THE NEW HOMEMAKER

CAN MAKERBOT'S $2,000 **REPLICATOR** TRANSFORM THE 3D PRINTER INTO A HOUSEHOLD STAPLE?

MEIZU'S MX SMARTPHONE GOES QUAD-CORE

PHILIPPE STARCK'S HIGH-DESIGN HEADPHONES

TOSHIBA'S U845W TRIES WIDESCREEN ON FOR SIZE

081012 #52

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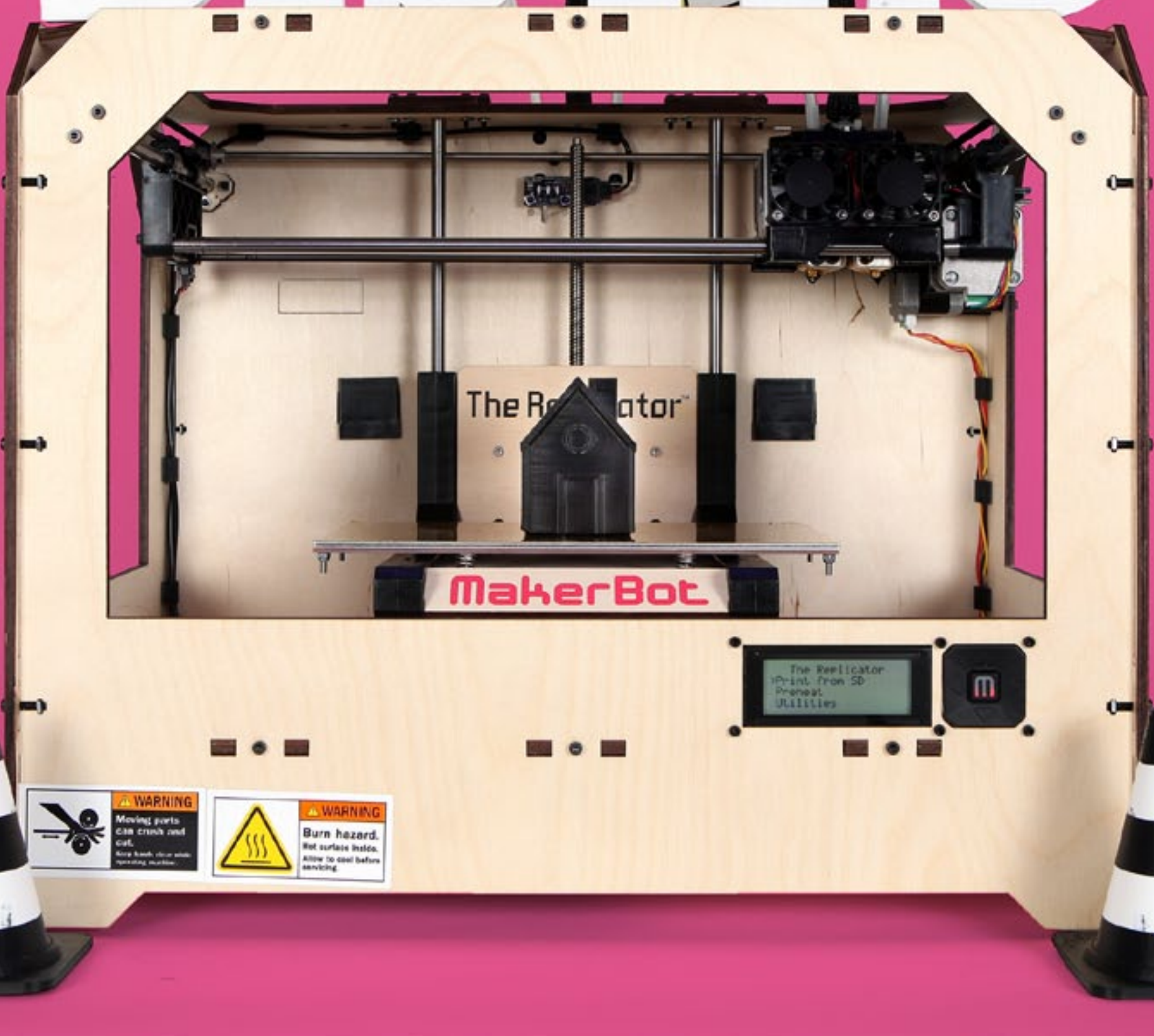
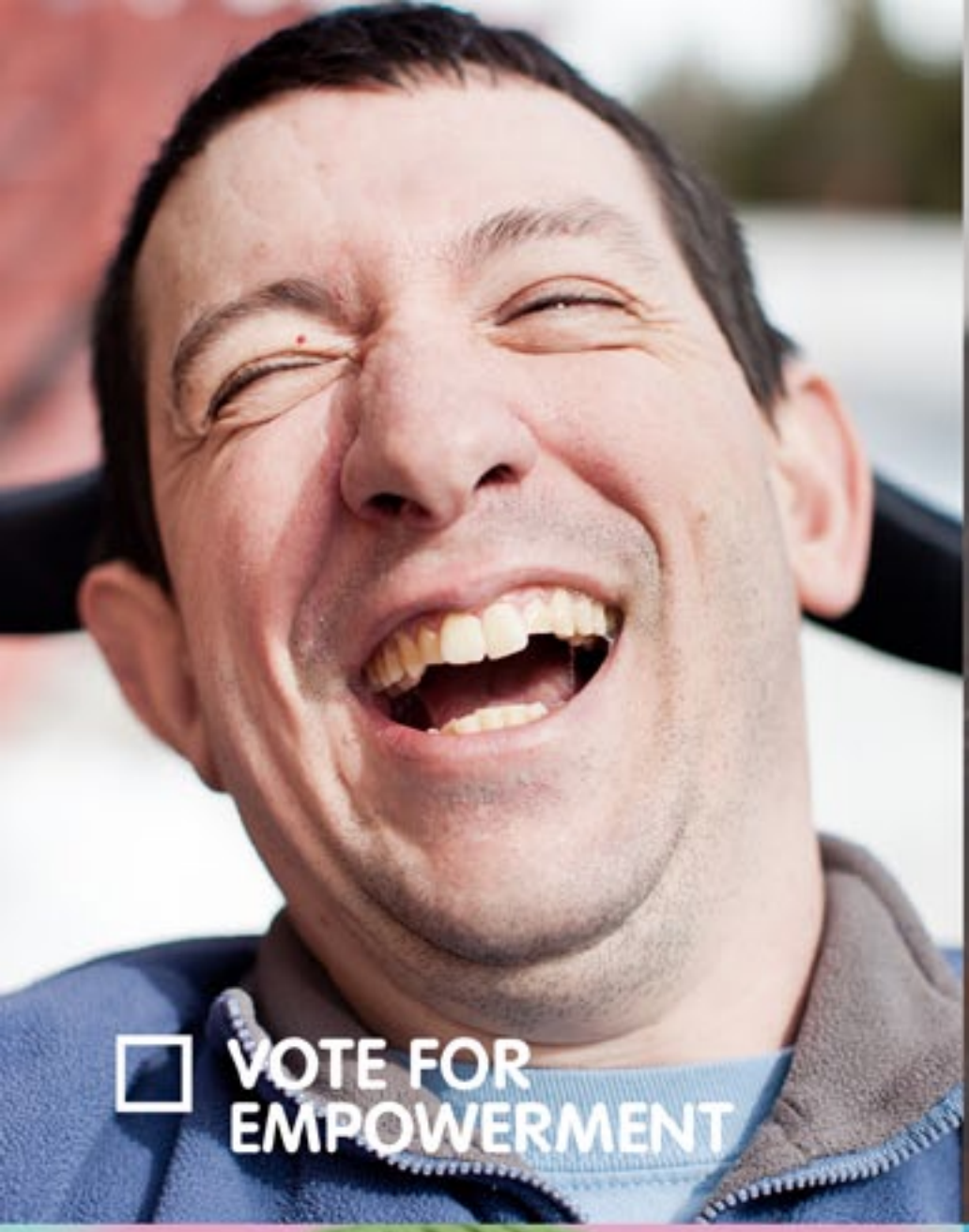
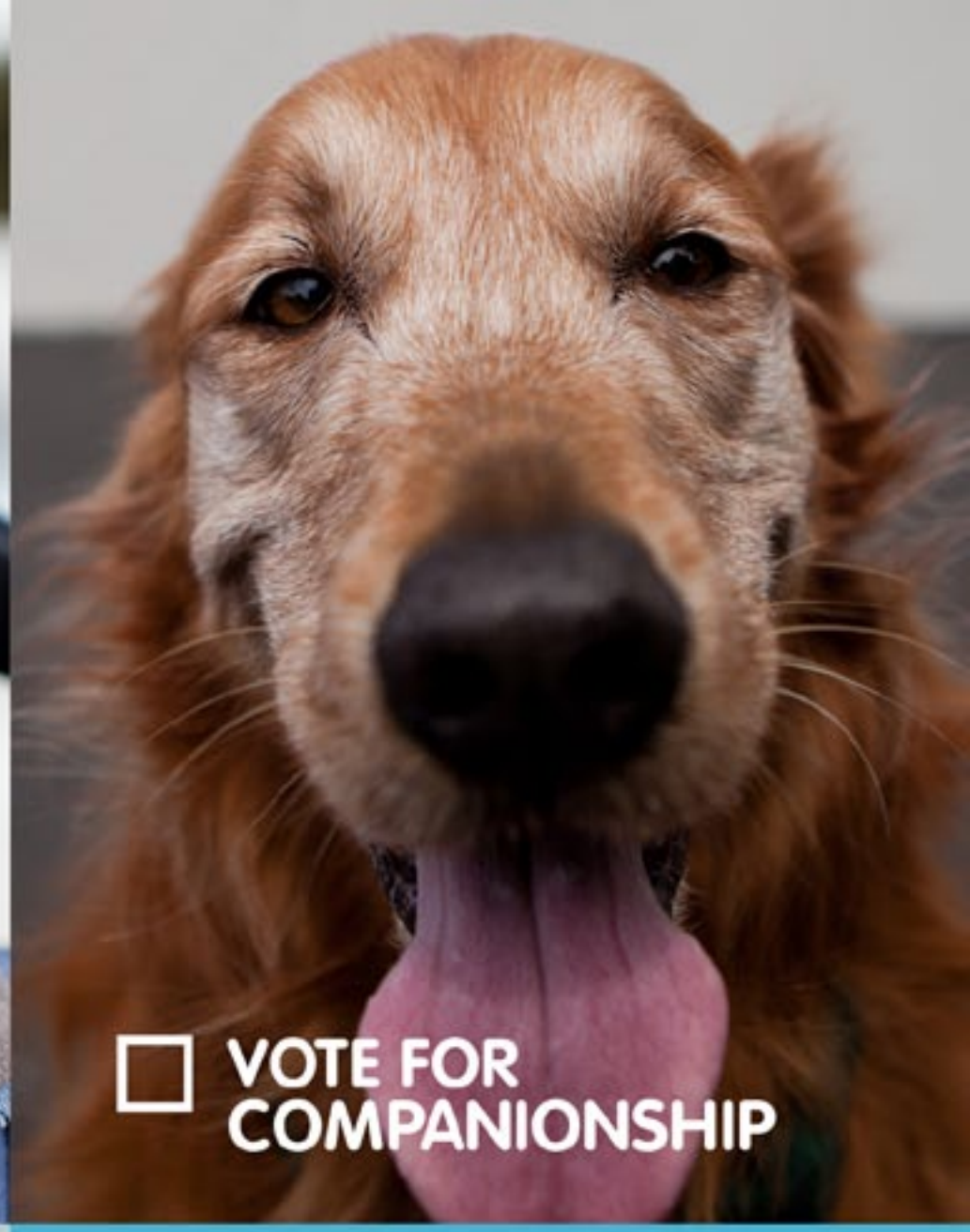
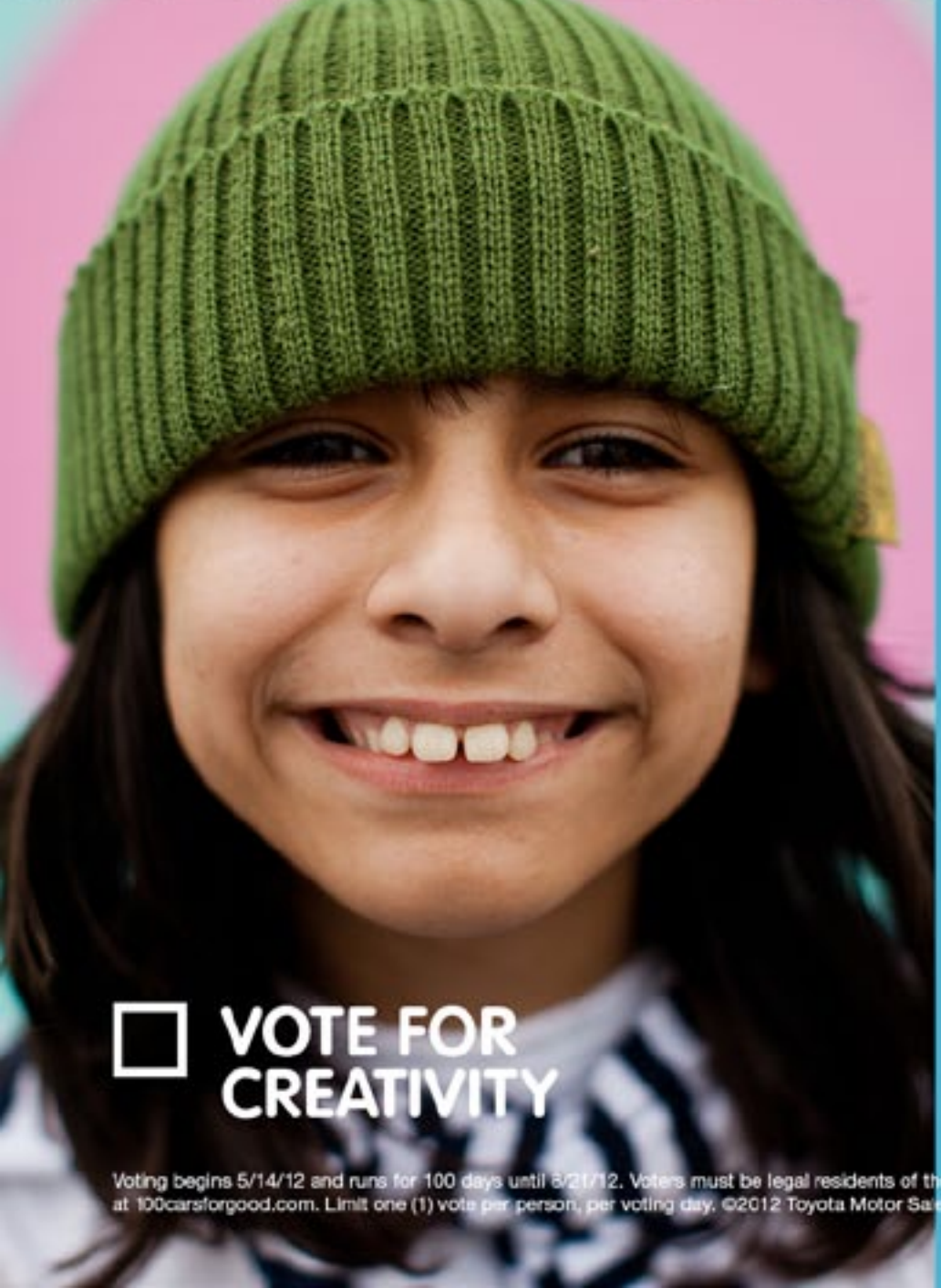
DISTRO









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ISSUE 52

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REVIEW

FEATURE

ESC

On the Cover:
Photograph by Wendy George

SETTLING IN ON MARS, AGAIN

DISTRO
08.10.12

EDITOR'S LETTER

I'll just say this right up front: there just wasn't a whole lot going on this week in the world of consumer electronics. But, in the world of science, it was absolutely an epic week thanks to a successful landing of the Curiosity rover. After blasting off last November, the six-wheeled craft made its debut on the surface of the red planet early on Monday morning, almost immediately sending back images from the ground, including a sequence of photos showing just how well its "seven minutes of terror" descent was executed.

On its 23-month mission, the nuclear-powered Curiosity rover will be gathering a swath of scientific information about Mars, including analyzing surface radiation and looking for the basic chemical elements of life — or elements that might some day support life. And, of course, it will be sending back two years worth of high-res photos for us to ogle. I can't wait to see them all.

The Apple vs. Samsung trial continued this week, with the former litigator deploying some seemingly damning evidence in its quest to show that its creative designs have been exploited. It's a 132-page document prepared by Samsung engineers in 2010 comparing the UI of the Galaxy S to that of the iPhone, ostensibly suggesting ways to make their phone's interface as visually appealing as Apple's. It certainly shows that Sammy's engineers were looking at every single pixel of the iOS interface, but it's doubtful in my mind that this is a truly unique document, as surely every mobile engineer wants to at least understand the magic appeal of iOS.

Surely the next device to be running that OS is a sixth-generation iPhone, and we got a glimpse of what looks to be another component from that device, a nano-SIM cradle that's slightly shorter than the tray found in the 4S. More intriguingly, we got a peek at what appears to be the casing for a 7-inch iPad, the sort of device Apple's Eddy Cue was pitching in an email uncovered during the Samsung trial. Could we see that released alongside the new iPhone this September? That would certainly make for quite the event.

We know for sure that we'll be seeing the Galaxy Note 10.1 this month, finally, with Samsung littering the internet with instructional videos and photos of the device — everything short of an official price. Like its phablet predecessor, this 10.1-inch tablet will work with a stylus to let you doodle to your heart's content, though a removable keyboard looks as if it will be

EDITOR'S LETTER

available for those times when you need to write more legibly. The slate is due out sometime this month.

We also got a peek of a very conspicuously wielded tablet in an HP promo video, a tablet that may or may not be the company's rhyme-happy Slate 8, naturally expected to be running Windows 8. All we know for sure is that it's an aluminum device with a large black plastic antenna window along the top of its landscape side.

Amazon started the interesting practice of renting paper textbooks this week, a move that should strike fear into the hearts of those egregiously over-charging campus bookstores everywhere. For an average price between $30 and $60, Amazon will ship you the textbook of your choice and let you keep it for a semester, and then even pick up the return-shipping tab when you're through. The company does, of course, expect you to keep your books in good condition, saying it'll charge you the full price for any rental should you return it with water damage, burns or a "strong odor of any kind." Better keep it away from your roommate's laundry pile, then.

Apple and Google both confirmed that the YouTube app is getting sprung from iOS 6, so it will no longer be part of the standard install. It'll live on in older versions of the OS, but anyone who upgrades this fall will have to turn to the App Store to download a standalone app — assuming it's approved in time. What it will look like and whether it will offer improved functionality compared to the current YouTube app remains to be seen.

Finally, Microsoft is doing a little house cleaning of its own, re-organizing the naming of some of its core apps — presumably just to keep us on our toes. The app formerly known as Windows Explorer was earlier renamed File Explorer in Windows 8, and in Windows Phone 8 the Windows Phone Marketplace is now going to be called the Windows Phone Store, bringing it more inline with the Windows Store. Meanwhile, Windows Store gaming titles will be known as Xbox Windows games, thus completing the 11-year journey of the "Xbox" name from big, cool console with fat controllers to nigh-meaningless designation for a game Microsoft wants you to buy.

In this week's Distro we're diving into a world of at-home 3D printing and the MakerBot Replicator, Brian explaining why this is the ultimate geek toy. Brad Molen reviews the MX 4-core from Huawei, Sarah Silbert takes a look at Toshiba's latest laptop, the U845W, and Joe Pollicino gives his take on the Parrot Zik by Starck. In Switched On, Ross Rubin gives us a fair and balanced look at the drama surrounding Microsoft's first-party tablet, Joshua Fruhlinger wonders why there aren't more Curiosity fanboys in This Is the Modem World and GameStop CEO Paul Raines was kind enough to take a turn on the Q&A machine. It's all here, it's all downloaded and it's all waiting for you to enjoy.

TIM STEVENS
EDITOR-IN-CHIEF,
ENGADGET

ENTER

BEST IN GLASS

IPHONE 4 AND HP ENVY 14 SPECTRE

These two products are worlds apart, but they signal a distinct design trend. When the iPhone 4 was released back in 2010, the incorporation of black glass became a symbol of sophistication in electronics design. HP has recently taken a shine to the material as a branding tool in its Envy line, moving beyond the 14 Spectre and teasing us with a touch of glass on a future all-in-one printer.

PHOTOGRAPHS BY WILL LIPMAN

ARM MALI-T604

After seeing the Mali-T604 GPU in action at SIGGRAPH, its capabilities left us hopeful for the future. The reference device on hand was operating in sync with a variety of unnamed hardware, protected from view in a relatively large sealed box. We weren't able to squeeze many details out of ARM reps, but what we do know is that we were looking at a quad-core Mali-T604 and dual-core ARM Cortex-A15 processor, with a fabrication size in the range of "28 to 40 nanometers." ARM confirmed that this reference device is running off an Exynos 5 Dual chip, offering a heads-up on what Samsung has up its sleeve. Clock speed is also TBD, and the early silicon on demo at the show wasn't operating anywhere close to its top end.

In order to experience the T604, we took a look at three demos, including Timbuktu 2, which demonstrates elements like self-shadowing and depth of field with OpenGL ES 3.0; Hauntheim, which gives us an early look at physics simulation and HDR lighting with OpenCL; and Enlighten, which renders silky smooth real-time illumination. ARM says it's working with eight manufacturers to get the licensed tech to market later this year.

Click on product names to read full stories

PRICING:
TBD

AVAILABILITY:
Q3 2012

THE BREAKDOWN:
AFTER A FEW MINUTES WITH THE MALI-T604 GPU, IT'S OBVIOUS IT'S AN IMPROVEMENT OVER ITS PREDECESSOR.

AMD FIREPRO GRAPHICS CARDS

Click on product names to read full stories

AMD has returned to grow its "Southern Islands" family of graphics cards with four fresh FirePros, offering up to four teraflops of graphics computing power. That spec can be found in the company's new W9000, which is capable of four TFLOPS single precision and one TFLOPS double precision with a price tag just shy of $4,000. That behemoth of a card offers 6GB of GDDR5 RAM and requires 274 watts of power. More humble members of the fam include the W8000, which has the same form-factor as the higher-end W9000, but eases back on the specs, consuming 189 watts of power and carrying a $1,599 price tag.

We had a chance to take a closer look at both cards at SIGGRAPH, and while they packed a significant amount of heft, you'll likely never take a second look once they're buried away in your tower rig. Fans of smaller housings (and price tags) may take notice of the W7000 and W5000, which are both considerably more compact and require less power to boot, with pricing set at $899 and $599, respectively. D

PRICING:
$599-$3,999

AVAILABILITY:
NOW AVAILABLE

THE BREAKDOWN:
THE FIREPRO SERIES COMES IN A VARIETY OF OPTIONS THAT CAN EACH POWER SIX 30-INCH 4K DISPLAYS.

