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In last issue’s note, I talked about size and form factor concerns in the ever growing mobile ecosystem. Going by performance and functionality advancements, I’m on the camp of convergence between mobile and mobility.

As it turns out, to no surprise, the biggest newsmakers are still smartphones. Last month we reviewed Samsung’s Galaxy Note9. This issue’s biggest story are Apple’s new iPhones and Watches. And as you read this in October, we’re going to have the Google Pixel 3, Razer Phone 2, Huawei Mate 20, as well as rumors of folding phones and 4-, 5-camera devices. It’s a crazy, crazy quarter.

But with all these new devices and rumors floating around, what is the one trend that’s becoming a growing concern among us? The cost of the smartphone. Apple’s iPhone XS and XS Max have already set a new bar by breaking the $2,000 price point. We’ve finally reached a time where a smartphone can be more expensive than a laptop. It’s mind-boggling; some even say it’s ridiculous. But as I’m writing this, I’m getting reports of a massive, unofficial, crowd/queue already forming in front of the Apple Store in Orchard Road, before Apple has even set up an official line. Who’s laughing at who now? (My design team sure chose an appropriate picture to use this month.)

But back to my convergence topic, if prices are any indication, could we be reaching a tipping point? PCs are making a comeback because of esports, but it feels like they’re turning into specialist gaming devices, rather than the general-use machines they were in the past.

That role has gone to the smartphone. Yes, a $2,000 phone is a gross excess, but if it’s the one device you ever needed. Would that change your view?

Zachary Chan
Editor
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How much wireless is too much?

Lamborghini Aventador SVJ

The jetpacks are here! The jetpacks are here!

The jetpacks are here!

Best exercise buddies: Wireless neckband earbuds

Cooler Master MasterAir G100

Lamborghini Aventador SVJ

Dale Lott, Fender Audio

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3 FISHES, 3 TASTES IN ONE, 3 TIMES THE FRESHNESS

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ACER PREDATOR THRONOS
You’ve never seen a chair like this

NIKON Z7
Nikon’s first full-frame mirrorless camera is a 45MP shooter

SAMSUNG PORTABLE SSD X5
Sasmung’s new portable SSD is thundering fast

ALEXA, TURN ON THE LIGHTS
Fancy controlling your PC’s fans with just your voice? Thermaltake’s Riing Trio 12 RGB fans let you do just that. The Riing Trio 12 supports Amazon Alexa, so you can control the fans using Amazon’s Echo smart speaker. This means you can tell Alexa to set the fans to a certain lighting mode, and even sync the lighting effects with local or international weather conditions.
IS THAT A FLYING SAUCER?
The Cooler Master MasterAir G100 air CPU cooler sports proprietary technology with its 45mm (in diameter) copper heat column. It’s touted to dissipate heat in the same manner as a large heat pipe. The low-profile cooler features an RGB LED controller, allowing you to cool your CPU and cycle through six different lighting options with just a push of a button!
GO FORTH AND CLEAN, DEEBOT 900!

This little robot vacuum cleaner comes with Smart Navi to better calculate the most efficient paths around your home, is designed to tackle things like pet fur and carpets, and even boasts of quieter operation at just 66dBA. Its Ecovacs companion app allows you to build detailed cleaning maps with up to 50 virtual boundaries. This new model is also compatible with Amazon Echo and Google Home so you can now issue voice commands to your very own robot.
THE WILDEST CHAIR YOU’LL EVER SEE

Wild, insane, gargantuan — there aren’t enough adjectives to describe the Acer Predator Thronos. This next-level gaming chair has a 1.5 meters tall steel structure and comes in impose black with white or blue accents. Impact in-game and the chair vibrates. Said chair is adjustable and is housed in a cabin that reclines up to 140 degrees! An overhead brace supports three 27-inch gaming monitors, with space for a Predator gaming PC.
A BUDGET FPV RACING DRONE

The Yuneec HD Racer is a first-person view racing drone built for beginners and intermediate drone pilots. The drone features a range of flight modes to suit the needs of such users. The drone shoots up to 1080p video at 60fps and provides a low-latency FPV video feedback to the racer. Its propellers are encased in guards to prevent damage in the event of a crash.
FULL-FRAME AT LAST

Nikon’s full-frame mirrorless cameras are finally here. The Z7 is the first model to drop, and it’s a 45MP shooter. Hybrid AF provides 493 focus points that cover 90 percent of the image area. It can do up to 9fps on AF-C with exposure locked on the first frame, and up to 5.5fps with continuous AF and exposure. 4K video, of course, with 10-bit Log output over HDMI. The body is sealed against dust and moisture and comes with 5-axis image stabilization.
AMP IT ALL UP
The Sonos Amp lets you integrate non-Sonos speakers into a Sonos multi-room system. If you have existing speakers, subwoofers, record players and the like, plug them into the Amp and you’ll be able to use them as you would a Sonos device. It can power up to four speakers with 125 watts per channel and supports AirPlay 2. An HDMI Arc port makes it easy to integrate with your TV.
**MINIMALIST RENOWN**

Minimalists are going to lap this one up. The Braun Prestige Watch received four iF product awards when it was released in 2012 and still looks timeless today. A front wheel lets you scroll through the watch’s features, which include a calendar, chronograph, countdown timer, alarm, and a second time zone. The watch comes with an LED-backlit LCD display, with a stainless steel case. Comes in black and silver variants.
A DIGITAL ASSISTANT FOR DRIVERS

Chris is touted as the world’s first digital assistant for drivers. Chris extends the essential functions of a connected smartphone. It supports voice texting and reads messages aloud while the driver keeps his eyes on the road. Chris is also a GPS device with maps of over 100 countries and supports voice navigation. It supports gestures so your hands can do the work!
A VERSATILE GAMING HEADSET

The ASUS ROG Strix Fusion is a versatile gaming headset that is compatible with PCs, the Sony PlayStation 4, and the Nintendo Switch. It supports Bluetooth 4.2 and USB connectivity. Inside, it has an ESS 9018 DAC that supports high-res audio playback of up to 24-bit and 96 kHz. It features 50mm ASUS Essence dynamic drivers capable with a frequency range of 20 to 40,000 Hz. The ear cups feature an 'airtight chamber' design that improves sound reproduction and isolation. For fans of RGB lighting, this headset also comes with ASUS Aura and has multiple color modes. Battery life is rated at 17 hours.
THE GOLD STANDARD FOR HAIR DRYERS

This brilliant gold Supersonic hair dryer is the same high-end hair dryer we know, with one artful difference. Five 23.75k gold leaves are hand-glided onto each hair dryer for an opulent finish, set off against a contrasting Dyson blue body. The gold is expected to reveal some of the deep red primer over time, giving each hair dryer a unique patina. Comes in a case of the same shade of red as the primer.
1. STRONG IN PINK

Native Union plays around with colors with a new Rose Collection for its cable range. The color way is available with Native Union’s Apple Lightning cables, which includes the Key Cable shown here. The cables are made from DuPont Kevlar fiber and covered nylon braiding to make them ultra strong. An O-Flex strain relief design at the connector joint prevents breakage. The oversized knot helps to anchor the cable to a table.

NATIVE UNION KEY CABLE ROSE EDITION

2. THUNDERBOLT IN A BOTTLE

The Samsung Portable SSD X5 is a miniature speed demon. The portable SSD is specifically — and only — engineered for Thunderbolt 3, which gives you a thundering connection of up to 40Gb/s. It boasts read/write speeds of 2,800/2,300MB/s and can transfer a 20GB 4K video in only 12 seconds. Dynamic Thermal Guard tech and a heat sink keep temperatures low, and the chassis is reinforced to withstand a 2m drop.

SAMSUNG PORTABLE SSD X5

3. COMPACT FLYER

The Parrot Anafi is a compact drone with four foldable arms. It shoots 4K HDR video at 30fps as well as 21MP stills. The drone’s 3-axis gimbal helps to stabilize any footage for up to 2.8X lossless zoom. Its embedded AI allows for automated flight modes so that you can focus on capturing your shots. Its FreeFlight 6 application promises to make piloting easy, and its high-density Li-Po battery flies up to 25 minutes.

PARROT ANAFI
4. BAGS FOR THE TRAVELLING PHOTOGRAPHER

Manfrotto’s new Noreg collection is made for photographers who love to travel. The backpack and messenger bag are 3-in-1 modular bags with two detachable parts; the shoulder bag and laptop sleeve. Detach them for a lighter bag, or use them to carry light. Camouflage textures and cross-positioned straps elevate the bags with a distinctive urban style. MANFROTTO NOREG COLLECTION

5. SPEED OF LIGHT

The Razer Huntsman Elite was designed with speed in mind. Its Opto-Mechanical switches, as Razer calls them, use light for actuation instead of mechanical parts. This is a tactile, clicky switch with a 45g actuation force, and it features shorter actuation and travel distances for faster response times on paper. This is one of the most fully featured keyboards around, and you also get RGB lighting all around the keyboard, a plush wrist rest, and dedicated media keys. RAZER HUNTSMAN ELITE

6. KEEPING IT STRAIGHT

Some people swear by vertical mice, which are designed to reduce forearm and wrist strain by keeping your arm in a natural handshake position. The MX Vertical Mouse may be the nicest vertical mouse yet. A textured rubber surface and thumb rest provide a solid grip, while a 4,000 DPI sensor results in accuracy and reduced fatigue. It lasts up to four months on a full charge and can recharge via USB. LOGITECH MX VERTICAL MOUSE

7. STEREO FROM A SINGLE SPEAKER

The new Bose Home Speaker are wrapped in seamless anodized aluminum, and Bose boasts they “have the widest soundstage of any smart speaker available today.” Two custom drivers point in opposite directions, so sound reflects off surrounding walls creating a broad stereo effect. The wireless smart speaker supports Amazon Alexa, with other voice assistants to follow. Bose promises AirPlay 2 support to come in early 2019. BOSE HOME SPEAKER 500
8. FAST CHARGE YOUR SWITCH ON THE GO

The Anker PowerCore 20100 Nintendo Switch Edition is an officially licensed product and rated 20,100mAh. It claims to be able to fast charge your Nintendo Switch from zero to full capacity in 3.5 hours, even if the Switch is in operation. With the battery pack, you can add up to 15 hours of playtime for the handheld console.

ANKER POWERCORE 20100 NINTENDO SWITCH EDITION

9. ADAPTIVE INSIDES FOR CUSTOM CARRY

The Freeline BP 350 AW is a photography backpack made of high-grade nylon fabric with a water and abrasion coating. Its good looks would already be an easy sell, but the BP 350 AW also introduces Lowepro's new QuickShelf adaptive interior divider system, which unfolds into 3-tier shelves or folds flat for open interiors.

LOWEPRO FREELINE BP 350 AW

10. SHOOT WITH TAY TAY

Tay Tay fans can now dance and shoot to her tunes at the same time, thanks to Fujifilm. Swift designed the Instax Square SQ6 Taylor Swift Edition herself, with a newspaper pattern similar to the one on the ‘Reputation’ album. A reproduction of her autograph is printed on the back of the camera, and you also get a Swift camera strap and film case.

FUJIFILM INSTAX SQUARE SQ6 TAYLOR SWIFT EDITION

11. BIG IS BEAUTIFUL

When everyone else in the tech world is making smaller and thinner gadgets, Diesel is living large. The Full Guard 2.5 is a massive Wear OS smartwatch with a 56mm case and 1.39-inch display. It’s powered by a Qualcomm Snapdragon 2100, and includes a heart rate sensor, onboard GPS, NFC, and is water resistant. Diesel says it’ll get up to two days of battery life.

