The Real Deal?

Are augmented and virtual reality finally set to become the next big computing platforms?

Front and Centre

After decades dominated by visual data, sound is making a return to centre stage.
HELPING DRIVE YOUR INNOVATION

FREE SHIPPING ON ORDERS OVER £33 OR $50 USD*

0800 587 0991
DIGIKEY.CO.UK

8.2 MILLION+ PRODUCTS ONLINE | 800+ INDUSTRY-LEADING SUPPLIERS | 100% FRANCHISED DISTRIBUTOR

*A handling charge of £12.00 will be billed on all orders of less than £33.00. A handling charge of $18.00 USD will be billed on all orders of less than $50.00 USD. All orders are shipped via UPS, Federal Express, or DHL for delivery within 1-5 days dependent on final destination. No handling fees. All prices are in British pound sterling at United States dollar. Digi-Key is a franchise distributor for all supplier partners. New products added daily. Digi-Key and Digi-Key Electronics are registered trademarks of Digi-Key Electronics in the U.S. and other countries. © 2013 Digi-Key Electronics, 7771 Bishop Ave, Thief River Falls, MN 56701, USA.
COMMENT
With the roll-out of the Industrial Internet of Things set to accelerate, why are so many current projects failing?

NEWS
‘First’ AI processor that can execute multiple neural networks and entire workflows on a single system
NI launches 4GHz vehicle radar test system for the latest automotive radar sensors
SamacSys completes new integration with Cadence’s Allegro and OrCAD PCB design tool suites
How can we solve the challenges in the electronics industry and what are the opportunities?

COVER STORY
Front and Centre
After decades in which video data has dominated the market, are we finally seeing audio making a return to centre stage? By Neil Tyler

ADVANCED PLATFORMS
A ‘golden age’ of architecture
Tuned silicon attempts to make a comeback with small SoCs. Chris Edwards looks at what is being described as a ‘golden age’ of architecture

COMMUNICATIONS HARDWARE
Radio architectures for 5G
Preparing for 5G means a move from analogue to digital in radio architecture and a renewed interest in process technologies. By Alex Brinkley

RF & MICROWAVE
Indoor positioning technology
Indoor positioning technology may have reached an inflection point, with widespread adoption now a possibility. By Nick Wood and Chris Barnatt

MECHATRONICS
Robotics for all
New platforms are helping to transform the sector, according to Michael Seren

DESIGN PLUS
Technology renewal
The concept of the circular economy looks to put refurbishment and recycling at the heart of manufacturing. Neil Tyler investigates

SYSTEMS DESIGN
How secure is secure enough?
In the emerging connected world when is security considered “necessary”, “adequate”, or “sufficient”? By Cliff Ortmeyer

DISTRIBUTION
Distributors eye renewables
As a driver for innovative systems and components, what role can distributors have when it comes to renewable energy?

MISSION STATEMENT
‘New Electronics keeps designers and managers abreast of the latest developments in the world’s fastest moving industry’
INNOVATIVE NEW SOLUTIONS
Solve PCB design, production & test challenges

NETWORK WITH PCB EXPERTS
Discover new, better suppliers. See and evaluate all the latest new PCB products and innovations

ATTEND TECHNICAL SEMINARS
Learn about the latest new products, innovations and practices from the global experts in PCB design & manufacture

WHY VISIT?

INNOVATIVE NEW SOLUTIONS
Solve PCB design, production & test challenges

NETWORK WITH PCB EXPERTS
Discover new, better suppliers. See and evaluate all the latest new PCB products and innovations

ATTEND TECHNICAL SEMINARS
Learn about the latest new products, innovations and practices from the global experts in PCB design & manufacture


12TH MARCH 2020
BRITISH MOTOR MUSEUM, GAYDON

PCB DESIGN & MANUFACTURING LIVE

www.pcbdmlive.co.uk

FREE MUSEUM PASS WORTH £14.50 IF YOU PRE-REGISTER

Brought to you by the publishers of newelectronics Eureka! Engineering Materials The Engineer Fast Machinery

PART OF ENGINEERING SOLUTIONS LIVE
The Industrial Internet of Things (IIoT) business is expected to see annual IIoT node shipments top 224 million units in 2023, up over 100 million on 2018. These are figures from IHS Markit | Technology, who have also come up with the startling fact that about half of all current IIoT deployments actually fail. Why? The reasons are myriad, from deployments being hit by planning breakdowns to failing to gather the necessary support and cooperation from critical personnel within organisations.

With Ethernet set to displace Fieldbus as the primary network medium for the first time next year, the transmission of much larger volumes of data and faster connectivity will now be possible, allowing manufacturers to better exploit cloud-based solutions and to look at speeding up product design, as well as enhance inventory management.

While faster connectivity holds great promise in reality, however, many current deployments are actually failing as often as they succeed. According to IHS Market those failures are happening at the proof-of-concept phase and at the deployment stage of projects.

Companies are investing enormous sums and are simply not seeing the levels of payback expected – they are certainly not becoming more agile or competitive. Why such a high level of failure? Well, it appears that it can be attributed to inflated expectations. Around 50 percent of companies are expecting to see a payback within one year. Is that realistic? Not really, when many of these projects will take much longer to generate returns.

In response, the authors behind this research have recommended that manufacturers take a number of steps to increase their chances of success. These include determining, in advance, which exact challenges you want IIoT to address; start small, with some pilot projects of concepts to see how the technology can be utilized; obtain senior-level management support for projects and ensure support from all the relevant functional groups.

Last, but by no means least, get staff involved with deploying the technology. Encourage them to view IIoT not as a threat, but as an augmentation to their job capabilities.

None of these alone will guarantee success but they could go some way to reducing the extraordinarily high levels of failure currently being reported.

Neil Tyler, Editor (neil.tyler@markallengroup.com)
A global distributor that provides a high quality service to make sure you are Ready for Tomorrow!

- Same day despatch, fast delivery
- 950,000+ products available online
- Excellent and available customer service – we will pick up your call in 3 rings!

Our best ever range
Inventory increased by 25%

ready4tomorrow.farnell.com

---

Your innovative products deserve sterling performances.

- Ultra-Miniature components crucial for IoT applications
- Maximise PCB Real Estate
- Smaller crystals need lower power requirements
- Off-The-Shelf products developed with leading chip manufacturers for Bluetooth, Zigbee and WiFi applications
- Proven reliability
- Highly competitive global pricing from AEL Crystals Ltd

Talk to our highly experienced field sales engineers and let’s see how we may assist you in the development of your next innovative product.

AEL Crystals Ltd
Unit 28, The ioCentre, Salbrook Road, Safords, Surrey, RH1 5GJ, UK
email: sales@aelcrystals.co.uk - web: www.aelcrystals.co.uk
Tel: +44 (0)1293 789200
New possibilities for AI computing

‘FIRST’ AI PROCESSOR THAT CAN EXECUTE MULTIPLE NEURAL NETWORKS AND ENTIRE WORKFLOWS ON SINGLE SYSTEM. CHARLOTTE HATHWAY REPORTS

Blaize has unveiled what it says is the first true Graph-Native silicon architecture and software platform built to process neural networks and enable artificial intelligence (AI) applications with unprecedented efficiency.

Dinakar Munagala, Blaize’s co-founder and CEO, commented, “Blaize was founded on a vision of a better way to compute the workloads of the future by rethinking the fundamental software and processor architecture. We see demand from customers across markets for new computing solutions that address the immediate unmet needs for technology built for the emerging age of AI, and solutions that overcome the limitations of power, complexity and cost of legacy computing.”

The Blaize GSP architecture, together with the company’s Picasso software development platform, blend dynamic data flow methods and graph computing models with fully programmable proprietary SOCs.

This allows Blaize computing platforms to exploit the native graph structure inherent in neural network workloads all the way through runtime. The massive efficiency multiplier is delivered via a data streaming mechanism, where non-computational data movement is minimised or eliminated. This gives Blaize systems low latency, reduced memory requirements and reduced energy demand at the chip, board and system levels.

The company says developers can use these products to build end-to-end applications integrating non-neural network functions such as Image Signal Processing with neural network functions, all represented as graphs that are processed 10-100 times more efficiently than existing solutions.

Proof-of-concept demonstrates automated valet parking

Almotive, HERE Technologies and Vodafone have built a proof-of-concept for automated valet parking.

The solution was embedded in several vehicles to showcase a commercially viable platform, with the prototype vehicles proving capable of automated parking in multiple predetermined garages in Budapest.

Almotive’s aiDrive software stack provided the vehicles’ automated driving capabilities, while HERE Technologies delivered detailed indoor maps of parking infrastructures.

Vodafone provided Narrowband-IoT technology that supported the system to communicate free space information to the vehicle.

Maps were downloaded via Vodafone’s mobile network at the entrance of the garages. The vehicles drive based on parking sensor detections and feature maps to dynamically adapt its trajectory to changing conditions.

Peter Kovacs, Chief Product Officer at Almotive said, “Creating a scalable solution to this automated driving challenge is a vital step on the road to increasing driving automation.”

Rambus announces PCI Express 5.0 interface solution

Silicon IP and chip provider Rambus has announced it now offers a comprehensive and optimised interface solution designed for PCI Express (PCIe) 5.0.

The solution includes backward compatibility to PCIe 4.0, 3.0 and 2.0; as well as both PHY and digital controller for easy SoC integration and faster time to market. With the PHY designed for an advanced 7nm process node, the integrated solution offers power, performance and area.

“Our high-speed SerDes and memory interface solutions make possible amazing advancements in performance-intensive applications in AI, data center, HPC, storage and networking,” said Hemant Dhulla, vice president and general manager of IP cores at Rambus. “Now we’ve added PCIe 5 to our industry-leading portfolio of high-speed interface solutions giving chip makers another tool to unleash the power of their designs.”

