



EIPC SPEeDNEWS

*The Weekly On-Line Newsletter from the European Institute of Printed Circuits.
Issue 12 - May 2014*

PRINTED ELECTRONICS NEWS

Wearable Electronics: Here Come the Novelty Peaks

By Dr Peter Harrop, Chairman, IDTechEx

Last Christmas and New Year the ideal present, for a girl of a certain age, from Japan to the UK was the neurowear clip-on of floppy ears driven by brain waves to reflect your mood. They would have been played with for one day and then put away forever. Such novelty peaks can be expected with many forms of wearable technology as it enters its manic phase with hugely overpriced acquisitions. Facebook is buying tiny Oculus VR, a Californian company which specialises in virtual reality headware, for around \$2 billion. Is it worth that much?

We now have wearable technology for all parts of our body but Nike has recently exited fitness monitoring wristbands after a collapse in sales. That market reached \$400 million very rapidly and big names in electronics invested, but it turns out that people are getting bored with them. They may have changed their lifestyle as a consequence of using them but that does not merit ongoing "mind time". It must be even more true of versions now available for your dog.

If novelty peaks do not ruin your sales of wearable devices then commoditisation may. The lessons of history are clear; from the Chinese electronic wristwatches averaging three dollars each, to their earphones at even less. Hearing aids go the same way. Only niches remain for manufacturers from other countries.



The third bit of bad news for manufacturers is the sheer misery of using a lot of these wearable devices. Eloquently, a speaker at a recent event said that, "Using these new smart wristwatches is like assembling an ocean liner through a keyhole".

The good news is that the Google Glass and some other devices have hugely improved human interfaces so they are a pleasure to use. Wearable electronics in the form of infotainment may be largely exposed to commoditisation but medical wearables are cleverer, the IP better protected and the short runs are less attractive to the Chinese. A diabetic kept alive by a smart patch will not give you a novelty peak any more than the management of a care home putting safety electronics on disoriented patients in their care or a paraplegic walking because of an exoskeleton. That is why the new IDTechEx report, "Wearable Technology 2014-2024: Technologies, Markets, Forecasts"

(www.IDTechEx.com/wearable), concludes that the merging sectors of healthcare, medical, fitness and wellness have the most potential with industrial, commercial and even fashion applications becoming appreciable as the market powers to over \$70 billion in 2024. There will be many false starts but even informatics wearables will not be fully commoditised.

The sound of taste – the feel of flavour

Herb & Spice brand Schwartz is all about flavour. But how do you dramatise flavour when flavour is invisible and silent? Simple: make it possible for people to see, hear and feel it.

Print Tech collective, Novalia and ad agency Grey London have collaborated on an interactive poster that uses innovative 'touch sensitive' inks to turn the surface area of the paper into an interactive interface. Illustrator Billie Jean was invited to create a visual articulation of what taste might look like. Each herb and spice depicted in the artwork was then assigned a musical chord matching its flavour characteristic. For example, cumin became E flat major, chilli was ascribed A flat major and fennel was characterised by a higher pitched F minor. The image was then back-printed with an innovative conductive



ink, effectively giving the poster capacitive touch technology. When paired with a mobile device via Bluetooth, the poster becomes an interactive musical instrument.

The poster was created as part of a Schwartz promotion designed to target the retail trade. Credits: Client: Schwartz Creative Agency: Grey London Chief Creative Officer: Nils Leonard Creative Director: Andy Lockley Art Directors: Andy Lockley / Andy Garnett Copywriter: Dan Cole Creative Producers: Georgie Moran / Lucy Dunn Original Music: MJ Cole / Soho Music. Sound design: Holly Clancey Production Company: Grey Works Producer: Becky Knapp DOP: Bruno Downey Print Production / software developer: Novalia

Read more at: <http://www.printedelectronicsworld.com/articles/the-sound-of-taste-feel-flavour-00006471.asp>

Wearable electronics: success factors for 12,000 developers

Wearable electronics is a very fragmented industry when it comes to manufacturers. Even mature sub-sectors have no clear leaders in what will be a \$70 billion plus business in 2024 with 12,000 developers and manufacturers as newly calculated by analysts IDTechEx. An example is the thousands of companies making basic earphones and electronic watches, nearly all in China. In premium versions there are some leaders. In the newer wearable electronics there are no clear leaders at all - nothing equivalent to Samsung and Apple winning in mobile phones for example, despite some wearable electronics being intimately linked to mobile phones. Yet it is clear to all concerned that wearable electronics is a large business today and it will be a multiple of that in ten years from now.