DIESEL FULL GUARD 2.5
The Synology DiskStation DS1618+ is a six-bay NAS powered by the quad-core Intel Atom “Denverton” processor, coupled with 4GB DDR4 RAM. Targeted at enthusiasts and small- to medium-sized businesses, the NAs can be paired with Synology’s M2D17 PCIe adapter card to house dual M.2 SATA SSDs to boost maximum throughput and reduce the I/O latency. **SYNOLOGY DISKSTATION DS1618+**

**A LONG TIME COMING**

Three years in the making, the Cascade is Campfire Audio’s very first full-size headphone. The challenge was to capture the in-house sound that Campfire Audio has been known for in a portable closed-back headphone and that took Campfire Audio multiple prototypes to get right. The Cascade features 42mm beryllium drivers and is built using premium materials. It has an all-metal construction using forged aluminum and stainless steel and the ear pads are clothed in sheepskin leather. It also comes with a detachable silver-plated litz cable with cloth jacket. **CAMPFIRE AUDIO CASCADE**

**LEATHER LUXURY FOR AIRPODS**

Ever dug into your bag for your AirPods or forgot where you put them? The AirSnap is a beautiful full-grain leather case that both protects your AirPods as well as keeps them close. A top swivel clip lets you attach it to a bag or clip, and a bottom cutout lets you recharge the AirPods in the case. **TWELVESOUTH AIRSNAP**
Oh, what a difference a letter makes. The old Aventador SV was hardly a slowcoach but Lamborghini has reworked it by giving it more power and more aero. The new car is called the Aventador SVJ and it is powered by an upgraded version of the 6.5-liter V12 found in the old SV. Naturally aspirated, of course, the V12 makes 760hp and 720nm of torque - up 20hp and 30nm from the SV. Performance is biblical as you would expect. 0-100km/h is dealt with in just 2.8 seconds and 0-200km/h in just 8.6 seconds. Top speed is 350km/h.

However, the Aventador SVJ isn't just about straight line speed. Oh no, the SVJ was designed to be a track weapon and it features Lamborghini's trick ALA aerodynamic system that actively varies aero load by opening and closing electronically controlled flaps in the front splitter and bonnet based on a variety of parameters such as speed and steering angle. The end result is 40% more downforce over the old SV and the small matter of being the current record holder of the fastest production car around the famous Nüburgring. The time? An amazing 6 minutes and 44.97 seconds.

Oh, and if you are seeking something even more exclusive, there's the SVJ 63, which is limited to 63 units in celebration of the founding year of Lamborghini - 1963, in case you were wondering - and features a special white livery and even more extensive use of carbon fiber.
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IT’S 2018, WHERE’S MY JETPACK?
As it turns out, there are a few around you can actually buy and fly.

MORE INSIDE>
THE WIRELESS PROBLEM
It’s one thing to lose the cord, but at the expense of increased battery usage and more things to charge.

THE STATE OF GAMING
Dell’s Rakesh Mandal talks to us about PC gaming and the challenges of becoming mainstream.
Defying gravity

By Alvin Soon

If you’ve ever wanted to fly like Iron Man, you’re in luck. London department store Selfridges is selling a working jet suit for £340,000.

Created by British inventor Richard Browning, Gravity Industries’ jet suit is composed of five jet engines mounted on the arms and back. It runs on jet fuel or diesel, packs 1,050 horsepower, and can dart up to 12,000 feet.

Depending on the weather, the jet suit can take off from three to nine minutes at a time. Browning broke a world record in 2017 by flying the suit at its top speed of 32mph.

You can see the jet suit in Selfridges, and take it for a spin in virtual reality. If you’re well heeled and adventurous, you can order your own custom suit, which comes complete with flying lessons.

MORE WAYS TO JET
Jetpacks don’t only exist in science fiction anymore. Here are other jetpacks zipping around the sky.

**JETPACK AVIATION JB-10**
- The JB-10 is JetPack Aviation’s follow-up to the JB-9. Like Gravity Industries’ jet suit, the JB-10 is for sale, but not in stores. The pack lets you take off and land vertically, can reach speeds of more than 100mph, and can fly up to 12 minutes. An electric version is currently in the works.

**YVES ROSSY’S JET WINGPACK**
- Developed by Swiss ex-military and commercial pilot Yves Rossy, the Jet Wingpack is less a jetpack and more of a miniature plane. The Wingpack can’t take off on its own; it has to be lifted into the air by plane or helicopter. But it can reach incredible speeds of up to 190mph.
Technology is increasingly getting mobile, and it’s no secret that batteries are the Achilles’ heel of today’s mobile devices.

For smartphones, it’s easy to understand why battery life matters: people don’t want their phone to die in the middle of the day. Not when they’re in the midst of typing an email, and especially not on a bus with no power outlet in sight. For mobile devices, a long battery life is both an anxiety-reducing feature (you don’t need to keep glancing at the battery status) and a convenience feature (you don’t need to lug a power bank everywhere you go).

But technology is also getting more portable. And by that, I’m referring to typically desktop-bound devices that are now dropping their cord so that we can more easily bring them on the road. Things like keyboards, speakers, printers, and scanners. The key difference between smartphones and these other ‘cable-less’ gadgets is that wireless operation is a must–have in the former but entirely a nice–to–have in the latter.

I just did a quick audit of my desk and found that I’ve over the last few years snipped the cord of many of my office/work–related gear. At the moment, I’m staring at two Bluetooth keyboards, two wireless mice, a pair of Bluetooth headphones, and a mini Bluetooth speaker. And somewhere in my drawer sit a couple of portable printers, voice recorders, and of course, numerous power banks.

Like phones, wireless peripherals with the longest battery life aren’t usually the highest–end or most expensive offering in their respective category. For example, I’ve flirted briefly with Logitech’s MX Master mouse, but gave up because I didn’t like the idea of charging it every two to three weeks. My solution was to return to the company’s Marathon Mouse M705, which currently is still going strong with the two AA batteries I put in it two years ago.

Same goes for my keyboard. I started with the Logitech K810 Bluetooth keyboard, but soon switched it out for the K760. The latter is also a Bluetooth keyboard but I’ve not once in the last four years needed to worry about it running low on power when I’m out working in a coffeeshop. Why? Because the K760 is a solar–powered keyboard. And for what it’s worth, I use the Beats Solo 3 not because I love its sound (it’s okay), but because I love its 40 hours of battery life, which isn’t common in the realm of wireless headphones.

Am I relating a first world problem? Maybe. But it’s undeniable that mobility is a workforce trend and that more and more traditional devices are now battery–powered so that you can bring them around. Whether you like it or not, the wireless revolution is invading into more spaces, and we’re powerless (pun fully intended) to stop it.

By Ng Chong Seng
Q & A

TWO SPEAKERS AND THE TRUTH

* Dale Lott, VP Product development, Fender Audio

By Marcus Wong Photography Vee Chin

What’s the process of designing a headphone like for you?
In the past, I tried to make what I liked and over time people started liking what I liked. Now it’s different. The market is changing constantly and with so many in the headphone space, there’s a need to be competitive. But even as we add drivers and things, I still have an underlying sound that I go for, that’s more like a live concert sound. It’s not an audiophile sound but more of the sound you get when you go to a large concert and you’ve got the bass thumping. It invigorates you and makes you happy.

Music comes to life, and that’s what I’m trying to do when I design something. With every new prototype, the one song I always play is Toto’s Gift of Faith. I’ll listen to that and if my blood starts rushing, the hairs start standing on the back of my neck, and I start breathing hard, then I’ll know – this one’s pretty good. You don’t get that unless it’s right; it’s like a Zen moment!

Multiple drivers in in-ear headphones seem to be a trend. Is this the best approach?
No (laughs). The market wants more drivers, but if you ask me, less is more. You don’t see high-end headphones with 15 drivers, so why would you need that in your ear? My personal favorite in-ears is something I made for myself with one 10mm dynamic driver. The market likes numbers and drivers, but the best set I’ve made and heard is a single 10mm diameter (headphone).

Audio manufacturers now release products that have frequency responses that exceed the 20Hz-20kHz range of human hearing. Is there a point to this?
No. Pardon my French, but it’s all bullshit. Sony came out with “High-Resolution Audio” so only certain products would qualify, but if you’re over 18 years old, I’m pretty sure you can’t even hear tones at 18kHz. We’re all deaf! Our frequency response in actuality is much less than 20Hz-20kHz.

So there’s no real point to the 20-20 specification?
Not on the high end. You can feel the lower frequencies even if you can’t hear them though. It’s that rattle-your-teeth bass you get at concerts. If you go to a live concert and you see a bassist or a keyboard player and you feel those low tones, that’s what’s below 20Hz. You don’t hear that bass, but you feel it, and it shakes you to your soul.

What made you use 3D printing to create headphones?
3D printing was something I did out of sheer necessity. When I started out, people were doing 3D printing, but not manufacturing. I didn’t have the money to buy the tools I needed in the beginning, and I had to be nimble to the wants and needs of the market. 3D printing allowed me to change the model completely with the very next print job.

I imagine it also allows you to define the space?
Yes. Most people make a hollow shell then cram the drivers into it, maybe they glue them to a couple of points and that’s it. But with 3D printing, I’m able to control where the speakers fit and how the sound bore goes through the ear and the shell. All

“[It makes my blood start rushing, the hairs start standing on the back of my neck, and I start breathing hard, then I’ll know – this one’s pretty good.]”
the teeny attributes you can’t do otherwise. The way we do it; all the speakers’ vibrations transfer directly to your ear. It’s what we call coupling, so your head and ears are coupled to the speaker. You don’t get that with anyone else’s stuff.

We’re seeing headphones with processing for 3D sound and other immersive technologies. What do you think about AI and audio?

Once at the Hong Kong AV Show, there was a pair of these big speakers playing an acapella track. The lady was singing a Christian song and it almost brought me to tears because of how perfect it was; how real it felt. You can’t do that with AI. That was music in its rawest, truest sense. That’s the best example of why a set of speakers is worth a million dollars because I would love to have a set of those speakers (laughs). For movies, you have new speaker setups with multiple speakers so the sound goes around you. It’s invigorating, but music’s not like that. Music is two speakers and the truth, and that’s what we’re after.
How excited should you be about NVIDIA’s new GeForce RTX cards?

It all comes down to game developers.

By Koh Wanzi

A small part of me expected NVIDIA’s GeForce RTX 20-series cards to be something special. After all, it’s been over two years since NVIDIA released the GeForce GTX 1080 and its Pascal architecture, a lifetime when set against the frenetic cadence of yearly product refreshes. NVIDIA had to have been working on something special, right?

As it turns out, NVIDIA did deliver, sort of. At Gamescom 2018, the company unveiled the GeForce RTX 2080 Ti, 2080, and 2070. While some thought that the Turing cards might have debuted under the 11-series name, NVIDIA decided to skip ahead to the 20-series. The choice of name is symbolic, and NVIDIA clearly intends to suggest that Turing GPUs are a generational leap and not an iterative upgrade.

The big new feature on Turing is something NVIDIA is calling RT cores, and they’re designed to accelerate something known as ray tracing. Ray tracing is more than just a way of simulating realistic lighting conditions and can be thought of as an alternative way of rendering models that is different from traditional rasterization techniques.

Put simply, ray tracing enables more accurate images than rasterization, but it requires a lot more computational power. Games that take advantage of RTX will be able to produce lighting and shadows that are truer to life, so game worlds look lusher and better than ever.