The Rambus PCIe 5.0 solution also includes a high-performance, digital controller core from recently acquired Northwest Logic. The Rambus PHY and controller are offered as a fully validated and integrated solution, or they can be licensed separately and used with third-party solutions.
NI launches 4GHz vehicle radar test system

NEW VRTS PROVIDES RELIABLE, REPEATABLE TEST CAPABILITY FOR THE LATEST AUTOMOTIVE RADAR SENSORS. NEIL TYLER REPORTS

NI has announced the release of a 4GHz Vehicle Radar Test System (VRTS). Automotive radar is one of the key technologies that is helping to drive progress in the advanced driver assistance systems (ADAS) needed for future generations of driverless vehicles.

Radar is one of the most widely used sensing technologies because it’s robust and readily available. The shift in the automotive industry towards 79GHz radar has also helped to reduce the cost of radar-based safety features like autonomous emergency braking (AEB) and rear cross-traffic alert (RCTA).

The main advantage of 79GHz radar sensors is the 4GHz bandwidth, which significantly improves resolution and accuracy for both range and velocity. A trade-off, however, is a larger set of test challenges, as the additional bandwidth means more data. This requires additional processing capabilities and an increase in test scenarios as more objects are discernible.

"4GHz is more than just larger bandwidth and extra scenarios," explained Oliver Poos, Radar Test Engineer at Noffz Technologies. "It provides added room for error on the test, so reliability and repeatability are increasingly important to guarantee safety."

NI’s new VRTS is capable of simulating two objects per angle with a highly repeatable radar cross section (RCS). The RCS makes the simulated obstacle appropriate for both validation and production test.

Pyreos partners with AP Sensing

Pyreos, a manufacturer of miniature, rugged, pyroelectric, mid-infrared sensors and detectors has been chosen by AP Sensing to provide its ezPyro surface mount digital infrared sensors for the Spectrail collaborative project.

Spectrail is part of Network Rail’s R&D portfolio of projects which recently was awarded funding from Innovate UK, with a view to supporting research, development and innovation in the rail industry.

AP Sensing is working with several technology partners on the project and has chosen Pyreos to provide the ultra-low power detectors that connect to its fibre optic system. The low-cost IR sensing platform will detect problems like wheel flats, trespass and cable theft before it can impact passengers.

The ultimate goal is to automate train inspections and increase data capture, making rail monitoring easier and increasing the types and quantities of assets that can be monitored.
SamacSys and Cadence integrate tools

SUPPLYFRAME AND CADENCE INTEGRATE CLOUD-BASED PCB LIBRARY SERVICE DIRECTLY WITH PCB TOOLS. NEIL TYLER REPORTS

SamacSys, a Supplyframe subsidiary company and a provider of electronic component CAD models and library services, has completed a new integration with Cadence Design Systems’ Allegro and OrCAD PCB design tool suites.

The collaboration supports the Cadence OrCAD Capture Cloud and the Allegro System Capture electrical engineering design platform by directly integrating the SamacSys platform of free design resources, including PCB footprints, schematic symbols and 3D models for more than 15 million components.

“Collaborating with Cadence to integrate our eCAD model platform within their next-generation Allegro System Capture and OrCAD Capture products means that engineers are now able to search online and download PCB symbols, footprints and 3D models directly from within these design suites,” said Alex MacDougall, CEO at SamacSys.

“We wanted to make our new generation of Allegro System Capture tools as intuitive and future-proof as possible. Giving our users direct access to the SamacSys eCAD model platform within the design environment helps the design process become truly seamless,” explained Dan Fernsebner, product marketing director of PCB solutions at Cadence.

“Designers using the Allegro and OrCAD tools can now benefit from the convenience and confidence of accessing high-quality PCB models for components across the entire industry from SamacSys, without having to waste valuable time.”

Denchi Group expands capabilities

Denchi Group, a specialist in high-reliability energy storage solutions, has announced a significant extension of its operations. As part of the company's roadmap to move into new markets and strengthen its core technical capabilities, it is opening a product development hub in St Ives, Cambridgeshire – complementing its longstanding engineering resources in Thurso, Scotland.

The Cambridgeshire site will focus on making major advances in battery and charger design, leveraging the expertise that the company has built up in mission-critical defence and aerospace applications.

Product areas that staff will be working on include renewable energy generation/grid balancing, compact and lightweight high-density batteries for use in portable industrial equipment, ultra-reliable back-up power systems, plus lighting and power solutions for the mining industry.

“The pace at which the energy storage sector is evolving means that ingenious new approaches to battery electronics, software and mechanical design are going to be required, especially in the high-reliability markets we serve. The fact that Denchi’s battery and charging systems are 100% developed and manufactured in house, means we are able to provide our customers with fully-optimised turnkey power solutions that exactly match their application demands,” said Nick Russel, Chairman of Denchi.

Smiths Interconnect acquires Reflex Photonics

Smiths Interconnect has acquired Reflex Photonics, a supplier of rugged high-reliability optical transceiver modules for aerospace and industrial applications. Reflex optical transceivers deliver high signal density and ultra-fast speeds for low SWaP solutions. Its products are used in harsh environments and in advanced systems such as AESA radars, satellites, automotive applications and high-resolution cameras.

The acquisition complements Smiths’ product offering with the addition of a core fibre optic capability that will address the need for high speed data transmission in market segments requiring high reliability.

Commenting Smiths Interconnect President Karen Bomba said: “Reflex adds leading ruggedized and radiation-resistant transceiver technology and strengthens our presence and positioning in harsh environment fibre optic end applications.”

Cree and STMicro extend SiC wafer supply agreement

Cree and STMicroelectronics are to expand and extend an existing multi-year, long-term silicon carbide (SiC) wafer supply agreement.

Worth more than $500m the extended agreement will see a doubling in value of the original agreement for the supply of Cree’s advanced 150mm silicon carbide bare and epitaxial wafers to STMicroelectronics.

“This agreement will increase the flexibility of our global silicon carbide substrate supply and contribute to securing the required volume of substrate we need to manufacture our SiC-based products, as we ramp up production for automotive and industrial customers,” said Jean-Marc Chery, CEO of STMicroelectronics.

“Silicon carbide delivers performance enhancements that are critical to a host of next-generation industrial solutions,” explained Gregg Lowe, CEO of Cree. “This agreement ensures we meet the accelerating, global demand for this solution across a diverse range of applications while accelerating the market.”
Alan Banks opened the recent TechWorks Summit with a look back on what has been accomplished since his appointment as chief executive back in March. He has spent time taking stock of where TechWorks fits into the technology ecosystem and is now ready to push forward a new agenda focused on helping the electronics industry capitalise on the opportunities presented by this period of unprecedented change.

Sir Hossein Yassaie, TechWorks’ chairman, walked attendees through the history of TechWorks and how it spun out of NMI. He then highlighted six areas he believes provide big opportunities for the electronics industry. Those were user experience, artificial intelligence and machine learning, MedTech, information accuracy and data security, green energy, and EdTech.

Yet there are some hurdles that need to be cleared first. Electronics companies, Yassaie says, need to be better at branding themselves but they also need to push through the current investment focus on software over hardware.

“When people say they only invest in software, they’re saying they only want to invest in apps or stuff in the cloud. These companies are good at being acquired, but they are never going to be independent.”

How, then, can electronics companies move forward? His message to the room was one of collaboration: “we need people with expertise to come together and work with us to generate the systems of the future”.

Yassaie made clear that he believes TechWorks can help push things in the right direction, but it can’t do it alone. Everyone with a stake in the electronics industry in the UK needs to play their role. “This is your community and stuff happens if people participate with their time, knowledge and money.”

The packed agenda then spanned education, automotive, IoT security, AI, MedTech, investment, and diversity and inclusion.

On that last aspect, Jim Nicholas, CEO of Uniphy, examined how organisations should approach diversity and inclusion initiatives. He explained that he personally “hates” the idea of positive discrimination.

What is needed, he says, is better mentoring. There is no need to artificially acknowledge great work, but it is important to “propagate the results” of talented individuals.

Nicholas emphasised that this is important for one simple reason. “The reason you want to address the diversity issue is that you don’t want a company full of outliers. You do want a company of people that speak to the global community we serve.”

The big announcement was regarding the future of the ElecTech Council, an organisation set up in 2012 to examine the significance of electronics to the UK. That initial report found 850,000 people work on electronic systems and the sector contributes £80 billion to the UK economy each year.

Back in September, the ElecTech Council set out a roadmap for the UK to enable a digital future. Tony King-Smith, its Chief Executive, explained what he thinks is the logical next step.

He said, “We need to look at a new agenda, and that agenda is ElecTech 2.0 – where we act on the recommendations in the report. We need to justify the use of business time, and build a new approach that gets this industry involved in a meaningful way.”

That is why, King-Smith explained, ElecTech will now be a community within TechWorks.

Alan Banks added that bringing ElecTech into TechWorks marks “a new dawn” for the organisation. What’s key, he says, is that TechWorks is “not going to lose the data or the learnings” of ElecTech. It will instead “build on and enhance it”.

How can we solve the challenges in the electronics industry? And what opportunities are on the horizon? Charlotte Hathway reports.

“We need to look at a new agenda, and that agenda is ElecTech 2.0”

Tony King-Smith
GP21

First 400 VDC coupler system according to IEC

- Standard form acc. to IEC TS 62735-1
- Hot plug rated for disconnecting under loads up to 2.6 kW
- Ideal for compact PDU applications with an operating temperature up to 105 °C

T: 01296 319 000
E: sales@schurter.co.uk
400VDC.schurter.com
After decades dominated by visual data, sound appears to be making a return to centre stage. By Neil Tyler

The audio industry has changed dramatically in recent years and audio design engineers are using sound more creatively.

Streaming services are investing heavily in quality sound and new technology for speakers, sound bars, and immersive sound systems are appearing on the market.

How we consume audio is changing, whether that’s in the home, on the move or at work and in the world of VR, AR, and MR spatial audio is becoming better known. The gaming industry is a good example of an industry that is using sound to create a more immersive experience for players.

There is also a growing awareness that with the amount of audio visual art and entertainment that is now being consumed, it is no longer acceptable that when it comes to the development of new products sound systems are included that fail to enhance or complement the video quality that consumers have come to expect.

The consumer audio landscape is evolving quickly. Consumers are keen to embrace new technologies as they seek high quality, wire-free audio experiences.

