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LOW POWER MICROCONTROLLER
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- Ultra low power active and hibernate mode
- Active mode dynamic current: 30 μA/MHz (typical)
- Flexi mode: 300 μA (typical)
- Hibernate mode: 750 nA (typical)
- Shutdown mode: 60 nA (typical)
- ARM Cortex-M3 processor with MPU

Contact Conrad Coetzee - Field Application Engineer
on 083 746 2616 or ccoetzee@arrow.altech.co.za
for more information.
Forbatt lead acid batteries have been at the heart of many projects that require reliable energy storage. Forbatt SA looks forward to the development of appropriate alliances and partnerships to help our country move into new markets and realise the vision that will benefit all in South Africa. Read more about these efforts on page 14.

For more information contact Forbatt SA, +27 11 469 3598, sales@forbatt.co

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Exploring opportunities around ‘hybrid’ renewable energy, battery design trends for IoT, and points to consider when running power supplies from portable generators.

Electronics manufacturing services
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Opinion from local electronics contract manufacturers on the state of the industry, and an analysis of quality management based on quality assurance.

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www.dataweek.co.za
The last decade or so has been a running litany of misery for the South African electronics manufacturing industry. There’s no point naming any names, but those readers who’ve been around for a while will be able to recall the companies that have shut their doors – OEMs and contract manufacturers alike.

One high-profile name I will mention is Leratehima Tellumat Manufacturing (LTM). The only reason I’m comfortable doing so is because Tellumat’s Group CEO himself, Andrew Connold, was gracious enough to provide his frank comments on the division’s imminent closure, and his insights into the industry at large, for the article on page 20, together with Barracuda’s Rob Steltman.

The failure of LTM is an object lesson in why the local electronics manufacturing industry is struggling so much: its very own government. Or rather, the government’s poorly thought out policy decisions, inept implementations, and politics trumping economics. LTM was essentially set up to secure a portion of the tender for digital television set-top boxes (STB), which it duly did.

The ensuing disaster that is South Africa’s digital migration is directly responsible for the company’s failure, and its best efforts to get business elsewhere simply weren’t enough to staunch the bleeding. As Connold points out, once a manufacturing exercise like that gets underway, it can’t just be stopped – not without incurring major financial losses anyway.

Troubles at Eskom certainly haven’t helped matters either. Fortunately, power cuts and load shedding seem to have been largely curtailed since the beginning of the year (at least in the Johannesburg area where I live) but there are long-term consequences over and above the immediate availability of power.

Manufacturers considering upgrades or expansions have to consider the additional costs of installing backup power, making them reluctant over and above the general economic uncertainty. The volatility in the power distribution industry, combined with large-scale woes at the municipal level, also means that the highly anticipated rollout of electricity meters has been stalled – another market that should be a huge boon to local electronics manufacturing.

Another market that South African manufacturers could be tapping into is smartphones. There are a handful of local companies making them in modest volumes, but my understanding is that most of the local manufacturing component is straightforward assembly work (although I’m looking forward to the flood of letters from readers proving me wrong).

The International Data Corporation (IDC) announced earlier this year that the African smartphone market experienced year-on-year unit growth last year for the first time since 2015. The market grew 2.3 percent in 2018 to total 88.2 million units, spurred by the strong performance of the continent’s three biggest markets – Nigeria, South Africa, and Egypt.

Instead of South Africa as one would hope, it is Rwanda that seems to be the African country best poised and willing to tap into this market. In what has been described as Africa’s “first high-tech smartphone factory,” the Mara Group recently opened a factory in the country’s capital, employing a workforce of 200 factory employees.

(2017, South African company Onyx Connect claimed to be producing the first African smartphone, but repeated attempts by Dataweek to make contact with the company proved fruitless, and it later emerged that it was simply assembling imported parts.)

I’m not saying we should dismiss our existing capabilities in other more established sectors, but surely if the public and private sectors put their heads together and came up with a focused, single-minded approach, South Africa could assume its rightful place of leading smartphone manufacturing on the continent.

Or, we could make smartphones

From the editor’s desk
South Africa

• The deputy minister of Trade and Industry, Fikile Majola, has told community members in Evaton in Gauteng’s Vaal region that government is taking major steps towards the designation of the Vaal Special Economic Zone (SEZ). Majola said the SEZ would create economic and employment opportunities, and further urged local government officials to identify one industrial park for revitalisation. He said the revitalisation of industrial parks was part of government’s strategy to revive the economy.

• The Independent Communications Authority of South Africa (ICASA) has pledged to publish the information memorandum on the licensing process for the International Mobile Telecommunications (IMT) spectrum, or what is also referred to as high-demand spectrum, by the end of 2019. The publication will be an important step in the licensing process for the ultimate release of the high-demand spectrum in order to give effect to government’s policy objectives of ensuring broadband access for all, transformation of the ICT sector, lower data costs, promote competition and ensure inclusive economic growth.

• The Department of Science and Innovation (DSI) announced that South Africa and Switzerland are set to deepen their collaboration in science, technology and innovation (STI) following the renewal of a fruitful STI cooperation agreement between the two countries. Signed in Bern at the end of September, the agreement will, among others, see exchange visits of scientists, researchers and scholars, the sharing of scientific and technical knowledge, and the hosting of bilateral STI seminars and courses.

Overseas Companies

• Dialog Semiconductor has signed a definitive agreement to acquire Creative Chips, a prominent supplier of ICs to the Industrial Internet of Things (IIoT) market, for $80 million in cash. The new acquisition is strategic for Dialog to establish itself as a proven supplier, well positioned to capture the significant growth potential of the IIoT market. It also provides Dialog with a rich portfolio of core IC products and a broad library of relevant analog, digital and RF technologies.

• Despite achieving an acceptance level of 51.6 percent, AMS’s $4.9 billion takeover offer for Osram Licht AG failed to meet the minimum acceptance threshold of 62.5 percent. As a result of purchases prior to the expiry of the offer, AMS is currently the largest shareholder in Osram with a direct shareholding of 19.99 percent.

• Qorvo has acquired Cavendish Kinetics, the world’s leading provider of high-performance RF MEMS technology for antenna tuning applications. RF MEMS devices are used to tune both main and diversity smartphone antennas across low, mid and high bands, resulting in stronger signals and faster data rates. RF MEMS maximise performance through outstanding Q-factor, improved linearity and extremely low insertion losses, offering great potential for improving 4G and 5G system performance.

Industry

• The Semiconductor Industry Association (SIA) announced worldwide sales of semiconductors were $34.2 billion in August 2019, a decrease of 15.9 percent from the August 2018 total of $40.7 billion but 2.5 percent more than the July 2019 total of $33.4 billion. On a year-to-year basis, sales were down across all regional markets: Europe (-8.6 percent), Asia Pacific/All Other (-9.2 percent), Japan (-11.5 percent), China (-15.7 percent), and the Americas (-28.8 percent).

• Akira Yoshino, John B Goodenough and M Stanley Whittingham have been jointly awarded the 2019 Nobel Prize in Chemistry for the development of lithium-ion batteries. Underlining the importance of their contributions to the mobility and convenience of our modern daily lives, the Nobel Committee said in a statement that “Lithium-ion batteries are used globally to power the portable electronics that we use to communicate, work, study, listen to music and search for knowledge.” Yoshino created the first commercially viable lithium-ion battery in 1985, based on a metal oxide cathode design by Goodenough. Sony released the first commercial lithium-ion batteries in 1991, based on Yoshino’s configuration. The trio will share the prize money of nine million kronor (£738 000).

Technology

• NXP Semiconductors unveiled the first microcontroller (MCU) to break the gigahertz (GHz) barrier. Built using advanced 28 nm FD-SOI technology for lower active and static power requirements, the iMX RT1170 family of ‘crossover’ MCUs integrates a Arm Cortex-M7 and power-efficient Cortex-M4, advanced 2D vector graphics, together with NXP’s signature EdgeLock security solution. NXP claims the iMX RT1170 delivers a CoreMark score of 6468 and DMIPS of 2974.

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Altron Arrow and Thingstream to boost IoT innovation in SA

Altron Arrow has recently become a distributor for Thingstream, a global provider of IoT connectivity solutions which is expanding into South Africa via a local partner network in order to grow the local Internet of Things (IoT) market.

IoT has provided organisations with unlimited opportunities to transform business models, fully enhance operational performance and open up new revenue streams through wide-scale, intelligent solutions. Thingstream offers a solution to the low-power connectivity coverage issue to businesses across industries, which allows for successful global implementation of IoT applications, with specific focus across ready connected devices, asset tracking, logistics and supply chain, remote condition monitoring and control.

According to Neil Hamilton, Thingstream’s vice president for business development, fragmented connectivity and infrastructure in South Africa and across the continent are still significant barriers to installing effective, widespread IoT systems. The Thingstream solution, however, delivers a global IoT connectivity platform which connects via GSM networks using a combination of MQTT (Message Queuing Telemetry Transport) and USSD (Unstructured Supplementary Service Data) messaging protocols.

IoT innovation in South Africa is gathering pace, with pioneering companies bringing new solutions to market on the back of Thingstream’s ability to connect IoT devices without constraints such as cross-border connectivity or the need for high-speed access. Local initiatives under development using Thingstream include new IoT solutions across multiple industry verticals including transport, agriculture, and refrigeration within the FMCG market.

“Thingstream is opening up a world of opportunity for developers of new IoT solutions,” says Gyula Wendler, engineering manager at Altron Arrow. “We have such a high level of engineering capability and technical expertise in South Africa, and we are seeing a substantial appetite for IoT innovation. Altron Arrow, through its partnership with Thingstream, is now able to offer an IoT connectivity platform which not only provides trusted global connectivity (it is not limited to one network operator) but is also secure, low-powered and extremely cost competitive.”

According to Wendler, what makes this solution so appealing is that in a market like South Africa, and in fact the greater Africa region, most of the current global SIM solutions do not offer a cost-effective data solution. With Thingstream, however, you can truly deploy your product in any region with one flat rate.

Although this solution is not suited for high data-rate applications, it is certainly ideal for low, infrequent data requirements such as IoT sensors. Given the fact that GSM has the best coverage in the whole of Africa, and that the Thingstream SIM will roam onto at least one of two networks in any country, this makes this solution a real alternative to other low data requirement solutions.

“Due to the way Thingstream’s platform has been designed, we are able to deliver a solution to our customers within a matter of weeks once they have been engaged,” says Wendler, “Thingstream’s technology overcomes several challenges in the roll-out of IoT solutions locally.”

For more information contact Gyula Wendler, Altron Arrow, +27 11 923 9709, gwendler@arrow.altech.co.za.

Win a Microchip LoRaWAN evaluation kit

Dataweek readers stand a chance to win a SAM R34 Xplained Pro evaluation kit for LoRaWAN development (ATSAMR34-XPRO) from Microchip Technology. The kit is a hardware platform used to evaluate the ATSAMR34 low-power LoRa sub-GHz SiP designed to enable long-range wireless connectivity while extending system battery life.

The highly integrated LoRa SiP family combines an ultra-low-power 32-bit microcontroller, sub-GHz RF LoRa transceiver and software stack, and is supported by certified reference designs and proven interoperability with major LoRaWAN gateway and network providers, simplifying the entire development process with hardware, software and support. The devices also provide extremely low power consumption in sleep modes, offering extended battery life in remote IoT nodes.

Supported by the Atmel Studio integrated development platform (IDE), the kit provides easy access to the features of the ATSAMR34 and explains how to integrate the device in a custom design. This FCC, ISED and RED certified board is not only an evaluation platform but also an excellent reference design for developing SAMR34 based LoRa end-node applications.