Then there’s something called Tensor cores, another new addition traditionally dedicated to machine learning. It’s not immediately obvious what use they would have in graphics rendering, but NVIDIA has some cool new tech called Deep Learning Super Sampling (DLSS) that can utilize these cores to upscale images with less of a performance hit.

Digital images are composed of
pixels, which can give rise to jagged lines and blocky images at lower resolutions. This is usually overcome using one of a number of anti-aliasing techniques such as MSAA or SSAA, but the performance penalty can often be brutal.

However, DLSS supposedly offers quality on par with 64x SSAA, among the highest quality and most demanding forms of anti-aliasing, while being less taxing. It’s not difficult to see why this might be attractive since you’re technically getting more for less. In fact, NVIDIA claims that games that use DLSS could see up to two times better performance on the GeForce RTX 2080 than the GeForce GTX 1080 at a 4K resolution.

All this sounds fantastic, but the problem is that the potential gains all hinge on new technology and their adoption by game developers. At the time of writing, no game can take advantage of the RT and Tensor cores, so the vast majority of gamers are probably more concerned about how the 20-series cards will perform with traditional rasterization techniques.

Unfortunately, NVIDIA’s presentation at Gamescom concerned itself almost exclusively with ray tracing, paying little heed to conventional measures of performance. It’s going to be great we were told, as long as games are coded for the new specialized RT and Tensor cores.

That’s a huge caveat, and even Shadow of the Tomb Raider – one of the biggest games to support NVIDIA’s RTX platform – will only be able to take advantage of it in a post-release patch that currently has no release date. Of the 21 games that have confirmed RTX support, there are a couple of heavy hitters on board as well, including Metro Exodus and Battlefield V, but we’re still a way off from truly mainstream support.

Furthermore, NVIDIA has taken to quantifying performance in GigaRays/s, which measures how well the cards can handle real-time ray tracing. That’s an unfamiliar metric and one that’s not necessarily fair. For instance, the GeForce RTX 2080 Ti is rated for up to 10 GigaRays/s, whereas the GeForce GTX 1080 Ti tops out at 1.21 GigaRays/s. By this measure, the RTX 2080 Ti is up to 8 times faster than its predecessor, except that this wouldn’t be an accurate representation of what you’ll really get in real-world terms.

Since no games currently support the RT or Tensor cores, how well the cards can handle ray tracing is practically a non-factor. NVIDIA’s estimate of a 30 to 40 percent increase in conventional metrics falls far short of the nearly 80 percent improvement we saw moving from the GeForce GTX 980 Ti to 1080 Ti.

In terms of real, tangible gains, nothing quite beats Pascal, and the Turing cards, which NVIDIA is heralding as the start of a new generation of graphics, only deliver modest improvements.

Real-time ray tracing is exciting technology, allowing light to interact realistically with the environment and the addition of small details like softer shadows. After all, this is the same technology that’s used in movie post-production facilities, so to have the ability to do this real-time in games is pretty groundbreaking.

However, the problem is that most folks won’t have a card that can do this for some years yet. This means that there’s less incentive for game developers to add support for ray tracing, which is really what’s needed for the technology to take off. Furthermore, DLSS is NVIDIA’s tech, which might turn developers wary of favoring NVIDIA over AMD away.

This could very well be the future of PC graphics, but you probably won’t feel its impact until a couple of generations later.
THE STATE OF GAMING

Rakesh Mandal, Senior Director & General Manager, Client Solutions, South Asia & Korea, Dell

By Koh Wanzi Photography Angela Guo
How is Dell working to grow the esports industry?
We’ve been supporting the esports industry for longer than most other OEMs. For instance, we supported the Championship Gaming Series, one of the first major esports tournaments almost 11 years back. We’ve supported franchises as well, such as Team Dignitas. At the same time, we’re looking ahead and working to establish new, global partnerships, as seen with the NBA 2K League, Miami Heat, and Misfits Gaming.

“What’s the biggest driving force behind the growth of esports?”

In addition, we’ve got the Alienware Training Facility in North America, which we’re working with Team Liquid on. Each and every one of our partnerships works both ways. They’re obviously looking at us because of Alienware, what it stands for, and how it can help them extend their competitive advantage. On the other hand, we’re also really excited to help them take their game to the next level and grow our brand.

How would you describe the gaming industry today?
I think the industry is moving toward greater mainstream adoption and acceptance. It’s no longer reserved for a niche audience, and it’s becoming more progressive and expansive. Given the circumstances, that’s definitely one of the reasons why we’re beefing up our gaming PC portfolio and investing in the Training Facility.

Furthermore, support from professional sports leagues is growing and no longer simply restricted to one-off gaming tournaments. It is significantly different from what it was before and I think our partnerships help ensure that Alienware continues to be the brand of choice. They also cement it as a brand gamers should aspire for.

Gaming is also becoming more intellectual as games become more layered and complex. Not only do you require good hand–eye coordination and quick reflexes, you also need to be able to plan, strategize, and make sense of information. It’s not a stretch to say that this can help you become sharper and more attentive.

What’s the biggest driving force behind the growth of esports?
I think esports itself represents a shift away from old perspectives and consumption habits with regard to gaming. Today, a big part of it comprises shared experiences and interactions between players and the community.

Furthermore, one of the biggest driving forces behind esports is technology. As a result, it is important that we as a technology company continue to push boundaries, deliver new and more advanced devices, and continue to take computing to the next level. For example, we’ve shifted away from the Inspiron Gaming series in favor of the Dell G series, an effort to widen the appeal of gaming devices and gaming itself. The G3, G5, and G7 laptops cater to a broad audience, encompassing both budget-conscious customers and those who want the latest hardware.

However, I think it’s key to balance cutting-edge technology with affordability, which is where the Alienware brand comes in.

Where do you see the industry going in the next five years?
We recently conducted a study with a third-party agency that looked at what defines a gamer today. Ultimately, we realized that it’s hard to pin down as people who identify themselves as a gamer spanned so many different and divergent groups. I mentioned before that gaming is becoming more mainstream, and that’s definitely a big part of why traditional stereotypes of gamers no longer apply. We’re making huge strides in getting rid of the stigma where people used to think that gamers were generally people who didn’t have their lives in order and associated them with anti-social behavior.

Gaming revenue is potentially the fastest growing segment in the consumer PC space today. Asia is home to millions of esports enthusiasts. It is one of the most exciting markets, regardless of whether you’re a gamer, technology company, developer, or publisher. The reach of esports and gaming is increasing, and technology firms that partner with industry organizations can help to confer further legitimacy.
Meet the world’s largest airplane

The Stratolaunch is designed to heave heavy rockets into space.

By Alvin Soon

Meet the Stratolaunch. It has twin fuselages, 28 wheels, six 747 jet engines, and its wingspan measures 385 feet or 117 meters. It is the largest airplane, by wingspan, ever made.

The Stratolaunch is designed to be a flying launch pad for rockets. Launching enormous rockets from the surface of the Earth carries an enormous price tag. Launch sites are also limited, and launches are susceptible to weather.

An airplane, however, can take off quickly and adjust flight times more flexibly. It costs less to send an airplane into the sky than a rocket into the sky. And an airplane can be reused, reducing costs further.

The Stratolaunch is a potentially easier, cheaper, and more reliable way to launch satellites into space. The plan is to attach rockets to the Stratolaunch’s belly; the gigantic airplane will fly to cruising altitude, where it’ll drop the rocket. The rocket then ignites its engines and blast off into orbit, where it’ll drop its payload.

The project is funded by Microsoft co-founder, Paul Allen, and has been in development since 2011. It’s successfully taxied down the runway, hitting a top speed of 46mph. And its first flight is expected to take place within the year.

If successful, the Stratolaunch company plans to pair the colossal airplane with its own rockets, named Kraken. It says that customers will be able to use the pair to launch satellites into orbit for roughly US$30 million, or half of what SpaceX charges. This part of the project is expected to go live in 2022.

Thereafter, Stratolaunch plans to build reusable space planes that can launch from the huge airplane. Similar to the NASA space shuttle, these planes will drive into orbit, drop their payloads, and then return to Earth.

It’s a tremendous undertaking with the world’s most sizable airplane, and it’s safe to say that nothing on this scale has ever been attempted before. Stratolaunch is flying into the vast unknown here, but if successful, can make space more accessible than before.
E-books have been around for a long time but I only recently decided to give them a shot. I’m pleased I did. In fact, I have now decided that I will do most of my reading with e-books.

A big problem that keeps me from completing books is that my book is never with me when I have the time to read. This isn’t a problem with e-books since they are on my phone. Since I almost always have my phone with me, I can read whenever I want. Every page counts for slow readers like me, and being able to read a page or two here and there helps.

Most e-book apps have built-in tools like dictionaries and note taking. This is helpful since it means you don’t have to put away the book and consult a dictionary. You can check a word and continue reading without losing context of what’s happening. After all, a single word can make or break a sentence or passage.

With note-taking tools, you can also save and mark passages, then come back to them later. To do the same with printed books means using a highlighter and unsightly post-it notes.

Have you tried using reading lights in a darkened plane cabin? They are usually either too dim or too bright. Or they don’t shine on your book properly and you are forced into an awkward position just so that light falls on it. This isn’t a problem with e-books since smartphones have self-illuminating displays and most of the newer e-book readers have backlights.

And then there’s the convenience of purchasing books. E-books can be purchased online with a few simple clicks of the mouse or taps on the screen. Thereafter, the book appears almost magically on your device. No more running down to the bookstore on the day of the book’s launch.

Finally, there’s the price. E-books are usually less expensive than their printed counterparts. Let’s use Amazon as an example. The Kindle version of *Lake Success*, a new book by Gary Shteyngart, is US$13.99, whereas the paperback version is US$19.36. The discrepancy can be even greater for older novels. The paperback version of *Ready Player One* by Ernest Cline is US$8.78. The Kindle version is US$4.80 — that’s a whopping 45% less.

In a perfect world where I can have my cake and eat it too, I would rather be reading printed books. As convenient as e-books are, they cannot replicate the smell of printed paper, the sensation of flipping pages, or the vibrancy of color photos. I’m a sucker for those kinds of things. But one needs to be pragmatic, and the advantages of e-books are too many to ignore.
Could your grandma be the next cybersecurity expert?

By Zachary Chan
I was in attendance of a panel discussion during RSA Conference 2018 that was focusing on emerging cyber threats and the challenges faced by corporations and governments in a digital world. Yes, the thrilling melting pot of modern security concerns.

However, there was one discussion point that stuck with me, and it was about how we think of cybersecurity experts today. I’d imagine the first thing that popped into your mind—just as it did mine—was the typical programming savant. A high profile black hat hacker, brought in to reverse engineer a company’s infrastructure, in order to find and eliminate security loopholes. Or maybe I’ve just watched one too many movies.

The reality of it, as echoed by panelists Zulfiqar Ramzan, the CTO of RSA, and Narelle Devine, the Chief Information Security Officer at the Australian Government Department of Human Services, is that IT skills aren’t the most important thing you need to be a cybersecurity expert any more. And organizations are finding out that current education curriculums aren’t producing people with the right skills for the real world when they leave university.

In fact, there is currently a shortage of qualified people in this field. There is no such thing as hiring a cybersecurity specialist with 10 years of experience, because the skillsets required for such security needs didn’t exist 10 years ago.

Security firms talking about increased threat landscapes, and breaches that seem to be happening in greater frequency, are simply an effect of our world going digital.

