but it only added a light shade of white over the image instead of improving it.

The biggest problem with the PadFone's camera is the shutter speed: in a well-lit environment we measured around 1.4 seconds from hit-

ting the virtual shutter button to seeing a refreshed viewfinder. It's not bad, but it's certainly no match for the "zero shutter lag" on the HTC One series and the Galaxy S III, so brace yourself if you do switch from those devices to the PadFone. Similarly, the PadFone's camera app is very much a skinned version of Ice Cream Sandwich's native app, so you'll miss out on the extra goodies like HDR, image stabilizer, slow motion capture, smile trigger, burst shot mode or simultaneous photo and video capturing. This is obviously a big disadvantage compared to some of the competitors, so hopefully ASUS will fix this in a future update.

Furthermore, the native camera app's "Silly faces" and "Background" effects in camcorder mode are absent for some reason, but ASUS has added three filter effects (greyscale, negative

The PadFone takes a bit of coaxing to get good night shots.



and sepia) in both camera mode and camcorder mode to sort of compensate. As usual, you can use Android's Photo Studio for more still filter options afterwards, but that's obviously not as fun as seeing the effects applied onto the camera's live viewfinder. What's left in the camera app are the usual ICS panorama mode, 1080p video capture and three camera scene modes (night, backlight and vivid). You can find all these settings in a pull-out tray on the left (next to the slider for digital zoom). On the right you have the toggles for still camera mode, camcorder mode and panorama mode, followed by buttons for the shutter, switching cameras, toggling flash and opening the gallery. Last but not least, there's a handy counter at the top right indicating how many photos or how much video you can capture.

While the features are lacking in the camera app, the PadFone makes up with pretty decent camcorder video quality. The recorded 1080p, 30fps MPEG-4 clips are of AVC baseline profile level 4.0, and they were encoded at up to 20Mbps — higher than One X's 10Mbps (baseline profile at level 4.2, 23fps) and the Galaxy S III's 17Mbps (high profile at level 4.0, 30fps) — which is the maximum video bit rate specified for this profile. The accompanying audio comes at a bitrate of 156kbps (nominal 96kbps) — again beating the aforementioned competitors — and sampled at 48kHz. Even without these technical comparisons you can still appreciate the fine details in

the clips; but when filming in the dark, the frame rate is reduced to no less than 15fps (which is acceptable for the quality it achieves), and the camera finds it harder to focus. The lack of touch focus in camcorder mode doesn't help, either. As for audio, we were impressed by how well the mic picked up our voice, except the first second always got cut out — no doubt an easy bug to fix. At least there's no audio and video sync issue.

While there's no optical difference between using the phone's camera inside the tablet and outside, we noticed that the audio in our recorded clips sounded slightly muffled when recorded from inside. You'd think, due to the nature of the mic's poorly chosen position, that this was probably because we accidentally covered it up with our right hand, but we've triple-checked this by gripping the tablet with just the tips of our thumbs and index fingers during the tests. Having inspected the sample clips we sent it, ASUS told us this phenomenon was more to do with the external mic's audio path via HDMI when in tablet mode. So, by design, the audio quality would be a bit different, and it seems there's nothing that ASUS could do here.

SOFTWARE

Considering ASUS already released three iterations of Transformer Pads that are now running Ice Cream Sandwich, we naturally have high expectations when it comes to the PadFone's software features and performance. Luckily, the company's



preserved many of its goodies here: the overall look and feel are very much in line with Google's vanilla skin. You'll only see ASUS' customization straight away in the notification panel (in both tablet mode and phone mode), widgets and the extra "Pad only" tab in the app tray — shameless plug but this is where you'll also spot our Distro magazine app once installed.

As with the Transformer Pads, you can revert to the original notification panel under "ASUS Customized Setting" in Settings; but we actually much prefer the beefed up version. Here, you have a row of quick access buttons for auto-rotate screen, WiFi, Bluetooth, vibrate, auto sync, GPS, airplane mode and WiFi hotspot, followed by a screen brightness slider with buttons for toggling outdoor mode (née Super IPS mode à la Transformer Prime) and auto brightness. Gone are the buttons for switching system performance modes (performance mode, balanced mode and power saving mode), but they are still accessible in Settings. Another nice, but subtle, enhancement by ASUS lies in the dialer: again, the essence of the vanilla skin is here to stay, only to be garnished by the popular T9 smart dialing feature that somehow never made it to the Galaxy Nexus. Oh, and in phone mode, ASUS has managed to slip in the recent callers list underneath the lightly condensed dialpad as well, thus part of the list is conveniently displayed above the retractable dialpad.

Of course, the PadFone's main selling point when it comes to software is the Dynamic Switching feature, where apps

are supposed to switch between their phone interface and tablet interface upon docking or undocking the phone. Sadly, we regret to say that this isn't quite as ready as anticipated. With the Android build (IML74K.CHT_PadFone-9.18.8.2_CHT_9.0.33-0) shipped with our retail unit, only the handful of pre-loaded apps got Dynamic Switching working: People, Messaging, Dialer, Camera, Browser, Calendar, Supernote, Clock, Email, File Manager, Gallery and Video Player.

This list may seem to have the basics covered and it's easy to impress your friends with the seamless video playback in the default video player, but trust us, this is far from sufficient when you consider how *all* other apps slap you in the face with this painful message: "Application does not support dynamic display switching and has been closed." The blacklist includes pretty much all Google services (e.g., Maps, Gmail, Play services, Movie Studio and YouTube); some of the pre-loaded apps like Garmin and WebStorage; popular downloads such as Facebook, Twitter and *Angry Birds*,

Given the supposedly tight relationship between ASUS and Google, we were very surprised by the severe incompatibility with Google services.



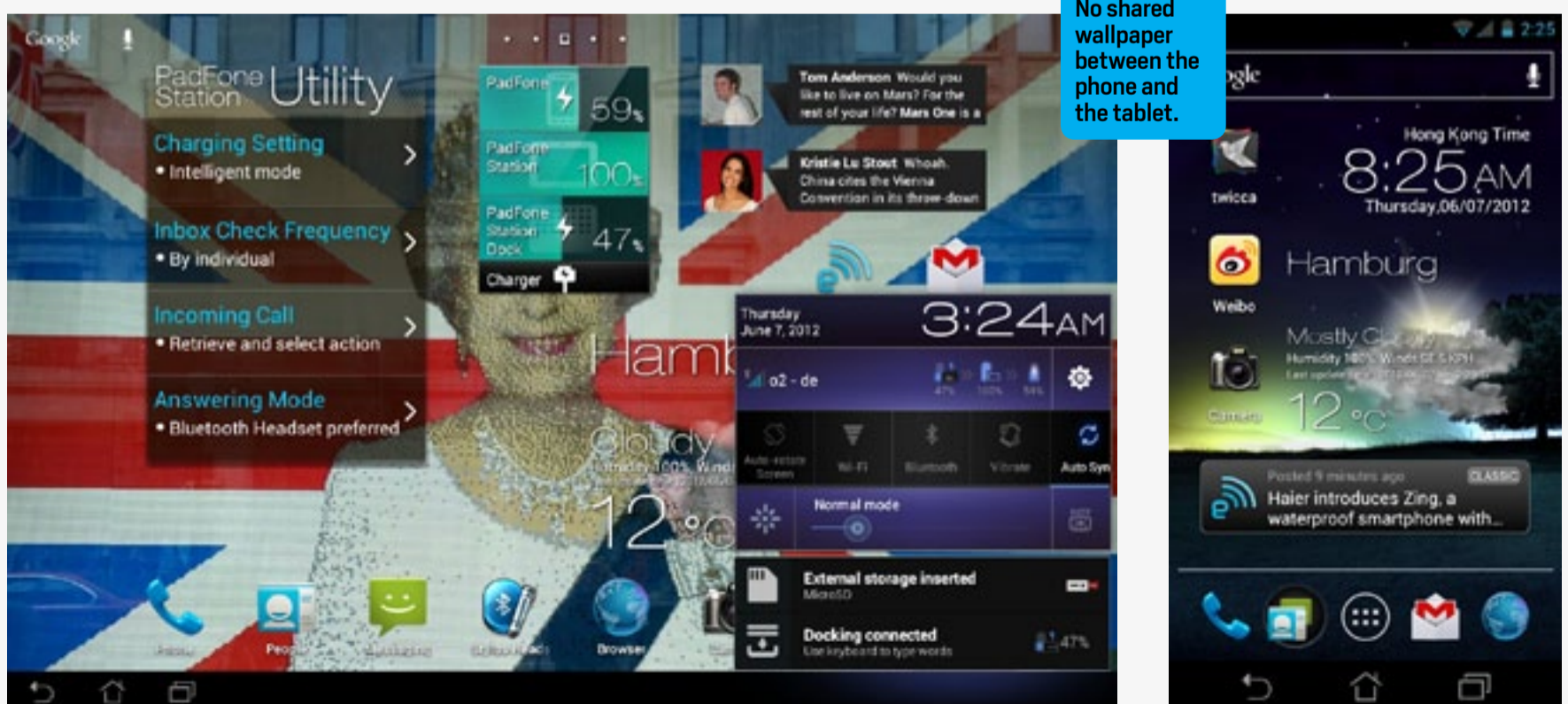
and our very own Engadget app as well. Just to rub salt in the wound, the recent apps list is wiped clean every time Dynamic Switching is attempted, regardless of the outcome. So whatever you're doing, you must always make sure you save your work before tinkering with Dynamic Switching — we had already managed to lose a draft in Gmail back in the early days. Good thing it wasn't an essay.

Given the supposedly tight relationship between ASUS and Google, we were surprised by the severe incompatibility with Google services, so our assumption is that ASUS had to rush this product out ahead of Computex. On the bright side, ASUS told us this is something it's constantly honing, so here's hoping the OTA update coming this month adds more apps to the list. We also asked ASUS who to contact for support should a developer wish to ensure Dynamic Switching compatibility, but the response we got was rather odd: apparently

its local sales reps, not a dev support team, will be handling this.

While exploring Dynamic Switching, we were initially baffled that the phone interface and the tablet interface can't share the same wallpaper. You'll have to set this manually if you're picky (although we're pretty sure many people would rather have two options instead of one). ASUS says this is due to the two different resolutions and having to take portrait and landscape modes into consideration. It's hard to offer an automatic solution and keep the picture quality well-controlled at the same time, plus the company wants to stress the fact that you can run two totally different UIs in one system here. We guess that's a fair point, and at the end of the day, you can't share the same icon layout between the home-screens of the two interfaces anyway.

Fans of Transformer Pads should be familiar with most of the widgets on the



PadFone, namely MyZine, battery, task manager, weather and WebStorage. With the exception of MyZine, all of these are available in phone mode. There are also a few new widgets here, with the pad-only PadFone Station Utility letting you toggle settings for charging (intelligent mode or charging pack mode), inbox check frequency, incoming call action (retrieve to answer or retrieve and select action) and preferred answering mode (Bluetooth headset or speaker). Again, these are also accessible under “ASUS Customized Setting” in the Settings menu.

You’ll also find a healthy set of pre-loaded apps on the PadFone. With the exception of the Hami utilities from Emome.net (a Taiwanese portal operated by local partner carrier Chunghwa Telecom), most of these should come in handy for those living outside Taiwan. Starting off with the oldies from the Eee Pads, we have App Locker, WebStorage, SplashTop Remote (under MyCloud), asus@vibe, File Manager, SuperNote, Polaris Office and Garmin StreetPilot. This has productivity, navigation and entertainment covered, so not a bad package at all. Then there’s the phone-only FM Radio as well as the new Watch Calendar, the latter offering a cool and surprisingly tidy clock-style layout for your daily agenda.

While the asus@vibe hub offers a selection of channels for streaming and purchasing multimedia content, the PadFone lacks powerful multimedia apps to support more formats or to offer a more

intelligent service. For music, the device only supports MP3, WMA, AAC and AAC+ out of the box. You also have Android’s native Play Music which does a fine job (despite the incompatibility with Dynamic Switching), but you’ll have to look elsewhere if you want smart features like the Music Square auto-playlist tool on the Galaxy S III.

Video support is more of a worry: the spec sheet lists just MPEG4, H.264, H.263 and WMV HD 1080p as compatible formats, so we’ve had to rely on third party apps to get AVI and MKV support which don’t always work well. And even so, these apps lack Dynamic Switching support. We don’t mind if the phone comes with a relatively basic music player, but for a device that’s often been shown doing seamless video playback while switching screens, we were seriously hoping for a robust video player that’d handle all the formats you can think of. A DivX certification and some tweaking should be all that ASUS needs in order to turn the PadFone into the ultimate multimedia hub that’d make your neighbors jealous.

WRAP-UP

While it may seem like we moan a lot about the PadFone in its current state, we do it only out of love. To put it simply, we’re all over ASUS’ vision of making the smartphone the literal center of our lives, but the company can do so much more: what we see here is just the core of the idea, the foundation



to get things started, while the rest of the product seems half-finished and doesn't yet realize its full potential. On the other hand, you have to start somewhere, and a product like this will surely inspire many to take advantage of this hybrid form factor, be it consumers, developers or even manufacturers.