The new IDTechEx report, Wearable Technology 2014-2024: Technologies, Markets, Forecasts notes why so many of the famous names in apparel, electronics and infotainment are involved in an energetic struggle to win in wearable electronics before the sectors mature and only a few become winners, generating large amounts of cash. Thousands of others are competing with them and a shakeout will occur in about ten years from now as some new sectors offer real volume and the choice has to be niche or volume, at a huge investment



cost often of billions of dollars just as happened with mobile phones, LCD and OLED displays and lithium-ion batteries. Brand power and strong routes to market are also effective but not enough on their own.

Large markets now and much bigger in future. Anything involving a head on clash of the titans of electronics and information technology is likely to be big and wearable electronics is no exception. Companies from many other industries are also involved, including component suppliers such as Qualcomm with a smart watch newly competing with their customers and investing in many start-ups to power more success in finished products rather than the sophisticated integrated circuits on their own. Why software and services giants get involved Companies such as Google, Baidu (the Chinese equivalent of Google), SAP and Microsoft are involved in wearable electronic hardware leading to a strong position later in wearable electronics services, they hope. However, the players in apparel and textile wearable electronics, where electronics increasingly and literally "vanishes into the fabric of society" are very different though Microsoft has dabbled in both, without, as yet, the inspirational products of Google which range from a planned smart contact lens to Google Glass eyewear launching this year. It seems wristwear is attracting most attention; including Samsung's recently released Gear 2 and Gear Fit, and the Apple iWatch which is rumoured to be in production. Interestingly, Apple is not confining itself to wearable infotainment. Apple has recently hired top executives from Sano Intelligence, Proteus Digital, C8Medisensors and Senseonics, and although despite much speculation it has yet to officially announce a product in the medical/healthcare sector of wearable electronics. However, apps and services will still matter even in wearable electronics.

Nowadays apps may consist of hardware modules in wearable technology such as changing links in wristwear. In this we have gone full circle back to the hardwired logic of the first computers 70 years ago. We can even make disposable printed electronics in trillions, each with a different circuit (identity, function) if need be. Goodbye programming? Well not entirely but certainly "here comes modularity".

Read more

at: <http://www.printedelectronicsworld.com/articles/wearable-electronics-success-factors-for-12-000-developers-00006480.asp>



Groundbreaking method to commercialize new material for electronics

Samsung Electronics announced a breakthrough synthesis method to speed the commercialization of graphene, a unique material ideally suited for electronic devices. Samsung Advanced Institute of Technology (SAIT), in partnership with Sungkyunkwan University, became the first in the world to develop this new method.

"This is one of the most significant breakthroughs in graphene research in history," said the laboratory leaders at SAIT's Lab. "We expect this discovery to accelerate the commercialization of graphene, which could unlock the next era of consumer electronic technology." Graphene has one hundred times greater electron mobility than silicon, the most widely used material in semiconductors today. It is more durable than steel and has high heat conductivity as well as flexibility, which makes it the perfect material for use in flexible displays, wearables and other next generation electronic devices. Through its partnership with Sungkyunkwan University's School of Advanced Materials Science and Engineering, SAIT uncovered a new method of growing large area, single crystal wafer scale graphene. Engineers around the world have invested heavily in research for the commercialization of graphene, but have faced many obstacles due to the challenges associated with it. In the past, researchers have found that multi-crystal synthesis - the process of synthesizing small graphene particles to produce large-area graphene - deteriorated the electric and mechanical properties of the material, limiting its application range and making it difficult to commercialise.

The new method developed by SAIT and Sungkyunkwan University synthesizes large-area graphene into a single crystal on a semiconductor, maintaining its electric and mechanical properties. The new method repeatedly synthesizes single crystal graphene on the current semiconductor wafer scale.

Over the past several decades, the growth of the semiconductor industry has been driven by the ability to grow the area of a silicon wafer, while steadily decreasing the process node. In order to commercialize graphene to displace the industry's reliance on silicon, it



is vital to develop a new method to grow a single crystal graphene into a large area. Samsung and Sungkyunkwan University have been partnering in the field of nano research since 2006.

This breakthrough is a testament to the strengths of the two institutions, which together were able to successfully achieve results that could become a driver of next generation technology. The research was funded by Korea's Ministry of Science, ICT and Future Planning (MSIP), under the Project to Nurture Leading Creative Researching Experts Program.

Read more at:

<http://www.printedelectronicsworld.com/articles/groundbreaking-method-to-commercialize-new-material-for-electronics-00006469.asp>

