The Industrial Internet of Things

FEATURING:
- Telecommunications, Wireless, IoT, RF & Microwave
- Surge & Lightning Protection, EMI/EMC Management

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as in, “Mouser is an authorized source.”

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For more information contact Avnet South Africa, +27 11 319 8600, sales@avnet.co.za.

regulars

News................................................................. 3
Events............................................................. 3
Systems, components, design...................... 12
General .......................................................... 27
Literature Showcase ................................. 31
Hot chips ......................................................... 32
QuickFind index ............................................. 33

features

Telecommunications, wireless, IoT, RF & microwave .............................................. 16

Featuring Industrial IoT, wireless charging, and a case study on the creation of a global parcel tracker.

Surge & lightning protection, EMI/EMC management ............................................ 24

EMI filtering and shielding solutions, and protective components for electrical surges.
Mom and dad want to re-marry, but how is the kid doing?

After a messy divorce presided over by former president Jacob Zuma in 2014, the departments of telecommunications and postal services (DTPS) and communications (DOC) are set to re-tie the knot this year. This follows calls from industry to merge the two departments to create an environment in which policy can more effectively be written and regulations developed and implemented, in order to move South Africa’s telecommunications industry forward.

President Cyril Ramaphosa announced late last year that he had appointed Stella Ndabeni-Abrahams, former deputy minister of communications, to head up the merged entity (which will become known simply as the DTPS) and take charge of the merger process. Ndabeni-Abrahams announced in January that the process is gaining traction, as she sets about meeting the president’s target of completing the merger after the 2019 general elections.

But the whole, sordid affair has left scars. Even the aunties and uncles got dragged into it, with eTV and MultiChoice trading legal blows over the issue of encryption. Eventually, grandma (Marian Shinn, the DA’s shadow communications minister) felt compelled to step in and pass judgement, declaring that the split in the department was one of the major causes of delays in digital migration.

Which brings me to the innocent victim in all this: what of the welfare of digital migration? The sickly, misbegotten child of that former union has been left out in the cold while the corporates, politicians and (dare I say) champions of state capture have been fighting over the poor, wretched creature like some sort of gilded wishbone.

The answer to that question, quite simply, is “I don’t know.” After spending R10 billion on the project, government seems to have shrugged its shoulders and declared it somebody else’s problem, by saying it will no longer buy, store, transport or install set-top boxes like it promised, but will instead leave it up to the private sector to fix its mess.

I’m not sure about everybody else, but I’m left fairly clueless as to what’s actually happening around digital migration at this point in time. Can I go into an electronics store and buy a digital TV decoder? No idea. If I did buy one and plugged it in, are there any TV signals for it to receive in my area? Not the foggist. Is the whole thing even still happening? I wouldn’t even hazard a guess.

Surely the Go Digital SA website, set up by the DOC for the express purpose of informing the public, will give me the answers I need? Well, the ‘Digital Coverage’ page on the website, which purports to show what areas of the country are covered, has a tiny pink block (representing free-to-air, i.e., SABC and eTV) and a tiny blue block (representing M-Net) in the rough vicinity of Johannesburg, the same somewhere between Pretoria and what looks like it might be Middelburg, the same again at some unlabelled locale between Richards Bay and Pinetown, and one solitary blue block over Cape Town.

The first two lines of text on the page read: “Full market launch of digital TV is expected to take place during the first [sic] half of 2010. To make sure everything goes smoothly, digital TV broadcasting will be phased in one area at a time [sic], after launch in 2010!” So… not much help then.

Following my investigative instinct, I fired up google to find out more, before bravely giving up halfway through the second search phrase that came to mind. To be honest, who really even cares anymore seeing as we’ve got Netflix now? Getting enthused for the year ahead is a far better use of my energy.

And to start off the year, we bring to you not only the January issue of Dataweek, but also our fourth annual Electronics Manufacturing & Production (EMP) Handbook, featuring news and views from local contract electronics manufacturers, company profiles, technical articles and practical guides, selection guides for equipment, consumables, tools and accessories, and a directory of South African manufacturers, suppliers and service providers.

On behalf of the Dataweek team, I would like to wish all our readers a productive and prosperous 2019!
South Africa

• Avnet South Africa has appointed a new IPE (interconnect, passive and electromechanical) field applications engineer, Quatraine Domoney. She will be based in the company’s Johannesburg office.

• Electrocomp has added three new agencies to its stable, in the form of enclosure manufacturers Hammond Manufacturing and Ritec, and supercapacitor and ultracapacitor manufacturer Vinatex.

Overseas

Business

• Analog Devices announced financial results for its fourth quarter and fiscal year 2018, which ended on 3 November. Revenue totalled $1.6 billion in the fourth quarter, up 2% sequentially and up 4% year-over-year. Annual revenue amounted to $6.2 billion, up 21% year-over-year, which resulted in earnings per share (EPS) of $3.97.

• Maxim Integrated Products reported net revenue of $638 million for its first quarter of fiscal 2019 ended 29 September 2018, a 1% increase from the $633 million revenue recorded in the prior quarter, and an 11% increase from the same quarter of last year. Based on generally accepted accounting principles (GAAP), diluted earnings per share in the September quarter were $0.70.

• For the three months ended 30 September 2018, Microchip Technology reported record net sales of $1.433 billion, up 18.1% sequentially and up 41.5% from the year-ago quarter. Net income was $96.3 million, earnings per share were $0.38, and a record quarterly dividend of 36.45 cents per share was declared.

• National Instruments announced Q3 2018 revenue of $346 million, up 8% year over year. Net income was $43 million, with fully diluted earnings per share (EPS) of $0.32.

Companies

• Taoglas announced the completion of its acquisition of ThinkWireless, an antenna provider that specialises in the design, development and production of combination antenna systems for the commercial vehicle market. The ThinkWireless antennas are available from local distributor, RF Design.

• Infineon Technologies announced it has acquired Siltecrna, a startup which has developed an innovative technology (called Cold Split) to process crystal material efficiently and with minimal loss of material. Infineon will use the Cold Split technology to split silicon carbide (SiC) wafers, thus doubling the number of chips out of one wafer. A purchase price of 124 million Euros was agreed on with the venture capital investor MIG Fonds, the main shareholder.

• Cree has signed a multi-year agreement to produce and supply its Wolfspeed silicon carbide (SiC) wafers to STMicroelectronics. The agreement governs the supply of a quarter billion dollars of Cree’s advanced 150 mm SiC bare and epitaxial wafers to STMicroelectronics during this period of accelerating growth and demand for silicon carbide power devices, particularly in automotive and industrial applications.

Industry

• The Semiconductor Industry Association (SIA) announced worldwide sales of semiconductors reached $41.4 billion for the month of November 2018, an increase of 9.8% from the November 2017 total of $37.7 billion but 1.1% less than the October 2018 total of $41.8 billion. Regionally, year-to-year sales increased in China (17.4%), the Americas (8.8%), Europe (5.8%), Japan (5.6%), and Asia Pacific/All Other (4.4%).

• The Edge Computing Consortium Europe (ECCE) has been established, with the aim of driving adoption of the edge computing paradigm within the manufacturing and other industrial markets. With members including the likes of Intel, Renesas, Harting, Analog Devices, Arm, IBM, National Instruments and around a dozen more vendors and organisations, the initiative will seek to develop specifications for a reference architecture model, technology stacks, identify gaps and recommend best practices for edge computing nodes.

• Research conducted by IC Insights has shown that the world’s leading semiconductor suppliers significantly increased their market share over the past decade. The top 5 semiconductor suppliers accounted for 47% of the world’s semiconductor sales in 2018, an increase of 14 percentage points from 10 years earlier. In total, the 2018 top 50 suppliers represented 89% of the total $314.0 billion worldwide semiconductor market last year, up 7 percentage points from the 82% share the top 50 companies held in 2008.
SA edition of global EMC conference a success

The 4th edition of the IEEE Global Electromagnetic Compatibility Conference (GEMCCon) was successfully held from 7 to 9 November in Stellenbosch, at the Wallenberg Conference Centre, part of the Stellenbosch Institute for Advanced Study (STIAS).

Previous editions of this annual conference have been held in Australia, Brazil and Argentina. GEMCCon brings together the EMC community, both in academia and industry, specifically to date in the southern hemisphere. The event provided excellent opportunities to meet and interact with a large part of the South African EMC community, including current postgraduate students, as well as international community members.

The venue in Stellenbosch is nestled between a vineyard on one side, and a nature park on the other, with beautiful views of the Stellenbosch mountains. It provided a beautiful setting for a very creatively interactive conference. The welcome cocktail evening was held on the porch, with delightful weather, calming music, delicious snacks, some local gins, and good Stellenbosch wine, of course. It provided a good opportunity for relaxed networking and relationship-building. Excellent service from the venue staff ensured that everything at the conference went smoothly as planned.

Our plenary speaker, Keith Armstrong, gave an insightful talk, as well as a tutorial session, on the functional safety and risk in EMC. This, together with the special sessions on time domain EMC measurements, risk-based vs rule-based EMC, and EMC in large installations, attracted great interest from the audience. For the three special sessions, our invited speakers were Marc Pous, Paul van der Merwe and Frank Leferink. South Africa’s own pioneering EMC engineer, Sarel van der Merwe, gave a very interesting talk on the history of EMC in South Africa.

All the other technical papers were very well received. A student paper competition was also held, which Thabo Nhlapo from the South African Radio Astronomy Observatory (SARAO) won. The book and book-voucher prizes were graciously sponsored by the IET.

The conference platinum sponsors, EDA Technologies and Würth Elektronik, both gave very practically useful workshops during the conference. This was preceded by a short technical presentation of each of their company’s capabilities and services. It also worked extremely well to include all the other sponsor exhibit tables inside the auditorium hall where the papers were presented, which allowed the sponsors to participate more easily with the technical talks as well.

The poster session was held in the library hall of the historical Manor House behind the conference centre. A local wine farm, Asara, provided wine-tasting and gin-tasting on the one side of the hall, while the technical paper posters were displayed alongside local university postgraduate student posters as well. Feedback on the quality of work in both the technical and student posters was very good. It also allowed student exposure to local and international opportunities, with good interaction and new relationships formed.

The gala dinner banquet followed the poster session, with excellent food and excellent wine, two things South Africans are particularly proud of and fond of. It was rounded off with more relaxed conversations during after-dinner drinks. During these sessions it was more than just work relationships that were strengthened, but new friends were made.

A special thanks goes to the organising committee of vice-chair and treasurer, Temwani Phiri; conference administrator Anelja de Bok; and international chairman, Alistair Duffy. The team did an outstanding job of making the conference a huge success. Our generous sponsors played an important role in this as well, together with our venue and service providers.