Focusing on the PadFone that's already on the market, we can't help but feel ASUS really just wanted to get it out of the way ahead of Computex, and then rely on OTA updates to beef up the device. This is okay as long as ASUS keeps up its pace, and looking at its track record of updating the Transformer series, we're confident that the fixes will be delivered in good time. Leaving the software bugs aside, at this point it's hard to tell whether the PadFone will appeal to the masses who are spoiled by multi-device options, or those who think the glass is half empty — as in the tablet is useless

without the phone. But then again, the off-contract price for the full package is already very competitive, let alone the subsidized offers from carriers. Ultimately, not only does Android need to become even more productive, but the PadFone also needs to shave off some weight. We guess it'll follow the same path as the first Transformer and evolve into a slimmer model, and you have to remember how fast Jonney Shih came back with the Transformer Prime after the TF101's launch in the same year.

What we want ASUS to do now is cuddle up to Google and sort out Dynamic Switching for everyone, as well as come up with even more applications and ideas that will truly push its transforming Android devices to a more significant role in our everyday lives. **D**

Richard is addicted to gadgets, even more so than a typical Chinese lad. Also looking after Engadget Chinese.

BOTTOMLINE

ASUS PADFONE

NT\$17,990+
(US\$610)



PROS

- Inventive design
- Superb battery life
- Good value for three form factors
- Preloaded with many handy apps

CONS

- Heavy and chunky
- Dynamic Switching not widely compatible

BOTTOMLINE

The ASUS PadFone is a remarkable piece of work and its unique transformation will catch people's attention. It just needs a diet and some software fixes.



DISTRO
06.22.12

REVIEW

MACBOOK AIR (13-INCH, MID 2012)



This new **MacBook Air** update keeps the same slim figure while boosting its specs and adding a little wiggle room.
By Dana Wollman

The last time we reviewed the MacBook Air, we didn't have a whole lot to compare it to. Sure, there was the original Samsung Series 9, but it was more expensive, at \$1,649, and ran off a standard-voltage processor, often at the expense of battery life. Companies like Lenovo and Toshiba already had deep experience making ultraportables, but those notebooks generally weren't as light, or as skinny, as the Air. A year ago, too, Ultrabooks, as we now know them were little more than a concept as far as the computer-buying public was concerned.



Today, there are 110-plus Windows-based Ultrabooks on the horizon, leaving consumers with an overwhelming smorgasbord of thin, shockingly powerful laptops. Apple, for its part, has stuck with the same Air design we liked so much the first time around, though it's refreshed the lineup with speedier Ivy Bridge processors and traded those USB 2.0 ports for 3.0. Additionally, the Air can now be configured with more RAM and roomier storage. Oh, and the 13-inch version now starts at \$1,200, down from \$1,300. (The 11-inch version still goes for \$999 and up.)

That sounds promising, making an already-excellent laptop faster and less expensive. Still, with so many comparable products on the Windows side, we have to wonder, does Apple really continue to define the category or have other companies narrowed the gap? Let's find out.

LOOK AND FEEL

As it turned out, those rumors of a MacBook Air with Retina display were greatly exaggerated: with the exception of those USB ports, this year's model is exactly the same as last year's, right down to the unibody aluminum shell and contested wedge shape. The good news: the existing design was already pretty swell. At 2.96 pounds (1.35kg), the Air is still lighter than most 13-inch Ultrabooks, which is saying a lot, given how many are hitting the market. And despite being 0.11 inches thick at its

skinniest, it still feels reassuringly solid in-hand. At this point, it doesn't necessarily feel better-made than, say, the Lenovo IdeaPad U300s, but it's fair to say the build quality is top-notch, and that this kind of attention to detail remains rare.

If we could ask Apple to change one thing about the Air, it would be to make that pretty aluminum casing a little more durable. Anyone who's spent time with a unibody Mac can tell you that smooth metal finish is as scratch-prone as it is beautiful. Unless you handle it with kid gloves, the likelihood that you'll ding it within the first day is fairly high, which kind of saps the fun out of unboxing a new \$1,200 toy. To avoid doing any immediate damage, we'd buy some sort of skin along with the laptop itself (Speck's SeeThru Satin case is an Engadget staff favorite).

Given that the dimensions and overall aesthetic haven't changed, the only cosmetic differences between this year's Air and the last-gen model are the ports. Starting on the left side, the tried-and-true MagSafe connector has been replaced by MagSafe 2, which has a thinner opening. Unfortunately, that flattened shape renders it incompatible with older adapters. If you're dead-set on reusing your scratched-up old power brick you can make it work using a \$10 adapter, but that makes for a rather clumsy setup.

The USB port adjacent to it has naturally been upgraded from USB 2.0 to



3.0. On that same side, you'll also find a 3.5mm headphone jack and microphone, just as before. Move along to the right, where you'll see another USB 3.0 socket, along with a Thunderbolt port and SD card reader. If you think you might buy the 11-inch Air instead, that, too, has been refreshed with MagSafe 2 and USB 3.0, but lacks a memory card reader, as it always did. Finishing our tour, the FaceTime camera tucked into the bezel now does 720p video.

KEYBOARD AND TRACKPAD

When Apple re-issued the Air last year, it introduced a retooled keyboard with springier, bouncier keys and also back-lighting. The result was a clear, much-appreciated improvement over the looser keys used on the earlier models. So it's no surprise, then, that Apple chose not to re-invent the keyboard yet again in 2012. The keys are just as comfy as ever, and though they're not quite as cushy as what you'll find on a MacBook Pro, they still offer more travel than most Ultrabook keyboards. Also unchanged: that spacious glass trackpad. It's still, hands-down, the best laptop trackpad we've tested, with a smooth, low-friction surface that responds impeccably to two-finger swipes, pinch-to-zoom and simple cursor navigation. Palm rejection is excellent as well, and we enjoyed

It's still the best keyboard-and-touchpad combination you'll find on a laptop this size.

flawless tracking in both OS X and Windows 7, which we installed using Bootcamp. The built-in button, too, is quiet and easy to press.

All told, it's still the best keyboard-and-touchpad combination you'll find on a laptop this size. As we've said in other reviews, the problem isn't that other computer makers are incapable of building a precise trackpad or an ergonomically sound set of keys. No, the catch is that they so rarely manage to pull off *both*. We've tested too many Ultrabooks that stumble on at least one major input device, if not both. Maybe they offer a tactile keyboard and flaky track-

The MacBook keyboard and trackpad combo still tops the list.



pad, or perhaps they bring precise navigation, paired with shallow keys. Considering how often we interact with these parts of a laptop, it's critical PC makers *not* screw these things up, and we naturally favor those companies that succeed in getting both right.

DISPLAY AND SOUND

If you like, you can go ahead and tell yourself the next generation of Airs will have Retina displays. For now, though, you're looking at the same 1440 x 900, LED-backlit display used in the 2011 model. We can't guarantee you won't be disappointed if you happen to be shopping in an Apple Store, making side-by-side comparisons with the next-gen MacBook Pro. Heck, the Air has com-

petition even from other Ultrabooks, such as ASUS' 1080p Zenbook Primes. Still, compared to what you'll find on most ultraportables, it's quite good. It's crisper, for one, and also offers satisfying contrast and fairly wide viewing angles. At times, you might have to adjust the screen angle to compensate for glare, but nonetheless, you shouldn't have a problem crowding around the laptop with a friend or two to re-watch that bombshell of a *Mad Men* finale.

The Air's speakers push out surprisingly loud sound for such a petite machine, though the quality isn't anything to write home about. Across various genres — classic rock, pop, hip hop — songs sound pleasant, though, as with most laptops, you'll still want to pair it

OS X BENCHMARK	GEEKBENCH	XBENCH	BATTERY LIFE
MACBOOK AIR (MID 2012, 1.8GHZ CORE I5, INTEL HD GRAPHICS 4000)	6195	321	6:34
MACBOOK AIR (MID 2011, 1.7GHZ CORE I5-2557M, INTEL HD GRAPHICS 3000)	5373	N/A	5:32
MACBOOK PRO WITH RETINA DISPLAY (MID 2012, 2.6GHZ CORE I7)	11591	486	7:49
MACBOOK PRO WITH RETINA DISPLAY (MID 2012, 2.3GHZ CORE I7)	11082	457	9:22
MACBOOK PRO (EARLY 2011, 2.2GHZ CORE I7-2720QM, RADEON HD 6750M / INTEL GRAPHICS 3000)	9647	340.1 (RADEON) / 157.78 (INTEL)	7:27
MACBOOK PRO (EARLY 2010, 2.66GHZ CORE I7-620M, GEFORCE GT 330M)	5395	228.22	5:18
MACBOOK AIR (LATE 2010, 1.83GHZ CORE 2 DUO, GEFORCE 320M)	2717	117.38	4:34

NOTE: HIGHER SCORES ARE BETTER.



with external speakers or maybe a Jambox to unlock a wider soundstage.

PERFORMANCE

Now this is the section you've been waiting for, is it not? We already know how the MacBook Air looks and feels, but how does it perform with that faster processor? The \$1,199 model we tested has a 1.8GHz Core i5 CPU, specifically, along with 4GB of RAM and a 128GB solid-state drive. (The last Air we tested had similar specs, but sported a Sandy Bridge Core i5 CPU clocked at 1.5GHz.) As you can see in the tables, the latest generation offers a considerable performance boost over last year's model, in both Mac and Windows benchmarks. Its PCMark Vantage score

of 13,649 is simply blistering. Record-breaking, even. We haven't seen an Ultrabook that comes close to this — not even the ASUS Zenbook Prime UX21A, which has a Core i7 Ivy Bridge CPU, 4GB of RAM and the same integrated Intel HD 4000 graphics.

Granted, the UX21A is the only other Ultrabook we've tested to date with a third-generation Core processor, so we expect there's room for other PC makers to close the benchmark gap once they get their refreshed systems into the hands of reviewers. Still, it's impossible to shrug off that delta in scores entirely: there's no reason the UX21A should score 3,100 points lower in PCMark and nearly 1,300 points less in 3DMark06.

LAPTOPS	PCMARK VANTAGE	3DMARK06
MACBOOK AIR (2012, 1.8GHZ CORE I5, INTEL HD GRAPHICS 4000)	13469	5827
ASUS ZENBOOK UX31 (1.7GHZ CORE I5-2557M, INTEL HD GRAPHICS 3000)	10508	4209
ASUS ZENBOOK PRIME UX21A (IVY BRIDGE CORE I7 PROCESSOR, INTEL HD GRAPHICS 4000)	10333	4550
LENOVO IDEAPAD U300S (1.8GHZ CORE I7-2677M, INTEL HD GRAPHICS 3000)	9939	3651
SAMSUNG SERIES 9 (15-INCH, 2012, 1.6GHZ CORE I5-2467M, INTEL HD GRAPHICS 3000)	10580	4171
MACBOOK AIR (2011, 1.7GHZ CORE I5-2557M, INTEL HD GRAPHICS 3000)	9484	4223
MACBOOK AIR (LATE 2010, 1.83GHZ CORE 2 DUO, GEFORCE 320M)	2717	117.38

NOTE: HIGHER SCORES ARE BETTER.



So what do those raw scores translate to in real-world performance? For starters, we timed an 18-second start-up when we were booting into OS X (with Windows, it was closer to 40 seconds). We also ran the disk benchmark ATTO to pull off a more direct comparison with various Ultrabooks we've tested recently, and the SSD inside showed top read / write speeds of 551 MB/s and 521 MB/s, respectively. That's just a shade faster than the ASUS Zenbook UX31, which had been holding steady as the Ultrabook transfer speed champ for about eight months. It's also worth spelling out that the Air stayed quiet throughout our testing period, and surprisingly cool too.

BATTERY LIFE

If we were betting types, we would have guessed the battery life wouldn't be much different from last year's model: after all, this year's Air packs the same 50Wh cell as its predecessor, and Apple is once again promising between five and seven hours of runtime. Besides, early Ivy Bridge benchmarks have suggested the battery life between machines with second- and third-generation Core chips is similar.

In fact though, the 2012 Air lasted six hours and 34 minutes in our run-down test, which involves looping a video with WiFi on and the display brightness fixed at 65 percent (in the case of Macs, 10 out of 16 bars). That's about an hour longer than what we got

LAPTOPS	BATTERY LIFE
MACBOOK AIR (13-INCH, 2012)	6:34 (OS X) / 4:28 (WINDOWS)
SAMSUNG SERIES 9 (15-INCH, 2012)	7:29
LENOVO THINKPAD X230	7:19
HP FOLIO 13	6:08
TOSHIBA PORTEGE Z835	5:49
ASUS ZENBOOK UX31	5:41
MACBOOK AIR (13-INCH, 2011)	5:32 (MAC OS X) / 4:12 (WINDOWS)
HP ENVY 14 SPECTRE	5:30
LENOVO IDEAPAD U300S	5:08
SAMSUNG SERIES 5 ULTRABOOK (14-INCH, 2012)	5:06
DELL XPS 13	4:58
SAMSUNG SERIES 9 (13-INCH, 2011)	4:20
ASUS ZENBOOK PRIME UX21A	4:19
ACER ASPIRE S3	4:11

when we ran the 2011 Air through the same test last year. This also makes it the longest-lasting 13-inch Ultrabook we've tested — a distinction long held by the HP Folio 13.

SOFTWARE AND WARRANTY

Though Apple is on the cusp of releasing its next-gen OS, dubbed Mountain Lion, those of you who purchase a MacBook



Air within the next few weeks will have to make do with plain old Lion. Fortunately, upgrading will be free for anyone buying one of Apple's latest laptops, and for everyone else upgrading will be fairly cheap: just 20 bucks will get you a license for as many machines as you like. At that point, you'll enjoy features like notifications, iMessage, deep Twitter and iCloud integration and Power Nap, which keeps web-based apps up to date while your machine is asleep. If you're not in a rush, settle in with our in-depth Mountain Lion preview to get a feel for what's coming.

