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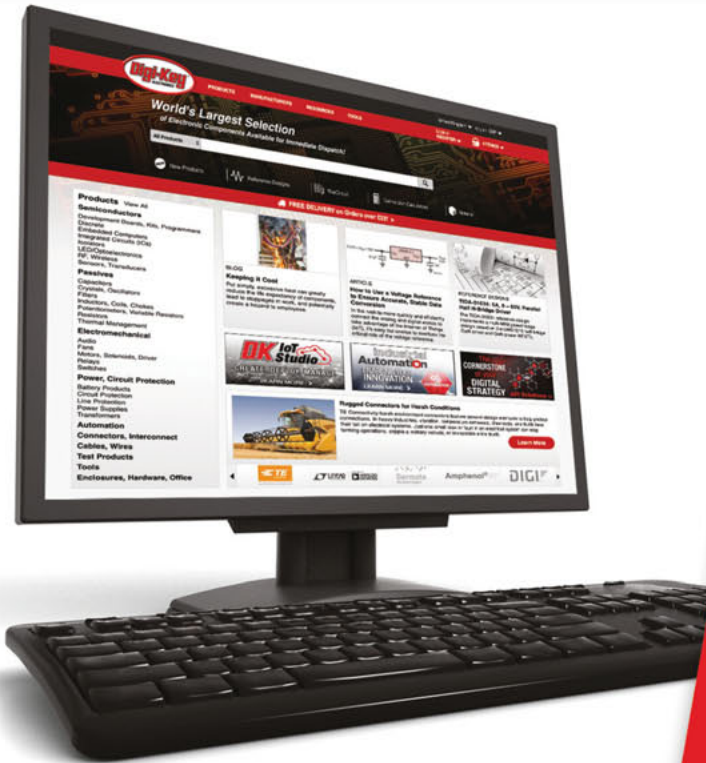
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ECIA MEMBER
Supporting The Authorized Channel

Front End

Simply the best! The Electronics Industry Awards 2020	4
Revamped and ready to rock and roll: WNIE Live! returns	6
Anglia Inception customised parts service	8
And so into 2020...	10

LED Technology

How to build a powerful IoT-based greenhouse LED lighting and sensor system	12
---	----

Display Technology

Choosing a stereo microscope that's right for you	14
Novel Optical LFD Reader: Pushing the limits of quantitative readout	15
Dealing with increased expectations of display technology	17

Show Preview

LOPEC	19
-------	----

EMC & Thermal Management

Fiber optic systems get thermal enhancements	20
Supporting advancements in the semiconductor industry	22

Enclosures

Verotec shows results of recent £500k investment at Southern Electronics	24
--	----

Interconnection

RTI's connectivity middleware for in-vehicle communication for autonomous vehicles	28
--	----

LED Technology

Three thermal challenges facing the LED industry in 2020	32
--	----

Mobile Technology

Secure memories in a connected world	30
--------------------------------------	----



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Industry Focus: Automotive

Trends in the automotive electronics industry for 2020	32
Contrinex fiber-optic sensors ensure fast and safe automotive brake cable production	35

Power

The guide to effective battery maintenance	38
TT Electronics acquires US aerospace power supply business	41



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Simply the best - better than the rest?

Entries and nominations for the Electronics Industry Awards 2020 are now open and can be accessed from the website electronicsindustryawards.co.uk. The deadline for entries is Friday 6 March 2020

Dateam Business Media is pleased to announce that entries and nominations for the Electronics Industry Awards 2020 are now open. Following the success of the awards over the last two years, the award event will be held on Thursday 24 September 2020 at London's Tower Hotel.

Your can enter your outstanding company, product or employee for an Electronics Industry Award. You can also nominate another company(s) or individual(s) in each of the relevant categories.

ENTER FOR FREE NOW

Entries and nominations are completely free of charge and can be submitted by filling out the online form, making it quick and easy to shine a spotlight on those that deserve it. Subject to meeting the necessary criteria, each entry and nomination will then proceed to the decision making stage.

This is where the awards will be split. The Business Awards will be chosen solely

by the industry online vote, giving the power of choice over to those who know best. Following the success of last year, for the Product and Individual Awards, we will be continuing to combine the online vote with votes from our expert judging panel, who will be hand selected by CIE's editor from within our illustrious industry.

