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Disappointing Q4 Puts Brakes on IDC's Tablet Forecast

IDC has cut back its five-year forecast for worldwide tablet shipments, following a YoY decline in Q4'14. The firm expects 234.5 million units to be shipped this year, representing a moderate increase of 2.1%. Although predictions have been cut, IDC still expects positive - if low - growth from the tablet market in the coming years; primarily due to increasing demand in the commercial sector, as Microsoft rises.

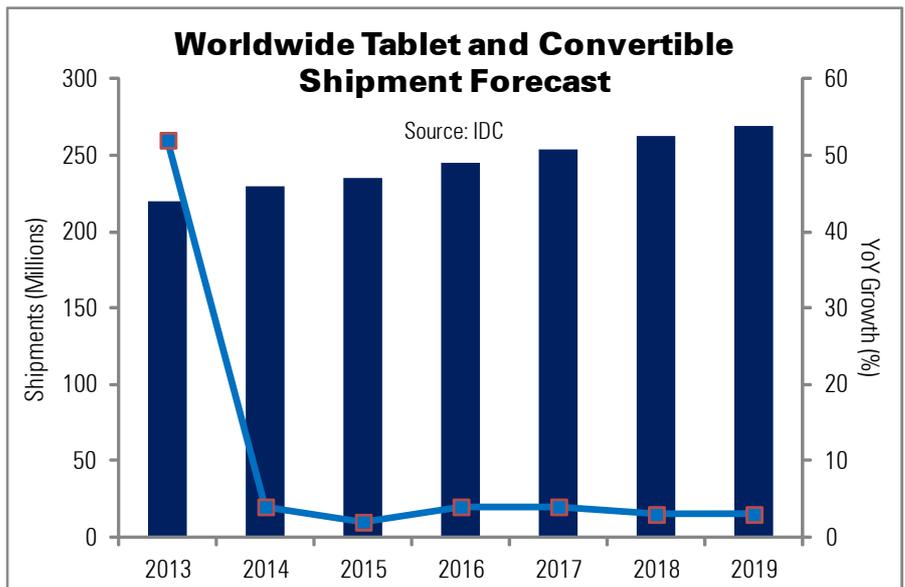
Android will remain the market leader in operating system terms, with almost 66% of the market to 2019. iOS is 'likely the weakest link'; IDC predicts that the OS's volume share will fall this year, to levels below those seen since 2012. Despite modest adoption

so far, Windows is expected to gain significant share over the coming years - growing from 5.1% in 2015 to 14.1% in 2019.

Jean Philippe Bouchard, IDC's research director for tablets, said, "Microsoft is doing a lot of good things right now and we believe the launch of Windows 10 later this year will not only have a significant impact on Microsoft's share of the market, but on the industry as a whole... There is an appetite for a platform that can provide a productivity experience that remains consistent across multiple form factors and device types, and we believe Microsoft is well positioned to capture some of that demand".

Worldwide Tablet and Convertible Shipments' Market Share and YoY Growth by Operating System, 2014 - 2019 (Shipments in Millions)						
Operating System	2014 Units	2015 Units (F)	2019 Units (F)	2014 Market Share (%)	2015 Market Share (%) (F)	2019 Market Share (%) (F)
Android	154.7	158.1	169.5	67.3	67.4	62.9
iOS	63.4	60.1	61.9	27.6	25.6	23
Windows	11.6	16.3	38	5.1	7	14.1
Total	229.7	234.5	269.4	100	100	100

Source: IDC



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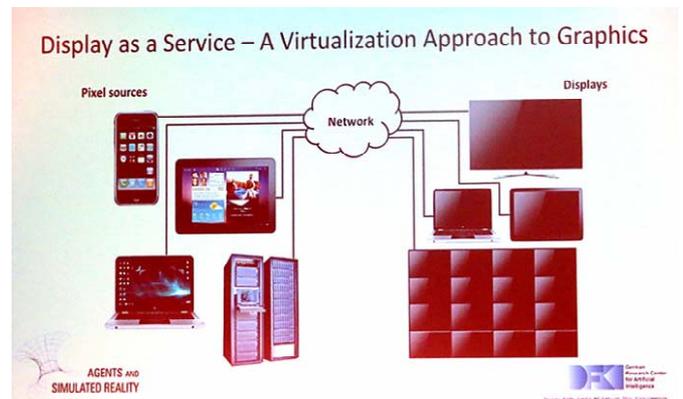
Editor's comment



Steve mentions in his report in this issue that the interest at DSE from Google might be related to the idea that Digital Signage might just become part of the "Internet of Things" (IOT). I can see what he means and we have been reporting on developments that might suggest this.

It seems to me that one of the key concepts that is central to this is the idea of "Display as a Service". I was reminded of this technology earlier this week as I was at CeBIT and spoke to the University of Saarland, which has been working with Intel on this concept. DaaS was launched at the Hannover show in 2013, although there was no news on the idea at this year's CeBIT. In fact, the last entry to the DaaS blog was from CeBIT 2013.

The idea of DaaS is that applications can send pixels to displays without worrying if there is a directly connected display and without worrying about the detailed specification of the final display device. The display image is created on the source device, then compressed and transmitted over a network to the final display, where it may be combined with other images and where the limits and features of the final display device are taken into account (borders, bezels, aspect ratios, whether it's a video wall etc) and the final image rendered. Equally, the display device can look around for content from "pixel providers" and blend those into an image for display. You can easily see how those approaches might be attractive to makers of "headless" IoT devices which could look around for a display to show their data.



This kind of "display virtualisation" is a very powerful concept. It's basically the same kind of approach that has seen the development of the idea of the "Virtual STB" by Active Video Networks that we have been writing about since 2010 and which is gradually getting into the TV market. It's also behind the remote provision of workstation performance by RealVNC and AMD that we report on from CeBIT. Nvidia has also shown impressive game play over the internet to us in the past, and I have raved over several years about the "Project Fresco" research project that NDS started developing before it was acquired by Cisco and which won prizes for Cisco in 2013.

Matt wrote about technology from Useful that uses some of the same concepts in the same space in his Display Daily article in December.

So, we have Intel, Cisco and Google working away on this, among many others including high tech start-ups in software and networking - there's a lot of activity.

Continued on page 9

Sony Starts Job Cuts in Sweden

Sony is reported to have started making the first round of job cuts in its mobile business, with news that 1,000 jobs are to go in Sweden.

The company is understood to have told staff in Lund that it will almost halve the workforce there from 1st April when Sony begins making structural changes to its business.

Last month Sony narrowed its annual net loss forecast to ¥170 billion (\$1.4 billion), having previously said it expected to record a net loss of ¥230 billion (\$1.9 billion) (Sony Cuts Loss Forecast but Also Cuts More Jobs). At the same time Sony announced a further round of job cuts in its mobile business. The business has now seen its workforce reduced by one third.

Panasonic to Establish Procurement Unit

Panasonic is to set up a dedicated unit for procuring common parts and materials, in a bid to improve competitiveness and lower costs.

The company's annual procurement bill is around \$32.6 billion, covering all of Panasonic's business segments and reports suggest that the new unit would be responsible for around half of that amount.

Microsoft Files Lawsuit Against Kyocera

Microsoft has filed a lawsuit against Kyocera alleging that three of the Japanese company's phones infringed seven Microsoft patents. According to a Reuters report, Microsoft has asked a federal judge in Seattle to impose a US sales injunction against Kyocera's alleged infringing products.

Microsoft had previously said that it will adhere to the wishes of standards organisations and make its standard patents "avail-

able on fair, reasonable and non-discriminatory terms" and has agreed patent licensing deals with a number of Android handset manufacturers, including Samsung, LG and HTC.

Reuters quoted a Microsoft spokesman as saying, "We respect Kyocera but we believe they need to license the patented technology they are using. We're hopeful this case can be resolved amicably".

Intel Cuts Revenue Forecast

Intel has cut its first quarter turnover forecast by almost a billion dollars, saying it now expects turnover to be around \$12.8 billion having previously forecast \$13.7 billion.

The change in outlook is a result of weaker than expected demand for business desktop PCs and lower than expected inventory levels across the PC supply chain. Intel said it believes the changes to demand and inventory patterns are caused by lower than expected Windows XP refresh in small and medium business and increasingly challenging macroeconomic and currency conditions, particularly in Europe.

TCL to Build Plants in India, Brazil

TCL Corp. says it is planning to start building factories in India and Brazil next year to manufacture smartphones and wearable devices. According to reports, the company wants to establish manufacturing bases in these two countries to meet the needs of their rapidly expanding consumer electronics markets. By setting up plants close to the end market, TCL is aiming to overcome high import tariffs.

Last week, TCL reported a 60% jump in net profit for the year to \$518 million and an 18.4% increase in turnover to \$14.4 billion, largely driven by a 60.3% growth in sales at its handset unit, TCL Communication Technology. This year, TCL Communications is targeting 30% revenue growth as part of the group's wider push to transform itself into a manufacturer of connected technologies.

Sharp Rebutts Latest Rumours

Sharp has issued a further denial to reports in Nikkei this week that it is planning job cuts, capital enforcement and a revised earnings forecast.

Nikkei had claimed that Sharp was seeking a ¥200 billion (\$1.6 billion) capital injection from its main banks, Mizuho Bank and Bank of Tokyo-Mitsubishi UFJ, which was ¥50 billion (\$410 million) more than its initial request. The report also said that Sharp was planning to cut more than 10% of its Japanese workforce, equating to around 3,000 jobs, through voluntary early retirement.

Sharp said: "Under the current severe business environment, Sharp is considering various options to reduce overall fixed costs, but no specific decisions are made apart from the voluntary salary cut of directors and executive officers which was announced earlier", and reiterated that an announcement would be made in May 2015.



Computacenter plc has released its 2014 results, reporting a net profit of £55.1 million (\$81.3 million) for the year on turnover of £3.1 billion (\$4.5 billion), which compares with a net profit a year earlier of £33.1 million (\$48.8 million) on turnover of £3 billion (\$4.4 billion). Total turnover in Germany declined 8.2% to £1.1 billion (\$1.6 billion), while the UK reported strong revenue growth of 10.2% to £1.4 billion (\$2 billion).

Emagin Corporation has released its fourth quarter and full year results, posting a net loss of \$1.5 million on turnover of \$6.7 million in Q4, which compares with a net loss of \$8.7 million on turnover of \$6.1 million in the final quarter of last year. For the year, Emagin's net profit narrowed to \$5.2 million from \$14 million in the previous year, while turnover fell to \$25.7 million from \$28 million.

Finance Results, People News



Sony Corporation recorded a net profit of ¥90 billion (\$746.3 million) in the third quarter of the year on turnover of ¥2.5 trillion (\$20.7 billion), which compares with a net profit in Q3 of the previous year of ¥26.4 billion (\$218.9 million) on turnover of ¥2.4 trillion (\$19.9 billion). The 6.5% increase in turnover in Q3 was primarily driven by an increase in unit sales of smartphones and a significant increase in Sony's devices segment sales. This was partially offset, however, by decreases in Sony's other business units, mostly related to the company's exit from the PC business. Mobile communications sales increased 28.7% year on year to ¥429 billion (\$3.5 billion), while sales in the home entertainment and sound business dipped 2.3% to ¥413.3 billion (\$3.4 billion).

For the first nine months of the year, Sony recorded a net loss of ¥19.2 billion (\$159.2



million) on turnover of ¥5.4 trillion (\$44.7 billion), which compares with a net profit for the corresponding period of last year of ¥9.8 billion (\$81.3 billion) on turnover of ¥5 trillion (\$41.4 billion).

Hannstar Display has released its fourth quarter and full year results, posting a net loss of NT\$659 million (\$20.9 million) in Q4, which compares with a net profit in the final quarter of the previous year of NT\$148 million (\$4.7 million), on turnover which was flat at NT\$6.3 billion (\$200.3 million). Hannstar's net profit for the year was NT\$541 million (\$17.2 million) on turnover of NT\$23.7 billion (\$753.7 million).

Hannstar's small and medium sized panel shipments in Q4 reached 110 million units, while shipments of large panels and HannsG products reached 300,000 units.



Midwich Expands Technical Sales Team

Midwich has appointed Steve Goodwin to its technical sales team. Goodwin has worked in the past on many higher education procurement frameworks with system integrators, such as Impact Marcom.



Market News

SID Display Week iZone Extends Deadline



Our own Matt Brennessoltz seen trying a Fraunhofer IPMS bidirectional HMD

The deadline for applications to Display Week's innovation Zone (iZone) was extended to March 27th. As committee chair Helgi Seetzen explained, the show's producer, Society for Information Display (SID) is looking to expand the prototype display technology space to some 35 booths. The group is accepting applications on its website and evaluating candidates for suitable prototypes that can be demonstrated during the show on a no fee basis.

The I-Zone offers researchers space to demonstrate their prototypes or other hardware demo units for two days free of charge at the premier display exhibition in North America, and gives attendees a chance to view best-in-class emerging information display technologies in a dedicated area on the show floor. The committee is actively encouraging participation by small companies, startups, universities, government labs, and independ-

ent research labs, that often lack the funds to show off new prototypes. iZone will also feature next generation device development from established companies looking for feedback on non commercial shipping devices. The iZone was established in 2013 and its corporate sponsor E-Ink Holdings LLC has kept up the funding since its charter mandate. Companies wanting to apply for a space in the iZone can find all documentation on the SID iZone website.