With the success of this conference, conversations have already started to pursue future workshops, collaborations and conferences on the topic of EMC in South Africa, to also include other southern African countries. More collaboration with international partners and the IEEE EMC Society is also planned, to allow the growth of the EMC community in southern Africa.

For more information contact Gideon Wiid, gwiid@ieee.org.
Avnet South Africa are hosting their familiar AVNET INSIGHTS 2-day Technology Seminar which includes presentations from some of our leading manufacturers as well as some guest industry partners like Vodacom, Sqwidnet and iSert Laboratory.

Attendees can choose from a wide range of classes over the 2 days from local and international presenters. There will also be time to engage with the various representatives outside of the presentations and spend time at the various stands on display at the event.

A once off registration fee of R350.00 (VAT inclusive) per delegate will be charged, which will include your attendance for both days.

Numbers are limited per class and bookings will be on a "first-come-first-served" basis.

Join us for this exciting event on Tuesday the 5th and Wednesday the 6th March 2019 at Blandford Manor in Johannesburg.

Registration & Class Selection online: www.avnet.co.za

TOPICS OF DISCUSSION:

Avnet Abacus
• Battery trends and technologies
• Selecting the right lithium battery

Digi
• XBee: One Footprint – Multiple Protocols
• The CC8X – An iMX8X IoT-Enabled SoM

Infineon
• Demystifying MOSFET's & selecting the right device for your application

Maxim Integrated
• Security & Authentication including PUF Technology
• NanoPower – extending the life of your battery powered designs

Microsoft
• Azure & IoT Central Cloud Solution
• Azure Sphere – A Secure, connected solution for MCU’s

Nordic Semiconductor
• Demo of BLE Stack implementation with a simple user app
• NB-IoT – Demo of config and first comms with the nRF91

Panasonic
• Ultra low power Panasonic modules for smart IoT nodes
• MLCC replacement – Polymer caps, the perfect solution for your Design

Quectel
• Future-proofing your GSM design

STMicroelectronics
• Sigfox: From Concept to Certification

Telit
• NB-IoT Technical features & Integrated Cloud Connect

*Topics subject to change without prior notice
The annual Centre for High Performance Computing (CHPC) conference, which took place in Cape Town recently, provided a platform for South African students to showcase their skills in building supercomputers and their innovative ideas on how to prevent cybercrimes through the Student Cluster Competition and the Student Cyber-Security Challenge.

In 2018, following the theme of the conference on how high-performance computing (HPC) transforms for the future, growing of women’s participation in HPC was prominent. This was supported by the introduction of a sponsorship for an outstanding woman in the Student Cluster Challenge.

The award in this newly introduced category, sponsored by Intel, was taken by Ms Mapule Madzena, a student from the University of the Free State. She was hailed as the best female student who participated in the competition and walked away with R64 500.

Six students from the University of Cape Town (UCT) and the University of the Witwatersrand (Wits University), who came out tops at a national Student Cluster Competition to build a supercomputer, will fly the South African flag at the International Student Cluster Competition in Germany, in June this year.

During the local competition, 10 teams of students from various universities in the country battled it out to build small high-performance computing clusters on the exhibition floor – using hardware provided by CHPC and its industrial partners – and raced to demonstrate the best performance across a series of benchmarks and applications.

Sefan Schroder, Dillon Heald, Jehan Singh and Clara Staasen from UCT; Anita de Mello Koch and Kaamilah Desai from Wits University, will test their skills against their international counterparts when they compete with computer students from 11 countries, including China, Germany, Poland, Singapore and Thailand, among others.

In the cybersecurity challenge, the University of Pretoria came first, followed by Stellenbosch University. This competition provides a platform for students to compete in real-time and come up with ideas that could protect South Africa from cybercrimes. The winning team will compete at an appropriate international competition, such as the European Cyber Security Challenge.

The CHPC is a Department of Science and Technology (DST) initiative managed by the Council for Scientific and Industrial Research (CSIR). Speaking at the conference, DST chief director: emerging research areas and infrastructure, Dr Daniel Adams, said that the event was critical to develop the skills needed in the country.

“Looking back at the first meeting where we engaged in the discussions of building a strong high-performance computing community in South Africa, and advocating for financial support from government, significant growth has been achieved. Notably, it is now a continental focus, not only on computing, but overall cyberinfrastructure growth and demonstration of impact, he said.

Held under the theme "Transforming the Future Through High Performance Computing and Transforming High Performance Computing for the Future", the conference attracted over 400 people from business, industry and academia.

For more information contact David Mandaha, CSIR, +27 12 841 3654, dmandaha@csir.co.za.
Laser Technology Conference

7-8 March 2019
Emperors Palace Convention Centre, Johannesburg

Aspects to be covered
- Technological innovations
- Opportunities in the industry
- Laser safety, regulations and standards
- Skills and capacity development
- Research development and industry collaboration
- Laser applications in the medical industry

Objectives of the conference
- To deliberate on new trends and innovations in the laser technology sector
- To cultivate industry collaborations and partnerships between sectors
- To discuss opportunities arising in the industry
- To investigate manufacturing capabilities and infrastructure boosting
- To deliberate on the challenges and possible solutions
- To deliberate on laser safety, regulations and standards
- To network with industry experts in the laser technology industry

Speakers Include

Prof Andrew Forbes, Professor at School of Physics, WITS University
Gareth Jackson, Product Manager, Bystronic South Africa
First Cut
Wicus Olivier, Managing Director, HiTech Lasers

Emma Molobi, Senior Engineer (Metallurgy & Materials), Transnet Engineering
Prof Anton du Plessis, Unit Manager: CT Scanner Facility, Stellenbosch University
Senisha Moonsamy, Head of Innovation, Skills & Development, Technology Innovation Agency

Andrew Poole, Managing Director, First Cut
Anthony Keyter, Director, ArchiScan

Kyle Parker, CEO, Mitas Corporation
Prof Heidi Abrahamse, Director: Laser Research Technology, University of Johannesburg
Dr Aletta Karsten, Programme Manager, National Metrology Institute of South Africa

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It was a big decision amongst the Microtronix management team whether to have a 25th birthday function or not. After all, we are supposed to be an electronics manufacturing company and not an event organising company, and on top of that we are currently in a tough economic climate, and we are at our busiest and under the most amount of pressure near the end of the year.

After some short deliberation we all agreed that if we look back over 25 years, we actually do know how to throw good parties! But more importantly there are certain milestones in life that we need to recognise and stop for a few moments to appreciate and celebrate. Our celebration with staff and customers on 22 November 2018 was one of those occasions.

Microtronix started out from humble beginnings in 1993 in a small three-storey building in Fontainebleau with about five staff members, then 10, then 15. Our major clients in those days were the illegal casinos, which you'll be glad to know later became legal. A few years later we were offered an opportunity to build LED moving signs for a company called Stella Vista but it was on the condition that we moved to Turfontein, next to the client.

Microtronix became a proper sweat shop in Turfontein, where our staff grew to a complement of around 50 members. We stayed in Turfontein for another seven years but as we adopted more clients we decided it was time to start saving for our own factory. In 2003 we began construction of our own custom-built factory, and in 2005 we moved into our current facility in Strijdompark and have been there for over 14 years.

By 2014 Microtronix employed well over 200 staff and was servicing some major customers. In 2015 we made our next big strategic change to the company: we got bigger and we got smaller. Smaller as in we acquired SMTech, a smaller factory in Pretoria with only two pick-and-place lines, to cater for prototyping and clients in and around Pretoria with lower volumes. In 2015 we also got bigger, I got a call from a company called BUA Africa asking us to produce set-top boxes. Considering we had already produced over two million Samsung TV boards we decided this job could be done. In 2016 we renovated an old building in Strijdompark into a new state-of-the-art facility and formed BUA Microtronix, a new entity, with the team from BUA Africa coming on board as shareholders. This entity is now 51% black owned and to date we have produced well over two million set-top boxes for Multichoice.

Over the past 25 years we have gone from a small ‘garage’ business to a multiple-entity and multiple-factory manufacturing group. Of course, we could not have achieved this without our clients, and I'm extremely grateful for the long partnerships we have had with many of them over the years. For new clients, we are merely a supplier and our future business is as good as our last run. However, over time our clients learn that we are by far ‘the best of the worst’ – we fix our mistakes, we improve our processes and most of all, we care about our clients. So, in time we have become more than suppliers but partners in our clients’ businesses, and them in ours.

To the staff of Microtronix, you are the real unsung heroes. You have worked hard over the years and Microtronix has become far more than a company – it is a large family unit, where people support each other and have the opportunity to grow. We have always used the slogan in our adverts ‘the only constant is change’. Many years ago one of my mentors told me that a business cannot stand still – if it does not grow it will shrink, and many times along our journey over the past 25 years we have taken bold steps. One never knows if those decisions were correct and if the stress levels were worth it, but today I guess I can take some comfort in knowing most of my decisions along the way – together with the Grace of God - were in fact bold but probably correct, and that has kept us ahead in business over all these years.

Mike Goodyer, Owner of Microtronix
AVR MCUs get beta support in MPLAB X

Microchip Technology recently announced the release of MPLAB X integrated development environment (IDE) version 5.05, which beta supports the majority of AVR microcontrollers (MCUs).

This release will allow designers who traditionally used PIC microcontrollers and developed with the MPLAB ecosystem to easily evaluate and incorporate AVR MCUs into their applications. Microchip says support for additional AVR MCUs and enhancements will be added in future MPLAB versions, while AVR support will also continue to be added to Atmel Studio 7 and Atmel START for current and future AVR devices.

MPLAB X IDE version 5.05 provides a unified development experience that is both cross-platform and scalable, with compatibility on Windows, MacOS and Linux operating systems, allowing designers to develop with AVR MCUs on their hardware system of choice.

The tool chain has been enhanced with support for Microchip's code configuration tool, MPLAB Code Configurator (MCC), making it easy for developers to configure software components and device settings such as clocks, peripherals and pin layout with the tool's menu-driven interface. MCC can also generate code for specific development boards, such as Microchip's Curiosity ATMega4809 Nano (DM320115) development board and existing AVR Xplained development boards.

More compiler choices and debugger/programmer options are also available when compiling and programming AVR MCUs using MPLAB X IDE 5.05. Compiler choices include the AVR MCU GNU Compiler Collection (GCC) or the MPLAB XC8 C compiler, providing developers additional advanced software optimisation techniques to reduce code size. Designers can also accelerate debugging and programming using the MPLAB PICkit 4 programmer/debugger tool or the newly released MPLAB Snap programmer/debugger tool.

The majority of development boards available to evaluate and program AVR MCUs are supported by the MPLAB ecosystem and MCC. Xplained development boards are compatible with START and are now compatible with MPLAB X IDE.