They want longer playback times, a truly wireless earphone experience and are looking to embrace Voice UI’s, which today are playing a major role in shaping the way people access and enjoy audio.

The move towards wireless comes with a growing demand for ever-better sound quality and, according to a report from Qualcomm released over the summer, sound quality is the number one issue among audio consumers globally.

The company found that consumers want rich, clear audio quality and that is now the top-ranking purchase driver for 65 percent of consumers. When it comes to smart speakers, specifically, sound quality is even more important than price for many shoppers.

Truly wireless earbuds have exploded in popularity and have become one of the most sought-after devices in the headphone category.

Driven by improvements in Bluetooth audio and technologies like aptX, there’s been a notable shift in the perception of wireless sound quality.

As already mentioned, another important demand, in this space, is for more playback time. Consumers want to be able to enjoy their wireless headphones and speakers for longer periods between charges.

The demand for greater wireless freedom to listen to music reflects a growing trend in which people want to add a soundtrack to their whole day. Qualcomm’s research found that 70 percent of all respondents rated extended battery life as the most
important purchase driver.

Listener preferences are also changing and how we consume content is changing, and that will have significant implications for the next generation of wireless audio and the way in which people interact with their smart speakers.

Speaking at last month’s Audio Collaborative event, hosted by Futuresource Consulting in central London, Carsten Oleson, the President of HARMAN’s Consumer Division made the point that with a world filled with screens and more and more visual imagery it has become, “All a bit too garish, a bit fake or simply too much.

“Increasingly, consumers prefer to put their trust in a different kind of experience, something a bit more honest and intimate that can touch them more deeply.”

Oleson pointed to what he called an emerging ‘Sonic Revolution’ and to the findings of a recent study conducted by Spotify among Millennials and Generation Z consumers that found that a majority said they believed that there was ‘too much visual stimulation’ and that sound was becoming ‘more and more important in everyday lives’.

“Over half of the people that were surveyed said that their music consumption had increased and I believe that we are seeing a big comeback in terms of audio. In fact neuroscientists have confirmed that listening provides the consumer with a more intense experience than simply watching something.”

According to Oleson, “We are seeing a new culture around listening developing and there seems to be a longing for more authentic moments when it comes to experiences.

“Here’s where technology comes into play. It can act as a catalyst for this change, adding to augmenting the world of sound and not just supporting the visual experience. Technology offers people unlimited ways to experience sound and it is able to address the growing demand that we are seeing for a more personal or personalised experience that can be immersive or fine-tuned by the user.”

According to Oleson, we are “entering the decade of sound!”

He backed up that claim by pointing out that acoustic formats and experiences are on the rise, “Just look at podcasts, audiobooks, music streaming and of course connected speakers.

“We are surrounded by sound more than ever before. I believe that after a decade dominated by visual media and culture, sound will take centre stage and people, companies and institutions will increasingly approach the world with a sound-first mindset.”

Crucially, the enjoyment of sound is no longer dependent on a dedicated device, as our sound experience has now become mobile.

“From the car to the living room or gym and from the garden to the bathroom, our audio experience is now seamless, without interruption,” said Oleson.

“That has been one of the key benefits of technology. Another is that it also gives us the opportunity to customise the sound experience to our individual preferences and needs.

“Possibly the most important future trend in the audio space concerns artificial intelligence (AI) and how that will help to open up exciting new frontiers.

“Music composed entirely by AI? Well, you can already find that by looking on YouTube.”

Smart home

Speaking at the same event Simon Forrest, Principal Technology Analyst, Futuresource Consulting focused on the smart home and developments in how audio is being deployed.

“The smart home of today is really all about the touchscreen, smart appliances and environmental controls,” he explained.

“These devices are certainly becoming smarter but what is getting more interesting is that voice systems are developing just as quickly with the advent of AI and machine learning.”

He suggested, however, that despite these developments, in truth, machine learning remains flawed and that today’s AI is still “pretty dumb”.

“Any learning happens in the cloud and on big machines located in a massive server farm,” he said.

According to Forrest the truly smart home is some way off but is likely to include a combination of AI, biometrics, gesture controls and conversational platforms.

“Voice needs to become more conversational but as communications technology gets faster, voice will become the primary interface.

“Today, we have Alexa, Google Home, Apple’s Siri, Cortana from Microsoft and AliGenie from Alibaba, but all of them, while the lexicon is improving through the use of machine learning, remain essentially ‘command and control’ in nature.”

Voice only systems are some way off, according to Forrest, but things are moving quickly.

“All the main vendors are looking to improve language support in order to develop a more natural interaction and a much more fluid process. But they are also looking at combining smart speakers with cameras, so that with the use of AI we can hold up a product – say a bunch of bananas – and ask our smart speaker to order ‘five of these’.”

That, according to Forrest, is
You’re combining ‘command and control’ with biometrics and visual recognition, in this case, so we do need things to be much more simplistic. We need natural language along with a visual recognition system that has to be quite smart because it has to not only recognise something but understand shapes and sizes as well.”

Jeremy Keele, Regional Vice President, Sales, UK & IRE, Poly, in looking at the evolution of the workplace and workspace said that how we communicate and go about our business has changed drastically over the years.

“Today we have flexible office spaces and huddle rooms. But how many of those are actually fit for purpose for every type of meeting?”

According to Keele, mobility is now a massive commercial driver for Poly.

“The demand for flexible office spaces that allow people to be flexible in their approach is growing rapidly but, that begs the question: How do you give them the right tools in a secure environment? That is the biggest challenge we have today as vendors in this marketplace.”

The rise of the ‘huddle room’ environment is making people more productive but as people use mobile phones or their laptops to communicate, many want flexibility in their working habits and they want technology that delivers a similar level of service whether that’s a room system or via a mobile phone.

“They need the tools to be able to communicate, collaborate and share, wherever they are.”

“While we can all live with a poor video connection that is only true as long as we can hear what is being communicated, Audio is vital in the office environment of today and it’s about providing the right level of communication, whether people are physically present or whether they’re remote.”

Keele argues that while audio is critical users also need to be able to see the people they’re communicating with – in terms of audio and video, it’s not either or, but both.

“Video and audio collaboration across multiple countries, across multiple devices is becoming more and more important.”

Jeremy Keele

“Video and audio collaboration across multiple countries, across multiple devices is becoming more and more important.”

Jeremy Keele

Work experience

Turning to the work environment

The rise of the ‘huddle room’ environment is making people more productive but as people use mobile phones or their laptops to communicate, many want flexibility in their working habits and they want technology that delivers a similar level of service whether that’s a room system or via a mobile phone.

They need the tools to be able to communicate, collaborate and share, wherever they are.

“While we can all live with a poor video connection that is only true as long as we can hear what is being communicated.

“AUDIO TECHNOLOGY

“If OEMs aren’t thinking about audio, they certainly need to be because if you can create that fantastic audio experience you will drive up overall vehicle satisfaction and that’s a huge win for the OEM as well as their consumers,” explained Callum Hubbard, Lead Engineer, Audio Strategy at Jaguar Land Rover.

“When it comes to audio technology and the automotive space, the discussion tends to focus on noise cancellation, surround sound and 3D sound.

“Crucially, especially in the future, OEMs designing cabins will need to know where exactly listeners will be sitting in order to take advantage of audio technology.”

Hubbard made the point that with the advent of autonomous vehicles that may no longer be as simple, as seats may rotate.

“I think there’s going to be a lot of interesting developments around how you continue to provide high level audio, regardless of what configuration we see in vehicle cabins. It’s challenging but there will also be a lot of opportunities,” he suggested.

Among those opportunities is the use of audio in navigation.

“What if you can use audio to say deliver a better navigation experience? The range of possible experiences inside the cabin is growing rapidly and we need to look at bringing audio technology to the forefront to help solve many of them.”

An area of particular interest is in the development of electric vehicles.

“Consumers want these silent vehicles to provide an engine roar but there are also safety concerns to take into account - EV’s are silent, so how do we make sure that we create external noises that can signal to people that a vehicle is approaching?

“Not only that, if you take the engine out of the car you now have the ability to put speaker amplifiers in different places to create a better sound environment - fewer parts and fewer speakers - but because you can put them all in the right location, you will be able to enhance the infotainment experience while reducing the complexity in the car.”

Whatever the user experience sound/audio quality is crucial.

Good sound quality tends to trigger positive emotions and bad sound quality triggers negative ones, such as dissatisfaction or disappointment, all of which can make or break the consumer experience.

It’s no longer possible for OEMs and developers to ignore audio as an essential part of the consumer experience, so perhaps the coming decade will be the ‘audio decade’.

Above: The Jaguar I-PACE interior incorporates Touch Pro Duo, Interactive Driver Display and the Meridian Sound System

Image: Jaguar Land Rover Limited

Cover

Image: Jaguar Land Rover Limited

26 November 2019 www.newelectronics.co.uk
DataVoice

Field-assembly data networking components

AMJ-S Module Cat.6A
RJ45 plug MFP8 Cat.6A
Connection Module VM8-8 Cat.7A

- Assembly routine often encounters the unexpected. A damaged cable segment requires quick repair without necessarily laying a new cable segment. The existing network has to be extended or an additional device has to be integrated but you do not have an assembled cable at hand.
- The perfect solution for such situations is now available: field-assembly data networking components from Telegärtner.
- Telegärtner data networking components for field-assembly feature excellent easy assembly and unique homogeneity. This makes them ideal in situations in which speed and reliability are essential.
- The build of field-assembly data networking components from Telegärtner allow for professional assembly directly on site in as little as 60 seconds.
- You need no special tools to assemble Telegärtner field-assembly data networking components. AMJ-S Module Cat.6A and MFP8 Cat.6A are suitable for all common cable types.
- With the AMJ-S Module, MFP8 plug and the VM8-8 Connection Module, you not only get three top class products but also a perfectly adapted system solution for your daily cabling tasks.

www.telegaertner.co.uk/contact

19” ENCLOSURES

19” ENCLOSURES

TECHNOMET 19” CASES

Highly attractive and versatile desktop rack cases for 19” chassis and subracks. Standard heights: 3U, 4U and 6U, painted in light grey or anthracite. Supplied fully assembled with side handles, chassis supports, ventilation and non-slip feet. Can be fully customised to order.