At Display Week 2015, the I-Zone Committee will select a winner of the "Best I-Zone Prototype at Display Week 2015" award, to be announced on the show floor during Display Week and in the post Display Week issue of Information Display magazine.

Dates were pushed back so filing deadline is now March 27 and candidates will have until April 10 to confirm participation. To apply go to the iZone Application website.

The I-Zone is one that always gets a lot of attention from press and analysts, so the offer of a free table is a really good one. How often is such an opportunity given for free in the heart of Silicon Valley? (BR)

SuperMHL Silicon Announced



At CES, the MHL Consortium announced the superMHL specification. This specification, when implemented by CE manufacturers, will allow 8K 120Hz video to connect from the source to the display with a single cable.

On March 16th, the other shoe dropped. Lattice Semiconductor, which recently acquired Silicon Image, the driving force behind the original MHL specification, announced on March 16th the first superMHL port processor, the SiI9779. This chip is intended to be used either in an 8k TV or a dedicated 8k set top box. When used at the receiving end of a video stream in a TV, the SiI9779 can handle one superMHL connector and three HDMI 2.0 connectors. When used as a transmitter in an STB, it can transmit only the superMHL signal, not HDMI signals. While the superMHL specification allows 8K 120Hz video, the SiI9779 chip can only handle a maximum of 8k at 60Hz.

He said that by 2018 DisplaySearch predicts that virtually 100% of TVs 55" and larger will be 4k and manufacturers are looking to the success of 4k as justification to move beyond it to 8k. He said the 8k demonstration at CES on a 110" display had been very well received, both by the consumer electronics people who saw it and by the production and post-production people.

HDMI, the original basis for MHL connectivity, was originally intended as a consumer interface, just like superMHL. However, HDMI has been widely adopted by professional applications as a single cable, uncompressed solution to display connectivity for both 2k/HDTV and 4k/UHD applications. (I'm writing this article on a laptop connected to a monitor via HDMI.) Since superMHL is the only single-cable solution to 8k video currently available, even as a specification, Goldberg sees it moving into the professional market as well as the consumer market.

According to Goldberg, the superMHL standard is uncompressed at "lower" data rates such as UHD 60Hz. At the extreme data rates superMHL is capable of, such as 8K120 with HDR, visually lossless compression is applied, with compression ratios in the 2x - 3x range (using the VESA DisplayStream standard - Man. Ed.). When used with HDR signals such as Dolby Vision, superMHL transmits metadata to the TV or other display that tells the display exactly what the HDR is, whether it is Dolby Vision or some other HDR technique. It's then up to the TV electronics to display the video correctly.

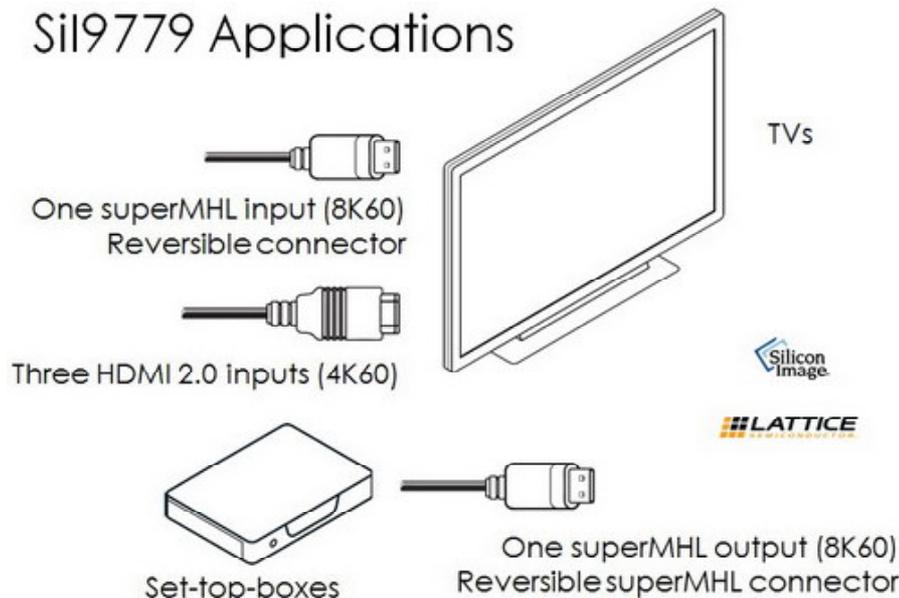
The superMHL connector is reversible in two senses. First, it is (or at least can be) the same on both ends, unlike, for example, earlier versions of USB. Second, each connector is reversible top-to-bottom, so if you are fumbling around behind a display in the dark, you don't have to worry about reversing the connector to plug it in.

Goldberg said Lattice Semiconductor will be sampling the SiI9779 in Q2 to TV, display and set top box manufacturers.

8k content? Goldberg said the first planned 8k availability will be in 2020 when NHK plans to broadcast the Tokyo Summer Olympics. Manufacturers have plenty of time to ramp up 8k STBs and TVs before then. He added that there are likely to be professional and PC graphics applications for 8k before then.

- Matthew Brennesholtz

SiI9779 Applications



The SiI9779 supports key features such as:

- 8k60 resolution
- BT.2020 expanded colour gamut
- High Dynamic Range, such as Dolby Vision
- Reversible connector (top-to-bottom, end-to-end)
- Latest audio features including object audio, high resolution and high bit-rate audio such as Dolby Atmos, DTS:X, 3D audio
- Audio-only mode

I had a chance to talk to Marshall Goldberg of Lattice Semiconductors, formerly of Silicon Image. He is the Sr. Product Manager at Lat-

Slight Increase in Long-Term PC Forecast, Says IDC



PC shipments worldwide will fall by 4.9% YoY in 2015, says IDC, which has revised its previous forecast down from a 3.3% fall. At the same time, growth predictions for 2016 and 2017 were raised slightly.

In Q4'14, PC results were 1.7% ahead of IDC's forecast. Total 2015 volume is expected to reach 293.1 million units, falling to 291.4 million by 2019. In value terms, the market was worth \$201 billion in 2014 (a 0.8% fall), and is expected to decline 6.9% this year. Small declines in the following years will bring market value to \$175 billion by 2019.

There were real demand improvements in the second half of 2014 in some market

areas, but IDC believes that the more positive Q4'14 result was the result of inventory build-up. It is thought that retailers were stocking up on 'Windows 8.1 Plus Bing' systems ahead of Microsoft lowering subsidies in 2015.

A short-term impact of the above is expected to affect consumer channels, as they seek to clear stock. Average prices are likely to rise in the near future, due to subsidy scale backs, the strong US dollar (making systems more expensive overseas) and the continued shift to slim, convertible and touch-based PCs. In addition, IDC believes that OEM product updates and consumer demand will be delayed until the end of 2015, due to the release of Intel's Skylake platform and Microsoft's Windows 10.

Emerging markets are especially struggling, ending last year with shipments down 9.5%. 2015 growth projections are for a 4.7% fall. Spending in these regions has been limited by political instability, commodity pricing pressures and currency devaluations. Additionally there has been competition from other devices, such as mobiles and wearables. Although emerging regions are expected to see positive growth in 2017, shipment estimates will remain below 160 million units through 2019 - down from 163.7 million last year.

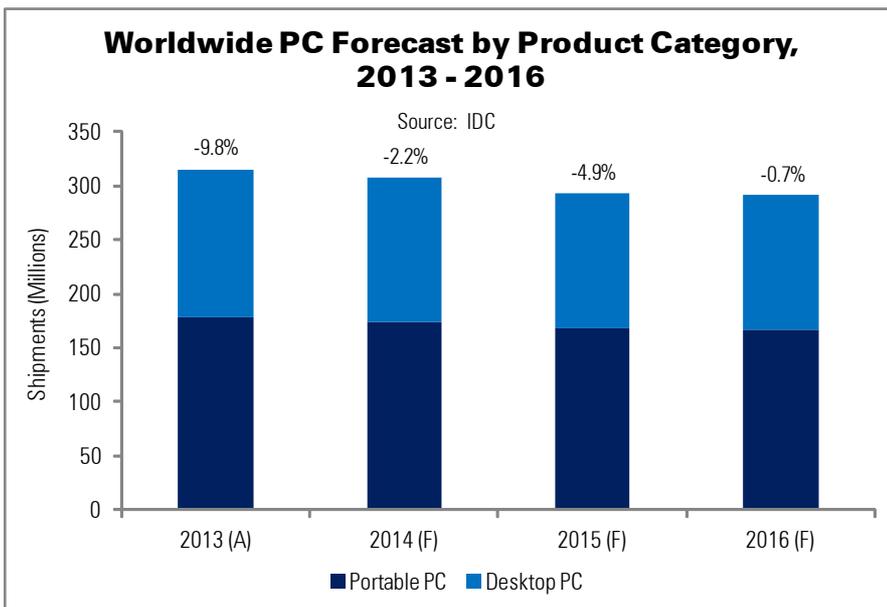
Mature regions are expected to fare better, having ended 2014 at 8.4% growth - the first positive result since 2010. XP system replacements; slowing tablet demand; and aggressive PC pricing supported the result. Despite this, IDC expects shipments to fall 5.1% YoY in 2015, followed by incremental declines in coming years. IDC has revised its previous forecast up slightly, and now expects 134 million units to be shipped to mature regions in 2019, up from 130 million.

Windows 10, to be introduced later this year, is expected to be well-received and support the Windows ecosystems. It will also provide a better mouse-and-keyboard experience, relieving some pressure to move towards touch, and support non-PC devices like convertibles - likely without significantly boosting total PC shipments.

Loren Loverde, VP of worldwide PC trackers at IDC, said, "The gains in mature regions

PC Shipments by Region and Product Category (Shipments in Millions)				
Region	Product Category	2014 (A)	2015 (F)	2016 (F)
Emerging Markets	Desktop PC	80.4	76.8	75.2
	Portable PC	83.2	79.1	83.7
	Total PC	163.7	156.0	159.0
Mature Markets	Desktop PC	53.4	48.7	45.8
	Portable PC	91.1	88.4	86.7
	Total PC	144.5	137.1	132.5
Worldwide	Desktop PC	133.8	125.5	121.0
	Portable PC	174.3	167.5	170.4
	Total PC	308.1	293.1	291.4

Source: IDC



Slight Increase in Long-Term PC Forecast, Says IDC

Continued from previous page

for 2014 helped stabilise the market, but any opportunity for long-term growth depends on reviving growth in emerging regions, and that seems unlikely with the shift toward mobile devices... Even including 2-in-1 systems would only boost the compound annual growth rate for total PC shipments

through 2019 from -1.1% to 0.5%. Vendors can focus on growth segments of the PC market such as AIO, slim and convertible PCs, or consolidate share, but pressure on pricing and from competing devices will continue to make it a challenging market".

Bob O'Donnell once of IDC but now of TECHanalysis Research is more positive than this and expects just 1% or so drop this year. Other commentators have pointed out that there are two schools of thought on PC forecasts - there are those that see the more negative results as "normal", while better quarters are the exception, and others who see the positive quarters as "normal", with the negative ones the real variations! (BR)

HSA Finalises 1.0 Specification for Power-Efficient Computing



The Heterogeneous System Architecture (HSA) Foundation has released the HSA 1.0 specification, bringing the technology industry one step closer to true heterogeneous computing on platforms spanning mobile devices, desktops, high-performance computing (HPC) systems and servers'.

HSA is an architecture that integrates the CPU and GPU on the same bus. Both are used for compute tasks, in parallel. The newly-approved specification includes elements designed to improve the programmability of heterogeneous processors, the portability of programming code and interoperability across different vendor devices. They include:

The HSA System Architecture Specification, which defines how the hardware operates; The HSA Programmers Reference Manual (PRM), which targets the software ecosystem, tool and compiler developers; The HSA Runtime Specification, which de-

finies how applications interact with HSA platforms. HSA 1.0 includes several features for the efficient implementation of languages such as C++, Java and Python on heterogeneous hardware. These enhancements are intended to make heterogeneous computing available to mainstream and mobile applications.

Mediatek was one of the first companies to produce mainstream heterogeneous applications, with SoCs such as the MT6589 and MT6785. Giri Amarakone of the company said, "HSA allows us to move to the next step of heterogeneous computing with the ease of conventional programming and superior power efficiency".

Tim Leland, VP of product management at Qualcomm, noted that the company is developing new, low-power, heterogeneous computing technologies for Qualcomm Hexagon DSP, Adreno GPU and custom CPU micro architectures.

Editorial (Continued)

Now, the challenge of display interfaces is always the sheer number of bits that needed to be transmitted. We see this challenge in our story in this issue on the new HP wireless display dock - the bandwidth needed and that consequent high frequencies of the radio means that ranges are very limited.

To get the bandwidth requirement down needs compression and then you run into two problems. Compress too much and you start to lose data - and the human visual system is very sensitive to the visual artefacts from lossy compression on graphics content (if not so much on video).

Compression and de-compression also takes time, which introduces latency, and the more sophisticated the codec, the more silicon you need. That's the trade

off going from MPEG2 to MPEG4/H.264 to H.265/HEVC. Adding the decompression hardware tends to increase the cost of your display "end points". However, in IOT and digital signage applications, unlike desktop applications, latency is not a big issue.

Given a flat level of display quality delivery, you could see how quickly improvements in networks, the codecs and the chips that run them could be successful. However, the demands of users of displays go up and up in terms of resolutions, colours, refresh rates and dynamic range, offsetting the gains made elsewhere.