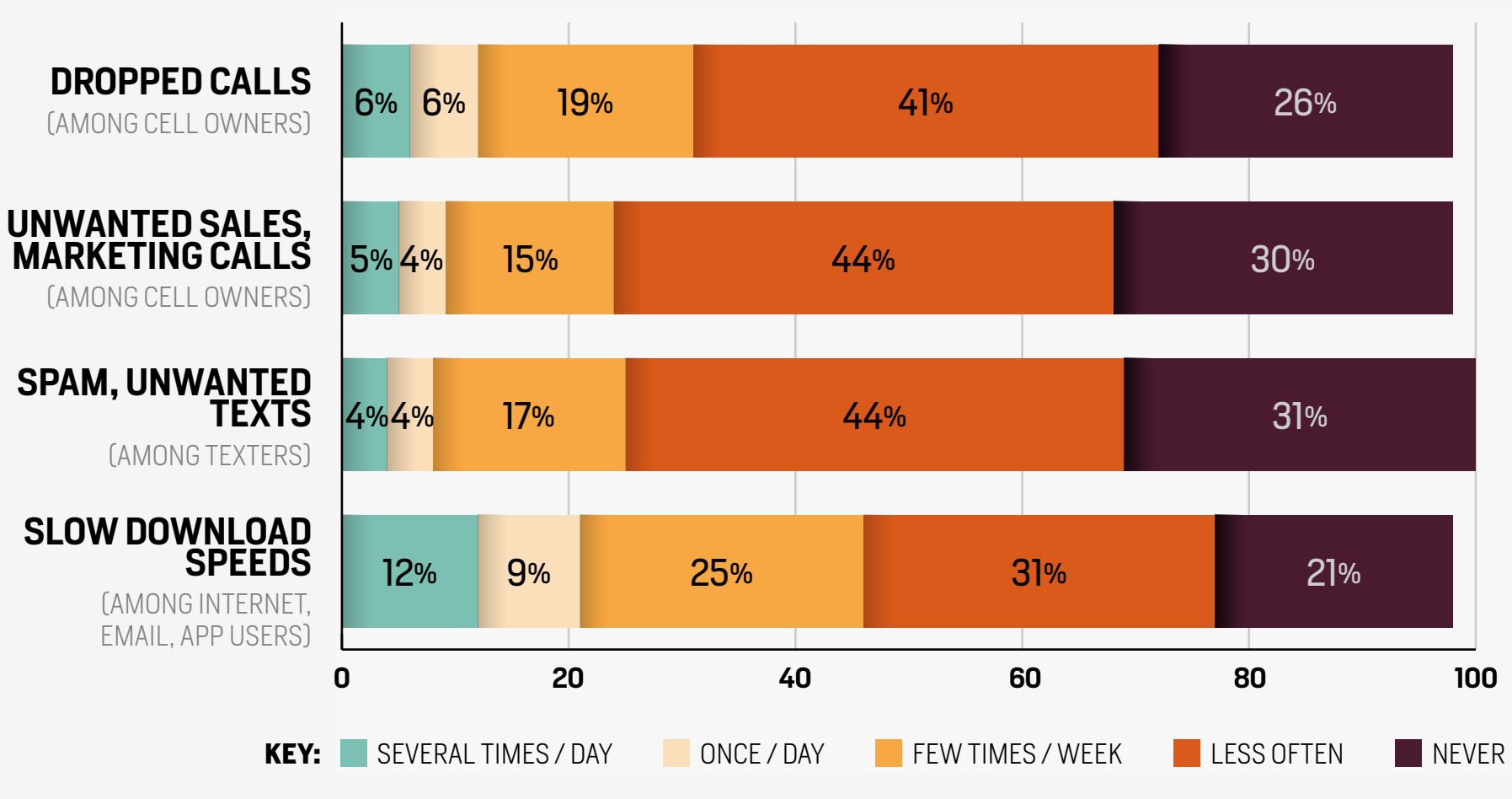
Users Sound Off on Cellphone Shortcomings

Everyone has an opinion, and if they all stink, then Pew must have one hell of a tolerance for foul odors. The research group recently surveyed a number of mobile phone owners to determine their primary complaints, and while it's not much of a surprise, slow network performance stole the show. In all, 77 percent aired at least some dissatisfaction with download speeds, and nearly half of all respondents cited frequent frustration. The story is similar for dropped calls, as 72 percent of those surveyed claim to experience the annoyance at least occasionally. While less widespread, the distribution of those who receive unwanted marketing attempts via either telephone calls or text messages is roughly equal — it seems reasonable to assume that many respondents are harassed by both means.
—Zachary Lutz

SOURCE: PEW RESEARCH CENTER

FREQUENCY OF CELLPHONE USER EXPERIENCE ISSUES

COMPARING CELLPHONE USER EXPERIENCE ISSUES



AMONG AMERICANS AGES 18+ WHO ARE CELL OWNERS, TEXTERS OR CELL INTERNET/EMAIL/APP USERS

Siri, Take This Down: Will Voice Control Shape Our Writing?

By Robert Rosenberger
The Atlantic

Technology sometimes has a way of sneaking into our lives unexpectedly. Personal computers changed where we spend time in our homes, and smartphones have had a noticeable effect on how we behave in public. As Robert Rosenberger explains in this recent essay for *The Atlantic*, the increasing use of voice recognition now seems poised to usher in a new set of changes, including how we write. Just as typewriters and computers have introduced their own characteristics into the writing of those that use them, Rosenberg sees voice control introducing a potentially profound shift of its own — one where “all writing becomes a kind of rehearsal for verbal interaction.” Something he suggests could also lead to us all becoming better verbal communicators.

RECOMMENDED READING

Click on headlines to read full stories

How Apple and Amazon Security Flaws Led to My Epic Hacking
By Mat Honan
Wired Gadget Lab
As you may have heard, if you follow a lot of tech writers on Twitter, *Wired’s* Mat Honan was the victim of a particularly bad hacking attack last week, where he not only lost access to his Twitter account, but also all of the data on his iPhone, iPad and MacBook. After initially revealing some of the details in a blog post, he’s now decided to tell the whole story of how it all went down in this informative piece for Wired’s *Gadget Lab*.

Huawei: The Company that Spooked the World
The Economist
Apple and Samsung may be grabbing the majority of headlines these days, but China’s Huawei has also garnered its share — sometimes for its smartphones, and sometimes due to one controversy or another. Here, *The Economist* looks at how the company became one of the world’s largest smartphone manufacturers, why it has some people outside of China concerned and what it’s doing to change that perception.

The Fine Art of Keeping the World’s Weird Films Alive: An Interview with Archivist Rick Prelinger
By Katie Bennett
Vice Motherboard
You may not be familiar with the name Rick Prelinger, but there’s a decent chance you’ve come across a video that came from the Prelinger Archive, his effort to preserve rare films and make them available for free online (with some help from the Internet Archive). *Motherboard’s* Katie Bennett recently caught up with Prelinger to talk about his work, the films themselves and how he got started collecting.

CURIOSITY KILLED THE FANBOY

DISTRO
08.10.12

FORUM

THIS IS THE MODEM WORLD

BY JOSHUA FRUHLINGER

USAIN BOLT IS FAST. REALLY FAST. So fast, in fact, that we all revel in his quirky personality and dig the fact that he comes from Jamaica. We're all Bolt fanboys. ❡ The Olympics, born as a celebration of the human body and spirit, bring the world together every two years in a peaceful competition and allow us to transform nationalism into a spirited, peaceful chant for our own countries. Usain Bolt displayed the Olympic spirit during a post-race interview when he stopped the affair to wait for the American national anthem to finish as another athlete received her gold medal. Respect.

Our nationalistic Olympic fanboyism is transparent: we live in a certain place and root for our guys and girls across the world. In pro sports, the model is similar: support your hometown team lest you be labeled a turncoat. Sure, we argue with others about why our team is better, but at the end of it all, this is normally a peaceful exchange and personal attacks are left out unless you're a jerk who takes it all too seriously.

Then there's our gadget fanboyism, where nerds take sides on symbolic home teams, if you will. You're either an Apple fanboy or you're not. You play Xbox or PlayStation. Where does this come from? Do humans simply need to root for something, to engage in warfare? Is it because we spend a lot of money and need to validate our investments? I'm not about to answer that here — that'll be tackled in a future column.

But let's say an amazing device —

Curiosity is our Usain Bolt: technically superior, charming and a bit cheeky (follow Curiosity on Twitter and you'll see).

the Usain Bolt of devices — were to hit the market. Would we see past the branding and celebrate our ability as humans to make amazing things?

Yes. In fact, we're doing that right now. When NASA's Curiosity rover landed on the surface of Mars earlier this week, we joined together to celebrate the six-wheeled science lab. We read about Scott Maxwell, one of the rover's 12 drivers, and wanted to hang out with him. We flooded NASA.gov, hungry for Curiosity's first photos. For two years we'll be fans of the same device, no arguments. And that's pretty cool.

But are there cranky little people who think the rover's camera is weak and has poor battery life, and "could have done it better" in their basements? Probably, but they haven't come out of the woods just yet. I just Googled "Curiosity rover sucks" and only found an old article that predicted the landing may not go well and that we'd be wasting $2.5 billion on a failed experiment. That didn't happen, of course, and Curiosity is safe.

Because Curiosity rules. We all believe this.

So what's missing from the fanboy equation when it comes to Curiosity? None of us can personally buy Curiosity, so that's out. There are no current-generation rivals on Mars, so there can be none of that. Instead, we all get to learn more about Mars and space and dream big. Curiosity is our Usain Bolt: technically superior, charming and a bit cheeky (follow Curiosity on Twitter and you'll see).

Maybe, back in the day, Soviet and American kids pitted Soyuz against Apollo and, if there was an internet available, they would have waged the most epic fanboy war of all time. And maybe today there are some Chinese rocket scientists telling their friends that their rover will be faster and lighter.

If so, bring it on. Space program competition is good for us all. If China, Russia or anyone else for that matter launched a Mars rover and we were watching robot wars millions of miles away, we'd be in space heaven. We'd all win. For now, though, let's just enjoy this moment of space-gadget unity, shall we? D

SURFACE DAMAGE

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08.10.12

FORUM

SWITCHED ON

BY ROSS RUBIN

AS SWITCHED ON discussed a few weeks ago, and as Microsoft noted in its recent 10-K filing, it is an unavoidable truth that a software company getting into the hardware market will cause conflict with its partners. The extent of that conflict, though, depends on many variables and Microsoft can — and must — take steps to ameliorate it.

Recently, Acer CEO JT Wang stepped up his rhetoric against the company's most important operating system provider entering the PC hardware market with its Surface tablet, but as the objections have become more forceful, they've also become more perplexing. The company says that it may be forced to explore alternatives if Microsoft proceeds, since Acer is not only one of the many companies already producing Android tablets, but one of the two producing Chrome hardware. (If it has a keen interest in MeeGo or Tizen, I'm sure its fellow Taiwanese rival ASUS can share how that worked out.) Even more curious is Acer's assertion that Microsoft is "no good at" hardware. If that's so, why worry?

Neither Dell nor HP has been as active as Acer in the tablet market during the post-iPad era. As for Dell, it may be more reticent because Surface is a consumer-first play and the company is stronger in the enterprise space. The business PC market is also very fertile ground for HP, but the company remains the leader in the consumer Windows hardware market and has been striving to court the high-end with its Envy line, which has expanded from

“Faced now with competing against Microsoft, did HP pull the plug on webOS too soon?”

laptops to printers. It’s the Windows vendor that has the most to lose from Surface’s success.

Faced now with competing against Microsoft, did HP pull the plug on webOS too soon? Might a TouchPad, which would have easily been in its second generation by the time Surface ships, have been a worthy competitor? Even in the height of its doubling down on webOS, HP never wavered in its support of Windows. On the other hand, even if webOS had been met with more success it might have been an effective hedge against Microsoft doing exactly the kind of thing it’s doing now. Of course, HP could still hop into the Android market as Acer has, and may even have more success than its PC rivals there, but it has shown little interest in doing so as it focuses its tablet efforts on Windows 8 and competing with Microsoft on that front.

It would indeed be ironic for HP if its webOS overtures helped to spur Microsoft to create its own hardware to compete with the Silicon Valley pioneer. But from a business standpoint, the evaluation is not so poetic. The revenue HP will gain from Windows 8 will be far greater than what it could have garnered from webOS. And its share of revenue lost in competition with Surface will be far less than it would have spent trying to build a competitive ecosystem. D

DEATH FOR A SALESMAN

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FORUM

REACTION TIME

BY LUDWIG KIETZMANN

As a mascot for what remains of THQ's 2012 lineup, there's no choice more awkward or more apt than Death. The stoic star of *Darksiders 2*, and one quarter of the world's scariest equine club, has become the de facto face for a troubled publisher. It's mean, clearly aligned with THQ's hardcore identity, and shows obvious signs of unkemptness and decay.

The company has resorted to drastic measures to stay in business and rebuild its pipeline, which was once packed with hastily assembled licensed fare and colorful games meant to enthuse a younger demographic. In shifting fully to hardcore products like *Darksiders 2*, THQ shirks the playfulness implied by its name — derived from "Toy Head-Quarters" — and gets down to serious business. If not irreversible, the situation has at least begun to reek, no thanks to the bodies sacrificed on an altar of second chances. The studio closures, layoffs, executive shuffles and major cancellations (like *Insane*, a horror game conceptualized with film director Guillermo del Toro) are beginning to pile up.

We look to *Darksiders 2* as a portent of THQ's recovery, though Death is not the single savior so much as an ironic proof of life. If the beleaguered corporation can effectively produce and market this important milestone — the kind of high-quality, traditional game that must sustain it from now on — it bodes well for the other THQ franchises that are on the cusp of widespread popularity. The "AAA" market is probably the worst place to make a last stand, considering the endangering expenditure required to make a big impact.

Maybe it's a worrisome compliment to say that *Darksiders 2* looks like a mammoth investment, and a larger, bolder attempt at encapsulating so many things that so many games do so well. To the game's credit, it's not even being constructed with obvious prudence. Texas-based, THQ-owned developer Vigil Games is not only expanding the scope and number of vivid environments, but is going so far as to build optional dungeons.

"You can't really call it exploration if you force people to go through it," Creative Director and artist Joe Madureira told me during one of several preview events for the game. Creating a rich world is an expensive endeavor, he agreed, especially when time and resources are allocated to content that some players might just ignore. But the cre-

ators want that choice to be there, even if it seems impractical or risky.

Some of that risk will be mitigated in marketing, while more of it will recede because of what *Darksiders* is best at — that is, what video games are best at. Madureira's bold embellishments and larger-than-life characters don't obscure the classic premise of a hero discovering, traversing and pulverizing a world built specifically around his abilities. Ancient temples are littered with elaborate traps and convoluted door mechanisms because it's our pleasure to overcome them, and to see ancient stone doors swing into life.

It's the kind of classically designed, large-scale action-adventure that seems precisely aimed at THQ's new best friends — the people that will spend $60 because they can easily spot all the appealing influences in *Darksiders 2*. *God of War* meets *The Legend of Zelda*, with a splash of *Prince of Persia*? And there's loot? Sold!

Though THQ is also betting on a *South Park* role-playing game and another sequel for the *Saints Rowd* franchise (its silly, open-world antithesis to the humorless *Grand Theft Auto*), *Darksiders 2* seems like it marks the beginning of the company's leanest, meanest ever push for high-quality core games. The quality of Vigil's work will be measured by reviews next week, and its effect on the company's bottom line will be scrutinized soon after. I suspect it'll be a hit, but what THQ needs is a BIG hit.

I asked Joe Madureira whether the increased scope and scale of *Darksiders 2* was problematic from a financial standpoint; a dooming toll on resources to produce content that some players may miss entirely. The answer, of course, is about balance, and the black art of picking out parts that are truly worth the cost and effort. Death's mantra, as summed up by Madureira, is "ambitious but manageable." Perhaps it's the philosophy that will keep THQ in the game. D

3 NEW GAME RELEASES FOR THE WEEK OF AUGUST 10TH

Click on game to buy

HYBRID
Xbox Live Arcade – $15

SOUND SHAPES
(PlayStation Vita, PlayStation 3) – $15

PERSONA 4 ARENA
(PlayStation 3, Xbox 360) – $60

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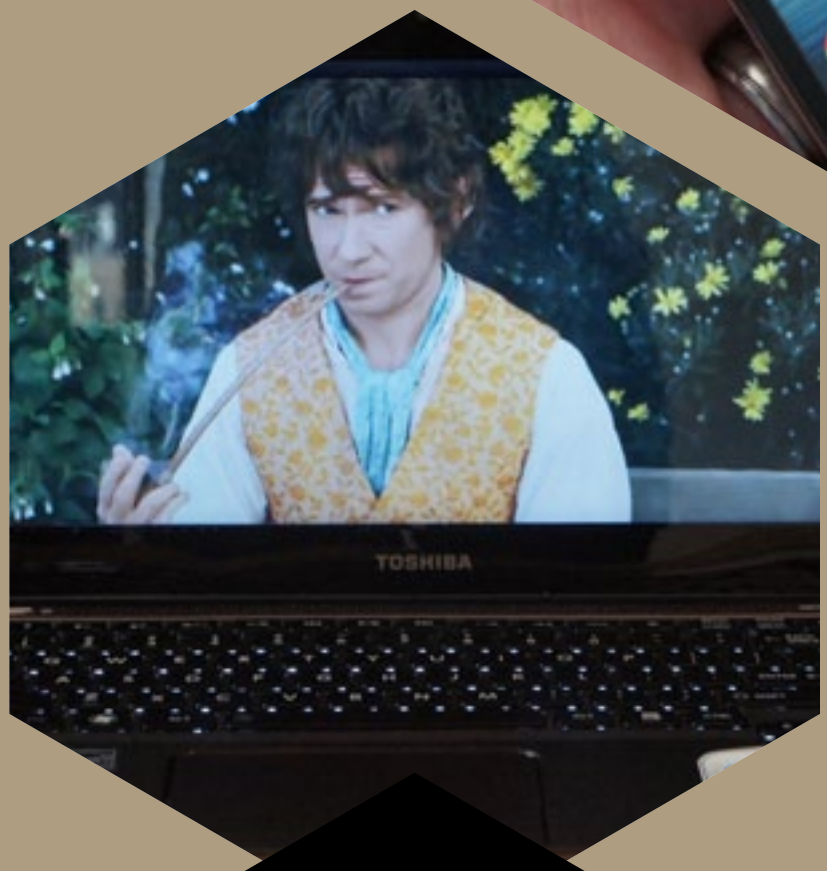
Meizu MX 4-core



Toshiba Satellite U845W

Parrot Zik by Starck

REVIEW

MEIZU MX 4-CORE

The Meizu MX 4-core has some serious processing power and an exotic flair, but does its software quirks and battery issues lessen the appeal?

By Brad Molen

If it feels like yesterday you read our in-depth review of the dual-core Meizu MX, you're not too far from the truth. In reality, it's been just over seven months and we've already moved onto the smartphone's quad-core sequel, aptly named the Meizu MX 4-core. Not only is it easy to confuse the two phones by name, but good luck trying to tell which one is which. Indeed, the two handsets are quite similar both inside and out, with the exception of some improvements in a couple rows on the 'ol spec sheet.

The biggest surprise isn't necessarily the

speed with which the company cranked out a second MX, and it's not even the reasonable price (HK$3,099, or US$400, for the 32GB version, and HK$4,099 / US$530 for the 64GB). Nope, it's seeing Meizu, a manufacturer known for its copycat products, evolving into a relevant player beyond its native China. So how does this latest effort stack up? Read on to find out.

HARDWARE

We highly doubt anyone would purchase a phone solely based on the quality of its packaging, but an extra bit of polish certainly makes for a more favorable first impression. What's more, manufacturers offering more intricate eye candy tend to be of the mindset that even the littlest details can make a difference. Meizu, it seems, understands this.

The glossy, removable back offers access to the micro-SIM.

The Meizu MX 4-core comes in an all-white box, and the unit we received featured a blue ribbon marking it as an engineering sample, and offering the tagline "Dream, upgraded. New surprises begin from here." Inside is a Chinese outlet plug with a female USB port on the right edge. Meanwhile, a minimalistic white book with the letters "MX" printed on it takes up the rest of the box. Here you'll find the first surprise the company is referring to: the "book" looks exactly like a Meizu-penned hardback novel — or, perhaps, the largest user manual known to man. In reality, it's hollowed-out on the inside to allow room for the actual phone, with three pages of marketing material attached above it. We're not sure if this is one final attempt to deter potential thieves from looting the box, but it's not the only secret this particular "book" holds. Turn it around and you'll find an extra leaflet covering up another hollowed-out compartment containing a micro-USB cable and a handy tool to help you take off the phone's back cover. Sadly, we couldn't find any headphones hidden in the box, try as we did.

But what about the phone itself? If you've ever played with last year's dual-core MX, you may have a difficult time telling the two devices apart. That's because Meizu has, in an extremely rare move, put a new phone in nearly the same exact chassis. On the version made for the Chinese market you'll notice Meizu's name in Chinese on the top-right corner of the front side. But the only branding that can be found on the global iterations is the name of the phone (and its GB count, in the case of the white models). Aside from this, there are no telltale signs that this is the 4-core.

If you haven't had the chance to handle the previous MX model in real life, we won't hold it against you — both the current and old MX are a pretty rare sight outside of China, though Meizu is intent on expanding the phone's reach. Despite being sold for a reasonable HK$3,099 (US$400) in Hong Kong, a 32GB version of the phone will likely run you around $650 or so on this side of the Pacific (if you can find an e-tailer that has one in stock, that is).

In this case, what newbies will find is a phone that borrows from Apple and Android, in terms of both hardware and software. This shouldn't come as much of a surprise since the company's most infamous device is the M8, a phone that bore a few similarities to the iPhone — enough, at least, to draw the attention of Cupertino's legal team in 2010. The manufacturer has since chosen to put a heavily skinned version of Android on its phones, but as you'll see later in the review, it hasn't completely let up on the Apple design references.

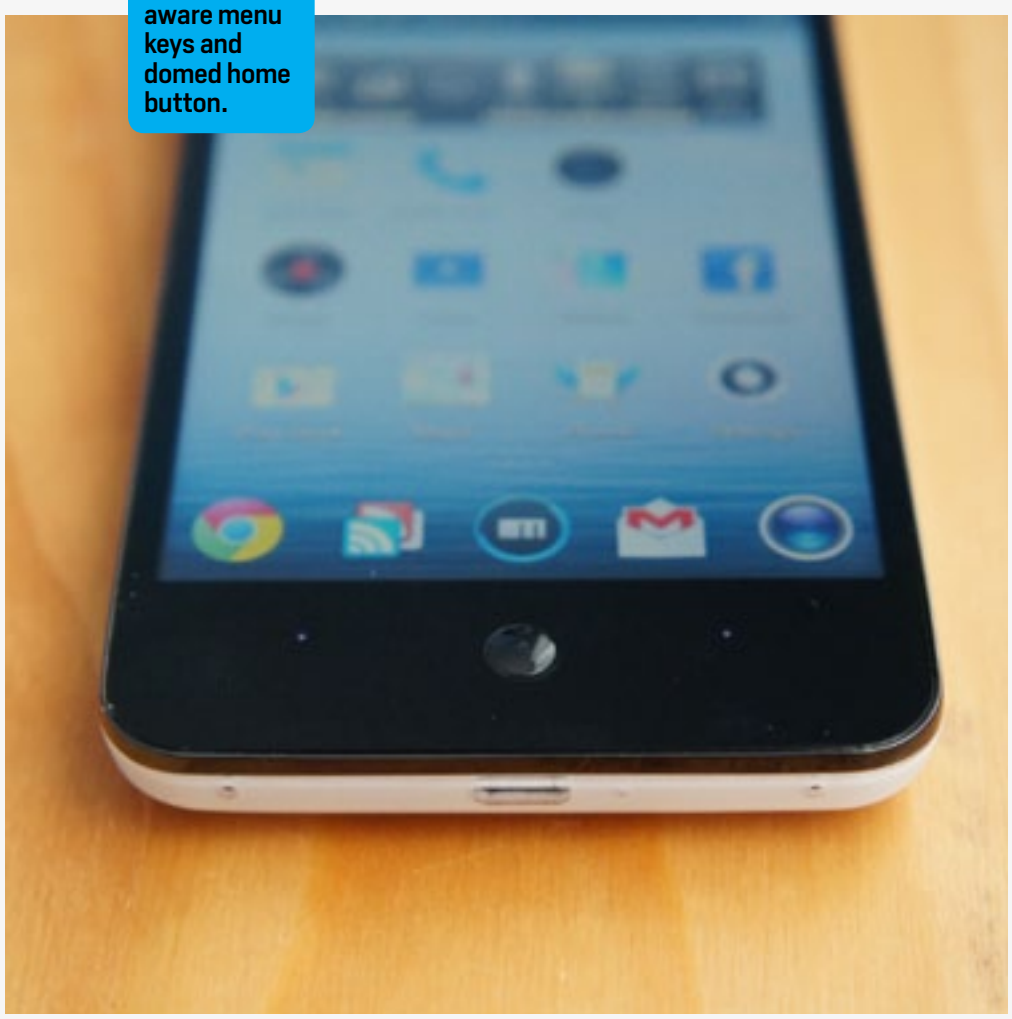
Let's start with the tangible goods first: the front side features a 4-inch 960 x 640 ASV display with a pixel density of 288ppi. The resolution is the same as the Retina display, but it uses a larger panel. The bezel is rather large, and really should've been trimmed. The earpiece

and VGA front-facing camera sit above the screen, but the real party takes place below the panel.

Here, you'll notice a three-button setup that, at first glance, appears similar to what you'd find on many other Android devices: two capacitive buttons with a physical home key sandwiched in between. But look a little closer, and you may find yourself in awe with what Meizu's done. The home key resembles a tiny dome that rises above the surface of the screen just enough to offer easy access (you'll still want to be careful about accidental presses, however). As we soon discovered, with much delight, this button is quite comfortable to use once you get used to it.

So what's so special about the capacitive keys? As with the previous-gen MX, these keys are situation-aware: they light up with respect to the phone's orientation (portrait and landscape modes) and will also change depending on the availability of the feature each button represents. In other words, the key on the right will display three dots when there's actually a menu to utilize, but only one dot otherwise (for example, when you're looking at the home panel or settings menu, where the menu key is dormant). Additionally, both buttons will light up if you receive a notification while the phone's in standby mode. All of these features were on the previous MX, but we appreciate that Meizu chose to use them here as well.

The left side of the MX 4-core is home to a volume rocker, while the top has a power / standby button, a 3.5mm headphone jack and an opening for a noise-cancelling mic. Heading down to the bottom you'll find the micro-USB port (which supports USB host, MHL for HDMI output and S/PDIF for digital audio connection), along with the same pair of mysterious dents as before (which do serve a purpose: professionals insert a special tool into these holes to remove the back cover). The right side of the phone is completely devoid of buttons. Around back, you'll see the 4-core's 8-megapixel camera and LED



The content-aware menu keys and domed home button.

flash at the top, and a pair of speaker grilles located on the lower left corner — a horrible position for the external speakers when you're holding the phone in portrait mode. The cover is incredibly glossy, but looks can be deceiving. Instead of using a single standard layer of plastic, both 4-core models offer a dual-layer setup with each measuring 1mm thick. Look closely at the headphone jack or speakers and you'll see what we mean — the outside stratum is actually a transparent plastic, so what you really see is the white plastic underneath. This crystal-like build appears to be another hardware flourish that few other phone manufacturers have attempted to duplicate. Still, you'll notice another connection to Apple here: the finish here calls to mind the materials used on the original white iBook, iPod and flat-panel iMac. Additionally, the LED flash is located on the outside of the back cover, rather than the body of the phone. It's able to function with the help of two contact points on the reverse side of the cover that are used to provide power and grounding.