Like Apple's other computers, the Air is backed by a one-year warranty, which includes 90 days of free phone support. As always, you can extend that coverage to three years through the company's Apple Care plan. In the case of the Air, that package costs \$249 (compared with \$349 for the MacBook Pro with Retina display).

CONFIGURATION OPTIONS

The MacBook Air starts at \$999 for the 11-inch version we didn't review here. The base model comes with an Ivy Bridge Core i5 processor clocked at 1.7GHz, 4GB of RAM and a modest 64GB solid-state drive. The higher-end \$1,099 model has the same CPU and four gigs of memory, except it offers double the storage space. You can also step up to a 2Ghz dual-core Core i7 CPU

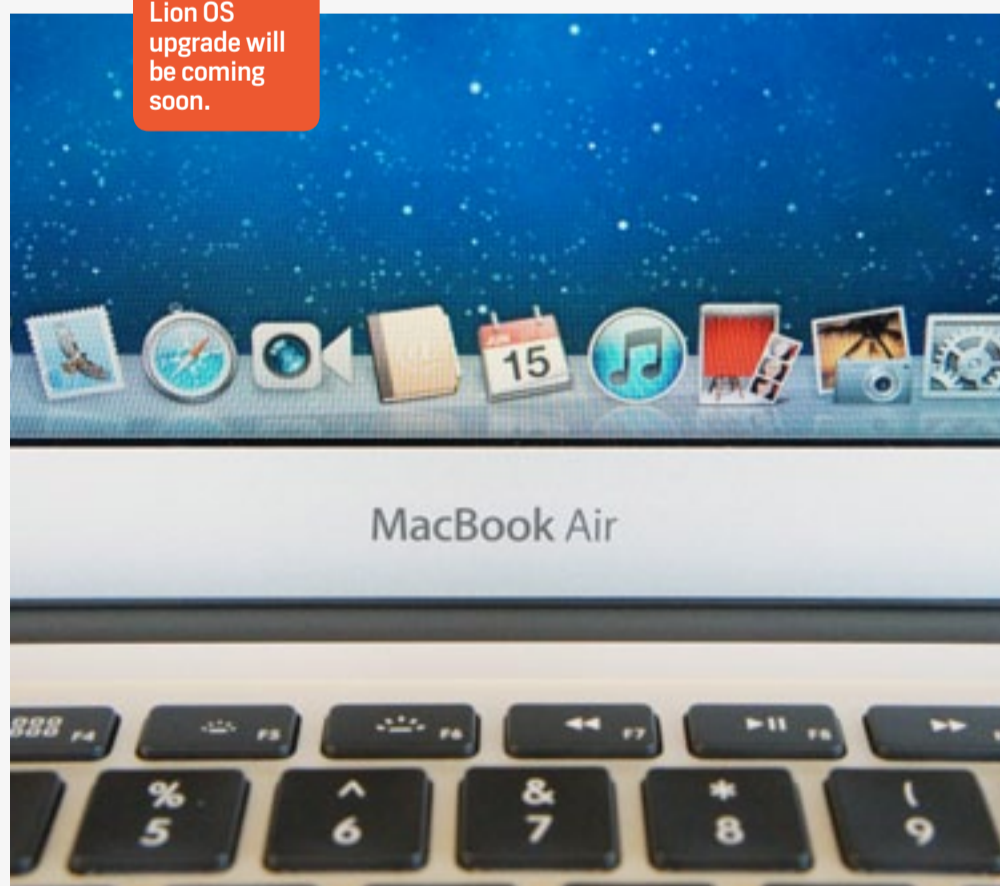
(\$150), 8GB of RAM (\$100) or a 512GB hard drive (\$800), but these upgrade options are only available if you start with the pricier \$1,099 model.

It's a similar deal with the 13-inch version. The entry-level \$1,199 configuration features a 1.8GHz Core i5 processor, 4GB of memory and a 128GB SSD. The \$1,499 model is the same, except with 256GB of storage capacity. As with the 11-incher, you'll need to select that top-tier model if you want to upgrade to 8GB of RAM, a 512GB SSD or that 2GHz Core i7 processor.

THE COMPETITION

What's your budget? And how much time are you willing to spend wading through the options? If you're the sort of platform-agnostic type just looking to get the best bang for your buck, you have a sprawling,

The Mountain Lion OS upgrade will be coming soon.



almost unwieldy selection before you. Even if you ruled out all those 11-, 14- and 15-inch Ultrabooks, you'd find yourself faced with dozens of 13-inch contenders, many of them priced in the same ballpark.

For the sake of keeping things simple, we'll stick to the models that seem truly promising. Of all the companies challenging Apple's lead, ASUS has been presenting the most compelling reasons to buy a PC instead. Though the outfit's first Ultrabooks performed well and showcased some striking industrial design, they suffered from flat keyboards and flaky touchpads. Now, though, the new Zenbook Primes appear to correct both these shortcomings, all while ushering in 1080p IPS displays and improved performance. We've yet to test one of the 13-inch models, and we *still* don't know how much these will cost, but it would seem, tentatively, that ASUS' second round of Ultrabooks are about to hand Apple some persuasive competition.

People eyeing the Air for its speed, thinness and beauty should also give the Samsung Series 9 a long, hard look before pulling the trigger. In terms of build quality, it's on par with the Air, and there's an argument to be made that its matte, 400-nit, 1600 x 900 display is actually better than the reflective 1440 x 900 Apple is offering. Here, too, the performance is brisk and the battery life is long, though we confess we've only tested the 15-inch ver-

sion so far. Speaking of which, for those of you who were disappointed when Tim Cook failed to announce a 15-inch Air, the bigger-screened Series 9, just 0.58 inches thick, is still, in some ways, the closet thing you've got. And it just happens to be one of our very favorite laptops of the moment.

The Air falls short of its competitors in a couple categories, but as an all-around performer it triumphs.

We could go on and on about 13-inch Ultrabooks, but as we continue further down the list, we'll start mentioning more trade-offs, from cheap build quality (Acer Aspire S3) to crowded keyboards (Toshiba Portege Z935). We actually have a sweet spot for the Lenovo IdeaPad U300s, despite the fact that it's one of the only machines in its price range missing an SD slot, higher-res display and backlit keyboard. It's just so gorgeous, well-made and comfortable to use that we're willing to forgive these shortcomings somewhat.

In any case, the problem with the U300s and many of these other Ultrabooks we've reviewed is that they haven't been upgraded to Ivy Bridge yet. All these other potential drawbacks



aside, we're reluctant to sell you on a kind-of expensive laptop with dated internals.

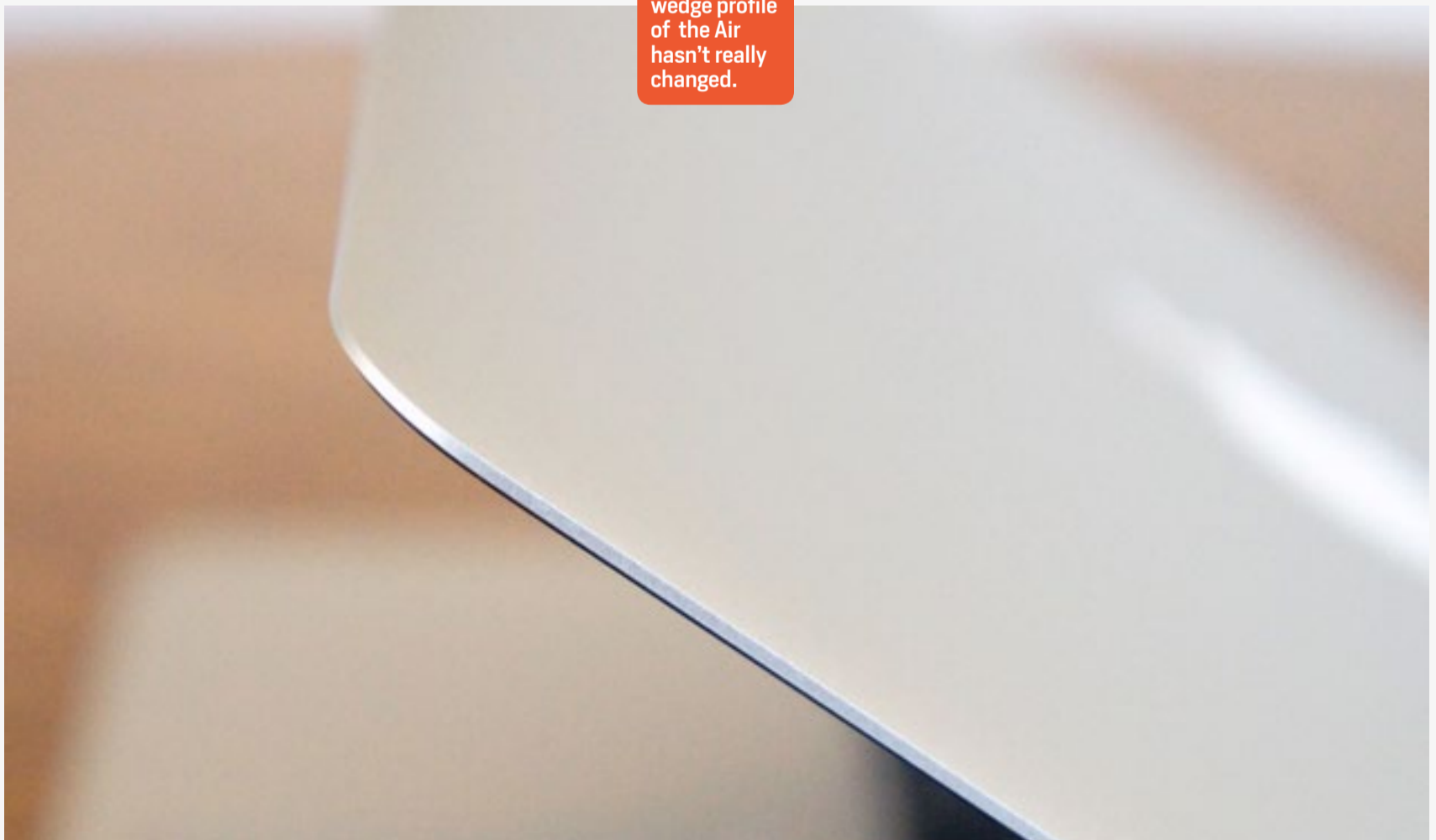
And what of the Ultrabooks we *haven't* tested yet? The ones that were on display at Computex earlier this month? Well, this might be as good as time as any to give some serious thought to Windows — specifically, whether you want to stick around for Win8, and whether you'd prefer using the new OS on a touchscreen. With few exceptions, the most compelling Ultrabooks on offer there were built with touchscreens to help make the most of Microsoft's upcoming, touch-friendly OS. Sure, you might be loathe to track fingerprints all over your 1080p display, or maybe you agree with Mr. Cook that tablets and notebooks are

best kept separate. But if you're already jazzed about Windows 8, you should at least consider waiting for those touch models. The operating system was built for fingers, after all, and if that's appealing to you, the Air, Series 9 and non-touch Zenbook Primes might *all* be the wrong choice for you.

WRAP-UP

At first blush, the MacBook Air doesn't appear to have changed much between 2011 and 2012: it looks exactly the same, save for those USB 3.0 ports and new MagSafe2 connector, and even the 50Wh battery remains unchanged. As for those faster Ivy Bridge processors, well, every PC maker is refreshing their Ultrabooks with Intel's new chips, if they haven't already. We can see

The slim wedge profile of the Air hasn't really changed.



where you might expect similar performance across the board, especially with other specs being more or less equal.

But you'd be wrong: those tweaks Apple made on the inside amount to some significant performance enhancements, and place the Air at the head of the (very crowded) pack. The battery life is about an hour longer than it was last year, making this the most longevous 13-inch lightweight on the market. By several metrics, too, it steamrolls the competition in terms of speed, even when pitted against another Ivy Bridge machine. Just as important, the Air continues to have the best keyboard-and-trackpad combination of any ultraportable — something Ultrabook makers are *still* struggling to get right.

All that said, the competition is stiffer this time around: Samsung's Series 9 laptops remain some of our fa-

vorites, even if they are pricier. What's more, the Air actually falls short of its competitors in a couple categories — namely, display quality (winner: the Zenbook Primes) and port selection (winner: the HP Envy Spectre 14). All told, too, there will be some users who decide against *all* these machines in favor of touchscreen Ultrabooks — something you won't find Apple making any time soon. Even so, as an all-around performer, the Air triumphs. It ticks off the most boxes, and in particular, succeeds in the areas that matter most to shoppers: speed, longevity and comfortable design. Until PC makers can get all these things right *and* match Apple on price, the Air remains the ultraportable to beat. **D**

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

BOTTOMLINE

**MACBOOK AIR
(13-INCH, MID
2012)****\$1,199+****PROS**

- Still thinner and lighter than many competitors
- Improved battery life
- Blistering speed
- Comfortable keyboard and trackpad

CONS

- Aluminum casing is still scratch-prone
- Competitors offer higher-res displays

BOTTOMLINE

The Air remains our favorite ultraportable, thanks to improved battery life, exceptional speed and a comfortable design.