Xplained development boards are cost-effective, fully integrated MCU development platforms targeted at first-time users, makers, and those seeking a feature-rich rapid prototyping board. The Xplained platform includes an integrated programmer/debugger and requires no additional hardware to get started.

MPLAB X IDE version 5.05, MPLAB XC8 C compiler and AVR MCU GCC are available for free on Microchip's website.

For more information contact Shane Padayachee, Avnet South Africa, +27 11 319 8600, shane.padayachee@avnet.eu.

Evaluation kit for Vishay sensors

The Vishay SensorXplorer evaluation kit is based on a universal USB-to-I2C board for connecting individual sensor boards to a host PC. All software and connectors are included with the kit, which is backwards-compatible with existing SensorXplorer boards while also supporting the latest models. The comprehensive range of sensor boards supports the rich selection of sensors in Vishay’s portfolio and can be used for ambient light, proximity and bio-sensing applications.

The VCNL4020-SB supports the VCNL4020 sensor, which has similar proximity capability and adds an ambient-light sensor (ALS) with sensitivity close to that of the human eye, making it ideal for HMI management. There is also a board dedicated to the VCNL4020C, a short-range proximity sensor for distances up to 20 mm that can be used for bio-sensing applications such as heart-rate monitoring.

For mid-range proximity sensing, the VCNL4035X01-SB works at distances up to 500 mm, and with added gesture sensing in the VCNL4035X01-GES-SB lets engineers develop even more intuitive user interfaces for next-generation projects.

For fast response, high accuracy and low power, the VCNL4040, supported by the VCNL4040-SB board, features intelligent cancellation to eliminate crosstalk and implements smart persistence to combine high speed and accuracy.

For more information contact RS Components, +27 11 691 9300, sales.za@rs-components.com.
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www.microchip.com/SmartConnectedSecure
Microchip, via its Microsemi Corporation subsidiary, announced an extension to its Mi-V ecosystem by unveiling the architecture for a new class of SoC FPGAs at the RISC-V Summit during December 2018. The new family combines the low-power, mid-range PolarFire FPGA family with a complete microprocessor subsystem based on the open, royalty-free RISC-V instruction set architecture (ISA).

The new architecture brings real-time deterministic asymmetric multiprocessing (AMP) capability to Linux platforms in a multi-core coherent central processing unit (CPU) cluster. Developed in collaboration with SiFive, it features a flexible 2 MB L2 memory subsystem that can be configured as a cache, scratchpad or a direct access memory. This allows designers to implement deterministic real-time embedded applications simultaneously with a rich operating system for a variety of thermal- and space-constrained applications in collaborative, networked IoT systems.

PolarFire SoC includes extensive debug capabilities including instruction trace, 50 breakpoints, passive run-time configurable Advanced eXtensible Interface (AXI) bus monitors and FPGA fabric monitors, in addition to Microchip’s built-in two-channel logic analyser, SmartDebug. The architecture includes reliability and security features, such as single error correction and double error detection (SEC-DED) on all memories, physical memory protection, a differential power analysis (DPA)-safe crypto core, defence-grade secure boot and 128 Kb Flash boot memory.

Evaluation and design with PolarFire SoC are supported by the antmicro Renode system modelling platform, which is now integrated with Microchip’s SoftConsole IDE for embedded designs targeting PolarFire SoCs. A PolarFire SoC development kit is also available, consisting of the PolarFire FPGA-enabled HiFive Unleashed Expansion Board and SiFive’s HiFive Unleashed Development Board with its RISC-V microprocessor subsystem.

For more information contact Dirk Venter, Altron Arrow, +27 11 923 9600, dventer@arrow.altech.co.za.

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Analog Devices’ EV-ADE9153ASHIELDZ is an Arduino shield compatible with Arduino Uno, Arduino Zero, or ESP8266. The shield has an on-board shunt resistor for line current measurement and enables quick evaluation and prototyping of energy measurement systems that use the ADE9153A single-phase energy metering IC. Arduino library and application examples are provided on the ADE9153A product page to simplify implementation of larger systems.

Using mSure autocalibration, the shield can be calibrated to measure energy with 1% accuracy over the dynamic range without the need for expensive calibration equipment.

Specifications include nominal current of 5 A, maximum current of 10 A, and up to 240 Vrms nominal line neutral voltage measurement.

For more information contact Conrad Coetzee, Altron Arrow, +27 11 923 9600, ccoetzee@arrow.altech.co.za.
The Electronics Buyers’ Guide

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How a global parcel tracker was brought to life in just three years

Every month, 13 million Euros’ worth of packages go missing. Solving this thorny global logistical issue is a lucrative Internet of Things (IoT) opportunity – one that businesses and entrepreneurs around the world are scrambling to address.

Time is of the essence in this competitive space, as the number of large-scale IoT projects doubled in the year 2017 alone. So, London-based IoT innovator, Hanhaa, turned to Avnet to get its smart parcel solution, ParceLive, to market quickly.

A richer picture of your shipments

Hanhaa CEO, Azhar Hussain, had a small business with a big mission: to enable businesses to monitor their global shipments at massive scale – meaning, tens of thousands of parcels – and make detailed information more easily accessible. Where was the parcel? Was it within the allowable temperature range? Had it got wet? Had it been tipped, dropped or opened?

What’s more, Hussain wanted to offer his product as a service to make it more operationally feasible for a broad range of customers. “By offering ParceLive as a tracking service, our customers can stay focused on using their IoT data to improve their business without worrying about the upfront logistics and expense,” he said. “Customers won’t need to buy the trackers, or charge them, or test them, or ship them around the world. We look after all of that while providing near real-time data about their parcels.”

This startup founder’s promising vision hinged on one small, yet surprisingly complex, piece of technology: the parcel tracking device itself.

Tackling technology complexity

At first glance, the ParceLive device sounded straightforward. It was based on individual pieces of proven technology, from GPS and other sensors to the wireless communication equipment.

“It was when we started combining these different capabilities that things quickly become more complex – especially the antennas. A small tweak to one part of the design had a big impact elsewhere,” Hussain said. The product simply wasn’t meeting the requirements, so he turned to Avnet for a solution.

There were three primary technical challenges that needed to be tackled. Firstly, the microcontroller (MCU) architecture was not performing at the required levels. The solution was to migrate to STMicroelectronics for significantly enhanced performance with full design support.

The second challenge was that the battery life was too short for international tracking. This was solved by leveraging VARTA’s certified solution to increase battery life from seven days to more than 20 days.

Finally, the existing chip antenna would not allow ParceLive to track with the granularity required for the product to reach its full potential in the market. Avnet thus worked closely with TE Connectivity’s engineers to upgrade the chip antenna to an embedded antenna that could offer a far greater granularity of data and a tracking performance that was previously unattainable.

As the team worked through Hussain’s ideas to refine the engineering, components and supply chain requirements, they were able to identify and quickly fix a number of issues with the MCU architecture and battery life. Still, it became clear that Hanhaa’s complex radio frequency (RF) requirements needed a specialist’s attention. The Avnet team knew that TE Connectivity was the right partner to call.

Paul Jones, business development manager at Avnet Abacus, has worked with many startups at this same point in their product development process, when they’re beginning to grasp how complex and challenging it is to recognise and mitigate design risks. “In IoT especially, a small mistake early in the design process can cost vast amounts of time and money further down the line,” he said.

“Armed with its network of highly specialised engineers and production equipment, TE was uniquely positioned to help Hanhaa avoid that scenario with their antennas. As Azhar told us: ‘TE helped us climb a wall before we even realised it was a wall.’”

A sounding board for ideas

TE’s engineers reviewed Hanhaa’s designs and highlighted issues that could affect the tracker’s performance or battery life, working in tandem with Avnet’s experts to balance both the requirements of the overall device and those of global markets. Together, the team helped Hanhaa overcome its antenna development hurdles and save significant time and money.

“TE helped us refine the designs and tune the performance so that the tracker delivered the level of accuracy we needed,” Hussain said. “Thanks to this close collaboration with Avnet and TE, ParceLive is able to offer capabilities like passive antenna arrays that enable GPS readings from inside a building, for example.”

Because they leveraged Avnet’s expertise to pull the most complex pieces of their path to market together, including TE Connectivity’s specialised antenna resources, Hanhaa was ready for its commercial launch in less than three years. That means it took Avnet less than 1000 days to take its concept, prototype it, refine it and get the first 20 000 units manufactured – one fast path to market for a small business.

“Global product development is one of the most complex and resource-heavy endeavours you can take on – especially for IoT entrepreneurs,” Jones said. “We’re committed to helping startups succeed because nobody can do it alone. We’ll use our global ecosystem to help you move faster than your competitors while still checking all the boxes for the long-term.”

For more information contact Avnet South Africa, +27 11 319 8600, sales@avnet.co.za.
Development kit for wireless power transfer

Würth Elektronik eiSiSos and Infineon Technologies have jointly brought a development system for wireless power transfer to market. The kit serves to develop applications outside the Qi standard up to a power of 200 W.

Data can also be transmitted via transmitter and receiver coil, as well as receiver sending data to the transmit coil. A manual is available online and explains the innovative method of modulating the alternating field between transmitter and receiver. Options include sensors and a display board to test scenarios for data acquisition, forwarding and display.

Possible fields of application include Industry 4.0, IoT or medical technology, for instance. Wherever there are harsh environments with any cable and connector openings in enclosures which should be avoided, such as in the case of wireless battery charging, it may be expedient to convey status messages.

The 760308EMP-WPT-200W development kit includes a power supply unit, a transmitter and a receiver unit. The transmitter side consists of a full bridge and a resonance circuit. This is formed from the series connection of the WPT coil and the resonance capacitors. As a result of the phase shift between the voltage and current in the resonance circuit, the system works in ZVS (zero voltage switching) mode. This leads to a very high efficiency of the overall system.

A synchronous rectifier is used on the receiver side with downstream filtering and screening. In addition, amplitude modulation (AM) of the alternating field between the transmitter and receiver allows any data to be sent from the receiver side to the transmitter side.

Antennas for iDAS applications

Wireless connectivity has become a major consideration for building owners. As 80% of cellular connectivity occurs indoors, the reliance on the LTE network poses a problem for large buildings which have little or no cellular coverage.

Taoglas thus provides a selection of IDAS (indoor Distribution Antenna Systems) which will facilitate and provide coverage for smartphone usage and wireless internet to support smart buildings.