As with the last-gen MX, the back cover is removable, except it doesn't require that special tool we mentioned earlier. In the current model, unfortunately, removing the backing requires nothing short of an act of Congress. To do this, take either your fingernail or the funky guitar-pick-like tool from the box and, beginning at the micro-USB port on the bottom edge, work your way around the edges until the cover pops off. Your reward for this achievement is access to the micro-SIM tray... and that's it. There is no user-accessible microSD slot. The 1,700mAh battery (an improvement over the original's 1,600mAh capacity) gives the misleading impression that it can be lifted out of its comfortable bed. In fact, though, this isn't possible without thoroughly tearing down the device. This inconvenience may be minor to some, but as you'll see later in the review, it can become a source of irritation for frequent travelers or users who demand as much power as possible.

> There is no user-accessible microSD slot, and the battery isn't removable.

The MX 4-core's measurements of 121.3 x 63.3 x 10.3 mm (4.78 x 2.49 x 0.41 inches) aren't envelope-pushers by any stretch of the imagination, but they do make for a fairly comfortable in-hand experience. The edges are straight, with a very slight taper on the back that flatten toward the middle. This reviewer was able to handle the device well enough with his average-sized hands, though the phone's glossy finish makes the 4-core a little slick-feeling. At 4.9 ounces (139g), it's a bit heavier than what we'd imagine a phone of this size would weigh, but it's at least light

enough that most people won't notice or care (it's just one gram lighter than the iPhone 4S, after all).

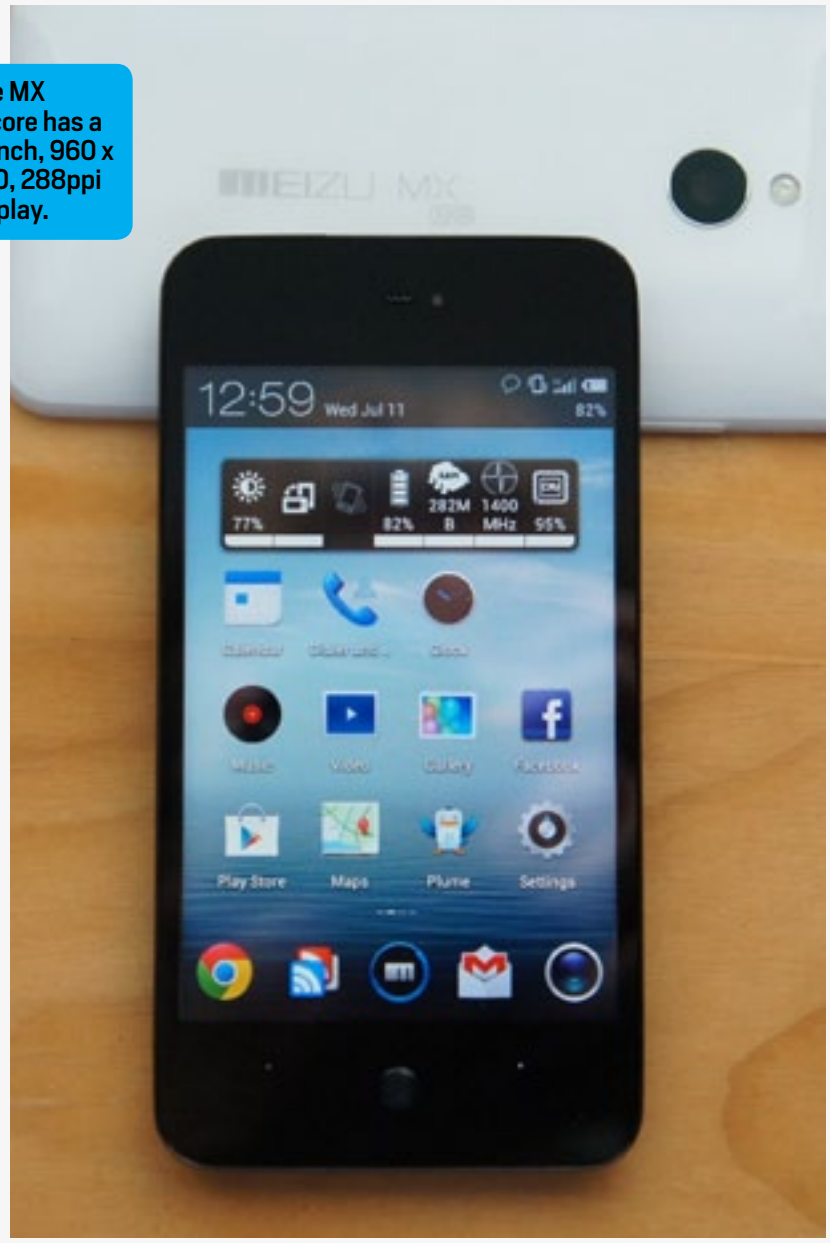
We found ourselves intrigued by the mystery surrounding the quad-core CPU. Most spec sheets and third-party diagnostic apps confirm that the silicon embedded within the latest MX is a re-branded 1.4GHz Exynos 4412 chip with a Mali-400MP manning the graphics and a full gigabyte of RAM to supplement both. The mystery, however, is that despite the mounting evidence, Meizu won't specify exactly what chip is used. We were simply told that it's named the MX5Q, though a simple Google search matched this chip with the Exynos. (Even some of the company's marketing materials confirm that this mysterious SoC is a 32nm Cortex A9 wafer clocked at 1.4GHz, without getting more specific.)

Lastly, an element of the phone that should be of particular interest to international roamers and T-Mobile US customers is Meizu's inclusion of a pentaband (850, 900, 1,700, 1,900 and 2,100MHz) HSPA+ / UMTS radio, which tops out at 21Mbps. It also has quadband GSM / EDGE. Lastly, it contains radios for Bluetooth 2.1 and WiFi 802.11b/g/n but lacks NFC support.

Thankfully, the MX 4-core delivers pentaband HSPA+ support.

DISPLAY

If you've perused the spec sheet, you shouldn't expect the 4-core to have a top-notch display. Still, it's actually a little better than the resolution would suggest. It can't really compete with the Retina display (despite having the same resolution on a larger screen) or the HTC One X's SLCD 2 panel — its whites aren't as bright, and its blacks aren't quite as dark. However, it does offer a wide color range and we liked the amount of detail retained in images, though some high-res videos showed slightly oversaturated colors. As the non-PenTile (RGB) screen delivers a



The MX 4-core has a 4-inch, 960 x 640, 288ppi display.

pixel density of roughly 288ppi, we had a difficult time picking out jagged lines or any form of pixelation. The viewing angles are so wide that the display remains usable even if you're viewing it nearly edge-on. We could read almost everything on the screen in direct sunlight as long as the display was cranked up to full brightness. The only exception was when we tried viewing detailed images or videos.

SOFTWARE

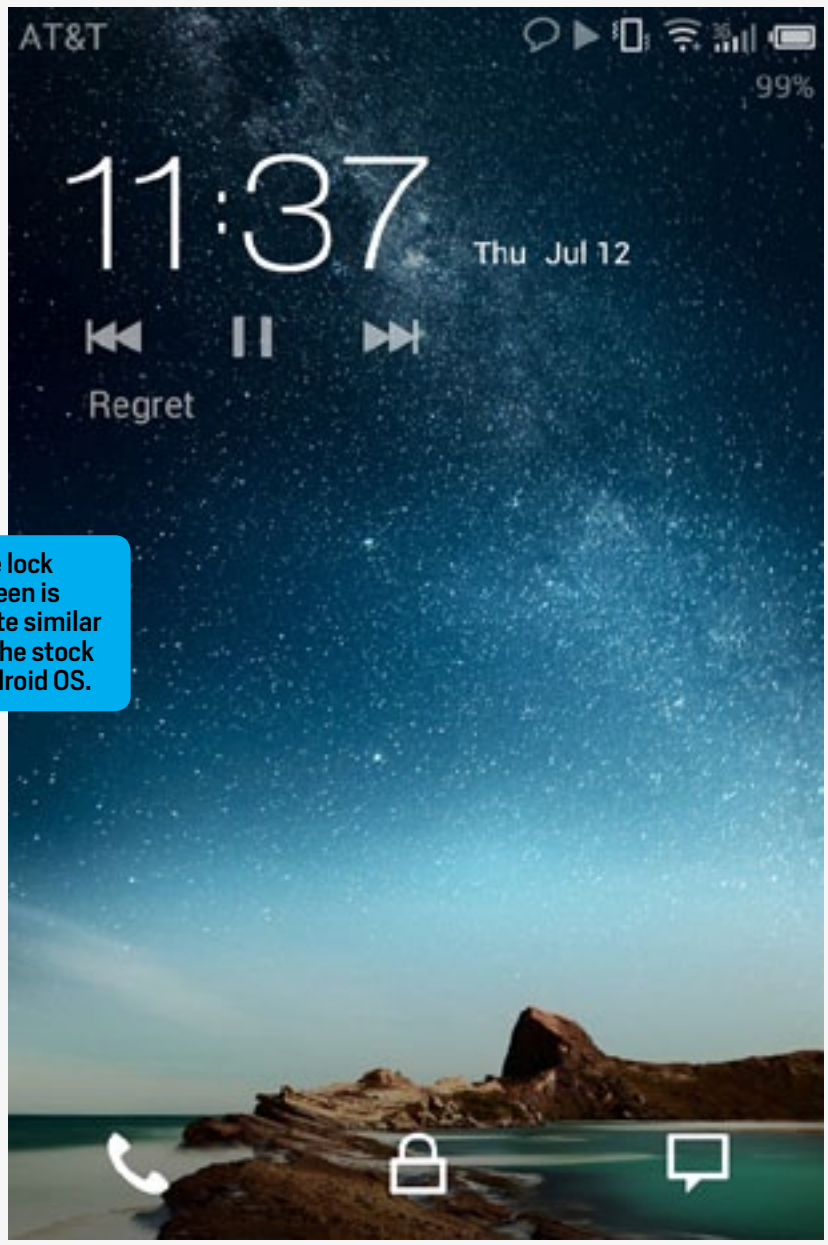
After booting up the device for the first time, you'll find that Meizu's Flyme OS is not your average Android skin. If you think Samsung and HTC have gone too far in their respective Android user interfaces, prepare to shift rather uncomfortably in your chair for the next few paragraphs — it's going to be a bumpy ride.

Indeed, Meizu's homebrewed skin may be a stranger to the Western hemisphere, but it still emits an aura of familiarity despite the fact that it bears virtually no trace of Google's stock UI. That's because after just a few minutes of playing with the device, we were reminded more of iOS than Android. (As we mentioned earlier, this comes as no surprise; we imagine Meizu has been on speed dial in Apple's legal office for several years.) Flyme OS, which we've seen on previous Meizu devices, is an interesting mash-up of the two popular operating systems.

At first, the lock screen makes it seem like Flyme won't be a drastic de-

Flyme OS is an interesting mash-up of iOS and Android 4.0.

parture from stock Android. Date and time are at the top just underneath the notification bar and above the music controls (only displayed during playback, of course), while three quick-access icons sit at the bottom of the screen. When sliding the icons up, Flyme adds in a clever animation that makes it appear as though the destina-

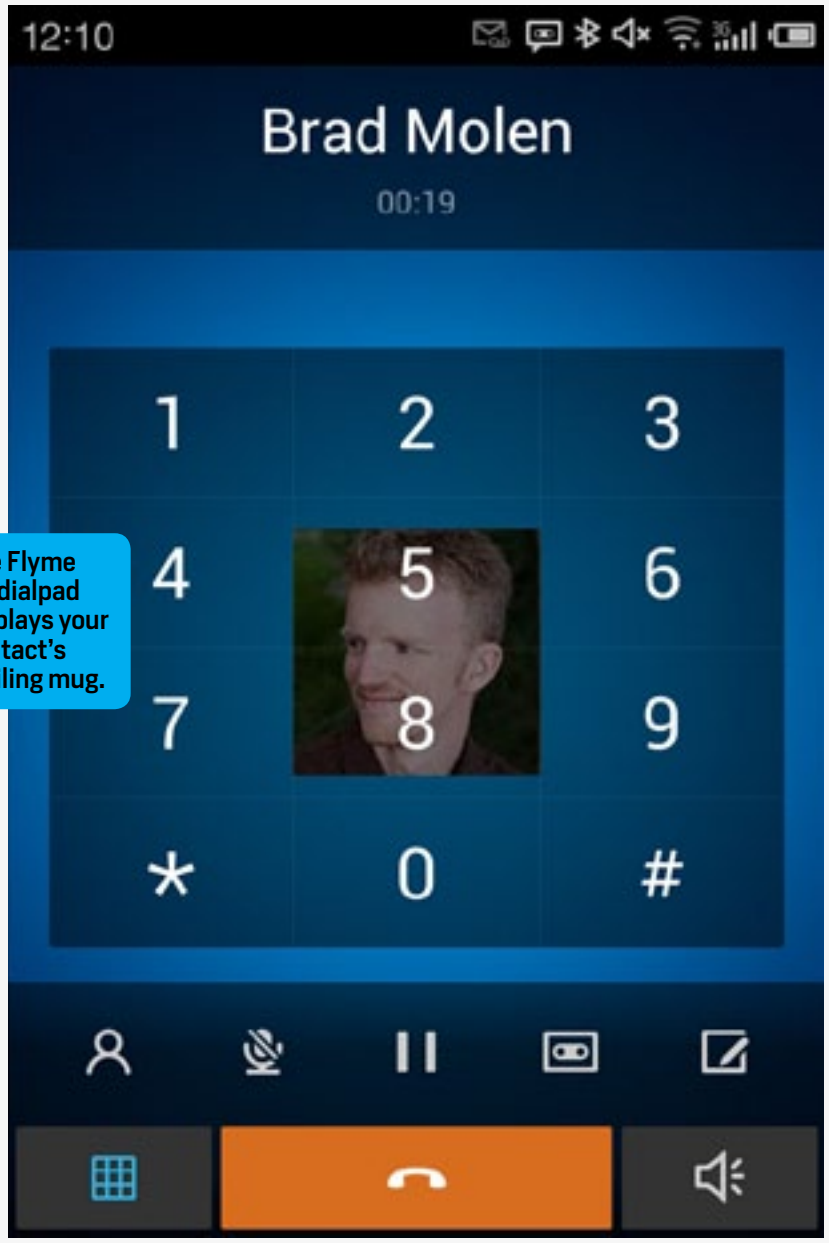


The lock screen is quite similar to the stock Android OS.

tion screen is being dragged up along with the icon itself.

The home panel is your typical 4 x 4 grid with the app dock hanging out at the bottom and a larger-than-usual status bar up top. The bar, which is twice as thick as the standard Android option, displays the date and time on the left, with all notifications pushed to the right. Meizu also threw in the remaining battery capacity on the lower right portion of the bar. As a side note, the status bar shrinks down to the normal size when you enter an application.

The app dock is also unique. Up to five icons can reside within it, though only four can be switched around. The one app that isn't going anywhere is Meizu's very own web browser, which we'll return to in just a moment. Perhaps the most jarring change in the Flyme setup, however, is the omission of an app tray. Every single app on the device is displayed on one of the home pages in the same style as iOS (and MIUI, incidentally). What's more, you can have up to 12 pages to place your apps and widgets, and each one is created in exactly the same fashion (dragging the app as far to the right as you can until a new panel appears). Having so many pages is frustrating, though, because the OS doesn't have a way of jumping to the panel of your choice, which means you have no choice but to swipe from page to page.



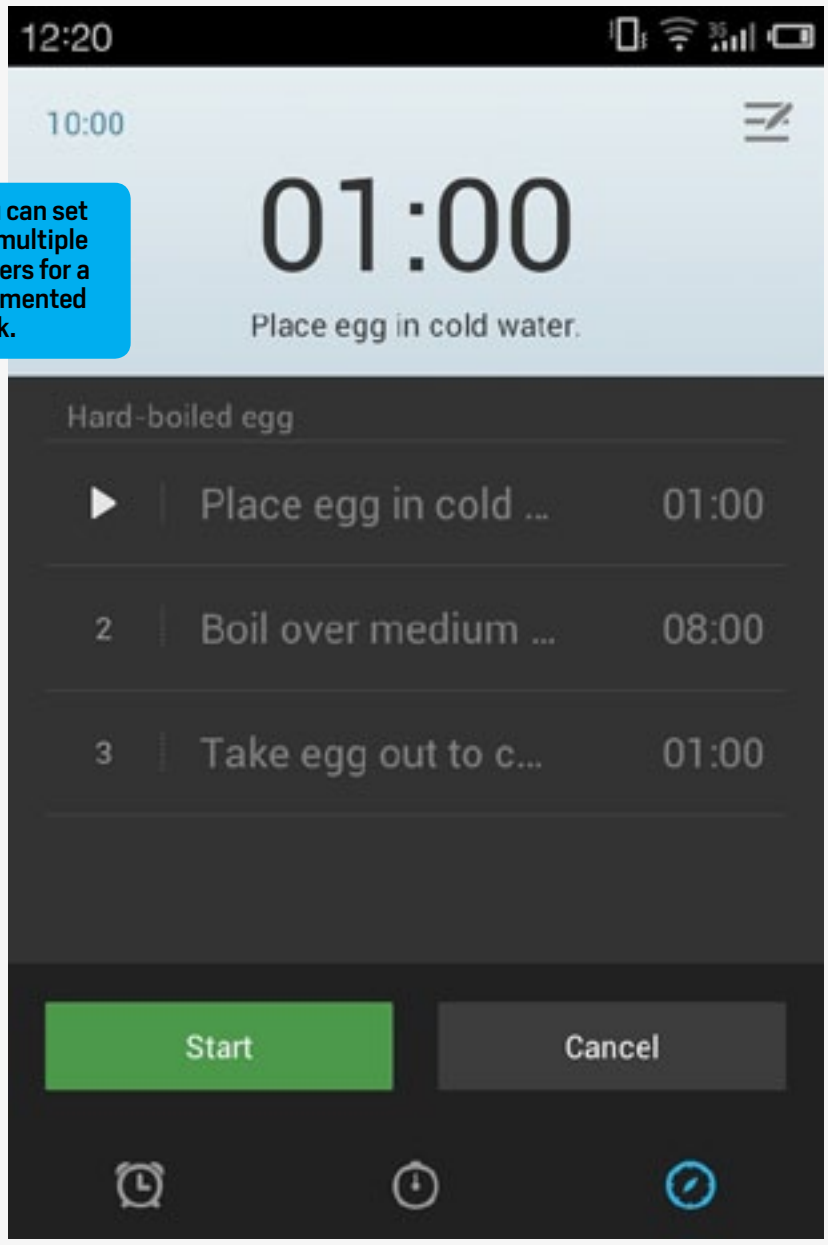
The Flyme OS dialpad displays your contact's smiling mug.

What if you just can't live without the app tray? Here's an easy solution: download a launcher that still supports one and your problem becomes a thing of the past. We installed Apex and were able to bring up a very familiar menu, complete with apps and widgets. By the way, multitasking also leans closer to Apple's approach: long-pressing the menu button brings up a horizontal bar with three layers. The middle layer is the most prominent, displaying four app icons at a time. To find more recent apps, just slide your finger to the left and you're treated to another set of four. Above these icons sits a button that enables you to close all of your open apps in one fell swoop. If you prefer, you can still get rid of them one

at a time by long-pressing icons until a large X appears below, after which you just drag and drop it. The bottom layer is reserved for a basic music player, which unfortunately doesn't appear to offer any support for third-party apps.

The notification bar is also slightly different than what you'd typically expect. On top, you'll find a set of quick-toggle buttons for WiFi, airplane mode, Bluetooth, GPS and sync. The date and a "clear all" button hang out just above these. However, the most interesting part is over on the right: a drop-down menu allowing you to switch between WiFi networks and the type of mobile network (you can choose between 3G-only, GSM-only or auto). Notifications can still be swiped away one at a time if necessary. Lastly, you can only drag the bar itself down as far as the bottom-most notification; in other words, if you don't have any to look at, the bar will only go down far enough to expose the quick controls found at the top. This may feel jarring to some, but we actually appreciated that the notification drop-down didn't unnecessarily obscure whatever it was we were looking at.

Despite its Apple-inspired layout, the device runs Ice Cream Sandwich — version 4.0.3, to be exact. This means you still have access to the Play Store and whatever widgets you want. But without an app tray, where can you find the widgets? They're in the settings menu, under "customize" — not



You can set up multiple timers for a segmented task.

necessarily the first place you'd think to look, but it's there nonetheless. Fortunately, unlike last year's MX, you can place the same widget in more than one spot. Speaking of ICS, there are a few features missing from Flyme. Face Unlock, for instance, is MIA, as is the data usage setting. Additionally, many of the core apps have been tweaked, the stock keyboard isn't included as an option, Android Beam isn't supported (naturally, since NFC isn't onboard) and so on.

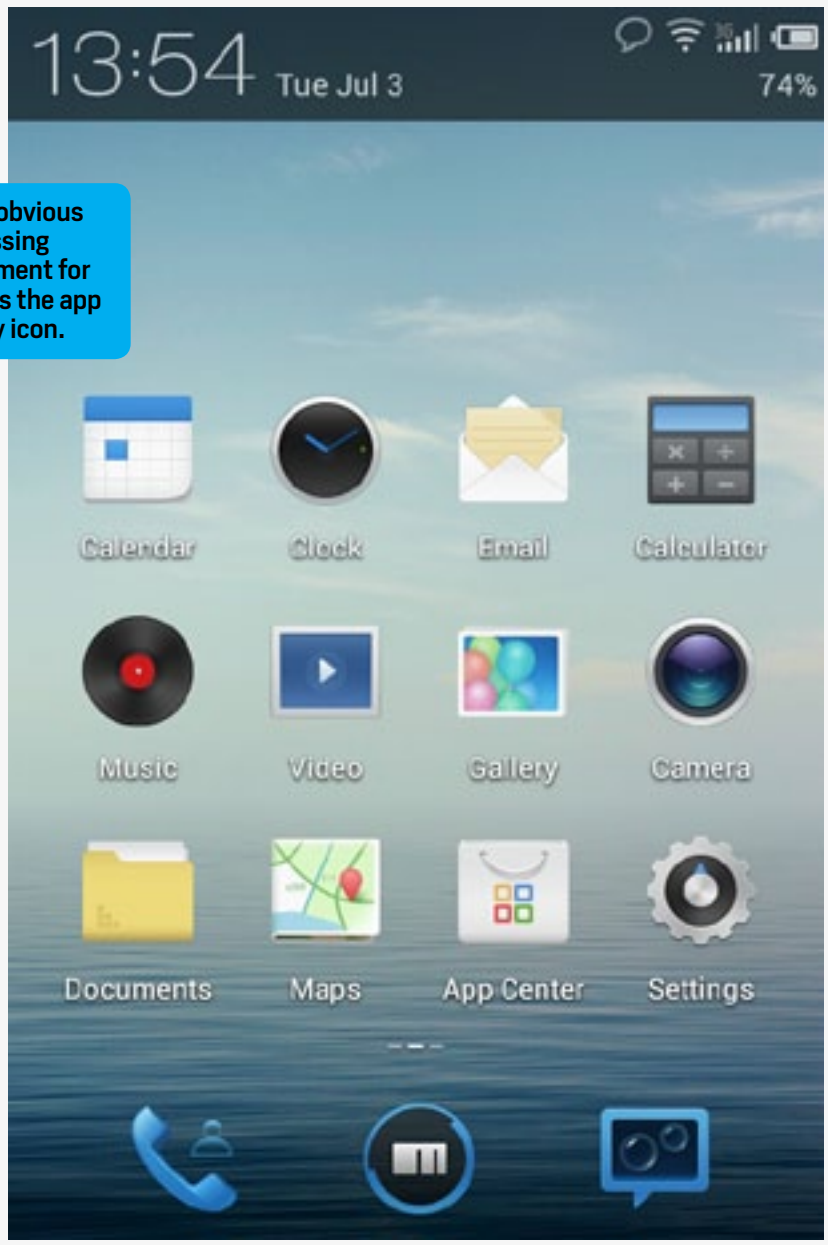
Flyme OS has quite a few clever shortcuts spread throughout the interface. Holding down the back button immediately places the phone in standby

Flyme has quite a few clever shortcuts spread throughout the interface.