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During the awards event, no decadence will be uninvited, as we will be having a delicious dinner to accompany the show, offering everyone the chance to network with fellow colleagues and friends.

PEER REVIEWED

Steve Chapman, marketing strategist and senior copywriter from Swordfish Marketing, thinks that the industry vote is an important part of the process, saying: "We were impressed with the way the awards evening was staged. We've attended a few over the decades



and this was among the best. The venue was ideal and the catering was first class too – that was delightfully unexpected. Best of all is that the award votes came from within the industry. We like that as it gives excellent credibility."

Nick Foot, PR director at BWW Communications, former electronics editor and winner of the EIA 2019 Industry Personality of The Year, also enjoyed the awards event. He says: "BWW and our clients really enjoyed the

Electronics Industry Awards – it was a nice boost to our industry and a welcome addition to the calendar."

The awards evening itself and the calibre of attendees impressed Mike Maynard, managing director at Napier. "As the only awards to be voted on by the industry, the Electronics Industry Awards are highly prestigious," he said. "The quality of attendees on the night – a real who's who of electronics – reflected their importance."

electronicsindustryawards.co.uk

5 reasons to enter the Electronics Industry Awards

Entering the Electronics Industry Awards, and having a presence at the awards ceremony, can provide excellent opportunities for you and your business. These five reasons merely scratch the surface of what you and your company could achieve by simply entering on the website.

1. A free marketing opportunity – By simply being shortlisted you would be able to enjoy increased brand awareness, handing you a chance to maximise on promotion and exposure.

2. An excuse to do some benchmarking – By entering the Electronics Industry Awards, you will be forced to look at your competition, which in turn, could identify areas where your company could improve to climb to the top.

3. Increased credibility – A win, shortlisting or nomination can act as a third-party endorsement. A win can give a seal of approval to your activities and is a sign of quality for potential customers, so can form part of your sales pitch. It can also help seal invaluable relationships with suppliers, and is a great way of differentiating yourself from the competition.

4. Increased employee motivation – The Electronics Industry Awards have categories specifically to recognise people's hard work and achievements. This is a great

opportunity to celebrate your team, boost employee morale and improve motivation.

5. Attract talent – By entering the awards you are pitching your business as 'the best', which will attract the best talent that you desire, to push your business forward.

TOP TIPS FOR ENTRANTS

Ready to enter your award? In order to make sure you make the cut, here are some top tips from key industry players:

- Explain what is really unique about your approach, 'me too' products and services rarely win.
- Humanise your entry. We want to know about the incredible technology, but, also, what difference does it or has it made? Have you got real-world examples or case studies? Include them in your entry!
- High-resolution photography is vital, both for the judging and for future PR opportunities. Don't do yourself a dis-service and make sure you make your business or product look outstanding and exemplary.
- Feel free to include any additional documents – engineering drawings, calculations and system



specifications. We want entrants to demonstrate the technical excellence of the project. If it's a person, include some fun facts or greatest achievements.

- Make sure you get your entry in early to avoid disappointment – the deadline is looming and you've only got until Friday 6 March.

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Revamped and ready to rock and roll: WNIE Live! at the NEC

Components in Electronics magazine is pleased to introduce the brand new What's New in Electronics Live!

event, which will be held at Birmingham's NEC Exhibition Centre in Hall 1 on Tuesday 29th – Wednesday 30th September 2020.

WNIE Live!, a recent acquisition for leading publishing house Datateam Business Media, is one of the only dedicated exhibition and conference events for all things electronics in the UK. With a multitude of applications considered, this show will cover all areas of electronics from the cutting-edge technologies in the automotive and

defence sectors to the latest in the life-saving field of medical electronics.

With a comprehensive seminar programme, live product demonstrations, a packed exhibitor floor and a complementary show collocation with Sensors & Instrumentation Live – the 2020 event is one not to be missed.

Stand prices start from an all-inclusive price of just £1,000. For more information on exhibiting at the two day event, please contact Harriet Campbell on 01622 699163 hcampbell@datateam.co.uk

www.wnielive.co.uk

Digi-Key announces global distribution partnership with Anderson Power Products

Digi-Key Electronics, a global electronic components distributor, announced that it has expanded its product portfolio by signing a global distribution partnership with Anderson Power Products (APP).