METcase ENCLOSURES

Tel. 01489 583858
Email: sales@metcase.co.uk

www.metcase.co.uk
Tuned silicon attempts to make a comeback with small SoCs. By Chris Edwards

The gate-array users either made do with off-the-shelf parts or turned to field-programmable gate arrays (FPGAs) that pushed up unit costs but dispensed with a huge chunk of non-recurrent engineering (NRE) cost.

Luminaries such as UC Berkeley professor David Patterson believe custom chip design is making its way back to the lower-volume customer base that abandoned the hardwired gate array two decades ago.

In a series of speeches that kicked off with a Turing Award lecture to honour his work alongside Alphabet chairman John Hennessy in writing another engineering hit from the 1980s, “Computer Architecture - A Quantitative Approach”, Patterson talked of democratising design.

He argued a number of elements have come together to yield more accessible and agile hardware.

“It’s a great time to be in hardware again. With agile hardware, everybody can do it and can afford it.”

In an environment where estimates for the cost of getting a 7nm system-on-chip (SoC) to market now run to more than $300m, claims of a mass move to custom hardware may seem incredible. People like Patterson are not thinking of those projects but smaller microcontroller-like designs that can be fabbed on older processes, such as 90nm, 45nm or 28nm.

“You can go a long way with small chips,” he argues.

Using multiproject wafers to cut mask costs and taking advantage of cheaper tools, the costs become much more manageable, similar to the gate arrays of yesteryear. Although custom hardware has its attractions, readymade silicon still has benefits.

Assuming the parts are on the market, programmers can start with software on an evaluation board while the hardware team puts together the PCB design. The downside is that customisation is limited to what can be wrapped around the outside in a separate FPGA or what can be implemented in software.

The ASIC path provides the ability to change the core processor more fundamentally, either to add tightly coprocessors or even custom instructions.

Customisable instruction

Customisable instruction sets used to be restricted to a small subset of processor architectures, such as the Arc cores now owned by Synopsys and the Tensilica core family offered by Cadence Design Systems. Although suppliers of mainstream cores initially resisted the idea because of the threat customisation poses to compatibility, most have relented.

The most recent was Arm with the option to add a limited set of custom operations to version 8 Cortex-M processors.

One reason for going down the custom route is energy.
Martin Croome, vice president of marketing at Greenwaves, says: “We are interested in devices that are really power constrained: systems that run for their entire useful lives from a single charge. By designing instruction-set extensions we can save three times the energy versus a device that uses the baseline processor architecture.”

Greenwaves opted for the RISC-V architecture, which provides an open-source instruction-set architecture and is steadily building an infrastructure of open-source development tools around it.

Croome says the customisation that his company has done “wasn’t possible before for a small start-up like ourselves”.

The drawback with custom silicon is the extra time that software engineers need to wait before they can start work on a stable prototype.

Rocco Jonack, principal solutions architecture at German consultancy Minres Technologies, says it is often only during integration that mismatches between hardware are revealed.

In ASIC design, a common phrase in use today is the “shift left”: making it possible to begin software development and system verification much earlier and fix integration problems before the design has taped out to the fab. To get there, the teams employ virtual prototypes and hardware emulators of various forms.

Languages such as SystemC have made it easier to simulate architectures at a higher level and so run reasonably quickly on a workstation, although circuit-level emulation on a FPGA will be more accurate.

A major overhead even in SystemC simulation is the processor, as it is often the most complex circuitry in the system. The usual technique is to employ an instruction-set simulator (ISS) such as the open-source Qemu, which can be found in FPGA tools from suppliers such as Xilinx.

Working with an ISS with a limited set of simulated logic cores around it provides a mechanism for making faster progress in adding custom instructions, says Kevin McDermott, vice president of marketing at Imperas. Getting to the stage where you building a system and test it in an FPGA so it can work with live data raises problems:

“It’s months of work to prove your assumption,” he argues. “What happens if you find the advantage of adding instructions is not that clear cut. You want to let the software guys drive some of the early decisions.

“You want to know: does that instruction actually help? Can this function be achieved in one cycle? If I hard code this function will that be useful for the next four generations? It’s not enough simply to model.

“Communication is important. You want the software developers to talk to the hardware guys. Those conversations are going to be far faster than compiling to an FPGA and testing there,” McDermott says.

With an ISS and simulated data, it is a relatively fast process to add and modify custom instructions to test assumptions if it is not clear how much performance the extra hardware will provide.

For example, it may be that the work that a custom instruction needs to do may work better in a coprocessor with its own memory interface as that avoids the need to load large quantities of data using core processor registers and displace other data that needs to be kept close to the core to maintain performance.

Another issue may be that a custom instruction is too inflexible to deal with algorithm changes that might be needed in later revisions.

Register-level interfaces to custom hardware are equally important. It may turn out that polling a register for changed state makes more sense than having a peripheral initiating interrupts whenever they finish a job because the function is in a highly active loop.

As simulations will help reveal the bottlenecks these decisions create or remove, Jonack says it is important to use high-level register-generation tools so these modifications can be made easily and quickly instead of diving into the RTL.

“We use a lot of automatic generation. Because these registers are constantly changing during the project.”

Techniques such as continuous integration supported by Jenkins and similar configuration tools help ensure hardware and software do not get out of step, Jonack says. With those approaches in place, it is possible to make embedded systems far more agile and support the ability to optimise hardware. In doing so, more teams should be able to exploit what Patterson calls a new golden age of architecture.
Preparing for 5G means a move from analogue to digital in radio architecture and a renewed interest in process technologies, as Alex Brinkley explains.

On its journey from the Blackberry to the iPhone, the smartphone has changed beyond recognition. Today there may be five or more radios in a single phone, all competing for the crowded spectrum available. As a result, single-band radios have been overwhelmed with the capacity demanded by users as they expect data-rich content, demanding wider bandwidth in offices, vehicles and homes.

Coming soon, 5G will introduce 10Gbit/s data rates for faster throughput to enable connected environments and expand the IoT at a greater rate than today’s 4G networks.

Multi-band radios are selected in designs because they make more spectrum bandwidth accessible. The landscape of 5G is likely to be a ‘shared space’ with 4G networks, and one where they jointly access legacy and new bands, including the sub-1GHz band which is used for voice, mobile broadband and the IoT. The mid-band, 1GHz to 2.6GHz, was used by 2G, 3G then 4G and will evolve for 5G. It offers better wide area and indoor coverage than the higher 3.5GHz to 6GHz bandwidth which will be exploited by 5G technology for higher throughput at low latencies. This will enable mission-critical connected applications like autonomous vehicles.

Optimising form factor and power consumption will be a significant consideration in multi-band radios used in emerging 5G applications.

RF designers will have to balance signal bandwidth with power consumption, both of which impact the overall size of the radio.

The ability of multi-band radios to be reconfigured allows them to access the sub-6GHz (i.e. 1GHz to 6GHz) spectrum for broader coverage without size or power penalties or, in many cases, the systems bill of materials.

Companies like Skyworks have developed multi-band front-end modules. One example is the SKY680xx IoT series, which integrates multiple RF front-end components. The SKY68020-11 is a hybrid, multi-band, multi-chip RF front-end module that supports cellular LTE-M/ NB-IoT transceivers. It uses Smart Biasing to control power through the MIPI (Mobile Industry Processor Interface) by programming reduced bias current for lower gain states, allowing the transceiver output power to be adjusted according to the total output power required in a particular application.

The wide bandwidth demands of 5G can be met by moving frequency translation and filtering from the analogue to the digital domain. Two RF converters that are part of this wave of digitisation are the AD9081/AD9082 mixed signal RF converters, introduced by Analog Devices. They have been engineered for developers to install multi-band radios in the same footprint as single-band ones, to increase call capacity three-fold, compared with the call capacity available in today’s 4G LTE base stations, says the company.

The integrated RF converters are part of the company’s MxFE (Mixed signal front-end) platform. This is targeted primarily at multi-band radios to enable engineers to configure and control the radio through software.

Danish Aziz, Field Application Engineer, at Analog Devices, explains that the two mixed signal RF converters improve performance with more stages of conditioning and processing the digital signal. The MxFE RF converters have a 1.2GHz channel bandwidth and are based on a 28nm CMOS process. The larger AD9081 has four transmit channels and four receive channels (i.e. four 16-bit, 12Gsps DACs and four 12-bit, 4Gsps ADCs). Two of the four receive channels can be used as observation receivers to inherently support digital pre-distortion, for wireless communications transmissions.

The AD9082 has two 12-bit 6Gsps ADCs and four 12Gsps 16-bit DACs. Both achieve up to 2.4GHz instantaneous signal bandwidth to reduce the number of frequency translation stages. They are both supplied in a thermally enhanced 324-BGA. Analog Devices reports that the level of integration results in a 60%...
A key factor in the advance of RF design is refining CMOS processes. The gate length of a CMOS transistor is directly related to the speed, size and power requirements of the chip. The smaller the gates, the faster they become and less power and space they require, allowing for more on-chip digital signal processing without impacting the power budget.

Deep submicron lithography allows for more digital circuitry on the RF converter die to handle tasks, such as digital pre-distortion or algorithms, to optimise power efficiency or system power consumption. The next step is to integrate the RF converter, digital circuitry with microwave or mmWave components to reduce the size and complexity of the radio design.

A significant development is a proprietary technique to improve the performance of transistors by up to 50%.

Atomera, which patented Mears Silicon Technology (MST), a quantum-engineered material, has enhanced it with a smart doping profile. The company reported that the resulting MST SP technology reduced channel on-resistance by up to 50%. The company says that it can be applied to other silicon devices, including planar CMOS chips.

MST SP has improved carrier mobility to lower on-resistance compared with the original version and dopant profile engineering controls short channel effects for low loss switching and good isolation. The result is that switching is not affected by voltage swings in the signal path.