On that basis, it looks as though it will be a while before direct display interfaces are just a part of display history!

Bob

Pascal is Nvidia's Newest, Fastest GPU Architecture



Nvidia's GPU technology Conference took place in the USA recently, with a new flagship GPU (see Product News) announced as well as a brand new architecture.

Maxwell is Nvidia's 10th-generation GPU architecture, and will be succeeded by 'Pascal' in 2016. According to Nvidia, Pascal is as much as 10 times faster than Maxwell.

Pascal's design was developed thanks to Nvidia's work on deep (aka machine) learning. GPUs based on the architecture will have three key features: mixed-precision computing; 3D memory; and NVLink.

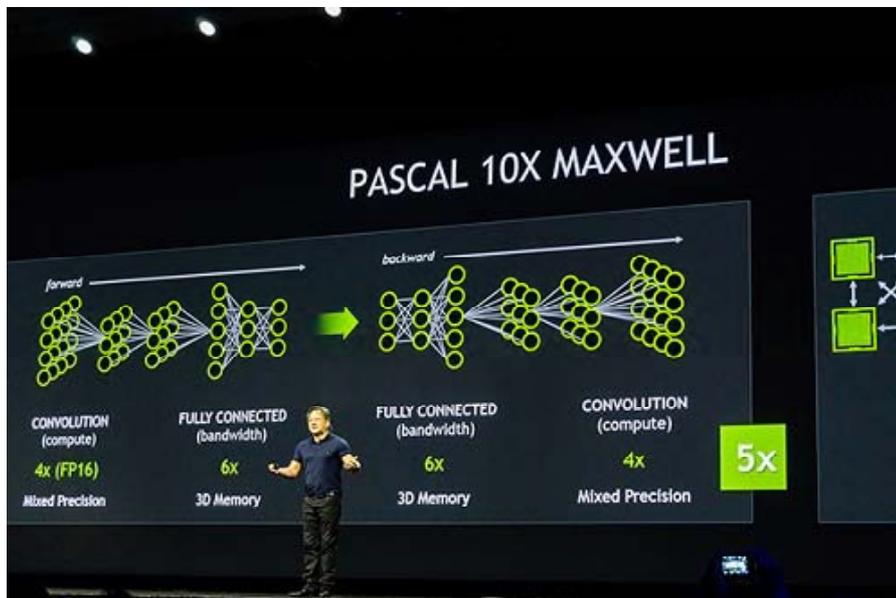
which data can be delivered to the GPU. 3D memory will increase bandwidth by three times, with almost three times the frame buffer capacity of Maxwell-based GPUs. Pascal-based GPUs will have their memory chips staked on top of each other and placed adjacent to the GPU, rather than further down the processor boards. Bits will thus need to travel a small distance between the two components, accelerating communication and raising power efficiency.

Finally, Nvidia's NVLink interconnect enables faster data movement: between 5 and 12 times faster, the company says, than PCIe. It also means that the number of GPUs in a system working together in deep learning computations can be doubled. Nvidia has a video about NVLink that can be viewed at <http://tinyurl.com/q48pn9n>.

Deep learning is a key part of the automotive market. We talked to Nvidia about its move into this space at CES, where it was showing the new Drive PX platform (Nvidia's TeraFlop Chip Enables Self-Aware Cars). Drive PX, which now has a price (\$1,000), monitors a car's surroundings to enable self-driving vehicles. It uses two Tegra X1 processors and can combine data streams from up to 12 cameras.

Automotive is the fastest-growing segment of Nvidia's Tegra business, with higher gross margins than the devices segment. Revenues almost doubled YoY in Q4'14, and more than 7.5 million cars now use Nvidia's technology - well up from 4.7 million a year ago.

At the GTC, Tesla CEO Elon Musk predicted that self-driving cars would become the rule, rather than the exception, within 20 years.



Mixed-precision computing enables Pascal-based GPUs to compute at 16-bit floating point accuracy; this is of particular benefit to classification and convolution, which are key to deep learning.

Memory bandwidth limits the speed at

Interestingly, Anandtech reports that Nvidia has significant advantages over AMD in the GPU market. The site's most demanding benchmarks (Crysis 3 at UltraHD in high quality, with FXAA) saw the Titan X beat the R9 290X's performance by 54%; AMD's high-end GPUs had their last significant refresh in 2013. For many years, the two company's have been almost even in performance. (TA)

Silver Nanowires Approach \$500 Million Value



A report by Nanomarkets (<http://tinyurl.com/l5j7kf8>) predicts that the market for silver nanowire-based transparent conductor materials will be worth \$485 million by 2022. These materials are currently seeing increasing adoption in touch sensors. The market is

expected to be worth about \$41 million this year and \$158 million in 2018.

Other end markets, notably solar photovoltaic and OLED displays, will provide more revenue opportunities throughout the forecast period.

Gartner Predicts Strong Growth for Head Mounted Displays

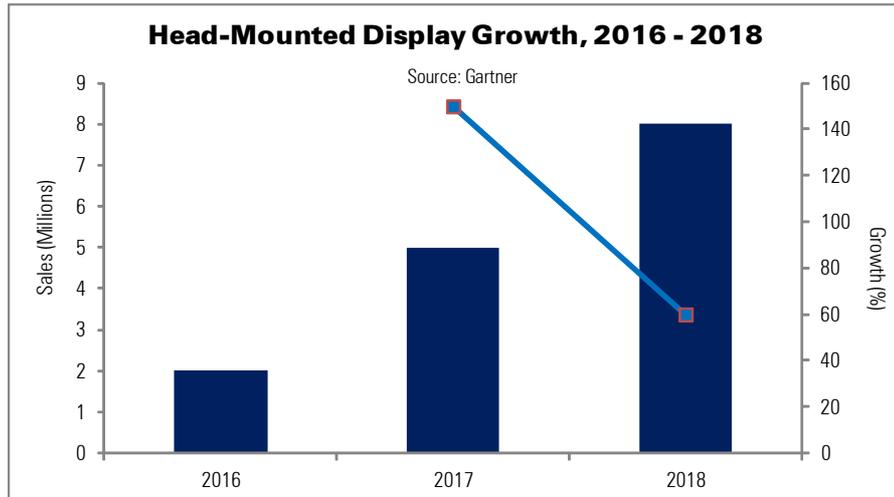


At a press event in Taipei, Gartner research director Brian Blau stated that the total unit sales for virtual reality, augmented reality and other smart glass apps will grow to 2 million units by 2016 and 5 million in 2017 followed by 8 million in 2018. This includes all head mounted displays. They conclude that by 2018 more than 25 million head mounted displays will have been sold.

According to this math, a total of 10 million head mounted displays have been sold so far and are in the hands of users. This includes all Google Glass devices as well as the many other devices from Epson, Vuzix and others. Gartner saw an increase in HMD sales in 2014 and believes that this represents the strongest sales in this technology so far. The analyst sees this development as a move from the fringe of the markets to an entry into the mainstream consumer market.

The company continued that, before 2014, the main application for head mounted displays were specialty applications such as industrial design, military training and simulation. Of course, this changed to a certain degree when Google Glass entered the market and pushed for mass market adoption. So far this initiative has failed as Google Glass has been discontinued for adoption in the general public space.

Gartner believes that this will change as soon as HMD's are offered as stylish, consumer grade video eyeglasses. In addition, companies such as Sony, Samsung and HTC (there are more offering such devices) need to provide quality devices together with compelling applications to enhance the user experience.



I have seen and tried many head mounted displays and personally found most of them more of a scientific project than a consumer device. First of all the image quality often left much to be desired and secondly the use cases were often weak and were met with resistance because of social awkwardness. This is by no means a good start for the use of this technology in consumer markets.

Gartner sees the style of the device and video use as the keys to consumer adoption. Interestingly it did not mention gaming as a potential driver. Looking at the interest of the media in virtual reality and Oculus Rift in particular, it seems that other players like Facebook and Microsoft have other ideas for this technology. Gaming, video conferencing, social media and other applications seem to be more attractive for these companies.

The current market trend seems to favor industrial and military applications. While it is possible that these applications will generate these kind of sales numbers, this still does not mean that the technology is ready for the mass market. Oculus Rift may be released later this year and change all that. So far the only application I have seen working very well was for drawing attention to a booth at MWC. People lined up to watch some content. The interest of people is there (or at least curiosity - Man. Ed.), but there is a long way to go to mass market adoption. - NH

Competition Shifts Tablet Share Away From Dominant Brands



Apple and Samsung, the tablet market's leading vendors, will see their market share fall in the coming years, says Juniper Research. New players introducing low-cost models and new form factors will be responsible for the companies' combined 38% market by 2019, says the firm.

Lenovo is chief among the competing brands. Juniper has forecast that the Chinese company will ship 30 million tablets, on top of what it is already selling, by 2019.

The new report from Juniper (<http://tinyurl.com/kgq6eoc>) predicts that tablets' variety and capabilities will expand. Sales will be affected by phablets, and manufacturers will need to develop devices suited to different segments, rather than products that aimed at a very broad audience.

Android will remain dominant, although Windows devices will represent just under 10% of the market by 2019.

CeBIT

CeBIT is Very Quiet - but Merkel Promises 50 Mb/s

We have been documenting the decline of CeBIT for quite a few years, now (I've seen the arc over 30 or more years - Man. Ed.). It grew out of the Hannover Fair, which covers many industries, in the 1980s and was a huge success in the '90s. However, many of the top PC hardware brands dropped to low level of attendance a few years ago and it entered a period of decline. The show got something of a revival when, for a few years, mobile technology really grew, but the mobile business then established MWC in Barcelona and abandoned CeBIT as an international event (although it's still important as a local mobile event).

Since then, the show has seen a steady decline, although organisers said that there were around 3,300 exhibiting companies from 70 countries and they claimed that the space taken has risen for the first time since 2001 with a number of companies increasing their booth size. The expectation was of 200,000 visitors, a far cry from the 600,000+ in years gone by. It no longer runs over the weekend, so the crowd is more business-oriented.

We attended on the first day, so it may be that by the end of the week attendance numbers will be up, but the first impression was of real quiet. Some of the press facilities were not even opened this time and just before 9:00 am on the first morning, there was only a short queue waiting for entry. I managed to get a seat on the fast train from Hamburg, even though I had no seat reservation. I even got a press locker!

Many of the halls were very quiet, although the main software halls with Microsoft, SAP and Software Ag were busy and I make no change in my analysis that from an international hardware show, it has become a German software event. Except for the Chinese.

There was a huge area in Halle 6 that was taken by the Chinese trade authorities and with attendance from several big vendors including BOE, CEC and TCL. However, there were very few visitors on the booths when we visited, in the middle of the afternoon. We were told by staff from the companies that we spoke to that they were there partly because China was the special partner company this year. There were also hundreds of small component and accessory companies from China, but few talking to anybody when we went past. It's hard to imagine how they can recover the costs of participation.

The biggest part of our time was in the Reseller Hall where API ComputerHandel had a big booth that was being supported by a number of vendors of displays and graphics products.

We managed to get around to see everything that we thought was relevant in a single day, including a brief wander around the technology hall that is always one of the most interesting parts of the show, if you are a geek!

On the day before the show started, there was a big press event with Chancellor Merkel

and Jack Ma of Alibaba. Ma said that he was at CeBIT for the third time as he had found it very hard on previous occasions to make an impact in Europe. Looking to the future, he said that the next wave of business is about building sustainable internet companies. At the moment, internet companies such as Google and Alibaba could not, typically, last more than a few years - they have to become like Mercedes or Siemens. (I wonder about this - the point about software is that it is very asset light and becoming more so as the cloud becomes more important - and that means faster speed and mobility. There's a symmetry, companies can become global leaders very quickly, but can die just as fast. - Man. Ed.)

Ma said that B2C has to become C2B, with businesses doing more to offer customised products. The last industrial revolution was about replacing muscle power, the next one will be based on replacing and enhancing human brains. In the future, he said that "clicks & mortar" is essential. It's not technology that changes the world, it's the dreams that matter. Ma said that his latest dream for the future at CeBIT was to help small companies from Europe to enter the Chinese market.

Ma also demonstrated how an app he has developed can enable purchase of products from the internet, using face recognition to verify the buyer's identity.



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Merkel set out plans to help the development of the economy by some clear steps including bringing a 50Mbit/s connection to all citizens, with an aim of bringing this by 2018. Money from the 700MHz spectrum auction will be spent on improving rural access and public Wi-Fi will be expanded. Germany will also try to make it easier for start up companies to get going as well as working with other European countries to develop a clear and common network. Merkel also wants to work on mobile networks to help to maintain Germany as a centre for the automotive industry. At the same time, regulations for anonymity of data and net neutrality need to be developed.

Samsung Finds Some News at CeBIT

Samsung had a very big booth at CeBIT - substantially bigger than last year, and with more partners present, it seemed to us, in line with the change we noted at ISE this year. Samsung in Europe is now being led by executives with long B2B experience and it is starting to show. After Mobile World and ISE, there was only a limited opportunity for new product announcements.