Cybersecurity—the definition of the term bandied about today—is no longer an IT-only issue. It is a multi-faceted problem that encompasses every aspect of our lives, with running a business or even a country.

TL;DR. As long as there is internet, there will be cybersecurity concerns. And because of this, human skills are required more than ever. And this goes beyond the need to align technical jargon with business goals. I’m talking about the skillsets needed to understand and deal with growing digital threats that can’t be detected or stopped by your run of the mill firewall and anti-virus.

Psychologists for example, can be employed within a cybersecurity team to combat the increase in sophisticated social engineering techniques. These are the threats that attempt to hack the human connected to the system rather than the system itself.

Lawyers also have a role in cybersecurity to help develop new policy and processes, to identify and combat traditional criminal activity that’s moved into the digital space. For example, many cyber attacks aren’t really caused by hacking. They’re merely incidents of fraud; digital fraud yes, but still just fraud.

Following this vein, real world cybersecurity skills can be trained, or re-trained into people that may have the aptitude to excel in a cybersecurity environment, without necessarily having an IT background. In the more traditional sense, Singapore’s Republic Polytechnic and Temasek Polytechnic works with RSA to operate student-run Security Operation Centers. On the other hand, in Australia, there are programs to re-train veterans.

Further down the unconventional rabbit hole, it was brought up that truck drivers are supposed to have excellent facial recognition skills, which leads to very good pattern recognition. They can also stay focused for hours on end, which are exactly the kind of skills that a cybersecurity war room would need. There was even a suggestion of re-training retirees and the elderly as untapped talent sources, as they may already have skillsets that can be applied to the bold new cybersecurity frontier.
Like clockwork, Apple has announced new iPhones and Watches for the year. They're bigger, faster and more expensive than ever. But look past the specs, and you may just get a bigger picture of Apple's long game.

By Team HWM Art Direction and digital imaging by Ashruddin Sani
Forget notifications and cellular connectivity. The real reason why you might want to wear an Apple Watch is that you might live longer and healthier.

Apple has announced a new Apple Watch every September for the past two years and this year was no different. Alongside the new iPhones, Apple also unveiled its latest generation smartwatch, the Apple Watch Series 4. The new Watch has a larger display, a more powerful processor, more accurate sensors, and better all-around health features.

Early Apple Watches focused on features. What can it do other than telling the time? Does it have a built-in GPS? Can it play music? Can I surf the web with it? Can I use it to make phone calls? But these have gradually taken the back seat as Apple focuses on health and fitness.

One of the first things Apple did to enhance the Watch's health capabilities was improving its ability to track fitness activities. Apple achieved this with a combination of software and hardware updates. For example, in 2016, Apple Watch Series 2 added 50 meters water resistance and the ability to track swimming workouts. Last year, Apple introduced GymKit in watchOS 4. GymKit allows owners to sync their Watches with compatible gym equipment, so they can have a more complete set of workout data. This year, the latest watchOS 5 adds yoga and hiking to its ever-growing list of workouts.
Another area that has been a focal point for Apple is heart health. The Apple Watch always had a built-in heart sensor but it has gotten more powerful and useful over the years. watchOS 4 included a revamped Heart Rate app with more information about your heart's health. The Heart Rate app shows all-day heart rates, including your walking average, resting, and maximum heart rates. But most important of all, it can even detect and alert users if it senses abnormal heart rates.

There have been instances where the Apple Watch's enhanced heart rate tracking has proved itself useful. In August this year, an Australian man's Watch notified him that his resting heart rate had shot up to 130 beats per minute. That's more than double the healthy average. A trip to the doctor revealed that he had a hole in his heart and required surgery.

The Apple Watch Series 4 is able to do something that no other smartwatch in the market can - it can take electrocardiograms. It does this using electrodes built into the case back of the watch as well as its crown, and it only takes 30 seconds. The only caveat is that this feature won't be available at launch and it will only be available in the US until further notice. Still, it is easily one of the new Watch's most exciting features.

Over the few short years of the Apple Watch's existence, Apple has astutely shifted the focus of the Watch to health and fitness. Beyond watchOS 5 and Apple Watch Series 4, Apple has other health initiatives that are worth mentioning, like ResearchKit. ResearchKit is an open-source framework for medical research. It allows medical researchers to tap into the power and wide user base of both the Watch and the iPhone to advance medical studies. An example is EpiWatch, an app that uses the heart rate sensor and accelerometers on the Watch to measure changes when epileptic seizures occur.

Over the few short years of the Apple Watch's existence, Apple has astutely shifted the focus of the Watch to health and fitness. What better way to get people to wear your watch than the promise that wearing it might help you live a longer and healthier life? There is evidence to suggest that Apple wants to build the ultimate health tool, and the Apple Watch Series 4 is only the next step in that direction.
APPLE’S NEW A12 BIONIC CHIP IS THE UNSUNG HERO FEATURE OF THE IPHONE XS

Its neural engine is evidence that Apple is serious about A.I.

By Ng Chong Seng

Over the years, consumers have learned that Apple’s “S” suffix for the iPhone are about improvements under the hood. But there were always one or two standout innovations that went beyond the usual upgrades. Like Siri on iPhone 4S, iOS 7 and Touch ID on iPhone 5S, and 3D Touch on iPhone 6S.

This year, there seems to be nothing new. Sure, iPhone XS Max has a 6.5-inch OLED, the largest display ever on an iPhone, but that’s what people have been expecting since the iPhone X. In my opinion, the 6.1-inch edge-to-edge LCD on iPhone XR is the bigger of the two screen feats. But it’s also fair to say that it shouldn’t be spoken in the same breath as Siri and Touch ID, which were truly ground-breaking tech during the day.

Does this mean Apple has lost its touch? Did the world’s first trillion-dollar company hit an innovation roadblock after its exertions last year, when it introduced the futuristic iPhone X with a Super Retina Display, TrueDepth camera system, and Face ID? I don’t think so.

When Apple CEO Tim Cook took the stage to announce the iPhone X in September 2017, he claimed that the phone will “set the path of technology for the next decade.” It’s a statement that he has uttered twice in two
The iPhone XS, XS Max, and XR, which take their design cues from the iPhone X, certainly look like a typical S-year upgrade. But delve deeper and you’ll realize that one improvement isn’t like the others. I’m referring to the new A12 Bionic chip. It’s a fact that Apple debuts a new processor for its latest iPhone every year. And the narrative for each new “A” series chip is this: apps run faster and games run smoother, with better visuals. The Apple-designed A12 Bionic SoC (system-on-chip) broadly follows this marketing template. That’s unfortunate because this means most consumers will overlook what Apple’s silicon team has achieved and what it means for the future of the iPhone.

Like last year’s A11, the A12 Bionic has a six-core CPU made up of two performance cores and four efficiency cores. But the performance cores are now 15% faster and the efficiency cores now use 50% less power. All six CPU cores can also be turned on at the same time when you need a power boost.

The GPU is improved, too. Now a four-core design (previously three cores), Apple claims it’s up to 50% faster than the A11. Now all this is well and good, but it’s hard to imagine that you need 60% more transistors to pull that off.

Completing the processor trinity is what Apple calls the “neural engine.” This is the component that I posit benefits the most from the increase in transistor count. It’s an eight-core part designed to handle machine learning and AI tasks, like Face ID, Animoji/Memoji, Siri voice recognition, and smart search in Photos.

The A11 has a neural engine too, but it pales in comparison to this “next-generation” version. According to Apple, the improved neural network of the A12 Bionic can perform 5 trillion operations per second, which is 8.3 times the A11’s 600 billion operations.

In just one generation, the improved neural network on the A12 Bionic can perform 5 trillion operations per second, which is 8.3 times the A11’s 600 billion operations.

For a start, the A12 Bionic is the industry’s first mobile processor manufactured on the state-of-the-art 7nm process to ship in volume. A smaller process node allows Apple to pack more transistors on a chip. In the A12’s case, we’re looking at 6.9 billion transistors, which is way more than the 4.3 billion we’ve on the A11 from a year ago. Where do these nearly 7 billion transistors go to?

Like last year’s A11, the A12 Bionic has a six-core CPU made up of two performance cores and four efficiency cores. But the performance cores are now 15% faster and the efficiency cores now use 50% less power. All six CPU cores can also be turned on at the same time when you need a power boost.

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The A11 has a neural engine too, but it pales in comparison to this “next-generation” version. According to Apple, the improved neural network of the A12 Bionic can perform 5 trillion operations per second, which is 8.3 times the A11’s 600 billion operations. Core ML, Apple’s machine learning framework, now runs 9x faster, which means more immersive augmented reality experiences. With rumors of Apple incorporating time-of-flight (ToF) sensors in the 2019 iPhones and exploring AR glasses, it’s not hard to imagine that the company is paving the road now.

But AR and machine learning on phones are still in their infancy. If you need a compelling story today, know that the neural engine can also make existing features better. One prime example is Smart HDR, the marquee camera feature on the new iPhones. According to Apple, Smart HDR is a result of hooking the neural engine into the phones’ ISP (image signal processor). The phone will take a four-photo buffer as well as several “interframes” each focused on capturing different data (e.g., varying exposures to get more highlight and shadow details). Instead of simply combining the photos, the neural engine will analyze each image and pick out the best part in each to create the final photo.

In Portrait mode, the neural engine applies machine learning to analyze data from the camera sensor to distinguish faces. It also creates segmentation data to accurately separate the subject from the background and generate convincing bokeh. It’s thanks to the A12 Bionic chip and its neural engine that Apple is able to bring the advanced HDR and depth of field effects to the iPhone XR, which only has a single-lens rear camera.

A.I. is a term brandished by many smartphone makers these days, but few can make the connection between the tech and the user benefits like Apple does with the 2018 iPhones. There’s no doubt in my mind this neural engine will be central to Apple’s machine learning efforts, and the enabler of the coolest features we’ll see on iPhones in the next decade. This is only the beginning.
Two years ago, deciding which iPhone to get was easy. Did you like the smaller one, which was also more affordable, or did you prefer the bigger one, which was more expensive?

This year though, things get a little more confusing. The smallest new iPhone, the iPhone XS, actually costs more than the mid-sized iPhone, the iPhone XR. The XR is the most affordable new iPhone, but its larger size might put small hands off. The iPhone XS Max is for those who always liked the iPhone ‘Plus’ model. But it comes with a massive price tag that might upset buyers.

**THE XR IS THE MOST AFFORDABLE NEW IPHONE**

The easiest way to make this decision is the price: if budget is an issue, the iPhone XR is the most affordable new iPhone. The iPhone XR has almost everything the iPhones XS and XS Max have; it enjoys the same new A12 Bionic chip with next-generation Neural Engine. It also switches Touch ID for Face ID.

Compared to the previous most affordable iPhone, the iPhone 8, the XR has a larger edge-to-edge 6.1-inch display. Unlike the iPhones XS and XS Max that have OLED screens, the XR has an LCD screen. The screen has a lower contrast ratio, at 1,400:1 instead of OLED’s 1 million:1. But it’s also a wide color display (P3) with True Tone. There’s no 3D Touch but most people likely won’t miss it.

And the iPhone XR comes with the same, new and bigger 12MP sensor and wide-angle camera as the iPhone XS and XS Max. You don’t get the second telephoto camera, but Apple is including software-based Portrait Mode in the iPhone XR.

One major difference is that the iPhone XR comes in six finishes instead of three for the XS models. You can pick from white, black, blue, yellow, coral, and (Product)Red colorways. The XR also, curiously, has the longest battery life of any iPhone. It’s rated for five hours more talk time than the XS, two hours more internet use and one hour more video playback than the XS Max.