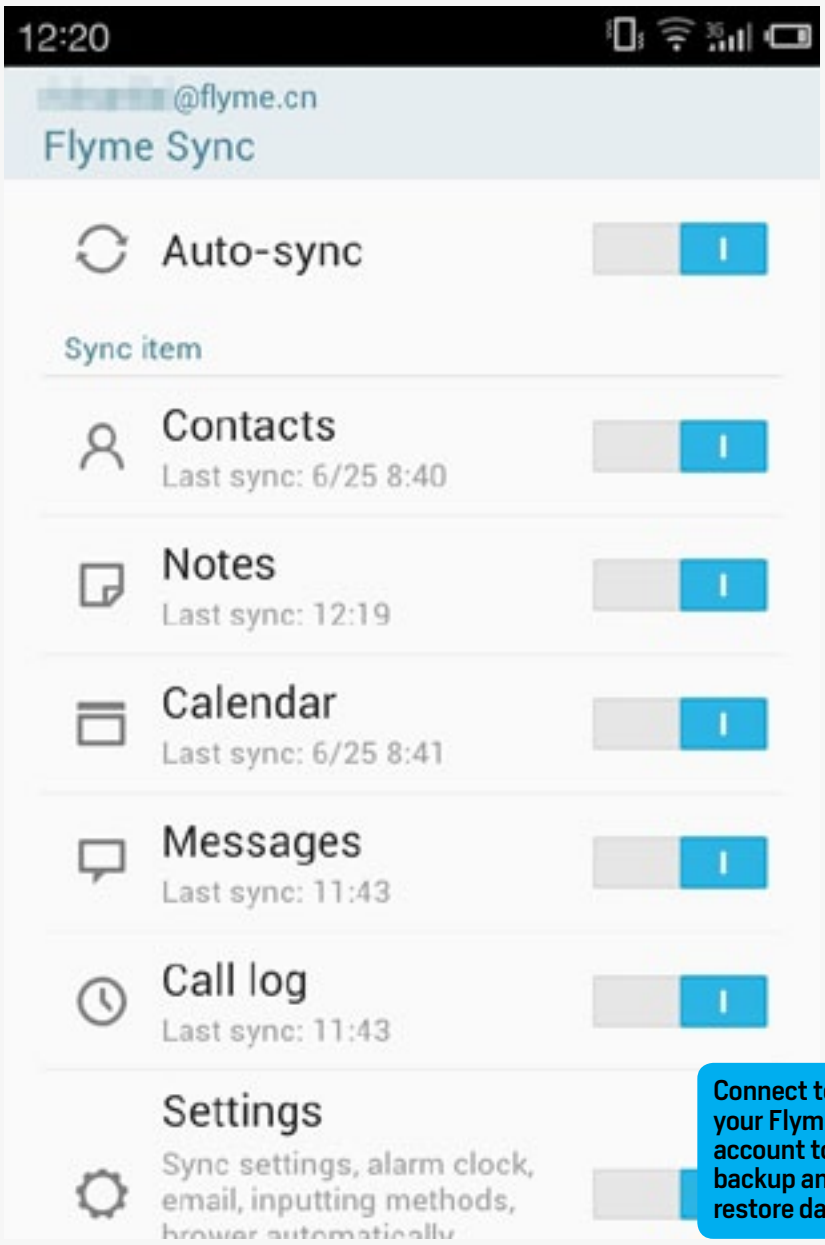
mode and shuts off the screen. Pressing the top-right corner of the display will automatically scroll you back to the top of whatever page or feed you're currently looking at, and pressing the home and power buttons will produce a screenshot. Holding the home and volume down keys will launch the camera app and automatically take a picture. While you're in camera mode, the volume down key acts as a toggle switch for the camcorder, and the volume up key can be used as a single-stage shutter button.

We're glad that third-party keyboard support is allowed on the MX, because we grew increasingly frustrated with the default option. Perhaps we've become spoiled by devices with larger screens, but the keys here are not only difficult to press accurately, they're arranged in left orientation. Faster typists will be concerned with the lack of autocorrect features, although word prediction is an option. It also took us a while to get used to the placement of the standard punctuation keys: instead of putting them with the other symbols or on a separate button, they're only accessible in the word prediction row when you hit the space bar.

As with the previous MX, the Play Store is limited to just one download at a time, contrary to the standard Android style, which provides for multiple streams. In fact, it seems as though the official Google store has been put on the backburner, since it's tucked away in an obscure folder (you can move it) while the Flyme App Store sits front-and-center on your home screen. This comes as no surprise, given the prevalence of alternative application markets found in China. Some core Google apps, such as Gmail and Google+, were noticeably absent from the start as well, while other random programs like Talk and



An obvious missing element for us is the app tray icon.



Translate made the cut. Don't worry, these apps can still be downloaded easily enough.

Of note is the ability to add your own Flyme account, which allows you to backup and restore your contacts, calendar, messages, call logs and settings whenever you need it. You also have access to the aforementioned homegrown Flyme Store, which hooks you up with a repertoire of apps geared mainly toward the Chinese market. Don't get too excited, though — it's relatively small, with roughly 20,000 apps added to its collection.

The remote control feature we saw on the dual-core MX didn't make a return appearance on this particular version, but Meizu tells us that the feature is only taking a brief hiatus and we should be seeing it again in the future. We're hoping to see this re-enabled in a later update, but we won't hold our breath.

But enough about cool features that can't be found on the device — let's discuss some more unique additions that can be used, like Flyme Voicemail. The service is similar to standard Visual Voicemail in the sense that you don't have to dial into your carrier's voicemail number to listen to your messages. But there are plenty of unique details here to make it a compelling concept in its own right. For instance, all of the messages are recorded locally and stored on the phone's Recorder app, which means you can listen to each voicemail immediately after the caller leaves it. You can also choose to have the feature enabled whenever there is no answer or even every time somebody calls. It's a lovely idea, but it needs some work: none of the voicemail messages were very clear; the voices sounded garbled and extremely distorted.

Additionally, the phone app allows you to record calls, and you can pick which parts of the conversation are recorded, just in case certain portions of the call need to stay off the record. In fact, you can even choose to have every conversation recorded automatically. To be clear, the recordings won't be perfect — while the mic picked up our voice

well and offered crisp playback, the other side of the line came out just as garbled as it did on the Voicemail feature. Still, you can at least hear the recording well enough to make out what everybody is saying. (This might be a good time to remind folks it's best to make sure the person you're chatting with knows you're recording the conversation.) You can also import and export contacts from the phone application, as well as filter out unwanted callers.

Another Flyme-branded service is Flyme Messaging, which is essentially Meizu's equivalent of iMessage; it only works if both parties are registered on Flyme and online. Meet both of those requirements and your message will be sent using data instead of as a text.

Flyme even offers its own take on the standard smartphone timer: a multi-segmented timed task list. This means that instead of featuring just a single timer that needs to be reset every time you want to start a new task, you can set multiple timers, each beginning after the previous one ends. If that isn't enough, you can even set up multiple lists of timed tasks.

The music and video players on the 4-core have a different look and feel than you'll find on the corresponding apps in stock Android. The music app, for instance, sticks to Flyme's simple aesthetic, but still offers a five-setting EQ with a few pre-programmed genres (including a custom option) and the ability to set up playlists and folders. The player adds an easy-access sleep timer for anyone who likes to fall asleep listening to their favorite Carly Rae Jepsen tunes. Finally, it also searches the internet to find lyrics and cover art for the song you're currently playing. It even scrolls through the lyrics in real-time, so you can sing along to your heart's content or skip ahead to your favorite verse. This feature's performance ultimately depends on how eclectic your musical tastes are, and indeed, our results were mixed. Often, if the system is confused as to which artist or album it's looking for, it will give you a few possible options to choose from, and generally gets it right once you give it a nudge in the right direction. Other times, however, the player would download the right lyrics but the wrong version of the song (we fired up New Order's "Temptation" but it pulled down Moby's cover).

The video player, meanwhile, keeps to the bare essentials. You're first greeted by a gallery-styled layout, with all of your titles showing up in one folder. This is the only major frustration we found with the app: in order for movies to show here, the file needs to be placed in a specific folder (this is also true for music, by the way). Fortunately you can still view any of your vids directly from the file manager if you need to, but it's an unnecessary nuisance. Once you begin watching the movie, you're presented with basic controls at the bottom, the file name on the top-left corner, volume to its right, and buttons

to adjust the brightness and screen lock (to prevent the display from turning off during a crucial moment).

CAMERA

The MX 4-core retains the same 8-megapixel backside-illuminated CMOS sensor found in the dual-core version, with f/2.2, autofocus and an LED flash just as before. As such, this camera finds itself in the same league as stars like the iPhone 4S (surprised?) and the Sony Xperia arc S. But it's important to consider which features are built into the user interface. Though it offers many similarities to the MX, Flyme's ICS skin is more streamlined than its Gingerbread equivalent. Its ISO is limited to 800 (versus 3200 on the MX), it only offers one wide dynamic range setting (down from four), has fewer scene mode options and generally delivers a much cleaner look.

The sidebar contains the virtual shutter button in the middle, flanked by a camcorder toggle switch on one side and the gallery button on the other. On the opposite end of the viewfinder are the flash modes (auto, on and off) and the front-facing cam toggle. The menu gives five paths for you to wander. Cap-

The MX's camera specs are up there with the iPhone 4S.

Comparing the cameras on the 2-core (L) and the 4-core (R).

ture mode lets you choose between panorama, normal mode, smile detection and burst shot. ISO comes next, followed by Scene Mode (night, landscape, macro and text scenes are the only alternatives you're offered), white balance and "other." That final option is where you'll find the wide dynamic mode, gesture capture and geotagging toggles. Lastly, holding the on-screen shutter button appears to lock focus, but not exposure.

Meizu's use of handy shortcuts doesn't stop with the camera, either. While you're in the app, the volume down button acts as a camcorder toggle switch and the other side of the volume rocker works as a single-stage shutter button — this may come as a disappointment to some, but we're happy to see the company include at least some type of physical shutter. This is the same setup as we saw on last year's model, but this time the camera app will work in two landscape directions. This gives you the chance to take images with the volume rocker on top, which makes for a more natural photo-taking experience.

Another feature carried over from one MX generation to the next is Gesture Capture, which lets you take a shot just by placing your finger (or the side

The volume down button acts as a camcorder toggle, while the volume up can be used as a physical shutter key.

of your hand) above the front-facing camera. By letting you take the image without physically tapping the phone, it's designed to reduce the chance of shaking or blurriness.

While we expected the image quality to be virtually the same on the 4-core as it was on the original MX, we were surprised to see a slight improvement on the newer device. Looking at the pictures side by side, you may notice that the 4-core's version displays more natural tones and a small improvement in white balance. We were also relieved to see that, true to the promise of ICS, the shutter lag was greatly minimized and the app itself was noticeably quicker.

We were happy to see daylight images churning out natural and realistic colors without any clear exaggerations in saturation, and we were pleased with the majority of our shots. Taking advantage of the BSI sensor was also a great experience, as it came in handy in low-light situations. In one instance, we activated night mode outside with only a porch light turned on around 30 feet away, and the sensor grabbed enough errant light from it to produce a usable image. Of course, an unfortunate side effect to this is that the shutter remains open for a longer period of time, making moving objects turn out blurry when they're close to the camera. (The results were generally much better for those objects in the background.) The macro focus mode gave us average results, as we were able to properly focus on objects as close as 5-10cm from the lens. When compared with the Galaxy S III's macro mode, however, we discovered that fewer details made it into the MX's shots.

The front-facing cam was the only major disappointment, but our expectations were already set by its VGA sensor. Each image picked up too much noise for our taste, while colors were washed out in sunlight. The app also doesn't allow an adjustable settings menu while in this mode.

Moving on to video recording, we first noticed that little has changed since the last MX came out — including Meizu's insistence that 720p should be the default resolution, despite the camcorder's ability to record at 1080p. If the company's concerns are with limited storage, the additional storage space in the 4-core (32 or 64GB, as opposed to the dual-core's 16GB) should be enough to change its mind. At the very least, it would be helpful to have some sort of notification the very first time the camcorder is booted up.

The 1080p video quality (1,920 x 1,088 at 31fps, MPEG-4 AVC main pro-

file at level 4 and 10.5Mbps bit rate) is reminiscent of what we saw on the last MX, with the exception of the green overcast we noted during last year's review. Choppiness was kept to a minimum (with only a little bit in low-light situations) and the mics do a great job of capturing audio. Continuous autofocus is still missing here, though the action can at least be mimicked manually with the viewfinder's tap-to-focus capability, which allows you to focus on any part of the screen.

PERFORMANCE AND BATTERY LIFE

As we discussed earlier, the MX 4-core houses a mystery 32nm quad-core Cortex A9 chipset clocked at 1.4GHz, and Meizu has been coy about revealing any more specifics. As we said, though, a quick Google search (as well as a litany of third-party system diagnostic apps) has exposed the wafer's true identity: it is, as we suspected, a rebranded Exynos 4412. (Again, this shouldn't come as a shock since last year's MX featured the dual-core Exynos 4210.) In other words, barring any unknown tweaks on Meizu's end, this is virtually the same chip featured on the Galaxy S III and is accompanied by a Mali-400MP GPU and 1GB RAM.

But Meizu has a neat trick up its sleeve that Samsung's flagship device doesn't: the ability to underclock the processor as a way of preserving battery life. Called "CPU level," this option is hidden in the accessibility section of the settings menu and lets you choose between three performance tiers — low mode limits the chip to 800MHz, medium bumps it up to 1.0GHz and high mode pushes the processor to its full potential at 1.4GHz (though we suspect there are plenty of code connoisseurs eager to prove that this clock speed is for the birds). As we'll explain, you may find yourself switching back and forth more frequently than you'd expect.

In true Engadget tradition, we ran the Meizu through a full gauntlet of benchmarks to see what this thing's made of. How does it fare against its previous generation as well as some of its quad-core competition? We've tabulated the results.

Given the Exynos chipset, we weren't surprised to see Meizu's new flagship play ball with its silicon brother, the GS III — but one significant difference here is that the 4-core rocks a much smaller display and lower resolution, which naturally had an impact on some of the scores (namely, Quadrant). Chances are that Meizu's heavyweight Android skin may have also had an adverse effect on the phone's scores. Regardless, it still emerged as the champ in half of the benchmark tests we ran, with respectably modest margins the rest of the time.

As for real-life usage, the quad-core device performed as we expected — insofar as processing power, at least. We were concerned by how frequently the 4-core froze on us — it typically

BENCHMARK	MEIZU MX 4-CORE	MEIZU MX DUAL-CORE	SAMSUNG GALAXY S III (I9300)	HTC One X
QUADRANT	**5,229**	3,497	4,454	4,906
VELLAMO	1,455	1,394	**1,751**	1,617
ANTUTU	**12,014**	6,808	11,960	11,030
SUNSPIDER 0.9.1 (MS)	1,463	1,537	**1,460**	1,773
GLBENCHMARK EGYPT OFFSCREEN (FPS)	96	71	**99**	63
CF-BENCH	**13,883**	7,729	13,110	13,233

SUNSPIDER: LOWER SCORES ARE BETTER; NOTE: MEIZU MX DUAL-CORE RESULTS RECORDED ON ANDROID 4.0.3 WITH FLYME 1.0 BUILD.

stalled at least once a day during regular use, but there didn't seem to be any rhyme or reason for these hiccups. It often occurred during menial tasks that aren't taxing to the processor. When we encountered these bugs, the screen would stay frozen for a few minutes until it finally went black and the phone automatically rebooted. Meizu told us it's addressing this in an upcoming firmware update for the Chinese model, but we're still waiting to see a compatible build for the international version.

There are some bugs that Meizu's engineers hadn't been aware of, which may have a negative effect on your overall experience. The Gmail app, for instance, is incapable of downloading attachments or conducting a standard search, even though the proper buttons and user interface elements are all present. (In discussions with Meizu, reps were quick to recommend that we use its native email client for Gmail, which utilizes IMAP.) We've also seen overlapping text in the calendar app when using the agenda view.

Equally disappointing — if not even more so — is the battery life. Our endurance tests, which involve looping a video with WiFi and data enabled and the screen fixed at 50 percent brightness, told a terrible tale. The 4-core lasted only three and a half hours in high CPU mode (1.4GHz), five hours and 12 minutes in medium (1.0GHz) and five hours and 20 minutes when turned to the lowest setting (800MHz). The small difference between medium and low modes was a little perplexing, but our theory is that the screen's power consumption likely dominated the CPU in the latter setting.

The real-life usage results were

just as depressing: with the occasional call, moderate surfing, a little photo-taking, a steady stream of email and continuous social media updates, we ran out of juice in six hours on high mode and 10 hours on medium. The only scenario that got us almost an entire day was when the processor was clocked at 800MHz. This means the casual user may be able to use this as their daily driver without needing constant electrical nourishment, but power users won't be so lucky.

How about that internet? On the highest performance setting, we saw little to no lag when bringing up a photo-heavy site like Engadget. We were able to scroll through the entire page as we waited for the last pictures to appear, which frankly didn't take very long on an HSPA+ connection anyway. As if we needed any more persuasion, the 4-core grabbed some very convincing SunSpider and Vellamo scores, with the former grabbing some of the best scores you'll find on a phone at the moment.

We were quite satisfied with how well HD movies fared when playing them back on that 960 x 640 display. After playing multiple 1080p and 720p movie trailers on all three CPU settings, we came away impressed with the 4-core's ability to crank through all of them without nary a frame skip. Audio and video remained in sync the entire time on the phone, and MHL playback left us happily enjoying our multimedia with seldom a hitch.

With headphones, audio playback performance was excellent. It's one of the best multimedia devices in that regard — we experienced a diverse tonal range, and the volume was more than sufficient for our needs. The external speaker is loud enough, but we wouldn't want to listen to music or watch a full-length movie without plugging in a pair of headphones — especially when using the phone in portrait mode, since it's easy to cover the speaker with your hand.

Despite some dreadful playback performance from Flyme Voicemail, the small earpiece was sufficient for real-time voices to come through to our satisfaction. While our callers mostly reported we sounded clear, we apparently

MEIZU MX 4-CORE BATTERY LIFE	ENDURANCE TEST	AVERAGE USE
HIGH MODE (1.4GHZ)	3:30	6:00
MEDIUM MODE (1.0GHZ)	5:12	10:00
LOW MODE (800MHZ)	5:20	12:00

Moderate and power users won't get anywhere near a full day of juice out of the 4-core's battery.

sounded slightly muffled on occasion. We never suffered any dropped calls during our time with the phone, and the 4-core's reception was on par with the AT&T Galaxy S III.

GPS took a little longer to lock into an exact position than on some other flagships we've tested recently (e.g., the GS III and HTC One X), but it generally took less than half a minute to get the right location. Once it locked onto our coordinates, it stayed accurate most of the time. On occasion, unfortunately, the blue dot would wander a few miles away, but it would return after a few curse words of encouragement on our part.

The quad-core variant of the MX also saw some slight improvements in USB transfer speeds. It chugged along at roughly 10MB/s while moving an hour-long video to the phone. That's not the fastest we've seen (especially when compared to the Xiaomi Phone), but it's still better than the dual-core's 8.5MB/s performance.

Rather than opting for Bluetooth 4.0, Meizu decided to go with version 2.1 + EDR. We never had any problem connecting the 4-core to any other device using this wireless standard, and this phone is no exception. Unsurprisingly, it took longer to transfer files — moving a .MOV file from our desktop to the phone was successful, but it clocked in at an average pace of 55KB/s. Pushing the same file to a v4.0 device averaged 120KB/s. Fun fact: if you initiate a Bluetooth file transfer with another MX device, one of them then

The Meizu MX 4-core has a sleek eye-catching design.

becomes a WiFi hotspot and the transfer uses WiFi for better speed.

WRAP-UP

At the close of this lengthy review, we're left with a somewhat bizarre dilemma on our hands. It's hard to say no to a quad-core Exynos device that offers a plethora of clever features experienced by Android fans on this side of the Pacific Ocean — especially at such a tempting price. But packaged in with the good are a handful of tradeoffs that you'll need to accept before whipping out your wallet. Power users (and most moderate phone users, for that matter) will scoff at the battery life and the smaller qHD display, and fans of traditional Android skins may reject Flyme's heavily stylized (and iOS-like) look. Additionally, there are still quite a few wrinkles in performance that need to be ironed out before it's ready to hit the global stage. And it may be hard to justify searching lands near and far to find a 4-core when unlocked devices like the Samsung Galaxy Nexus offer a buttery-smooth performance, use stock Jelly Bean (Android 4.1) and can be yours for less hassle at a lower price.

Despite some of its flaws, we can't help but have a hearty helping of admiration for a device like the MX 4-core. It's playing the role of the underdog in the mobile industry, and its creator has been hard at work, coming up with some clever new ideas that will only stand to benefit consumers in the long run. It's been fun trying to unlock the many little secrets this phone holds, and — as the box itself promises — we're sure there are plenty more surprises in store for those who crave cool new phones. D

Richard Lai contributed to this review.

Brad is a mobile editor at Engadget, an outdoorsy guy, and a lover of eccentric New Wave and electro. Singer and beatboxer.

BOTTOMLINE

MEIZU MX 4-CORE

HK$3,099+ (US $400)

PROS

- Includes pentaband radio
- Reasonably priced
- Great audio and video playback

CONS

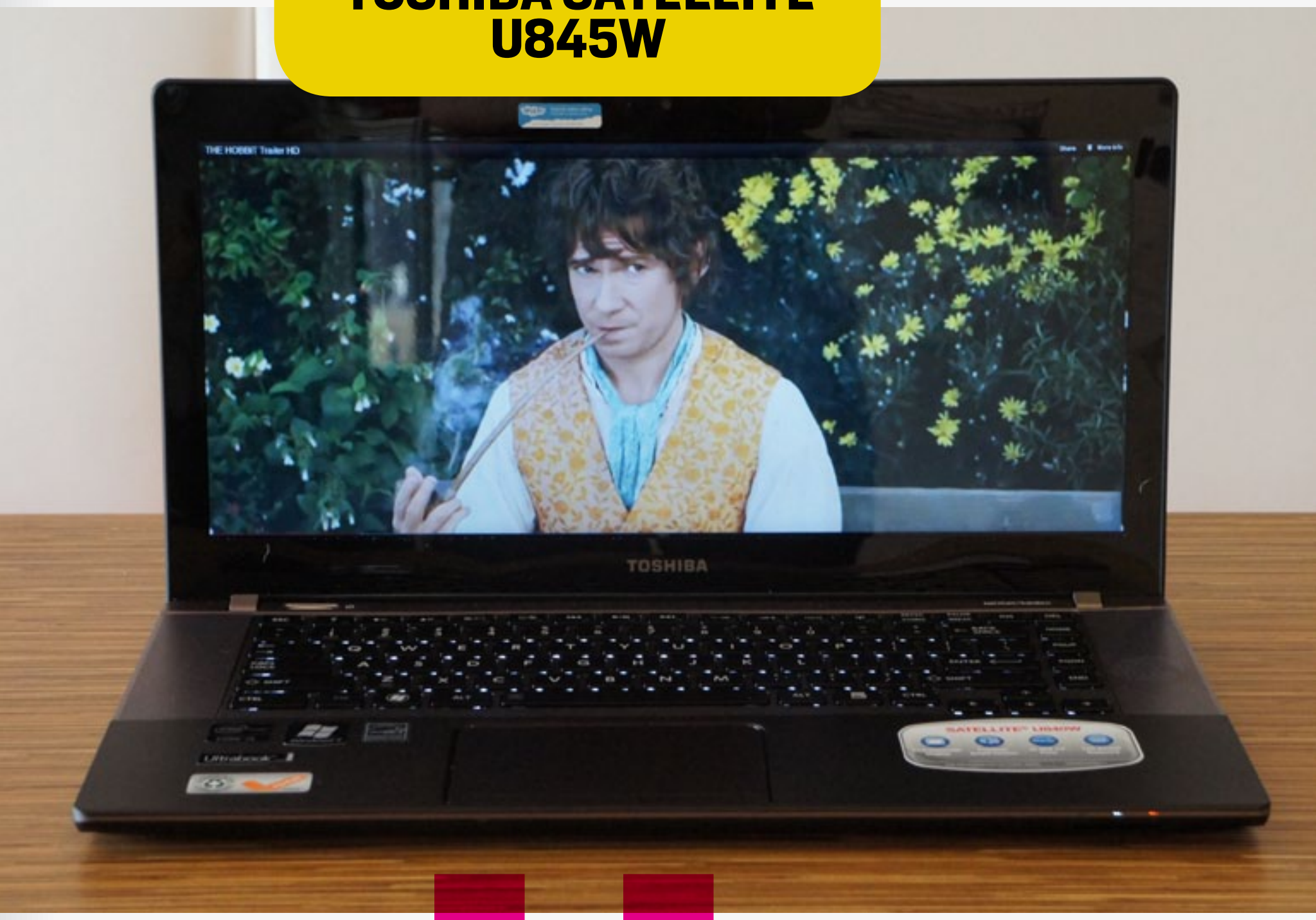
- Disappointing battery life
- No memory expansion
- Quad-core performance hampered by bugs

BOTTOMLINE

The Meizu MX 4-core is a decent quad-core device, but its limited availability outside China and horrendous battery life make it a tough sell for power users.

REVIEW

TOSHIBA SATELLITE U845W



For widescreen enthusiasts, the Satellite U845W hits that sweet spot, but will this laptop make the cut for everyone else?

By Sarah Silbert

Ultrabooks now come in countless shapes and sizes, and we've seen display quality vary just as much. Though 1,366 x 768 may still be the norm, 1,600 x 900 panels aren't unheard of in this ultraportable category. But what about a screen that bucks the 16:9 aspect ratio for an extra-wide 21:9? Toshiba is mixing things up with its new premium Satellite U845W Ultrabook ($1,000 and up), the first laptop to feature that odd aspect ratio.

Styled in the fashion of movie theater screens, the U845W's 14.4-inch, 1,792 x 768 panel adds

more horizontal pixels — ostensibly to enhance the movie-watching experience. In theory, too, that setup should allow for more room to multitask with windows side by side. So how good of an idea is a 21:9 screen in practice? Join us as we put it to the test.