The 105" 21:9 ultra wide display was shown at ISE and before, but at CeBIT Samsung told us its name, the QM105D and what it would cost. The list price has been set at €169,000 inc VAT, so it's in the realms of "if you have to

ask, you can't afford it". The display has 5120 x 2160 format and has lots of input flexibility to allow many configurations. Contrast is quoted at 4,000:1, brightness at 500 cd/m² and response time at 8ms. Despite the price, the panel is only rated for 16/7 use. Connectivity includes D-Sub, DVI-D, Display Port 1.2 (2 inputs), Display Port 1.1 (1 input)

Most of the smartphone news was at MWC and there were plenty of people looking at the new Galaxy S6 and S6 Edge at CeBIT. News at the show was that the newest smartphone from Samsung adheres to military ruggedness standards. The Galaxy Xcover 3 complies with the MIL-STD 810G specification; it can survive a 1.2m drop and is IP67-rated.



There are physical buttons for Home, Back and switching apps to windowed mode ('Multitasking'), as well as a dedicated 'Xcover' key. The Xcover button will turn on the torch, or activate the camera when double-tapped.

A 4.5" display has 800 x 480 resolution. Android 4.4 - to be upgraded to 5.0 in the future - runs on a 1.2GHz quad-core processor with 1.5GB of RAM. The phone has 8GB of storage and a 2,200mAh battery, as well as Samsung's Knox security system.

Samsung will release the Xcover 3 in April, for €230.

There have also been rumours of a rugged feature phone in the Xcover line. The B550 Xcover 3 - according to a leak - will have a 2.4" display with 320 x 240 resolution; a SC7703A processor; 128MB of RAM; and 128MB of storage. The same IP67 protection is expected to be featured, as well as a 1,300mAh battery. The phone will be launched in Q2 for €85, it is claimed.

Finally, a rugged version of the new Galaxy S6 is also planned, say sources. SamMobile says that the phone will have the same 5.1" AMOLED display and octa-core processor, but will be water- and dust-proof. There will be 16MP and 5MP cameras and 32GB of storage. The phone will also be slightly (2mm) thicker, and the battery will be larger (3,500mAh).

Intel Explains WiDi Pro and Promotes HP Wireless Dock

We hadn't expected Intel to provide a CeBIT highlight, but it turned out that one of the most interesting products was shown there.

We started on the Intel booth (which was staffed by many of its partners including Fujitsu, HP, Dell and others) by looking at WiDi Pro. First, we wanted to understand how it fits in alongside consumer WiDi and also Miracast. Intel told us that the technology had started as an Intel initiative, but once Miracast had been developed, it seemed sensible to exploit it, so WiDi was re-aligned to exist as an extra layer on top of Miracast for Intel platforms. In the same way, WiDi Pro sits on top of consumer WiDi as an extra layer covering security and session handover.

We had a demonstration of WiDi Pro which is about meeting display control. The first machine (which has to include Intel's VPro chip technology) creates a session by connecting to a WiDi receiver (Intel was using a device from Actiontec, connected to



Samsung's 105 inch 21:9 LFD looks great, but if you have to ask the price, you can't afford it!

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HP Wireless dock supports dual displays over WiGig

the display). The session software can identify other devices with Wi-Fi in the room and can then control which of them has access to the display. A request is sent from the controlling machine to the new user, who then confirms that they want to display on the main screen. The display stream then switches across. The controlling system can also take back a display connection at any time.

There is also a second mode which was described as "peer to peer", where each user can pass to the next, without a controlling system. If no machines in the meeting have VPro technology, then each can make an individual connection to the WiDi receiver, but no control system can be used.

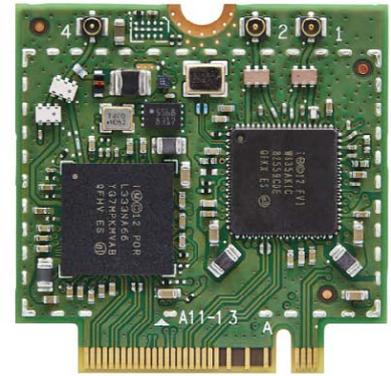
Staff told us that latency could be as low as 30ms or 40ms, although the demonstration system looked to us as though it was a bit slower. However, hand over from one system to another was fast and smooth.

Next we looked at Wireless Docking. It seems that HP has launched its first wireless docking station which it is calling the "Advanced Wireless Docking Station". The dock takes advantage of the 802.11ad 60GHz WiGig wireless connection technology to stream display data and networking across to the dock, which was launched recently and costs €199 (\$239).

At the moment, the only PC that connects is the new HP Elite x2 1011 G1 which includes the required 60GHz technology as an option, but Intel told us that it has a new PCIe

card (Intel Tri Band Wireless AC with WiGig Combo card) that includes 60GHz and can replace existing Wi-Fi and Bluetooth radios, so it expects quite wide and rapid adoption by higher end notebooks.

The Elite x2 is a convertible, and the radio card is included in the display/tablet part, so the wireless docking becomes a real benefit if the device is being used in tablet mode. It



Intel's Tri Band Wireless AC 17265 can be fitted in client PCs

can be used as the input device for dual desktop displays.

The dock includes dual DisplayPort outputs (to support up to dual FullHD displays using the Intel transmitter), 4 USB 3.0 ports (1 powered), an RJ45 for Ethernet and a VGA port as well as audio and microphone connectors.

Range can be an issue for 60GHz technology and HP is quoting 1.2 m as the standard, warranted range, although this also requires "line of sight". We heard that just putting your body between the tablet and the dock could break the connection, but that where there was clear line of sight, in practice, dis-



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tances of up to 3M were possible. Extending the range would be possible by using higher power, but this would compromise battery life performance.

WiGig uses beam steering to help to optimise connectivity and we heard that there are a number of factors, including user movement and changed orientation of the notebook, that cause re-alignment of the beams to be needed. That can have an impact on overall data rates. Nevertheless, the docking station function seems to work well.

LG Hides New Monitors Away

LG had a section of the API booth, but also had a meeting room in the IC building in the middle of the Messe where the desktop monitor business was demonstrating its new range. The team was in positive mood as it has been very successful with selling 21:9 monitors - as we reported in our IFA report, the country is said to have the largest global sales in LG. As a result, the sales team has been feted by the Korean Head Office and staff were wearing commemorative pins that had been awarded.

There is a new B2B series that is being



known as the MB67 series which is intended to boost LG in the upper ends of the market. An innovation for LG is a presence detector that can detect whether a user is close to the display. There will be a 24" 1920 x 1200 format monitor (this size and resolution remains strongly in demand in Germany) and there will also be a 27" version, although this has just 1920 x 1080 resolution.

The mainstream business line is also being updated (to the MB37 range) with an increase in the degree of height adjustment that can be achieved.

In May, LG will launch a new business line of 21:9 monitors - a pre-production prototype

was being shown with some swivel capability and around 130mm of height adjustment, although the stand design is not yet final. Pricing for the 34" version is expected to be €649, with the 29" at €500, although, as with all pricing at the moment, final pricing will depend on currency issues between now and the launch.

Finally, there will be a new 27" UltraHD monitor in the UM67 line in June.

the UK and the Netherlands as well as the DACH region of Germany, Austria and Switzerland. The company has inaugurated its own cloud centre and has developed a line of PC products for education (MDM Product Roundup - Vol 22 No 8)

The company was on a distributor booth and showed us its new business line design monitors. There are 24" (2470W) and a 27" unit with a "glass design" that minimises the borders around the display. The 2470W is a



Wortmann Is Main "Local Hero" Brand in Germany

Wortmann is almost the last remaining German "local hero" PC brand with real momentum - it recently announced that it had achieved sales of €1 billion in 2014 from €850 million in 2013. Sales are increasing outside Germany and the firm told us that it is selling in France,

23.8" FullHD unit with wide viewing angles and a DisplayPort input. The monitor is claimed to have an A/R coating which cuts reflections to less than 2% and transmissivity is said to be 95%. The panel uses IPS technology, brightness is 250 cd/m² and DisplayPort and HDMI inputs are featured. Wortmann is selling the monitor now, for €260 ex VAT.

The 27" version (2770W) has a 2560 x 1440



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panel with an AHIPS panel and a DisplayPort 1.2 interface along with HDMI, VGA and DVI. Brightness is high at 400 cd/m² and response is quoted at 6ms/g.

The 2840W "GreenLine" monitor is a FullHD touch monitor with a 1.3mp integrated camera and microphone. There is support for 10 point touch. Panel technology is MVA and brightness is 250 cd/m². Connections are through VGA, HDMI & DVI.

For education, as well as PCs, Wortmann has developed tablets and convertibles. Although not fully ruggedised, they are said to be water resistant. Staff told us that Microsoft has a special campaign in German schools. If they register directly with Microsoft, they can get Windows free (a Google search for Microsoft and FWU will give more details). Microsoft has also had some success with Multipoint servers being used to drive multiple thin client devices that are used by students on PCs and tablets.

Wortmann has also developed ruggedised tablets for business applications and these are generally supplied with Windows, but the firm also has two models with Android for low end price requests.



This Wortmann rugged tablet is for schools

BenQ Booth Highlights B2B Push

BenQ had a booth with API, but it was one of the biggest and best staffed. We were guided around the booth by industry veteran, Thomas Müller. Part of the booth showed the POS, stretch and LFD displays that the firm had shown at ISE (BenQ Clear in B2B Push). It's still early in this market for BenQ, but we are confident that the focus that the firm has developed in this direction will pay off.

Mueller told us that the it has had consider-

able success with the BL3201PT 32" UltraHD monitor which has recently had its list price reduced from €680 to €649. Ordinarily this would not have been worth remarking, but several vendors have had two or more price increases in recent months as the Euro has weakened so any reduction is unusual.



BenQ uses this settings "puck" to allow quick access to custom display settings

A new monitor with the same resolution is the BL2711U, which is a 27" model and BenQ will also introduce a 24" model, the BL2420PT. The BL2711U has 300 cd/m² of brightness and 4ms response. Vertical adjustment is supported (140mm) and there is a pivot function. Dual 3W speakers support sound use and there are dual HDMI ports, a dual link DVI-D and DisplayPort as well as 4

BenQ launched the SU197 projector at CeBIT



USB ports. Both are based on AHVA (IPS) panels from AUO.

The SW2401PT is in interesting model. It has a number of special settings so that colour and brightness adjustments can be stored in memory and then recalled using a "puck" switch that normally sits below the display. The 23.8" model has 2560 x 1440 resolution.

A new product that was not on the booth will be a 35" 21:9 model with a 2520 x 1080 curved panel. No details or timings are available yet.

In projection, BenQ now claims top sales position in Germany and wants to keep moving upmarket. The SU917 is a new 1920 x 1200 projector for business use and BenQ plans a full laser projector later in the year. The SU917 has 5,000 ANSI lumens of brightness, 7,000:1 contrast and a 1.5:1 zoom lens. Audio is supported by a 10W speaker system.

Müller told us that the World Cup had definitely boosted projector sales in Germany last summer, but to his surprise, the trend had continued and sales were very good in Q4.

CeBIT 2015 Round Up

Acer was in the API area with mobile and monitor products. We have covered the mobile products before, but staff told us that there were new monitors. However, when we checked our databases, we have reported

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Acer showed a new consumer id

most of them at CES and MWC. The H257U is new to us and is a 25" 2560 x 1440 monitor with an IPS panel, 4ms response time and DVI, HDMI 2.0 and DisplayPort inputs. Brightness is 350 cd/m².

Asus was also in the API area, but the products that were new at CeBIT had already been announced at CES and Mobile World Congress.

BOE was on the Chinese Partnership booth and had a number of panels on display including a FullHD panel for medical applications with brightness of 725 cd/m² and a 27" 2560 x 1440 panel with 99.8% (how frustrating! - Man. Ed.) of AdobeRGB support and brightness of 350 cd/mm². It uses the QD Vision glass tube-based QDs to achieve the wide gamut and will start to ship in Q2. Already in mass production is a new 23.8" UltraHD panel with 98% of sRGB gamut. Finally, we looked at a 13.3" 2560 x 1440 resolution panel for notebooks.

BOE was also highlighting its OGS (One Glass Solution) touch which can support 10 finger touch and uses an ITO electrode pattern on a separate glass sheet, which is produced in BOE's own factory and can be supplied with panels in an integrated module. It was shown on a 15.6" notebook panel, but can support sizes from 8" and a 23.8" version is "currently waiting for customer qualifica-

tion". Standard soda lime glass can be used, or strengthened or Gorilla Glass and anti-reflective and other coatings can be applied according to customer requests.

Butterfly Technology surprised us by saying that it has been at many of the shows that we have reported on over the years, but somehow the firm has slipped through our net (no pun intended!). Butterfly is a Chinese specialist in pico-projection, originally with

LCOS imagers, but more recently just with DLP. It started by selling engines to local brands in China, but is now entering the market under its own brand.

Products range from 80 ANSI lumens and upwards to 500 lumens and a unique feature is autofocus. There is an embedded camera in the projector that monitors the image during the focusing adjustment and optimises the setting. Projectors also include a full Android implementation (which helps with the camera control) and also a special remote control, based on what the firm calls "G Sensor" technology. Staff were demonstrating the quality of the remote by using it to play Fruit Ninja.

Later this year, Butterfly will introduce wireless streaming to allow mirroring of smartphone and tablet content on the projectors.