Users who’ve always used the smaller iPhone will have to get used to the XR’s larger size though. Compared to the iPhone 8, the XR is 12.5mm taller, 8.4 wider, 1mm deeper, and 46g heavier.

If these prices are hard to swallow, you might have to contend with the older iPhones 8 and 7, which Apple is still selling at reduced prices.

**THE XS IS THE MOST POCKET-FRIENDLY NEW IPHONE**

This year’s iPhone XS costs roughly the same as last year’s at the same storage point, but there is a new 512GB model at $2,199. If you must get the smallest new iPhone, the XS is the one you’re looking at. But if you’re coming from a regular iPhone 8, know that the XS is still bigger than those models.
Compared to the XR, you get a smaller 5.8-inch display, but this screen is OLED with higher contrast and deeper blacks.

Previously, in the iPhone with iPhone Plus generations, the Plus always had the slightly better camera. But the iPhone XS and XS Max have the same new dual-camera system, so it really comes down to the size you prefer.

**THE XS MAX IS FOR THOSE WITH DEEP POCKETS**

If you've always enjoyed the larger iPhone Plus, you'll love the iPhone XS Max. It's about the same size and weight as the last Plus, but with a huge 6.5-inch screen in comparison to the Plus’ 5.5-inch. It’s a gorgeous OLED too.

The only requirement is that you have deep pockets – both to carry the phone and to pay for it. The iPhone XS Max starts at a whopping $1,799 for the entry 64GB model, $2,039 for 256GB, and $2,349 for 512GB. To put these prices into perspective, Apple's most affordable 13-inch MacBook Pro (128GB, without Touch Bar), costs $1,898. These are not just the most advanced iPhones that Apple has ever sold, they are the most expensive too.

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**IPhONES COMPARED**

A key look at the new iPhones’ key specs

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</table>
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HOW WE RATE:
Products are rated on a scale of 1 to 10; 1 being so abysmal, it should be a crime to sell it, and 10 being almost perfect. Come now, nothing is perfect. An Editor’s Choice may also be awarded based on unique merits.

MORE INSIDE>
FELIKS
AUDIO ECHO
Mellow sounds from a vacuum tube.

NAD VISO HP70
Clearer sounds from cancelled noise.

RAZER
MAMBA ELITE
Angry sounds from your dead opponents.
NO LOSING THESE BUDS

The problem with wireless in-ear headphones is working out what to do with them when they’re not in use. You could put them back in their carrying case, but that just becomes one more thing to rummage through your bag for. With neckband headphones, the band keeps them around your neck at all times – ready to go whenever you are.

By Marcus Wong Photography by Veronica Tay
Art Direction & Digital imaging by Ashruddin Sani
1 More Triple Driver BT
• Audio Technica ANC40BT
• Beats X
• Jabra Elite 45e
• RHA MA390 Wireless
1More has been on our radar for quite a while now, with their quad-driver in-ear headphones impressing us greatly at last year’s CanJam. Now, they’ve taken the three-driver design and taken them wireless. The overall design aesthetic remains consistent with 1More’s offerings so far—aerospace grade metal contrasted against black silicone—giving it a modern, flashy look that’s bound to stand out from the crowd.

We like that 1More opted for slightly larger buttons on the neckband. They’re raised up just enough to be easily accessed and provide solid tactile feedback when pressed, making it easy to use without glancing. The headphones boast a battery life of seven hours, with a handy fast charging feature that gets you three hours of use from just 10 minutes of charging.

While supporting the usual audio codecs, the 1More Triple Driver BT also supports Sony’s LDAC, which enables higher transmissions speeds than regular Bluetooth when used with an LDAC-enabled player. It also comes with Environmental Noise Cancellation (ENC) technology so you can take and make quality calls even if you’re in a noisy, crowded environment.

Moving on to our audio testing, the Triple Driver BT definitely impressed as it exhibited good naturalness with Leny Andrade’s Maiden voyage. Leny’s vocals are rendered with a nice warmth and good detail – you can even hear her quick breaths in between verses as she prepares to move on from one line to the next, subtle cues that make it feel like you’re watching live.

A recording of Diana Krall’s Temptation showed that this headphone definitely was a strong performer in the lower ranges too. There’s a strong bass component in this piece, and the Triple Driver BT delivers it nicely, with good body and punch. There’s good imaging to be had too, as you can close your eyes and almost see Krall performing – slightly off center with the drums to her left and the strings to her right.

Finishing off with the faster moving You Give Me Something by Jamiroquai, we thought the headphones did quite well with electronic music too, picking out the synth effects well and adequately surrounding you with sound. The delivery was punchy, and there was definitely enough pace to get you moving. All in, an impressive performance.

### At A Glance

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
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</thead>
<tbody>
<tr>
<td><strong>Battery Life</strong></td>
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<td><strong>Charging Time</strong></td>
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<td><strong>Bluetooth Version</strong></td>
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<tr>
<td><strong>Price</strong></td>
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AUDIO TECHNICA ANC40BT
Audio Technica’s ANC40BT have perhaps the blockiest design of the group, with two rather large blocks on either end of the headphone. The neckband is flexible enough to stretch around most necks, but isn’t the most comfortable as the rubbery material offers little padding. The earbuds themselves are accented with a small silver Audio Technica logo on the outside of each bud, giving the entire set a slightly futuristic look.

We found these a little uncomfortable as the base is a bit larger than normal and the provided ear tips didn’t improve the fit. As such, the active noise canceling function didn’t quite give these headphones an advantage over the others, but at least the sound signature wasn’t drastically changed with it activated.

Controls are housed on the left block. While the slider to enable noise canceling is large and easy to activate, the other playback controls are rather small and tightly bunched together, making them difficult to make out via feel. We actually found ourselves sliding the band to the front so we could visually see what we were trying to activate, defeating the purpose of having these controls to begin with.

In our audio testing, we found the lower mid to bass region to be quite lacking with this headset. *Beauty in the World* by Macy Gray has a nice inviting bass beat that takes you through the piece, and this is lacking with this headset. Macy’s backup singers are clapping throughout this piece, but with these headphones the clapping seems to just lack that bit of naturalness.

Next up, we listened to *Festival Te Deum* by the Choir of Westminster Abbey, and on this piece we thought the imaging was lacking as it felt like we were in a recording studio instead of an expansive cathedral. The headphone does manage to provide separation between the multiple layers of voices, but the atmosphere of this particular piece is lost.

Moving to a recording of *Old Love* from Eric Clapton’s Unplugged album gave the headphone a chance to shine. It seems to do well with vocals and highs, as Clapton’s vocals are quite nicely handled. The mids and low highs seem to be a stronger region too, as the headphone renders Clapton’s guitar and the piano work of Chuck Leavell well.
Advertised as being “Fit for your life”, the Beats X is a smart looking headphone. They’re deliberately minimalist, and carry the Apple touch in the form of magnets in each ear bud to keep them together when not in use. They also come with silicone pocket-sized carrying case, but this is a little too small so you’ll probably find excess neckband sticking out.

Pairing is a really simple affair, and if you’re using an iPhone you’ll even get a pop-up from the headphones that you click to complete the connection thanks to the included W1 chip. Charging is of course done via Lightning, and Fast Fuel has been implemented in the headphone, so a five-minute charge will give you two hours of playback (a full charge takes 45 minutes).

There’s of course an in-line remote for basic playback controls on the left, and these offer nice feedback while housing the in-line microphone beneath. The power button sits separately on the right band. All in, the headphone just works from a design standpoint. The neckband material is soft enough to fit comfortably around your neck, while the ear buds fit well enough to offer good passive noise isolation.

In terms of audio, Beats X represent a marked change away from the usual Beats sound signature, as there’s no longer the overly heavy bass emphasis, but rather an emphasis on mids and highs instead. For example, on a recording of the acoustic version Layla by Eric Clapton, we thought the headphone did a good job picking out Clapton’s lead guitar, but also his backing singers and the percussion instruments in the piece.

Moving on to a rock classic, Sweet Child O’ Mine by Guns N’ Roses gave the headphone a chance to show off its lower mid-range. The headphone does a decent job with the guitar solo, delivering it with plenty of energy, but we felt the bass was a little too thin for our liking for this particular piece.

Unsurprisingly, faster pieces work well with the Beats X too, as evidenced from a recording of Little L by Jamiroquai. The headphone shows great sense of pace with this piece, and handles the myriad of digital synth effects well. Importantly, there’s a good verve to the piece that makes you want to get moving.

Very fast charging.

Bass can be too dry.

AT A GLANCE

| Battery Life | 8 hours |
| CHarging Time | 45 minutes |
| Weight | N/A |
| Drivers | N/A |
| Bluetooth Version | N/A |
| Price | $198 |
The Jabra Elite 45e has a utilitarian design seems to suggest it fits best in the office, but the IP54-rated design means it can just as easily go anywhere with you without fear of dust and water. It's one of the lightest in this shootout, and so is certainly easy to bring around. This too has magnets in both earbuds to keep them from flapping around your neck when not in use.

The neckband isn't rigid enough though, making it prone to curling up on itself. Given that Jabra doesn't include a carrying case with the set, this means that you're likely to find it tangled in a mess if you put it straight in your bag.

Given Jabra's background in creating headsets for mobile, it's almost a given that the Elite 45e features easy support for voice assistants on your phone. As such, there's a dedicated button (and microphone) so you can get things done with voice commands on the go. On that note, the Elite 45e uses a 2-microphone technology to filter ambient noise from your calls, so that's something to consider if making calls from your headset is of high importance.

We have to say we found ourselves a little disappointed by the audio performance given Jabra's recent track record. The highs and mids don't quite have the crispness they need so guitars and percussion instruments don't sing out like they should. On a recording of the live version of Hotel California by The Eagles for example, there wasn't enough clarity to do justice to the guitar work, and you certainly couldn't feel the energy of the crowd.

Moving on to Sara K's If I could sing the Blues, we thought Sara's vocals were nice and haunting, but the headphones couldn't quite capture the depth in the piece. Compared to Sara, the rest of the instruments seem too withdrawn, taking away from the piece somewhat.

Finishing off with the fast-moving Like a G6 by Fareast Movement, we thought the Elite 45e did a decent job conveying the pace of this piece, but again was let down by the lack of body in the bass regions. This track has a heavy booming bass that gets you grooving, but the Elite 45e just can't quite deliver.

---

**Good support for virtual assistants.**

**There's a dedicated button for the microphone.**

---

**AT A GLANCE**

**BATTERY LIFE** 8 hours

**CHARGING TIME** 2 hours

**WEIGHT** 25.95g

**DRIVERS** 12.4mm drivers

**BLUETOOTH VERSION** Bluetooth 5.0

**PRICE** $168
Coming in at just $128, the RHA MA390 Wireless is easily the cheapest headphone of the bunch, but that’s no indication of their quality at all. The buds are engineered from aluminum for better noise isolation, and the headphones of course come with spare tips of different sizes so you can find the best fit. These fit us really well and offered the best passive noise isolation of the group.

The MA390 Wireless features IPX4 sweat/splash protection and uses USB-C for charging. It comes with a three-button universal in-line microphone, and is certified for aptX for better wireless streaming. The inline remote seems to be just long enough to fit the needed controls, but these are a little stiff and will take some effort to activate.

We’re not the greatest fans of how fat and round the ends of the neckbands are, as that seems to take away from the sleekness of the entire design, but they do seem to help hold the headphones in place. As with the Beats X headphones above, the earbuds of the MA390 Wireless also contain magnets to hold them together, keeping everything neat and tidy.