APPLE MACBOOK PRO WITH RETINA DISPLAY



The **MacBook Pro with Retina display** bridges the gap between two product lines, but is it worth the premium price?
By Tim Stevens

Product categories come and go, grow and wither, revolutionize the world and then slowly fade into a state of cold, quiet, everlasting obsolescence. It happens all the time, sometimes over the course of just a year or two (see: net-books) and, while companies have made billions by establishing truly new categories, rarely has anybody rocked the world by splitting the difference between two very closely aligned ones.

That's exactly what Apple is trying to do here. The company's MacBook Pro line is one of the



most respected in the industry for those who need an ostensibly professional laptop. Meanwhile, the MacBook Air is among the best (if not conclusively *the* best) thin-and-light laptops on the market. Now, a new player enters the fray: the MacBook Pro with Retina display. It cleanly slides in between these two top-shelf products, while trying to be simultaneously serious and fast, yet slim and light. Is this, then, a laptop that's all things to all people, the "best Mac ever" as it was called repeatedly in the keynote? Or, is it more of a compromised, misguided attempt at demanding too much from one product? Let's find out.

HARDWARE

When physically placed between the 13-inch MacBook Air and the 15-inch Pro, it's clear that this new guy (who, for now, is simply called "MacBook Pro with Retina display") leans far toward the latter when it comes to design. With both closed, at a quick glance you would almost not notice there's anything different between this new Pro and the also-new-but-yet-old one. Still, it doesn't take long to spot the thinness — or the lack of the slot-loading optical drive on the right.

That thickness measures in at 0.71 inches (1.8cm) while the width is 14.13 inches (35.89cm) and the depth is

9.73 inches (24.71cm). Those figures compare quite favorably to the old 15-incher (at 0.95 inches thick) and it's very nearly as thin as the Air, which is 0.68 inches at its thickest. Weight? A healthy 4.46 pounds (2.02kg). That's just over a pound less than the full-sized MacBook Pro and about 1.5 pounds more than the 13-inch Air.

The new Pro feels considerably heavier than the Air and not that much lighter than the old Pro.

That may sound like an even split between the two sister models, but in reality the new Pro feels considerably heavier than the Air and not that much lighter than the old Pro.

No more slot-loading optical drive on the new Pro.



Where the last design will grab and hold the end of whatever USB cable you pointed its way, the new MagSafe wants nothing to do with them.

That said, much of this depends on where you're coming from. If you're an Air user, carrying this around is going to feel burdensome. However, if your regular daily driver is a current 15-inch Pro (or, heaven forbid, a 17-incher), the new Pro could feel like a refreshing reduction in curb weight. And, with even more resolution and performance than the outgoing 17 inch model, we think this new model makes for a more than compelling alternative.

In exchange for your pack getting a little lighter, you're not being asked to give up all that much. Yes, the optical drive is the most obvious omission, the only physical media you'll be supporting here is the SD slot located conveniently on the right. The lack of

ROM support helps this new model be as thin as it is — and provides room for the extra batteries needed to keep that Retina display brightly and brilliantly backlit.

Also gone is the Ethernet port, replaced by a Thunderbolt adapter that is not included with the laptop. (It'll cost you \$29.99.) Likewise, the FireWire 800 port has been removed, replaced by a separate Thunderbolt adapter. Leaving all those things behind will be difficult, but stay strong, road warrior, because the new Pro is there to help, supporting your love of modern standards with two USB 3.0 ports *and* two Thunderbolt ports. (Interestingly, Apple chose not to make the USB ports blue, as they're both 3.0 and,

therefore, there was no need to differentiate.) Inside is an 802.11n radio providing some of the fastest wireless connectivity available, but there's no option for 3G/LTE broadband. Those who want to roam past the confines of a hotspot will have to bring their own modems.

There's the now-standard single headphone jack on the left side and the soon-to-be-standard MagSafe 2 connector.



A new MagSafe2 adapter and USB 3.0 ports.



This new connector is a few millimeters shorter than the old one and a few millimeters wider. Apple says this is needed because of the laptop's thinner profile and, indeed, the new Airs also make the change to MagSafe 2. But, since the *old* Airs got by just fine with the slightly chubbier connector, and since there's still plenty of room for the relatively massive USB ports, we're just not seeing the need for a redesign right now.

Whatever the reason, all those scratched-up, white, plastic power bricks you've accumulated over the years won't work here — at least, not without a \$10 adapter. That's a bummer, but there is some good news: the new MagSafe is no longer the same size as a USB port. Where the last design would grab and hold the end of whatever USB cable you pointed its way, the new MagSafe wants nothing to do with them. That, at least, is some true progress.

Settled between all these ports and interconnects is the keyboard, which hasn't really changed from the current Pro. That's a good thing. Apple has shown itself extremely proficient in crafting fine, island-style keyboards on its portable machines, and neither that layout nor feel has changed with the new Pro. Well-weighted and nicely spaced keys make for a great typing experience — even in the dark, thanks to the backlighting.

On either side of the keyboard are the speakers, said to be louder and more effective than those in the previ-

ous Pro. We didn't notice a huge change here, but they're certainly more than capable of turning your hotel room into an impromptu dance party — albeit one without too much bass. Beneath it all lies the glass trackpad, which feels just like it always has: really good. MacBooks have the best touch experience in the business, hands down, and this latest one is no different.

DISPLAY

Sure, it's a quarter thinner and lighter than before, but the real story with this new laptop has nothing to do with external dimensions and everything to do with internal density. Pixel density, to be specific, a figure measured at 220 ppi. That's far lower than the 326 ppi the iPhone 4S delivered when it introduced the world to Retina and, indeed, the 264 ppi rating on the new iPad.

**The new display
is gorgeous.
Absolutely gorgeous.**

But, held at the appropriate distance, this new panel is said to meet the mystical requirement to be labeled "Retina" and, while that threshold for pixel-invisibility seems to be slinking lower, we're not here to be cynics. We just know one thing: the new display is gorgeous. Absolutely gorgeous. Text is incredibly sharp and clear, 1080p video is amazing and



images, of course, look great — when they're of a high enough resolution to do this 2880 x 1800 panel justice.

Curiously, you can't actually select that resolution in the OS any longer. Where on other Macs you can explicitly select what display resolution you'd like to use (optionally going lower than the native resolution of the panel), here we have a slider with five positions ranging from "larger text" to "more space." In the middle sits "best" which presents apps, icons and text in roughly the same size as you'd find them on a non-Retina display — rendered in a higher resolution. It's perhaps more friendly for novice users, but remember: this is a laptop with the word "Pro" in the name.

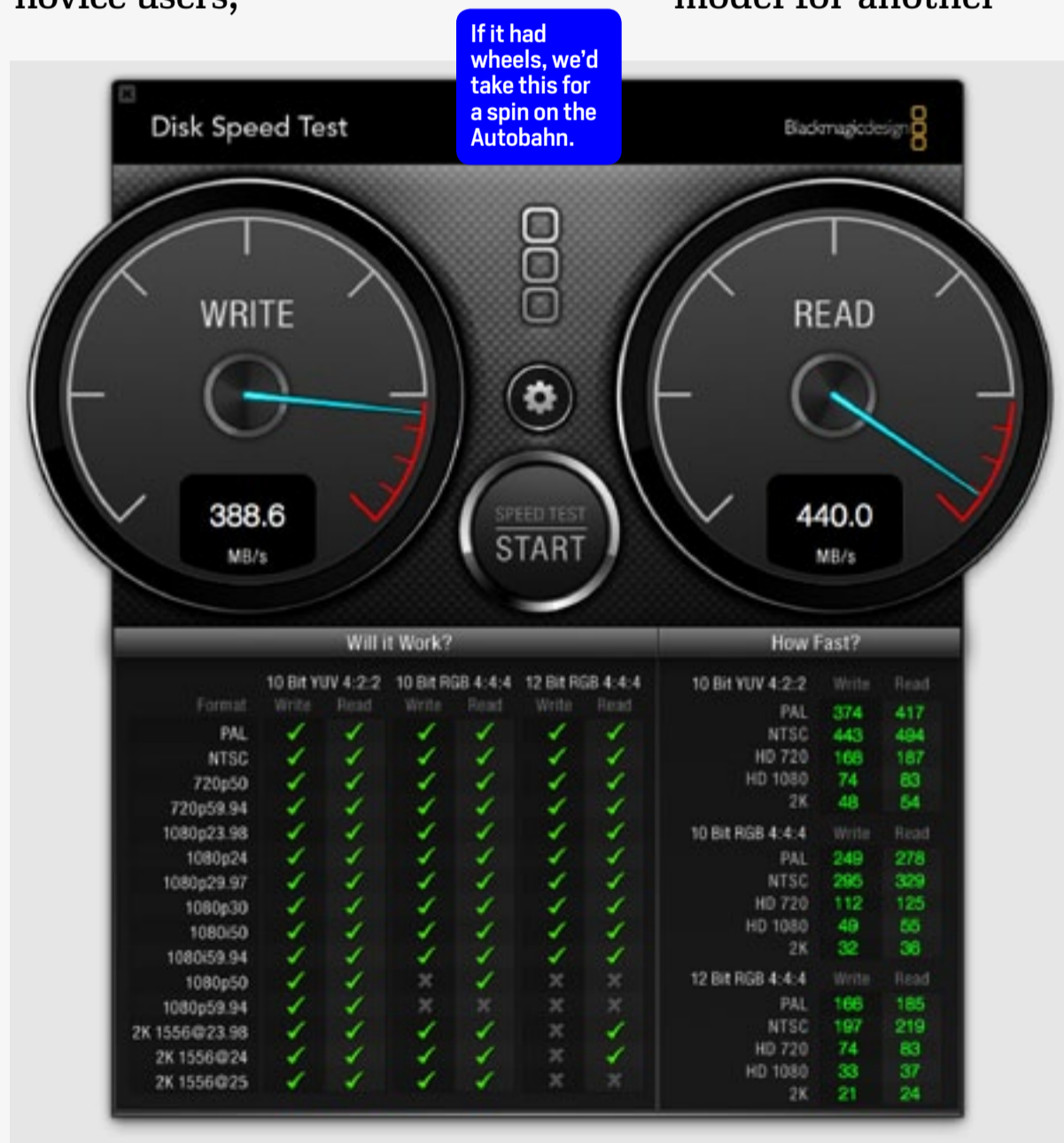
Let's not ignore the fact that this new display has much more to offer than just additional pixels. Viewing angles are expanded compared to Apple's other high-end displays, so the annoying drop in contrast that happens from odd vantage points is all but abolished. Contrast, too, is boosted and, interestingly, glare reduced. Yes, this is still a glossy display and no, there still isn't an option for

matte glass. But, Apple promises a reduction in glare here from previous Pros.

Indeed, this laptop does have less glare than the thicker Pros, but it's no better than the current Air, which already takes advantage of the new, reflection-reducing construction. You might, then, want to turn off that lamp behind you.

PERFORMANCE AND BATTERY LIFE

We tested both the base 2.3GHz and higher-spec 2.6GHz quad-core Ivy Bridge CPUs that are on offer (there's an even faster 2.7GHz build-to-order model for another



\$250), and neither disappointed. In fact, you'd have to be a seriously jaded desktop user to want more oomph from your on-the-go machine. The new MacBook Pro handled absolutely everything we could throw at it and did so with aplomb. General productivity tools fly and more... *intensive* things run impressively well.

The SSD delivered write speeds hovering around 390MB/s and read speeds topping out at 440MB/s. That's properly fast.

We ran all the major benchmarks and saw some big, big numbers. For the 2.6GHz model, Geekbench gave us an average of 11,591 — that crushes the 9,647 we scored with the last MacBook Pro, which is itself far from sluggish. The new 2.3GHz model wasn't far behind with a score of 11,082. Xbench was similarly

close: 486 for the higher-spec'd model, and 457 for the lower. Finally, the SSD delivered write speeds hovering around 390MB/s and reads topping out at 440MB/s. That's properly fast.

Paired with those quad-core chips is 8GB of 1,600MHz DDR3 RAM and an NVIDIA GeForce GT 650M Kepler unit with 1GB of GDDR5 memory. Also on tap is integrated Intel HD 4000 graphics, the hotter of the two GPUs toggle on when the situation demands. To create such a scenario, we installed one of the hottest games of the moment, *Diablo III*, and cranked it up to full resolution and full graphical details. We did, however, make one exception: anti-aliasing. When you're running at 2880 x 1800, there's no real need.

We were quite happily surprised to see the frame rate hovering between 25 and 30 fps as we explored a few towns and crawled a few dungeons — perfectly playable at an obscene resolution. Turning it down to something a little more reasonable, 2048 x 1280, netted 40 to 45 fps and running at a relatively mundane 1280 x 800 delivered frame

BENCHMARK	MACBOOK PRO WITH RETINA DISPLAY (MID 2012, 2.6GHZ CORE I7)	MACBOOK PRO WITH RETINA DISPLAY (MID 2012, 2.3GHZ CORE I7)	MACBOOK PRO (EARLY 2011, 2.2GHZ CORE I7)	MACBOOK PRO (EARLY 2010, 2.66GHZ CORE I7)
GEEKBENCH	11591	11082	9647	5395
XBENCH	486	457	340	228
BATTERY LIFE	7:49	9:22	7:27	5:18



rates over 70. This, then, is a quite passable gaming machine.