LOOK AND FEEL

The most striking thing about the U845W is undoubtedly its squat design. At 14.5 x 7.9 inches, the laptop gives you plenty of horizontal screen real estate, but the 14.4-inch panel's 21:9 aspect ratio means the display is disproportionately short compared to what you'll find on other systems. (More on screen quality later.) Toshiba has talked up the U845W's unique form factor, saying its footprint is ideal for air travel since you won't have to worry about the person in front of you reclining their seat. When we traveled with the laptop, though, what we noticed most was how it tests the limits of a backpack — it fits, but it's going to be tight.

Dimensions aside, the U845W is a good-looking machine. The lid sports a rubberized strip along the edge, but most of the surface is fashioned out of brushed aluminum in an attractive copper shade. (In fact, it reminds us of the two-tone aesthetic Samsung used for several of its Series 3 models.) The bottom side is made of the same soft-touch material as the lid and the small dimples give it a firm, comfortable grip. At four pounds, it's just a hair heavier than the

Dimensions aside, the U845W is a good-looking machine.

14-inch Samsung Series 5 (3.94 pounds), which happens to be just as thick as the U845W (0.82 inches). All told, while the U845W's unconventional measurements make for a stocky silhouette, it still has the build quality and tasteful design you'd expect from a premium machine.

The U845W comes with a handsome selection of ports, including three USB 3.0 sockets (one of which has Sleep-and-Charge capability), an Ethernet jack, HDMI-out and separate ports for headphones and a mic (included here is Toshiba's Sleep-and-Music technology). Meanwhile, the memory card reader is tucked away on the bottom lip of the machine.

The U845W's copper-tinted brushed aluminum exterior.

KEYBOARD AND TOUCHPAD

The U845W's keyboard sports the island-style layout we see on so many laptops these days and indeed, like other Ultrabooks, it suffers from shallow keys and a little too much flex. When we gave the Ten Thumbs Typing Tutor a whirl, we managed 53 words per minute with a 6 percent error rate — a poor showing for this particular editor. The problem is that the keys are sticky; simply pressing a letter requires a good deal of effort. Most often, your press won't be recognized, or the keyboard registers an adjacent letter. And, as with Toshiba's first Ultrabook, the Portege Z835, it doesn't help that the keys are unusually wide and vertically short. Because they're shaped the way they are, there's not much buffer between them. Toshiba didn't add a number pad on this spacious layout, instead using a good deal of space on each end for the speaker grilles. We do, at least, appreciate that the keyboard is backlit — this feature isn't standard on Ultrabooks, after all.

On to that Synaptics touchpad. We'd like to say the scrolling and clicking experience is smooth, but that's not exactly the case. First of all, we wish Toshiba had situated the touchpad dead-center rather than slightly off to the left; its placement requires some getting used to. Paging through websites and pinch-to-zoom works reliably, but other ges-

Our testing of the trackpad yielded some mixed results.

tures such as image rotation only register every few tries. In general, we found that the trackpad offered too much resistance to accurately recognize our clicks and taps. On the bright side, palm rejection is great, and you won't have to suffer any accidental input.

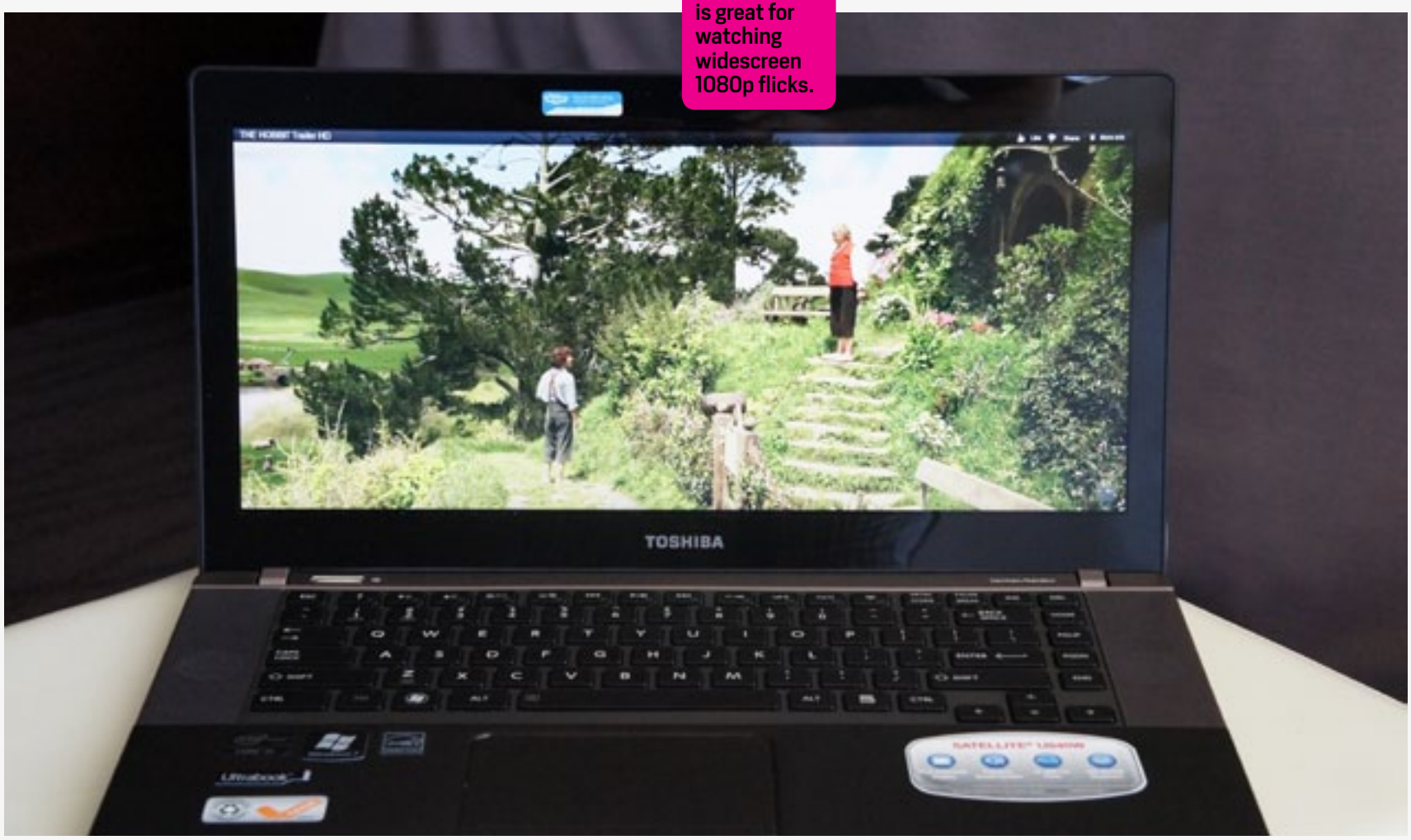
DISPLAY AND SOUND

The 14.4-inch, 1,792 x 768 TN display is clearly the main attraction here, and it *is* great for watching 1080p videos. Viewing angles are sufficiently wide (you could accommodate three to four people huddled around this machine) — that is, until you tip the screen forward or back, in which case images wash out quickly. Colors are accurate, if not overly rich, though the display's glossy finish kicks back no shortage of glare.

Keep in mind that most media isn't filmed in the U845W's 21:9 aspect ratio.

Keep in mind that most media isn't filmed in the U845W's 21:9 aspect ratio; when we fired up *Batman: Arkham City* and various movie trailers we saw black columns on either side of the clip. Indeed, letterboxing appeared on nearly everything we watched.

Let's be clear: the 1,792 x 768 resolution ultimately amounts to your garden-variety 1,366 x 768 with some extra horizontal pixels. And while



This screen is great for watching widescreen 1080p flicks.

there are clear cinematic benefits to the U845W's form factor, the extra width makes everything on the screen feel smaller than usual. When viewing web pages and working through our Gmail inbox, we often felt the need to zoom in, as default text size seemed dwarfed by the laptop's ample screen real estate.

Toshiba's SnapScreen utility is a preloaded feature that lets you take advantage of the expansive panel by viewing two windows side by side. Click the icon at the top of a window, and the computer will resize the window so you have room to view a browser and Windows Media Player, for example. This feature isn't as seamless as the Snap feature built into Windows; you have to specify which split view you want, and the options aren't as intuitive as we would like. It's nice to work in one window while viewing content or chatting in another, but since everything feels shrunken on this giant screen, the setup isn't perfect.

Flanking the keyboard are two Harman Kardon stereo speakers — a setup powerful enough to fill a medium-sized room and then some. When we streamed a couple songs from a '90s rap Spotify playlist, we were able to make out plenty of bass, though sound wasn't very crisp. SRS Premium Sound 3D software is on board, letting you tweak your laptop's audio profile depending on whether you're listening to music or watching a movie. Bumping up the bass level and SRS definition results in richer sound, though you won't be able to escape the tinniness completely.

PERFORMANCE AND BATTERY LIFE

With a Core i5 Ivy Bridge CPU clocked at 1.7GHz, 6GB of RAM and a 500GB hard drive plus 32GB of solid-state storage, the Satellite U845W is a decent performer — at least compared to other Ultrabooks with hybrid hard drives (most ultraportables at this price come standard with an SSD). On synthetic benchmark tests like PCMark Vantage and 3DMark06, the laptop notched higher numbers than many other 14-inch systems, including the Samsung Series 5 and last year's Dell XPS 14z. In ATTO, the U845W notched 103 MB/s read speeds and 97 MB/s writes.

The U845W has Intel HD Graphics 4000, so you shouldn't expect too strong of a graphics punch, but its score of 5,471 is certainly respectable. It tops other systems with the same chipset, including the Lenovo IdeaPad U310 (4,549), ASUS Zenbook Prime UX21A (4,550), and the Samsung Series 9 (5,155). In *Batman: Arkham City*, the frame rate hovered around 50 fps, but we saw a much more modest 22 fps in *Call of Duty*.

In everyday use, the U845W was responsive and ran smoothly, even with a dozen-plus tabs open across two browsers, Spotify running and the occasional gaming break. Cold-booting into Windows 7 Home Premium takes a brisk 20 seconds, and we never encountered any sluggishness or force-quits during our testing period.

On our battery rundown test, which involves playing a locally stored video on loop with WiFi on and display brightness

set to 65 percent, the Satellite U845W lasted five hours and 13 minutes. That's on par with other 14-inch Ultrabooks, such as the Series 5, which lasted five hours and nine minutes. Categorically, though, we don't see why these 14-inchers can't offer more impressive runtime compared to 13-inch ultraportables, especially since they have room for larger batteries.

BENCHMARK	PCMARK VANTAGE	3DMARK06
TOSHIBA SATELLITE U845W (1.7GHZ CORE I5-3317U, INTEL HD GRAPHICS 4000)	9,043	5,471
MACBOOK AIR (13-INCH, MID-2012; 1.8GHZ CORE I5, INTEL HD GRAPHICS 4000)	**13,469**	5,827
ACER ASPIRE TIMELINE ULTRA M3 (1.7GHZ INTEL CORE I7 2637M, INTEL HD 3000 / NVIDIA GEFORCE GT 640M 1GB)	11,545	**11,128**
SAMSUNG SERIES 9 (15-INCH, 2012, 1.6GHZ CORE I5-2467M, INTEL HD GRAPHICS 3000)	10,580	4,171
ASUS ZENBOOK UX31E (1.7GHZ CORE I5-2557M, INTEL HD GRAPHICS 3000)	10,508	4,209
ASUS ZENBOOK PRIME UX21A (IVY BRIDGE CORE I7 PROCESSOR, INTEL HD GRAPHICS 4000)	10,333	4,550
LENOVO IDEAPAD U300S (1.8GHZ CORE I7-2677M, INTEL HD GRAPHICS 3000)	9,939	3,651
HP ENVY 14 SPECTRE (1.6GHZ CORE I5-2467M, INTEL HD GRAPHICS 3000)	9,335	3,468
SAMSUNG SERIES 9 (13-INCH, 2012, 1.7GHZ INTEL CORE I5-3317U, INTEL HD GRAPHICS 4000)	8,624	5,155
LENOVO IDEAPAD U310 (1.7GHZ CORE I5-3317U, INTEL HD GRAPHICS 4000)	8,345	4,549
LENOVO THINKPAD X230 (2.6GHZ CORE I5-3320M, INTEL HD GRAPHICS 4000)	8,234	4,891
DELL XPS 14Z (2.8GHZ CORE I7-2460M, INTEL HD GRAPHICS 3000 / NVIDIA GEFORCE GT520M 1GB)	7,982	5,414
ACER ASPIRE TIMELINE ULTRA M5 (481TG-6814, 1.7GHZ INTEL CORE I5-3317U, INTEL HD GRAPHICS 4000 / NVIDIA GEFORCE GT640M LE 1GB)	7,395	9,821
14-INCH SAMSUNG SERIES 5 ULTRABOOK (1.6GHZ CORE I5-2467M, INTEL HD GRAPHICS 3000)	6,908	2,618

LAPTOP	BATTERY LIFE
TOSHIBA SATELLITE U845W	5:13
SAMSUNG SERIES 9 (15-INCH, 2012)	7:29
LENOVO THINKPAD X230	7:19
SAMSUNG SERIES 9 (13-INCH, 2012)	7:02
MACBOOK AIR (13-INCH, 2012)	6:34 (OS X) / 4:28 (WINDOWS)
HP FOLIO 13	6:08
HP ENVY SLEEKBOOK 6Z	5:51
TOSHIBA PORTEGE Z835	5:49
ASUS ZENBOOK UX31E (2011)	5:41
SONY VAIO T13	5:39
MACBOOK AIR (13-INCH, 2011)	5:32 (OS X) / 4:12 (WINDOWS)
HP ENVY 14 SPECTRE	5:30
ACER ASPIRE TIMELINE ULTRA M3	5:11
LENOVO IDEAPAD U300S	5:08
SAMSUNG SERIES 5 ULTRABOOK (14-INCH, 2012)	5:06
ACER ASPIRE TIMELINE ULTRA M5	5:05
DELL XPS 13	4:58
LENOVO IDEAPAD U310	4:57
DELL XPS 14Z	4:54
ACER ASPIRE S5	4:35
SAMSUNG SERIES 9 (13-INCH, 2011)	4:20
ASUS ZENBOOK PRIME UX21A	4:19

SOFTWARE

Toshiba doesn't skimp when it comes to its branded pre-load. The company's pre-installed utilities include Book-Place, Laptop Checkup, ReelTime and Sleep Utility, but the grand total comes to more than a dozen Toshiba programs. Third-party applications include Adobe Acrobat Reader, Adobe Flash Player, and trial software from Norton Internet Security and Skype.

CONFIGURATION OPTIONS AND THE COMPETITION

The unit we tested, the Satellite U845W-S410, is the $1,000 entry-level configuration. For that price, you get a Core i5 CPU, 6GB of RAM, and a 500GB 5,400RPM hard drive coupled with 32GB of solid-state storage. A $1,500 model steps up to a Core i7 processor and a 256GB SSD, and you can configure the system to run Windows 7 Professional instead of Premium, which comes standard.

If you want a 14-inch Ultrabook, you won't find any other options with the U845W's unique dimensions and 1,792 x 768 display, but you will find many Intel-approved systems in the 13- and 14-inch range that offer faster performance — not to mention higher-res panels. The HP Envy 14 Spectre ($1,400 and up), is a splurge, but its 1,600 x 900 IPS display is stunning (if not a 21:9 novelty like the U845W's). Additionally, it features Beats Audio and a memorable glass-and-metal design.

TOSHIBA SATELLITE U845W

You can find faster, longer-lasting Ultrabooks for a similar price.

The MacBook Air is also a bit more expensive than the U845W, but it lasts longer on a charge and offers faster performance. At 2.96 pounds, it's also one of the lightest ultraportables around. On the 13-inch front, you might also want to consider the ASUS Zenbook Prime UX31A, which has a 1,920 x 1,080 IPS display and comes with either a 128GB or 256GB SSD. That system starts at $1,099, and it's also a very portable 2.86 pounds. Lastly, let's not forget one of our favorite

The U845W's 21:9 display ratio makes for a unique figure.

TOSHIBA SATELLITE U845W

Ultrabooks, the 13-inch Samsung Series 9 ($1,300 and up), which brings long battery life, fast performance, an impossibly thin metal chassis and a bright, matte 1,600 x 900 display.

Toshiba also offers the Satellite U845 Ultrabook, a 14-inch Ultrabook with more conventional dimensions. You won't get the extra-widescreen display — it's a standard 1,366 x 768 pixels here — but you do get the same processor, graphics and storage. This laptop starts at $699, which is about as cheap as Ultrabooks get right now.

WRAP-UP

There are so many Ultrabooks on the market that the available options may seem to blend together. So, if for nothing else, the Satellite U845W stands out for its unique display. Sadly, the actual display quality is merely mediocre, and while it's a treat to watch videos that don't exhibit letterboxing, that doesn't happen nearly enough. And truly, that's the big problem here: media isn't tailored to that super-wide aspect ratio.

We like the U845W for its powerful speakers and attractive, portable design. It's just not the most practical system, and though $1,000 is palatable in a world of high-priced Ultrabooks, you can find faster, longer-lasting Ultrabooks for a similar price. If you're a cinephile with money to blow, you might enjoy the U845W as a novelty; after all, when content fits the screen, it's great. If you're just looking for a solid all-purpose thin-and-light, though, you'll find this laptop's unconventional shape more of a nuisance than a benefit. D

Sarah is Reviews Editor, a wannabe tap dancer and a closet film critic.

BOTTOMLINE

TOSHIBA SATELLITE U845W

$1000+

PROS

- Powerful speakers
- Attractive design
- Decent battery life for a 14-inch laptop

CONS

- Uncomfortable keyboard
- Flaky trackpad
- Display not compatible with most media

BOTTOMLINE

The U845W Ultrabook is the first laptop with a 21:9 display, but ultimately its odd, outsized dimensions are more of a nuisance than a boon.

REVIEW

PARROT ZIK BY STARCK

Parrot's Zik headphones are overflowing with style, design and technology, but are they worth the $400 asking price?

By Joe Pollicino

You do know that Parrot makes more than just the AR.Drone, right? It was at CES earlier this year that we first caught a glimpse of — and subsequently began geeking out about — the Parrot Zik by Starck. For those unfamiliar, these headphones are jam-packed with enough technologies to make even the geekiest audio lovers smitten. Priced at about $400, they feature Near Field Communication (NFC), Bluetooth connectivity, on-board capacitive touch-control, active noise cancellation, head detection, a jawbone sensor for speech and Parrot's audio-enhancing DSP app for iOS and An-

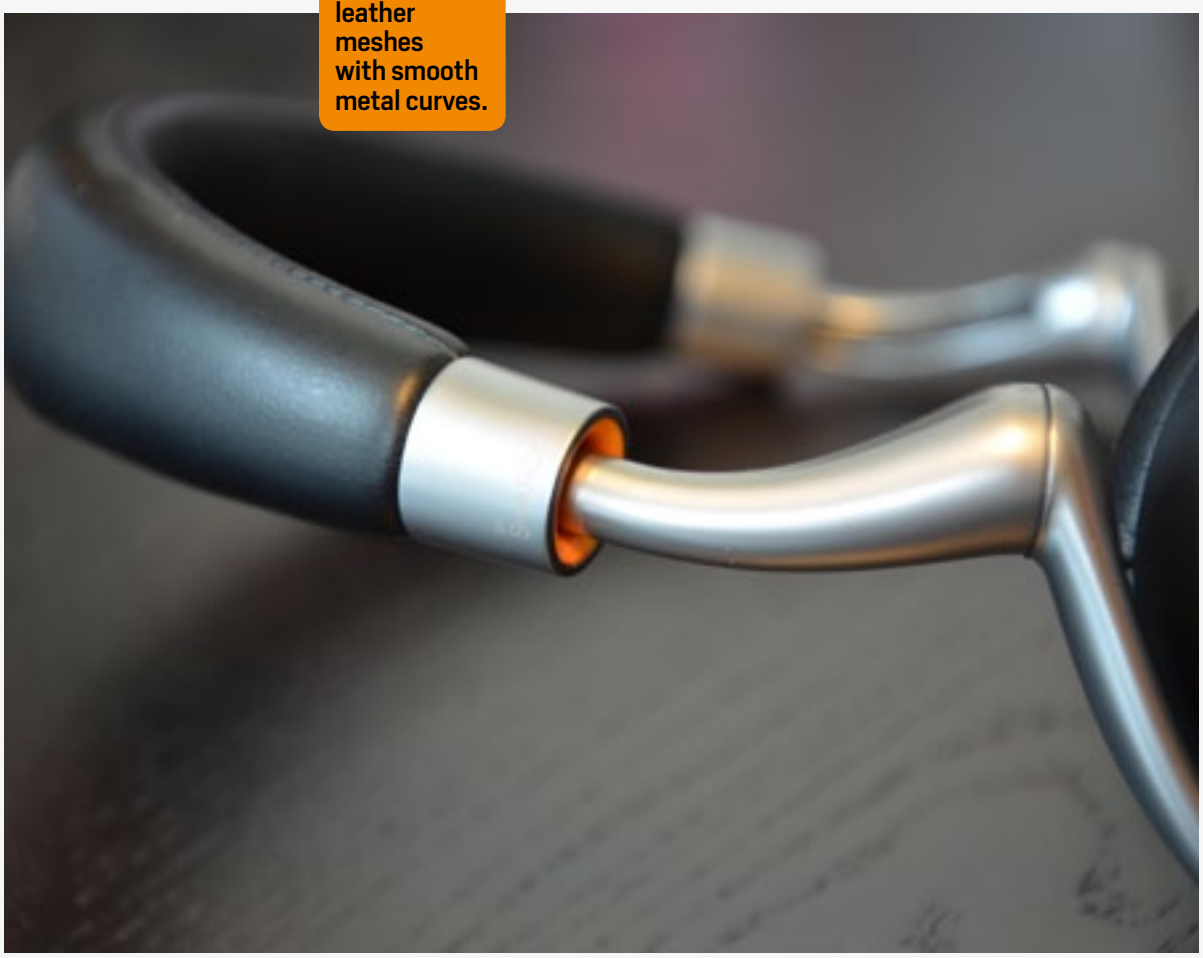
droid — not to mention a striking design by the renowned Philippe Starck.

This isn't the first time Parrot and Mr. Starck have worked together, but this does mark their debut in the portable audio market (as opposed to home-based speaker systems). In the case of this review, not one, but two Engadget editors spent some time testing the product. So, do they impress? More importantly, are they worth the $400 asking price?

HARDWARE AND EMBEDDED TECH

Despite all the high-tech features crammed inside the Zik, it appears more dapper than geeky from the outside. Up top, there's a flexible headband made of synthetic leather embossed with the Parrot logo. Continuing down the sides, the band connects to curvaceous, skeletal-like metal headrails that meet at swiveling joints with the half-wishbone yokes. Aside from being eye-catching, these earpieces can swivel just over 90 degrees to fold flat for storage in the included travel pouch. Look closely and you'll see the inner portions are scooped out to reveal the cabling leading down to the cups. The clicky headrails drop down from the headband, but retract if you're adjusting the headset for a smaller skull. Aside from the metal's semigloss finish, you'll notice subtle orange accenting — a Starck trademark — underneath where the inner edges of the headband meet the rails. Additionally, there's laser-etching to mark the right and left sides, adjustment points and a tasteful "By Starck" logo on the headband.

That brings us to the earcups — where all the magic happens. While the Zik generally looks bony, the ear cups are dense and plush — disproportionately so in relation to the rest of the headset, but attractive nonetheless. The outer edges are mostly finished in a soft-touch matte plastic, and we're very happy about that decision. Why, you ask? The outside of the right ear cup contains a capacitive touch-panel for controlling music playback and taking calls, while



Despite all the high-tech features crammed inside the Zik, it appears more dapper than geeky from the outside.

there's an NFC sensor embedded within the left ear cup. Even after swiping the headset hundreds of times per day, we only noticed the slightest trace of oil and fingerprints.

Swiping vertically controls volume, while swiping horizontally lets you change tracks. Beyond that, tapping the panel controls playback, and allows you to start and end calls. Unless you're changing the volume, your various swipes will produce a clicking sound in the earpieces, some audio feedback letting you know the tap was registered. Aside from a hint of lag, it's generally an intuitive way of inputting commands. Annoyingly, though, the current firmware doesn't support long taps to enable voice control on smartphones — a common feature on Apple- and Android-compatible inline remotes.

On the outer edge of the earcups, you'll notice two chrome vents. Aside from adding some visual spice, they serve as bass vents for the headphones. It's visually clear they each have a different shape, with the chrome leading into the bottom edge of the right earcup. Here you'll find a micro-USB port, a 3.5mm headphone jack, a single microphone and a backlit power button. We're happy to report that both ports coupled extremely tightly with the included cables (each of which feature a thick, braided shielding, by the way). Of course, that wired option is mainly there in case the battery dies, or if you want to conserve power by not using Bluetooth. As a final note, the audio cable features a thick right-angled tip, which you might appreciate when you have a mobile device sitting in your pocket.