Surprisingly, the MA390 Wireless turned in the best audio performance of the group. It’s capable of nice mids and impactful upper bass notes, as evidenced when listening to a recording of *Bohemian Rhapsody* by Queen. This piece also gave the headset a chance to show off its stereo imaging capabilities, and this was especially evident in the bridge when the song assaults you with its chorus.

*Like a G6* by Fareast Movement gave the MA390 Wireless a chance to show it does well with faster moving tracks too. It doesn’t have as full a bass as the 1More, but there’s still enough weight to be felt. There’s plenty of energy in the delivery to get you moving too.

We ended off our testing with The Eagles’ *Hotel California*, and on this piece we felt the highs on the MA390 Wireless weren’t as crisp as we’d like, as the headphone turned in a slightly darker rendition than expected. It does well to provide separation between the crowd, the main vocals, and the guitar work though, making for quite an immersive listen.

### AT A GLANCE

<table>
<thead>
<tr>
<th>BATTERY LIFE</th>
<th>8 hours</th>
</tr>
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<tr>
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<tr>
<td>WEIGHT</td>
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<tr>
<td>PRICE</td>
<td>$128</td>
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</table>
THE BEST WIRELESS EARBUDS IS...

RHA MA390 WIRELESS

It’s not often that a product outperforms its price point, but that’s very much the case here. The RHA MA390 Wireless easily provided the best sound while coming in a good $70 cheaper than more expensive options. It didn’t have the best highs or the heaviest bass, but easily provided the best clarity and imaging of the group, while delivering full-bodied sound that the rest just couldn’t match. Eight hours battery life is good enough for a full day out. The fact that they’re IPX4 sweat and water resistant and offer aptX streaming are nice pluses too. All in, you get great sound with a bunch of extra features at a price that easily beats its competitors – and that’s why the RHA MA390 wireless is hands down the winner of this shootout.
MOTOR WITH US ON THE MOTORING INFORMATION SUPERHIGHWAY

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If you want to blow a thousand dollars on a vacuum cleaner, you now have another option besides Dyson. The Bosch Unlimited vacuum cleaner costs a pretty $1,399, even more than the flagship Dyson V10 Absolute+, which costs $1,199.

If the Dyson V10 looks like a Japanese sports car with its exposed innards and bright highlights, the Bosch looks like a European luxury sedan. But the Bosch Unlimited weighs 3.5kg, 1kg heavier than the Dyson V10. It doesn't feel as balanced as the Dyson, and its weight will wear on you as you use it. In comparison to the vacuum's heaviness, the Unlimited's roller cleaner head is delightfully dexterous. The head glides gracefully across the floor, thanks to four wheels on the bottom. Until it meets a carpet. Then it stumbles and gets stuck.

You'll find the Bosch Unlimited a quiet worker. My wife, who hears better than I do, prefers the Unlimited's sound to the Dyson's.

The Bosch Unlimited has other advantages over the Dyson. Unlike the Dyson, the Unlimited's trigger can be locked down so you don't get finger fatigue. You can also clean without any accessories attached, something the Dyson can't do.

The battery can be swapped out, so you can keep cleaning for longer. The Bosch Unlimited shares the same battery pack as Bosch's 18-volt home and garden cordless tools. And it only takes 60 minutes to top up a flat battery. But you might not even need to swap batteries. I got an average of 50 minutes from the Bosch Unlimited on its Standard setting, and about nine minutes on Turbo.

But there are two things about the Bosch Unlimited that make me hesitate to recommend it. The first is that it's inconvenient to empty the bin. First, you have to separate the vacuum into two, then you twist open the bin to empty. On the Dyson V10, you remove any attachments and simply push a lever to open the canister's lid.

The second is that Bosch is measly with the attachments. For $1,399 you get a combination nozzle and a crevice nozzle, besides the roller cleaner tool. Granted, you also get two batteries and a docking station. But for $1,199, the Dyson V10 Absolute+ comes with seven extra accessories, in addition to a soft roller cleaner head. Dyson even throws in a tool bag.

CONCLUSION

A detail or two of living up to the price.
The ATH-M50x is a legend amongst headphones. If you look up recommendations for inexpensive closed-back over-the-ear headphones, the ATH-M50x is guaranteed to turn up. Now, there’s a new limited edition called the ATH-M50x BB, where BB stands for blue-black.

In terms of design and construction, it is the same as the vanilla ATH-M50x. The frame is mostly plastic, but feels sufficiently solid and robust. Synthetic leather is used for the headband and earpads, which is common for headphones in this price range.

However, they are known to crack and peel after prolonged use in our humid climate so you might want to consider investing in aftermarket earpads.

The ATH-M50x BB is nicely packaged. It comes with a carrying pouch and not one, but three cables. There’s a single 3-meter straight cable for desk side listening, a 1.2-meter cable for portable use, and a handy 1.2-meter coiled cable. The coiled cable is my favorite as it stretches and gives me more freedom of movement around my desk. The cables all terminate in a 3.5mm jack, but Audio-Technica also provides a 6.35mm screw-on adapter.

In terms of sound, the ATH-M50x BB has a fairly even and balanced tonality. There is nothing that sticks out or sounds too wonky. Bass response is fairly warm but it is clean and tight. The midrange is recessed and the treble is a little hot. This manifests itself as vocals sounding a bit thin. Female vocalists who sing in higher registers suffer the most as they sound far too breathy.

The slightly elevated treble creates a sense of greater clarity and detail, but it also causes drums, cymbals, and synthesizers to sound too harsh, at least to my ears. Those who are sensitive to treble ought to audition carefully.

In spite of these niggles, the ATH-M50x BB remains a fairly good sounding headphone especially when you consider how hard it is to get closed-back headphones to sound right - the enclosed earcups of closed-back headphones create a lot of unwanted resonances.

All in, if you are shopping for a closed-back headphone that won’t leave a gaping hole in your pocket, the ATH-M50x has always been a good place to start, and this BB variant adds a little more flavor to the mix.

**CONCLUSION**

**Sounds fairly good and won’t leave a huge hole in your pocket.**

**AT A GLANCE**

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<td>PRICE</td>
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Smooth operator

Razer Mamba Elite

By Koh Wanzi

The Mamba is an old stalwart in Razer’s product line-up, and it’s about time it got a sensor that holds its own against the competition today.

The 16,000DPI optical sensor is the same one used in the DeathAdder Elite, and it’s simply excellent. I wasn’t able to make the mouse spin out no matter how fast I flicked, and all my movements felt responsive and accurate. That’s a huge upgrade from the old laser sensor, making the Mamba Elite pretty much a tournament-ready mouse.

It is right-handed and ergonomic, with a curved left side to allow your thumb a more natural grip. Conversely, the right side protrudes slightly to accommodate your ring finger and pinky. Both sides feature rubber grips, which help provide added purchase during long gaming sessions.

At 96g however, the mouse is a little heavier than I’d like, but it’s still light enough that it doesn’t feel excessively cumbersome.

Now, the Mamba Elite is a large mouse, so it’s not the best if you’ve got small mitts like me. However, I do find it more comfortable than the DeathAdder, which has a rather severe shape that feels tiring to use.

The side buttons are large enough and easily accessible.

The Mamba Elite is best suited for palm grips, given that the highest point is located more toward the middle, leaving the back arch relatively flat.

That said, I’m not a fan of how the buttons feel as they’re a little too light for my tastes. The scroll wheel feels good though, with well-defined notches and just the right amount of resistance.

Another area where the Mamba shines, quite literally, is in its sheer extent of lighting customization options. It is flanked by light rails on both sides, and both the scroll wheel and Razer logo on its back are illuminated as well. In fact, it features a total of 20 independent lighting zones, so you can make some truly fine-grained adjustments to suit your specific tastes.

In keeping with Razer’s recent products, the Mamba Elite also supports both onboard memory and cloud storage. You can store up to five profiles on the mouse and access them anywhere, even without an internet connection, which finally addresses one of the greatest weaknesses of Razer’s Synapse software. A button at the bottom of the mouse also lets you switch between different profiles.

CONCLUSION

Razer’s best Mamba mouse yet, complete with an excellent sensor and extensive lighting customization options.

T E S T E D  &  R A T E D

8.5/10

H W M  S I N G A P O R E

A T  A  G L A N C E

SENSOR
16,000DPI optical sensor

DIMENSIONS
125 x 69.9 x 43.3mm

WEIGHT
96g

PRICE
$149
Small but significant upgrades

AMD Ryzen 7 2700X

By Koh Wanzi

AMD's second-generation Ryzen processors are an iterative upgrade, but they do a good job shoring up the key weaknesses of the first-generation chips. The Ryzen 7 2700X sits at the top of the new mainstream, boasting 8-cores/16-threads and a 4.3GHz boost clock (up from 4.0GHz on the Ryzen 7 1800X).

The processor comes bundled with the Wraith Prism cooler.

It uses GlobalFoundries' 12nm LP process, which can offer 10 to 15 percent better transistor performance than preceding nodes. This allows AMD to extend the clock speed range and reduce the current required at all frequencies, resulting in higher overall clock speeds. One of the key weaknesses of the first generation Ryzen processors was its relatively weak performance in games at 1080p, so higher overall clock speeds definitely help alleviate that.

The other big feature is Precision Boost 2, an improved frequency-boosting algorithm that lets each core run at the highest possible frequency. It no longer distinguishes between dual-core and all-core boost frequencies. Instead, it's more opportunistic, relying on Dynamic Voltage Frequency Scaling (DVFS) technology and using data on CPU temperature, current, and load to determine boost speeds.

Overall, the frequency curve is smoother, and there's no longer a steep drop-off when moving from a dual-core boost to an all-core boost.

Zen+ also features design optimizations to speed up access to cache and memory, which can help boost performance in latency-sensitive tasks. In addition, the Ryzen 7 2700X also supports DDR4-2933 memory now, up from DDR4-2667 before.

All told, AMD has done a commendable job with its second-generation Ryzen to close the gap in IPC performance, as evinced by single-threaded Cinebench scores. Intel's Core i7-8700K is around 12 percent faster than the Ryzen 7 2700X, but the 2700X is further ahead in multi-threaded performance, with a whopping 24 percent advantage.

Furthermore, the Ryzen 7 2700X is a big step up from the 2700, especially since the latter's low 3.2GHz base clock hurts it in certain workloads that are sensitive to clock speeds. The 2700X is also just $40 more expensive, so it makes plenty of sense to just pony up for it. It comes bundled the Wraith Prism cooler as well, an impressive specimen of a stock cooler that boasts RGB lighting and fairly robust cooling capabilities.

CONCLUSION

A capable all-rounder to handle just about everything from gaming to video encoding and streaming.
The FiiO M7 is a High Resolution Audio (HRA) player with a touch screen that costs just $329. Despite the low price, it comes with a 3.2-inch touch display that has a resolution of 800 x 480 pixels, a dual-core Samsung Exynos 7270 processor, and a Sabre ESS 9018Q2C DAC chip for speedy conversion of audio. It also comes with Bluetooth 4.2, support for aptX-HD, aptX and even Sony’s LDAC format, thus allowing for quality streaming of High Resolution Audio (HRA) files. On that note, the M7 supports playback of APE, WAV, FLAC, AIF, DSD, M4A, WMA, OGG, AAC, ALAC and MP3 files, so it’s safe to say your music library should be covered.