Still, it only took a few minutes of hacking and slashing to get the bottom of this unit warm, and then noticeably hot. That, of course, caused the redesigned fan system to pop on, which draws in air from a pair of vents on the left and right sides of the bottom of the chassis and blows it out through the hinge. It's been optimized to create a less obnoxious sort of whirring noise. Indeed it's a subtle and unobtrusive white kind of sound, but it's definitely not silent. In fact, the fan doesn't sound particularly different than that on the current MacBook Air, though a few decibels less obtrusive. Still, you'll always know when your system is really cranking.

Despite all that performance, we were still impressed by the battery life. In our standard rundown test, which involves looping a video with WiFi on and the display set at a fixed brightness, we netted an impressive seven hours and 49 minutes on the 2.6GHz model. We're still testing the 2.3GHz model, and plan to update this review with final results once we have them.

SOFTWARE

Right now, the new MacBook Pro is running Lion, but buy yours now, and you'll find a free upgrade to Mountain Lion in your inbox. We already know quite a bit about Mountain Lion, which is, as of this writing, about a month away from

launch. But what we didn't know was the high-resolution support needed for these Retina displays. As of now, that support is sadly far from pervasive.

Right now, seemingly every third-party app on the Mac looks terrible.

The primary Apple apps — Safari, Mail, the address book, etc. — have all been tweaked to make use of all these wonderful pixels. Sadly, little else has. While we got assurances that third-party apps like Adobe Photoshop and AutoCAD are in the process of being refined, right now, seemingly every third-party app on the Mac looks terrible.

Yes, terrible. Unlike a PC, where getting a higher-res display just means tinier buttons to click on, here OS X is actively scaling things up so that they maintain their size. This means that non-optimized apps, which would otherwise be displayed as tiny things, instead are displayed in their normal physical dimensions with blurry, muddy edges. You do have some control over this scaling, with five separate grades to choose from, but none will make these classic apps look truly good. At least, not until their developers release the updates they're no doubt frantically working on at this very moment.

Take Google Chrome, for example. You



might forgive the buttons and UI elements for being ugly, but even the text rendered on webpages is blurry and distorted. It's bad enough that you won't want to use Google's browser until it's updated, which will surely leave some cynics wondering if indeed this isn't a ploy to get folks to spend a little more quality time with Safari. Good thing Safari's about ready for its own update.

CONFIGURATION OPTIONS

The Retina display MBP starts at a lofty \$2,199. For the money, you'll get a 2.3GHz quad-core Core i7 processor, 8GB of RAM, a 256GB solid-state drive, seven-hour battery and dual graphics — Intel's integrated HD 4000 and NVIDIA's Kepler-based GeForce GT650M, paired with 1GB of video memory. Of course, the three-year Apple Care Warranty is sold separately, for \$349.

If money is no object, you can select the highest-tier model for \$2,799. Though this has the same battery, graphics and 8GB of RAM, it steps up to a 2.6GHz quad-core Core i7 processor, and doubles the storage capacity to 512GB. Not impressed? You can upgrade further to a 2.7GHz CPU for \$250 or select 16GB of RAM, to the tune of \$200. You can also max out with a 768GB SSD, provided you're willing to part with an additional \$500. For those keeping track at home, that brings the outside cost to \$4,098, the extended warranty included.

Disappointingly, you can't add the

higher-capacity SSD to the lower-spec CPU. And, since the storage is proprietary, swapping in your own will not be a particularly easy task. If you want more than 256GB of storage, you'll just have to step up to the 2.6GHz model.

THE COMPETITION

You say you're looking for a laptop with a 15-inch screen, top-notch build quality and a pinch-thin frame? Fortunately for those of you who feel paralyzed by choice, that criteria whittles down your options to two notebooks, tops. The only other contender we can think of is the 15-inch Samsung Series 9, which starts at a more palatable \$1,500. At 3.5 pounds and 0.58 inches deep, it's barely thicker

The new Pro has definitely dropped down in size here.



than the 13-inch version, which is saying a lot, since that's one of the thinnest Ultrabooks in its own right.

The 15-inch Series 9 is far skinnier and lighter than the MacBook Pro, then, but it matches the MBP in build quality, thanks to a rock-solid unibody aluminum chassis and some funky aquamarine keyboard backlights. Ultimately, too, both deserve to be handled with kid gloves: whichever machine you choose, you'll find the smooth metal finish is quite vulnerable to scratches and greasy fingerprint smudges.

It's with the display that the MacBook Pro starts to justify its higher starting price. On its own, the Series 9's matte, 400-nit 1600 x 900 panel is still worlds better than what you'll find on most laptops. Certainly, it's a triumph for Ultrabooks, which tend to get saddled with subpar displays, even on higher-end machines. Still, the Series 9's SuperBright Plus screen can't compete with the MBP's tightly woven pixels and wide, wide viewing angles. On the inside, too, the new MacBook Pro offers potentially better specs, with options for twice the RAM and a more spacious 768GB solid-state drive. It's also offered with multiple Core i7 processor options, whereas the Series 9 is only available with Core i5, and with integrated graphics only.

These unflattering comparisons aside, the 15-inch Series 9 is still one of our favorite Windows machines — heck, one of our favorite laptops, even. It remains a sterling

choice for Windows fans, or anyone who's willing to spend \$1,500 on a notebook, but not \$2,200-plus. The two are also well matched when it comes to battery life: the difference in runtime is only about 20 minutes. Even so, if the Retina display MBP is aimed at people who demand the very best, it sweeps at least two key categories: specs and display quality.

If it's discrete graphics you're really after, we also recommend checking out the HP Envy 15, which starts at \$1,350 (not counting promotions) and can be configured with Ivy Bridge Core i5 and i7 CPUs, a 1GB Radeon HD 7750 GPU, up to 16GB of RAM and either an SSD or spinning hard drive (storage options max out at 300GB and 1TB, respectively). Here, too, you'll find a better display than most laptops have to offer, though the IPS-quality Radiance panel has noted color calibration issues, and the 1080p resolution is still no match for the Retina display.

WRAP-UP

Is this the best Mac ever? You can't ignore the Air as an amazing piece of machinery, especially with the new, higher-powered Ivy Bridge processors and faster SSDs tucked inside its wedge profile. But, this new Pro is on another level of performance. With a quad-core processor and up to 16GB of RAM it's a proper beast — a proper beast that you can throw in your messenger bag and carry around all day without spending all night complaining about an aching back.





That said, this is not exactly a small machine, heavy enough that those happy Air users who've been feeling tempted might want to take a swing by their closest Apple Store and lift one themselves. It's expensive, too. If you want a machine with enough storage to keep up with all that processing and gaming power you'll be looking at a price of \$2,800 — and that assumes you can resist all the upgrades.

So, then, is this a laptop that's creating its own new product category? Not exactly. This is a laptop that stands poised to kill an existing one, one that Apple has dominated. The new Pro is good enough to make the old Pro (even the updated version) look and feel obsolete. It pushes and redefines the category, raising the bar higher than even its brethren can jump.

If you can afford the premium and aren't set on a 13-inch model there's no reason to buy any Pro other than this Pro. **D**

Zach Honig and Dana Wollman contributed to this review.

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

BOTTOMLINE

**APPLE
MACBOOK PRO
WITH RETINA
DISPLAY**
\$2,199+**PROS**

- Beautiful Retina display
- Thinner and lighter than previous Pros
- World-class performance
- Improved battery life

CONS

- Expensive
- MagSafe 2 connector requires an adapter

BOTTOMLINE

The MacBook Pro with Retina display is a top-shelf laptop with a world-class display. It isn't cheap, but it's worth it.



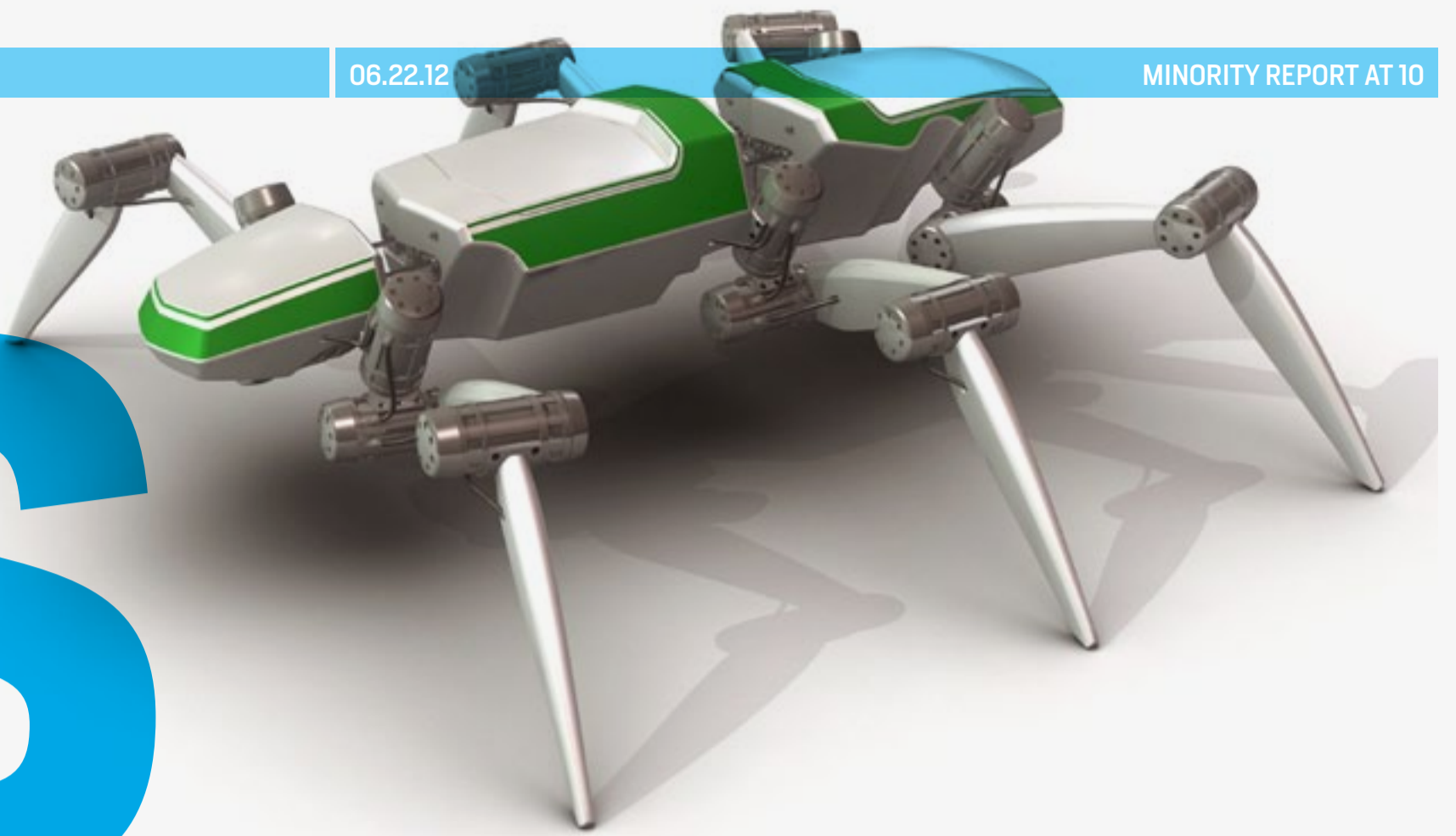
MINORITY REPORT

AT 10:

A LOOK AT TECHNOLOGY FROM TODAY TO 2054

Since its debut, **STEVEN SPIELBERG'S ADAPTATION OF PHILIP K. DICK'S SHORT STORY** has served as a technological crystal ball. With the introduction of Microsoft's Kinect and increasing interest in the connected home, its vision of the future is fast becoming a reality. **By Donald Melanson**





Steven Spielberg's *Minority Report*, based on the Philip K. Dick short story, opened in North American theaters 10 years ago. It was preceded by the director's *A.I.* a year earlier, which was famously a pet project of Stanley Kubrick's for decades prior, and was followed up by Spielberg's version of *War of the Worlds* a couple of years later. Together, they formed an unofficial trilogy

PHOTO: CITEC BIELEFELD UNIVERSITY

HECTOR, a.k.a. hexapod cognitive autonomously operating robot was developed to study animal movement, and could easily be the precursor for nimble robotic forces.

of sorts that represented a turn to darker science fiction for a director noted for his more optimistic excursions into the genre. Of the three, *Minority Report* was the best-received out of the gate, both as a film and as a detailed vision of the near-future unlike any since *Blade Runner*.

That reputation has largely held up in the decade since (while *A.I.*'s has grown quite a bit), during which time it's also become a sort of technological touchstone. For all its bleakness, the future of *Minority Report* was one that we could recognize, and one that we were reaching towards — at least when it came to the technology. Human-computer interaction would be more natural than ever, advertising would be everywhere and more personalized, and smart





The Ford EVOS concept is certainly stepping closer to the future with its all access gull-wing doors, sleek cockpit interior and cloud computing capabilities.

cars would deliver us to our smart homes. Today, it's almost as common for a new technology to be described as *Minority Report*-like as it is to be described as *Star Trek*-like. That was hardly just the result of good luck.

Well before filming got underway, Spielberg gathered together a team of experts from a variety of fields for a three-day think tank. That included people like virtual reality pioneer Jaron Lanier, *Wired* co-founder Kevin Kelly, *Whole Earth Catalog* and WELL founder Stewart Brand, writer Douglas Coupland, and a number of other scientists and researchers. They were tasked not only with making sure the filmmakers got things straight, but with dreaming up and thinking through much of the technology that fills the film's universe.