Applications are extensive, and cover smart lighting, heating management, connected security as well as monitoring, pollution and earthquake warning systems. Many hospitals, airports and stadiums will have reliable Wi-Fi but cellular coverage is still necessary for building owners. Cellular coverage has advantages over Wi-Fi because it is broader and is, therefore, more suitable for IoT. Furthermore, cellular data is encrypted whereas data over Wi-Fi is not, making it a more secure solution for payment systems. Networks using the LPWAN, CAT-M or NB-IoT protocols using mobile networks will benefit from boosting the cellular network in buildings. LTE public safety networks in the US (FirstNet) and the UK (ESN) rely on cellular connectivity. While building infrastructure created problems for effective public safety communications in the past, iDAS creates a solution for building owners and for first responders.

Finally, the installation of iDAS antennas decreases costs for the building owner because there is little or no need to install a large number of Wi-Fi routers in the building, since cellular coverage is sufficient in order to decrease dependency on Wi-Fi connectivity.

Taoglas’ product range includes the iDAS.C.001 ceiling-mount omnidirectional antenna, a compact LTE MIMO circular antenna with high performance and low passive intermodulation (PIM). It covers the frequency bands 699-960 MHz, 1710-2700 MHz and 3400-4000 MHz, for worldwide coverage of 4G, 3G and 2G bands. It measures 218 mm in diameter and 40 mm in profile, and carries an IP67 waterproof rating. Also available is a wall-mount model, the iDAS.W.001 MIMO.

For more information contact Andrew Hutton, RF Design, +27 21 555 8400, andrew@rfdesign.co.za.

Würth Elektronik eiSiSos and Infineon Technologies have jointly brought a development system for wireless power transfer to market. The kit serves to develop applications outside the Qi standard up to a power of 200 W.

An application example that can be simulated with sensors at the I²C interface of the receiver board, is a mobile device that sends data to a base-station while charging. All data and documentation necessary to realise a proprietary system of this kind are freely available for download.

For more information contact Jason Page, Würth Elektronik eiSiSos, +27 71 259 9381, jason.page@we-online.com.

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That feeling of frustration surges when one can’t spot a spare power outlet or doesn’t have a charging cable or a battery pack – all too familiar scenarios in public places like airports, trade exhibitions, shopping malls, hospitals, etc.

However, what if items of portable electronics could be charged by just placing them on a table without plugging into a wall socket or some other power outlet? That is, of course, the key value proposition that wireless charging technology now presents.

Offering increased convenience, mobility and flexibility by eliminating wired connections, the technology is seeing rapid adoption in the consumer, retail, medical, Internet of Things (IoT) and automotive domains. Coffee shops like Starbucks, hotel chains and furniture manufacturers are all integrating the necessary infrastructure to support it. According to Global Market Insights, the wireless charging business is expected to experience a compound annual growth rate (CAGR) of 13% between now and 2024.

Despite its emergence in recent years, the technology itself is not actually new at all; it has in fact been around since 1902, when celebrated electrical engineering luminary Nikola Tesla filed a patent for what must have been almost unthinkable then. He envisaged transmitting electrical energy through the air by creating a magnetic field between two coils – a transmitter and a receiver. Further developing on it, contemporary implementations of this basic concept broadly come in three different forms:

• The charging pads used by smartphones, which rely on tightly-coupled electromagnetic inductive or non-radiative charging and require very close contact.

• Charging bowls or through-surface type chargers, which employ loosely-coupled or radiative electromagnetic resonant charging – allowing power transmission over a few centimetres.

• Uncoupled radio frequency (RF) wireless charging, which enables charging over distances of several metres.

In terms of transmitted power, wireless charging applications – typically transmitting 2 W to 100 W of power – can again be grouped into three principal categories:

• In the low power range (up to 5 W) are wearable devices like headsets, smart watches, electric toothbrushes, wristband devices, medical sensors, etc.

• Situated in the medium range (5 W to 15 W) are handheld devices, including tablets, medical electronics and most notably phone handsets.

• The high power range (15 W to 100 W) covers applications such as power tools, drones and other heavy-duty equipment.

### Convergence of wireless charging standards

The recent developments among the standards governing wireless charging technology are also a testament to its rapid and widespread adoption across multiple sectors. Until a few years back, wireless device manufacturers had to deal with three competing standards: Alliance for Wireless Power (A4WP), Power Matters Alliance (PMA) and Wireless Power Consortium (WPC). However, in 2015, A4WP and PMA decided to join together to form the AirFuel Alliance – whose advocates include Dell, Duracell, Samsung and Qualcomm.

Further consolidation came in 2017 when Apple decided to offer wireless charging in iPhones based on the Qi standard. Pronounced ‘Chee’, Qi is the wireless inductive charging standard developed and licensed by WPC. Since the introduction of its first specification in 2009, Qi has come a long way. It has the support of over 200 companies, including technology leaders like Apple, Google, Samsung and Bosch.

WPC’s latest Qi Power Class 0 specification (version 1.2.3) applies to the transfer of power of at least 5 W and up to 30 W with a typical operating frequency range of 87 kHz to 205 kHz. The primary application of Qi technology is for smartphones and other low-power handheld consumer electronics. In addition to inductive charging, where transmitter and receiver need to be close (less than 7 mm apart), WPC has been working on Qi-compliant magnetic resonance technology that removes the close-contact requirement, allowing power transmission over distances of up to 45 mm.

After Apple’s announcement to support Qi, Powermat, one of the early pioneers in wireless charging stations, also had to change tracks. It had followed the PMA standard for years, but in January 2018 the company announced that it was joining WPC. Well before Apple’s announcement, Starbucks had rolled out Powermat charging stations based on PMA, but it also decided to implement updates in order to support Qi on the new iPhone models.

Following the domination of WPC’s Qi standard in close-contact charging, AirFuel has set its sights on two non-contact charging technologies. These are AirFuel Resonant, which offers greater spatial freedom with charging across distances of up to 50 mm, and AirFuel RF, which provides low-power charging at distances from a few centimetres to a metre.

With wireless charging technology settled on two main standards – Qi by WPC and AirFuel – the uptake of necessary wireless electronics hardware, like transmitter and receiver coils, controllers and development tools, is set to gain momentum.

### Wireless development tools

To help designers evaluate the features and performance of wireless applications under development, leading electronic component manufacturers offer a range of development and evaluation tools. An example is the STEVAL-IS8045V1 wireless battery charger transmitter evaluation board from STMicroelectronics.

Powered by the STWBC-WA digital controller, it offers 2.5 W of output power along with resistive and capacitive modulation, foreign object detection (FOD) and active presence sensing. Similarly, IDT supplies a range of WPC-compliant wireless power receivers, transmitters and evaluation hardware. Comprising of both a transmitter (P9235A-R-EVK) and a receiver (P9027LP-R-EVK), the IDT WP3W-RK wireless power reference kit is applicable for prototype testing of 0.5 W to 3 W wireless charging applications.

The transmitter is based on the flexible 32-bit ARM Cortex-M0 processor with integrated full-bridge power stage drivers and on-chip simultaneous voltage/current demodulation capabilities. Offering an ultra-compact form factor, the active area of the receiver board and
Transmitter boards are just 5.7 mm x 5.7 mm and 22.7 mm x 21.2 mm respectively. With three coil sizes for output power (1 W, 2 W and 3 W), the package is aimed at rapid prototyping.

For testing low-power wearable applications, Semtech’s TSWITX-G4-EVM (shown in Figure 1) is a ready-to-use evaluation platform for approximately 1.25 W of wireless power transmission. Based on the TS80002 wireless power transmitter controller and TSS1231 driver, when paired with a compatible receiver, TSWIRX-5V2-EVM is a complete system design solution.

The platform is not Qi compliant, in order to employ smaller coils and other optimisations that suit low-power wearable applications. Also, it doesn’t include FOD – which is not applicable as the risk of overheating is not present in such applications.

Transmitter ICs, plus transmitter and receiver coils

One of the key features of wireless charging technology is modulation of transmitted power based on the communication between a receiver and a transmitter. The BQ500210RGZT from Texas Instruments is a Qi-compliant wireless power transmitter controller that integrates the logic functions to control wireless power transfer in a single-channel, WPC compliant contactless charging base station.

As shown in Figure 2, the controller monitors all communications from the receiver and adjusts power applied to the transmitter coil according to the feedback from the powered device. Besides managing the fault conditions, the controller includes parasitic metal object detection (PMOD) and over-temperature protection.

With its small form factor (7 mm x 7 mm) and operating temperature range from -40°C to 110°C, key applications include WPC 1.0.2 compliant wireless chargers for smartphones, MP3 players, digital cameras and cars, plus various tools and the built-in wireless stations found in furniture.

Besides development tools and controllers, the most ubiquitous components in all wireless charging applications are the transmitter and receiver coils. Vendors adopting wireless technology can choose from a wide range of copper coils that come in different diameters, thicknesses and inductances.

By way of example, Vishay’s IWTX47R0BEEB6R3J11 is a 6.3 μH inductance wireless charging transmitter coil that comes with high-permeability shielding. In terms of size, it is only 47 mm in diameter and 4.9 mm in thickness. On the receiver side, the AWCCA-36R36H08-C51-B from Abracon is a 12 μH inductance single wireless charging coil for receiver applications in consumer electronics and wireless charging stations.

Similarly, Würth Electronics’ 760308101303, is a 12 μH, 26.3 mm diameter and 1.31 mm thick receiver coil, while the WT252512-8F2-5M from TDK is a 2.76 μH transmitter coil with maximum DC resistance of 150 mΩ, with 25 mm diameter and 2.05 mm thickness.

Conclusion

Although wireless charging technology has taken off, it still comes with certain constraints – like the requirement of proximity between transmitter and receiver, relatively slow charging speeds, incompatibility with metallic enclosures, and risks of overheating. Discerning consumers don’t want mobility to be compromised and also desire higher replenishment speeds.

The next frontier for the power electronics sector is, therefore, more rapid contactless charging over longer distances. The technology will fully deliver on its promise when people can go about their everyday lives without ever worrying about carrying cables or power banks along with them.

For more information contact TRX Electronics, authorised Mouser partner in South Africa, +27 12 997 0509, info@trxe.com.
Overcoming the challenges of implementing IIoT technology

The Internet of Things (IoT) is the culmination of progression that has been made within a number of different, interrelated technology disciplines in recent years.

Through major advances in wireless connectivity and sensing, as well as support given by processing, control and power management devices, the stage is now set for IoT to start seeing widespread deployment in both consumer and industrial spheres.

The purpose of the following white paper is to look specifically at Industrial IoT (IIoT). It will describe the commercial dynamics and market trends that are defining this particular sector. In addition, it will give details of the various design issues being faced by engineers as they look to develop and implement IIoT systems, then explain how these challenges may be overcome.