The kit also provides easy access to various features of the ATSAMR34J18B device and offers additional peripherals to extend the features of the board and ease the development of custom designs.

For your chance to win a SAM R34 Xplained Pro evaluation kit visit http://page.microchip.com/Dataw-SAM-R34.html and enter your details in the online entry form.
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Red Bull Basement Hatch showcases Cape Town’s tech talent

Cape Town’s brightest young tech geniuses gathered in Woodstock in September to share their ideas and their creations at the Red Bull Basement Hatch event.

The Red Bull Basement Hatch brings together tech enthusiasts, makers, creatives, designers, IT students, incubator managers and funders, in one room. Here they debate, talk, showcase, network and upskill each other, with the aim of connecting and building a better South Africa through the use of technology. RS Components South Africa partnered up with the event organisers, Red Bull and Geekulcha, by sponsoring components for the Maker Space corner at the event.

Brian Andrew, managing director of RS Components South Africa, said that these events truly add value to the youth of the country. “We at RS Components are passionate about education and nurturing the next generation of innovators. Events such as the Red Bull Basement excite us and we are proud to partner up with Red Bull and Geekulcha and look forward to future events where we can see South Africa’s tech geniuses at work,” he said.

RS Components South Africa also hosted a ‘Weather Station’ creation seminar at the event with the Xinabox team. Judi Sandrock, co-founder for the STEM School Space Programme at XinaBox, said the session was great and very engaging, underlining the high calibre of makers that the Red Bull brand attracted on the day. “The insightful questions allowed everyone to explore how XinaBox delivers true IoT rapid hardware development, removing the barriers to participate in this exploding industry. Thanks to RS Components, enterprising innovators can build XinaBox solutions and get straight to coding,” she added.

Sifiso Gcabashe, the social innovation manager for Red Bull, said the main aim of the Red Bull Basement project was to give young people who had created amazing innovations which are aimed at solving problems in their communities or wherever they may be working from a platform to learn, create and nurture their technical abilities.

“The Red Bull Basement brings together the community to share ideas as well as practicality so that we are not only talking about these innovations, we show what other people are doing. We have a big focus on women and we want to expose women doing amazing things in their communities and wherever they may be working from a platform to learn, create and nurture their technical abilities.

“The Red Bull Basement Hatch event was a day filled with technology, coding and robotics, leaving the participants inspired and ready to innovate in their various communities. The event also highlights the private sector’s commitment towards making a change and nurturing South Africa’s youth to harness their technical and computing skills for a brighter future.

For more information contact RS Components, +27 11 691 9300, sales.za@rs-components.com.
u-blox partners with Kudelski on IoT security

u-blox is partnering with the Kudelski Group to help clients protect Internet of Things (IoT) devices and the ecosystems that they enable.

The IoT Security Lab is a consulting service offered by u-blox in partnership with the Kudelski Group, which has more than 30 years’ experience of protecting business assets in high-value ecosystems.

The Lab will provide threat assessments and security evaluations for IoT device makers to identify vulnerabilities. These will give clients a complete view of the security of their IoT offerings, at the chip, board and software level. It will also provide advice about a device’s overall approach to security and test the security of IoT prototypes before market introduction. This approach will save IoT device vendors time and money and will reduce the chances of financial and reputational damage once the devices are in service.

Jean Michel Puiatti, SVP IoT security at the Kudelski Group, added, “Decades of experience have taught us that dedicated device level security features, such as the Root of Trust (RoT), are vital to building secure equipment, ecosystems, and the services that rely on them. Our partnership with u-blox will enable us to combine our hardware expertise with our security insights to enable a more robust IoT for our clients.”

The IoT Security Lab service will offer risk analyses, initial threat assessments, and will design customer-specific IoT security architectures. It will also be able to advise clients on how to design their IoT devices and ecosystems to take advantage of the security capabilities of u-blox products, to avoid vulnerabilities and protect from emerging security issues once in the field.

The IoT Security Lab will enable clients to protect the security of their IoT devices, ecosystems and businesses against the current and evolving threats that arise from communicating over the Internet and other networks. Clients will be able to draw on the combined hardware, software and security expertise of u-blox and Kudelski Group, without having to invest in hiring, retaining and constantly training in-house security experts, which are often scarce and difficult to find.

Clients will also be offered the opportunity to integrate their applications with the Kudelski IoT Security Platform, which creates trust and control between IoT devices and applications, protecting identity, data, decisions, commands and actions. The platform takes an end-to-end approach to protecting the confidentiality and integrity of IoT data, from the device, over the connectivity network all the way through to the application server.

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

Otto Wireless launches Mipot LoRaWAN modules

Otto Wireless Solutions has been appointed as a distributor for Mipot Spa, an Italian-based company specialising in the R&D, design, manufacture and sale of ISM-band RF wireless modules, aimed specifically at wireless automation vertical markets. Mipot’s product range features a full range of high-quality RF modules developed in accordance with technical regulations and laws applicable in different markets.

Mipot Spa was established in 1973 and has continued to grow steadily by adding additional technical capabilities as they have become available. The company currently produces approximately 1 million RF modules per annum and is increasing its business in Europe and outside of Europe in markets such as USA, China, India, and others.

In addition to the long-standing business, Mipot has developed a full set of LoRaWAN RF modules to support current, as well as future customers. It has also introduced a new 2.4 GHz RF module for a worldwide band which will be available in South Africa soon (pending successful local Type-approval).

Mipot also offers a professional ODM service to customers who require integration of its RF modules into their printed circuit boards (or any other wireless technologies, such as Wi-fi, LTE, BLE, GPS, etc. Mipot is looking to this service as a strategic key point to transfer to its customers all the knowledge in this sector which it has accumulated over 40 years of experience.

The business in South Africa kicks off, via Otto Wireless Solutions, with the introduction of the competitively priced, ICASA-approved LoRaWAN module, 32001353. This attractively priced and capable module is fully LoRaWAN compliant, low-power, and operates over the full industrial temperature range from -40°C to +85°C.

Thanks to the small form factor and low current consumption, this module caters for the implementation of highly integrated low-power battery operated solutions for IoT (Internet of Things) applications, security systems, sensor networks, metering, smart buildings, agriculture, supply chain etc.

As a pre-certified solution, integration into final applications is simplified, which reduces the development time, costs and time-to-market. The embedded stack is fully compliant with LoRaWAN Class A and C specifications by LoRa Alliance.

For more information contact Otto Wireless Solutions, +27 11 791 1033, wireless@otto.co.za.

Clearing the Static with Greg Barron, Actum Group director

Topic 8: Antistatic cleaning materials

Static charge can build up anywhere at any time, which means ESD-sensitive objects are always at risk. Cleaning materials can be the chink in one’s armour that compromises the entire ESD control system. ACL Staticide offers a range of antistatic cleaning products for the ESD protected area:

Neutral cleaner

The ACL Staticide 4020 neutral cleaner is a low-foaming, multi-purpose maintenance cleaner, especially used to clean floors. This is a non-abrasive, silica-free cleaner that will not degrade the anti-static properties of existing flooring. This cleaner can be used on concrete, ESD tiles, painted floors, metal, glass, porcelain and woodwork. Comes in 3.8 litre containers as a concentrate.

Mat and table-top cleaner

This ACL Staticide 6001 mat and table-top cleaner is ideal for workstations, such as bench-tops, where ESD-sensitive objects are being assembled, tested and handled. This is a static dissipative cleaner that effectively removes dirt and extends the life of ESD mats by restoring its antistatic properties. Comes in 3.8 and 0.95 litre bottles.

ESD safety shield

The ACL Staticide 6300 safety shield range offers coatings for long-lasting ESD protection, to easily seal old flooring to revive its antistatic properties. This cleaner is impervious to water, whereas normal antistatic needs to be reapplied frequently. It can be brushed, dipped or sprayed onto plastic parts, bins and shelving to guard against static. Comes in 3.8 litre bottles.

Antistatic wipes

Staticide SW12 wipes keep electronics and equipment clean and static-free. These wipes offer long-lasting static protection which prevents dust build-up, regardless of the humidity. Use it on PC screens, plastics or even industrial machinery. Easy tear-off wrapping in sets of 12 and 24.

For more information contact Altico Static Control Solutions on +27 11 608 3001 or email sales@actum.co.za to discuss your static control requirements.
End-to-end IoT edge solution

Avnet’s /SmartEdge Agile meta-sensor, together with the Brainium IoT platform, form part of an end-to-end IoT solution that delivers AI and security at the edge. This hardware and software combination introduces a new Meta sensing category in the IoT market. The key advantage of this ecosystem is to use the same solution for all stages of the IoT project – from proof of concept up to industrialisation.

Brainium accelerates delivery of industrialised IoT solutions, with higher performance, security and scalability, while significantly reducing costs.

The /SmartEdge Agile meta-sensor is CE/FCC certified, and both hardware and software can be used directly for industrialised IoT projects. The hardware is designed to allow a wide range of sensor and connectivity boards.

The platform is optimised for Microsoft Azure Cloud but can run on any public or private cloud services. Advanced network security has been built in, based on TLS security with ECC certificate protecting you, your network, and your reputation from attack. Brainium is proven, robust and modular for faster and easier development and deployment. With this hardware and software combination, Avnet claims users can launch IoT projects three times faster than with other platforms.

For more information contact Aveshen Nair, Avnet South Africa, +27 11 319 8600, aveshen.nair@avnet.eu

Sub-GHz wireless IP mesh networking modules

RIIM (Radiocrafts IP Mesh) is an embedded RF system designed by Radiocrafts to be an all-inclusive, easy-to-use mesh with direct IP addressing.

The technology employs the IEEE802.15.4 g/e RF protocol and includes an Intelligent C-programmable I/O (ICI), which makes it possible to directly interface to any sensor or actuator. It also supports Mist Computing and does not require any licence or subscription fee.

RIIM is a 2-way symmetric wireless mesh network at 868/915 MHz with the complete IP mesh included in the module and with automatic network setup. RIIM is capable of sending and receiving data directly over the Internet, making it easy to connect to cloud services and other devices. The modules are inherently low-power modules with automatic power saving functions enabling battery operation.

A RIIM leaf node can be put in ‘Sleepy Node’ mode and only wake up when there is activity to report or read. The node is still active on the network, but in a very low level just to maintain the dynamic network. The average current tested for a ‘Sleepy Node’ in standby is 8 µA, which will enable coin cell battery operation or energy harvesting solutions. A node can last 10 years on a CR2772 (870 mAh capacity coin cell battery) while sending 12 Bytes every hour, 24 hours per day.

The RC1882CEF-IPM RIIM module can be configured as a border router, mesh router, or a leaf node:

• As a border router node, it acts as the base of the mesh network. It can connect to an external network via Ethernet or custom user applications on other interfaces such as UART.
• As a mesh router node, it is a full-featured node that is able to re-transmit packets to other nodes in the RIIM mesh network.
• As a leaf node, it is a full-featured node that is not able to re-transmit packets to other nodes. This configuration uses the least amount of energy.

For more information contact Gyula Wendler, Altron Arrow, +27 11 923 9709, gwendler@arrow.altech.co.za.

55 GHz digital step attenuator

pSemi announced volume production of the PE43508 digital step attenuator (DSA). This mmWave (millimetre wave) product is the world’s first single-chip silicon-on-insulator (SOI) DSA to support the entire 9 kHz to 55 GHz frequency range.

Ideal for 5G test and measurement applications, the PE43508 maintains a monotonic response across the entire frequency range and features low insertion loss across a wide frequency and temperature range, low attenuation error and good return loss.