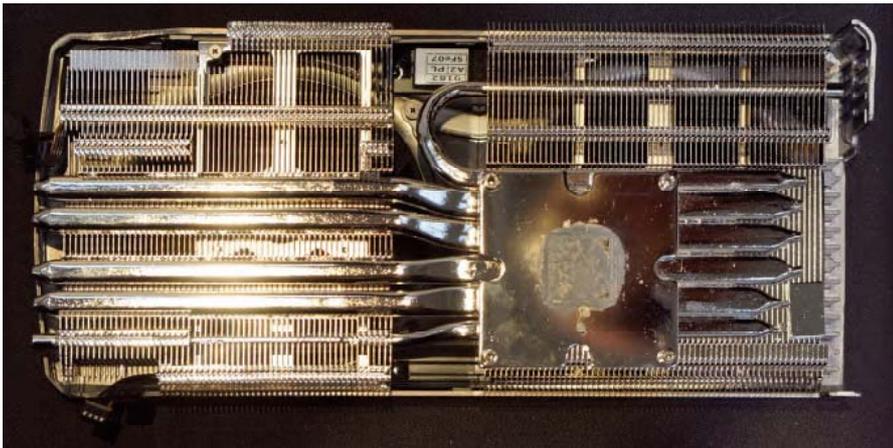
CEC of China had a booth on the large main "partner country" booth and was highlighting its ability to produce open cell panels and modules on its G8.5 plant in China. As we have reported over the years, CEC got into the business by acquiring the Sharp G6 Kameyama plant several years ago, and then developed its G8.5 fab, which still has a small share element from Sharp, but CEC is the dominant partner.

Our final meeting at CeBIT was with **EVGA**, the maker of high end graphics cards. The

Butterfly has Pico projectors with Android and flexible remotes as well as autofocus



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EVGA showed us what it takes to cool one of its high end cards!

company was showing its Kingpin 4 way SLI card that is said to be a world record holder in terms of overclocking. It's a while since I looked at this extreme end of the graphics board market and it seems that things have progressed. Apparently, the best way to achieve the extreme overclocking needed to be the fastest, liquid nitrogen is the preferred coolant!

Marginally more accessible is the 980 Hybrid CCS card which uses a closed loop cooling system. Standard liquid cooling systems for graphics cards may be prone to leaks and need the liquid changing on an annual basis, but the Hybrid card uses a factory sealed closed loop cooling system for easier installation and a fully leakproof system. It will be available in April and pricing is being listed at around \$800 plus tax in Europe. A new 4GB version of the 960 SSC card is starting to ship today and is available from this week.

EVGA told us that the amount of data involved in supporting UltraHD using multiple graphics cards is a real challenge. We were sworn to secrecy over the details, but suffice it to say that EVGA believes it has an answer.

Fujitsu had several booths, but there was nothing new in client devices, we were told, as we reported on a new tablet from MWC. There were no new displays and we have previously reported on some haptics technology from Fujitsu Japan at MWC and at the Fujitsu Forum. Staff told us that it is getting close to licensing the technology, which is particularly good at emulating different textures on displays, to device makers.

HKC had a booth within the API area and a

separate one on its own. There is a new industrial design that is more aimed at consumers than the traditional designs from the firm and the new models will be in 21.5", 23" and 23.8" versions. The firm told us that it will be introducing a new 39.5" UltraHD monitor.



HKC has improved its consumer id

Iiyama told us that it had nothing new, but then put out a press release about two new monitors (Iiyama Expands VA Product Lineup). In line with corporate policy, Iiyama in Germany is focusing on touch. It is happy to sell mainstream monitors, but is not chasing business to simply build turnover. New in Germany was the 55" procap monitor that we reported on at ISE.

KTC had a booth but no news. "We just have some TVs", we were told, "but nothing special". Fantastic marketing!

Optoma had no new updates since ISE, but was showing the UST interactive projector that it had demonstrated there.

RealVNC is a UK-based supplier of remote connection software used for support and remote control operations. It has a number of major contracts including Intel, which uses the firm's technology to support its VPro PCs. An unusual feature of the software is that linking servers (to link the client to the support worker) can be run within private networks, rather than through public cloud servers, which is appealing to corporates. In addition, the company's technology can survive reboots and allow remote technicians to access the BIOS settings of remote machines.

As well as PC applications, RealVNC has deals in transport for remote diagnostics and

in STBs, including a deal with Comcast. The software is also used for remote access to medical data by GE and Philips Medical. The technology, embedded in scanners, allows a single operator to monitor multiple patients from a single workstation.

At the show RealVNC announced that it has been working with **AMD** to make use of AMD's Rapid Fire Pro to access the RealVNC libraries, using the GPU to encode

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the streams and allowing remote access to virtualised workstations or remote workstations, even running very graphics intensive applications. The technology can be used, for example, to allow skilled workers to access their workstations from home or from remote locations and yet get a fast, low latency, connection to the power of the workstation.

Stino Eyevis was in Hall 2 to promote its special CMS technology for digital signage solutions, which it believes are scalable from small companies to large installations.

SuperTab is a Belgian company that can supply tablets under its own brand or with private labels. The company has a range of products available from 7" to 10" and with different specifications. It specialises in configuring tablets to fit clients' requirements. For example, it recently developed the S7Kids tablet following a request from Dubai for a rugged tablet for young users. The company also supplies "everything you need" from cables to earphones and even cases in the box. Despite this, prices are competitive and the S7Kids sells for less than €100 including sales tax. All the tablets run Android.

We reported on **Ultmost** at CeBIT 2011



Supertab's S7Kids tablet was designed for a client in Dubai

when it showed a prototype projector based on Sony's SXRD LCOS technology. It is still trying to sell that design, but told us that sales had been slow. Ultmost uses the "Fuss" brand.

More promising areas for Ultmost include mini- and pico-projectors. These have Android built-in and Wi-Fi connectivity and use DLP imagers. There are 10 different versions available depending on specification requests and brightness can be from 50 to 200



Ultmost's UST projector has an integrated document camera

Ansi Lumens. Staff told us that a feature of its technology is "complete connectivity" with MicroUSB and SD cards as well as support for Miracast.

Another new product that was said to be getting interest was an ultra short throw (UST) interactive projector, using the company's own optical pen detection. The projector is said to be selling well in China where the high level of integration is appreciated. The projector has an integrated PC and also a document camera, making it easy to show objects and documents on the display.

Hall 9 Points to Germany's Strength

We would have liked more time to get around Hall 9, which is devoted to new technologies and R & D. If you are a real technology geek, almost every item could be of some interest. The demonstrations highlight the strength of R & D in Germany.

University of Saarland Strong on Visual Computing

We spoke first to three groups from the University of Saarland, which has strong display-related interests - we have written before about the Visual Computing Institute that is working with Intel on "Display as a Service".

The first group has been looking at developing low cost and low volume simple display fabrication processes. It is using EL inks (from Gwent in the UK) to create the display surface which is then touch-enabled, allowing the development of low cost custom displays. The patterns for the four display layers are created using standard vector-based PC software such as Adobe Illustrator, and then deposited using screen printing (although we noted that the group's literature also made reference to inkjet printing of the patterns). Patterns can be segmented, multi-segmented or even passive matrix layouts.

The substrate used can be paper or PET, but also unconventional materials such as leather, stone, wood or metal.

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Saarland Menu with printable EL allows the hexagonal touch display element at the bottom of this menu

The display electrodes can also be used for simple touch control to allow displays to be used as touch switches.

For the group, the key to this development is very low cost and easy to use technology so that very low numbers of very simple displays can easily be created, perhaps by "print shops". A barrier to many of these applications is the junction between the hard world of silicon and the flexible world and we heard that this is often the case in flexible and printed electronics. There is good work going on either side of the connection, said the group, but sometimes how to make the connection efficiently is not clear.

Gaze is Used to Scroll Text for Multiple Readers

The next group we spoke to is looking at using gaze control to control text display rates. We put on the eye-tracking glasses and tried the system. As well as looking at the simple tracking, the group has been working on how to allow multiple users to look at the same display and scroll different columns of text, or parts of the columns of text at the same time. The software divides text columns into functional blocks and as the eye moves towards the top or bottom of the block, scrolling of the text happens as though the block was a window onto the text.

The text scrolling speed is calculated by

watching the movements of the eye and computing an average so that the appropriate scrolling speed can be maintained. The ultimate concept of the research is to allow multiple users to access displays and each be presented with the right reading material at the right speed. At present, the system can support three independent readers.

Contact christian.lander@dfki.de for more information.

This editor's enthusiasm for gaze is well known - and controlling reading speed was one of the useful applications that is being developed. However, I found it very disconcerting that the text that I was focused on was moving when the display scrolled. The scrolling was not very smooth and I was trying to read German, which I am weak at, and these are both factors that could have made the task more difficult. I also wonder how soon it would be that we have sensor technology that is accurate enough to estimate the gaze from multiple viewers at long distances without calibration. Even though I was using a head-mounted gaze tracker, it took two calibration attempts before I could get the system to work. (BR)

Smartphones and Tablets are Bad for your Health

The third group from the University was looking at problems in posture and health caused by the over use of tablets and smartphones. Users of these devices tend to adopt a very bad posture with the head tipped very far forward. A study of 40 users

showed that just two of the forty had their heads held upright in a way that would not cause neck discomfort and potential damage. One solution to this is to encourage users to hold their devices higher up, but this, in turn leads to musculo-skeletal problems in the shoulders and back.

The researchers have developed a tool, based on 3D capture and biomechanical simulation, to help system designers to understand the effects on the user of prolonged use of these devices, and of touch screens in general. With this knowledge, system designers can monitor the user and "nudge" the user to change position and move to counter the potential of RSI injuries.

Fraunhofer Shows Player Recognition

The Fraunhofer HHI from Berlin has moved forward from the "virtual camera" technology that it was showing at IFA. The group is developing technology to allow windows within a very high resolution video image (8K Super Hi-vision or more) to be selected and which can track either viewer's (or director's) viewports or can also be programmed to follow individual players in sports (the example was being shown of a player being tracked during a soccer match).

The HHI has now further developed the technology to allow the identification of individual players within a window and was showing a viewport with named players at the show.

Contact ralf.schaefer@hhi.fraunhofer.de



The End of an Era (Final Chapter)



Philips Research will close its Briarcliff labs and move the operation to a technology hub in Massachusetts, the company

quietly announced last October. According to a letter to staff from Philips Research head Hans-Aloys Wischmann, the move to Cambridge, Mass. will be completed by Sept. 1, 2015. The lab is part of a worldwide network of research facilities operated by Dutch giant Royal Philips.

Philips spokesperson Lea Armstrong confirmed that employees will be offered relocation. "This is not a restructuring, and we hope to move with as many people as possible", she wrote. "The relocation will also leverage the proximity to Philips' business headquarters and offers co-location opportunities", she told us.

In recent years, the Briarcliff facility has focused on healthcare systems and lighting, and has also included the seat of Philips Intellectual Property & Standards. The labs, which held over 300 staff in the heyday of digital television research, currently hosts 125 employees. Philips plans to sell the campus, according to Armstrong. Sale of the property, located in affluent Briarcliff Manor, NY and overlooking the Hudson River, should bring in a sizable sum. William Mooney, director of the Westchester County Office of Economic Development, said the Philips departure is not a setback for the county, where economic development officials have long promoted technology and research. Philips' original U.S. laboratory opened in Irvington, NY around 1944, and moved to

Briarcliff Manor in 1965, after acquiring more than 100 acres of the estate property of American banker James Speyer.

For nearly a decade, the labs were the heart of advanced digital video development work for Philips products in North America, marketed under the Magnavox name. Briarcliff R & D was responsible for receiving three Emmy Awards, for contributions to the Grand Alliance (ATSC) Digital TV standards, UHP (Ultra High Performance) lamp technology for large-screen TVs, and ghost canceling in TV reception. Among other innovations, Briarcliff research also made possible the industry's first readily-available, large-scale, single-panel liquid crystal-on-silicon (LCoS)

serves to focus company research on its healthcare and lighting businesses.

The move punctuates another change, too. Philips Research, along with Bell Labs, CBS Labs, and the David Sarnoff Research Center – collectively, among the world's foremost brain trust in advanced video technology R & D, and all within 50 miles of New York City – have either closed facilities or transitioned away from video research. This is not to say that video technology, especially in new displays and compression systems, does not continue to progress; it's just distributed across entities far and wide. But the Hudson Valley/Princeton corridor of video technology is no more.



Part of the Philips/Sarnoff Advanced Television Research team, circa 1992

display (one of whose developers is long-time Display Daily analyst Matt Brennesholtz).

The move is part of a shift by Philips away from consumer electronics and towards other, more profitable, businesses, selling their CE product divisions and brand-name licenses to various entities, including TPV, Funai and Gibson. (Funai/P & F USA is responsible for the sourcing, distribution, marketing and sales of television products in North America; the current deal expires at the end of 2015, and Philips has begun discussions on renewing the deal.) With most video development long gone from Briarcliff, the transfer of personnel to Cambridge

One final note - this will be my last regular piece for Display Daily, as I embark on a number of new undertakings, including ATSC 3.0, interactive content systems, unmanned aerial systems, and an entrepreneurial venture. It's been a pleasure working alongside so many gifted writers and analysts here at Meko, and at Insight Media before that - a collaboration that started 10 years ago this month! I won't disappear from the scene entirely, however, so watch for my contributions again from time to time. All the best!

-Aldo Cugnini



Atheer Labs has Unique IP to help Augmented Reality Adoption



Atheer Labs (Mountain View, CA) is one of many companies focused on opportunities in the augmented reality space. Art

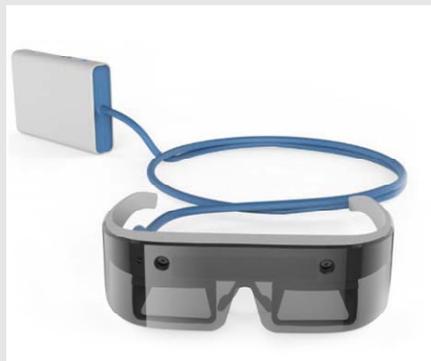
Berman provided a nice overview of the company back in February (Introducing the Atheer Augmented Reality Glasses), and this article provides an update based on a new interview with the company.