We're disappointed that there's nothing in the way of an inline remote on the included cable, meaning that phone calls and playback control are out of the question when the battery dies. The power button has a very slight wiggle, with enough tension for a pleasingly tactile push. A point of contention we have with many Bluetooth headsets are their annoying blinking lights, but these — these are very soft, and won't illuminate the surfaces around you in a dark situation, like an overnight flight. The button glows white when the headset is on and powered, and red when it's charging, but it can't be turned off like headphones such as the SYNC by 50.

Circling back to the left ear cup, you'll notice two more microphones on its bottom edge. Think three mics would've been enough? Well, Parrot didn't — there's even two more, one in each ear cup. If you've been counting, yes, that's a total of five microphones. According to Parrot, two of the outer microphones

analyze the sound around you for noise cancellation, while the ones planted within each earcup work to find any residual noise that may need to get taken care of as well. That leaves one of the three external microphones on the Zik for handling voice calls.

Of course, that's only half of how the Zik picks up on voices. Located near the bottom of the left earpad, you'll notice two square sensors, one of which is that jawbone sensor. As Parrot explains it, when the Zik notices that your mouth is moving it tells the microphone to focus on vocals, so that you'll be heard over any background noise. So while its name makes it seem similar to Jawbone's bone conductivity magic, that's about all they have in common.

That leads us to the claimed "motion sensor," one of the most unique features on the Zik. Simply taking it off your noggin or putting it back in place will cause the music to start and stop automatically. It's especially convenient when you need to talk to someone on the fly, and it's certainly more intuitive than fiddling for the play / pause button on an inline remote. That said, it's actually more of a pressure sensor than a motion sensor. It may seem at first blush that the headphone is using some sort of accelerometer to determine when the headphones are coming on and off. But in reality, it's merely activating a button within the right earpad. Thankfully, no matter how much this editor shook his head around, the sensors were intelligent enough to realize that the headphones hadn't, in fact, come off. There were a handful of instances where the music took a second or two to turn off as the pads expanded, however.

One less obvious feature of the Zik is that the outside of the left ear cup is actually a magnetic cover. There's no indentation for pulling it off, as you might find on a smartphone battery cover, but it's easy enough to remove nonetheless. The magnets keep it from budging unless you actually try to take it off, meaning you won't have to worry about it falling onto the train tracks in the middle of your commute. Pulling the cover back reveals a slot for the proprietary 3.7V, 800mAh lithium-ion battery. Though it's included, it will also be sold separately for $30. Parrot claims you'll get between five and 20 hours of use depending on how many of the Zik's features you use. Specifically, we got between five and six hours of battery life after enabling Bluetooth and all the audio features. If you want the full experience — and at least a full day's worth of use — you're going to need *at least* one spare battery.

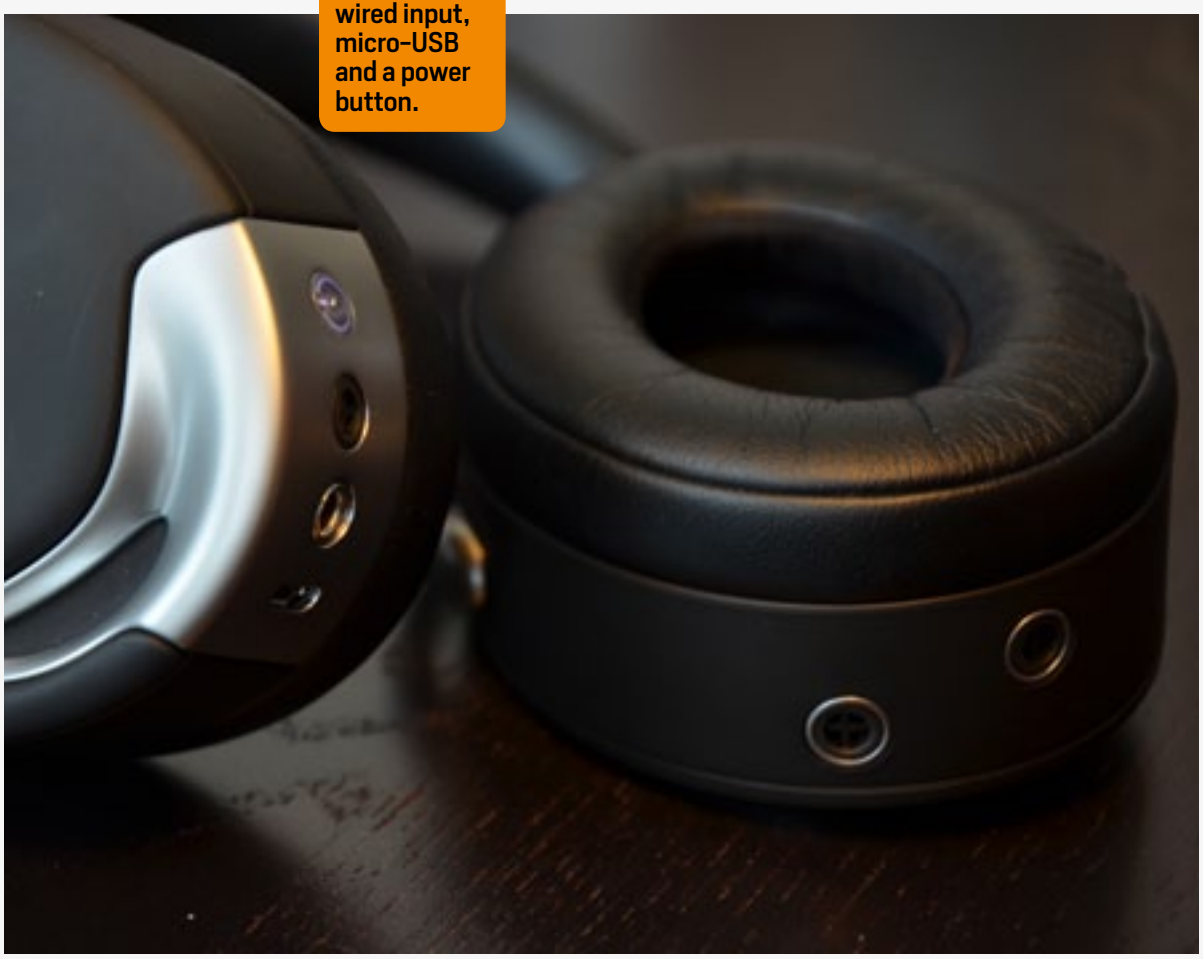
You're looking at a paltry five to six hours of battery life if you enable all the Zik's audio features while using Bluetooth.

Unfortunately, despite the head sensor, leaving the headphones on and around your shoulders doesn't put them in any sort of low-power mode. So regardless of whether music is playing or not, battery life remains the same. Thankfully, turning off active noise cancellation should increase runtime, and we can report that the headphones provide enough passive noise isolation that sometimes we didn't need ANC enabled anyway. We should also note that the Zik comes with noise cancellation enabled out of the box. For the moment, the app for controlling its audio features is only available on iOS, but Parrot expects proper Android and iPad versions will be available in the coming weeks.

Here's something frustrating: batteries can't be charged outside of the headphones. So, while it's convenient to charge the headset if you happen to be sitting near a PC with a spare USB port, it's going to be an issue for folks on the go. Parrot says it has no current plans for an external charger, so you'll need to have them fully charged before heading out on a long trip. This is a major sticking point that puts the headphones at a severe disadvantage, especially since headphones by Sony, Bose and Klipsch can last 20-plus hours on AAAs. The Zik's battery life is acceptable considering everything that's going on inside, but we do hope Parrot eventually offers better ways to stay juiced — or, at least, a spare battery in the box.

SETUP, BLUETOOTH AND NFC CONNECTIVITY

For the most part, the days of frustrating Bluetooth pairing are over, and the Zik is no exception. Whether we connected an iPhone 3GS, Galaxy Nexus, Samsung Galaxy S III, iPad 2, Nokia Lumia 900, HTC One X or a MacBook, we never had to go into a specific pairing mode or enter any codes. It's as simple as selecting "connect to device" from the device. This convenience does come at a cost, however — the headset can't pair with multiple


Bass vents, wired input, micro-USB and a power button.

Making Skype calls with the Zik on a computer is simply out of the question, unfortunately.

gizmos at once. This is burdensome if you tend to juggle gadgets, as you'll need to manually disconnect before attempting to pair with another device. Then again, we don't expect this to be a problem for most shoppers.

As we mentioned, the Zik is equipped with an NFC sensor on its left earcup for Bluetooth pairing. While there aren't too many NFC-enabled devices available here in the US, four of the devices we listed do have it built in, which allowed us to test this feature extensively. On the Galaxy Nexus, simply tapping the handset to the left earcup completed the pairing, while a second tap disconnected it. However, anytime we tried to carry out the same process with the GS III and One X we were met by an error message. As it turns out, Parrot later confirmed that this NFC pairing feature only works on Jelly Bean. Aside from that hiccup, the feature works great and it's nice to see this technology in something other than Nokia's Play 360 speakers.

Getting more specific about that Broadcom Bluetooth chipset, the Zik merely sports Bluetooth 2.1 + EDR with A2DP — there's no current support for codecs like aptX. This may be an issue if you're looking for more advanced Bluetooth audio, but as we'll explain soon, the headphones do sound pretty good usually. Discerning listeners might notice a humming noise from the right side, where the radio is located; it's only apparent when audio isn't playing through headphones, but may be an issue if you're solely planning to use the noise cancellation functionality.

Before we sign off on the subject, we'd be remiss not to mention a few Bluetooth issues that came up on both of our Zik test units. With a laptop, the connection proved to be a hit-or-miss affair. The headphones worked reliably with incoming audio, but as soon as we tried to enable the mic, our signal transfer would cease in both directions. At that point we had to completely kill our connection and restart it to at least get incoming audio again. Making Skype calls with the Zik on a computer is simply out of the question, unfortunately.

Aside from occasional drops in audio, we did notice that planting a phone inside a pocket often causes brief drops in the signal as well. Depending on our location, our range varied from about 33 feet, as promised, down to just a few steps away. Suffice it to say, the Bluetooth implementation here would benefit from some fine-tuning.

FIT AND COMFORT

If you've been following our coverage of the Zik, you know we found it plenty comfortable during early hands-on op-

portunities. Still, if you're concerned that all the tech inside may make for a heavy fit, we're happy to report the Zik is supremely comfy. The headphones feature a pleasing circumaural design. Unlike the Astro A50 gaming headset, though, it won't leave your ears floating inside of the earcups. The memory foam within the earpads is super supple, and there's even more padding inside of the earcups in front of the drivers. If you were to press your finger against the part of the earcups where the microphones live, you could easily feel them, but you shouldn't notice them when you're actually wearing the headset.

To explain further, the shape of the headrails help balance out the fit, keeping it firmly affixed to your noggin. If anything, some users might find that the headband could use a bit *more* padding. Our main concern is whether the earpads will stay this supple after months of use, as they're not replaceable. However, the clamping force of the headphones is comfortable, and just enough to keep 'em planted on your head without crushing your ears enough to cause cartilage cramps. Naturally, the synthetic leather pads don't exactly play nice in hot weather, though — things will get sweaty, but it didn't seem to erode the build quality in any way.

PARROT AUDIO STUDIO APP

Before we dive into our impressions of the audio quality, we'd like to fill you in on its free companion app: Parrot Audio Studio. We've already mentioned what platforms it's compatible with, so let's take a deeper look using the iOS version as our guide. Clicking into the app gives you three toggle options, along with three utility-based options — none of which can be adjusted from the Zik itself. Getting the utility options out of the way, you'll find System, Battery and Helpdesk icons. "System" allows you to change the name of your Zik and check for any firmware updates. "Battery" simply displays the current battery level. Unfortunately, there's no estimate for how much runtime you have left, which is a shame since the Zik doesn't warn you when the battery is running low. Also, it's not as convenient as having the meter planted in our phones' taskbars, as is the case with Jawbone's offerings.

> Whether you like gobs of bass, a bit more vocal clarity in your mix or a certain degree of stereo separation, the Zik can handle it.

Now for the fun stuff. To start, you can select whether you want active noise cancellation on or off. Unlike some ANC cans, the Zik doesn't currently allow users to tweak its settings — it handles this automatically. Thankfully, as we'll detail,

it does a good job of it.

The last of the three toggles is a seven-band equalizer. There are settings for Punchy, Club, Pop, Vocals, Cristal, Deep and one slot for a user customizable settings. Parrot favors the club and punchy settings, highlighting a "v-curve" (generally considered the "rock" setting) and we have to agree. By the way, changing any of the settings will automatically program it to the user option.

Between those, there's an option for toggling Concert Hall Effects on and off. Clicking this icon brings you into a menu that allows you to choose from four different room simulations (Concert Hall, Jazz Club, Living Room and Silent Room) and speaker placements from 30 degrees of separation all the way to 180 degrees from left to right. The speakers can only be adjusted in equilateral 30-degree movements, while the silent room setting won't separate past 150 degrees. This feature is an integral part of the experience when using the Zik, because it really lets you personalize the soundstage and stereo image of the headphones. We particularly like using the Living Room and Silent settings with a 120-degree placement for the speakers.

Of course, your preferences are sure to vary, but the point is that this option is here, and it's a key way that the Zik lets you personalize its sound to your own tastes. Whether you like gobs of bass, a bit more vocal clarity or a certain spacing of stereo separation, the Zik can handle it. Thankfully, no matter what device you use, your last settings are automatically saved within the Zik.

All that said, one thing that consistently bugged us during testing was the Zik's tendency to make a *pop* noise whenever we turned it on, changed an EQ setting or toggled ANC on and off. Keeping that in mind, the same annoyance occurs every time the headphone's head detector goes into action (pausing or starting playback again) when taking it on and off. We're hopeful that a firmware upgrade will eventually allow for a cleaner-sounding bypass action.

SOUND

Moving on, let's discuss the natural audio quality of the Zik's 40mm neodymium drivers before any of the DSP and EQing are added on top. Speaking to the sound, using the headphones wirelessly with Bluetooth versus wired with the included audio cable, we'd be hard-pressed to notice any major differences with the headphones powered up. Of course, the main note is that the Bluetooth signal does have the tendency to frequently cut out here and there, and that's something that naturally won't come up when using the audio cable. When using the headphones passively (read: powered off) with the audio cable, the sound is thin and brittle, just like many other headphones we've used with that feature and the same functionality.

The Zik is at its best with the power on — and while passive functionality is

a nice option to have when the battery dies out, we'd still recommend springing for some batteries so that you don't have to resort to it. The sound gets noticeably fuller with ANC enabled. It's very clear — not perfect, but still quite good. Now for where the DSP provided by the app comes into play. Enabling active noise cancellation does add meat to the extra-lows in the mix, but some might find it boomy. The Concert Hall effects make for the biggest impact in the overall sound. It doesn't make for the most natural audio, but it does pleasantly space out the various sounds in a recording. That said, those looking for a more clinically focused voicing might not be so keen on how each setting noticeably changes the timbre of each instrument.

To that effect, wired headphones like the $350 M40, $200 MDR-NC200D and $300 P5 provide a smidgen more clarity and a tighter overall response across the mix in comparison. We're not shocked, considering these units are more focused on sound than techy features, but for the money, we'd hoped the Zik would perform slightly better sonically. For what it's worth, the sound didn't fatigue our ears after hours of listening and we never noticed any clipping or very apparent distortion at louder volumes — the Zik can really handle any EQ setting you throw at it. Overall, the sound is extremely enjoyable, but for the $400 price, we expected a little more.

Now onto outgoing audio — we've already discussed how the jawbone sensor works, so let's talk about how that plays into the microphone quality for voice calls. Callers sometimes complained that our vocals were cutting out or a bit staticky. The focus on vocals is up to par with what you'll get from, say, a Jawbone Icon, so folks will hear you in louder environments easily, but the overall audio quality isn't as good. Furthermore, because the Zik takes down external noise on the user's end so well, some microphone monitoring would've been appreciated. But don't take our word for it, check out the audio recording we've included here where we compare the Zik with our Galaxy Nexus' built-in mic and a PlayStation Bluetooth headset in a simulated bar environment.

NOISE SUPPRESSION

So, just how good is the Zik at killing noise, you might be wondering? Fantastic. Great. Can you hear us scream-

MICROPHONE COMPARISON

ing it from the rooftop of Engadget HQ? You probably aren't using one at the moment then. According to Parrot, the unit can provide up to 25dB of active noise cancellation, eliminating 98 percent of the lower frequencies it focuses on. Translation: that's a hell of a lotta noise-slaughtering. Many ANC headphones will deliver a fair amount of annoying hiss, but that isn't the case here. Even inside of NYC's extremely loud subway cars, the Zik provided us with an aural sanctuary of sorts. Of course, ANC is merely a trick of the mind, simply pushing a reversed anti-noise signal of what's going on around you, and thus, still pushing sound into your eardrums. Impressively, the Zik features an ample amount of passive noise-isolation as well (for circumaural headphones, anyway) — in some instances we found it adequate enough to keep ANC disabled.

WRAP-UP

Parrot and Philippe Starck have crafted a truly unique set of headphones with the Zik. There are clearly some kinks that need to be worked out, however — most of which Parrot can

The Parrot Zik went for the ideal blend of form and function.

hopefully remedy via firmware updates. As it stands for now, we have seriously enjoyed using the Zik despite the product's various shortcomings. The touch control and head sensor make for a fun, intuitive way to control music and calls on the go, but in some regards, an inline remote is still a more practical design.

The Zik is also massively comfortable, making it great for long periods of wear, but one battery doesn't score you too much runtime — not to mention that charging it can get tricky. If you're set on silencing the world around you, the 25dB of active noise-cancellation works well in loud environments, and the passive noise isolation isn't shabby, either; if you need a set for flights, look no further. The sound quality is very good, and the headphones won't sound fatiguing during long listening sessions. But even with all the sound shaping options, the headphones fall ever-so short of offering the audio quality of cheaper wired headphones — and potentially other Bluetooth cans. Perhaps the biggest problem with the Zik is that Bluetooth functionality is limited, and downright frustrating for some usage scenarios — a shame, given Parrot's know-how in the area.

When it comes down to it, though, every second we've tested these has been a treat — so much so, that at least two Engadget staffers are ponying up for their own pairs. If the Zik lines up well with your priorities, even despite its current shortcomings, it could be a tempting splurge for gadget and audio lovers alike. D

Richard Lai contributed to this review.

Joe's functionally useless without his glasses — a fact you really shouldn't disclose to any enemies.

BOTTOMLINE

PARROT ZIK BY STARCK BLUETOOTH TOUCH-ACTIVATED HEADPHONES

$400

PROS

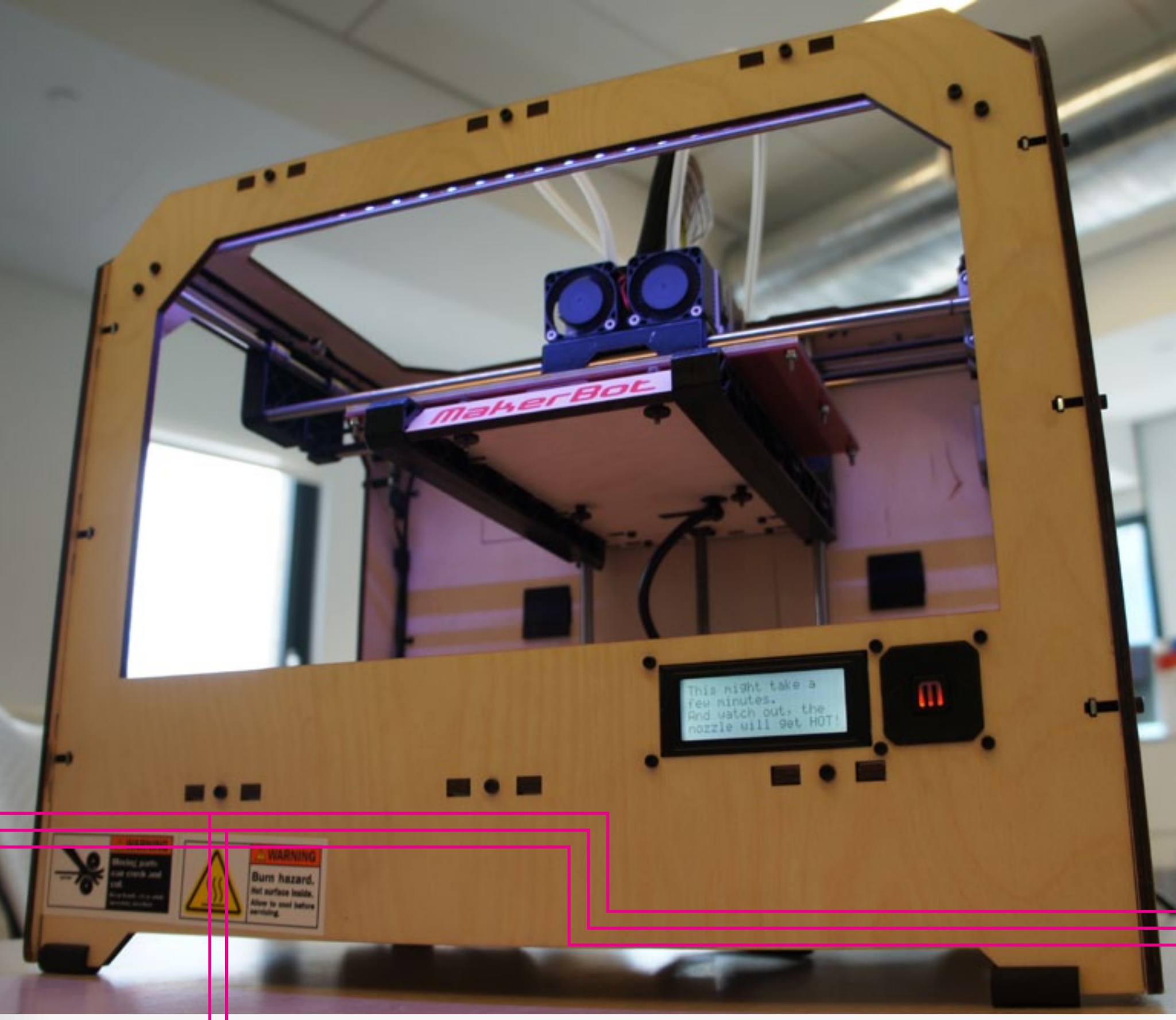
- Breathtaking, comfortable design
- Active noise cancellation and passive noise isolation
- Intuitive mobile app and onboard controls

CONS

- Short battery life, proprietary battery
- Slightly erratic Bluetooth performance
- Sound quality is pleasing, but could be better

BOTTOMLINE

The Zik generally performs well, but various kinks make it fall short of the $400 asking price.



MAKERBOT'S REPLICATOR

The Dawning of 3D Printers in Every Home?

As 3D printing seeps into the mainstream, questions about its practicality loom large. In an attempt to answer just a few of these questions, we set up MakerBot's $2,000 Replicator in our New York City offices and put it to work.

By Brian Heater

THERE'S SOMETHING universally appealing about the concept of a 3D printer — that concept being an automated system capable of turning computer code into real-world objects. I found myself forced to give a brief overview of the technology to AOL employees in our shared New York City office space after a particularly noisy initial run of MakerBot's Replicator. Reactions to such explanations tend to follow a fairly standard arc, beginning with wide-eyed wonder as one attempts to wrap their brain around the idea, followed almost immediately by a list of things they'd love to print out, given a chance. This is usually coupled with questions like "Can it print food?" and "Can I print a car?" Both of which speak to that larger, vitally important question: "Can I print anything useful?" This, in turn, speaks to another important concern: "How long until it pays for itself?"

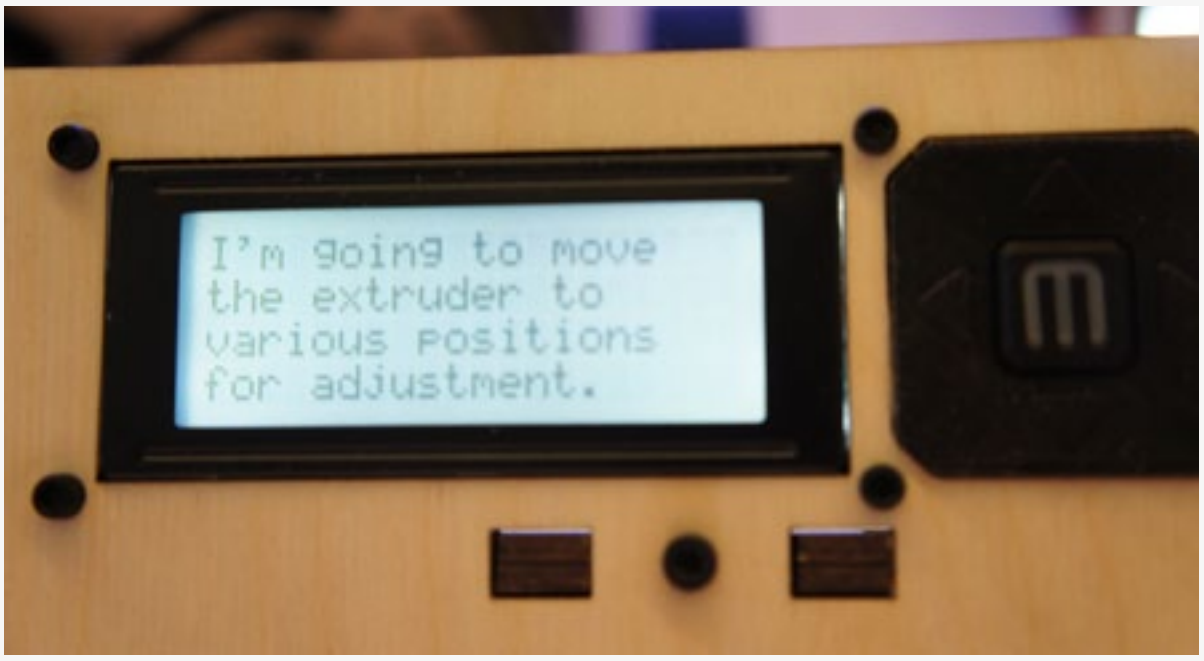
When we received an unexpected package from the folks at MakerBot last Friday, we realized it would afford us the opportunity to field some of these questions. Though, before opening the thing, we can tell you pretty confidently that, if you're looking for something that will "pay for itself," that answer won't come in a giant cardboard box with a MakerBot logo on the side. Some key questions are a little less straightforward, however, like whether or not this technology is ready for consumers — or if it's still just the territory of enthusiasts.