The device is a 6-bit, 50 Ω DSA that offers wideband support from 9 kHz to 55 GHz. It covers a 31,5 dB attenuation range in 0,5 dB and 1 dB steps, and it is capable of maintaining 0,5 dB and 1 dB monotonicity through 55 GHz. The PE43508 also delivers glitch-safe attenuation state transitions, meaning no increased power spike during a state transition.

The DSA has an extended temperature range from -40°C to +105°C, an HBM ESD rating of 1 kV and an easy-to-use digital control interface supporting both serial addressable and parallel programming. It supports 1,8 V control signals and has an optional VSS_EXT bypass mode.

For more information contact Andrew Hannay, RFiber Solutions, +27 82 494 5466, sales@rfbersolutions.com
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ATEK Access Technologies released the latest additions to its Datakey Bar Series of ruggedised removable memory devices. The BRFG and BRFN panel-mount Bar receptacles minimise the required internal mounting space by eliminating the pins that would normally extend into the enclosure. The new receptacles instead feature flat targets on the bottom surface of the receptacle. Spring probes from within the enclosure are used to contact the flat targets.

Datakey Bar receptacles and memory tokens are frequently designed into tactical military cryptographic devices. In these applications, the removable Bar memory token functions as a Crypto Ignition Key (CIK), where it functions as a credential that both enables operation of the crypto device and declassifies the device when it is removed.

Small spring-probe contacts are used to connect to the flat targets on the underside of the receptacle. Some of these spring-probe contacts are as small as a tenth of an inch (2.54 mm) in height, so small that they reside within the thickness of the enclosure wall, where they essentially take up almost no internal space.

With the addition of these new models, the panel-mount Bar receptacles are now available in three different pin lengths, accommodating various housing thicknesses. Bar receptacles use a non-traditional mounting, where they mount on the surface of a device or can be integrated into a corner to minimise the amount of front panel space required.

Bar memory tokens mate with all Bar receptacles and utilise an internal EEPROM for data storage. Memory capacities range from 1 Kilobit to 256 Kilobits with an option of SPI, I2 C or Microwire serial interfaces. Like the receptacles, the Bar memory tokens utilise solid over-moulded construction using an engineered thermoplastic.

The Bar removable memory system is designed for challenging military and industrial applications. The system has been tested to several MIL-STD-810 environmental specifications, including: shock, vibration, immersion, salt-fog, blowing dust, blowing sand, freezing rain, solar radiation and more. The receptacle and memory token system has an operating temperature range of -40°C to +85°C (-40°C to +100°C storage).

The system provides an intuitive slide-in/slide-out operation and features an open design for easy in-field cleaning. It also incorporates features that provide audible and tactile feedback when the token is fully inserted. All Bar receptacles are secured using two internal screws, providing for a tamper-evident installation. The receptacles are offered with or without an adhesive gasket, which contributes to the receptacle’s IP67 rating.

For more information contact IPD Electronics, +27 12 345 3619, info@ipdelectronics.com
Digital multimeter with thermal imager

A digital multimeter (DMM) with a built-in thermal imager has been added to RS Components’ RS PRO product range. The RS-9889 allows engineers to identify thermal overload issues in electrical equipment from a safe distance, without the need for any physical contact.

The instrument is an all-in-one handheld device designed, like other products in the RS PRO range, to combine durability and reliability with value for money. It is suitable for a wide variety of applications, ranging from smart manufacturing in the industrial automation sector, to general electrical tasks such as testing sockets and lighting during business safety audits and home renovations.

The RS-9889 combines features of a digital multimeter – measuring circuit parameters such as voltages, currents and resistances – with an infrared thermal imaging camera to allow hot and cool points in electrical components to be identified on a viewable thermogram.

The thermal imager of the RS-9889 offers max, min and centre crosshair targeting to help the user identify and measure required temperature ranges easily. A Bluetooth Low Energy (BLE) connection allows thermal images to be shared quickly to other devices via the Thermview+ app.

The thermal imager has a 2.8-inch colour TFT LCD screen with an infrared resolution of 80 x 80 pixels, a 21° x 21° field of view, thermal sensitivity (NETD or noise equivalent temperature difference) to less than 0.1°C/100 mK, a fast 50 Hz thermal image frame rate, an object temperature range from 20°C to 260°C, a spectral range of 8–14 μm, and accuracy to within ±2°C, or ±2% of the reading.

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

Energy Harvesting in Embedded Systems is Now a Reality!
Renesas New Extreme low power SOTB 32-bit ARM M0+ Cortex MCU

For more information please contact jody@hi-q.co.za Tel: 0118948083

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**Project-based learning for the modern engineer**

Projects that inherently challenge students to use innovative design thinking often involve interacting with an unknown process or device.

Students are encouraged to understand the unknown through theory, simulation, and experimentation. However, projects that introduce the unknown in messy, multisystem environments tend to challenge the students to be much more innovative.

“Designing a test in this style requires not only knowledge of the specifications, equipment limitations, and fundamental concepts being applied but also the ability to contend with outside factors and grasp how one change can have a cascading effect on the experimental setup,” says Stephen Plumb, sales manager at Test Dynamics.

He adds that engineering students must see the concepts they are taught in the context of real systems to fully understand them. They must explore fundamental topics used in engineering systems, while working in teams, and apply them in practical designs quickly and effectively. NI (National Instruments) ELVIS unites software, hardware, instrumentation, and control in a collaborative environment to prepare the next generation of engineers.

With its hands-on approach, NI ELVIS helps educators teach students practical, experimental engineering skills. Built on the concept of teamwork, this solution connects students to their experiments, which enables them to collaborate using the same technology in over 35 000 companies worldwide. It combines the precision and accuracy of seven benchtop instruments with the speed and customisation of industrial embedded controllers in one single platform. Students can use its easy, prebuilt interfaces to customise at a level not available in other educational laboratory equipment.

“To most effectively analyse concepts this way, students need the ability to not only instrument and analyse the experiment but also precisely control and manipulate the type and behaviour of the inputs to the system. NI ELVIS III is the only engineering laboratory solution that combines seven traditional instruments with fully customisable I/O to enable the complete implementation of the concepts in this approach,” Plumb points out.

Because NI ELVIS III is a network-connected device, it enables collaboration on experiments through multi-user access. Each of the seven instruments can be accessed simultaneously by different students connected wirelessly to. Also, the control I/O can be programmed independently by students accessing the instrumentation. This means that in a group of students, each individual can interact with NI ELVIS III to perform part of an experiment, so everyone is involved in a completely collaborative experimentation environment.

Similarly, since NI ELVIS III can be remotely accessed, teaching assistants find assessing student work much simpler. Rather than designating time to meet in person with each student, the TA can be a remote resource logging into each device after students complete the assignment.

“NI ELVIS III removes barriers to collaboration and enables more students to progress through a lab in less time. This increases student satisfaction and makes the best use of teaching staff resources. The team at Test Dynamics believes that this teaching aid will change the way that both lecturers and students look at engineering studies. Demonstrations are available at our offices,” says Plumb.

For more information contact Stephen Plumb, Test Dynamics, +27 62 217 0063, stephen.plumb@testdynamics.co.za

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**3U VPX software radio board**

Pentek introduced the newest member of the Jade family of high-performance 3U VPX boards. The Model 54821 is based on the Xilinx Kintex UltraScale FPGA and features three 200 MHz 16-bit A/Ds with three programmable multiband digital down-converters (DDCs) and one digital up-converter (DUC) with two 800 MHz 16-bit D/As.

The Model 54821 is the latest addition to the Pentek 3U VPX architecture with the advanced wideband I/O options afforded by OpenVPX. It takes advantage of these VPX I/O options for RF and optical interconnects through the VPX backplane:

- **Option -109**: Optical connections based on VITA 66.5 (draft), containing blind-mate MT optical connectors with SMPM contacts, spring-loaded on the backplane allowing more movement and larger diameter cables for better performance.

- **Option -112**: RF connections based on ANSI/VITA 67.3 type C, containing multi-position blind-mate analog connectors with SMPM contacts, spring-loaded on the backplane with plug-in module and floating displacement on the plug-in module.

- **Option -111**: RF connections based on ANSI/VITA 67.2, containing multi-position blind-mate analog connectors with SMPM contacts.

The Model 54821 can be populated with a range of Kintex UltraScale FPGAs to match specific requirements of the processing task, spanning from the entry-level KU035 (with 1700 DSP slices) to the high-performance KU115 (with 5520 DSP slices). The KU115 is ideal for demanding modulation/demodulation, encoding/decoding, encryption/decryption, and channelisation of the signals between transmission and reception. For applications not requiring large DSP resources or logic, a lower-cost FPGA can be installed.

The Model 54821 also includes a complete multi-board clock and sync engine and a large DDR4 memory. In addition to supporting PCI Express Gen. 3 as a native interface, the board includes optional high-bandwidth connections to the Kintex UltraScale FPGA for custom digital I/O.

The Model 54821 is compatible with a wide range of drivers and controllers:

- **Option -109**: Optical connections based on VITA 66.5 (draft), containing blind-mate MT optical connectors with SMPM contacts, spring-loaded on the backplane with plug-in module and floating displacement on the plug-in module.

For more information contact Stephen Plumb, Interconnect Technologies, +27 21 975 8894, sales@ni-tech.co.za.
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App Note ANP007 – Effective USB 3.1 filtering and protection: www.we-online.com/anp007

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Developing opportunities around ‘hybrid’ renewable energy power plants

There is a buzz in the technology world around the development of smart cities. There are programmes in place for the use of advanced technology for public protection, transportation, medical services, more efficient energy delivery and much more.

South Africa’s leaders have pushed us to open our minds to the possibilities around new smart cities. However, the more significant and current challenge is transitioning from our current state. Globally, the traditional electricity utility business model is being threatened by the uptake of renewable energy, but partnerships are solving many of the threats and opening up opportunities.

If we let our imaginations run wild in the local context – and imagine the possibilities that come from having the cheapest energy in the world – the creative minds amongst us could have a field day. Here’s one creative mind’s simple plausible concept, if power was cheap enough.

First, we imagine – watering the Karoo all year round
Imagine for a second the very plausible possibility of cheap renewable energy in the context of water shortages that are projected to worsen over the years. Think of the current Karoo crisis. Now imagine the water desalinated and pumped from the coast via pipeline into the Karoo. Imagine desalination pumps purifying the water for consumption and reviving the desert. Imagine lush, fertile land for animal husbandry, agriculture and beautification.

Plausible, yes, but barriers aplenty. The most significant barrier: expensive energy.

The solution: a partnership between the tech industry for less energy-intensive systems across the board and state-owned enterprises for the much-needed guidance and blessing to see it through. That’s just one solution with huge implications for our future of scarce water.

Second, we assess. The solution providers for today’s possibilities: batteries and utility companies
In the early days of the motor industry, batteries played a crucial role in the widening of our travel range. Affordable cars gave workers the opportunity to work further, travel, explore and develop.

Today, once again, batteries sit at the heart of widening our range not just to travel – but to build new cities. In the UK, battery installations are primarily being deployed to supply services to the national grid. Such ancillary services are increasingly essential to help match supply and demand.

Also in the UK, there are the beginnings of ‘hybrid’ renewable energy power plants, where batteries are installed alongside solar farms and wind farms. Large-scale battery banks are particularly crucial for the economics of solar farms, which can push down power prices around midday by peaking at the same time.

Instead of exporting immediately, hybrid farms can use reliable batteries to build super energy banks to store power to distribute later.