The new partnership will provide Digi-Key customers with worldwide, 24-hour availability of APP's high-quality interconnect solutions.

"We are excited about our new partnership with Digi-Key Electronics, and the ability to offer our leading power interconnect solutions to their customer base," said William Estes, general manager at APP. "Anderson Power's vision is to be the leading quality power interconnect solution provider, and this partnership enables us to reach the electronic design engineers that are developing next generation products and solutions."

APP is a leader in developing high-quality, low-cost, power interconnect solutions for several industries, including back up power systems, electrical recreational vehicles, uninterruptible power supply systems, telecommunications, high technology devices and alternative energy solutions.

"Digi-Key looks forward to expanding our portfolio with APP's versatile high-



power, quality interconnect products to customers worldwide. APP has a substantial number of power interconnect products that will allow Digi-Key to offer new solutions to high power designs that we have not been able to in the past," said David Stein, vice president, global supplier management at Digi-Key. "As the electronics industry continues to evolve, our customers' needs change as well. This global partnership with APP is just one example of how Digi-Key is working every day to respond to those global customer needs by offering the widest variety of in-stock components available for immediate worldwide shipping."

ATC Semitec signs distribution agreement with Heraeus Nexensos Platinum Sensors

ATC Semitec, UK distributor of temperature sensors, has announced that the Heraeus Nexensos' range of platinum sensors has joined their line-up of precision thermal components. Heraeus are the worldwide market and technology leaders in platinum thin film technology.

Robin Savin ATC Semitec's MD commented, "We are delighted to include the range of Heraeus platinum sensors within our portfolio. It is a perfect fit which complements our current range. With our involvement across many different industries we see an increased demand for sensors at temperatures of 500°C and above. This being particularly relevant in the industrial probe sensor, automotive and 3D printing markets. Thin film platinum RTD elements are now extremely cost effective compared with



other RTD sensing technologies, and due to their key characteristics of high precision, stability, repeatability and interchangeability, we see opportunities for even greater use within the UK and Irish markets."

The Heraeus range of products joins an already impressive line-up of innovative products from Semitec, PEPI, Asahi, TKS/ Thinking Electronics, Schott and Fuzetek.

KOE expands line-up of touchscreen display modules

Industrial LCD manufacturer KOE have announced an expansion of their range of LCD display modules with projected capacitive (PCap) and Pixel Eyes in-cell capacitive touchscreens. Screen-sizes range from 6.3-inch up to 12.3-inch.

KOE's bonded projected capacitive touchscreen line-up includes 6.3", 7.0", 8.0", 10.1", 10.4" and 12.3" display modules with resolutions ranging from 800 x 280 pixels up to 1920 x 1200 pixels. Pixel Eyes in-cell capacitive touchscreen technology features on the new 8.8-inch TX22D200VM0BVA (1280 x 720 pixels) and 10.2-inch TX26D208VM0AVA (1920 x 1080 pixels) display modules.

KOE's proprietary Pixel Eyes in-cell technology fully integrates projected capacitive touch panel functionality into the LCD cell. The Rx (receiver) function is incorporated into the shielding layer on the colour filter substrate, while the Tx (transmitter) function is incorporated into the common electrode on the TFT substrate. Pixel Eyes touch technology enables thinner and lighter display modules to be designed and manufactured.

KOE's PCap and Pixel Eyes touchscreen display modules are highly suitable for graphical user-interface applications which require a robust, reliable touch interface



PCap touch and Pixel Eyes KOE JDI Group

solution offering precise and flexible gesture interaction.

The use of optical bonding technology allows a variety of surface treatments such as anti-glare (AG), anti-reflective (AR), anti-fingerprint and scratch-resistant hard coatings to be used. Optical bonding can also significantly improve the optical performance of the display: a TFT display featuring an optically bonded cover glass and surface coating can reduce reflections to less than 0.2 per cent by scattering and absorbing ambient light.

Projected capacitive touchscreen technology is used in a multitude of human machine interfaces in electronic devices, medical equipment, smart meters, domestic appliances, in-vehicle displays and many more. The full range of KOE PCap and Pixel Eyes TFT display modules are available immediately from KOE's sales channel and distribution partners.