We receive a warm welcome from the Replicator via the LCD panel and are ready to get down and dirty with 3D printing.

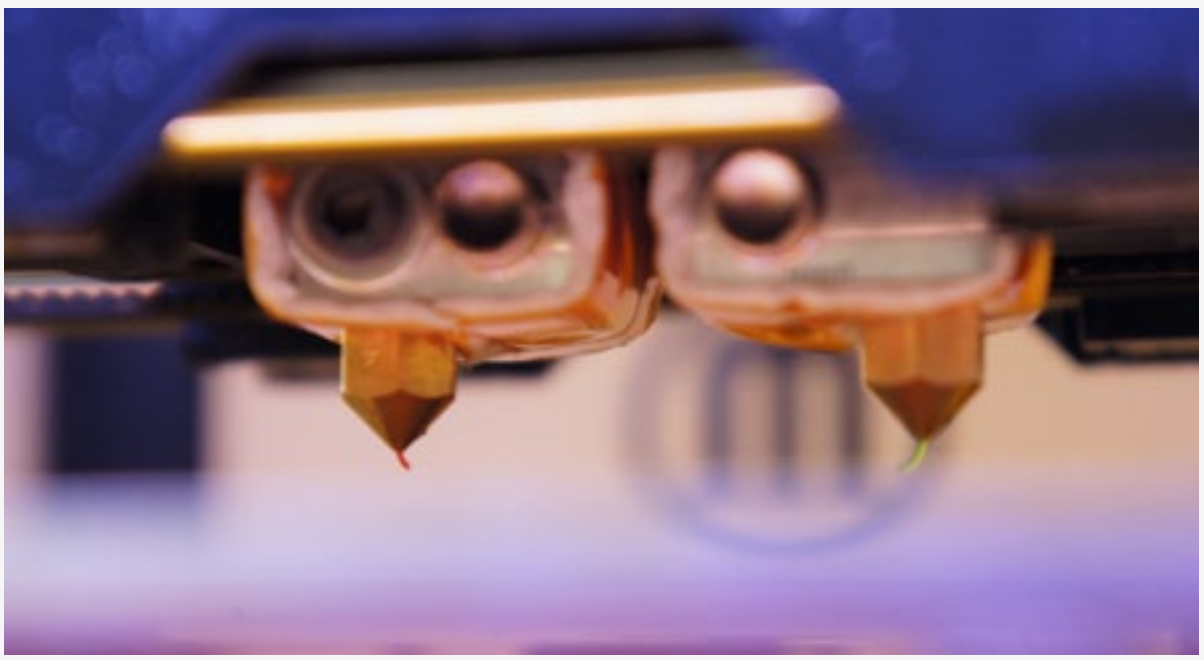
The Replicator setup guide had some sage advice right from the beginning.

The product housed inside the cardboard box may well be the best-equipped to answer that question. Sandwiched between several layers of cardboard, the Replicator represents, arguably, the most mainstream example of a consumer-facing 3D printer on the market today, clocking in it at a (relatively) reasonable $2,000. Sure, there are more inexpensive examples of the technology available for this purpose, but Brooklyn-based MakerBot has possibly done more than any company out there to help introduce 3D printing to the masses. Certainly, the Replicator marks a big step over its predecessor, the Thing-O-Matic, introducing dual-extrusion for two-colored printing and a much larger printing area, letting users create standalone objects roughly the size of a loaf of bread.

The product also marks a step toward mainstream adoption with the simple fact that it arrives mostly assembled, so customers don't need to be experienced craftspeople to put the thing together. That's not to say, of course, that no assembly or setup is required. In fact, the unboxing process itself is a bit of a to-do. MakerBot prominently positions the



The Replicator's screen indicates the need for position adjustment while the fan-fronted Stepstruder units make the rounds.



printer's setup guide at the top of the package, featuring a giant "READ ME BEFORE UNPACKING!" warning on the cover, courtesy of a tiny robot mascot. For those who are more digitally-minded, MakerBot also offers up a three-minute video on its site to take you through the steps. Indeed, the Replicator packaging is a delicate ecosystem. Don't force anything out and definitely don't pick the printer up with its threaded black cable, as tempting as that might be.

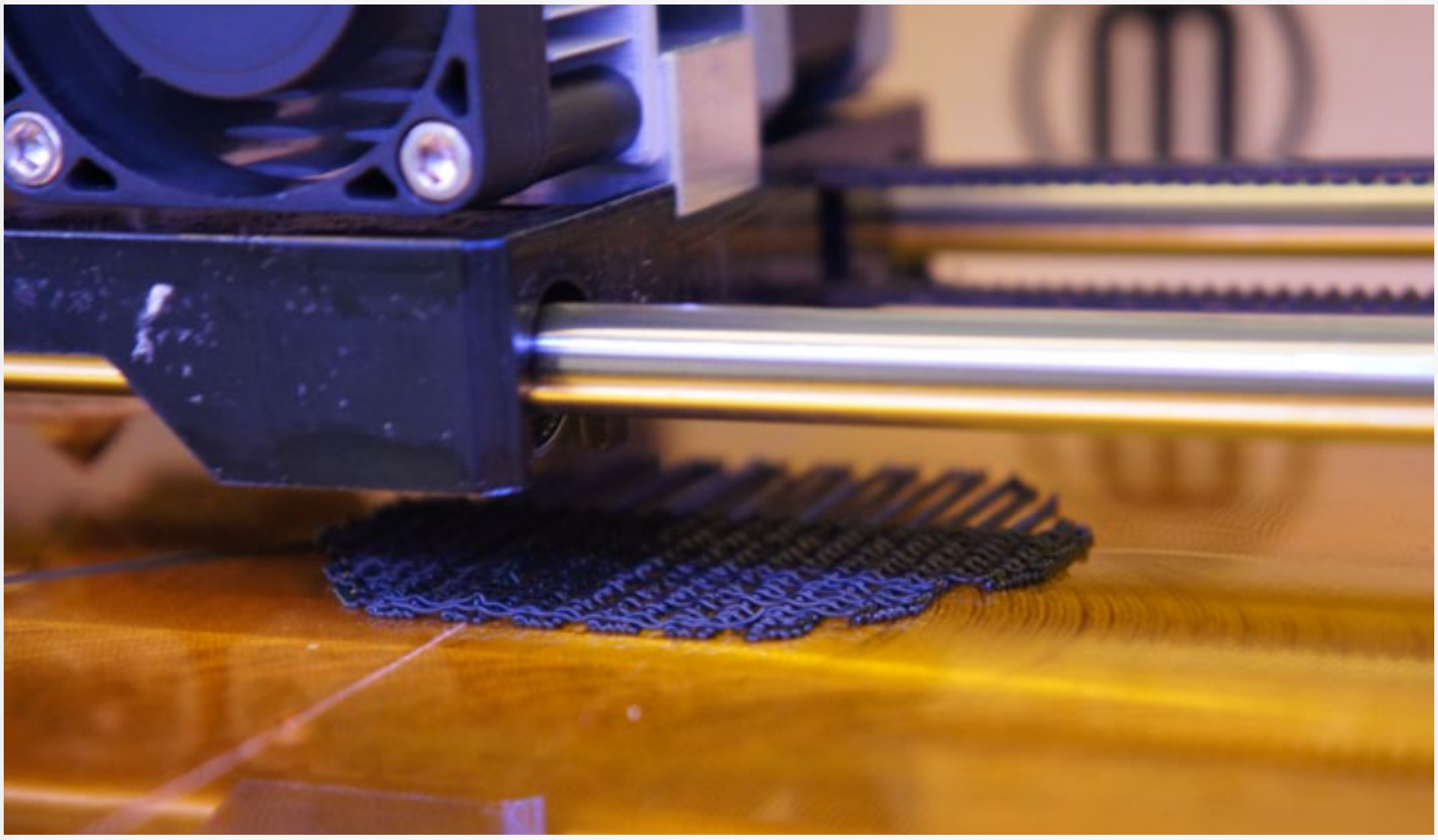
The unboxing process involves a lot of tiny compartments and several instances of moving the platform up and down to remove hidden cardboard boxes and plastic bags full of bolts, wrenches and the like. The actual hardware setup isn't really all that much more complicated than the unboxing. But, while the Replicator comes mostly assembled, there are still a number of things that have to be screwed, tightened, routed and attached. After all, there

are a lot of moving parts here that can't really be shipped as a complete piece. The Stepstruder (a toolhead mounted on the gantry that heats up and expels plastic through two nozzles) needs to be bolted onto its platform, the rubber legs have to be added to the bottom of the printer to avoid involuntary movement and the plastic spools of ABS plastic (the plastic found in Lego) need to be mounted atop their holders, which are attached to the rear of the printer.

Even put together, the Replicator isn't all that slick. There's no doubt a conscious aesthetic decision at play here on the part of MakerBot. The raw presentation of the printer seems like an attempt to maintain a connection with the craft community the company was born out of. The printer's shell is made of an unfinished wood with some rough corners — in fact, one of our editors managed to get a splinter from one of the sides during the setup process — and the sides are held together with a number of visible screws. The majority of the Replicator's internal space is wide open, save for a build platform that can be adjusted up and down by turning a threaded screw and the gantry atop the space that houses the Stepstruder MK8, whose front is monopolized by a large pair of fans. There are large cutouts in the wood on the top and three of the four sides.

We patiently wait for the extruders and platform to get up to the specified temperature before we can get started.

On the rear of the device, below the two spools, are ports for a USB connection and power, as well as the on / off switch (plus a little "Brooklyn" stamp, in case you were concerned about the product's origins). On the right side, just below the cutout, sits an SD card slot (the card itself ships with the printer), which is little more than a small slit in the wood. Adjacent to this, on the front of the device are a number of overly-sensitive buttons,

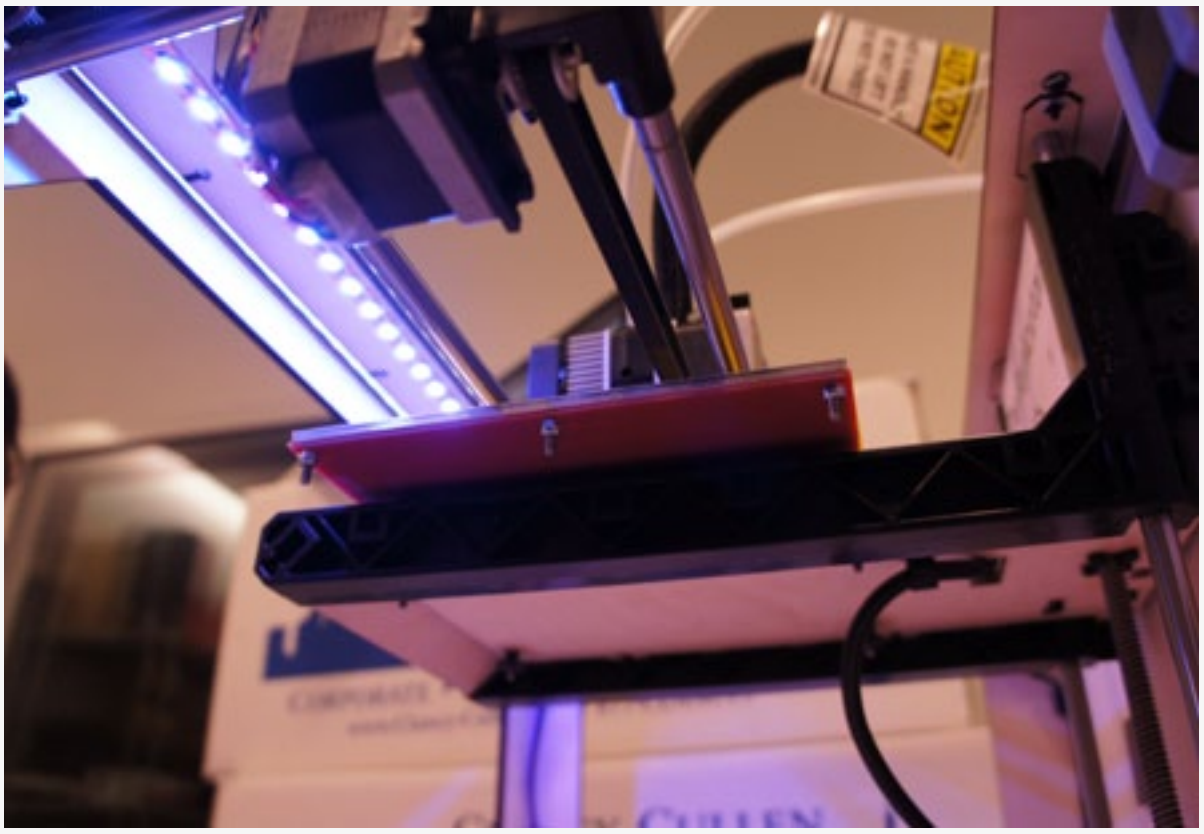


Dig into the ReplicatorG software and you can choose whether or not to laydown a 'raft' or latticework base layer for your printed output.

configured into a square. There are four arrows and an "M" selection button in its center that, with the slightest brush, opens menus and starts prints. Directly to the left is a small LCD panel that is essential to interfacing with the machine — it's also essential to setting it up.

The first time you fire up the Replicator, the display will take you through the FRE — that's First Run Experience — a series of step-by-step instructions it imparts one screen at a time (you can also access this later in the utilities menu). The script should take around 20 minutes, according to MakerBot's calculations. You navigate through the screens with the rubber buttons. A blinking red light in the center "M" button means it's waiting to be pressed, solid means its hard at work — just sit tight.

The first step in the process is leveling the build platform — contents in the box were almost certainly tussled during transit, and you've got to recalibrate things. Leveling the platform is a particularly important step — after all, if things are off by mere fractions of an inch, it can screw prints

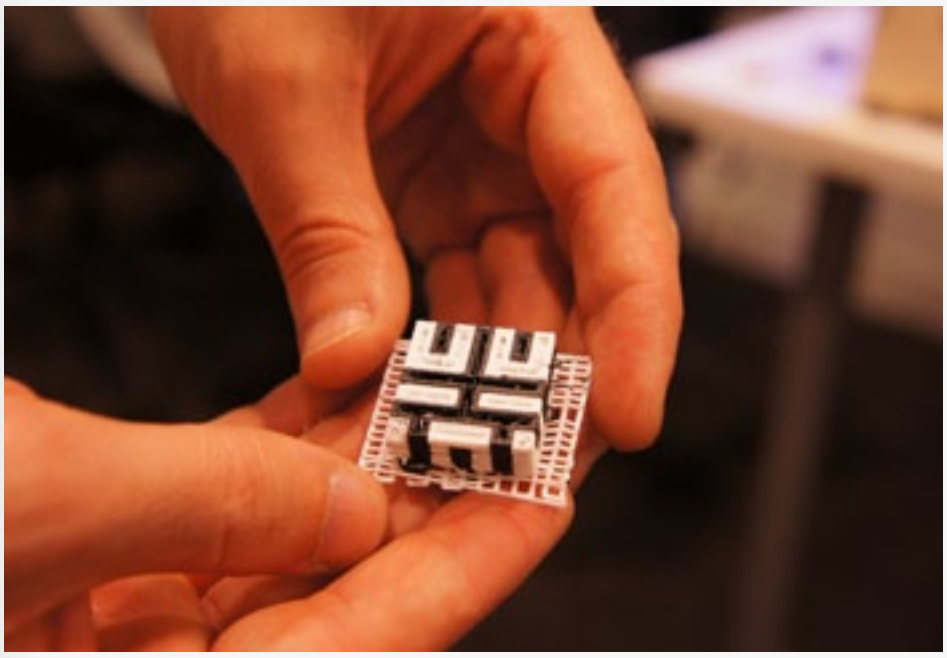


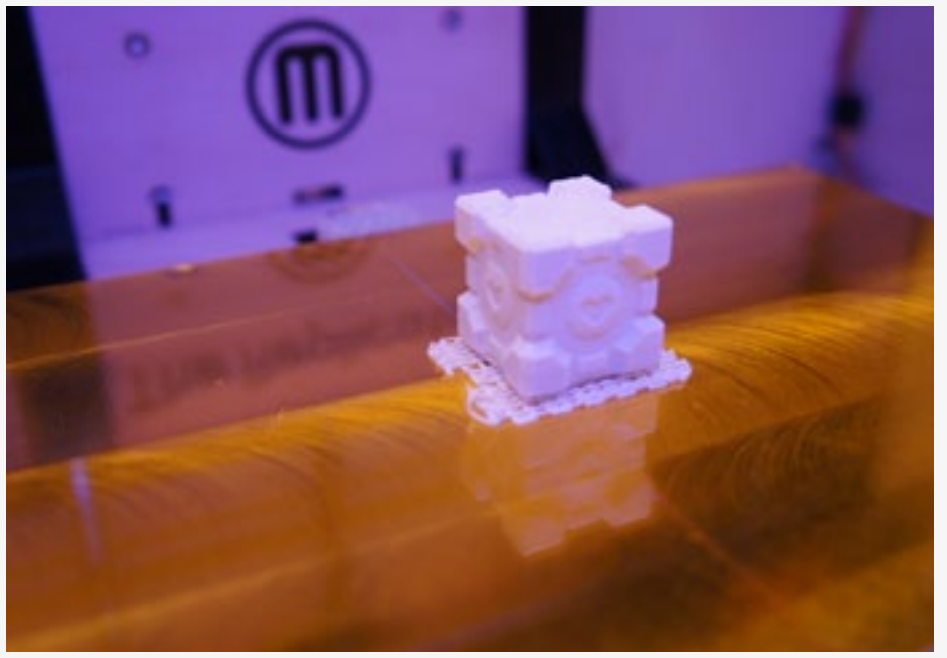
Leveling the build platform is a very important step in prepping the machine for a print project.

up completely. The process essentially involves making sure that the nozzles are the proper distance from the platform by twisting a series of screws. You test this by sliding a piece of paper between the two — if it can't slide in, they're too close. If it can be moved up and down, they're too far apart. It's a simple enough process, in theory, but there's a good chance you're going to find yourself performing it several times before things are just right. We ran through the leveling script no less than four times before we saw optimal results.

Next up, you'll be pulling the plastic filaments up from the spools, through two tubes and into holes at the top of the Stepstruder's head, holding it there for a few seconds, until the device's motor begins tugging at the strip. You'll have to put a bit more pressure on the filament than you'd expect, and the pulling motion of the motors is subtle enough that you might not notice it at first. Eventually, a thin string of plastic will emerge from the nozzle. In the case of our device, the plastic emerged with a green color, slowly turning black as it slid out like hot, plastic soft serve ice cream. On the other side, red plastic slowly lightened into white. The Replicator ships with a small plastic square its makers use to test the printer in order to make sure that everything is running well. In the case of ours, the square was red and green — the plastic in our own spools, meanwhile, was white and black. The system needed to melt down and extrude the reminder of the last batch before moving on to the new spools.

It's this process, ultimately, that's at the center of the Replicator. A motor in the Stepstruder pulls the plastic from the spool, melting it down and extruding the contents. The





Our intial test prints included a basic black and white checkerboard cube and a *Portal 2* Weighted Companion Cube.

configurations are created by the four-way movements of the gantry (left, right, front and back) and the up and down movement of the platform. Honestly, thinking of this like frozen yogurt isn't all that far off — the Replicator creates solid objects by layering levels of thin plastic extrusions on top of themselves. The layered patterns are evident in final products in the ribbed consistency of their surface (some users go so far as to sand down the product after it's done printing). It's even more apparent in products in which the calibration is off, resulting in what looks to be a mess of hardened string.

This, unfortunately, is something we saw several times early on, with a veritable *Island of Doctor Moreau* full of failed, mutant plastic experiments. There's a lot of trouble-shooting that needs to be done out of the box because, really, there's a lot that can go wrong here. Thankfully, MakerBot's got an extremely responsive email support team that has clearly heard it all. Judging from a number of videos we consulted online, we weren't the only ones having these sorts of issues. A lot of fine-tuning is required, which is certainly a major point against recommending such a device as a consumer product. As mentioned above, the initial run of the product was a loud one — there was a good deal of grinding noises and foundation-shaking vibrations as the Replicator went to work. The result was a big mess of plastic that looked like someone attempting to sew for the first time.

We re-leveled the platform and tried again, tightening the gap a bit from our first pass. Things looked slightly better, but

Its process was always audible, but now it was running like a washing machine with a handful of rocks...

the printer's jolts were fairly unnerving. After all, we'd seen the Replicator in action a number of times, including right in front of us on the Engadget Show. Its process was always audible, but now it was running like a washing machine with a handful of rocks thrown in — a rather unsettling experience. We tightened the bolts on the body in an attempt to subdue its violent oscillations, then downloaded the ReplicatorG software from MakerBot's site, installed it on our system and tethered the printer to our laptop with a USB cord.

Settings can be adjusted on the Replicator itself by way of the LCD, but the tiny display makes these things a bit of a chore. We turned the acceleration on and the "jerk" down, so things would be a little less aggressive — it also dawned on us that the table we were running it on might not have been a stable enough foundation, itself quaking during printing. Like a number of factors, this level of vibration can throw the printing process off completely. MakerBot support assured us that some movement is a normal part of the process and even suggested we find a way to secure the device to the table to minimize shaking.

Before the Replicator begins printing, there's a bit of a waiting process. First, the platform itself heats (to a default 110 degrees Celsius), followed by the extruders (220 degrees Celsius by default). The extruders, naturally, melt the plastic down, while the heat from the platform plays a role in keeping the object in place as it's printed — or, more precisely, the latticework foundation that object is built on top of. Without the heat turned up enough, you again risk throwing the whole process off, particularly when the printer is vibrating wildly.

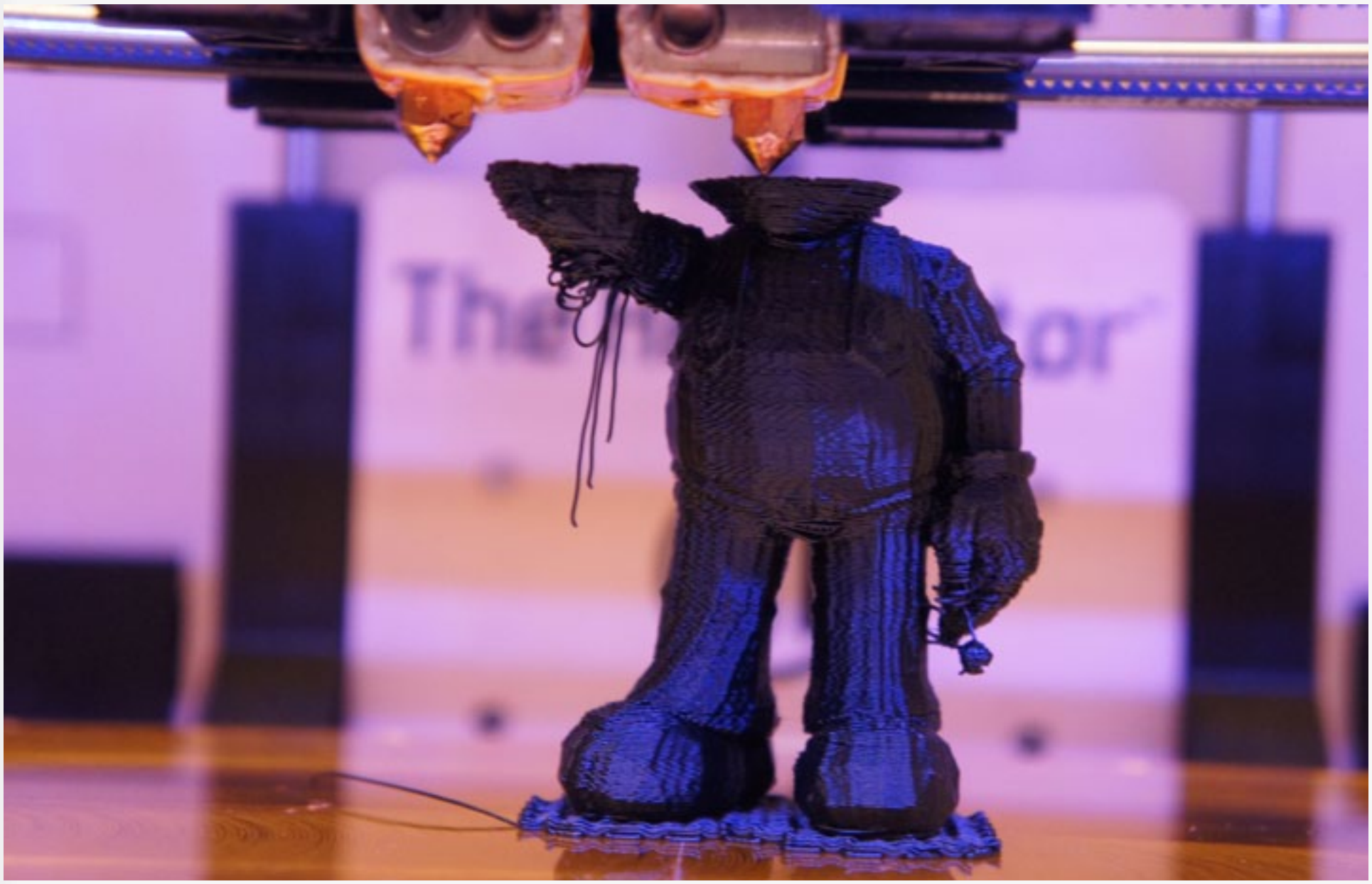
We ran through the process a few more times, tweaking things along the way and running into new issues as we progressed — like when the demo cube we were printing was knocked off the platform by the Stepstruder itself, or when the

nozzle pressed down too hard on an object, which melted at the heat and stuck to the toolhead. It took several frustrating trials, but we finally printed out an acceptable object — a small, black and white checkerboard cube. It was time, naturally, to move onto bigger and better things — and when your boss tells you he wants nothing more than a real-life Weighted Companion Cube from *Portal 2*, you begrudgingly concede.