In other parts of the world, such as South Australia, batteries are being used to make the grid more resilient and avoid blackouts. In South Africa, local utilities, renewable energy providers and super battery banks can be used to electrify remote locations and provide the energy to build the vision of new cities. Cities with reliable transport networks, ample water, tech hubs to develop localised solutions, and so on.

Finally, we work. Turning threats into allies
Globally, the traditional electricity utility business model is being threatened by the uptake of renewable energy. However, utilities are responding swiftly and effectively by partnering and reinventing their role. The challenges facing utilities are immense, but the partnerships with independent energy generators and battery companies are yielding positive results. When compared with other technologies such as gas generation and capacitor banks, the current trajectory of falling battery storage costs makes batteries the long-run solution.

The International Energy Agency estimates that by 2035, developing countries will make up 80% of both total energy production and consumption globally. A substantial amount of this new generation will come from renewable sources stored in batteries. It makes sense to be central to the solution.

While the cost of renewable generation continues to drop, effective use of these renewable energy resources requires reliable energy storage, especially in regions with poor grid infrastructure.

Hard at work already – Forbatt lead acid batteries turning the vision into reality
Forbatt lead acid batteries have been at the heart of many projects that require reliable energy storage. Lead acid batteries are still the battery of choice for their cost and stability. However, two things are key to Forbatt being the battery of choice for serious energy storage projects.

The first is build quality. A poorly built and assembled battery is a liability. Over the years more and more projects have taken on the Forbatt brand because the batteries are dependable and robust.

The second reason Forbatt is the battery of choice is return on investment. While the brand is not the cheapest, it does perform at peak power for one of the longest periods, making it one of the most cost-effective on the market. Where power backup and energy storage are critical, the specialists turn to Forbatt.

Whether you are a utility or private sector company, batteries are once again at the heart of the opportunity to expand society. In many regions across the globe, battery storage already assists in the role of balancing the electricity grid, particularly as an alternative to traditional peaking power solutions such as diesel, gas and pumped storage. Grid-scale battery storage can quickly come online, assisting with time-shifting, spinning reserve, frequency regulation and load following.

We look forward to the development of appropriate alliances and partnerships to help our country move into new markets and realise the vision that will benefit all in South Africa.

For more information contact Forbatt SA,
+27 11 469 3598, sales@forbatt.co

Information from Forbatt SA.
Modular AC-DC power supplies

TDK announced the addition of the SA modules to the 550-2000 W TDK-Lambda branded QM series of AC-DC modular power supplies. The SA modules are available with 5 V/15 A, 12 V/12.5 A, 15 V/10 A and 24 V/6.25 A outputs and offer a cost-effective solution for low-power output requirements.

The SA module’s patented loop control design uses a digital controller and TDK-Lambda developed algorithms. Phase mode control provides higher stability across a wider range of operating conditions. This enhances the output response to sudden load changes, with a faster and improved recovery. The use of a digital controller enables a reduction in component count of 40%.

Using TDK-Lambda’s online Quick Product Finder will automatically optimise the most suitable modules to generate the most cost-effective solution for a customer’s requirement, and provides a choice of signals, leakage current and standby voltages. Upon entering the desired output voltages and currents, the configurator will automatically produce a short 7-digit code for easy order placement.

All models in the QM series feature low acoustic noise and full MOPPs isolation. With medical and industrial safety certifications, the QM series addresses a wide range of applications, including BF rated medical equipment, test and measurement, broadcast, communications and renewable energy applications.

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

CoolSiC evaluation board for motor drives

Infineon Technologies’ EVAL-M5-E1B1245N-SiC is a complete evaluation board, including a three-phase CoolSiC MOSFET power module for motor drive applications. In combination with one of the available MADK control board options with the MS 32-pin connector, it demonstrates Infineon’s silicon carbide (SiC) power module technology.

The board features the EasyPACK 18 1200 V CoolSiC MOSFET power module (FS45MR12W1M1_B11) in six-pack configuration which is optimised for motor drive applications with very high-frequency switching operation, such as general-purpose drives and the fast growing servo drive and robotics market.

It is equipped with all assembly groups for sensorless field oriented control (FOC), over-temperature and over-current protection as well as short circuit protection. The evaluation board was developed to support customers during their first steps designing motor drive applications with the FS45MR12W1M1_B11.

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

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- Custom Design Pack Solutions

*Sampling Only
Battery design trends for IoT

By Tim Parker, Avnet Abacus.

The Internet of Things (IoT) phenomenon is allowing the collection of data from sensor nodes practically anywhere in the environment, and giving non-electronic objects the ability to communicate, opening up a whole new sphere of applications for electronic systems.

Selecting batteries for Internet of Things connected systems can be tricky, as there is such a wide variety of application types.

For the ubiquitous sensor node at the periphery of the Internet of Things – things like thermostats, building automation sensors and light switches – this type of system has a very specific power profile. The application will typically be in sleep mode for the vast majority of the time, waking up only to perform a measurement, or to activate a low-power wireless connection such as Bluetooth Low Energy.

When in sleep mode, the device consumes a very small amount of power, but when active, a burst of power is required. These devices are very low-power overall because the sleep period is generally many orders of magnitude longer than the active period.

These types of applications typically use coin cell batteries because of their low overall power requirement. Coin cells may have alkaline chemistries, with a cell voltage of 1.5 V. This drops to 0.9 V when discharged. Applications that require higher voltages may use Li-ion coin cell batteries, which are also widely available. This type of cell offers 3.0 V when fully charged, dropping to 2.2 V when discharged.

There are many variants on the exact Li-ion chemistry used, which maximise the different properties. For example, type BR maximises the battery’s capacity – Panasonic’s best BR coin cells have capacities up to 500 mAh (BR3032). Type CR, on the other hand, minimises the battery’s internal impedance, which means it can supply higher pulse currents.

Also at the periphery of the Internet of Things are some wearable accessories with similar power profiles, such as heart rate monitors that communicate data back to a sports watch or smartphone. Some wearables are able to harvest enough energy from the wearer’s movements that they can use this to power their electronics; however, energy as a power source can be unpredictable and may not coincide with the active period for the electronics. Most energy harvesting devices therefore require a rechargeable battery which is charged by the energy harvesting subsystem, so that energy can be used as and when it’s needed.
Rechargeable coin cells are available with excellent energy densities. For example, Varta’s Coin Power series offers nominal 3.7 V batteries, 5.4 mm high, measuring 12.1 mm (diameter) for the 50 mAh capacity and 16.1 mm for the 100 mAh capacity version. These button cells, as small coin cells are often called, offer low internal impedance and discharge currents up to 5C (that is, 250 mA or 500 mA, respectively).

Outside of coin cells, other small lightweight battery form factors for wearable devices include Panasonic’s pin type rechargeable battery, intended for thin applications like spectacle frames and pens. This 3.7 V battery measures 3.5 mm (diameter) by 20 mm, and weighs just 0.6 g.

Panasonic’s pin-type rechargeable battery.

Industrial temperatures
Aside from consumer electronics, the Internet of Things also encompasses the automotive and industrial environments. For industrial process control in particular, installing wireless sensors to tell a central system what is going on all over a factory is a big part of enabling Industry 4.0. Industrial sensor networks may use energy harvesting, perhaps from heat energy expended in the process itself, or from the movement of a robotic arm, but they still require batteries.

Though the power profile may be similar to consumer devices, batteries for these applications will need to withstand much harsher environments and maintain reliability though conditions are difficult. Specialised casings and seals can prevent dust, moisture and chemical ingress, but it can be hard to protect against very hot and very cold temperatures that affect the batteries’ chemistry.

For harsh environments like these, Tadiran has developed AAA and AA format batteries which may be charged at temperatures between -40°C and 85°C, a big improvement on typical Li-ion rechargeables which operate over the range 0°C to 60°C. This type of battery is actually a hybrid layer capacitor (HLC) which can produce the current pulses needed for wireless communication, up to 5 A. They also offer a low self-discharge rate, less than 5% per year, and are expected to last more than 10 years in the application.

Ultimately, the choice of battery for any application in the Internet of Things will depend on the power profile of the application, in combination with any environmental factors such as temperature. If you need advice on battery performance, contact Avnet South Africa using the details below.

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

www.dataweek.co.za
Points to consider when running power supplies from portable generators

By Andrew Skinner, chief technical officer, TDK-Lambda EMEA.

With outdoor events like concerts, events and festivals now involving multiple, large display screens and a host of other electronics, portable diesel generator sets are often used to provide the AC power in temporary locations.

One question we get asked quite frequently is about the suitability of running a power supply from a portable generator set. We tend to think of voltage waveform distortion and voltage noise spikes, but actually there are other issues that are of concern.

A backup generator for a factory would normally be powering multiple load types, consisting of heating, lighting, machinery and office equipment. It would be unlikely that the loading on the generator would undergo sudden major changes. At an outdoor event though, this may happen – particularly at the end of a song or during a break in the event schedule. If this occurs there could be a brief, but substantial rise in the AC voltage when the generator suddenly sees a very light load.

Initially manufacturers specifying the use of generators had to rely on local country standards, but these did not always specify voltage and frequency deviations – just the ability to be capable of accepting and recovering from a full load step. Stability and response times are now categorised under the ISO 8528 (BS7698) standard with four performance standards listed in ISO 8528-1-7 for governor regulation.

Class G1 is used for applications where the connected loads only require the basic parameters to be specified. This includes general-purpose applications like lighting and electrical loads.

Class G2 is required for applications where regulation is not that critical and temporary deviations are acceptable. Lighting systems, pumps, fans and hoists have some tolerance to frequency and voltage.

Class G3 is for applications where the equipment demands are moderately severe and includes telecommunications equipment and thyristor-controlled loads.

Class G4 is required for applications where the demands are extremely severe. This typically includes data-processing and computer equipment.

The limits for these devaluations are shown in Table 1.

Examining the impact of these voltages on various regions we get the data shown in Table 2. Most AC-DC power supplies are rated for 85 or 90 V a.c. to 264 V a.c. operation, but a number of manufacturers are now offering products that will accept 300 V a.c. for 5 seconds. These products tend to be enclosed in a metal chassis, like TDK-Lambda’s RWS-B series, and are targeted at industrial applications.

From the tables above, products rated for 300 V a.c. for 5 seconds can be used on Class G3 generators, and depending on the extent of the anticipated load changes, can probably be used with Class G2. Open-frame power supplies like TDK-Lambda’s ZMS100 tend not to have the 300 V a.c. peak rating. This is because they are usually used in ITE (Information Technology Equipment) systems, where the end customer will request a Class G4 generator.

This does raise issues of concern, as mentioned earlier…
The MagI³C-VDMM (Variable Step Down Micro Module) power module family from Würth Elektronik is being supplemented by more powerful 1 A and 1,2 A versions. The input voltage range (from 2.5 to 5.5 V) covers the standard 3.3 and 5 V bus voltages, and the adjustable output voltage ranges from 0.8 to 5.5 V. The modules have been designed for high efficiency in the low load range. Integration of the DC-DC converter and coil makes for a very compact solution in an LGA-6EP package.

This product range is particularly suitable as a replacement for linear regulators. Applications include the supply of interfaces, microcontrollers, microprocessors, DSPs and FPGAs. Thanks to their small size and high efficiency (over 96%), they are particularly suitable for use in mobile and battery-powered devices. To save energy, the VDMM can be put to sleep using an additional pin, which extends battery life.

The MagI³C-VDMM series features excellent electromagnetic compatibility, meeting the CISPR-32 standard for Class B radiated interference without additional filter elements.