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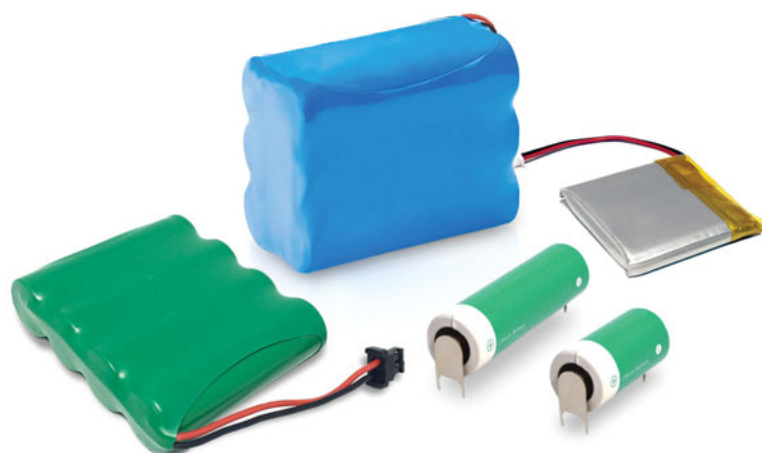
Anglia Inception customised parts service

Often a standard off the shelf component just doesn't quite fit the bill. If your design needs something quite specific, take a look at Anglia Inception, the customised component service from Anglia. You can now choose products including battery packs, keypads, displays, cable assemblies, thermal management components and others specifically tailored to your design requirements. Each component is manufactured and customised by trusted suppliers who have been fully audited to Anglia's rigorous selection process ensuring a quality product. Often, they come from the same design teams and factories as Anglia's standard range.

Two of the most common products Anglia see demand for customisation on are battery packs and keypads.

Custom battery packs

With portable electronics continuing to be a rapidly expanding market segment, the power source for these products is critical and will most often be a battery



pack of some description. Often embedded within the product, the battery pack is essentially an invisible element, however it is relied upon to deliver the performance and thus the end user experience of the product. The user expects their device to be ready for use when and where they want it, and that's only possible if the battery pack is carefully specified at the design stage, customisation of the battery pack is a critical part of this process.

Anglia's battery pack customisation service embraces a comprehensive portfolio of chemistries including Lithium-Ion, Lithium Polymer, Lithium Iron Phosphate, NiMH, Lithium Thionyl

Chloride as well as other non-rechargeable chemistries. Anglia can offer customised battery packs based on all these chemistries along with all required safety approvals including for example UL for the US market.

Anglia not only offers the battery pack with a comprehensive suite of physical and electrical customisation options, customers can even have their own part number and brand name

printed on the packs. This option is particularly popular where customers offer servicing with their products and want to ensure the correct replacement part is specified if the pack is to be replaced at any time in the future.

Custom keypads

Unlike the "invisible" battery pack, the keypad is the primary human machine interface of the equipment, as such it is often part of the overall aesthetic design and very often even carries the corporate branding or logo.

Anglia can offer custom keypads manufactured from a wide variety and mixture of materials such as silicone



only restriction for a custom keypad is the designer's imagination.

No matter what the custom requirement, Anglia have the knowledge and technical resource on hand to help designers select the correct product for the design and to guide them through all the customisation options which are available.

The Anglia Inception brochure gives an overview of the full custom product capability. In addition to battery packs and keypads it also covers custom displays, antennas, enclosures, cable assemblies, transformers and custom heatsinks. The brochure is available for



rubber, polyester membrane through to stainless steel for harsh environment applications. The keypads can be specified in any shape, size or colour along with customers own branding and even IP rated protection against moisture ingress if required. Additional functionality can also be embedded within the keypads such as LED's for backlighting buttons/keys. These are just a few of the many options available, the