Thankfully, printing out complicated objects doesn't require a mastery of CAD or other complex 3D modeling software. It's just a matter of going to MakerBot's Thingiverse site, finding something you like, downloading it as an .stl file and opening it up in the ReplicatorG software. The site has an impressive selection of open-source creations from enthusiasts and MakerBot employees — it's really easy to get lost on there, as we found out during our testing. But Tim had clearly been obsessed with the idea of taking home his own piece of Aperture Science since the MakerBot team first showed us one back at CES. The one we saw back then was roughly the size of a soccer ball, but we figured we'd start with something a bit more modest at one inch cubed.

The ReplicatorG software is reasonably user-friendly. While not always immediately apparent how, you can easily make alterations to the object, including alternating nozzles to switch up its color for dual extruders. You can also export the project to an SD card to stick into the Replicator or, if you're already tethered, you can start printing directly from the software. Of course, if you're an experienced 3D modeler, you've got a lot more leeway — in fact, you can, as promised, print pretty much anything your heart desires (within the material and spatial limits, naturally). The rest of us, however, are mostly beholden to the creativity of others. Thankfully, the community has been really hard at work designing some truly amazing stuff on that end.

The Companion Cube printed without a hitch in under 20 minutes, so we continued our pop culture bent, printing out an MST3K silhouette for the corner of a computer screen and a 3D statue of Mario flashing the "V" for victory. The larger the object, the more likely you are to run into an error. The Italian plumber, for example, started off perfectly, but began to degrade



The nozzle heads add layer upon layer of melted ABS plastic in order to print out the 3D objects, literally from the ground up.

a bit as it went along, leading to a frayed bill of his cap and some messed up finger action — nothing a few more tweaks to the calibration system couldn't help, no doubt. In all, he took about an hour and a half to print, including warm-up time. But it all sort of drives the same point home — the Replicator is far from a plug-and-play 3D solution. It is, however, a lot closer to that dream than we've seen in the past.

Between the $2,000 price tag ($1,750 for the single extruder) — plus around $50 per spool of ABS — and the calibration / upkeep required to print, it's hard to recommend the Replicator to the casual consumer. And as far as that question of usefulness goes, it all depends on your definition of the term. A large percentage of the products on Thingiverse fall into the "toy" category, though, folks are coming up with novel uses every day. Say, for example, if the knob breaks off on your stove and you can't buy an exact replacement — just print one up.

Overall, our Mario project was a success, although with a few more tweaks we could probably knock out a spaghetti-free version.

For the most part, however, the Replicator is really about novelty and the mere cool factor of having a product that can print out just about anything you can imagine. By those standards, this thing is downright amazing. All of those office workers who saw the printer in action were positively floored that such a thing can exist — and there's really no question why. It's a truly awe-inspiring technology that has already begun to transform design industries, and the Replicator takes a big step toward making it a home-based technology. Casual consumers should wait for a future version. For tinkerers and hobbyists, however, it's $2,000 well-spent. D

Terrence O'Brien contributed to this report.

Brian's work has appeared in Spin, The Onion, Entertainment Weekly, The New York Press, PCMag, Laptop, and various other publications.

ESC

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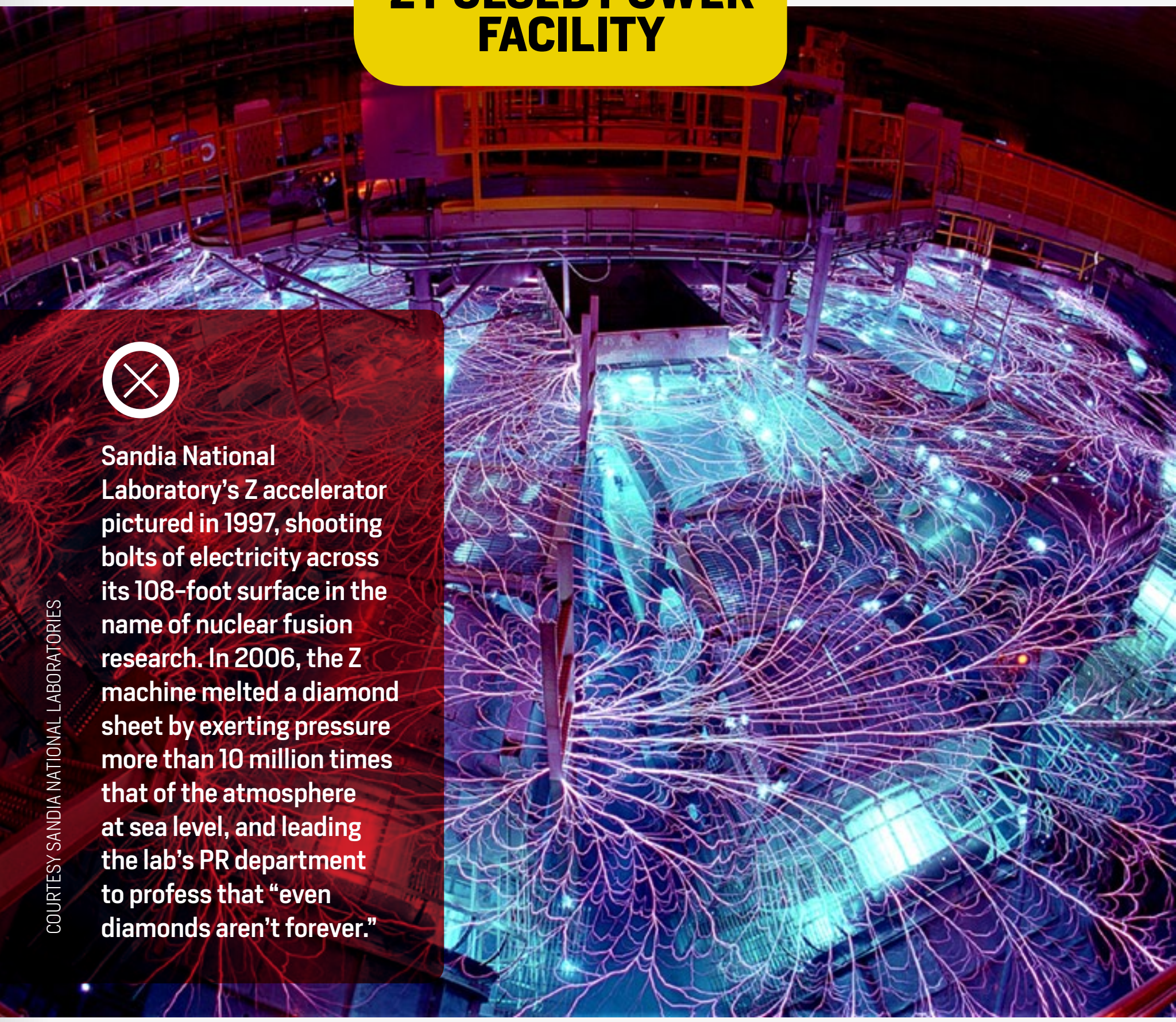
VISUALIZED

Z PULSED POWER FACILITY



Sandia National Laboratory's Z accelerator pictured in 1997, shooting bolts of electricity across its 108-foot surface in the name of nuclear fusion research. In 2006, the Z machine melted a diamond sheet by exerting pressure more than 10 million times that of the atmosphere at sea level, and leading the lab's PR department to profess that "even diamonds aren't forever."

COURTESY SANDIA NATIONAL LABORATORIES

PAUL RAINES

The GAMESTOP CEO on moonlighting as a Mac guy, his penchant for Android tablets and the power of Google Translate in Croatia.

What gadget do you depend on most?
I'm becoming a bit of a multi-tablet guy. I have a Transformer Prime as my "coffee table tablet," but lately I've been enamored with my Google Nexus 7. I carry it with me and keep it on my night-stand — it's usually the first device I use in the morning. I also carry a GameStop-refurbished iPhone 4, which happens to be the first one we ever refurbished.

“My primary, corporate machine is still Windows — that’s my day-job operating system, but after hours, I’m in the Mac and Jelly Bean space. ”

Which do you look back upon most fondly?
I think the first Blackberry I owned, maybe 10 years back. Those were fabulous — having email in your hand was life-changing. I became one of these guys that couldn’t stop staring at it — I was hearing phantom buzzes and, well, I had to wean myself off of it.

Which company does the most to push the industry?
I would say that Microsoft, Sony and Nintendo are three of the most innovative, largest players in technology. I don’t think they get enough credit — they happen to be big in video games, of course, but if you think about how they’ve revolutionized entertainment? I think they’re an enormous part of what’s going on in the 21st century.

What is your operating system of choice?
You know, I’ve always been a PC guy, but my wife, who went to school in California, got me into Mac OS, so lately I’ve been running that. Jelly Bean is pretty cool though, it’s simple, clean — I really like Jelly Bean. My primary, corporate machine is still Windows — that’s my day-job operating system, but after hours, I’m in the Mac and Jelly Bean space.

What are your favorite gadget names?
I’d say Nexus was a cool name — it’s kind of their branding, though. I always thought the iPod was a clean, fresh name when it first came out. Very minimalist.

What are your least favorite?
We have some internal codenames that I don’t like. There are a lot of people that are really judgmental about that kind of thing, product names. Maybe it’s because I spent a lot of time overseas when I was growing up and I’ve seen a lot of different funny names, but I think you just have to accept that different cultures have different terms — so I’m kind of open on names.

Which app do you depend on most?
Google Translate is fantastic — it makes you powerful in Croatia. I can sort of hold my own because I speak Spanish, I can hold my own in Italian and French, but not

“If you think about the devices you use, phones, game consoles, even your vehicles, everything has been miniaturized in a way that’s driven by Moore’s law.”

Croatian. Google Translate sort of helps bail you out. I also really love Evernote and using the Kindle app to read on airplanes. Oh! And the Georgia Tech sports app — that’s an important part of my life. I start every day with that app.

What traits do you most deplore in a smartphone?
Complexity of the operating system can be sort of a downer. I go through a lot of gadgets, because I’m always testing them and trying new stuff — if it takes me too long to set up my infrastructure, apps and calendar, it can be a real bummer.

Which do you most admire?
Seamless integration with multiple devices. The fact that my calendars, my emails and all my stuff is integrated across all of my tablets is really important to me.

What is your earliest gadget memory?
I had an electronic football game, from Mattel. The players were represented by red dots, and you had two blockers and a red dot that was the runner — you’d take out one of the defenders with the blockers and then sprint for touchdown. That’s probably the earliest. I spent a lot of time in Costa Rica growing up, so I was kind of behind on the gadget front when we were living overseas — but I remember that game. It was fantastic.

What technological advancement do you most admire?
If I had to admire one thing, I’d have to say miniaturization and the microprocessor has probably been the single most important advancement. If you think about the devices you use, phones, game consoles, even your vehicles, everything has been miniaturized in a way that’s driven by Moore’s law.

Which do you most despise?
Metal detectors at airports.

What fault are you most tolerant of in a gadget?
Probably processing speed — I’m pretty tolerant of that. Integration for me is huge, but if it’s a little slower, or if it freezes up for some reason, I’m alright. I sort of come at technology assuming you’re going to have glitches, and if it’s innovative enough, I’ll live with them.

"I sort of come at technology assuming you're going to have glitches, and if it's innovative enough, I'll live with them."

Which are you most intolerant of?
Lack of integration — it makes me nuts to have to constantly re-input information on a different device. When technology puts friction on the user, I think that's a problem.

When has your smartphone been of the most help?
I was in consulting for 10 years, and I can remember traveling with maps in my bag. I was in Europe recently, and to know what street I'm on in Venice by just pulling out my phone? That's fabulous. I think maps and those navigation features have been a huge help.

What device do you covet most?
How about a Wii U? I covet that big time, I need it here soon. I'm ready to get started with it, but I don't have it yet. I think it'll be a really hot device.

If you could change one thing about your phone what would it be?
I already did. Font size. My daughter taught me how to increase the font — I was struggling to read text. I'm 48, so I'm getting to that age.

What does being connected mean to you?
Knowing what's happening — both in the external market place and in our company, and with other colleagues. In business there's an ebb and flow that you've gotta be in, and if you're not plugged in, stuff is happening at a speed you can't keep up with.

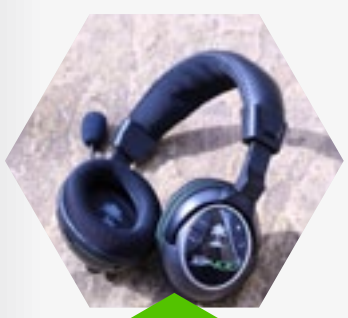
When are you least likely to reply to an email?
Probably when I'm on the beach in Costa Rica.

When did you last disconnect?
I just got back from Europe. I was on a cruise with my family — that was pretty disconnected. I did find out, however, that if you're within four nautical miles from shore, roaming works — so you have to be farther out. I think I disconnected between Corsica and Sardinia for about an hour. D

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

LINKSYS E4200 V2

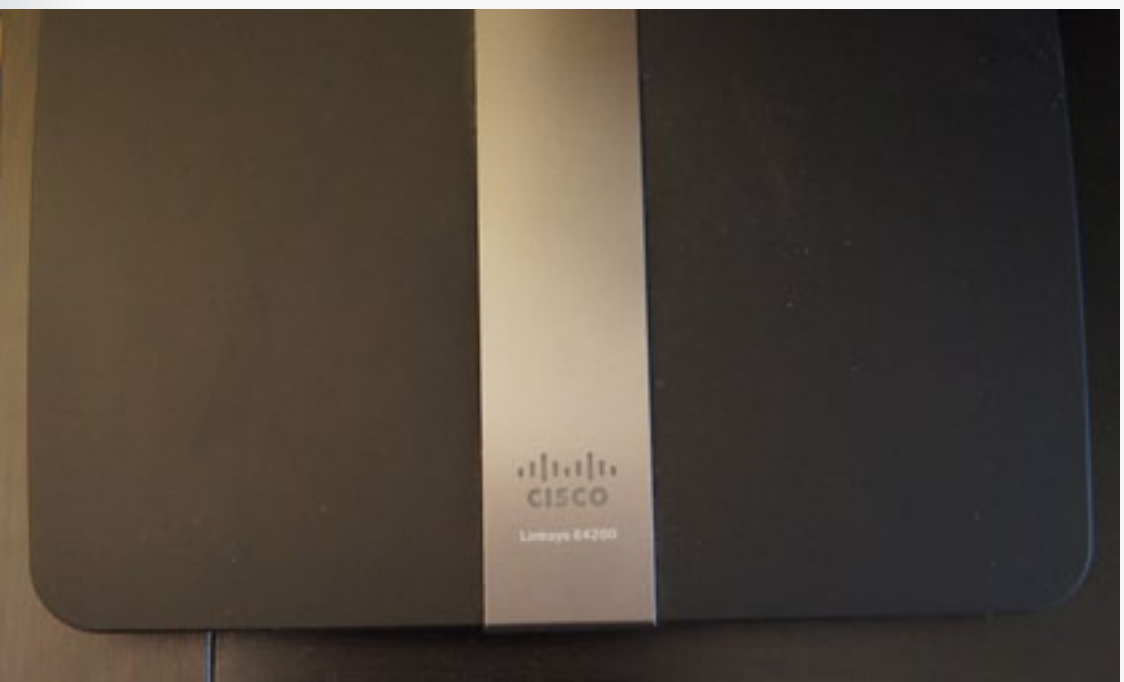
Twelve South BookBook iPhone Case



Turtle Beach XP400

Last CES ended in a whimper for me. I arrived home jetlagged, sniffly and deliriously sleep deprived, only to find that my router was dead. Passed on. No more. Ceased to be. Expired and gone to meet its maker. A stiff. Bereft of life. Off the twig. Kicked the bucket. This was an ex-router.

In a way, though, it was good timing: fresh off the holidays, I had a $100 Amazon gift certificate to spend, so money, at least, wasn't an issue. In fact, having stuck it out with the same TrendNet hotspot for five years, I didn't mind adding a little bit of my own money and springing for a top-of-the-line model. After much hemming and hawing, I chose the second-gen Linksys E4200, a dual-band router widely noted for its blistering speeds. (I also considered the RT-N56U by ASUS, but ultimately had more confidence in Cisco as a router maker. I also wanted a more discreet, flat-lying model that I could place on top of my modem.) The only drawback, aside from price, seemed to be that the E4200 had weaker range, but given that I live in a small studio apartment, this seemed irrelevant.



In brief, the router is easy to set up (just make sure you have a laptop with a DVD drive!). I also had no problem configuring a guest network, with a different password. As for throughput, it's definitely an improvement over my previous router (not that that's saying much), but its potential seems to be limited by Time Warner Cable, which doesn't *always* deliver the speeds advertised. Interestingly, that range issue I read about does, in fact, affect me, even in my cramped flat — when I move from the living room to the kitchen, the connection is more likely to cut out. Still, something tells me that if ever I get around to switching to FiOS, I'll finally be getting the performance I paid for.

— Dana Wollman

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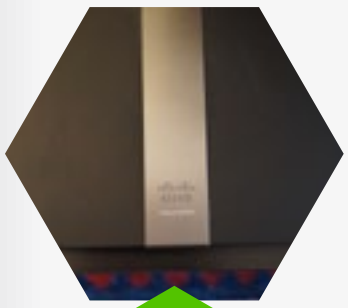
TWELVE SOUTH BOOKBOOK IPHONE CASE



Linksys E4200 V2

Turtle Beach XP400

Twelve South's BookBook iPhone case may be the classiest around, but is it really as functional as it is seductive? Yes, but there are a few caveats. I've generally been a fan of the "bulkier is better" mindset when it comes to cases. I had an Otterbox on my Nexus One, and two of Case-Mate's most rugged options on my Galaxy S II and iPhone 4S. Yes, they're ugly, but that's beside the point. When I invest upwards of $600 in a fragile piece of technology, I intend to shield it from as many drops, kicks and chips as possible. I realize some will disagree, but that's my mindset.

Switching to the BookBook immediately increased the style points surrounding my 4S, but it also introduced a few compromises. While I love having a trio of credit card / license slots (as well as a fourth joey pocket), I still have way more essential cards besides those. So, I still have to lug around my "real" wallet. For light card holders, though, this thing may indeed be your new wallet. Furthermore, there's no camera hole; I'm told that the hole would have to be enormous to completely eliminate the possibility of a flash echo, so you have to slightly push the phone out of the case to take a photo. Moreover, the leather bands across the top occasionally prevent the proximity sensor from acting right, enabling me to inadvertently activate speakerphone on a few occasions.

That aside, the case itself is *gorgeous*. It's wonderful to hold, and it's useful on flights — it looks like you're just penning a few notes, when in fact, you're finishing up a round of *Words With Friends* prior to takeoff. I will say, however, that talking on the iPhone whilst it's in the case takes a bit of getting used to. You can fold the front cover completely back, but I feel like I'm breaking the spine, so to speak. It also doesn't play too nicely with those chintzy screen protector overlays; it fits snugly, so corners of your protector may get bent. If, however, you're more into looks than anything else, you'll probably be able to forgive its oddities. — *Darren Murph*

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TURTLE BEACH XP400

Linksys E4200 V2

Twelve South BookBook iPhone Case

I'm hardly a hardcore gamer, so I was a little daunted when I was offered the chance to test Turtle Beach's XP400 surround-sound cans for the Xbox. Those still rocking the classic 360 are immediately forced to choose between high-def audio and video, since the optical audio adapter (sold separately) has composite outputs to your TV. My recidivism aside, I put these on and every game suddenly became deeply immersive. It didn't make me a better death match player, but at least I can hear those making a stealthy approach from behind and pretend that I'm turning around to defend myself before being gunned down in cold blood.

The only downside to these rather beautiful cans is that they're 312 grams of pure heavy — enough to force your neck into regular "headphone breaks" between gaming sessions. Using a mini TOSlink adapter (also sold separately) you can cheekily co-opt the gear for your desktop, listening to old music or giving your iTunes movies far better sound than you'll normally enjoy. You can also use the unit as a Bluetooth headset for your phone, and the people I tested it with rated it as "decent" and "seven out of 10," so while you wouldn't be replacing your Jawbone, it's certainly a nice optional extra. At $200 they aren't an impulse purchase, but if you're the sort who would upgrade your Xbox every time a new version came out, then that figure isn't likely to deter you.

— Dan Cooper

The week that was
in 140 characters or less.

COURTROOM DRAMA, A CURIOUS ROVER AND TWO-FACTOR AUTHENTICATION WOES

@carlzimmer
"If we can put a man on the moon, why can't we do X" is out. Now: "If we can sky-crane a robot into a crater on Mars, why can't we do X?"

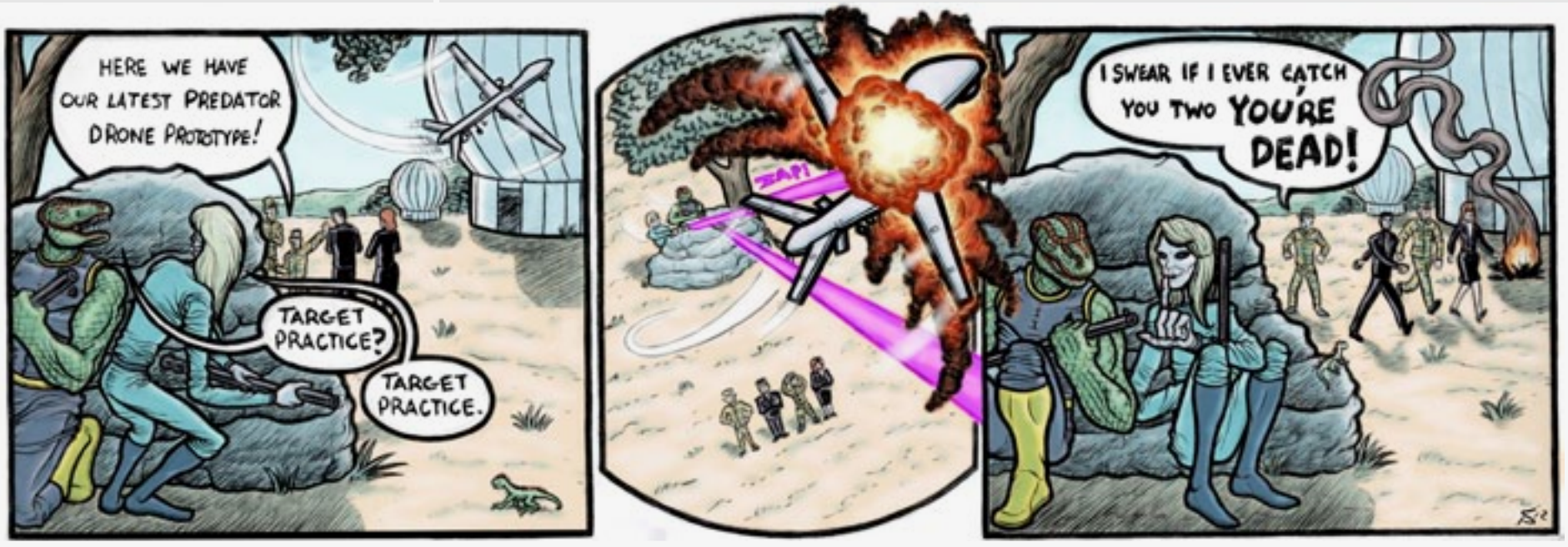
@MarsCuriosity
I'm safely on the surface of Mars. GALE CRATER I AM IN YOU!!!

@alexismadrigal
Do we have no better high-security technique than two-factor authentication? I'd rather draw blood at every login.

@parislemon
By 2014, HTC is going to release a 76-inch phone.

@darrenmurph
So wait. Susan Kare *ACTUALLY* looked an iPhone and a Galaxy phone and didn't know which was which?
#1, lie.
#2, HUGE diss on Apple.

THE STRIP | BY SEAN PRYOR



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