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

Step-down power modules

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Table 1. Comparison of ISO 8528 generator classes.

<table>
<thead>
<tr>
<th>Generator Class</th>
<th>Voltage Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class G1</td>
<td>±25%</td>
</tr>
<tr>
<td>Class G2</td>
<td>±20%</td>
</tr>
<tr>
<td>Class G3</td>
<td>±10%</td>
</tr>
<tr>
<td>Class G4</td>
<td>Custom*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Load Change</th>
<th>Voltage Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-100% load change</td>
<td>±25%</td>
</tr>
<tr>
<td>100-200% load change</td>
<td>±20%</td>
</tr>
<tr>
<td>Custom*</td>
<td></td>
</tr>
</tbody>
</table>

Voltage Recovery Time: <100 ms

Table 2. Impact of generator classes in different regions.

<table>
<thead>
<tr>
<th>Region</th>
<th>Class G1</th>
<th>Class G2</th>
<th>Class G3</th>
<th>Class G4</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>115 Vac</td>
<td>86 Vac</td>
<td>92 Vac</td>
<td>Custom*</td>
</tr>
<tr>
<td>Voltage Deviation</td>
<td>0-100% load change</td>
<td>150 Vac</td>
<td>144 Vac</td>
<td>139 Vac</td>
</tr>
<tr>
<td>Voltage Deviation</td>
<td>100-200% load change</td>
<td>280 Vac</td>
<td>290 Vac</td>
<td>290 Vac</td>
</tr>
<tr>
<td>Voltage Recovery Time</td>
<td>&lt;100 ms</td>
<td>&lt;50 ms</td>
<td>&lt;45 ms</td>
<td>Custom*</td>
</tr>
</tbody>
</table>

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

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5G ready
Things are tough for electronics contract manufacturers in SA

By Brett van den Bosch.

It’s no secret that the contract manufacturing side of the South African electronics industry has been under enormous pressure for some time now, with some high-profile manufacturers having closed their doors or suffering serious financial trouble in recent years.

The factors leading to these issues are varied and numerous. We asked two manufacturers to unpack the challenges they’re facing; although they both happen to be based in the Western Cape, the issues they highlight apply equally to the entire industry right across the country.

Here’s what they had to say:

Andrew Connold, CEO of Tellumat Group

The contract manufacturing side of our business, Leratadima Tellumat Manufacturing (LTM), is still running for now but the shareholders have decided to shut it down in an orderly shutdown process.

The reality is that manufacturing in this country has declined substantially, particularly on the electronics front, and despite government’s policies of designated products being locally manufactured or required to have a high percentage of local content, they really haven’t followed through on that very strongly.

I think part of it is a lack of understanding of the complexity of what goes into manufacturing. Referring to the big set-top box (STB) tender and our digital migration, government had very honourable intentions to have those millions of STBs manufactured locally and in so doing to create local jobs, and they contracted a few companies to manufacture and supply some 1.5 million STBs.

But nobody at USAASA (Universal Service and Access Agency of South Africa) appears to have had the background and understanding of what was involved for the industry, in that when you trigger electronics manufacturing orders of this size it triggers a huge global logistical exercise. Components are gathered from right around the world - they might get aggregated in China or somewhere else, but they come from many places like Europe, Malaysia, Vietnam, India, USA and other countries.

During the production, USAASA stopped the STB manufacturing process over an internal dispute about whether it should fall under the Department of Communications or the Department of Telecommunication and Postal Services. That sort of thing costs manufacturers absolutely millions, because they’re committed once they place their orders on overseas suppliers, the suppliers commit their production capacity to produce the components ordered, and once the train starts, to stop it is very expensive and to start it up again is also very expensive.

Government far too readily succumbs to the temptation to take the easy road and allow imports to be brought into this country. Take, for example, two-way radios. They are used by the likes of the police, municipalities, Eskom and others, as they are a very cost-effective way of internally communicating to get technical and service processes underway and completed. As Plessey, before we were Tellumat, we manufactured two-way radios in the 80s, and Altron also manufactured its own two-way radios.

So we have the capability in this country of making two-way radios locally and yet the Department of Trade and Industry (DTI) allows for the importation of these radios through the issuing of concessions. We understand there are OEMs who get a concession almost every month to import radios for sale to government departments without any local content being required, and they come from places like Hungary.

What we effectively end up doing as a country is outsourcing and exporting our jobs. The second pain to the country is that government lands up paying social grants to keep its many unemployed fed, and there’s no skills development and dignity for our communities in that route either. So I do think government has quite a lot to answer for as far as not enforcing its designated product policy is concerned.

That said, our manufacturing business was set up prior to the isolation years, and in the 80s and into the 90s we manufactured our own products which were developed locally and manufactured for local conditions in reasonable volumes. And subsequent to our own product development declining, we have continued to contract manufacture SA-developed products for export, but on a much smaller scale.

So electronics manufacturing was a reasonable business niche for a medium sized manufacturing outfit for a while. With the weakish Rand and with unique products we were able to do something reasonable, but the volumes were never sufficient to make a ‘sustained profit’ if I can put it that way, and furthermore to earn the income necessary to replace the equipment that we need to be competitive with the rest of the world.

We have also seen, through the DTIs policies of attracting foreign direct investment, local television manufacturers go to the wall because the DTI has given huge incentives to the likes of Samsung to come into the country and set themselves up with tax breaks in Dube Trade Port in Durban. In the process they killed off a brand new TV manufacturer in Johannesburg – Anyview – which was contracted to Samsung to produce its TV sets locally.

As such, well-intended policies perhaps to bring direct foreign investment into this country and create jobs, but with the unintended consequence that they killed off a local business. And the taxpayers largely funded the establishment of that new Samsung plant. So there are some policies that really haven’t supported local manufacturing.

At the end of the day, unless you find a niche in which you can make good profits, electronics manufacturing in this country is just not an attractive business to investors.

There is still some PCB manufacturing capability in the country but a lot of that is now outsourced and imported. The components are all imported and assembled; however, there is a fair bit of local manufacturing of things like wiring looms and enclosures that are part of the overall ecosystem, but by far the majority of work is really assembly, and modular testing, and then complete integration and test.

Government has engaged with us from time to time, through the ITAC division, and certainly around the STBs there was a lot of engagement from the localisation department at the CSIR to confirm that there was the appropriate level of local content to meet the designated product policy requirements for STBs, which I thought was very positive. But it would appear that politics trumps common sense when it comes to protecting the local industry and the jobs it provides to South Africans, at least it certainly has done in the past - I hope it will change.

TV and computer monitor local assembly seems to be the one product line that’s been consistently assembled locally, due to the duties on the importation of fully and partly made up units. The components are imported and locally assembled for local consumption. This is consistent and it does work to some degree for the local electronics manufacturing industry. But the major TV manufacturing is now with the OEMs who are set up locally, such as Hi-Sense, LG and Samsung. Hi-Sense in the Western Cape has expanded beyond TV sets into white goods and we’ve heard recently that because of their exports from here into Africa, they have purchased more machinery and are expanding their electronic manufacturing capability.

So to me Hi-Sense has been one of the success stories in terms of bringing in foreign direct investment and creating local jobs, but as far as supporting local manufacturing on designated products and enforcing local content, we’ve seen very little of that. This despite our efforts to engage directly with government around the local content required for two-way radios, STBs and electricity meters.

As for the opportunities in electricity meter manufacturing, one has to take into account that...
Eskom is going through an extremely bad time financially, doesn’t appear to have the money to invest in the new generation of smart electricity meters, and seems to have delayed its tender which it puts out every three years for the supply of electricity meters. The major municipalities are in similar dire straits, so they haven’t been placing substantial enough orders to make local smart electricity meter manufacturing readily viable.

To set up something like electricity meter manufacturing, one needs to find an OEM designer of a product, or range of products, and set up equipment for the local assembly and manufacture of a fairly high volume of units to make the setup a viable proposition for the OEM. One also has to set up substantial test and calibration equipment, and unless you’re making 200 000 to 300 000 or more meters a year, it’s very hard to justify that investment in equipment. One would need to be doing that consistently for 3 to 5 years typically to justify such a setup cost and get a return. It’s really economics at the end of the day and we’re not seeing a lot of opportunities in support of this designated product to see investors wanting to make the commitment.

LTM has kept itself alive by taking on the manufacturing of products of other local OEMs who have shut down their internal manufacturing capability. In these cases, their manufacturing staff have typically lost their jobs, particularly at the operator level, and it’s really those people who are going to struggle. Our middle management staff who know how to run plant, or stores, or the engineering and test side, I think have a better chance to find opportunities, but even these are limited.

Rob Steltman, director at Barracuda Holdings

It is deeply worrying to see the distressed state of some of our peers and we truly wish this was not the case. I believe the core reasons are most likely different in each case, but significantly amplified by the local and macro-economic challenges being faced by everyone.

As an industry, I truly hope that we can establish a higher level of cooperation, looking at securing business outside our borders and not wresting over the limited business that exists within our borders. Here I am not referring to only direct foreign manufacture, but also working closely with South African companies exporting their technology – ensuring they are globally competitive, but manufacturing here.

It is important to maintain critical mass in the country, from the component level to machinery support. We are all interlinked.

Manufacturers are highly exposed due to a variety of factors. Margins are at an all-time low due to intense competition, both locally and globally. What’s more, long-term and capex-intensive decisions have to be made with only a very short forward view of work. Continuous investment in equipment and process capability is essential – this is relentless as the technology is continuously changing – and these upgrade cycles are now shorter than ever.

Customers are themselves under pressure and are looking for better ‘deals’ all the time. This is understandable; however it is often incredibly destructive when one manufacturer is ‘traded’ against another to the point of unsustainable business and the inevitable outcome of closure, where everyone loses.

A proper understanding of the product costing and processes required to achieve the desired outcome is essential. Customers need to ensure they interact on a very deep level with the manufacturer and the manufacturer is open enough to expose the costing methodology in order for the customer to understand if they are getting a sustainable price that is fair and equitable to both parties. The short-term ‘good deal’ may in the end lead to significant problems on many fronts, one of which is the potential demise of the manufacturer.

With sufficient interaction, it is relatively easy to determine if the price being charged vs the investment in appropriate infrastructure and sustainability makes sense. If the customer wants a long-term, reliable partner this needs to be recognised.

Taking materials out of the equation, a significant part of the manufacturer’s cost is labour. This is most commonly paid on a weekly basis (in an industry where wage rates are regulated by the Metal Industries Bargaining Council and are one of the highest rates compared to other sectors) and therefore the manufacturer is out of pocket well ahead of being paid for the work by the customer.

When payment terms agreed on at the outset of the project are disregarded and payments for work done is delayed, it places the manufacturer under severe pressure, not only from a cash flow perspective but also in terms of the erosion of an already very thin margin due to the manufacturer having to incur the interest costs on funding.

Even if this funding does not come from a third party and is internal, there is still a material impact as that cash could have been used to drive further investment in capex, etc.

There is hope

Of course, there is hope, but complaining and waiting for solutions to be served up on a platter will do nothing to solve any of the challenges. One of the best things about living in this country is that, as an individual, one can actually make a tangible difference. It is going to take people with hardened resolve to navigate the challenges – we are all frontiers people in an emerging world which is really exciting. There is great hope with collective direction.

We are really happy to be in a sector that is relevant to the world today. Never before has so much technology been incorporated into everyday products and activities, with this driving even more opportunity. A mindset of adaptability and flexibility with continuous learning will allow a company to leverage on new opportunities.