The stand-out piece of technology from the movie is undoubtedly the gesture interface that's used to interact with the "Precrime" system central to the film (more on that later). In an interview with *Salon* shortly after the film's release, another one of those aforementioned advisers, John Underkoffler, said that Spielberg had one direction for this particular bit of tech. He wanted someone





A breakthrough in interactive technology and entertainment, the Kinect for Xbox comes quite close to the hands-free navigation seen in *Minority Report*.

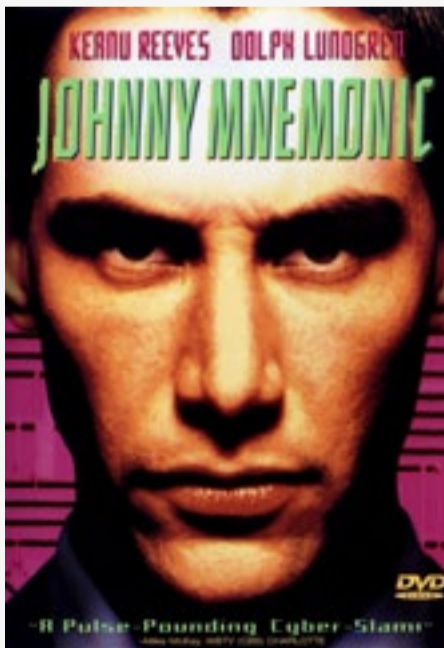
using the interface to look like a person conducting an orchestra (a notion that would be echoed by the film's score when we see the technology being used). Underkoffler took that notion and ran with it, drawing on work done by himself and others at MIT for further inspiration.

He's also been working to bring the technology closer to reality in the years since the film's release with his company, Oblong Industries, but he's hardly alone in developing human-computer interfaces that have drawn comparisons to the movie. The biggest of those, by far, is Microsoft's Kinect. Released less than two years ago, it may not have quite redefined video games, but it has arguably been one of the biggest boons to human-computer interaction research in decades.

Much like the often-relevant William Gibson line, the street found its own use for it, with hackers and DIYers taking the technology far beyond the applications Microsoft had in mind — a spirit that the company itself would ultimately embrace. It didn't come with the transparent display of the film version, but it did certainly make people much more of a “conductor” than a “user,” and we're still really just beginning to see what's possible with gesture interfaces. Only a few months ago, Leap Motion brought the *Minority Report* references to the fore once again with its new system that promises to one-up Kinect, and do so for just \$70.

To be sure, *Minority Report* wasn't the first movie to portray gesture interfaces as the future of human-computer interaction, but most prior examples were deeply entrenched in the traditional mindset of virtual reality and cyberspace common in the 1990s — think Keanu Reeves in *Johnny Mne-*

This '90s film depicts the mind-machine interface as users jack into the matrix, using gesture control to navigate through cyberspace.



monic. The interface of *Minority Report* was, in many ways, just as futuristic, but also more accessible — something that we could see as an extension of existing technology rather than a shift to something completely different.

But that's just the technology that has earned the most headlines in recent years. Central to the film (and Philip K. Dick's original story) is the idea of Precrime — the ability to foresee a crime and prevent it from happening. In the movie, that's possible thanks to three Precogs: people who are simply gifted with the ability to see the future and linked to an elaborate Precrime system. While that may be the most fantastical element of the film, the notion of predicting crimes before they happen isn't completely divorced from reality. As revealed last year, the US Department of Homeland Security is working on a system called FAST (Future Attribute Screening Technology) that relies on an array of sensors and advanced algorithms to detect physiological and behavioral cues that are said to indicate malintent.

Indeed, such a system wouldn't be out of place in the world of *Minority Report*, where iris scanners are everywhere and used not just for security, but to identify individuals in public places and deliver advertisements or messages tailored specifically for them. Privacy is ap-

Systems like Control 4's Smart Home have served as early examples of the connected homes featured in *Minority Report*.





Above: The Audi Urban Concept electric car. Below: The GM En-V self-drive concept vehicles.



parently very much a thing of the past by the year 2054, which is yet another possibility that's less remote today than it was even 10 years ago.

Many of the film's other technologies are also clearly evolutions of existing technologies. Newspapers have been replaced by foldable, paper-thin displays and small robots that mimic insects and other animals (spiders, in the case of the movie) are used by law enforcement agencies to explore hard-to-reach spaces and track down suspects. Smart homes are able to greet their occupants and adjust the interior accordingly, and, of course, cars are able to drive themselves. That last bit goes quite a bit further than today's experiments with self-driving cars, though.

One of the advisers for the film's transportation elements was automotive designer Harald Belker, who's built quite a career creating vehicles for movies (as well as real life). In *Minority Report*, the driverless cars are linked to a Maglev system, which Belker described as "individual transportation within a mass transport system." That allows the cars to travel not just on traditional roads and highways, but also vertically — even delivering a person directly to the outside of their apartment.

Such a system does have some obvious limitations when it comes to reaching areas not served by the Maglev, but the filmmakers thought of that too, and developed so-





Although not as sleek and maneuverable as its Hollywood counterpart, the Martin Jetpack finally lets us take to the skies.

called off-grid cars exemplified by a red Lexus sports coupe in the movie. While not dwelled on much in the film itself, it was explained by Toyota / Lexus at the time to be an all-electric vehicle replete with plenty of bells and whistles. Features included a heads-up display with night vision, a DNA-based entry and ignition system, body panels that changed color on the driver's command and an "auto valet" feature that let the car drop off its owner then park itself for recharging. If anything, it may be one of the more conservative predictions made for 2054.

The movie does prominently feature one nod to more traditional sci-fi, though: jet packs. While they haven't replaced cars as the way most people get around, they are apparently the transportation mode of choice for Precrime agents, along with a large flying vehicle that's decidedly more tank-like than the spinners of *Blade Runner*. These, too, are at least grounded somewhat in reality, and may well finally exist in 40 or 50 years, but they almost manage to seem a bit old-fashioned compared to most of movie's newer ideas.

Of course, it remains to be seen how well the rest of film's technology will hold up when we actually roll around to 2054, but great science fiction movies don't always have the best track record in pinpointing dates for their prognostications. The space travel and artificial intelligence of 2001 didn't exactly measure up to Stanley Kubrick's and Arthur C. Clarke's vision, and it doesn't look like we're going to have life-like replicants to contend with when we reach 2019 in just a few short years. But, like the best science fiction, *Minority Report* didn't shy away from tackling big ideas, and it had as much to say about our present condition as it did about the future. **D**

Don Melanson is a Senior Associate Editor at Engadget, a denizen of Canada's east coast, and generally curious.



ESOC

VISUALIZED

DISTRO
06.22.12

ENERGY FIELD

PHOTO CREDIT: PHILIPP RAHLENBECK

It's not *A Bug's Life*, but it's a pretty close approximation. German firms Tamschick Media+Space and Atelier Brückner teamed up to create Energy Field, the "world's biggest walkable 3D matrix display" for the 2012 World Expo in Yeosu, South Korea. These 59-foot-tall fibre blades are chock full of programmable LEDs for maximum sensory effect.



REENING



He led production on the world's first commercial light field camera, now **LYTRO'S FOUNDER** is professing his love for the lightsaber.



**Most
Coveted
Device**

What gadget do you depend on most?
iPhone.

Which do you look back upon most fondly?
Petzl headlamp — saved me after dark on many a rock climb.

Which company does the most to push the industry?
Apple.



What is your operating system of choice?

Mac.

What are your favorite gadget names?

Chumby. Lytro!

What are your least favorite?

Ones with letters and numbers, like XTR66-4...

Which app do you depend on most?

Yelp.

What traits do you most deplore in a smartphone?

Notification buzzers while sleeping.

Which do you most admire?

Probably shiny glass.

What device do you covet most?

Lightsaber!

What is your earliest gadget memory?

Family film camera.

What technological advancement do you most admire?

Clean power.

Which do you most despise?

Uh, WMD?

What fault are you most tolerant of in a gadget?

Audio.



Which are you most intolerant of?

Visuals.

When has your smartphone been of the most help?

Talking in the car.

What is your idea of the perfect device?

Lightsaber!

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

Wireless power.

What does being connected mean to you?

Being too connected!

When are you least likely to reply to an email?

Vacation.

When did you last disconnect?

Last vacation to Italy! 



IN REAL LIFE is an ongoing feature where we talk about the gadgets, apps and toys we're using in real life.

FX PHOTO STUDIO



Nikon
35mm
f/1.8G

I'M ALL ABOUT photo tweaking. But honestly, I'm not super into using filters for the heck of using a filter. Instagram's built-in options – while appreciated for \$0.00 – aren't exactly something that a haughty-taughty photog would adore. And over on the desktop side, Adobe's Lightroom is probably far too rich for the blood of those just messing around. FX Photo Studio (and FX Photo Studio Pro for OS X) hits somewhere in between on both fronts.

I've spent a few weeks using both the Pro version on the desktop and the paid version on the iPhone. Put simply, the app

provides 170-plus filters, a few frames and some very basic editing tools (crop, rotate, brighten, adjust, etc.). For just a few bucks on iPhone and iPad, it's actually not a half-bad deal. The Pro version, however, is entirely overpriced at \$40.

The biggest pitfall is the quality of the filters. I'd estimate that two-thirds of these are of the "so cheesy you'll never use this" variety, while the others are still too potent for my blood. In other words, there's really no "touching up" photos with these filters; when you apply one, you *know it*. It's also no good for doing anything other than

toying around; even amateurs won't want to rely on this for any serious editing. Sadly, you can't import your own textures and backgrounds to mix with the company's own cadre. There's promise here, but I still prefer Snapseed when push comes to shove.

– Darren Murph



Canon
PowerShot
D20



IN REAL LIFE is an ongoing feature where we talk about the gadgets, apps and toys we're using in real life.

NIKON 35MM F/1.8G

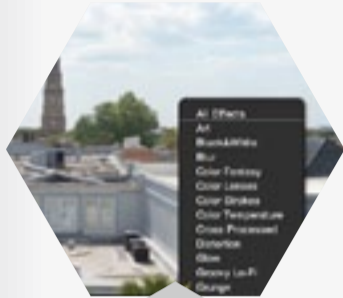
BACK IN MY NEWSPAPER free-lancer days, I once agreed to shoot some high school wrestling matches and basketball games. It was one of those last-minute, short-notice deals and I felt unprepared to capture fast-moving action in a dimly lit high school gym – my trusty, fast telephoto zoom was out for repairs at the time. I looked over the rest of my gear and puzzled over what to use instead. In the end, I decided to bring along a cheap 50mm prime lens (i.e., non-zoom) that only worked in manual focus mode. I felt a bit unsteady at first, in the knife-to-a-gunfight sort of way, but I soon realized just how much fun it was. I had fewer things to worry about and I came away proud of the shots I managed.

That assignment helped me

rediscover shooting with prime lenses, and it led me to purchase one of my most-used pieces of kit: Nikon's 35mm f/1.8G. It's the lens I keep on my D90 for those unpredictable, fleeting moments when my dog is doing something utterly adorable. My longer lens is just too ungainly to lug around the house for a quick snapshot, and my wider zooms can't match the prime lens' large aperture. Despite being one of the least expensive lenses I've owned, it can do things my \$2,000 telephoto zoom lens can't (letting in more than twice as much light, for example).

I'm honestly not exaggerating when I say the 35mm f/1.8G would be my choice if I could only have one lens. Naturally, I'd love if it had an even wider maximum aperture, a faster autofocus motor or a sturdier build. Such a lens does exist – at nearly 10 times the cost. No thanks. When I'm asked to shoot in places where ambient light is poor and using my flash isn't an option, I no longer worry. I don't get that knife-to-a-gunfight fear anymore – not when my knife is this good.

–Philip Palermo



FX Photo
Studio



Canon
PowerShot
D20



IN REAL LIFE is an ongoing feature where we talk about the gadgets, apps and toys we're using in real life.

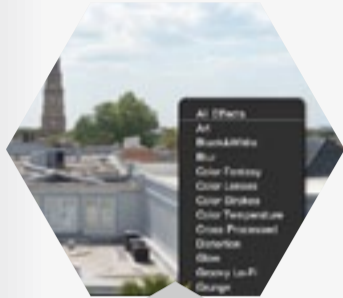
CANON POWERSHOT D20

ASIDE FROM MUST-HAVES like a passport, swimsuit and boarding pass, what else would I need to throw in my bag for a trip to the Caribbean? A camera, obviously. In an adventure involving swimming pools, salty waters, sand, parasailing, beach footy and kayaking, however, I needed something other than my T3i or Sony NEX-3 to handle the load. With that in mind, I brought Canon's ruggedized PowerShot D20 on a recent journey to Jamaica.

Without a doubt, one of the best traits the D20 has to offer is its robust battery, which lasted the entire six-day trip without the need for a single charge. The long-lasting prowess of that 1,000mAh battery were surprising, to say the least, especially when I was using it for two to three hours of photos and video per day, on average. Speaking of which, the

image quality coming out of that 12.1-megapixel HS CMOS sensor isn't anything to write home about, and the same applies to the 1080p videos; both tend to look over-processed and unlike anything you'd expect from a high-end \$349 point-and-shoot.