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Adam Fletcher

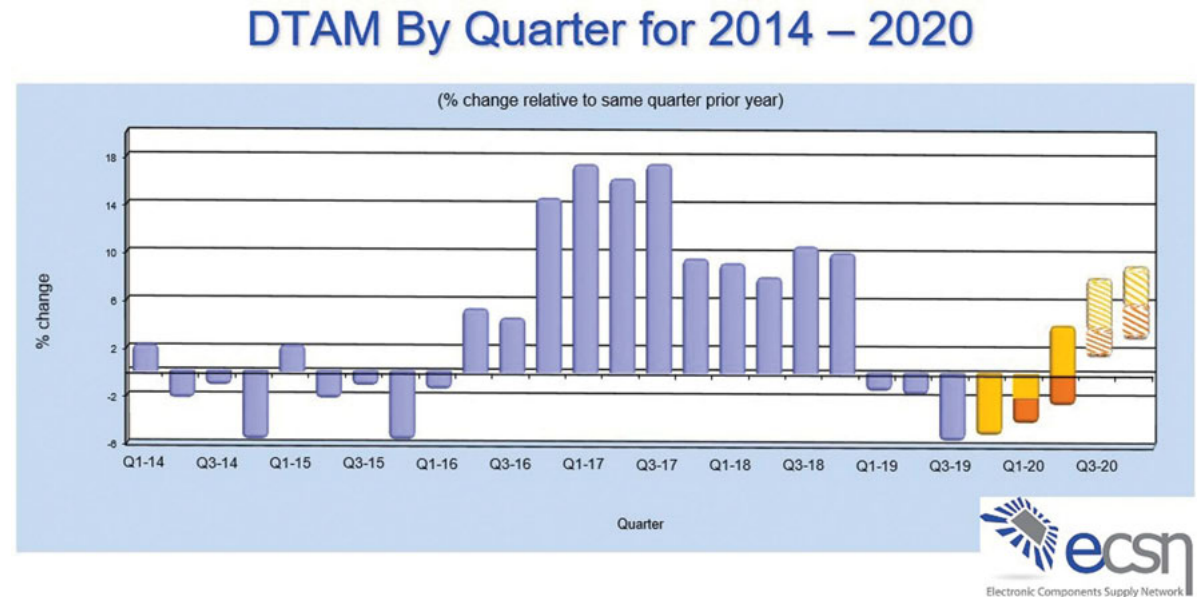
The International Monetary Fund has predicted that Global GDP will grow by a mere 3.4 per cent in 2020, while the collective opinion of members of the Electronic Components Supply Network (ecsn) garnered in the last few months of 2019 was that the greatest threats to economic growth in 2020 and beyond are likely to be geopolitical in nature. What is certain is that we're going to have to contend with a number of fairly major political upheavals with the ability to destabilise the global economy and probably keep consolidated growth for the UK electronic components markets in low single figures. In this article, ecsn chairman Adam Fletcher summarises his members' predictions for the UK and Ireland electronic components markets in 2020 and provides an update on the Intellectual Property aspects of the US China Initial Trade Pact.

In December last year ecsn members forecast that the UK & Ireland electronic components market will grow in the range (3 per cent) to 2 per cent in the first six months of 2020, with a mid-point expected to be a (1 per cent) decline on the same period last year. The association's provisional guidance for the second half of the year suggests that the market will grow in the range 2 to 7 per cent in 2H '20, with a mid-point of 5 per cent. If achieved manufacturer authorised distributors will close 2020 showing sales revenue-growth in the range 0 to 4.5 per cent, with a mid-point of 2 per cent when compared to 2019.

The table "DTAM By Quarter for 2014 – 2020" summarises this information. The blue bars show actual results achieved while the bars shaded orange indicate the association's forecast for 2020 and the brown portion highlights the range.

US/China initial trade pact

Global stock markets surged on the news that the US and China had reached an



initial trade pact. Much of the media coverage is centred on the relief the agreements gives to the US agricultural sector, which is currently in crisis but the Phase 1 deal also halved the tariff rate to 7.5 per cent on about \$120 billion worth of other Chinese goods, including flat-panel televisions, Bluetooth headphones and footwear. Probably more important to technology markets the agreement also cancelled planned US import tariffs on Chinese-made mobile phones, toys and laptop computers but left in place 25 per cent tariffs on a \$250-billion array of Chinese industrial goods and components used by US manufacturers. China's retaliatory tariffs remain in force on over \$100 billion in US goods.