The company reports that, working with a foundry partner, it has re-engineered a 5V NMOS switch for 50% less on-resistance without affecting characteristics of the device in power management ICs and other bipolar-CMOS-DMOS (BCD) mixed-signal devices.

MST is an ultra-thin film of semiconductor, re-engineered to incorporate non-semiconductor material to create a silicon lattice which has control the flow of the current to improve performance and efficiency. The single crystal, silicon-on-silicon technology enables RF and mixed-signal devices (as well as microprocessors, logic and memory ICs) to run at lower power levels and reduce the die area.

It reduces gate leakage – by up to as much as 50%, says the company - by impeding unwanted current flow in the vertical direction. This is particularly advantageous at lower process geometries, when gate leakage increases.

MST’s channel doping – or super steep retrograde (SSR) - profile, reduces random doping fluctuation which in turn reduces variability in the threshold voltage (Vt) and improved transistor matching. The company reports up to 50% reduction in Vt variability in third party evaluations.

In RF switching, MST was shown to improve the drive current of RF-Silicon on Insulator (RF-SOI) process technology with a lower on resistance (Ron) at the same breakdown voltage and reduced off capacitance (Coff), boosting RF switching performance.

www.newelectronics.co.uk 26 November 2019
Indoor positioning technology may have reached an inflection point, with widespread adoption now a possibility. By Nick Wood and Chris Barratt

New developments in indoor positioning technology

There has been a long-standing interest in accurate indoor positioning technology, with a wide range of interesting use cases involving the tracking of either people or objects. These include locating assets in a warehouse or other facility, finding people or for sports related data-analysis.

However, the will has not always been matched by the means. The technology has been either too inaccurate to serve the intended purpose or too complex and proprietary to easily put in place. We assume GPS is not feasible or accurate enough.

First, let’s look at the terminology. It is common in positioning systems to use the term “Tag” to refer to the mobile device that is being tracked and “Anchor” to the fixed points used to form a reference point or grid within which the Tag can be tracked.

The simplest indoor tracking method uses Bluetooth Beacons, a cheap and widely used technology. These work off simple received signal strength (RSSI) indicators, with position determined by the signal strength measured at one or more anchors.

Nearly everyone carries a Bluetooth device, namely their mobile phone. For objects, a dedicated tag can be easily and relatively cheaply created. Bluetooth has a simple standardised mechanism (“advertising”) whereby a device can send out a short message to detect location without complex interaction with the rest of the system.

The major drawback of such a system is lack of accuracy. The signal strength (or RSSI) is hugely influenced by obstacles between the two points, the relative orientation of the transmitting and receiving antennas and other factors.

In looking at the potential accuracy of locating a Tag worn by a person using Bluetooth RSSI, it’s necessary to consider the effect the human body could have. If we imagine the Tag as a badge pinned to a lapel, the emitted advertising pulse traverses the body in one direction but is freely transmitted through air in the other. Thus, if we consider a person with such a Tag equidistant between two Anchors, the measurements at each anchor will be very different.

Direct transmission through the body might involve an attenuation of up to -50db. There would probably be transmission round the body or reflection. However, 10 – 20db attenuation could be realistic, meaning the two equidistant anchors would infer distances different of up to an order of magnitude.

Even the direct measurement can only be assumed to be within a +/- 3 dB window resulting in an error in the distance estimation of a factor of 2 i.e. “somewhere between x m and 2 times x m”.

New capabilities

To improve accuracy, the Bluetooth Special Interest Group (SIG), has introduced new capabilities with Bluetooth 5.1 including the detection of the angle of arrival of a Bluetooth packet.

This works by having a multiple antenna array in the Anchor and measuring the phase difference of the same signal received at the different antennas, typically separated by a half wavelength i.e. c. 6cm.

The diagram opposite shows a signal arriving at an angle to the antenna array, assumed to be sufficiently far away that the paths to the different antenna elements can be parallel lines. Therefore, at right angles to the direction of travel, the signal is in phase.
The accuracy of the angle of arrival estimate is related to 2 fundamental parameters:

- The total width of the antenna array, typically \((N-1) \times \lambda/2\) where \(N\) is the number of linearly spaced antennas
- The accuracy with which the phase of the received signal can be measured for each antenna

The accuracy with which the phase can be measured depends on the precision of the IQ sampling carried out by the BLE device, which is affected by the internal precision of the IQ demodulator and the short term frequency drift of the crystal oscillators used in both the tag and the anchor.

In this article, we have assumed that the BLE device can resolve the electrical phase between bursts coming from different antennas with a tolerance of +/- 10° due to the combination of the different error inducing factors.

Geometric calculations indicate that for a 2 antenna array this results in an angular positioning error of +/- 3° close to the axis normal to the antenna plane and +/- 5° at 45° relative to the axis.

Similar calculations show that for a 4 antenna array the accuracy of the angle estimation is improved respectively to +/- 1° close to the axis and +/- 1.5° at 45°.

Assuming a more realistic angle accuracy of +/- 5 degrees, then the accuracy of location is dependent on the distance * tan (5 degrees). So, at 25m distance, one would have an error of 0.087*25 = +/- 2m. Thus, with multiple anchors, one could expect to localise an object to within a “zone” of 1-2 meters, depending on the distance from the anchor.

The other main method of indoor positioning is Ultra-Wide Band (UWB). This method uses a short sharp pulse in the 5-8 GHz range and detects the time of flight between two points, somewhat analogous to an “indoor GPS”. In terms of accuracy, such a system is limited by the timing accuracy of the arrival of a pulse.

Using the speed of light at 3 x 10**8 m/s, one can calculate that to achieve 1cm accuracy, a timing accuracy of 33ps is required.

Using only the detected amplitude of the received pulse implies that the accuracy is approximately half the pulse width. Since pulse width is directly related to the inverse of bandwidth and UWB systems typically use a 500MHz bandwidth, this technique could achieve an accuracy of the order of 0.5/500MHz =1ns or 30cm. However, UWB systems use very high frequency sampling of the incoming pulse train and correlation to a known reference train to improve accuracy. Assuming the high frequency sampling captures the phase of the pulse to within +/- 45°, the accuracy would be related to 1/4 of the carrier frequency period. In the case of 6.5 GHz UWB this implies an accuracy of 0.25/6.5 GHz or 38ps, equivalent to 1cm positioning precision.

In real case examples the basic repeatability of the receiver is of the order of 130ps (4cm) and additional antenna environmental issues allow for an average achieved accuracy of around 10cm. The disadvantage of such a method is that until now it has been based on closed proprietary technologies, and complex and expensive systems. Real installations require a system to synchronise and keep synchronised the anchors at high precision. Such systems are not trivial to install.

However, there have been interesting developments in the Ultra-Wide Band ecosystem. The first is that Apple mysteriously announced that the recent iPhone 11 will have a “U1” chip in it with UWB capability. There are almost no details available, but if this was to presage the development of a de-facto standard and a movement to make UWB ubiquitous in the mobile phone, it would be a game changer for the technology. Also notable is NXP becoming the first large silicon player to announce a UWB chip.

There are also intriguing possibilities if, as seems likely with the next generation, UWB devices were to offer an Angle of Arrival capability. This, coupled with accurate distance measurement, would provide the capability to locate an object with reasonably high precision in 2-D from a single anchor. This would significantly simplify the installation of indoor location systems.

In conclusion, indoor positioning technology has a lot of value adding use cases. What has been lacking are solutions that are sufficiently cheap and, perhaps more importantly, easy to install.

The technology to change this has developed slowly until now, but it has perhaps reached an inflection point where more widespread adoption will drive it on an accelerated development path.
Through the emergence of open source software and low cost development boards, we have already witnessed what can be described as a ‘democratisation’ of electronics. Now, it seems, the same principles are starting to be applied to robotics. A growing number of enterprises are looking to make robotics more accessible and are helping to accelerate its proliferation. Each organisation is employing their own distinctive strategy, as they look to enable a broader cross section of different parties to benefit from such technology.

London start-up, and British Engineering Excellence Awards winner (BEEAs), Automata Technologies is among those championing this cause. Its Eva product presents the market with highly effective table-top robotic apparatus that is almost an order of magnitude cheaper than standard industrial robotic systems, thereby opening up an array of possible use cases that wouldn’t have previously had the necessary budget.

Through implementing Eva, manufacturers can offload jobs which aren’t really making best use of trained staff. This 6-jointed robot arm has been purposely built with dimensions that are in-line with those of humans, so that it offers a practical automated alternative. It can be supplied with multiple suction cups or a 2-finger gripper.

As the company’s co-founder Mostafa Elsayed explained, “Until this point a very large proportion of the potential application opportunities for robotics simply haven’t been served, just because the financial barriers proved too high. Now, jobs may be automated that would never have been considered for it before.

“Bottlenecks can be removed and throughput increased. It also allows staff retention issues to be tackled, as employees aren’t stuck doing repetitive and mundane tasks which bore them, but can undertake work that is more meaningful.”

Crucial to the company, was the development of Eva’s powertrain. Much of its engineering resource was concentrated on construction of a unique, streamlined gearbox arrangement. This avoided the need to horizontally integrate everything, and brought the overall expense down.

The Eva robot arm has also been designed to be straightforward to programme (via a web-based user interface), which equates to less time and expense.

By placing the hardware in a more attractive price bracket and backing this up with intuitive control software, Eva has a lot more widespread appeal than competing robotic systems - being suitable for deployment in much smaller manufacturing facilities, workshops, technical colleges, etc. Key functions that it can execute are machine tending (i.e. loading/unloading), correcting orientation or performing quality inspection on items during production processes and carrying out testing procedures.

The modest financial outlay involved will also mean companies can add Eva robot arms to their operations so that sudden ramp ups in production demand can be dealt with, or to take care of seasonal increases.

Generally, everything can be implemented in about an hour (as opposed to several days, or possibly a week, for conventional systems). Furthermore, Eva has a much higher degree of mobility than its bulkier, heavier counterparts.