Still, you could argue the D20's durability and underwater shooting modes make up for the lack of outstanding pictures. Canon's all-terrain shooter managed to survive a snorkeling trip and a 7-foot drop (a bit higher than the claimed threshold). Apart from my minor quibbles about the image quality, the D20 is everything I expected. In other words, you can count on the D20 as being part of my gadget entourage during my next ventures, even if it lies dormant in the meantime. – *Edgar Alvarez*



FX Photo
Studio



Nikon
35mm
f/1.8G



Surface



A breakdown of Microsoft's foray into the tablet market.

Can Microsoft Make a Mark on the Tablet Market?

EDITORIAL

DISTRO
06.22.12

ESC

Microsoft has unveiled its new Surface, a reborn brand that now lives as two products. It was a showy event with a strong conclusion: at the unification of software and hardware lies great things. Microsoft has found that greatness with the Xbox 360. Can it do so again with a new series of tablets? Here's what we think.

TIM STEVENS

Let's take a moment to realize what just happened here. Microsoft just pulled off a showy, big-time event in which they unveiled not one but *two* pieces of hardware (plus a suite of accessories) that we'd speculated about but not actually seen in the flesh. That's a hell of

an achievement, and even more impressive, that hardware looks good. Really good. But, things aren't perfect. Recycling the name "Surface" is a bummer, having two very similar pieces of hardware running two different (yet similar) operating systems is going to be confusing — and then there's the pricing.





A keyboard is built into the inside of the tablet's cover.

The hardware looks great, the keyboard covers are a brilliant idea and I can't wait to try one out for myself.

Microsoft needed to come out and have these priced at parity with the iPad 2 and the new iPad. This needs to be competitive on a monetary front to stand a chance, and right now having a vague notion about something being priced “comparable” to a vague classification of tablets and laptops is not encouraging.

And, finally, having the Pro model ship 90 days after the RT model reeks of kow-towing to Microsoft's partners to keep from blowing them out of the water with such a (seemingly) polished device.

But ignore all that for now. The hardware looks great, the keyboard covers are a brilliant idea and I can't wait to try one out for myself.

DARREN MURPH

This is the product I wanted. The Surface for Windows 8 Pro, that is. It's a tablet with a full-fledged OS; one capable of entertaining me on the go, yet making me productive when docked. I already asked Apple to make an iPad with OS X, but Microsoft managed to





Steve Ballmer didn't smile much (if at all) while introducing this product range.

beat 'em to the punch with its own OS. Too bad I set my expectations so high.

You see, Microsoft somehow managed to do all of the wrong things in “launching” this product — if you can even call it that. First off, “Surface for Windows 8 Pro.” That’s a horrible name. When I think Microsoft Surface, I think of giant multitouch tables. The name of these slates is just awful for potential buyers. Imagine a curious 20-something walking into a Best Buy and requesting “one of those Microsoft tablets.” “Well, there’s one for Windows RT and one for Windows 8.” At this point, they’ll probably just ask for an iPad and call it a day. Harsh, but

true. (It’s worth noting that “MacBook Pro with Retina display” is equally horrendous from a naming standpoint.)

What else? No battery life estimates. No hard pricing details. No RAM figures. No CPU / GPU clock speeds. No resolution details on the Windows RT model. A maximum of 128GB on the Windows 8 Pro model (sorry, I need more space than that for a full-fledged PC operating system). And if the Win8 Pro edition costs as much as an Ultrabook... I’m just going to buy an Ultrabook.

Finally, there’s passion. Steve Ballmer didn’t smile much (if at all) while introducing this product range. Call me crazy, but shouldn’t he be amped about this thing if it’s truly engineered to change the game? Part of me wonders how many consumers will still be around to care about this when it ships in *six months*. People loved Palm... but they didn’t love ‘em enough to wait. I’ll happily reevaluate things once it’s shipped into the marketplace, but if you wanted some gut reaction, that’s what I’ve on offer.

JON FINGAS

From a pure hardware standpoint, Microsoft looks to have nailed it down: simple but attractive designs, distinc-



tive hardware touches and a few perks (the cover, the stylus) that are made for day-to-day use, not just as one-off gimmicks. There are still many questions left unanswered that could torpedo the whole affair, of course. But Redmond has jumped the first hurdle: it got the tech press, already cranky about flying out to yet another special event, to come out of the venue more interested than irritated. That's no mean feat.

There will be precious little incentive for those near Microsoft Stores to buy a tablet from Acer, ASUS or others.

What I'm most concerned about is the impact to Microsoft's hardware partners. Quite simply, the company just pulled a Zune. Surface tablets won't be competing in *every* area, but there will be precious little incentive for those near Microsoft Stores to buy a tablet from Acer, ASUS or others that may not get the same top-flight treatment as Microsoft's own hardware. There's certainly no guarantee that the Surface designs will repeat the Zune's fate — cannibalizing part-

ners' market share, only to stagnate and fade away — but witnessing the early signs of a repeat isn't exactly confidence-inspiring. I hope Microsoft keeps itself at arm's length more than it did with its MP3 player line, or its strategy could have a vicious effect on the very companies it needs for help.

Not to mention that the final launch needs to be perfect. Pitch perfect. Prices can't be at all higher than those of the iPad for similar features. Battery life can't be significantly lower. There can't be any glaring launch day glitches or examples of half-finished software. It may be trite to say, but it's still very much true that a successful competitor to a product can't just be a little bit better; it has to be dramatically better. We can't say that unambiguously just yet, and that's worrying.

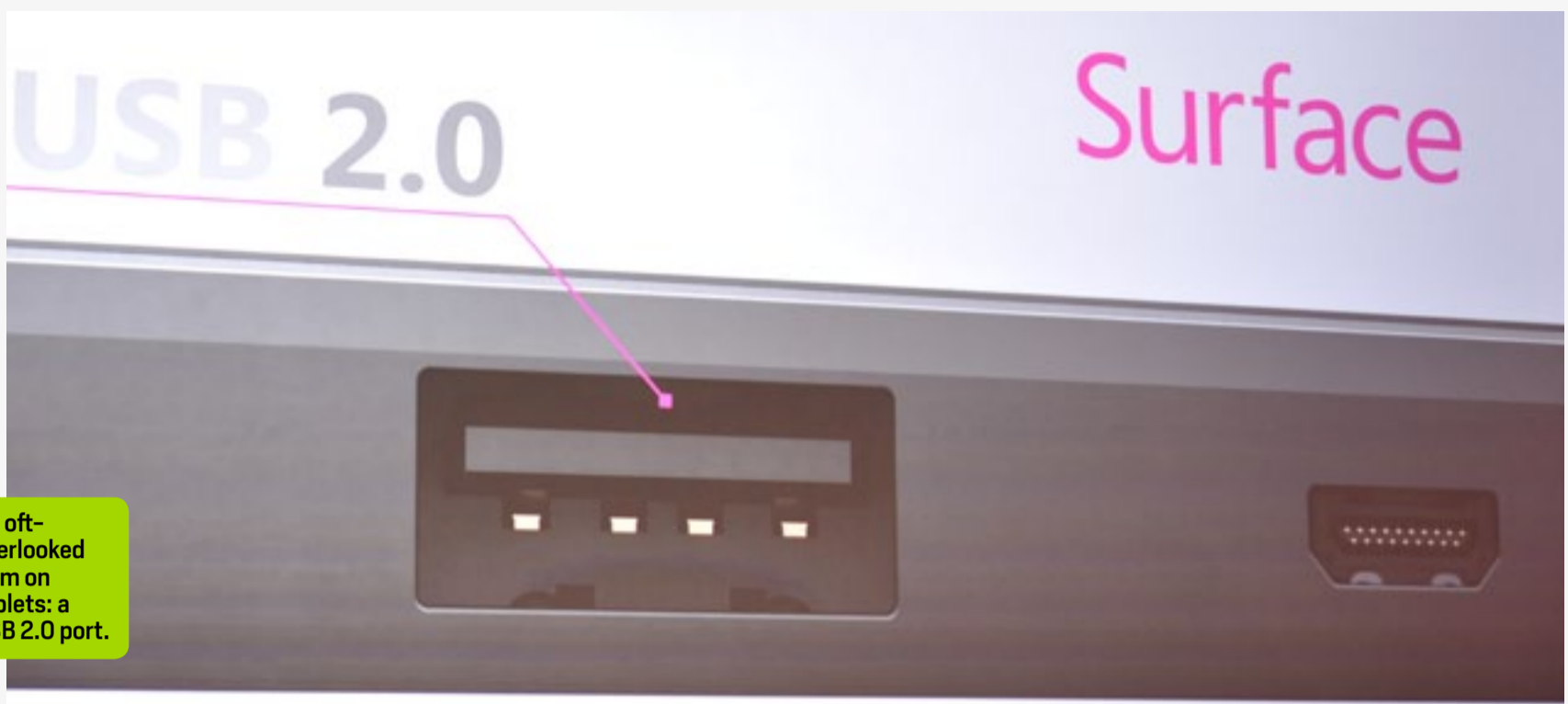
ZACH LUTZ

I see Microsoft's decision to release the Surface tablet lineup as the company's



The Surface tablet cuts a statuesque figure resting on its stand.





most instrumental decision yet in the buildup to Windows 8. There's no denying that it's late to the modern tablet game, and to succeed, the platform will need a serious push to do battle with the iPad. I've no doubt that numerous PC manufacturers will step up to the plate with compelling Windows 8 / RT tablets — and some may ultimately be better devices — but without Microsoft's own product, it'd be far too easy for consumers to get lost in this sea of tablets and then gravitate elsewhere.

These are the products that Microsoft needed to generate genuine interest in the Windows 8 tablet initiative.

Microsoft Surface will give consumers a halo product (and another platform) to evaluate, which is necessary given the intense popularity of the iPad. At the very minimum, these two devices will set a benchmark for consumers to evaluate how Windows 8 tablets should behave, and the level of functionality they can expect. Whether the tablets are ultimately hits with consumers is almost beside the point, because these are the products that Microsoft needed to generate genuine interest in the Windows 8 tablet initiative.

SEAN BUCKLEY

And here it is, the day I've been dreading since I caved in and bought a Transformer Prime. As much as I enjoy ASUS' Android-powered transforming slate, I've never been able to shake the feeling I'd like it even more if it ran Windows 8. I thought the hybrid tablets of Computex would scratch that itch,



but that was before the Surface's Touch and Type Covers. Paired with the slab's own built-in stand, these lightweight keyboards tease us with a full PC experience in a charming, easily detachable form factor. The jury's still out on how these accessories play out in practical use, but the idea has my attention.

And here it is, the day I've been dreading...

So does the tablet hardware itself, of course, but not for the same reasons. As much as I'd love to gush about the potential I see in the Surface's design, I feel like Microsoft is putting consumers on the fence, unbeknownst to them. Really, it's a tech support phone-jockey's worst nightmare: "What do you mean my old programs won't run, it's Windows isn't it?" Savvy Engadget readers may know the differences between Surface for Windows RT and Windows 8 Pro, but the common shopper won't — they'll just see a less expensive slate with longer battery life. Microsoft could get everything right on the hardware end, but Surface won't be worth all the Zunes on eBay if Redmond confuses consumers. Your move, marketing.

PHILIP PALERMO

This could be it. I've been meaning to replace my wife's six-year-old laptop for quite a while now, and Microsoft's Surface could be the one.



Microsoft's second big push of the week focused on mobile. announcement. announcement.



CAN WINDOWS PHONE 8 MAKE MICROSOFT A MOBILE CONTENDER?

FIRST, THE GOOD NEWS: Windows Phone 8 looks really great. I've been a big fan of the various flavors of Windows Phone 7 and, honestly, it was only the lack of a good mobile Gmail app and high-resolution screens that have kept me from switching over. With this new version things look even better. The more customizable Start screen is a great start, the ability for devs to break out of CLR and write native apps has been long-needed and bringing Nokia's offline maps to every device is a very strong selling point for the platform — though at the cost of a strong selling point for the Lumia line. That, plus bet-



Click on headline for more Windows Phone 8 impressions and to check out our group editorial



I've watched three generations of iPads hit the streets and I've held off from grabbing my wallet each time. I think my wife would love the form-factor of a tablet, but she still needs the usability of a laptop from time to time. Meanwhile, I enjoy the portability of my ASUS Transformer Prime and appreciate its optional keyboard dock. I just wish it ran the Windows programs I use every single day.

Questions remain, of course. This was just the first reveal and there are still plenty of details left unannounced — price and availability to name just two. Battery life, heat dissipation and third-party Metro support also remain up in the air. I like what I see and hear about the tablet's rigid frame and responsive display. Having played with the Windows 8 OS on a standard laptop, I'm cautiously optimistic about the software's abilities on a fast, multitouch device.

Still, the last time I invested in a device based purely on its potential for greatness, I bought a Windows Phone... and I'm still waiting for that to truly pan out. Before that, I picked up a Zune HD hopeful of the promise it held and... well, we all know how that ended up.

And that's my dilemma here. On first blush, I'm supremely impressed by the potential of the Surface tablets. Yet, I'm waiting to see which Microsoft is behind these devices — the all-in juggernaut that willed millions of Xbox 360s into homes, or the tentative newcomer that dipped its toes into the water with the Zune.

ter voice recognition and a suite of other tweaks, makes this version far and away the most likely to succeed of any of Microsoft's attempts since Windows Mobile — even if a maximum WXGA resolution still feels short-sighted.