As Art mentioned in his article, Atheer Labs is basically a software company that is developing a hardware platform to showcase what it can do for the augmented reality space. The hardware is a dual-display/dual camera eyeglass device that features technology sourced from partners. The current Augmented interactive Reality (AiR) Smart Glasses device features dual OLED panels with XGA resolution to create a wide 38-40 degree field of view. A next generation device will feature LCOS panels with higher resolution, increased brightness and a larger field of view. Mass production plans have not been announced, but the company has a partnership with Flextronics and is expected to announce something shortly.

The key innovations at the company are centered around two items: a gesture interaction paradigm and - advanced visual ergonomics.

According to Soulayman Itani, the company CTO, the visual ergonomics feature is like a personal profile of your particular eyes and viewing comforts characteristics. He explained that every person's eyes are different in terms of separation, spectral response, luminance response, 3D viewing comfort ranges, etc. By measuring all of these and other factors upfront, a profile can be created for every user. "This allows us to customize every image we present to make sure it is always easy to look at and comfortable – something that users of other AR headsets have complained about".

They call this capability "comfortable visual ergonomics" and it is different than reducing motion artifacts and latency, although these must be eliminated as well.



The other key innovation is a gesture control solution that seeks to provide people with a natural way to interact with the displayed information. That has not really been possible before. Most existing gesture based solutions feature crude movement of hands and arms to perform some very basic interactive commands. "People's arms actually get tired doing this after awhile", commented Itani.

Finer gesture movements have been difficult as increasing the resolution of the capture led to heavy power consumption. To reduce power consumption, developers reduced resolution and/or backed off the frame rate. Atheer Labs has solved this trade off with a new solution that allows resolution fine enough for finger accuracy that mimics how you interact with a tablet, but drawing far less power. How much less? Itani didn't provide any hard numbers, but what he did say was that it will not seriously impact the run time of the AiR Smart Glasses.

These and other features are all rolled up in their AiR OS. This also includes the ability to lock items in the 3D space you are working in. For example, if you are wearing the AiR Smart Glasses and working to repair an

engine, you can call up a parts list and place it to the left of your work space while your task list is displayed on the right side. Want to see what the next task is – just turn your head to the right as if the list was on a table next to you.

Ketan Joshi, Atheer Labs' VP of Marketing, told us more about the applications for the AiR Smart Glasses. "We are seeing good pull from users in the industrial space, oil and gas, healthcare and recent, insurance applications. All of these areas have needs where hands-free access to information is critical".

He explained that industrial applications include repair and maintenance of high value equipment like turbines, engines and other gear in aircraft and heavy equipment. Oil and gas applications include a variety of field operations again in repair and maintenance.

Healthcare applications include access to patient data and records, especially while in the OR or ER. "We have heard that every time a surgeon has to scrub out of the OR, go check some patient data and scrub back in, it costs the hospital \$1500. Any device that can eliminate this expense can be justified pretty easily", noted Joshi.

Another emerging area is insurance where adjusters can do visual inspections of new properties or damage of existing property, documenting all with the built-in camera or connecting to the home office to discuss something while in the field. This video expert capability has value in all these applications.

Joshi sees these enterprise applications dominating early adoption of AR, but its use will start to grow into the prosumer market in a few years as well.

The company is offering its second generation developers kit now that includes improvements based on user feedback. You can sign up here.

-Chris Chinnock

Smartwatches - The Future of Wearables?



Wearables were mainly represented by smartwatches at MWC 2015. Most top OEMs have smartwatches in their portfolio or have first models announced with many new announcements coming out at the MWC 2015 in Barcelona.

The observer is seeing two main approaches to this market. There is the smart version of the digital watch as marketed by Casio since 1974 and then there is the typical wristwatch (round or rectangular) that shows the user a typical watch face on its high resolution display.

MWC 2015 provided plenty of opportunities for both types to show their respective face to the world. Differentiators include price, size, operating system, as well as functionality. Most smartwatches today are Android-based and operate in conjunction with the smartphone of the user. Some models do also offer their own cellular radio to allow for complete standalone functionality. This is, however, still the exception.

One particular product concept is the high end fitness band. Most fitness bands are pure sensing devices that have minimal displays or none at all. As the price point increases, more functionality is added leading to larger and higher resolution display use. Fitbit as a leader in the fitness band market demonstrates this very well.

So what makes a smart watch a

smartwatch?

When we follow the likes of Dick Tracy, the key is communication in the form of two way radio or even video calling. Other vendors are going the route of putting the highest number of functions into their devices in the hope that the consumer finds something that appeals to him. Then there are the specialized devices that focus on certain niche applications such as racing, climbing, diving, etc. While they may not attract a large market, they may be essential products in their market achieving high market penetration in their niche markets. We also see more established watch brands entering the market with what one could call hybrid watches. While maintaining their traditional style of a mechanical wristwatch they add very small display segments to provide additional information including messages and such.

Many devices are already capable of these tasks, however so far consumer interest has not been overwhelming. Several million units have been sold, but after strong sales following their respective releases, sales have been slow. This is not the sign of the kind of consumer enthusiasm that these companies are hoping for.

The question for the OEMs remains "What type and function will resonate with the consumer?"

While the consumer electronics companies follow the idea of incorporating high resolution displays that are as large as possible to replace the watch face and allow the



Martian Guess Connect

creation of a smart watch type user interface, the traditional watch companies extend their offering into more networking functions related to other mobile devices.

The recent Apple event announcing more details of the Apple Watch shows three main aspects Apple is pushing. There is communication, health and design. Arguably, communication and health have been addressed by other manufacturers since the beginning, though there is still a difference between the different devices mostly based on the user interface and input method. While Apple claims superiority based on the user interface, as the strong suite of the company's identity, the question remains if this will be enough to sway the way consumers look at smartwatches. A survey by NBC in the US, on the day after the Apple event, showed that about half of the responses were actually positive; this is higher than other surveys I have seen. Also about half of the responses claimed interest in the Apple Watch. Nevertheless this is a steep hill to climb, but Apple may be the best company in the world right now to lead the way.

The third aspect Apple is pushing in its watch is the design aspect. Some of the later watches seem to finally acknowledge that wristwatches are as much about fashion as they are about timekeeping. In addition, for now, Apple is also holding the record for the most expensive consumer smart watch with a price tag of \$10k for the 18 karat pure gold version, while the cheapest one starts at \$349 for the small sport edition.

Apple is also expanding the Apple Pay func-

Smartwatches: Fitbit Charge, Huawei TalkBand B2, LG Watch Urbane



tion to the Apple Watch, making it basically a credit card on the wrist. So far Apple Pay is still considered a safe payment method, however one should not underestimate the resourcefulness of the hacker community. In most cases the question is not if a system is being hacked, but when.

While I personally do not wear a watch every day, neither approach would make me change my position. While the traditional

watch approach does not offer much in terms of functionality, the big screen approach seems extremely nerdy. Remember those Casio watches with calculators that required a microscope to see the keyboard and extremely good hand eye coordination to hit the right keys?

The industry hopes for Apple to change all this, but I am not as optimistic for the upcoming release as many others. I see

strong initial sales, but in the long run the question is how people keep using the device after the initial excitement is gone. Fitness bands show a strong drop off after a few months, a fate that smartwatches may share as well, unless you invested \$10k for the gold version.

-Norbert Hildebrand

One Connector to Rule Them All...



Last week, Apple, along with its new Watch products, announced its latest MacBook notebook. One of the stand out features was that the small size and weight, enabled, in part, by the decision to have just two connectors on the body - a 3.5mm jack for audio and a USB Type-C connector for everything else.

The latest Chromebook Pixel also features two of these connectors. Just two is a stark contrast to the notebook that I'm using to write this - a Lenovo ThinkPad that has nine connectors (power, three USB, VGA, miniDisplayPort, SD card, VGA, 3.5mm jack).

said (here - subscription required) it "could become the next de facto connection standard for IT and consumer devices". As well as USB 3.0 and display signals, the Type C can carry power, allowing it to be used for charging.

Physically, the connector is small (although we have heard that some mobile device makers would like it even thinner) and is reversible - it can be inserted either way up without problems. That's a great move - the power connector on my notebook does the same and it can save a lot of fiddling.

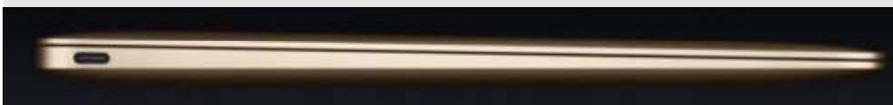
At the moment, Type C connectors and controllers cost more than standard USB connectors, we hear around \$5, but eventually the sheer scale of adoption should drive

although it moved the design into VESA for standardisation, in 2008. It developed the very neat magnetic charging connector which it has dropped for Type-C and not every user will think that it's an improvement.

The weight of just 2lbs for the new notebook is compelling. but road warriors will add to that. If you like operating the computer with a mouse, and you want to use it when the notebook is charging, then you will need an adaptor ((\$79 from Apple for a converter from USB C to HDMI/Type-C and Type A USB), but there will be cheaper ones). You'll need adaptors to connect to VGA, HDMI or DisplayPort - and I meet all of those visiting different companies. If you want more than one USB device, you'll need a USB hub. If you want to connect to wired ethernet, you'll need an adaptor.

Now, I'm a great fan of wireless technologies, but I often find myself in press situations where hundreds of journalists are trying to log onto a limited wireless system and getting nowhere. In this circumstance, the joy of finding a wired ethernet connection is intense - I speak with feeling about this as I had this experience twice at Mobile World Congress in Barcelona - once at the Samsung Unpacked press event and once in the press room where I needed to upload a big video file.

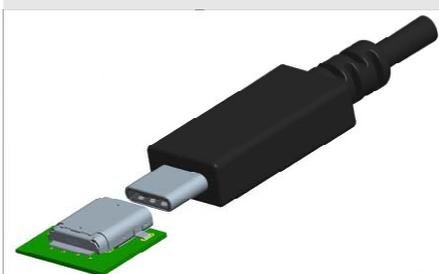
So, if I had the very desirable new



The USB Type C with an optional DisplayPort "Alt mode" was announced just five months ago and at the time, our own Chris Chinnock

that down - after all, there have been few connectors that have been endorsed by all three of the operating system giants - Apple, Google and Microsoft.

The design of the MacBook is very slick and elegant with its single tiny connector. It is also quite a turn-around for Apple to adopt an industry standard connector. It has been pushing the Thunderbolt and Lightning interfaces for some time and has a history of working out its own solutions. Apple was the developer of the mini-DisplayPort interface



Opinion & Editorial

MacBook, I suspect I'd end up with some kind of "mobile docking station" to connect everything, or a bag of dongles and adaptors, which offsets some of the advantage of the slim size and low weight.

Too Many Permutations?

Apple's multiport adaptor costs \$79



As Chris said in his original article, there will be lots of Type-C options and that could be the cause of confusion for users, especially consumers. The connector is very small, so it's hard to label to give clues to what is supported. Now, mobile phones are likely to migrate to the type C sooner rather than later. Will all consumers realise that the charger that they use for their phones might charge their notebook in theory, but in practice will not do so in any reasonable time scale?

How will a user know if a Type-C has the DisplayPort Alt Mode? I can see a fair amount of irritation and, potentially calls to technical support over this kind of issue.

Type-C is also symmetric for power supply - it can flow either way, so it's important to make sure all the handshaking works between systems (and the symmetry of power delivery does mean that it might be possible to make intelligent choices about how and where to share available power between devices).

Happy Birthday (nearly) USB

Still, the dominance of USB is incredible. We wrote about the first announcement of USB at a Winhec event in Display Monitor Vol 2 No 12 at the end of March 1995 - so twenty years ago in a couple of week's time. It's amazing to think that this interface supported just 12 Mbits/second (compared to 10GBps for Superspeed USB 3.1 now) and that one of its first target applications was telephony on the PC/network. For some time, it looked as though mice and keyboards might be the main users of the interface.

USB was a huge step forward partly because it arrived at the same time as Windows 95 and supported "Plug & Play" (although another real advantage was that the asymmetric architecture meant that low cost peripherals were possible, whereas peer-to-peer interfaces like 1394 needed quite a lot of silicon in the connected device). By now, USB has displaced serial ports, parallel ports, IEEE interfaces, external SCSI, Firewire (P1394), e-Sata, Thunderbird and now looks to usurp native Ethernet connectors. I spoke to someone last week that has USB charging ports on all his kitchen power points.

Of course, the dream remains to go wireless, and the next variant of Wi-Fi - 802.11ad could replace many of the features of Type-C. Qualcomm, at the recent MWC event was showing 802.11ad wireless docking stations). However, it's still more efficient (if less convenient) to deliver power with wires and it will be a while before 802.11ad, with its support for displays and storage devices, is pervasive enough to leave cables at home.

Display interfaces have also been through a long evolution from VGA, through "Plug & Display", VEVC, DFP, DVI and various versions of DisplayPort, as well as HDMI. MHL, based on HDMI, is still a competitor to DisplayPort in the mobile space and we will be watching out for support of the MHL alternate mode to see if it can fight back. For the moment, though, USB-C with DisplayPort has some real momentum.