Looking at the Industrial IoT (IIoT) market specifically, industry analyst firm, Market & Markets, estimates that by 2022 the global IIoT business will be worth around $195 billion annually. There are many factors that will drive this growth, but the principle ones are for companies to be able to:
- Gain from more efficient working practices, through access to and subsequent analysis of the large quantities of data derived.
- Respond quicker to incidents that might occur which could otherwise have costly or dangerous outcomes, such as a fault arising or some deviation in an industrial process.
- Be notified more quickly for places where maintenance (or other pre-emptive measures) might be required to prevent faults that could impact operations in the long term.

IIoT can enable higher degrees of automation and thus raise productivity. It can also help companies to broaden the array of services they can offer, heighten safety, avoid downtime (and the financial expense associated with this), better control their assets and also become more ecologically responsible. The fundamental technologies that will form the basis of IIoT implementations are connectivity, sensors and actuators.

Connectivity

Predictions about the number of connected IoT nodes that will be in operation vary quite considerably. Table 1 gives a detailed summary of the forecasts being made by different organisations. The most ambitious suggest there will be 50 billion by 2020, while others claim 20 to 30 billion. The most conservative make figures as low as 10 billion. What is certain is that there will be tens of billions of objects being connected to the Internet over the course of the next few years, and around 50% of these will be for some type of industrial application.

There are a multitude of different connectivity technologies offered that will support IIoT. Some of these are already established, while others are still in the process of emerging. They include traditional industrial wireline protocols (such as CAN bus, FieldBus, Hart, KNX, Ethernet, MBUS and PLC), as well as wireless protocols.

The wireless connectivity options can be categorised as either cellular-based ones that cover the wide area network (like LTE-M, and in the future, 5G) or short-range, power-efficient ones (like Wi-Fi, LoRa, ZigBee, Z-Wave and BLE) for ‘last mile’ implementation.

Actuators

IIoT presents an opportunity to control different mechanisms remotely via cloud-based automation infrastructures, including activating lighting, driving motors, opening/closing actions, etc.

The advent of smart lighting and smart motor control will have real tangible benefits to society, in terms of greater convenience and marked energy savings. Li-Fi communication technology, for example, is now permitting the ability to interface with what were previously conventional standalone actuators.

Sensors

Likewise, the capture of data through instrumentation will be pivotal to making system deployments effective.

Different sensor technologies can be employed in an IIoT context, providing valuable insight – on the temperature at which an industrial process is being conducted (to ensure that it is running correctly), the ambient light and moisture levels in a large commercial greenhouse (to check that conditions are correct to allow maximum crop yield), or nitrogen-oxide content in gas leaving the exhaust flue of an industrial boiler.

Outside the industrial engineering sector, other types of sensors can be utilised for different tasks that are still categorised under the IIoT umbrella. In building automation, passive infrared devices can be used to provide motion detection, for controlling the lighting/heating or alternatively for security purposes. In healthcare, sensor technologies will allow remote monitoring of parameters, such as blood glucose levels. This will result in significant improvements in the quality of patients’ lives, as they will be able to spend less time in hospitals/clinics.

For sensor-connected networks, the power consumption of the object is likely to be significantly less than will be the case for connected actuators, hence battery-powered objects will represent the vast majority of deployments. This is likely to prove critical to IIoT proliferation, as many
applications will rely on sensors that have been deployed in remote locations (and therefore sending engineers out into the field to regularly replace batteries will be uneconomical).

The power consumption and connection range of the radio interface will potentially represent a significant impact on the lifespan of the battery, so BLE and other ultra-low power RF protocols will be preferable. In some cases energy harvesting will be employed to take care of the power supply problem, enabling batteries to simply be dispensed with.

Practicalities of IIoT deployment

In addition to the limitations placed on IoT hardware due to battery-powered operation, the electronics located at each node are likely to have other constraints. The large number of nodes deployed could mean that low bill-of-materials costs need to be adhered to. Furthermore, available space may also be restricted.

These factors mean that often IIoT objects will generally have only limited microprocessor and memory resources that they can draw upon. Consequently, their construction must be as sleek as possible, with no excess functionality incorporated.

Cloud services and supporting infrastructure

The cloud will be the foundation upon which IIoT data processing and storage activities are reliant. In the realm of consumer IoT, the data that is captured and transmitted to the cloud may be required for marketing analysis (for example), without any subsequent involvement from the user.

In contrast to this, however, IIoT-based data (concerning industrial processes, confidential medical records, etc.), must be managed under extremely strict control procedures and with authorisation of the owner of this data. To mitigate the potential threat of industrial espionage, hacking or even acts of terrorism, a fully secured service offering needs to be employed - this can either be software as a service (SaaS) or platform as a service (Paas) based.

The revenue that IoT/IIoT services will constitute is far bigger than both hardware and connectivity elements combined, and is also growing at a much faster rate (this is illustrated in Figure 3). As we will see, the hardware and cloud service providers looking to serve the IIoT market are only focusing on their own established area of expertise.

This is having a detrimental effect on the uptake of IIoT technology though, as the hardware and software development aspects have to be addressed separately. The ‘silo’ approach that is currently prevalent has to be altered considerably. What the industry needs instead is an all-encompassing solution that deals with both these key elements together – so that hardware engineers have the warranted support, but at the same time software developers are able to create the cloud-based apps that will accompany that hardware.

Another consideration is the versatility of the hardware itself. Currently, semiconductor vendors supply generic single-board development solutions with a certain set of sensor and connectivity functions built in. This leaves little scope for engineers to optimise the system in accordance with their particular application criteria though.

Far more appealing would be a flexible platform, where they could choose from a broader array of different sensor, actuator and connectivity options, just adding the ones that they actually required.

An IoT development kit

ON Semiconductor recognised early on that something needed to be done about the disjointed situation that exists between the hardware and software aspects of IoT/IIoT development. Its technical staff were given the job of attempting to bridge this gap - bringing a solution to market that covered both distinctive types of competency.

The objective was to provide hardware engineers (who had little knowledge of cloud-based software development) with an out-of-the-box solution via which they could access cloud-based services, while at the same time giving more experienced embedded software experts provision to change to another cloud service provider or to develop their own proprietary services from the ground up.

The result of this endeavour was the ON Semiconductor IoT Development Kit (IDK).

This presents engineers with a ready-to-use single platform that exhibits a high degree of flexibility, upon which the demands of both hardware and software are fully accommodated.

Based on the company’s highly sophisticated NCS36510 system-on-chip (SoC) with a 32-bit ARM Cortex M3 processor core, it has all the necessary hardware resources for constructing highly effective, differentiated IIoT systems, along with a comprehensive software framework to attend to interfacing with the cloud.

By attaching different daughter cards to the IDK board, a wealth of connectivity (Wi-Fi, SIGFOX, Ethernet, 802.15.4 MAC-based radios enabling Zigbee and Thread protocols, etc.), sensor (motion, ambient light, proximity, heart rate, etc.) and actuator (with stepper and brushless motor driving, plus the ability to drive LED strings) options can be added to the system. This means that compromises do not have to be made and the most suitable technology can be chosen.

The Eclipse-based integrated development environment (IDE) that accompanies this hardware consists of a C++ compiler, debugger, code editor and a collection of application-related libraries. Through the use of the Carriots PaaS, it is possible to give engineers the functionality needed to interface with the cloud, but without putting any major restrictions on the scope of their creativity. It allows them to configure the IDK in the way that best fits with their particular application, but simultaneously still benefiting from powerful security features and real-time diagnostics/ analytics.

The IDK provides a highly configurable platform that will help engineers to achieve their system design goals while accelerating development timeframes – thereby getting systems deployed much quicker and with greater cost-effectiveness.

For more information contact Dirk Venter, Altron Arrow, +27 11 923 9600, dventer@arrow.altech.co.za.
Globally configurable NB-IoT module

u-blox recently announced the SARA N3, a multiband NB-IoT module that supports a preliminary set of 3GPP Release 14 features (LTE Cat NB2). The SARA N3 is available in two variants: one dedicated to China and another that can operate across multiple bands on any NB-IoT network globally.

The u-blox firmware over the air (uFOTA) client/server solution with Lightweight M2M (LwM2M) allows SARA N3 to be remotely provisioned with additional features. LwM2M is a more lightweight solution as compared to OMA DM and is therefore ideal for providing critical firmware updates to IoT devices. In this way, the module can ultimately become 5G compliant. It also supports the creation of dynamic LwM2M objects, giving customers high levels of feature customisation through the ability of scripting their own configurable objects.

The SARA N3 provides a comprehensive set of features and protocols that NB-IoT based applications will benefit from, including TCP, HTTPS, CoAP, DTLS and MQTT. With its ultra-low power consumption profile and the ability to configure voltage domains, the module is optimised to operate on a single cell primary battery for 10+ years, eliminating the need for frequent maintenance visits.

Other features include a ‘last gasp’ function that lets the module send one last message should the power fail unexpectedly, and protection against software attacks by detecting potential jamming signals.

For more information contact Andrew Hutton, RF Design, +27 21 555 8400, andrew@rfdesign.co.za.

S-band high-power amplifier

The CHZ9012-QFA from United Monolithic Semiconductors is an S-band quasi-MMIC high-power amplifier based on GaN power bar and GaAs input and output matching circuits. It is fabricated using 0,25 µm GaN on SiC and GaAs MMIC passive technologies.

The CHZ9012-QFA is fully matched on 50 Ω and can be used in various operating conditions to meet system requirements. It is suitable for a wide range of applications, from military to commercial radar systems. It comes in a low-cost, RoHS-compliant plastic SMD package, providing low parasitics and low thermal resistance.

For more information contact Andrew Hannay, RFiber Solutions, +27 82 494 5466, sales@rfbersolutions.com.

SiPs for LoRa IoT nodes

Microchip Technology announced a highly integrated LoRa system-in-package (SiP) family with an ultra-low-power 32-bit microcontroller (MCU), sub-GHz RF LoRa transceiver and software stack.

The combination of long-range wireless connectivity with low-power performance is designed to accelerate the development of LoRa-based connected solutions.

The SAM R34/35 SiPs are supported by certified reference designs and proven interoperability with major LoRaWAN gateway and network providers, significantly simplifying the entire development process with hardware, software and support. The devices also provide the industry’s lowest power consumption in sleep modes, offering extended battery life in remote IoT nodes.

Most LoRa end devices remain in sleep mode for extended periods of time, only waking occasionally to transmit small data packets. Powered by the ultra-low-power SAM L21 Arm Cortex-M0+ based MCU, the SAM R34 devices provide sleep modes as low as 790 nA to significantly reduce power consumption and extend battery life in end applications. Highy integrated in a compact 6 x 6 mm package, the SAM R34/35 family is ideal for a broad array of long-range, low-power IoT applications that require small form factor designs and multiple years of battery life.