We have received next to no support from government and it would be fantastic to receive practical support, perhaps in the form of tax rebates on employment targets, etc. The rigid operator remuneration, based on very outdated grading criteria dictated by bargaining councils, is in my view one of the biggest impediments to competitiveness and ability to tackle opportunities and employ more people. This really needs urgent attention and intervention with regards to revising the grading criteria.

Thanks to our very supportive customers, suppliers and great team, now 150 strong, we have grown year on year with this past year being our best yet. We have and continue to set up to offer more than just PCB assembly and have a number of value-added services.

We are challenged by what I have described above and we do not have the predictability in business we would hope to have, but are focussed on what we do know and what we can control, and do our utmost to make it work as best as possible.

For more information contact

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- Tellumat, +27 21 710 2911, https://tellumat.com
Originally known as Parsec, the company was founded in 1993, focusing on the design, development and manufacture of a wide range of advanced electronic and digital technologies. In 2015, Parsec was acquired by Alt-X-listed company, Ansys, and changed its name to Etion Create as part of the holding company rebrand from Ansys to Etion.

The repositioning of Etion created a platform for the group to create a new value chain and enabled it to take an integrated offering to the market. With its proudly South African roots, Etion Create forms a critical part of the Etion value chain and its overarching proposition to create, digitalise, connect and secure digital technology.

Other divisions within the Etion Group include Etion Digitise which specialises in digital systems that help improve the safety and productivity of client operations in sectors that include transport and logistics, mining and energy; Etion Connect which offers connectivity and communications products, solutions and services for fibre wireless deployments, data and digital radio communications networks; and Etion Secure, incorporating the newly acquired LAWTrust, which provides cybersecurity solutions that focus on establishing positive identity, ensuring authenticity and protecting privacy.

By joining forces with Etion, Etion Create now offers turnkey professional engineering solutions spanning from the early system concept stages through to final product manufacturing and logistics support. Its proven ISO certified project management, system engineering, design and development and manufacturing processes guarantee professional and consistent end results which are a key requirement on all defence platforms. Where possible, the company leverages its range of in-house commercial off-the-shelf (COTS) embedded products.

Offering and capabilities
Etion Create carries certifications for ISO 9001, IPC-A-610-Class 2 and 3 (inspection), IPC-3-STD-001-Class 2 and 3 (workmanship) and IPC-7711/7721 (rework, modifications and repair).

As an environment-conscious entity, the company supports efforts to eliminate the use of conflict minerals (e.g. columbite-tantalite, cassiterite, gold, wolframite, or their derivatives such as tantalum, tin, gold and tungsten) from improper sources and is committed to promoting transparency and consumer awareness regarding the use of these minerals.

Etion Create has also been involved in the information security market since 2007 with the development of its range of high-security network encryption (SOLIDnet) products. The SOLIDnet products provide a military-grade Virtual Private Network (VPN) solution which addresses the need of government and
enterprises to communicate securely over public networks such as the Internet.

Etion Create has recently expanded its product offering to include a USB-based Public Key Infrastructure (PKI) cryptographic token solution known as the SOLIDid which covers a wide range of information and cybersecurity applications of interest to government, enterprises and individuals alike. The applications are numerous and include the digital signing and encryption of emails, files and documents.

The company has also embraced the new world of Internet of Things (IoT) technologies, big data and the cloud, by creating the right platforms for collecting, analysing and understanding information crucial to your business. Its expertise and deep understanding of its customers’ needs assures them of peace of mind for them to remain focused on their own core competencies.

Value proposition and vision
With a workforce that includes more than 150 individuals, highly specialised engineers and project managers, and long-standing industry experts, Etion Create delivers the crucial expertise and support that its customers need for their business.

The bulk of its business is derived from the South African market with a number of other countries in the Middle East and sub-Saharan Africa geographies. It has ambitions to grow significantly beyond its border to reduce its reliance on the South African market. Both its home and international markets are constantly changing, and the company’s approach is to have enough flexibility to tailor its business to the ever-changing market dynamics.

Etion Create would like to be known as an iconic group known for accelerated growth and value creation for all stakeholders. It continuously strives to be a place where people with ideas can turn these into sustainable business despite the constraints present in the markets that it operates in.

For more information contact Etion Create,
+27 12 678 9740, sales.etioncreate@etion.co.za
Quality management based on quality assurance

By Heike Schlessmann, SEHO Systems.

A production process free from defects, with every step being reproducible and traceable, is the target of quality assurance in electronics production worldwide.

In many cases, manual rework processes are not allowed due to quality related reasons and cost issues. It is time consuming and cost-intensive, and hidden costs need to be considered, such as productivity rates or personnel training.

Because of this, assemblies with defects often go through the production process a second time. However, in this case the entire board is exposed to the thermal load, not only the faulty solder connections, which can affect the overall product’s reliability. An automated zero-fault production concept can provide a cost-effective solution. Automated process control and integrated automated rework enable a soldering process free from defects and completely documented.

Compared to other automated processes, selective soldering is considered demanding. Structures with small pitches result in a small process window, and variable parameters such as flux quantity, temperatures or wetting time, play a decisive role in terms of solder joint quality and reliability. In addition, material-related influences have to be considered.

A controlled and reliable process is a basic requirement for approaching zero-fault production. Besides the selective mini-wave soldering process with monitoring and control functions for all process steps, the zero-fault production concept incorporates integrated automated optical inspection (AOI) of the solder joints, as well as a defined and automated rework soldering process at the fault coordinates, corresponding to the fault classification.

This is an advantage from the technical processing point of view since only defective solder joints go through the process again, not the entire board. As all work stations are linked via bidirectional data transfer, all process steps are completely traceable and reproducible. In addition, analysis of trend and series faults allows process optimisation at an early stage. This applies particularly for component placement and the soldering process, however, design faults can quickly be identified as well.

With a focus on the critical issues in a selective soldering process, this article will describe all process steps that need to be controlled to ensure consistently high product quality. In addition, it will describe a production concept enabling automated rework with minimal thermal exposure for the assemblies.

Introduction

One of the most frequently experienced solder defects is the formation of solder bridges. As with many typical solder defects, the root cause might be several factors. Particularly in lead-free applications, the reduced wetting force of the solder alloy contributes to a changing flow behaviour, which may result in bridging. Solder bridges, however, also might be caused by an inadequate quantity of flux applied to the solder joints, or insufficient preheating of the assembly.

Insufficient solder through-hole penetration is another typical process-related soldering defect, and besides the possibility that the connecting ‘partners’, e.g. the printed circuit board and/or the component, show poor solderability, this defect is often related to a poor heat balance. Moreover, an insufficient flux quantity can also be the reason for this defect.

Another typical solder defect which might occur in selective soldering processes is the formation of solder icicles. Most frequently, icicles are caused by an insufficient preheat process or inadequate energy transfer during the soldering process. However, insufficient flux application can also be a reason for icicle formation.

These are only some of the possible soldering defects, and in many cases they are related to the flux application process or the heat transfer rate, while preheating the assembly or during the soldering process.

Figure 1. Solder bridges are one of the most frequently experienced solder defects.

Figure 2. Real-time flux quantity monitoring.
Changing the temperature of the object goes emits a certain amount of infrared radiation. The intensity of the emitted radiation depends on the material. This material-specific constant is described with the help of the emissivity, which is a known value for most materials. Infrared thermometers are optoelectronic sensors that calculate the surface temperature based on the emitted infrared radiation from an object. Their most important feature is the measurement of the objects without contact. Consequently, this helps to measure the temperature of inaccessible or moving objects without difficulty. In conjunction with the appropriate software, the required preheat temperature can be preset for a printed circuit board, which allows a gradient-controlled preheat temperature profile.

Control of the preheat process
Monitoring of the preheat temperatures is essential to ensure reproducible temperature profiles, which again are required for activation of the flux. One of the most common and most reliable methods to monitor and control the preheat temperature is the use of infrared thermometry.

Depending on the temperature, each object emits a certain amount of infrared radiation. Changing the temperature of the object goes along with a change of the intensity of the radiation. The wavelength range used for infrared thermometry, the so-called ‘thermal radiation,’ ranges between 1 µm and 20 µm. The intensity of the emitted radiation depends on the material. This material-specific constant is described with the help of the emissivity, which is a known value for most materials. Infrared thermometers are optoelectronic sensors that calculate the surface temperature based on the emitted infrared radiation from an object. Their most important feature is the measurement of the objects without contact. Consequently, this helps to measure the temperature of inaccessible or moving objects without difficulty.

In conjunction with the appropriate software, the required preheat temperature can be preset for a printed circuit board, which allows a gradient-controlled preheat temperature profile.

Controlling the soldering process
Particular attention should be given to the soldering area – the heart of the process. There are many variables which can influence the soldering results, for example the temperature of the solder alloy and the solder level in the solder bath, which should be continuously monitored and automatically controlled. Due to the very small solder nozzle geometries that are used in selective soldering processes, it is important to ensure a constant and stable wave height, which is decisive for sufficient energy transfer to ensure reproducible soldering quality.

Multi-wave systems typically use an eddy current sensor to control the solder wave height and it simultaneously monitors the solder level in the solder pot. A measurement funnel, which has the same level as the solder nozzles, is connected with the pump channel.

Based on the principle of communicating tubes, which is an indirect measurement, the same solder wave height arises at the solder nozzles and at the measurement funnel. The signal of the eddy current sensor is continuously compared with a nominal value to keep the wave height stable.

The easiest method to measure the wave height in single-nozzle mini-wave processes is using a measuring needle made of titanium or any other resistant material, which performs a contact measurement at the surface of the solder wave. This causes an electrical signal and the pump speed is regulated to the necessary speed to achieve the preset wave height. As the measuring needle only carries out a contact measurement and does not dip into the solder, it is important to keep the atmosphere stable. Changes in the surface tension can lead to different measurement results.

Alternatively, the wave height can automatically be controlled using a laser measuring system. The measurement procedure is performed simultaneously with the production, and therefore there is no influence on the cycle time. In addition, any change of the pump speed affects the measuring signal quickly.

The direct measurement of the wave height also recognises soiling in the nozzle system, which could affect the soldering results. The wide measuring range of the sensor and the adjustment to zero at the top edge of the solder nozzle enable the use of nozzles with different height.

A newly developed wave height measurement system is a cross sensor that takes over several functions. On the one hand, the wave height in mini-wave soldering processes is

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 preciously controlled. The measurement is made directly at the solder nozzle, without having to touch anything, and it is fully independent from the solder alloy used. In addition, the cross sensor is also used for automatic tool measurement: diameter, height and mounting position of the solder nozzle are automatically controlled, thus excluding potential operator errors.

The cross sensor carries out another task if additional processes are installed, such as a brushing process for the removal of solder balls. Here, the cross sensor also monitors the condition of the brush and automatically indicates the need for a replacement if the brush is worn to a certain level.

Additional control functions help to improve process reliability and stability

Additional automatic monitoring and control functions help to avoid potential soldering defects or to eliminate operator errors. An example is the automatic position correction of the x, y and z value for assemblies which show misalignment or warpage. Furthermore, intelligent tool management based on sensors and software tools recognises the current solder nozzle setup and assures that only printed circuit boards are allowed to enter the selective soldering system that are designed to be processed with this setup.

Due to the comparatively small solder volume that is available for energy transfer, selective soldering processes use relatively higher solder pot temperatures up to 320°C. This goes along with an increased risk for oxidation.

Selective soldering systems generally are operated in a nitrogen atmosphere. While the mini-wave in a nitrogen environment shows a controlled solder flow, the liquid solder rapidly oxidises as soon as the inert atmosphere is lost. The solder flow can then be deflected easily and can hardly be controlled, which makes it difficult to produce reliable solder connections.