The M7 comes in a total of four colors – black, blue, red and silver. It measures just 109 x 52 x 13mm and weighs just 116g, so should easily fit into your pocket if you’re on the go. It comes with just 2GB internal memory, but
has a standard microSD slot for easy expansion.

The M7 is very smartly designed, with just four physical buttons (including the power button) on the player. Volume control is via a scroll wheel on the left of the player, and this is clicked for more accurate control. You can even disable the buttons when the screen is locked, so you won’t accidentally skip tracks when you go back a step. Slide it up from the bottom right, and you jump back to the main page. Simple, and effective.

Now despite being Android-based, there are no options that allow you to download additional apps, so you’ll have to root the DAP or find some creative workaround, but then the lack of Wi-Fi support probably means it won’t be worth your effort.

As a bare bones DAP, it’s good that FiiO’s own music player gets the job done without much fuss. Browse via Album, Artist, or Genre with a couple of taps, and swipe up and down to easily scroll through your files.

The M7 comes with an in-built FM tuner too that uses your headphone cable as an antenna to get live radio on the go. This works surprisingly well, though we do wonder if they’d be able to offer an antennae accessory that went into the 3.5mm audio jack so you’d be able to continue using your wireless headphones.

88.3 Jia FM listeners may be disappointed to hear that we weren’t able to pick up stations below the 89.0MHz band, but otherwise the M7 was able to receive all other local Singapore stations fairly easily (and clearly).

All in, the M7 is a handsome-looking DAP that easily fits in your palm without having to sacrifice functionality or ports to do so.

We tested the M7 with a variety of headphones, both wired and wireless, and the DAP powered them all nicely. There were no issues with streaming to wireless headphones, and having LDAC’s was a nice plus. This particular feature was tested with the Sony MDR-1000X, and they sounded better than ever.

It also impressed us by delivering good detail with all the headphones we paired it with in our testing. We started off with Sweet Child O’ Mine by Guns N’ Roses, and got an energetic rendering of this classic track, with the guitars in the piece ringing out nicely.

Moving on to a jazz standard in Call Me Irresponsible by Michael Buble gave the M7 a chance to show off its ability to image the lower spectrum as it picked out the bass guitar and the saxophones in the piece quite easily, providing the perfect backdrop to Buble’s vocals.

We then slowed things down by moving to a recording of Spanish Harlem by Rebecca Pidgeon, and found that the player did a great job providing a sense of atmosphere to the piece, rendering Pidgeon’s haunting vocals well forward of the backing instruments while providing enough clarity to make out the shakers behind.

Finishing off with Hotel California by The Eagles, we were impressed by the detail the player was able to render, and with its stereo imaging capabilities. You feel like you’re right there in the crowd, with the band playing in front of you. We’d say the player creates a medium-sized soundstage that’s great for live recordings.

CONCLUSION
A DAP that provides you quality sound by paring everything down to the essentials, and that’s not necessarily a bad thing.
A great starter tube amplifier

_Feliks Audio Echo_

By Kenny Yeo
The Echo has a pair of RCA input and output jacks.

CONCLUSION

An ideal gateway for anyone into audio that's curious about the 'tube sound.'

Based in Poland, Feliks Audio is a relatively new company specializing in handcrafted tube amplifiers. The Echo is their entry-level model for headphones and it uses two 6N6P power tubes and two 6N1P driver tubes. It has an output transformerless topology which means it will only play amplifier, the Echo is built to very high standards. Its chassis is solid metal and the side panels are made out of real wood. The large volume knob that dominates the front has a smooth action with none of the creakiness you sometimes find on less well-made amplifiers. The 6.35mm headphone jack and RCA inputs and outputs. In this regard, it can be used as a pre-amp to another amplifier or it can be used directly with powered speakers.

My only gripe is that the power switch is positioned at the rear. You have to be very careful when you reach behind the amplifier to turn it off as you might inadvertently bump into the tubes which are glowing hot and can reach temperatures of over 90 degrees Celsius.

The general consensus is that tube amplifiers sound warmer and more natural. I certainly hear that with the Echo. Through the Echo, my Audeze LCD-3 has never sounded more full and organic. The mid-range stood out for me as being noticeably richer and more forward, accentuating vocals, pianos, and guitars in the process. The Echo emphasizes bass response too, giving my Sennheiser HD 6XX a thump and heft that I haven't heard with any other solid state amplifier.

The Echo is also surprisingly quiet and clean. I could discern a faint hum only with the volume turned up to 1 o'clock and when there is nothing playing. There is a detectable amount of bloom and a sense of haziness around notes, but this is only apparent when directly comparing with a solid state amplifier back to back.

All in, I consider the Echo to be a great starter piece for fledgling audiophiles curious about how tube amplifiers sound. It is well-built and imparts a pleasingly warm and natural tonality to your music collection that will put a smile on your face.

CONCLUSION

Well with high impedance headphones; Feliks Audio recommends headphones that have an impedance of at least 100 ohms.

Despite being Feliks Audio’s most affordable tube RCA jacks are solidly placed too. Speaking of jacks, the Echo has a single pair of RCA inputs and outputs. In this regard, it can be used as a pre-amp to another amplifier or it can be used directly with

AT A GLANCE

TUBES
6N6P x 2 (power), 6N1P x 2 (driver)

POWER OUTPUT
350 mW

RECOMMENDED HEADPHONE IMPEDANCE:
100 - 600 ohms

PRICE
$769

TESTED & RATED

8.0/10
ANC for audiophiles

NAD VISO HP 70

By Kenny Yeo
The VISO HP 70 is NAD’s flagship wireless headphone. Construction is top notch and feels solidly put together. Though faux leather is used for the headband and ear cups, they are soft and cushy. Wearing comfort is good, but the ear cups might be a little small for some users. It doesn’t fold like some of its competitors though, making it bulkier to carry around.

The right ear cup is home to all of the controls, with a Bluetooth pairing button, volume, active noise-cancelation, phone call and track control switches. The numerous switches make the ear cup look fussy, but they are intuitive and because the headphone’s DSP circuits automatically apply NAD’s RoomFeel equalization. RoomFeel aims to recreate the sound of listening to high-performance loudspeakers in a room — hence the name. The headphone still sounds closed in, but the overall tonality is warm and quite good if a little dark and hazy. Bass is strong, slightly north of neutral, and a little muddy. I hear it bleeding into the mids, but it isn’t overbearing or excessive. Mids are smooth and organic-sounding though a little veiled to my ears. Highs are polite but also significantly rolled off.

Overall, amongst the wireless active noise-cancelers that I have heard so far, I found the VISO HP 70 to be the most mature, natural, and refined. In comparison, the Bose QuietComfort 35 sounds cold and digital, while the Sony WH-1000XM2 has the tendency to be hot and bassy.

One nifty thing about the VISO HP 70 is that it can play directly off PCs using the supplied charging cable, while charging. Used in this manner, it bypasses the (usually inferior) built-in DACs of your PC and relies on its internal DAC and DSP. While its active noise-canceling performance is commendable—I’ve used it on a flight and ambient noise in the cabin was reduced by a considerable amount—Bose’s and Sony’s implementations are still ahead in this respect.

CONCLUSION
Not the most advanced, but arguably the best-sounding active noise-canceling headphones available.

If audio quality is your biggest priority, with active noise-canceling more of a bonus, this should be one of the first headphones you audition.

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**AT A GLANCE**

<table>
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<th>40mm dynamic driver</th>
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**TESTED & RATED**

8.0/10

HWM SINGAPORE
Does whatever a spider can...

*Marvel’s Spider-man*

By Salehuddin Husin (GameAxis)

This is the greatest Spider-man game yet. That’s a bold statement to start the review on but there’s no other webslinger game that comes even close to this.

It’s not an origin story (thank god), and stars a pretty veteran Spider-man. Most of his rogues have been established and imprisoned in The Raft and Peter Parker now works as a research assistant.

We see the webslinger in fine form as he initially takes on the Kingpin (who looks uncannily like a fat Live Schreiber), though it’s the parts playing as regular Peter Parker that sticks in your mind. There has not been any Spider-man game that gives Parker’s personal life as much weight as this one.

Like a good rollercoaster, Spider-man’s plot starts off slow, and builds up to a climatic second act where all hell breaks loose. Luckily, Spidey is a kickass fighter.

Combat falls into a rhythm of dodging and attacking, but with tons of acrobatic moves thrown in. The camera does a great job in keeping up with it all. You’ll rarely lose track of where Spidey is, which allows you to keep on fighting enemies instead of camera angles.

There’s an incredible kinetic charm to the combat, and best of all, it looks damn impressive.
If you have a PS4, you NEED to play this game. It’s simply amazing.

overlooked as the game forces you into combat most times. When the game does allow you to, being stealthy is awesome. You can pounce on enemies or web them up to surfaces, with some incredibly cool animations.

Of course, fighting and sneaking won’t be the only things you’ll be doing.

Web swinging is marvelously fun. Chaining together swings, doing tricks, wall-running and launching off objects makes you feel like you’re really Spider-man. There’s a huge version of Manhattan that you’re able to explore, but there’s also a fast travel option to get around quick where you’ll get some rather funny loading screens of Spidey riding the subway.

Fast travel too much though and you might miss out on one of my favourite parts of the game: J. Jonah Jameson’s ‘Just the Facts’ radio show. He rants and

raves about the wallcrawler and it’s hilarious how he blames everything on Spidey, even when callers try to set him straight. The show adapts to what you’ve done in the story, so you’ll keep getting new episodes as you play.

There are a ton of side missions to do from stopping crime to special challenges. Completing these optional events nets you medals, which you can use to upgrade equipment and unlock new suits.

You gain a new suit every 2 or 3 levels and there are a ton of superb suits taken from Spider-man’s history, though some iconic suits are missing from the game. For example, the Ben Reilly Spider-man (though the Scarlet Spider suit is is), Future Foundation and Superior Spider-man suits to name a few.

Once you unlock a suit, you can swap out its ability with any other unlocked ability, so you’re not forced to wear a certain suit just because it has an ability you like.

On top of that, there are mods you can attach to your suit, which gives you even more customization. As you level, you’ll gain skill points which can be assigned to three different skill trees. No worries though, you’ll be able to unlock every skill from every tree at max level.

The visuals for the game are spectacular. Buildings have interiors you can peer into, squirrels dart from tree to tree; you can even take selfies or high-five civilians walking around! The best part is that the cutscenes are all rendered in real time, reflecting your current Spidey suit.

Even the voice acting reflects the quality of the game. Nearly every voice actor delivers a capable performance, but Yuri Lowenthal’s performance as Peter takes the cake. All these elements come together to do great justice to Spider-man.

CONCLUSION

Unlock and collect different iconic Spidey costumes as you play.
After all the times you stopped evil and saved the universe in the past, the plot of the Forsaken expansion is a much welcome breath of fresh air. Instead of the grandiose scale of past stories, this one is much more intimate and personal; the death of Cayde 6 and the Guardians’ response to it.

I’ve grown to like Cayde 6 throughout the years. He’s not a deep character, but as the sole wisecracking outlet for Destiny 2’s humor, he’s a pretty standout figure in a serious and dour game.

The plot to avenge Cayde 6 is unlike other expansions as you’re almost immediately given a hitlist of targets to take out. These 8 targets are the ones directly responsible for Cayde’s death, and are the key to stopping Uldren Sov, one-time ally and Cayde’s killer.

Uldren and his 8 Barons lead a new faction in Destiny. Calling themselves the Scorn, they’re made up of dead Fallen soldiers, animated by dark magic used by The Fanatic, Uldren’s right hand man. The 8 Barons all have fancy names and personalities, and are ominously introduced through a pretty cool cinematic.