- Bob Raikes

In Brief - Channels, Green

Channels in Europe

John Lewis EHT Sales up 8% in 2014

UK-based John Lewis' electricals and home technology (EHT) business grew 7.9% year on year in 2014, despite what the firm described as a "challenging" market. The company said sales of large electricals and audio products rose throughout the year, and every channel and category grew.

Green News

TCO Reviews TCO Certified Criteria

A new generation of TCO Certified will be introduced this year, with a focus on environmental, social and economic sustainability throughout the product life cycle. TCO Development reviews the criteria of TCO Certified every three years, to remain in-line with

new technologies. The 2015 review began with the publication of draft criteria for displays, on the 19th March. Many of the criteria in the document will be shared with other product groups, scheduled for release later in the year.



Semiconductor News

Synaptics Combines Touch and Display Driver

Synaptics has developed the Clearpad 4191 and Clearpad 4291: the world's first touch and display driver integration (TDDI) solutions for smartphones and tablets, according to the company. These new solutions combine the touch controller and display driver into a single chip, simplifying design.

The Clearpad 4291, which is available now, supports hybrid in-cell touch designs. It enables the elimination of a separate touch sensor by leveraging existing layers in the LCD display. The 4191, being supplied as samples to tier one OEMs now, goes further; it leverages existing electrodes in the LCD display to register touches.

Last week, we reported that Tianma was claiming to be the only supplier of in-cell touch with a single driver chip. It was not clear that the firm was using this Synaptics chip, however. (BR)

Smartphone News

Nanoscale's Coating Waterproofs Electronics

UK-based Nanoscale has developed a product called Flash Flood, which - it claims - will make electronics water-resistant. The coating is supplied in the form of a liquid; after three coats (including in the ports), plus drying time, electronics will be protected against accidental splashes. CNN found that a phone can even be submerged for a short time (<http://tinyurl.com/n8lb4d6>). The product is a nanotechnology coating that is UV- and fingerprint-resistant, and does not interfere with charging or touch operation.



HTC Expects Double-Digit Smartphone Rise

Taiwan's HTC expects its domestic smartphone shipments to rise more than 50% YoY in Q1. A double-digit rise, possibly higher than 50% is also predicted in Q2 thanks to the launch of the new HTC One M9.

Samsung Commits to Premium Materials

Joint Samsung CEO Shin Jong-Kyun has said that the company will launch more mobile devices using premium materials in the future. Shin specifically mentioned high-resolution displays, metal bodies and slim designs. The news follows the launch of the Galaxy S6 at MWC (Samsung Unpacks Two New Phones).

Microsoft Takes Over Android Phones

Microsoft is testing Windows 10 with select users of Xiaomi's Mi4 smartphone - which normally runs Android. According to Techcrunch's sources, Windows is provided as a flashable ROM that effectively overrides Android, turning the phone into a Windows handset. According to a statement, Microsoft is also planning to launch this service for more mobile devices - reinforcing the platform-agnostic approach that it has been taking in recent years.

Software News

Windows 10 Arriving This Summer

Microsoft has confirmed that Windows 10 will be released this summer. The update will be free for users of Windows 7, Windows 8 and Windows 8.1 for the first year - and yes, that includes non-genuine copies. The move is thought to be an attempt to



address the huge number of pirated copies of Windows in China, where it is estimated that 75% of PCs in the country use a hacked version of the OS.

Supply Chain News

AUO Focuses on Five Areas for Panel Promotions

AUO is focusing on five key areas to promote panel sales this year, said president Paul Peng. They are UltraHD resolution; curved display technology; integrated touch; image improvement technologies such as wide colour gamut; and added-value functions for industrial, enterprise, car-use and wearable applications. AUO will produce more panel sizes to support UltraHD resolution, and due to this its average TV panel size will rise from 43" to 44" this year. In a separate report from Liberty Times Net, AUO is said to be developing 75" and 85" LCD panels with quantum dot technology.

30% Yield Rate Rumoured for Apple Watch

G is For Games claims that Quanta, which manufactures the Apple Watch, has a yield rate of just 30%. It is unclear at this time what is causing the problems. Quanta has taken on 3,000 Foxconn workers to help solve the issues, according to the source.

Sapphire Capacity Expands in China

Biel Crystal Manufactory and Lens Technology, Chinese sapphire makers, have expanded their production capacities, according to industry sources. The companies made the move due to the growing adoption of sapphire in wearable and smartphone applications. Biel Crystal and China's Roshow Technology have apparently invested an additional CNY200 million (\$32 million) in their JV (Biel Roshow Sapphire), which was established a year ago. Meanwhile, Lens Technology has established a subsidiary maker specifically for producing sapphire.

In Brief - Supply, Technology

Xiaomi to Open Plant in India with Foxconn and Inventec

Xiaomi is reported to be in talks with Foxconn Electronics and Inventec about setting up a joint venture smartphone plant in India. The Indian government is currently promoting the production of industrial products in India.

ET News Details Flexible OLED Plans

ET News has summarised information about the flexible OLED plans for LG Display and Samsung Display. LGD currently has a monthly capacity of 14,000 substrates (LGD Succeeds in Doubling Flexible Capacity), and is now said to be building a G6 line with an initial capacity of 7,500 substrates, scaling to 15,000. Construction will apparently begin in Q3. For its part, SDC currently produces 8,000 flexible OLED substrates per month in a G5.5 line, and is finishing a new G6.5 line. ET News says that capacity will be 15,000 substrates per month.

Nanosys Doubles QD Capacity on UltraHD Demand

Nanosys has doubled its quantum dot production capacity, to 25 tons per year. The new capacity enables Nanosys to provide optical components to more than 6 million 60" UltraHD TVs a year and the company now claims to be the biggest provider of QDs in the world.

Technology News

Microspherical Lenses Bypass 3D Angle Issues

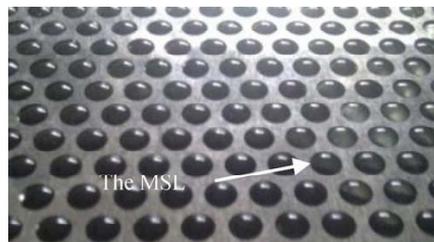
Glasses-free 3D is seen as the 'holy grail' of 3D display. The technology has several drawbacks, such as viewing 'sweet spots', but a team of researchers at Chengdu Technological University and Sichuan University are working on making auto-stereo 3D viable.

The work revolves around the use of microsphere-lens (MSL) arrays on the display, rather than flat microlenses. Parallax barrier technology, which most auto-stereo 3D is based on, has a viewing angle of between 20° and 30°. These lenses, however, have boosted the viewing angle to 32°, with a theoretical maximum of 90°.

Ball placement technology means that MSL arrays can be manufactured easily, so displays could be made at a low cost. MSL technology also lowers crosstalk, said the researchers, although focusing light in this way does lower brightness. The researchers plan to address this in the future, as well as improving the resolution and optical efficiency. They are also attempting to slim the display down, as the MSL array adds to its thickness.

The work was published in IEEE's Journal of Display Technology: <http://tinyurl.com/oofz9uu>.

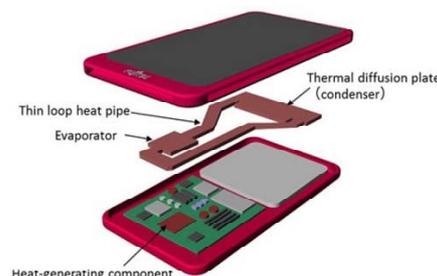
LSD microstructures on the EUT spread light to reduce hot spots and dark spots



Fujitsu Aims to Liquid-Cool Mobile Devices

Fujitsu uses liquid cooling in its SPARC servers, and is preparing a similar system for mobile devices. Liquid Loop Cooling is a closed system using pumps to move coolant around a motherboard, although pumps would not be viable in the smaller form factors of smartphones, tablets and laptops. Instead, Fujitsu has developed a loop heat pipe that is less than 1mm thick.

According to the company, A loop heat pipe is a heat-transfer device that consists of an evaporator that absorbs heat from the heat source and a condenser that dissipates that heat away, with the two components connected by pipes into a loop. A working fluid



is encapsulated inside this closed loop as a coolant. The heat from the heat source evaporates the coolant, and the energy that goes into evaporating the coolant is taken away from the heat source, lowering its temperature. It is based off of the same principle used when sprinkling water on pavement to reduce heat'.

Patterning in the system is performed by etching metal sheets - so the pipe layout and heat transferred can be customised on a per-device basis. Fujitsu aims to have a working system with manufacturers in 2017.

QMC Breaks Stokes-Shift Barrier for Brighter Displays

The 'Stokes-shift' is the difference between a quantum dot's (QD) peak excitation and peak emission wavelengths. Minimising the overlap between these bands enhances the clarity and brightness of a fluorescing QD, by avoiding re-absorption of emitted light into nearby QDs.

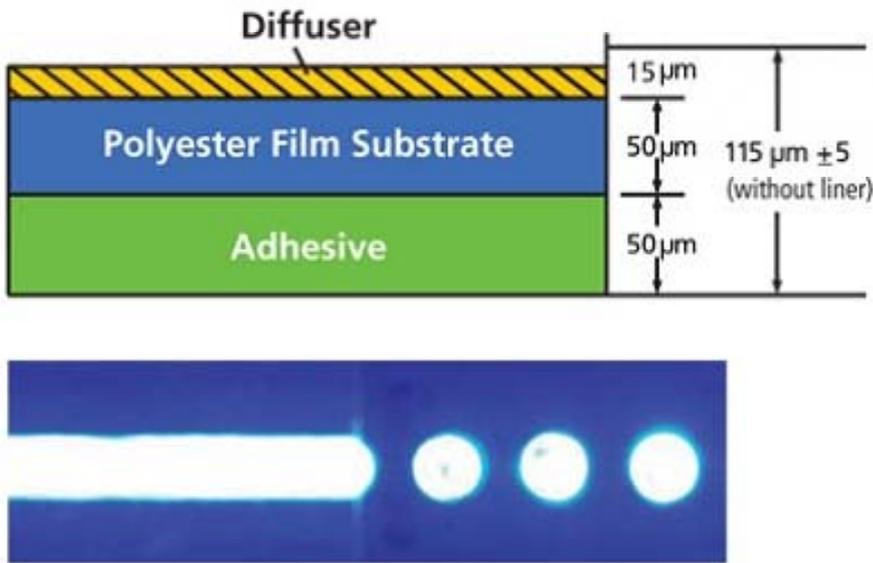
Until now, says Quantum Materials Corp, it has not been possible to produce a Stokes-shift in QDs up to 20nm - at least, not in sufficient quantities for manufacturing applications. However, the company claims to have broken the Stokes-shift barrier and is able to produce 'strong-shift' QDs with consistent characteristics in high volumes.



QMC says that its continuous-flow production process enables automated synthesis with the uniformity necessary for achieving precise characteristics for high-volume production of highly-driven strong-shift QDs.

Luminit's Uniformity Tape Spreads Light to Reduce Hot Spots

Wide-spaced LED lighting can suffer from several issues, including hot spots and non-uniform characteristics, said Luminit. These artifacts can become visible on the edge of LED-backlit TVs.



Adding more LED lights is an option, although this makes the display or lighting fixture more expensive. California-based Luminix, which specialises in lighting diffusers, has developed a lower-cost solution called Edge-lit Uniformity Tape (EUT).

EUT can be applied to a light guide plate during the assembly process. It uses Luminix's Light Shaping Diffuser (LSD) technology, which diffuses LED light sources. The EUT uses LSD microstructures, embedded on a polyester film; these microstructures increase the LEDs' divergence, so the light mixes before it enters the display.

Luminix says that the transmissivity of its EUT is greater than 88%, while lighting panel uniformity is more than 80%.



TV in Brief USA

Apple Preparing TV Service (Again...)

There have been many rumours about an Apple TV service, stretching back four years or more. Now the all-knowing 'people familiar with the matter' have told the Wall Street Journal that the company plans to launch such a service in the autumn. There will be 25 channels and it will be able to be streamed by Apple devices. Apple is apparently talking to content owners ahead of a June announcement.

Warranty

Apple to Expand iPhone Trade-Ins...to Android?

9 to 5 Mac claims that Apple will expand its iPhone trade-in programme to include Android phones, in an effort to entice new users. Apple staff will put a value on the device and help customers to swap their contacts to a new phone. No hint at a timeline is provided, however.

Wearable News

NFC Makes Swatch Watches Smarter

Swatch claims to have worked around the limitations of smartwatches - small screens, low battery life and 'inelegant' designs - through the integration of some smart functions into its existing products, using NFC. The technology will enable the timepieces to be used for tasks such as cashless payments and hotel room access. There are still no plans to produce a Swatch smartwatch, though. CEO Nick Hayek said, "We are not a consumer technology company... We don't want to produce a reduced, minimised mobile phone on your wrist".



Hayek praised the Apple Watch, saying that there is room for both Apple and Swatch in the market

Swiss Manufacturer Enters 'Smartwatch' Market

Swiss watch maker Breitling has taken the step to produce a 'smartwatch' (of sorts) called the B55 Connected. It is an analogue chronograph with a digital display, able to connect to a mobile phone through a dedicated app. It is targeted at pilots, with features such as the ability to easily time flights and backing up data for logging and sharing through the app. Pricing and availability have not been shared yet.