Various control methods can be used to ensure a stable nitrogen atmosphere during the process. The quality of the supplied nitrogen can be monitored by measuring the rest-oxygen value at the nitrogen feed-in. This is particularly useful if a nitrogen generator is connected. It is also possible to permanently control the nitrogen quantity at the gas supply of the soldering unit. Here, an individual value that is needed for the specific process can be set in the soldering program (l/min).

Integrated AOI and automated rework

100 % process control is given with an automatic optical inspection (AOI) system that is integrated directly into the selective soldering machine, which offers significant benefits in view of the total production line. Soldering defects will be detected early, and analysis of trend and series fault information allows process optimisation at an early stage to reduce the overall defect rate. This particularly applies for component placement and the soldering process, however, design related defects can quickly be identified as well.

The inspection of one assembly is performed in parallel to the soldering process of the following assembly to ensure short cycle times. The integrated AOI system allows the inspection of solder joints for remaining solder balls, non-wetting or insufficient wetting, missing pins, bridging or removed neighbouring SMD components. As the soldering unit and the AOI system are using the same x/y axis system, this solution also provides high efficiency.

In a subsequent separation module, assemblies without defects and assemblies with defects are automatically separated. Verification and classification of soldering defects is made at a verification work place. Afterwards, the assembly can be processed with another soldering system, or alternatively can pass through the same selective soldering machine a second time.

In both cases, an automatic rework process will be performed exclusively at the solder joints that were classified with a defect. This is a large advantage from the technical processing point of view, as only defective solder joints go through the process again, not the entire board. As all work stations of this production concept are linked via bidirectional data transfer, all process steps are completely traceable and reproducible.

Conclusion

To ensure consistently high product quality and ultimately achieve a zero-fault production stage, it is necessary to control all process steps. Manual rework is costly and does not always provide the required quality. In addition, manual rework is difficult to trace. Automated control functions and – if necessary – automated rework offer both repeatability and traceability, which are independent from human actions.

For more information contact Quamba Technologies, +27 83 417 4294, igmar@quamba.co.za.

Application centres for dispensing and coating

With a larger global installed base of MYSmart and MY700 jet printing and dispensing systems, Mycronic is taking the next step in bringing its hands-on expertise closer to customers by establishing multiple new application centres for dispensing and coating in the US, Europe and Asia.

The centres offer customers a complete service offering, from prototyping and process development to automation and software integration. They are designed to function as a practical interface between Mycronic and its customers, across industry sectors and among industry partners.

At a typical technical seminar for coating, the company bring together several leading manufacturers of coating and dispensing fluids and inspection systems to explore future demands in electronics protection. To date, the new centres have handled dozens of customer projects, with many more in the pipeline for 2019 – from advanced process control and traceability systems for automotive electronics manufacturers to new adhesive fluid trials for consumer electronics.

A number of process improvements have already resulted from several customer collaborations. One example is a pre-heat buffer conveyor which Mycronic developed for a customer, primarily to reduce energy consumption in the dispenser. By pre-heating the board up to ninety degrees, it also ensures a more stable process with a shorter cycle time.

Another service offering that has experienced strong customer demand is application development, where specialists from Mycronic help to optimise a particular board design for the dispense application, to reduce cycle times or to minimise production costs.

One of the pieces of equipment powering these innovations is the dual-head MY700 jet printer and jet dispenser, which enables smaller high-mix manufacturers to achieve high-quality solder deposits at high speeds, apply high-precision adhesive fluid deposits, or a combination of the two.

Mid-volume producers can ramp up speeds by combining two MY700s, using a dual large-dot ejector for higher throughput together with a dual small-dot ejector for more challenging precision deposits. High-volume stencil printer lines can benefit from the MY700 as part of an add-on program, which makes it possible to solve quality issues in challenging processes while simplifying stencil designs.

For more information contact MyKay Tronics, +27 11 869 0049, mykay@iafrica.com.

Cleaning machines and agents on show at Productronica

Using the motto ‘Make the Cleaning Check’, Zestron will be exhibiting a selection of state-of-the-art cleaning machines from leading international manufacturers. Visitors who are looking for a new cleaning system will be shown diverse, innovative and proven technologies on Stand 359, Hall A2.

Zestron’s process engineers and experts from the equipment manufacturers will be available to answer questions about the technology as well as the compatible cleaning chemistry.

In addition to the selection of machines and cleaning agents, the focus is on process monitoring. Trade show visitors can get information about innovative test methods and measuring concepts that help to ensure the reliability of electronic assemblies and to optimise production processes.

For more information contact Electronic Industry Supplies, +27 11 726 6758, hreispty@iafrica.com
3D printing and electronics manufacturing

3D printing has come a long way over the last decade.

Even though it remains in its early stages, 3D printing for electronics and electronic manufacturing seems promising. It could bring huge changes to the industry, especially in terms of adaptive and smart manufacturing practices. Currently, the technology is mostly still used as a prototyping tool, but the benefits are quickly outweighing the challenges and many engineers are experimenting in different ways to improve on-demand manufacturing and mass customisation. 3D printing is paving the way in various new areas of electronic fabrication.

Simply put, two materials are used during 3D fabrication: the base material for the product construct and the conductive material for the circuitry. By combining these materials, a fully functioning 3D rendering can be made. This technology holds many advantages for various industries, from electronics manufacturing and aeronautics to the medical sector. For the electronics manufacturing industry this could mean fully functioning components and circuitry that can be made in a single process that requires little or no assembly.

3D printing allows for in-house prototyping which would otherwise usually be outsourced due to the challenges during the development of, for example, the printed circuit board (PCB). This would usually lead to prolonged lead times and additional costs. With 3D printing, procurement costs are lowered and lead times are shortened.

Because lead times are shortened in the prototyping phase, the final product can also reach the end user much faster and this can give your company a competitive advantage. 3D printing also allows for design flexibility and customisation, which means that engineers and developers can design more complex shapes and sizes, which contributes to better overall functionality.

Not only does 3D printing lead to shorter lead times and functional testing but costs savings are also imminent. Shipment and warehousing costs are eliminated, and outsourcing is limited. 3D printed parts are also cheaper and, again, are available in just a few hours.

For us as an electronics manufacturing firm we have already seen improvement in turnaround times and costs. We have applied the technology to the development of test jigs and prototyping, and it has been useful in our production processes as well.

3D printing can be used by any size company. The cost of a single 3D printer allows for new or smaller companies to buy one and bigger companies can use them on a mass scale to reach their goals. Smaller companies can conduct prototyping quickly which gives them a competitive advantage, and large companies can reflect major cost savings over the long run.

Because 3D printing is still in its early stages there are still a few challenges that need to be addressed. For electronic component manufacturing, design software will need to be developed to be able to print the component correctly. Many electronic components that are used in manufacturing are currently in nanometre size, thus suitable materials will need to be identified or developed to be able to print components at the nanoscale.

High-temperature processing will also pose challenges as most metals used for circuitry require post-processing at a minimum of 100°C to become conductive. Adhesion between parts and conductive material will also need to be perfected as repairs later on will be very difficult.

Although these challenges currently keep electronic 3D printing in the infant phase, many studies and experiments are being conducted to overcome these challenges. Many avenues still need to be explored, from taking electronic circuits into the third dimension to conquering new materials and the Internet of things (IoT). If 3D printing can be done on almost every object, then every object can, for example, become a sensor and be connected.

The opportunities are endless and we are excited to see what the future holds for 3D printing and the electronics manufacturing industry. We are already considering adding another 3D printer to our existing line and we can’t wait to see what developments in this field are going to be revealed. In just a few years it might become one of the great technological advances in the electronics manufacturing industry.

For more information contact Pieter de Nysschen, Omnigo, +27 12 803 8218, pieterd@omnigo.co.za

High-accuracy fluid dispenser

Nordson Asymtek recently introduced the Forte fluid dispensing system.

The Forte series combines high-accuracy fluid dispensing with increased throughput and productivity in a narrow footprint to handle applications such as flex circuit and printed circuit board assembly, electromechanical assembly, MEMS, underfill, precise coating, and encapsulation.

With a highly stable chassis and new electrical and mechanical architectures, the Forte series claims units per hour (UPH) gains of 20-50% higher productivity through swift acceleration and improved motion control. A dual-valve-ready design allows two high-frequency Intellijet jetting systems to be run simultaneously to further boost UPH and quality outcomes – reducing dispense time by half.

Moving with 1.5 G acceleration, dual Intellijet jets dispense fluid volumes quickly, while the patented real-time skew correction automatically adjusts for workpiece rotational skew. The added stability in the chassis accommodates fast motion in the x, y, and z axes without sacrificing placement accuracy.

Nordson Asymtek’s Canvas software delivers a completely new interface that simplifies programming and provides powerful insight and control over the dispensing process. Graphical programming lets the operator scan a workpiece, develop their program on- or off-line, and simulate the dispensing results on a virtual canvas. Guided wizards provide easy step-by-step setup instructions and quick-reference graphing and data tiles allow control of how system sensor and process data are displayed.

The integrated dual-valve service station, patented closed-loop process controls, and nozzle cleaning rain reduce operator maintenance and intervention. The Forte system has a space-saving 600 mm (conveyor rail end-to-end) x 1374 mm footprint.

For more information contact Techmet,
+27 11 824 1427, info@techmet.co.za

By Pieter de Nysschen, Omnigo.
High-power connectors

TE Connectivity introduced Multi-Beam Plus connectors, the latest evolution of its power connector line.

The new connectors share the same low-profile dimensions and enable the same through-system airflow as previous designs such as Multi-Beam XL, Multi-Beam XLE and Multi-Beam HD power connectors.

Multi-Beam Plus connectors satisfy the demand for higher-power solutions by providing a high current per power contact at a maximum of 140 A/contact or 100 A/contact per four adjacent contacts. In addition, the scalable and modular design also supports greater flexibility in configuration and PCB design.

The new Multi-Beam Plus power connector is manufactured with thicker material and features a high-density tail to carry higher current. Separated power contacts improve dimension stability. Multi-Beam Plus connectors are suitable for data centre and telecommunication equipment, industrial automation devices, and power systems.

New EPCOS power line chokes

TDK has extended its range of EPCOS power line chokes to include six new types. The new components are available in three different core shapes with different rated currents and inductance values, delivering extended design flexibility.

The B82116B* rod-core chokes cover rated currents of 10 A, 21 A and 25 A and offer inductance values of 1.8 μH, 3.3 μH and 3.4 μH. Both B82116S* mushroom-core chokes feature a current capability of 25 A and are available with inductances of 2.9 μH and 3.1 μH. The new range is completed with a ring-core choke (B82622S*) with two windings, which is designed for a current of 30 A and has an inductance of 2.1 μH.

Depending on the type, the maximum permissible operating temperatures are between 85°C and 140°C. The RoHS-compatible chokes use Class 200 insulated wire and are UL listed in accordance with EN 60317-13. All components are qualified to AEC-Q200.

The main applications for the new chokes include industrial and automotive motors and motor controllers.

For more information contact Electrocomp, +27 11 458 9000, andrew@electrocomp.co.za

Memory keys and plugs for OEMs

Datakey’s family of Secure Memory devices includes the Slimline token series, as well as series of plugs and keys.

The devices contain a serial number that is guaranteed to be unique, as well as 1.5 Kb of rewritable, non-volatile memory that makes these products a much more powerful credential than read-only devices like mag-stripe cards or RFID badges. Two typical use cases include 2-factor identification and identification with an audit trail.