Academic community

MIT’s Biomimetic Robotics Laboratory has similar goals to Automata, but in the context of helping the academic community. Announced back in the spring, its Mini-Cheetah biomimicry quadruped robot is similar in format to the units currently on the market from firms like Boston Dynamics, et al. However, it is far smaller and lighter (weighing little more than 9kg), and (most important of all) markedly cheaper - relying on easily available off-the-shelf electronic devices.

Sturdy, but agile, it provide ease of movement and can travel at speed (easily managing 2.45m/s), traversing over relatively challenging terrain when necessary. It supports forward,
reverse and lateral movement, as well as having the ability to jump, land, rotate and do backflips. Balance and orientation controls ensure that it remains upright even when kicked, and if it is knocked over then a self-righting mechanism steps in.

The Mini-Cheetah’s robustness allows research departments to significantly reduce the simulation time undertaken. Instead they can participate in direct experimentation, without the risk of component parts failure. It also means that students can use it without the risk of any expensive damage being done.

The Biomimetic Robotics Laboratory’s intends to start offering Mini-Cheetahs to other MIT departments, and universities, in order to conduct their own investigations.

As Professor Sangbae Kim, who masterminded Mini-Cheetah, explained, “Right now we are building ten Mini-Cheetahs to collaborate with robotics departments in other institutions, such as Berkeley and Notre Dame, as well as for commercial robotics ventures.

“There are also discussions underway with our industry sponsor to support the funding needed to donate an additional twenty to thirty units to numerous robotics research groups across North America, and possibly further afield,” he continues “though this is still at a very early stage.”

If these ambitious plans come to fruition, then there is the prospect of it becoming a common, almost open source, foundation for future robotics projects across the globe.

There aren’t just costs and logistical aspects to consider though, other dynamics must be factored in too - in particular how robots will fit into the environments that we live and work in.

Humans and robots together

Since 2008, thanks to European Union funding, the Bristol Robotics Laboratory (BRL) has undertaken pioneering research into how human beings and modern robotic systems might coexist with one another. This work is contributing to the technological progression of a new breed of collaborative robots - or ‘cobots’.

Based on predictions from various industry analysts, major growth markets in the coming years (aside from the industrial space) are likely to be agricultural robots, social functioning ‘companion’ robots (building on the popularity of smart speakers) and assisted living robots (to make up for the shortfall in carers and our aging population demographic). Professor Manuel Giuliani, who leads the BRL’s Embodied Cognition for Human-Robot Interaction (ECHOS) Team, shares the sentiments of Automata’s Elsayed.

“It is important to understand that this isn’t about replacing human workers, but about them working alongside on another, with each bringing their own particular strengths to the partnership,” he notes. “Carer robots could do day-to-day chores, like washing dishes, changing bedclothes, attending to the laundry, and suchlike. That doesn’t negate the services of human care assistants, it just means time is freed up for them to deal with the social needs.”

Whether they are placed on production lines or in homes, hospitals or retail outlets, cobots will come into close proximity with human co-workers, patients and customers.

As a result, numerous sensors must be encompassed to give them full awareness of their surroundings (and any alterations that might occur), so as to stop them harming anybody.

“In industrial locations, workers coming into contact with robots will have been trained appropriately beforehand, but when we talk about these other scenarios, the general public won’t have any formal training, and early experiences could be somewhat unnerving,” Giuliani believes.

Communication between robots and humans is another area where research is on-going. As humans we can converse vocally, but this is often less applicable to robots, with it being difficult for them toathom what someone requires them to do.

“Full arbitrary dialogue is still a long way off, with the complexity of human speech, and the many nuances relating to it, still representing a challenge, plus this may be accentuated in noisy environments,” said Giuliani. This is why his team focuses much of their attention on developing non-verbal forms of communication, based on gestures and body posture.

Other issues being addressed include robots’ ability to identify and then grasp different household implements correctly without damaging them. In his opinion: “For the foreseeable future, robots will remain too expensive to be present in most homes or offices, so clever business models need to be formulated that maximise their utilisation and spread the costs over multiple end users. As with any technology trend, in time the volume levels will rise and this will gradually increase commercial viability.”

Breaking down the current barriers to entry that prevent more widespread adoption of robotic technology, and also looking at ways in which these pieces of machinery can cooperate with us, will eventually lead to a better functioning society.

The next generation of affordable robotics solutions is getting ever closer.
Today, there is a growing consensus that the economic model of production and the management of resources, goods and services, which puts short-term consumption ahead of a more sustainable approach, is fast coming to an end and is seen, by many, as no longer fit for purpose.

Globally, there is an argument that we need an economic system that rather than colliding with sustainable development looks to address the issue head on.

More people believe that we should be looking at the longer term in which all elements within the manufacturing process play a continuous role and can be reused across the different stages of production.

At the heart of this new model is the concept of the circular economy - a system in which the use of resources is not only reduced but in which they are then reused and recycled.

“The aim of the circular economy is to minimise production to a bare minimum and, when it’s necessary to use a product, go for the reuse of the elements that cannot be returned to the environment,” explains Mateo Dugand, IT Efficiency & Sustainability EMEA lead at HPE.

The circular economy promotes the use of as many biodegradable materials as possible in the manufacture of products and where that is not possible, especially when it comes to electronics, hardware and batteries, the aim is to facilitate what is described as a ‘simple uncoupling’.

“It’s about giving these products a new lease of life by reintroducing them into the production cycle and when that is not possible, they should be recycled but in a way that is respectful to the environment,” argues Dugand.

He suggests that sustainability actually makes for a smarter business as well as being one that is also good for the environment.

“Sustainability is smart business,” he believes, “and HPE has been leading the way among a growing number of companies committed to looking at the lifecycle of the solutions we build. We build efficiency into our products which, in turn, are made with materials that have a low impact on the environment.”

“Today, for companies like HPE, it’s not only about how we use a device but what we do with it when we no longer need it.”

But for those companies, like HPE, that are taking a stand – typically multinational consumer facing brands with a lot to lose in reputational terms – there are simply too many companies that just pay lip service to current environmental legislation.

Speaking at the recent RINA Electrical and Electronic Equipment and the Environment conference in London, Dr Kevin Bradley, Secretary General of BSEF, The International Bromine Council, said that what’s needed is pragmatic solutions and a better approach to sorting out the waste at source.

He warned that, “No one is collecting enough and they don’t know what to do with it. There are a lot of grey areas, and material is exported, with companies washing their hands of their responsibilities.”

Scott Butler, WEEE Fund Project Manager with the not-for-profit Joint Trade Associations (JTAC), a collection of electronics industry trade bodies including TechUK, argued that it was vital that the sector adopted new innovation and technologies.

In response, the WEEE Fund has been developed by a group of major producers as a reaction to UK WEEE regulations.

“In short,” Butler explained, “if producers don’t meet the WEEE collection targets, they can pay a fee into this fund, based on the average cost of collection plus some escalators – so it’s designed to encourage collection.”

The funds that are collected are then invested in new schemes and research projects, many of which wouldn’t otherwise go beyond the drawing board.

The Fund, which so far has raised over £8m, provides financial support to research projects – with the evaluation panel looking for innovation.

TECHNOLOGY RENEWAL

The concept of the circular economy looks to put refurbishment and recycling at the heart of electronics manufacturing. Neil Tyler investigates
Unlike other economic models in which the economic aspect tends to take priority over social or environmental issues, the circular economy puts them centre-stage.

Companies that have implemented this approach have demonstrated that reusing resources is much more cost effective than creating them from scratch, so they are not only benefitting economically, but are also contributing in terms of social and environmental impact.

Achieving more with less is at the heart of HPE’s Technology Renewal Centre, located just outside Glasgow in Erskine.

Within the circular concept we look to close the loop and instead of creating waste look to recycle as much as we can," explains Dugand, "both at this facility and at our other one in the US."

The main challenge with ‘circularity’ is that it requires many different stakeholders throughout the lifecycle of a product. HPE is, however, well positioned because it engages with an extensive supply chain.

"And this is not a new project for HPE," says Dugand. "We are not jumping on some new ‘trendy’ wave as we started a ‘design for the environment programme’ as far back as 1992."

According to Dugand there are three pillars that are essential when it comes to designing for the circular economy.

"Design for energy efficiency; design using the least amount of materials and, thirdly, design for recyclability or reusability – and that’s key. Devices should be designed to be easy to repair, update, dismantle and reuse," he argues.

"An EU report found that 80 percent of a product’s environmental impact was influenced at the design stage. All companies must be looking to address this, as it can create a huge environmental footprint."

So what of the centre in Glasgow?

“Here the aim is not to simply tear down technology and recycle it, but rather to test and then refurbish it for reuse, as part of the company’s circular economy efforts,” explains Dugand.

In the facility hard drives are wiped, keyboards are cleaned and servers reconfigured.

“A lot of this refurbished equipment is then sold to a wholesaler looking to resell it as ‘certified pre-owned’ or turn it into short-term rentals,” explains Dugand.

“All this refurbished equipment has basically meant that HPE has helped to create a new market for second hand devices. We can sell, lease or rent and can provide a new warranty, giving all this equipment a new lease of life.”

Dugand continues, “There is huge demand for second hand equipment.

A lot of companies simply don’t need the latest and greatest technology for their businesses and so they can save by buying second hand rather than new.”

The facility, which is around 15,000 sq ft in size, does not only process HP laptops, monitors and PCs, but takes technology made by other manufacturers too.

According to the company around 200 workers process upwards of 100,000 workplace and data centre assets each month, and of that only 11 per cent ends up being consigned to recycling.

A partner in Germany granulates plastics and smelts gold and copper to leave just 0.4 per cent of unrecyclable residue.

When it comes to recycling there are a number of parameters that have to be taken into account, from the type of model to be recycled to the actual state of the equipment.

As Dugand explains, “Rates will vary from product to product, but the circular economy is about keeping equipment in the economy for as long as possible by giving it another life.”

With 50 million tonnes of e-waste being produced on an annual basis and with the prospect of that growing to 120 million tonnes by 2050, if left unchecked, the work at the company’s facilities in Scotland and the US have a crucial role to play.

“It does require a collective effort,” says Dugand, “which involves senior management down to every employee and that also includes our extensive supply chain.