Unfortunately, the hype built up by that cutscene is pretty much lost when you face them as apart from three (The Rider, The Machinist and The Rifleman), most of the fights devolve into a battle of attrition...pretty much
like every boss in Destiny. However, the three named Barons have incredibly cool battles. The Rider’s battle for example, has you stealing one of the Baron’s bikes before facing her in a vehicular showdown. The Rifleman fight on the other hand is a battle of wits, as you try to dodge sniper fire and take out the Baron’s hard light holograms. Finally, the Machinist fight is pure brute force as it has you piloting a tank for most of it, which is undoubtedly the most fun I had doing the Forsaken campaign missions.

Sadly, for an expansion based on taking down bosses, the final one is a major letdown. There’s no challenge to it, with you simply facing down waves of Taken, while being teleported in and out of the main arena as you whittle down the boss’ health. Frustratingly, you don’t even get to fight Uldren Sov and the aftermath of your final ‘encounter’ with him is infuriatingly vague and inconclusive.

Luckily, the plot isn’t the only thing that Forsaken adds.

The biggest and most noticeable addition comes in the form of a new playable location called the Tangled Shore. Another hidden area opens up once you’ve started the post-game content, called the Dreaming City. It’s here where you’ll be able to get another Seed of Light for your class as it drops during one of the Public Events that regularly occur.

The biggest change is definitely the one done to the weapons system. Now, guns are grouped into ammo types instead of weapon types, similar to how it was in the original Destiny. Forsaken also introduces a new weapon type: bows. You get one relatively early on in the campaign and it’s freakishly fun to use.

Weapons also now come with randomized perks, so even copies of the same gun might perform differently depending on which perk its imbued with. The star attraction for hoarders though has to be the new Collections tab.

With Forsaken, you can now level up to Level 50, with power levels rising up to a max of 600. As per the norm, you also get some post-game Exotic weapon quests, one of which will get you Cayde’s Ace of Spades handcannon. The hoops you have to jump through are still as annoying as ever though.

Forsaken also now comes with all new Bounties. You can get these from nearly every major NPC in the game, with each NPC specializing in their own bounty types.

The Bounty system was one of the best reasons to keep playing in the original Destiny and the MASSIVE number and types of Bounties you can now undertake in Forsaken is a HUGE step up from the original.

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BETTER EDITING FOR AUTOMOTIVE PHOTOGRAPHY

Eric Chen (@ericchenrr) is a commercial and advertising photographer who has loved cars from a young age. He considers commercial automotive photographs to be one of the more technically challenging types of image to edit, as there are an immense number of details to look out for. Here are three simple tips to make your car photos stand out.

Tips and images by Eric Chen (@ericchenrr),
Edited by Marcus Wong
The color tool HSL (Hue, Saturation, Lightness) in Adobe Photoshop or Lightroom can dramatically change the look of your image in many ways. This is found under the Adjustments tabs in Lightroom or under Filters > Camera Raw Filter > HSL / Grayscale if you are using Photoshop. Start by just simply playing around with the colors and see which variation you prefer. For example, changing the color of the grass or trees from green to yellow will make your image look like it was taken on another continent with different seasons.
Removing things that are distracting is another easy way to make the image look more polished. However, it can become a tedious process if there are a lot of unwanted distractions. Use either the Content-Aware Move Tool or the Clone Stamp tool in Photoshop to take away unwanted items in the image, and you’ll bring greater focus onto the car. Eric says these are some of the most useful tools in automotive photography, so learn them well.
SET THE MOOD

We all love movies. In movies, even an ordinary scene has what we call a “Cinematic” look. Here’s how you get that. Set the mood of the image by adding tones to your shadow or highlights. This can be done with the selective color tool in Photoshop – a simple tool that opens up many possibilities. It allows you to individually change the tones of a specified color or to selectively add color to your highlights or shadows. You’ll find it under Image > Adjustments > Selective color. Simply play around with the sliders of the desired color, shadow or highlights to create a more cinematic looking image.
What is ray tracing?

Following the path of light.

By Koh Wanzi

NVIDIA’s new Turing cards are supposed to represent some sort of paradigm shift. They feature dedicated RT cores for real-time ray tracing, a first for consumer graphics, and the company is claiming massive performance and visual improvements if developers code their games for the new hardware.

But what is ray tracing really? It sounds like some esoteric graphics rendering technique, but you’ve probably already enjoyed the results of it on the big screen. Modern movies use ray tracing to generate or bolster special effects, which is how you get photorealistic shadows, reflections, and refractions. It’s how filmmakers create blazing conflagrations and blend them with the real world.

In a nutshell, ray tracing involves following the path of beams of light backward from your eye to the objects that the light ray interacts with. However, this requires immense computational power, which is why it’s been restricted mostly to the post-production stages of a movie, where filmmakers can take their time to render scenes and take advantage of render farms.

Before Turing, real-time ray tracing was a pipe dream for games. But if NVIDIA has its way, Turing could pave the way for a new generation of games that can generate photorealistic scenes in real-time.

HOW DO GAMES TODAY DO IT?

Video games only have a fraction of a second to render a scene, so games today generally rely on something called rasterization. This is a method of translating 3D objects onto a 2D screen, and technological advancements mean that it’s actually pretty good.

With rasterization, 3D models of objects are comprised of a mesh of virtual triangles, or polygons. Each corner of a triangle is referred to as a vertex, which in turn intersects with the vertices of other triangles of different sizes and shapes.

Each vertex retains a wealth of information, including details on color, texture, and its position in space. The triangles that form these 3D models are then converted into pixels on a 2D screen, with each pixel taking on an initial color value from the data in the corresponding vertex.

Next, further processing or “shading” is performed to change the pixel color depending on how lights
in the scene hit it. Textures are also applied to the pixel, which factor into the final color applied.

Ray tracing is demanding, but rasterization is no walk in the park either. Millions of polygons could be used for all the object models in just one scene, and each frame could be refreshed up to 90 times per second, which is a lot of pixels to process in a very short time.

WHY IS RAY TRACING DIFFERENT?
Ray tracing hews more closely to how light works in the real world. Light rays hit 3D objects and bounce from one object to another before reaching our eyes. On the other hand, light may also be obscured by some objects, creating shadows. Then there is reflection and refraction, which can be challenging to simulate in computer graphics.

Ray tracing works backward from your eye, retracing the path of light from your eye to the object. In effect, it traces a light ray’s path through each pixel on a 2D screen back into the light source, color and lighting information from all these objects contribute to the final pixel color as well.

These techniques, along with further refinements long the years, are why ray tracing is the technique of choice for movie-making today. It effectively captures the way light works, which is why you get scenes that are truer to life, replete with details like softer shadows and light that interacts more realistically with the environment.

WHAT DOES THIS MEAN FOR GAMES?
NVIDIA has so far announced 21 games that take advantage of some portion of the new Turing architecture, but only 11 actually utilize the RT cores for real-time ray tracing. Metro Exodus provides an illuminating example, and with ray tracing enabled the rooms are far darker than with ray tracing off. In practice, this could give developers more freedom to tweak the atmospheric lighting to create their desired mood, in addition to concealing enemies in the shadows. Similarly, in Shadow of the Tomb Raider, the shadows blend together far more realistically, and you can distinguish between different gradations of shadow, where the words penumbra and umbra take on real meaning.
Using a virtual private network (VPN) is usually a good idea, especially if you frequent public Wi-Fi. By encrypting your Wi-Fi connection, a VPN protects your communications from invasive eyes and plays a vital role in your overall digital defense. But using a free VPN is a no good, very bad idea.

"A VPN has the capability to track users’ online behavior as well as their IP," Shahnawaz Backer, Security Specialist, F5 Networks, says. “So it’s important that a user validates the credibility and privacy clauses of the free VPN services. Otherwise, they risk giving up their data to advertisers or worst, cybercriminals.”

To be clear, I’m not talking about free VPN plans offered by known names like ProtonVPN. These companies offer complimentary, but slower, free tiers next to their full-speed VPN plans. I mean free VPN services offered by obscure brands without any paid options.

A VPN connects your device to the VPN provider’s servers, using an encrypted connection. It then connects you to the internet through those servers. Anyone trying to intercept your connection can only see
that you’re connecting to the VPN’s servers.

But the way a VPN works also means that whoever runs the VPN has the potential to see what you’re doing. Facebook’s free Onavo VPN app, for example, was explicit in how it harvested users’ data. Onavo’s terms of service stated that, “… Onavo collects your mobile data traffic. This helps us improve and operate the Onavo service by analyzing your use of websites, apps and data.”

Apple reportedly asked Facebook to remove the Onavo VPN app, as it violated the store’s guidelines on data collection. But the app is still available on the Google Play Store for download.

“The free VPNS services are able to log and track all user activity, online habits, and IP addresses,” Backer says. “This potentially poses as a treasure trove for advertisers, cybercriminals and agencies, should the data fall into the wrong hands.”

But how do you know that legitimate VPN services aren’t spying on you too?

Short of rolling your own VPN, there’s no way to know for sure. A VPN secures you from eyes on the network but can expose you to the VPN. There’s always risk involved, but you can call it a calculated risk. An anonymous spy on the network is most likely malicious. A VPN company with paying customers is less likely to be evil.

“Like so much else in computer security, VPNS are mainly about trust,” Nick FitzGerald, ESET Senior Research Fellow, says. “The cryptographic protocols employed in VPNS mean that, by design, only two parties can decrypt the traffic traversing the VPN — the two parties at each end of the VPN connection. Hence, if you are using a VPN for privacy and/or security reasons, you must be especially sure that you can trust the VPN service provider.”

HOW TO SHOP FOR A VPN
So what should you do when looking for a paid VPN service?

1. LOOK FOR TRANSPARENCY
One way to ascertain the credibility of a VPN provider is through transparency. A leadership page with real names and faces provides more trustworthiness than an anonymous company.

2. LOOK FOR LOGGING
Look for a privacy policy that states the nature of logs. Some VPNS will keep minimal logs to maintain the service, but at the least, they shouldn’t keep traffic logs.

3. LOOK FOR OPEN PROTOCOLS
Shop for a service that supports open source protocols like OpenVPN. Open source means that anyone can audit the code, making it less likely to compromise the protocol.

4. LOOK FOR GLOBAL SERVERS
A solid VPN will have servers around the world. This increases your odds of getting reliable and fast connections.

5. LOOK FOR THE ‘14 EYES’
If you’re especially paranoid, you’ll want to avoid VPNS based in the ‘14 eyes.’ These are countries that are known to spy on citizens and can force VPNS to give up private data.
<BILL GATES IS BORN.

October 28th, 1955

Born William Henry Gates III, Bill Gates is the founder of Microsoft and was their Chief Executive Officer from 1975-2000. In 2000, he transitioned to the role of chief software architect. He famously took a leave of absence from Harvard to work with Paul Allen at MITS Albuquerque, naming their partnership "Micro-soft." The duo dropped the hyphen when they registered the trade name "Microsoft" with the Office of the Secretary of the State of New Mexico. As of August 6th, 2018, Gates is listed as the second-richest person in the world, with a net worth of US$95.4 billion.

21st October, 1879

Edison perfects the first commercially practical incandescent light bulb.

October 11th, 1958

NASA has their first launch with the Pioneer 1.

1st October, 1982

The first commercial compact disc player, the Sony CDP-101 goes on sale in Japan.

October 23rd, 2001

The first iPod is released to arcades.

Mortal Kombat is released.
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