In addition to ultra-low-power consumption, the simplified development process means developers can accelerate their designs by combining their application code with Microchip’s LoRaWAN stack and quickly prototype with the ATSAMR34-XPRO development board (DM320111), which is supported by the Atmel Studio 7 software development kit (SDK). The development board is certified with the Federal Communications Commission (FCC), Industry Canada (IC) and Radio Equipment Directive (RED), providing developers with the confidence that their designs will meet government requirements across geographies.

The SAM R34/35 family is supported by Microchip’s LoRaWAN stack, as well as a certified and proven chip-down package that enables customers to accelerate the design of RF applications with reduced risk. With support for worldwide LoRaWAN operation from 862 to 1020 MHz, developers can use a single part variant across geographies, simplifying the design process and reducing inventory burden. The SAM R34/35 family supports Class A and Class C end devices as well as proprietary point-to-point connections.

Microchip’s SAM R34/35 LoRa family is available in six device variants, providing developers the flexibility to choose the best combination of memory and peripherals for their end application. SAM R34 devices offer a 64-lead TFBGA package and the SAM R35 devices are available without a USB interface.

For more information contact Shane Padayachee, Avnet South Africa, +27 11 319 8600, shane.padayachee@avnet.eu.
Development kit for IoT sensing

RS Components is making IoT sensing projects even easier to start, and more affordable, with the latest UrsaLeo Pi development kit. By combining the Silicon Labs Thunderboard 2 sensor module with a Raspberry Pi development board, UrsaLeo Pi delivers all the functionality of the UrsaLeo UltraLite development kit, at a lower price. Trading only reduced debug support and restrictions on hardware re-use, it is ideal for cost-conscious development in sectors such as Industry 4.0, automotive diagnostics, healthcare and general data monitoring.

The Thunderboard 2 module contains temperature, humidity, UV, ambient light, barometric pressure, indoor air quality and gas sensors, a 6-axis inertial sensor, a digital microphone and a Hall sensor. The integrated Silicon Labs EFR32 Mighty Gecko multi-protocol 2.4 GHz radio supports Bluetooth Low Energy, Thread, ZigBee, or proprietary short-range protocols. Sample applications and APIs are provided to manage sensors, run diagnostics, and share information with enterprise software or business intelligence applications.

Like the UrsaLeo Lite, UrsaLeo Pi is ready to connect to the UrsaLeo platform, which allows users to view sensor data and launch IoT applications, such as storage and analytics from within their own customised dashboard. Adding new sensors is simplified, and additional users can be invited, giving flexibility to share data and co-develop projects while protecting the owner’s Google Cloud account information.

UrsaLeo also provides a customisable dashboard and user-definable events to trigger alerts (texts, emails and actions). Up to 50 MB of data per month can be sent to the cloud platform free of charge, by a single user.

For more information contact RS Components, +27 11 691 9300, sales.za@rs-components.com.

Modular telecoms patch panels

The exponential growth in data and telecoms services has created significant space pressure in data centres and telecommunication rooms of telecom companies. Space is expensive and ever-increasing costs call for optimum usage with high-density solutions.

The crucial factor is that improved efficiencies must be affected without reducing quality, i.e., connections must still be robust, reliable, easy to handle and, as there is constant change in IT technologies, the cabling has to be highly flexible to cater for these changes.

These challenges are met with Telegärtner’s new patch panel system HD³ (high density, high durability, high dynamic) from Webb Industries. With fibre-optic, twisted pair and coax modules for cabling installation on site, as well as for the connection of pre-terminated cables that can be combined individually and which can be installed and changed within just a few seconds, the new HD³ patch panel is an ideal solution for users who need a flexible and future-proof solution.

½ HU, 1 HU and 3 HU modular 19” panels, which can be installed in a recessed position, and a multi-purpose rail allows for easy cable routing, strain relief and installation of mounting brackets. Installation of modules is possible from the front and from behind due to an innovative locking mechanism. Modules in a standard non-recessed position can be exchanged quickly without the need for special tools.

Mixing of fibre-optic, twisted pair and coaxial modules in the same panel ensures optimal efficiency, and a wide variety of different fibre-optic modules is available for breakout/mini-breakout/pre-terminated cables, with integrated splice cassette or fanout modules with MPO/MTP connection.

Up to 144 fibres with LC connectors can be realised per HU with MPO/MTP modules or breakout and mini-breakout cables; up to 96 fibres with loose tube cables; up to 48 RJ45 jacks per HU; and up to 48 SMA or 24 BNC coax connections per HU. Furthermore, cable management can be installed and removed without any tools, and customer-specific modules are available on request.

For more information contact Stephen Hands, Webb Industries, +27 11 719 0115.

IoT module sips power in sleep mode

Norwegian Internet of Things (IoT) developer, Nanopower, has developed an innovative way to reduce the power consumption of Nordic Semiconductor’s nRF52832 SoC to just 10 nA in sleep mode, and waking up the chip on a predetermined schedule or based on sensor threshold values.

Nanopower’s nP-BLE52 module employs a proprietary power management IC, integrated alongside Nordic’s nRF52832 system-on-chip (SoC) in a system-in-package (SiP). By reducing the SiP’s power consumption to such low levels, the module is ideal for IoT applications where battery life is critical by potentially increasing cell lifespan tenfold.

In active mode, the nRF52832 SoC runs normally. The SoC has been engineered to minimise power consumption with features such as the 2.4 GHz radio’s 5.5 mA peak Rx/Tx currents and a fully automatic power management system. Once the Nordic SoC has completed its tasks, it instructs the nP-BLE52 to put it to sleep and wake it up again at the pre-set time.

The nP-BLE52 then stores the SoC’s state variables and waits until it needs to be powered up again. On wake-up, the device uploads the previous state variables, allowing the SoC to be restored to the same operational state as before the power was cut. The SoC’s startup is much more rapid than if it was activated from a non-powered mode.

The nP-BLE52 module also features a low-power MCU which can be set to handle external sensors and actuators when the Nordic chip is switched off. In this state, the module still monitors sensors and buffer readings and can trigger wake-ups if these readings are above predetermined thresholds, while consuming less than 1 µA. The nP-BLE52 also integrates an embedded inertial measurement unit (IMU).

The module’s power management is controlled through a simple API, whereby the user can predetermine the duration of the Nordic SoC’s sleep mode, set the wake-up time and date parameters, and select pins for other on/off triggers.

For more information contact Andrew Hutton, RF Design, +27 21 555 8400, andrew@rfdesign.co.za.
250 V EMC filters

TDK announced the introduction of the TDK-Lambda RSEV series of EMC filters, with a voltage of 250 V a.c./d.c. and a choice of 6, 10, 16, 20 and 30 A currents ratings.

The RSEV has an integrated touch-resistant terminal block with recessed, captive screws. Hardware cannot be misplaced or dropped inside the system enclosure. The filters are suitable for general-purpose use in a wide range of industrial and communications equipment.

The RSEV series is chassis-mountable, or with an optional kit can be attached to industry standard DIN rails. The maximum weight is 150 g for the 30 A model. All models share a common package size of 85 x 39 x 30 mm (L x W x H), a 37% reduction in size compared to previous models (RSEN 30 A). The filters have an operating ambient temperature rating of -25°C to +85°C with derating above 55°C.

The series has a maximum earth leakage current of 1 mA at 250 V a.c. 60 Hz, and is safety certified to the UL 1283, CSA C22.2 No.8 and EN 60939-3 standards with compliancy to the RoHS2 directive. A five-year warranty is standard.

For more information contact Vepac Electronics, +27 11 454 8053, sales@vepac.co.za.

Temperature indicators protect USB Type-C plugs

Mouser Electronics announced it is the first distributor to stock setP temperature indicators from Littelfuse. Designed for the expanding USB Type-C market, setP surface-mount temperature indicators help protect against overheating in USB Type-C plugs and chargers with captive Type-C cables.

The components help protect USB Type-C plugs from overheating, combining over-current and over-temperature protection into a single package. Consolidating these protection technologies replaces the need to use both current limiting switches and PPTC devices.

Available in a compact, 2.0 mm x 1.2 mm (0805) SMD package, setP temperature indicators are a discrete solution that is independent of power, featuring a sensitive sensing temperature of 100°C. The SMD setP series offers an easy drop-in solution to existing designs, protecting systems with power 100 W or higher without contributing to IR loss.

For more information contact TRX Electronics, +27 12 997 0509, info@trxe.com.

TVS diodes for all protection levels

Würth Elektronik eiSos has expanded its portfolio of TVS (transient voltage suppression) diodes. The diodes are characterised by their short response time and an extremely low terminal voltage, and feature a high ESD dielectric strength with a contact discharge of up to ±30 kV.

WE-TVS diodes in the three series ‘Standard,’ ‘High Speed’ and ‘Super Speed’ offer effective protection against electrostatic discharges at all protection levels. The new TVS diodes meet the industrial standards IEC 61000-4-2 (ESD), IEC 61000-4-4 (EFT) and IEC 61000-4-5 (surge), and are flame-resistant (UL 94 V-0).

The three WE-TVS series comprise sophisticated TVS diodes for the effective protection of sensitive data lines – for example in the consumer electronics field, such as headsets and accessories, digital cameras, laptops, or USB power-delivery applications (PD). In these areas, the semiconductor components such as ICs and LEDs are often in immediate contact with external interfaces that may be exposed to electrostatic discharges. The Würth Elektronik TVS diodes block the electrostatic discharges and reliably protect these components against direct or delayed interferences or even the complete failure of the end devices.

The diodes are available in three separate series: first, there’s the Standard series for slow interfaces such as RS-232, RS-485, or power-supply systems. In addition, there are the High Speed and the Super Speed series that have been developed for very fast interfaces such as USB 3.1, HDMI, Thunderbolt or GBit Ethernet, a further characteristic feature of these two series being a small capacitance of as low as 0,12 pF.

The Standard Series is available in both uni- and the bi-directional technologies. The High Speed and Super Speed series can be supplied in a rail-to-rail protective circuit design, which offers the additional benefit of protecting the supply voltage using one and the same component.

For more information contact Jason Page, Würth Elektronik eiSos, +27 71 259 9381, jason.page@we-online.com.
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For more info: www.ebmpapst.co.za / info@za.ebmpapst.com
Single-phase EMI filters

XP Power has introduced a range of chassis-mount and IEC-inlet EMI filters that satisfy the requirement for equipment to conform to the latest EMC emissions and immunity standards.

The filters are suitable for any electrical or electronic equipment that is powered from a single-phase AC supply.

Chiefly aimed at medical and IT equipment manufacturers, types FASA/M, FCSS, FDMM, FFSA, FGSM are IEC power entry inlets with integral line filters, while types FHSA/M and FIHA/M are chassis-mount filters. Exhibiting versatility, FFSA and FGSM units also feature input switches. The range includes many variations to cater for a wide variety of end-user needs.