“It has required a huge effort to bring everyone on board and to ensure that all stakeholders understand the role that they are expected to play.

“Environmental savings bring with them financial benefits and we’ve created something that is sustainable as we look to reduce the environmental impact of our business.

“We will continually look at new ways in which we can leverage sustainability,” concludes Dugand.
How secure is secure enough?

In the emerging connected world when is security considered "necessary", "adequate", or "sufficient"? By Cliff Ortmeyer

Security is one key respect like quality that cannot be added in at the end of project; it has to be woven throughout the structure of a design, and it has to be seamless.

Embedded system designers face an increasing challenge as they create products that must function in an ever-more-connected, and potentially more hostile, context.

The idea of security as “adequate”, i.e. it would require more effort to compromise a system than the gains for an attacker is now more problematic with increasing connectivity. Access to an embedded system, whose purpose might be to control something relatively mundane can be priceless to those with malicious intent, as vulnerable gateways that can provide access to wider infrastructure.

The problem of security has become multi-dimensional. There is the matter of IP security and how to prevent code being copied and the design cloned. Then, the intended functionality of the systems has to be protected; the design should be secure against being subverted and made to operate in an unintended manner. Of course, the data that the system is primarily intended to handle should be made secure against being copied, as should the details of users.

An attacker should not be able to use the embedded system as an entry-point to gain access to a wider IT infrastructure.

Cryptojacking

To all of these, there has recently been added a new threat; the possibility of stealing compute cycles from a system (embedded, or otherwise). This is the phenomenon of “cryptojacking”, wherein a script is added to the normal operation of the target system, and in the background runs crypto-currency “mining” algorithms, quietly reporting its results via any open port it can access.

The effects may be quite insidious; no data is stolen, no privacy compromised, no malicious actions initiated; the only effect is that CPU cycles “go missing”.

For an embedded system that must exhibit real-time or near-real-time response, that could manifest as a lack of performance at a critical moment. Anecdotally, this has mainly been seen implemented by way of hidden code on web pages. It is, though, not difficult to imagine an embedded system based around a Linux distribution, inadvertently left with an unprotected Internet connection that could be exploited. In a similar vein, systems with Internet connectivity are open to being taken over as “bots”, becoming engines of a third party’s attacks.

For embedded systems designers security is a problem, but what is less clear is what they should do about it.

The software content of an embedded design often contains code drawn from a variety of sources. It can be specifically for the project but could be being re-used from earlier exercises. There may be segments derived from the suppliers of a system’s hardware – IP such as peripheral drivers for on-chip functions; there may also be open-source blocks of code imported into a design. So, at the very least, all of the sections of an application’s software should be available in source form.

The desktop environment has been a battleground for many years, and in that space an ecosystem has evolved to counter threats to security.

In the embedded space, no such support structures exist. Indeed, as the code in most embedded system designs goes into the field in the form of a single binary executable, the notion of a patch hardly applies.

A complete (version) update is the only option, which in most cases will require user/operator intervention, typically by way of loading a new flash configuration.

The mechanism for so doing, also becomes an aspect of the design that must be secured. That is to say, there should be (at least) a robust login barrier giving access to an admin user level, before the system will accept an authenticated update.

One vendor that has emphasised this aspect is STMicroelectronics, which has indicated it is working on a package for Secure Firmware Upgrade, to be deployed across its portfolio with a range of encoding and authentication schemes.

Prescriptions for actions to be taken to ensure an adequately secure product are many but a common theme is start with the basics.

Thinking of all the ways a project might be vulnerable may not come naturally to the designer, many of whom are already multi-tasking between hardware and software...
aspects of the product. Setting aside budget for an outside specialist consultant may yield useful input, and is probably best done at the architecturing stage, rather than as a retrospective audit.

With respect to software, adherence to accepted standards should go a long way to imparting resistance to well-known methods of attack. Specialist software tool vendors offer tools using techniques such as static analysis that are intended to be applied as software is written and developed, to “bake in” the requirements of standards such as MISRA, JSF, or HI++. Code that is compliant to such standards should be resistant to targeted attacks such as forcing stack overflows. The same tool sources caution, however, that while such compliance helps towards ensuring security, it is not enough by itself; it is necessary, but not sufficient.

**Arm cores**

Given the market share of Arm-core-based microcontrollers in the embedded space, there is a high probability that the silicon in a project will employ an Arm core.

Arm has extended its TrustZone technology to cover Cortex-M MCUs, in addition to the Cortex-A series of cores.

TrustZone creates a trusted execution environment, from trusted boot-up onwards and embodies the concept of parallel, trusted and non-trusted, contexts within a single system.

Secure and non-secure domains are hardware separated, with non-secure software blocked from accessing secure resources directly.

Arm says, “TrustZone for Cortex-M is used to protect firmware, peripheral and I/O, as well as provide isolation for secure boot, trusted update and root of trust implementations while providing the deterministic real-time response expected for embedded solutions.”

Microcontroller silicon for the embedded sector typically includes functionality to simplify implementing security features, such as hardware optimised to run encryption algorithms. Of equal importance, the MCU makers typically provide the software IP needed to stitch that functionality into the fabric of an application.

Focus on end-to-end security in IoT means security at the chip level, over the air, at the server and up to the cloud. Security in a design (that includes wireless connectivity) must be continuous across verification of identity and protection of keys; the integrity of data; and the code that constitutes the design.

It is also possible to concentrate on the subtle at the expense of the mundane; many exploits [hacks and attacks] are very simple. Access is granted or achieved because people simply forget to enable security – or using a default password. “Trivial things matter in security,” as one observer has put it.

If your product has a password-protected admin or maintenance mode, at the very least, ensure that every unit shipped is pre-set with a unique and robust password. You appreciate that while your design may “only” control the lighting, or monitor HVAC parameters, it will also have access to the client’s corporate IT system.

The technician who commissions it might overlook that fact, and also the fact that leaving the installation with “pa55word” enabled is less than ideal.

In many ways, this is not a comfortable place for the engineer to be. There is no single, easy way of assessing security and identifying “bulletproof” corrective actions. Mechanisms for updates are fragmentary, yet designers are creating systems that are being deployed now and that will be in service for a decade or more.

Without being overly alarmist, there may be legal minds poised to explore a new area of product liability. In the emerging connected world, how much attention to security might be considered “necessary”, “adequate”, or “sufficient”?

Help is at hand, however, and the chipmakers realise that they must not only provide the cryptography and other hardware elements of secure solutions, but also need to aid their customers in assembling the complete package.
As a driver for innovative systems and sophisticated components, what role can distributors have when it comes to renewable energy?

Andreas Falke takes a look at the market

As the end of fossil fuels is in sight, yet energy consumption continues to increase – be it in the electricity sector (households/industries), the heating sector (apartment buildings/public buildings) or in the transport sector (vehicles, aircraft, trains/other means of transport).

Although energy is being used ever more efficiently and, in some cases, even conserved, economic growth and higher consumption are preventing a more substantial decrease in energy use.

This is where renewable energy sources, such as wind and solar energy, biomass and hydro power, come into play. Since the expansion of renewable energies is a stated objective of the European Union, all member states are required to take action and, despite Brexit, the UK is also committed to reducing its carbon footprint.

At present, wind is among the leading providers of electricity among the renewable energies, followed by solar energy.

The largest wind-turbine generator systems (WTGS) currently available on the market have a generator output in excess of 7.6MW. Just one of these units can supply sufficient electricity to power approximately 5,700 households.

The solar energy that reaches the earth each year is around 10,000 times greater than global demand for energy and solar radiation can be converted directly into electricity with the help of PV systems.

Electronics as a key player

Regardless of the approach used – wind, solar, biomass, hydro - (further) development of technologies in the renewable energy sector is an important area of focus in research and the economy.

All of these technologies have one thing in common: innovative electronics play a key role.

In wind-turbine generator systems, for example, they are used to power the rotors and ensure the reliable delivery of electricity into the network. In PV systems, they are used in inverters to enable the conversion of power.

So, without electronics, biogas plants, geothermal, hydro power or tidal power stations and other systems would be unable to function.

Then there are electrical storage
systems, local distributor networks and smart electricity meters, among others. Improved drive technology, software and infrastructure – these factors offer vast potential for the electronics industry.

The role of distributors
This is precisely where the component distributors, whose business model has undergone an enormous transformation over the past 25 years, have a critical role to play.

Today’s distributors are specialists in their target markets, and they operate people-to-people business models. In their capacity as intermediaries between manufacturers and customers, they contribute significantly to the creation of demand. Distributors provide purchasers and developers with vendor-neutral advice and professional support when it comes to the selection and design-in of technologically and commercially suitable components for their applications. We need only take the example of a wind-turbine generator system (WTGS) and its drive system, in which control elements with sensors and the motor must be integrated into the most compact unit possible. Here, a wide variety of components from different manufacturers must function seamlessly with one another and ensure maximum efficiency to enable the project to reach a successful conclusion.

This cannot work without extensive product expertise regarding the suitable components, the overall applications and the respective market and its specific requirements. WTGS installations, for instance, must withstand exceptionally harsh operating conditions that can range from extreme heat to storms all the way to hail and ice.

As with many other industries, the focus when it comes to harnessing renewable energies is on highly available and reliable systems. This is also demonstrated by the example of the wind-turbine generator system: at a scale of 100 to 1000 kilowatts, set-up and installation including acceptance costs are between 600 and 870 euros per kilowatt of output. As a result, average costs of €735,000 are incurred for each megawatt of installed power.

If the WTGS is now rendered non-functional due to a failed component, costs can add up quickly depending on the duration of the failure. This calculation raises the reliability and availability of replacement components to a new level of importance. The need for support applies not just to the generation of energy but also to the demand side. For instance, companies that develop more energy-efficient systems and/or devices are contributing to a more sustainable future by reducing energy consumption while maintaining the same quality of life. They are often driven by innovative ideas whose implementation requires expertise in conjunction with the components. In this scenario, distributors not only contribute technical expertise - with their expertise in the area of design-in, they can also act as key partners for developments on the part of the manufacturer.