But, it comes at the expense of the entire Windows Phone user base today. There is simply no way to upgrade from any current Windows Phone device to Windows Phone 8. None of the devices sold between today and the release of WP8 (this fall) will be upgraded, and none of the devices sold between now and then will run Windows Phone 8 apps. Any bit of momentum the platform has gained over the past 18 months has just been lost.

That may be the right thing to do for the platform's future, but it's sure going to sting for current users who, it must be said, are left feeling a bit like beta testers. — *Tim Stevens*

DAN COOPER

It shouldn't be a surprise to learn that Microsoft is a frustrating company to follow. It has a fantastic capacity to innovate, produce great hardware and offer a few surprises, but its decision-making is eye-wateringly suspect. We've forgiven Surface it's confusingly reheated name thanks to that rock-solid magnesium body, we like how different Metro's UI is from iOS / Android and we're desperate to try typing on the cover.

Had Steve'n'Steve packed up there and gone home, we'd be twitchy with excitement to see the review unit arrive



at our door. But no, then came the pro model, which comes out months after the regular edition, with an incompatible OS, vague words on pricing (“akin to an ARM tablet” “similar to an ultrabook”), features that don’t span across the range like pen input and Office home.

Had Steve’n’Steve packed up there, we’d be twitchy with excitement. But no.

Imagine the millions of consumers out there as they stand in their local store when Windows 8 launches. They’ve got the choice of an iPad, or Surface... or Surface Pro — but you can’t buy one and switch to the other, because they run different versions of Windows, except they look the same. Oh, and one has Office, but it’s not the expensive one you’re thinking about buying for work. Oh, and the pro version won’t turn up for three months because Microsoft had to keep Dell happy... It’s hardly rocket science to suggest that people will be turned

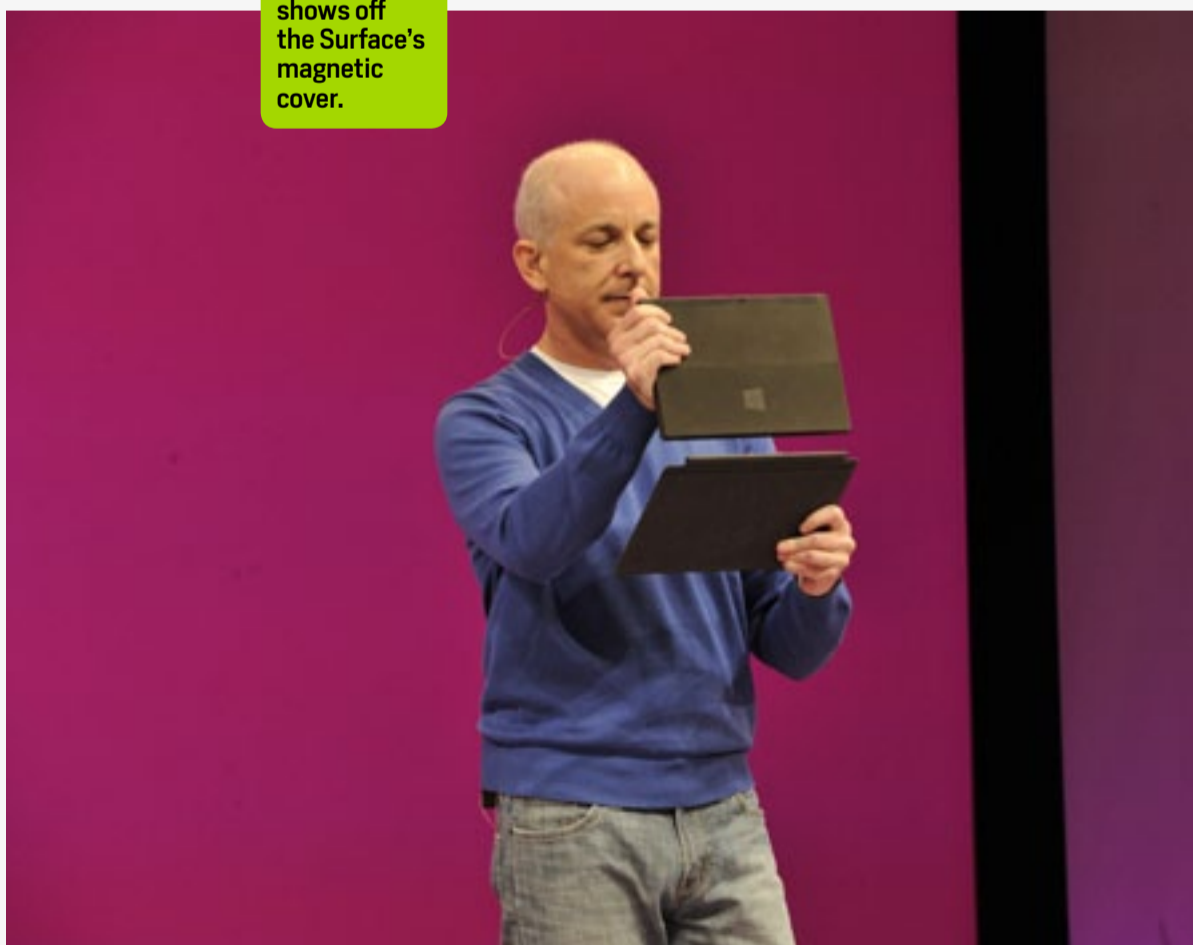
off by such a complex proposition.

Oh, and about Microsoft’s hardware partners. They’re quickly going to find that as Microsoft flexes its hardware muscles, their space in the tent is going to shrink with nowhere else to go. We kinda hope Meg Whitman wakes up this morning and thinks “Oh, *that’s* why Mark Hurd bought Palm.”

JAMES TREW

Well done Microsoft. Seriously, what happened here was important for many reasons. Most notably, it shows that the stuffy old Microsoft is (largely) on the way out. Ballmer and company showed that they can do product releases just like the rest of ‘em. Also, it shows that the firm’s not just tagging the line. Sure, it could have just released another tablet with a “lite” version of its main

Sinofsky shows off the Surface’s magnetic cover.





We see a Surface tablet at the moment of its inception.

platform (or worse, a scaled up Windows Phone), but it didn't. Instead we've got a new take on the tablet-story. Surface for Windows 8 Pro shows that a slate can be both portable, and full-fat. Okay, so it's not the first time we've seen something like this, but for some reason, this time it feels like they mean it.

...It's not the first time we've seen something like this, but for some reason, this time it feels like they mean it.

The only small concern I have is the size. Nudging over the 10-inch mark isn't an absolute no-no, and hey, it's far from the biggest we've seen, but it does set them very much on the business side of the fence. When you add in those keyboard covers, it all starts to look like we're back in notebook territory. That said, those covers are a darn nice addition, and a bit of a slow palm across Apple's Smart Cover face.

There are a few other wrinkles too, of course, like the name... it's no zinger. Also, hedging bets between a Windows RT and a Windows 8 version might prove confusing to some. Over all, though, this seems a confident step, and a good indicator that Microsoft is in no rush to catch



up, and will just do what it thinks is right. Whether public ultimately agrees, or not, is another matter.

BRIAN HEATER

Tablet or notebook? If that's the quandary you've been pondering since Microsoft's slate announcement, you've hit the nail on the head. The answer, of course, isn't quite so simple — and that's kind of the beauty of the new Microsoft Surface tablets. Rather than launching full bore into the overcrowded tablet world, the company is taking a different route — offering up slates that harness the “heart and soul” of Microsoft, as Ballmer put it during the outfit's press conference. That heart and soul, naturally, is Windows, the operating system that made the company such a dominant force in the computing world. It's a move that marks a bit of a change amongst the company's offerings over the past several years, a different take on a space rather than what feels like a me-too product.

Microsoft would do well to go aggressively after the business space.

Interestingly, it also marks something of a return of the company's original vision for the space: a tablet built around a full desktop operating system. Of course, there

are some major differences all these years later. For one thing, Redmond has really baked that functionality into the operating system. The early Microsoft tablets felt like square pegs in round holes, an operating system hastily jammed into a new form factor. Of course, until we actually get extended hands-on time with the product, it's hard to say how much better things are this time out, though judging from what we've seen of Windows 8's embrace of the Metro UI and the time we've spent with the tablet, things are certainly looking a lot brighter.

Its success obviously depends on these factors as well — and price will certainly play a big role in how the device is perceived. Consumers may balk at pricing on-par with ultrabooks — after all, standard tablet pricing has already been set by the competition, and even with the added functionality of a full operating system, it may be a hard sell. Microsoft would do well to go aggressively after the business space. Granted, many companies have already made tablets a part of their workflow, but there's still a lot of ground to grab there — especially when offering access to Windows' already familiar ecosystem. It's a ball the company dropped with the introduction of the new Windows Phone — the time is right to pick it up and run with it.

ZACH HONIG

Hollywood has something to be proud of this year. Well, perhaps — we've only yet seen the previews. What we're still



missing is a hint of price, which leaves me skeptical that Surface will be the next big thing in computing, but we do at least know the fate of the tablet's giant cousin — that *other* 1080p Surface has since become PixelSense.

As my Engadget brethren are well aware, the Galaxy Note is the only *tablet* in my life, and while I'm more than merely curious about the Windows 8 experience, I won't likely be queuing up around the corner to make Microsoft's homegrown darling my own. Still, the hardware is intriguing, and if the price is right, Surface could very well be a hit. I'm even the slightest bit remorseful that I sat through the product launch while awaiting a delayed flight home from a long weekend in Canada, rather than on an overnight trip to LA — thus delaying the chance to go hands-on for weeks, if not until the tablets' launch "around" the time we expect to see the next-gen MS OS this fall.

TERRENCE O'BRIEN

Surface is hardly Microsoft's first stab at the tablet space. Heck, when it first broke out the "Surface" name 2007, Redmond already had more experience with touchscreens than that other company with a quick selling slate. But, despite experiments like Windows for Pen Computing, folks simply weren't getting hooked on tapping, touching or scribbling with a stylus. The same was true of touchscreen XP, Vista and Windows 7 machines. None of them seemed to

be able to get off the ground — but I'd be pretty surprised if Surface suffered the same fate. Sure, we have our complaints about Windows 8 and its clear efforts to discourage true multitasking, but it's definitely a finger-friendly OS. In fact, the Metro interface makes iOS look staid and boring. Now, by stepping into the design process itself, Microsoft has hardware attractive enough to match its software. Surface may not have a "Retina" display and battery life is still a mystery, but it's unbelievably thin, beautiful and clever in its execution. And it doesn't sacrifice personality for functionality as "PCs" are often accused of doing. Am I already counting the days, waiting to drop my hard earned cash on one? No. But I'm certainly intrigued and convinced it'll be a success. In fact, it seems that Microsoft may have finally found its recipe for success in the increasingly mobile and touch-based future. An announcement like Surface is the sort of thing that will keep Apple and Google from getting too complacent. Now, we'll just have to see how Mountain View responds with its Nexus slate before I decide who gets my hard-earned tablet dollar.

SARAH SILBERT

Microsoft seemed to think its clout in the PC world — not to mention the buzz surrounding Windows 8 — was enough to draw tech journalists to an event without providing any hints about the announcement to come, and, unsur-





Presenting
the Surface
tablet to the
expectant
media.

prisingly, it was right. Though exactly how Windows 8 will fit into the already-crowded tablet space remains to be determined, the OS is clearly inspiring OEMs to create hardware that walks the line between PC and slate, and Redmond's new Surface tablets appear to be among the most promising of this bunch. It makes sense that the company behind Windows 8 would be one of the most capable at tailoring a product to that ecosystem, and then Microsoft showed off slates that not only look solid, but work with accessories made to help users leverage the OS

to its full productivity potential.

The thing is, clout can only get you so far. While the Surface tablets have already been met with overwhelmingly positive feedback, they haven't exactly been put through their paces. And while those Touch and Type covers seem great, they're testaments to Redmond's need to outpace Apple. There are worse things than coming late to the party — and it can even lead to better products that learn from others' mistakes — but the pressure is on for Microsoft to deliver products that are truly in a league of their own. **D**



The week that was,
in 140 characters or less.

WINDOWS, WINDOWS, WINDOWS!

@Gartenberg

So consumers love the
Windows Phones that
they're not buying. #wp8

@JoannaStern

Oh, whoops
forgot about
BlackBerry 10.

@alexia

People are excited about a
MSFT event. And I heard,
as it were, the noise of thunder ...

@ryan

OMG Ballmer?
Why do they
keep letting
this guy
launch stuff?

@harrymccracken

Fascinating to read
diverging views on
Surface. I think that
nobody really knows
where Windows 8
is taking Microsoft.
Including Microsoft.

THE STRIP

BY DUSTIN HARBIN



DISTRO
06.22.12

ESC

TIME
MACHINES



WHAT IS THIS? TAP  TO FIND OUT



DISTRO
06.22.12

ESC

TIME
MACHINES

POLAROID LAND CAMERA MODEL 95

MODERN
EQUIVALENT:
Instagram



Digital photography has satiated our need for instant nostalgia, but back in the early '40s, when Polaroid was still in its infancy, waiting for film to develop was just part of the process. That wasn't good enough for one young lady who reportedly asked her father, and inventor, Edwin Land, "Why can't I see the picture now?" The answer to that question was the world's first instant shooter, also known as the Polaroid Land Camera Model 95. It first went sale on in 1948 and would pave the way for Polaroid cameras like the SX-70 — largely considered to have popularized the medium.

PHOTO: PRESS ASSOCIATION VIA AP IMAGES



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