The units feature a wide operating temperature range -40°C to 110°C, with full power operation to +50°C. Their shielded metal body prevents radiated emissions within the equipment and the medical version features a low, 5 µA at 250 V a.c. earth leakage figure for stringent medical applications. The range embraces current ratings from 1 A to 20 A versions, and dual-stage, chassis-mount versions are also available that provide greater attenuation levels than standard.

Saving on customer manufacturing costs, compact combined versions with single or dual fuse holder or fuse holder and switch reduce the amount of wiring and panel cutouts required. All models feature a bleed resistor and Faston terminals, and the IEC-inlet EMI filters come with a three-year warranty.

For more information contact Vepac Electronics, +27 11 454 8053, sales@vepac.co.za.

EMI shielding solutions

Laird Technologies supplies a range of EMI protection, shielding and electromagnetic compatibility (EMC) products for suppressing interference and meeting immunity requirements; isolating offending circuits through filtering, grounding and shielding, and desensitising devices by increasing their immunity to susceptible circuits. This product range includes the following:

- Electrically conductive elastomers, ideal for applications that require environmental and EMI shielding. A wide range of conductive filler materials is available in extruded, moulded die-cut, dispensed form-in-place, printed and coated formats.
- Form-in-place gaskets, produced by an automated system for dispensing conductive elastomer shielding and grounding gaskets onto metal plastic substrates. It is ideal for mobile phones, PDAs, PC cards, cellular base-stations, radios, and many other compartmentalised casts or plastic enclosures and packaged electronic assemblies.
- Wire mesh gaskets which are versatile and provide effective shielding. Knitted gaskets can be made from a variety of metal wires, including monel, tin-plated copper-clad steel or aluminium. For board-level shielding, Laird offers a traditional metal enclosure, single- and two-piece EZ Peel, as well as new convergence products. The latter incorporates a stamped metal housing and over-moulded, electrically conductive elastomer, or thermal interface material, that is designed to meet the specific needs of an application.
- Microwave absorbing materials are coatings with electrical or magnetic properties that have been altered to allow absorption of microwave energy at discrete or broadband frequencies. Laird offers a wide range, including die-cut elastomers, foam, thermoplastics and custom solutions to aid in internal cavity resonances, antenna pattern shaping and high-frequency interference.
- Finger strips for enclosure doors, cabinets and boxes, made from an alloy selection that provides an optimal combination of spring and low compression force to meet a wide variety of applications. These solutions offer excellent corrosion resistance, solderability and palatability. They are effective for EMI shielding and can be used in a variety of slotted and grounding contact applications.

Also available is a lineup of fabric-over-foam shielding gaskets, conductive foam, conductive fabric and conductive tape. Fabric-over-foam gaskets are galvanically compatible with most mating surfaces, and offer high abrasion and resistance, high conductivity and shielding attenuation. They are ideal for applications requiring low-pressure force.

Finally, conductive foam provides effective EMI shielding for microprocessor speeds in computer and telecommunications equipment. Conductive fabric combines highly conductive metals with lightweight fabric to meet a diverse range of shielding requirements. Conductive tape shielding is lightweight, thin and flexible, and offers excellent conductivity, conformability and durability.

For more information contact Actum Electronics, +27 11 608 3001, sales@actum.co.za.
Accutronics announced that it has been formally appointed as the exclusive representative of TDK-Lambda and its entire range of products for the South African territory. Together with this announcement, Accutronics has launched the new TDK-Lambda DRF960 241, a DIN-rail mounting AC-DC power supply rated at 24 V / 40 A (960 W) with a 60 A (1 440 W) peak for 4 seconds.

The product has a very narrow 110 mm width, freeing additional space for other DIN-rail mount assemblies. With an efficiency of 95%, significantly less internal heat is generated, resulting in cooler electrolytic capacitors. Operating field life is calculated at greater than 10 years at 75% load, 40°C ambient and 230 V a.c. input. This energy efficient power supply is suitable for a wide range of industrial applications including factory automation, process control and test and measurement equipment.

The 24 V output is adjustable from 24 to 28 V, using the front panel potentiometer or an external 5 to 6 V d.c. source, to compensate for blocking diodes or FETs in redundant configurations. Also provided as standard is a DC OK relay contact rated at 30 V / 1 A, and remote on/off functionality. Power consumption is less than 1 W to reduce energy consumption when the output is inhibited. Up to five units can be connected together in parallel when set in droop mode current share.

The DRF960 is housed in a robust metal enclosure, measuring 123,4 mm in height, 139 mm deep and a width of just 110 mm. The power supply can operate from a wide-range 180 – 264 V a.c., 47 – 63 Hz input. Input to output isolation is 3 000 V a.c., input to ground isolation is 1 500 V a.c., and output to ground isolation is 500 V a.c. The unit is rated for operation in -25°C to +70°C ambient temperatures (40°C cold start), derating linearly above 60°C to 50% load at 70°C.

The unit is safety certified to IEC/EN/UL/CSA 60950-1, UL 508 and CE marked for the Low Voltage, EMC and RoHS Directives. It meets EN 55032-B radiated and conducted emissions, and complies with the EN 61000-4 immunity standards.

For more information contact Tobie Muller, Accutronics, +27 11 782 8728, tmuller@accutronics.co.za.

Gallium nitride (GaN) offers fundamental advantages over silicon. In particular, the higher critical electrical field makes it very attractive for power semiconductor devices, with outstanding specific on-resistance and smaller capacitances compared to silicon switches, which makes GaN HEMTs (high electron mobility transistors) ideal for high-speed switching.

The enhancement mode concept offers fast turn-on and turn-off speed as well as a better path towards integration, either on a chip or package level. Infineon Technologies’ CoolGaN 600 V e-mode GaN HEMTs exploit this technology according to a specific, GaN-tailored qualification process that makes it one of the most rugged and reliable solutions in the market.

The transistors enable simpler half-bridge topologies, and are applicable to applications such as server switch-mode power supplies (SMPS), telecoms, adaptors and chargers, wireless charging and Class D audio.

For more information contact Dirk Venter, Altron Arrow, +27 11 923 9600, dventer@arrow.altech.co.za.
Ultra slim DIN-rail PSUs

XP Power has announced the DSR range of AC-DC DIN-rail power supplies approved for industrial control systems and information technology equipment applications. These versatile supplies provide reliable power with a 150% peak load capability in a slim-line, DIN-rail mount metal case.

Competitively priced, the DSR’s space-saving design features a width of just 32 mm for 75 W and 120 W models, and 45 mm for 240 W models. For use in industrial and building control applications, specific deployment areas include machine control, process control, factory automation, escalator/travelator/lift control, building heating/aircon monitoring, control and security systems.

Models DSR75, DSR120 and DSR240 are rated at 75 W, 120 W and 240 W respectively, and feature efficiency figures of 91%, 92% and 94% respectively. The two lower-power models are available with 12, 24 and 48 V outputs, whilst the DSR240 is available with 24 or 48 V outputs. All models operate from 85 to 264 V a.c.

The power supplies’ 150% peak load capability enables startup for electromechanical loads. Ambient temperature rating is -25°C to +70°C for all models, with rated power available up to 50°C or 60°C depending on the model. Volt-free relay contacts facilitate remote monitoring for DC OK. Units can be paralleled for higher requirements or configured to provide N+1 redundancy in critical applications.

For more information contact Vepac Electronics, +27 11 454 8053, sales@vepac.co.za.

120 W planar transformers

Coilcraft has introduced its new PoE120PL series of high-efficiency planar transformers which are optimised for active clamp forward converters, including use in Power over Ethernet PSE (power sourcing equipment) and pre-standard PD (powered devices).

The PoE120PL series is suitable for 60-120 W applications, such as thin clients, monitors, industrial Ethernet, IPTV, building management, nurse call systems, point-of-sale terminals and information kiosks. It is also ideal for 90 W PoE++ PDs.

The transformers are optimised for 200 kHz, with a 36-72 V input. They offer excellent DCR for high efficiency and very low leakage inductance. They also provide 1500 Vrms primary-to-secondary isolation and 0,229 mm clearance above the seating plane, and include a 12 V auxiliary winding.

PoE120PL series transformers have a 20,83 x 23,37 mm footprint, with a maximum height of 10,34 mm, requiring far less board space and overall volume than a standard EFD20 wire wound package. They are RoHS-compliant and feature matte tin over nickel over brass terminals. They have an ambient temperature range of -40°C to +125°C.

For more information contact Andrew Hutton, RF Design, +27 21 555 8400, andrew@rfdesign.co.za.

Rack-mount and desktop 19” enclosures

Hammond Manufacturing has introduced 4U high versions and added extended 559 mm depths to all heights of its RM family of 1U to 4U 19” rack-mounting and desktop enclosures. 1U to 3U half-width versions are also available.

The all-aluminium construction consists of a heavy-duty extruded frame with removable vented or plain top and bottom covers. 19” units are supplied with rack-mounting angles; both 19” and half width variants come complete with self-adhesive rubber feet for when the enclosure is to be used as a desktop unit.

The front and rear panels are removable and interchangeable, and their flat design makes machining and printing a simple process. Front panel handles are optionally available to assist with insertion and removal of the 19” units from a cabinet. Adjustable rear panel mounting angles are also available as an accessory for the 457 and 559 mm deep units to give greater support for heavy components.

Four heights and five depths are available as standard. The half-width units are available in depths of 108 and 203 mm, 1U to 3U heights. 1U to 4U full width 19” units are available in depths of 203, 330, 457 and 559 mm. The standard finish is durable black powder-coat paint. Custom finishes, modified and silk screened front and rear panels, and other variants to meet customer specification can be supplied through Hammond’s in-house modification service.

As standard, the RM family is shipped pack flat to minimise shipping costs and to protect against damage in transit.

For more information contact Communica, +27 12 657 3500, sales@communic.co.za.
Cree has launched XLamp eTone LEDs, a set of chip-on-board (COB) LEDs that delivers 90 colour rendering index (CRI) light quality at the same efficacy as today’s standard 80 CRI LEDs. They also deliver up to 155 lumens per Watt (LPW) at 3000K CCT, 85°C – making them well-suited for high-quality lighting in retail, museum, high-end commercial and medical applications.

For many indoor lighting applications, the typical guideline for light quality is a minimum CRI of 80. Lower CRI values tend to distort colours and are generally unpleasing, while higher CRI values of 90 mean higher fidelity or accuracy, indicating better light quality. LEDs with 90 CRI values are primarily used in settings where colour quality is critical, such as retail and museum lighting.

LEDs have been available in 90 CRI versions for many years but until now, this light quality has come at a significant penalty to light output and efficacy when compared to lower light quality 70 or 80 CRI versions. Cree’s new eTone LEDs overcome this penalty by delivering an upgrade in LED efficacy of up to 17% over existing 90 CRI LEDs without sacrificing colour quality.