Secure Memory is ideal for credentials, storing serial number plus audit trail and PIN/password or biometric information. An IIT memory token can be used as the credential, where the serial number identifies the user and is used to encrypt the data. The encrypted data includes a PIN that the user must enter at the device. You must possess the token and know the password to gain access. With the PIN stored on the device, the embedded device does not need to be constantly updated as new users are added.

As another application example, consider a vending machine, parking meter, ticket machine or any other electronically-controlled device that collects cash. At some point, someone must collect that cash and hopefully transfer all of it to the proper facility. You can use an IIT token to gain access to the money. The microcontroller validates the ID, and then also records on the token the amount of money removed. When the deposit is made, the token is used to ensure the full amount is deposited.

For more information contact IPD Electronics, +27 12 345 3619, info@ipdelectronics.com
Compact industrial connectors

RS Components has extended its industrial connector portfolio with two new solutions from Harting, one of the world's leading providers of industrial connection technology, including the recently launched Han 1A connector.

The new Han 1A is a significantly smaller connector than the Han 3A, requiring 30% less space than the manufacturer's previous smallest rectangular industrial connector. The unit has been developed to meet the demand for smaller interfaces used with the latest power engineering equipment deployed in modern networks.

A key feature of the connector is its versatility, which enables the easy creation of simple interfaces. It has a system of modular inserts and is constructed from a lightweight and durable polyamide plastic, making it suitable for a wide range of applications. In addition, the Han 1A uses the simple 'click and mate' system and provides a solution for on-site installation with screw contacts or for the pre-assembly of separate units with crimp contacts.

The connector integrates contacts for data, power and signal transmission: it has modules available for Cat 5 or Cat 6A data transmission; it can handle a maximum of 16 A and 400 V; and has up to 12 D-sub contacts for signal interfaces. In addition, there is a shielded version for application environments that are susceptible to interference.

Overall, it provides an efficient solution for applications such as heating and cooling units, fans, control terminals, lighting systems, drives and vibration conveyors. It also meets the EN45545-2 standard for fire protection on railway vehicles, making it well suited for use on a variety of systems including door openers, lighting and screens.

Accessories are also available, such as fasteners for wall mounting or colour-coded pins to help in the identification of signal lines. The use of additional housing elements or single-wire seals can also extend protection up to IP65, making it suitable for use in outdoor environments.

The second new product available from RS is the Harting over-moulded VarioBoot RJ45 Cat 6A cable assembly for use with 1- to 10-Gbps networks. The low-height and compact VarioBoot introduces a high level of flexibility by controlling the angle and orientation of the RJ45 connector without interference or transmission loss, and enabling the ideal fit inside a control cabinet, for example. An engineer can make a short pull on the product's anti-kink sleeve and click the assembly in the desired direction, enabling the Cat 6A line to be routed along another path, for example.

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

19-inch lab racks

nVent Schroff's 19-inch lab racks are designed for laboratory environments, and come in mobile and stationary models. They offer a load-carrying capacity of 200 kg at the centre and a chassis depth of 400 mm. The rack is freely accessible from all sides and 19-inch cases and 19-inch shelves can be mounted.

Two angled steel uprights are screw-fixed on the base part (mobile base/plinth and base plate respectively). The 19-inch cut-outs of the steel uprights are recessed so far that a flat surface for front panels is created. At the top, the two profiles are connected by a cover plate which gives the rack additional stability.

The base/plinth of the mobile 19-inch lab rack has two fixed rear castors and two locking castors at the front. The 100 mm roller diameter ensures both good mobility and high stability. A base plate made from sheet steel forms the plinth for the stationary 19-inch lab rack.

Internal and external dimensions are in accordance with IEC 60297-3-100, and various shelves and accessories for cable ducting are available.

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

Steering diode TVS array

ProTek Devices has introduced a new steering diode transient voltage suppressor (TVS) array for circuit protection across popular consumer electronic display interfaces.

The new PUSB403 device is ideal for USB 1.0, 2.0, 3.0 and 3.1, and for HDMI 1.4 and 2.0 on UHD and 4K displays.

The device offers an ultra-low capacitance of 0.15 pF typical for I/O-I/O and 0.45 pF typical for I/O-GND. It also meets IEC standards 61000-4-2 (ESD): air ±16 kV, contact ±16 kV; and 61000-4-4 (EFT) as well as 61000-4-5 (lightning).

The circuit protection device protects up to four lines and offers low leakage current of less than 100 nA. Also, at higher operating frequencies or faster edge rates, insertion loss and signal integrity are a major concern. This device, in conjunction with passive components integrated into a TVS/filter network, can be used for EMI/RFI protection. The PUSB403 is also RoHS and REACH compliant.

Operating and storage temperature is rated at -40°C to 85°C. Peak pulse current, at 8/20 microseconds, is 6 A. Other ideal applications benefiting from the PUSB403's features include gigabit Ethernet, DVI and telecommunications equipment interfaces.

The array is available in a moulded JEDEC DFN-10 package with an approximate weight of just 7 milligrams. Other key mechanical characteristics include lead-free pure-tin plating (annealed) and a solder reflow temperature (pure tin) of 260°C -270°C. The device also has a flammability rating of UL 94V-0. It comes packaged on 8 mm tape and reel in quantities starting at 3000.

For more information contact Jeva Narian, Altron Arrow, +27 11 923 9600, jnarian@arrow.altech.co.za
Quectel’s EG18 is an LTE Advanced module optimised for M2M and IoT applications. Adopting 3GPP Rel. 12 LTE technology, it delivers M2M-optimised speeds of 1,2 Gbps downlink and 150 Mbps uplink peak data rates. Designed in the LGA form factor, it is compatible with Quectel’s Cat 6/12 modules EG06 and EG12, which will help customers to migrate between different categories.

The module comes in two variants – EG18-EA and EG18-NA which are designed for different target regions and cover almost all the mainstream carriers worldwide. It also supports Qualcomm iZat location technology Gen8C Lite (GPS, GLONASS, Beidou, Galileo and QZSS).

A rich set of Internet protocols, industry-standard interfaces and abundant functionalities (USB serial drivers for Windows 7/8/8.1/10, Linux, Android/eCall) extend the applicability of the module to a wide range of M2M and IoT applications such as business router, home gateway, STB, industrial laptop, consumer laptop, industrial PDA, rugged tablet PC and video surveillance.

For more information contact iCorp Technologies, +27 11 781 2029, enquiries@icorptechnologies.co.za

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LTE Advanced module

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STM32 microcontrollers (MCU) from STMicroelectronics are now available in an 8-pin package, enabling simple embedded projects to leverage 32-bit performance and flexibility in a compact and cost-effective outline.

The four new STM32G0 devices deliver a unique combination of 8-pin economy with a 64 MHz Arm Cortex-M0+ CPU giving 59 DMIPS, up to 8 KByte RAM and 32 KByte Flash on-chip, and high-performing peripherals including a 2.5 MSPs ADC, high-resolution timer, and a high-speed SPI.

With flexible mapping of I/O pins and internal MCU functions, designers can upgrade end-product functionality without trading board real-estate or bill-of-materials costs. The stability of the internal oscillator, which is accurate to ±1% over wide temperature and voltage ranges, also saves on external clock components.

The new MCUs also ease future scalability through the features available across the STM32G0 series, which offers up to 100 package pins, up to 512 KBytes Flash, additional high-performance analog peripherals, and cyber-protection features.

For more information contact Aveshen Nair, Avnet South Africa, +27 11 319 8600, aveshen.nair@avnet.eu

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8-pin STM32 MCUs

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The BGS12P2L6 from Infineon Technologies is a general-purpose, high-power SPDT switch designed to cover a broad range of applications from 0,05 to 6 GHz, therefore making it well suited for 5G sub-6 GHz. Its RF performance optimises the transmitting path (TRx) of LTE/5G mobile phones.

The chip integrates on-chip CMOS logic driven by a simple, single-pin CMOS or TTL compatible control input signal. Unlike GaAs technology, external DC blocking capacitors at the RF ports are only required if DC voltage is applied externally.

The BGS12P2L6 is manufactured in Infineon’s patented MOS technology, offering the performance of GaAs with the economy and integration of conventional CMOS, including the inherently higher ESD robustness. The device has a very small size of only 0,7 x 1,1 mm² and a maximum height of 0,31 mm.

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

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High-power SPDT RF switch

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Infineon Technologies’ NLM0011 is a dual-mode NFC wireless configuration IC with pulse width modulation (PWM) output, primarily designed for LED applications to enable near-field communication (NFC) programming. In addition, advanced features such as constant lumen output (CLO) and on/off counting are integrated, with no need for an additional microcontroller.

Since the NLM0011 is designed to work together with mainstream analog driver ICs, no firmware development efforts are needed. It can be easily adapted into existing designs to replace the plug-in-resistor current configuration concept. The NLM0010 is a pared-down version of the NLM0011 without the CLO function.

Both the NLM0011 and NLM0010 NFC-PWM configuration ICs are compatible with existing analog LED driver designs and with the NFC programming specification from the Module-Driver Interface Special Interest Group (MD-SIG).

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

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NFC-PWM configuration ICs

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For more information contact iCorp Technologies, +27 11 781 2029, enquiries@icorptechnologies.co.za
The use of low-temperature soldering is gaining interest in the industry to reduce cost, prevent component and PCB damage, and improve reliability. It is different but that does not mean it cannot be introduced into your process with existing process equipment. Many companies have been using tin/bismuth alloys for some years, reducing cost on PCBs and energy. Other companies have been using tin/indium for rework of lead-free area array packages with success. There are savings to be made even if the cost of the solder alloy is much more expensive, provided you consider the total cost of manufacture.

In his webinar entitled 'Low-Temperature Solder Benefits and Process Concerns', Bob Willis will address these issues by covering topics such as why you should use low-temperature solder, its benefits over lead-free alloys, materials available, reflow soldering and rework results, selective soldering, reliability with mixed alloys, and inspection results.

The webinars are limited to 100 delegates/companies. A copy of each of the slides presented will be provided after the webinar.

When: 11 November 2019
from 2:30 to 4:00 pm (UK time).
Duration: Between 60 and 90 minutes, including question and answer session.
Cost: £65
Register: www.bobwillis.co.uk/event/low-temperature-solder-benefits-process-concerns/

So many of the portable devices, electronic equipment, and tools we use every day are powered with lithium-ion battery systems. But one challenge for engineers who design these lithium-ion-powered products is that lithium-ion cells are a lot more dangerous than other types of batteries. That’s because they use an organic electrolyte that can react with active materials under high pressure, and they release excessive heat, which can cause venting, fire, and even explosion.

One study even found that the typical notebook battery pack contains more combustion energy than a hand grenade. Fortunately, it releases that energy quite a bit slower. In addition to the objectives like longer battery life and maximising battery cycles, design engineers are faced with challenges like faster but safer charging, preventing abuse conditions, and eliminating the potential for the unsafe events, providing a safer user experience.

Texas Instruments has a plethora of solutions for solving these challenges. Find out more in their ‘Battery Safety and Protection Overview’ video: www.dataweek.co.za/*tivid1019

A growing community of ‘transhumanists’ is pushing the boundaries of technology to implant chips and more into their bodies. Some are seeking to improve their lives and some are taking the ideology further into the area of DIY and open source modification. This video by the BBC explores the subject and finds out more about some of its proponents' motivations: www.dataweek.co.za/*bbcv1019

The CSIR has developed an electronic device that monitors indoor carbon dioxide levels and generates an alarm when corrective action is needed. You can watch a video about it at www.dataweek.co.za/*csirvid1019
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