Nowadays, distributors are forward-looking specialists with service offerings of varying scope – ranging from components and availability, EoL, traceability, logistics all the way to technical expertise regarding applicable environmental regulations. No matter how their services are configured – distributors perform an increasingly important role.

Economic power
Renewable energies are ready and waiting to be used in an intelligent way. Everyone can participate in the decentralised expansion of renewable energies, thereby promoting regional value added through installation, maintenance and operation.

Towards the end of 2018, the EU ruled that the share of renewable energies should increase from the previous figure of 30% to 32% of total consumption and adopted Directive (EU) 2018/2001, which must be implemented in the national legislation of the individual countries by 30 June 2021. In addition, consumers throughout the EU are to be empowered for the first time to store electricity themselves and sell it at normal market prices.

With regard to the expansion of innovative concepts, Germany scores highly as a global leader in technology with many years of successful development on the domestic market. Combined with the new EU Directives, growth in demand is virtually guaranteed. All of this means that there is ample potential for the distribution sector to use its expertise to play a driving role in this future market.

Figure 2: Electricity generated (TWh) from renewable sources in the United Kingdom between 2009 and 2018

Author details:
Andreas Falke is Managing Director FBDI e.V.

Figure 2: Electricity generated (TWh) from renewable sources in the United Kingdom between 2009 and 2018

26 November 2019 www.newelectronics.co.uk
New 19" Rack Mount Enclosures With Smooth Top

METCASE has launched a new version of its popular COMBINETM 19" rack cases. It has a wraparound top that offers superior aesthetics and easier access to components. This new version’s U-shaped top reduces the number of case parts and removes the need for visible top screws.

This new design combines the versatility of COMBINETM with the aesthetics of METCASE’S VERSEEKM 19" rack cases. Features also include ergonomic front handles and earth connection points on all panels.

New solid top COMBINETM 19" is supplied fully assembled and in a choice of two colours: light grey (RAL 7035) and black (RAL 9005). It is currently available in one standard height (1U) and two depths: 265 mm and 365 mm. Other sizes can also be specified.

@: sales@metcase.co.uk
@: +44 (0) 1489 583858

New beam angle LEDs from OMC

Ultra-narrow 15 degree LED and precision 60 degree LEDs suit signalling, indication, sensing and communication applications.

OMC, the pioneer in optoelectronic design & manufacture, has introduced two new surface mount LEDs: in the ultra-narrow 15 degree LED and a 60 degree beam angle LED. Both new LEDs are produced in a DMC in range of package styles, beam angles and all popular LED configurations, plus a broad range of job- and site-specific versions. The new DMC offers LED devices for the SMT for series launched by OMC in late 2018, which includes a 30 degree output beam device that has proved popular for two new SAP LED provides designers with greater choice and flexibility to very wide range of applications, including signaling, indication, sensing and communication applications. These beam-angle LEDs are often challenging for designers to source with the proves to be extremely competitive.

OMC’s ultra-narrow 15 degree LED is particularly suitable for the SMD in range of packages, components, some design sensibility was lost. With OMC’s LED, the LED body is generally produced using two optical material which is pre-manufactured before the LED (the LED is denatured, and therefore doesn’t appear in the same way. As a result, the majority of LED packages do not incorporate any estimated worth being in a wide beam angle LED which generally exceeds 60°. OMC, however, uses a proprietary pixel mount in a composition and is able to cost-effectively achieve an even higher beam spread from a range of surface-mount devices.

@: Heathwa@omc-uk.com
@: +44-1208-215424

New Lattice CrossLinkPlus FPGAs Accelerate and Enhance Video Bridging

New Lattice CrossLinkPlus FPGAs Accelerate and Enhance Video Bridging for World-class MIF-based Embedded Vision Systems

CrossLinkPlus family combines FPGA flexibility with instant-on panel display performance, accelerating designs in industrial, automotive, and consumer applications.

Lattice Semiconductor (NASDAQ: LSCC), a leading provider of customizable smart connectivity solutions, today announced the CrossLinkPlus FPGA family to support MIF-based embedded vision systems. CrossLinkPlus devices are innovative, low-power FPGAs featuring integrated fast memory, a hardened MIF PMU and high-speed I/Os for instant on panel display performance, and flexible on-die programming capabilities. Additionally, Lattice provides ready-to-use IP and reference designs to accelerate implementation of enhanced sensor and video display bridging, aggregation, and splitting functionality, a common requirement for industrial, automotive, computing, and consumer applications.

Lattice Semiconductor (NASDAQ: LSCC), a leading provider of programmable solutions, today introduced the CrossLinkPlus FPGA family to support MIF-based embedded vision systems. CrossLinkPlus devices are innovative, low-power FPGAs featuring integrated fast memory, a hardened MIF PMU and high-speed I/Os for instant on panel display performance, and flexible on-die programming capabilities. Additionally, Lattice provides ready-to-use IP and reference designs to accelerate implementation of enhanced sensor and video display bridging, aggregation, and splitting functionality, a common requirement for industrial, automotive, computing, and consumer applications.

Developers want to enhance the user experience by adding multiple image sensors and/or display to embedded vision systems, while also enabling system cost and power budgets. Lattice addresses this need with its CrossLinkPlus FPGA family, which offers a smaller footprint compared to competing devices, 4X faster than traditional FPGA on-die memory, and high-speed I/O support for front-ends and rear-ends. Lattice has also added a new feature to its CrossLinkPlus FPGAs: the ability to transmit signals through the FPGA fabric, providing a powerful tool for developers to create custom solutions.

“Adding HDMI eARC to our cutting-edge Elite line of A/V receivers gives our customers a forward-looking solution that provides high-quality audio in an easy-to-use package,” said Doug Hunter, Director of Marketing at Lattice. “This family of FPGAs is designed to meet the demands of today’s advanced home entertainment systems and provide the performance and flexibility that our customers require.”

PicoCoreMxGUL - Low Power and Low Cost on COM with only 35 x 40mm

NXP’s LMK6640 ARM® Cortex®-A7 CPU on PicoCore™ MxGUL

The module is based on an NXP LMK6640 ARM® Cortex®-A7 CPU with up to 500MHz.

The PicoCore™ MxGUL is offered with up to 512MB SLE NAND Flash or up to 1GB eMMC, an EEPROM is also on the module. Two 80-pins plug connectors (1.5-4mm board to board distance) enable numerous interfaces on the board. Based on 2x Ethernet, 2x USB, 2x CAN, 4x I2C, 4x SPI.

The Linux operating system (Buildroot and Yocto is supported) was ported by the experienced software team of F&S Elektronik Systeme. Drivers were customized and tested for all interfaces.

PicoCore™ MxGUL is available until minimum 2030.

https://www.mansky.co.uk/news/picocoremxmlow-power-and-low-cost-on-com-with-only-35x40mm.html

@: nw@mansky.co.uk
@: 01344 307733

PicoCoreMxGUL - Low Power and Low Cost on COM with only 35 x 40mm

Soft-switching gate drive solution from Pre-Switch slashes solar inverter costs

Two-stage architecture and platform enables significant cost reduction and simplification of renewable energy systems. Grid tie filter size slashed by up to 80%.

Pre-Switch, Inc., a Silicon Valley start-up that emerged from stealth mode last year, has announced that its revolutionary soft-switching (FET and silicon carbide gate driver architecture, including the Pre-Driver™3 controller board, powered by the Pre-Flex™ FET, and RFG gate driver board, can significantly reduce the cost of solar inverters. The two-stage architecture delivers the same switching loss performance – or better – as active level design, resulting in reduced cost, control complexity and GMI count. Pre-Switch has now simplified and cost-reduced silicon and silicon carbide gate drivers and filters used in renewable energy systems, enabling energy to be put back into the grid easily and efficiently.

The Pre-Switch soft-switching platform enables a doubling of power output for a typical inverter, or an increase in switching speed by a factor of up to 2X. Previously, soft switching had never been successfully implemented in SINE systems with good trade-off of voltage and temperature and humid conditions. However, Pre-Switch has overcome the challenging by using 4-channel Integrated IGBTs to considerably reduce the isolation timing in inverters, while the switching system required to form a minimum to the current and voltage lines of power minimizing switching losses.

@: Bruce.renouard@pre-switch.com
@: +1-408-209-3251

Nicomatic’s easy-to-use EMM series suits harsh-environment defense applications

Nicomatic SA, the leading manufacturer of power and signal distribution interconnect systems, has announced new features for its rugged micro-connector, the 1.27 mm pitch EMM series, which targets defense and other high-reliability applications. The EMM Series-13 style connectors that require a significantly smaller footprint than the closest industry convention, are now available in plug-in PCB and other high-reliability applications. The EMM Series-13 style connectors are now available in plug-in PCB and other high-reliability applications. The EMM Series-13 style connectors that require a significantly smaller footprint than the closest industry convention, are now available in plug-in PCB and other high-reliability applications.

Captive screw fixings provide the fastest locking solution available, since there is no need to tighten alternative sides repeatedly. They allow direct force application and provide the additional benefit of being reusable.

Andy Harvey, Managing Director of F&S Elektronik Systeme, was also at the presentation. "With the EMM series, we are now able to offer our customers in hi-tech industries by providing highly reliable solutions for their specific problems, rather than selling them a ‘catalogue part’. The EMM series offers a wide range of features that meet the needs of our customers, including high reliability, easy installation, and high performance."
INDUSTRY-LEADING
SCALABLE ETHERNET.
TIMED TO PERFECTION.

We Turn Your Vision of Connected Factories into Reality.
Analog Devices’ new Chronous™ family of compatible and interoperable industrial ethernet connectivity products enable best-in-class industrial automation solutions for the connected factory of tomorrow. From complete Time Sensitive Networking solutions for high-performance motion control to innovative 10Base-T1L concepts for robust field instrument connectivity – our market-leading and industry-first ethernet portfolio of software and hardware are scalable and timed to perfection. Designed from ADI’s rich factory expertise and system design knowledge, ADI Chronous™ ethernet solutions pave the way for intelligent industrial connectivity to turn your vision of the connected factory into reality.