Available in both the ceramic-based XLamp CXA2 standard density and the metal-based XLamp CMA and CMT high-current COB LED families, all eTone LEDs share the same mechanical and electrical characteristics as the standard versions so that lighting designers will be able to quickly upgrade their designs with minimal redesign effort. Additionally, LM-80 data coverage is available to reduce the time for lighting manufacturers to receive DesignLights Consortium qualifications on their products.

For more information contact Willem Schmidt, Altron Arrow, +27 11 923 9600, wschmidt@arrow.altech.co.za.

The coupled power chokes product category from Würth Elektronik eiSos has a new member in the form of the WE-MTCI SMT multi-turn ratio double choke. House in the 5030 package, it is the company’s smallest double choke yet, and comes with different winding ratios from 1:1,5 to 1:3. The magnetically shielded component with 0,8 kV isolation is specified for an operating temperature of -40°C to +125°C.

The WE-MTCI is available in versions for rated currents from 0,45 to 0,95 A. The double choke is an ideal solution for buck/boost converters with regulated or unregulated output voltage. Isolated converter applications – such as flyback converters – with high packaging density are also areas of use, as well as step-up or step-down converters with auxiliary windings, as are auto-transformer applications.

For more information contact Jason Page, Würth Elektronik eiSos, +27 71 259 9381, jason.page@we-online.com.

Gainta’s ALUG7XX range of extruded aluminium enclosures encompasses different sizes, with suitable lengths for indoor desktop devices or outdoor wall-mounting junction/control box use.

They come in five standard colours (gold, silver, red, blue and black anodised finish) and modern aluminium bodies with two either plastic or die-cast aluminium end panels. 0,5 mm of recessed area is designed into the top for customers to affix a product label or silk-screen printing.

Optional continuous rubber seals designed to meet IP66 rating are offered for when customers need to use the enclosure outdoors. A die-cast wall-mounting kit with black coating is also offered for selection.

For more information contact Sivan Electronic Supplies, +27 11 887 7879, elecsupp@global.co.za.
**Constant-current LED drivers**

Infineon Technologies’ LITIX Basic+ LED drivers serve as an extension to the existing LITIX Basic family.

The new linear constant current sources, with their 1 to 3 inputs/outputs, build a scalable family to reduce system costs through the need for fewer external components and the introduction of a power shift feature.

Output currents from 5 mA up to 360 mA (with power shift) can be served with this driver family, which also has optimised diagnosis features as well as improved output current accuracy. Several selectable fault management modes offer high design-in flexibility.

The devices’ flexible Single LED Short (SLS) feature puts them into either a latched off-state, active retry or simply diagnosis without channel deactivation. Design flexibility is provided through footprint compatibility across the entire family.

For more information contact Dirk Venter, Altron Arrow, +27 11 923 9600, dventer@arrow.altech.co.za

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**Environmentally resistant circular connectors**

TTI is stocking a broad selection of ITT Cannon’s Trident Neptune metal connectors. The Trident series is a versatile range of electrical connectors with fully interchangeable contacts, designed to perform in harsh environments. These rugged connection systems are suitable for applications that require additional shielding, sealing, and the extra durability of a metal shell.

The Trident Neptune metal series combines membrane seals and universal shielded end-ball to create a cost-effective and easy-to-assemble connector solution. This series features nickel plated zinc alloy shells, IP67 sealing and UL 94 V-0 rated thermoplastic insulators, allowing for an operating temperature from -55°C to +105°C. They are able to withstand approximately 200 mating cycles and meet UL 1977 and CSA C22.2 qualifications.

For more information contact TRX Electronics, +27 12 997 0509, info@trxe.com

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**Long-life LED for general lighting**

The new Osconiq S3030 is OSRAM Opto Semiconductor’s entry into the professional mid-power market. The LED is ideal for use in outdoor and industrial lighting, providing flexibility in forward voltage and luminous flux with a lifetime of 75 000 hours even at high temperatures.

Together with an optimised phosphor, lead frame and chip design, the LED boasts efficiency of 146 lm/W, making it well suited for 0,2 W solutions for linear lighting and fluorescent tube replacement. Osconiq S3030 is available in two versions (CRI 70 or 80) with a power rating of 1,0 W at 6 V and a luminous flux of 138 to 148 lm. Their footprint is 3,0 mm x 3,0 m x 3,0 mm and colour temperature ranges from 2 700 to 6 500 K.

For more information contact OSRAM Opto Semiconductors, +27 11 207 5600, michael.nel@osram-os.com
Board-to-board coax connectors

The Rosenberger SMP spectrum contains an innovative coaxial series of PCB connectors to enable multifunctional board-to-board connections. The latest innovation in this family, the SMP Infinity connector series, realises a wide range of applications up to 40 GHz.

The product portfolio includes one-piece connectors with pre-assembled inner conductors. The range of connectors includes cable connectors, straight and right-angle connectors, PCB connectors (pin-in-paste), solder pin, surface-mount, rear-mount type, bulkhead connectors, test adaptors and cable assemblies.

SMP Infinity is underpinned by a one-step locking mechanism, which guarantees a low insertion force and easy implementation. It has minimised dimensions (40% smaller than standard SMA screw types) to accommodate minimum board-to-board distances, while still delivering high-power connections. It requires only one tool for horizontal and vertical disconnecting, and offers fast and easy disconnection despite high retention forces.

Technical specifications of the SMP Infinity connectors include a return loss above 25 dB from DC to 15 GHz, and above 18 dB from 15 GHz to 40 GHz; low retention forces (no more than 45 N); more than 500 mating cycles; durability; and a temperature range of -65°C to +155°C.

For more information contact Actum Electronics, +27 11 608 3001, sales@actum.co.za.

In-line power connectors

Hirose has introduced the EF1 series to meet the requirement for smaller yet higher-performing power connectors for industrial applications. The EF1 series consists of a DIN-rail mount type in-line receptacle and plug, and a panel mount type in-line receptacle and plug which both accept high-power crimp contacts with the capacity to handle up to 160 A current rating.

The connector design allows the crimped cable to be inserted into the connector housing in a quick and user-friendly, one-step operation. The crimp contact can be easily terminated to the cable with a standard market commodity JIS C 9711 hand-tool.

The snap-in lock provides a positive tactile sensation to confirm correct mating engagement and secure connection. The unique shape of the internal spring contact and contact points allows the optimum contact force to maintain a highly reliable stable connection.

The housing features four different mating keying styles to prevent incorrect mating when multiple connectors are used. The connectors are available in a red colour to define the plus or minus connection. Suitable applications are power controllers, inverters, storage batteries, medical devices, BTS and robot controllers.

For more information contact Barry Culligan, Otto Marketing, +27 11 791 1033, contact@otto.co.za.
**MEMS-based environmental sensors**

The BPS line from Bourns has been designed to provide high sensitivity/accuracy, long-term reliability, high temperature capability and harsh media compatibility. The BPS110 and BPS120 pressure sensor models deliver extremely accurate ultra-low pressure sensing capabilities for sensitive applications. The BPS130 pressure sensor line features harsh media compatibility and high temperature operation with high accuracy. This sensor family offers particularly stable performance over the product’s lifespan, and the ability to work with a wide range of pressures. The Model BPS230 family offers precise relative humidity sensing in a small (2.0 x 2.0 x 0.75 mm) surface mount package.

Electrocomp, +27 11 458 9000.

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**Non-volatile F-RAM ICs**

Cypress Semiconductor’s new Excelon LP ferroelectric random access memory (F-RAM) delivers instant-write capabilities with virtually unlimited endurance, enabling these applications to perform mission-critical data logging requirements while maximising battery life. The series offers 4 Mb and 8 Mb industrial and commercial-grade densities with 50 MHz and 20 MHz serial peripheral interface (SPI) performance. The series reduces power consumption with 100 nA hibernate and 1 µA standby modes that greatly improve a battery-powered product’s user experience by extending system operating time. The Excelon family’s inherent instant writes also eliminate power failure ‘data-at-risk’ due to volatile data buffers in legacy memories.

Altron Arrow, +27 11 923 9600.

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**RS-485 transceiver**

The STMicroelectronics STR485LV 3.3 V transceiver for RS-485 applications enhances design flexibility by providing an external pin to select 20 Mbps or 250 Kbps communication, and interfacing directly with low-voltage logic down to 1.8 V. The user-selectable data rate allows designers to specify the same device and thus simplify inventory management for RS-485-networking applications, ranging from high-speed/short-range up to the maximum communication distance (1220 m) depending on cable performance. It is ideal for a wide variety of scenarios, including telecom infrastructure, high-speed data links, or low-voltage microcontroller communications.

EBV Electrolink, +27 21 402 1940.

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**MCUs with Arm Cortex-M0+ core**

By adding the new STM32G0 microcontrollers (MCUs) to the STM32 family, STMicroelectronics is stretching its portfolio of Arm Cortex-M-core MCUs to more thoroughly cover key embedded-market segments. The new G0 series targets entry-level applications that require greater energy efficiency, functionality, security and value, in a smaller footprint. A new power distribution architecture reduces external power and ground connections to just a single pair of pins, allowing more of the package pins to be allocated for user connectivity. In addition, ST is making large memory densities available in small and economical low-pin-count packages.

Avnet South Africa, +27 11 319 8600.

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**Multiple-output PMICs**

The MAX17270, MAX77278, MAX77640/MAX77641 and MAX77680/MAX77681 power-management integrated circuits (PMICs) from Maxim Integrated Products help to reduce the power management footprint for space-constrained products such as wearables, hearables, sensors, smart-home automation hubs and internet of things (IoT) devices. The chips’ control architecture allows a single inductor to serve as the critical energy storage element for multiple, independent DC-rail outputs. In addition, the low quiescent current of the PMICs plays an important role in extending battery life. With the intrinsic buck-boost operation of the PMICs, the power rails can operate over a battery’s entire range.

CST Electronics, +27 11 608 0070.

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**Dual-band Wi-Fi module**

The HF-LPD100 from Hi-Flying is a Wi-Fi module supporting both the 2.4 GHz and 5 GHz bands. It is a fully self-contained, small form-factor, single-stream 802.11b/g/n solution for providing a wireless interface to any equipment with a serial interface for data transfer. The device integrates a MAC, baseband processor, RF transceiver and power amplifier, as well as all Wi-Fi protocol and configuration functionality and a networking stack in embedded firmware to make a fully self-contained solution. It employs a low-power consumption embedded architecture optimised for applications in home automation, smart grid, handheld devices, personal medical applications and industrial control, that require lower data rates and transmit or receive data on an infrequent basis.

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