This looks like a more reasonable compromise between classic timekeeping and modern electronics than the Apple Watch. I've recently been boring friends and family with my views on the high-end (\$10,000) model of the device: while the Swiss watches at

In Brief - Wearable

these price levels will last for decades, the Apple Watch is going to need replacing in two years, at the most. If there was a way to retain the expensive gold body of the Watch while switching out the electronics, I might be more convinced, but Tim Cook didn't mention anything of the sort at his presentation. Of course, this is ignoring 'the Apple factor!' (TA)



Neptune Expands 'Duo' Concept to Multiple Devices

We covered the Neptune Duo handheld display/smartwatch concept last month (Neptune Reverses Watch/Phone Paradigm), and the project has now reached Indiegogo - with a few changes. The Neptune Suite adds another peripheral: a 10" tablet-like device with a keyboard, as well as a dongle to stream to a TV. The Neptune Hub (watch) will last for two days on a charge, and the 'phone' and 'tablet' peripherals have their own batteries that can transfer energy to the watch. Wireless streaming is via WiGig, with speeds up to 7Gbps. The Neptune Hub runs Android 5.0, with 3G/4G and a quad-core processor.

The price on Indiegogo is \$600, and it will cost \$900 at retail. Availability will be late 2015 or early 2016.

WCO Eliminates Tariffs on Galaxy Gear

The World Customs Organisation in Belgium has decided that Samsung's Galaxy Gear smartwatch is a 'mobile telecommunications' device, rather than a smartwatch. The decision means that the product can be exported and imported between most countries without tariffs - which would be up to 10% in some countries, if the device were classified as a watch. Tariff eliminations could begin as early as June, saving up to \$13 million, according to Korea's Ministry of Strategy and Finance. Like the long-running monitor vs TV saga, this decision is based on the ITA agreement that ensures that IT products have 0% duty (BR)

Tag Heuer Becomes First Swiss Smartwatch Maker

Tag Heuer, the Swiss watch manufacturer, has announced a partnership with Intel and Google to launch a smartwatch based on Android Wear. The watch will be launched this year. Jean-Claude Biver, president of Tag Heuer owner LVMH's watch division, said that they could have worked with Google or Apple, but asked "[W]hy should we do a part-

The Neptune Suite consists of phone- and tablet-size peripherals; a keyboard with touchpad; headset; TV dongle; and the smartwatch 'brains'

nership with Apple, who is producing watches?" He added that the watch will have a traditional look, saying, "Our watch will never look like a phone".

Oculus Confirms Dual-Display Use

During a panel at the recent SXSW festival, Oculus VR's Nate Mitchell announced that the latest prototype of the Oculus Rift headset (Crescent Bay) uses two OLED displays - not just one. It was revealed at CES this year that Crescent Bay used an OLED display (widely thought to be the same 2560 x 1440 unit used in the Galaxy Note 4). Per-eye resolution is much higher than in the Dev Kit 2 (which split 1920 x 1080 resolution between both eyes) because of this.



Impression Pi Boasts Control Through Computer Vision



uSens has launched a Kickstarter campaign for an interactive, mobile VR headset called Impression Pi (appropriately launched on Pi Day). The company says that development on hardware is nearly completed.

The Kickstarter campaign is intended to help uSens with final production and to introduce early adopters to the product. The cam-

paign also offers early access to the software development kit (SDK) and the company's Pi Development Program.

According to the information currently available, the Impression Pi is a headset that uses a smartphone as the display ('Like a more fashionable [Google] Cardboard', says uSens). Compatible phones include the Moto X (2014); Nexus 5 and 6; Galaxy Note 4; iPhone 6 and 6 Plus; HTC Desire Eye and One M8; Xperia Z3; Xiaomi M4; LG's G3' and the OnePlus One.

There are four versions of the product:

- Starter: just the headset
- Empower: also supplied with a processor board to improve the VR experience. Also enables extra features, such as 3D gesture control.
- Core: a 'DIY' set for integration with other devices, such as drones. Includes a camera sensing module and computer vision algorithms to enable the extra features from the Empower model.
- Master: an all-in-one integrated headset with a built-in display and processing system.

The feature list is extensive. The Impres-

sion Pi's processor board uses an IR projector and imagers to sense hand movements. Computer vision algorithms process the image of a user's hands generate 3D gesture modelling. Position tracking is another feature, although the company did not say how it is enabled.

The dual camera module captures and displays real-world objects to the user on-screen, overlaying VR image on top - creating a form of augmented reality. The headset also features collision detection, to warn users if they are too close to an object in the real world.

Finally, the Impression Pi is capable of head tracking.

The team behind the Kickstarter project has manufacturing partners that made made 'numerous products that are already in your pockets'.

So far, Starter packs are being sent to those pledging \$60 (early discount) - \$80; the Core package is being sent to those pledging \$200; Empower to those pledging \$250 (early discount) - \$280; and the Master pack to those pledging \$360. Estimated delivery is September - December this year.

Toshiba Produces Tiny Convertible PC



The Satellite Click Mini L9W-B-102 is a new convertible tablet from Toshiba, offering up to 13 hours of battery life in notebook mode. The device is a very small "Windows 8.1 With Bing" model - just 8.9" - with minimal (32GB) local storage, although there is an SD slot for up to 128GB of extra space. The majority of data - up to 1TB - is kept in the cloud.

Despite its small form factor, the Click Mini has high resolution: 1920 x 1200, as well as an IPS panel with 170° viewing angles. It weighs 479g in tablet mode and 989g with the docked keyboard. The tablet's battery

will last for up to seven hours.

Windows 8.1 runs on a 1.33GHz Intel Atom processor, with 2GB of RAM. The tablet features a micro-USB port and micro-HDMI output; the keyboard adds a full-size USB 2.0 port.

Toshiba's new convertible is part of its commitment to gaining a 12% market share in the German and Austrian 2-in-1 space this year. It will be launched in the region in April, for €335 ex VAT.

Sharp's POS System Uses Dual Flush Displays



Sharp Europe has developed a new point-of-sale terminal, with a 15" colour LCD display. The RZ-X850F is intended to be a simple and reliable system with a modern design, according to Sharp.

The display is set flush to the unit's bezels. It is IP66-compliant, with 300 cd/m² of brightness. An additional customer-facing display can be added; either a two-line unit or a 10"

colour LCD screen. Sharp did not share any more details about the displays.

A quad-core Intel Celeron Bay Trail processor runs Microsoft POS Ready 7 OS, with between 2GB and 8GB of RAM and a 128GB SSD. USB 3.0 (x4) and 2.0 (x2) ports are featured, as well as an RJ45 connection.

The terminal is available now; price is on application.

Asus' UltraHD Notebook Runs for Six Hours



Asus' new ultrabook, the Zenbook Pro UX501, features a 15.6" UltraHD display and high-end specifications.

Aimed at demanding users - primarily gamers - the UX501 features a slim (20.6mm) aluminium chassis and will last for 'more than' six hours on battery (a 96Wh lithium-ion unit).

Pixel density on the display, which uses an IPS panel, is 282 ppi. The screen has 178° viewing angles and colour gamuts of 72% NTSC, 74% Adobe RGB and 100% sRGB. Colour temperature is factory calibrated. Additionally, the notebook is supplied with three display modes: Vivid (for films), Eye Care (for reduced blue light) and Normal (for daily use).

A manual mode is also included, where users can adjust settings as desired.

Internally, the UX501 runs Windows 8.1 on a quad-core Core i7 processor, with 16GB of RAM. Nvidia's GTX 960M graphics card is featured, with up to 4GB of VRAM. An SSD using a PCIe x4 interface provides up to 512GB of storage, with read/write speeds of up to 1,400MB per second.

In terms of connectivity, Asus has built dual-band 802.11ac WiFi into the Zenbook. The unit also features an optional Thunderbolt port and USB 3.0 (x3) inputs.

Asus had not responded to our request for launch information before we went to print.

Product Roundup



Avnet Embedded is now stocking a 2.2" transfective TFT-LCD module from Logic Technologies in EMEA. Under high ambient light, the (LED) backlight is not required. The LTTD240320022-L3-TF will be available for at least three years. It has a 120:1 contrast ratio, RGB and SPI interfaces and will operate in temperatures between -20° and 70°. Resolution is 320 x 240, with a 35ms response time, 90 cd/m² of brightness and 30% NTSC coverage. Customers can choose to take the display with optically-bonded procap cover glass.

Hisense's G610M smartphone was introduced at MWC, but we missed it on the show floor. Due to be launched in the summer, it is a 5" unit with an IPS panel (1280 x 720) protected by Gorilla Glass. A 1.2GHz quad-core processor runs Android 4.4. The phone has 4G connectivity and a 3,000mAh battery. There is 2GB of RAM and 16GB of storage.

A worldwide rollout has now begun for the 'AKA' smartphones from **LG** (Tamagotchis Arrive in the 21st Century, Thanks to LG). Introduced in Korea at the end of last year, each phone has a 'personality', with animated eyes and reactions.

Pricing has been announced for the **Kairos** smartwatch (Kairos Makes Mechanical

Watches Smart). The wristwear uses a transparent OLED screen on top of a mechanical watch, and will connect to Android, iOS and Windows Phone devices. It will start at \$550, with a limited edition version being sold for \$1,250.

The **Microsoft** Band, the company's fit-



ness tracking wearable with a 1.4" (320 x 106) LCD display, will be available in the UK on 15th April. It will cost £140 (\$205).

Two 15" TFT-LCD display modules from **Avnet** are now being stocked by **MSC Technologies**. Both units (AA150PD03 and AA150PD13) have 1400 x 1050 resolution and are designed for industrial use, as well as applications in trains and on-board ships. They can operate in -30° to 80° temperatures, with IPS panels providing a 1,000:1 contrast ratio and 170° viewing angles. They use a 6- or 8-bit LVDS interface. The difference between the units is in brightness, which is 500 cd/m² (AA150PD03) and 1,000 cd/m² (AA150PD13). Both are available now; price is on application.

Samsung's Galaxy S6 and S6 Edge smartphones are now available to pre-order in the UK. They will go on sale on 10th April.

A new version of **Toshiba's** Portege Z20T notebook (Toshiba's Easyguard Protects its Professional Hybrid) has been introduced. The Z20T-B-103 is a 12.5" convertible laptop with a new Intel Core M-5Y51 processor and 1920 x 1080 resolution. It has HDMI, RGB and USB 3.0 (x2) ports and will last for up to 17 hours on battery in notebook mode, or nine hours in tablet mode. Toshiba will begin to sell the unit in April, for €1,665.

Vaio, the brand formerly a part of Sony and sold off last year (Display Monitor Vol 21 No 6), has released its first smartphone in Japan. The VA-10J has a 5" display with 1280 x 720 resolution and runs Android 5.0 on a quad-core 1.2GHz processor, as well as featuring 2GB of RAM. The phone costs ¥48,600 (\$400). Specifications are identical to Panasonic's Eluga U2, so it is very possible that this is an OEM device.

All prices are ex VAT.



REAR PANEL

Taking VR to the next level, **Samsung** - using its Gear VR - has taken part in the world's first live-streamed child birth in virtual reality. An Australian couple - Jason and Alison Larke - were separated when their son was born, with Jason at work 2,500 miles away from Alison. Samsung set up a 360° camera in the delivery room. Using a Gear VR headset, linked to the camera, Jason could look around the room in real time. You can watch the video yourself (<http://tinyurl.com/mm52k3c>), although remember that it contains footage of a live birth (around the 4 minute mark).



SmartKem's tru-FLEX semiconductor platform has won the Innovative Product of the Year award at the 2015 ESTnet Awards. Presented in Cardiff in early March, the ESTnet awards celebrate the achievements of electronics and software companies - specifically those in Wales.

The **PCR** Awards recognise the top brands and companies in the UK technology channel. 20 awards were handed out in three categories - Frontline, Distribution and Vendor - as well as the special Grand Prix award. Frontline awards went to **Overclockers**,



Utopia Computers, John Lewis, Stone and **Ebuyer. Entatech** dominated the Distribution section, taking three prizes; other winners were **Tech Data, VIP Computers, Exertis** (two awards) and **Westcoast**. Microsoft took two Vendor awards, with the rest going to **Intel, AOC, Lenovo** and **TP-Link**. Intel was the Grand Prix winner.

Microvision has said that it has received orders totalling \$14.5 million for its Fortune Global 100 customer - revealed, last week, to be Sony (Sony Agrees Licensing With Microvision). The company plans to ship these components in the second half of the year. Fulfillment is expected to continue into 2016.

Korea's **UBI Research** is to hold the first OLED Korea Conference - an international event highlighting the present and future outlook of OLED technology - on 2nd April. The event will take place at The Korea Science and Technology Centre in Yeoksam-Dong, Gangnam-Gu. Flexible OLEDs, OLED TVs, OLED production and improving LCD displays will be discussed. Register for the event at www.ubiresearch.co.kr.

Paul Butler, sales director at **AOC/MMD** UK and Ireland, has been recognised as one of the region's top technology executives by PCR. Butler has worked in the IT channel for more than 20 years (and, of course, worked for Display Monitor's publisher, Meko Ltd. - Congratulations, Paul!).



And Finally...In a perfect example of 21st century Darwinism, an armed man who robbed a Tesco store in the UK was arrested shortly after the act - because he posted about it on Facebook.

7 people like this.



Andrew Hennells Doing. Tesco. Over
13 February at 19:25

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