IP theft, Trade Secrets and Confidential Business Information

Following a brief review of the initial economic and trade agreement between the US and China, I can see that it will force some very interesting changes to how the Chinese legal system responds to issues surrounding international standards on Intellectual Property (IP) theft, Trade Secrets (TS) and Confidential Business Information (CBI). One of the most useful changes is that Chinese businesses and Chinese Government organisations and agencies will now be required to acknowledge the IP ownership, TS and CBI issues that already exist and also uprates current breaches from an "Administrative" to a "Criminal" enforcement issue and mandates that appropriate tariffs (fines, penalties, jail terms) are put in place.

In the short- and medium-term this is a big win for US-based (and by default, other Western nations') organisations who will be able to licence their technology and operate in a more certain legal environment. Once strong legal protections are in place and more sophisticated financial markets are established Western based organisations will feel comfortable

making direct investment in China. In the medium- to longer-term it also provides greater protection for Chinese IP, TS and CBI both within China and internationally as innovative ideas are generated. It will be interesting to see how quickly these Chinese legal systems are established and how effective they are. In the meantime the US government is retaining some of the current US import tariffs and will probably do so until strong evidence of compliance is detected.

US/China trade war rumbles on

Despite the initial trade pact the US Commerce Department is currently considering modifying its Foreign Direct Product de-minimus rules to enable it to block the sale of products by manufacturers in third party countries by reducing the threshold of US hardware or software content from 25 per cent to 10 per cent of the sales value of the item. This is well illustrated in the US Commerce Department's recent application of pressure on the Dutch government to embargo the sale of very advanced semiconductor manufacturing equipment made by ASML to a Chinese organisation and the pressure it continues to apply on the UK government (and other nations) to dissuade it not to purchase 5G telecom equipment from Huawei under the threat of reduced security cooperation. Huawei remain on the US 'table of denials' for both the purchase of US technology products for use in their equipment and banned the sale of any Huawei telecoms equipment to US entities.

Final thoughts

2020 is going to be another interesting year in the global economy but hopefully we will see modest growth in UK and Ireland electronic components markets. Any progress will however be linked to what happens in global electronic components markets where it is widely

believed, stronger growth is set to return into the second half of the year. Sadly, we'll probably also see the return of extended lead-times across many components as a result of persistent underinvestment in manufacturing capacity. These swings are not in the interests of any party in the electronic components supply network and I remain confident that they can best be mitigated in the coming year by sharing business intelligence effectively up and down the supply network and an accurate and effective forecasting process.

Adam Fletcher is Chairman of the Electronic Components Supply Network (ecsn), a business association established in 1970 that today offers support to all organisations with an interest in electronic components throughout their entire lifecycle. He is also Chairman of the International Distribution of Electronics Association (IDEA), an association of individual country electronic components associations whose objective is to share best industry practice.

Further information about The Electronic Components Supply Network and afdec may be found at the following website: www.ecsn-uk.org with regular industry updates available to all on the Breaking News pages.

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How to use add-on boards to build a powerful IoT-based greenhouse LED lighting and sensor system

In horticulture, the Internet of things (IoT) can play a key role in both monitoring and ensuring plant health, using a combination of sensors and specialised horticulture LEDs. However, adapting and implementing the right IoT computing platform can be time consuming and put both budgets and schedules at risk. To reduce this risk, a combination of board and device solutions can be used to greatly simplify the design process while at the same time allow the rapid development of sophisticated greenhouse control systems. This article by Stephen Evanczuk, Digi-Key, will explore the relationship between LEDs and plant health and offer solutions explaining how to use them together.

Plant health depends on a wide range of external factors including light, temperature, soil moisture content, and pH levels. They respond to various combinations of these factors in aggregate, as well as to the specific characteristics of each factor. For example, a plant depends upon light received within a photosynthetic active radiation (PAR) region lying between 400 nanometers (nm) and 700 nm. Yet, the illumination they require across that region is by no means uniform. Instead, plants require light at specific wavelengths corresponding to the absorption spectrum of the multiple photopigments involved in photosynthesis. For example, chlorophyll A has absorption peaks at approximately 435 nm and 675 nm (Figure 1).

Other photopigments, including chlorophyll B, beta carotene, and other photochromes, also serve vital roles in photosynthesis. As a result, optimal illumination for plants requires the ability to deliver illumination at multiple wavelengths in the PAR region.

As with any living organism, the factors that influence health in plants are not limited to a simple set of wavelengths or static illumination levels. Plants require

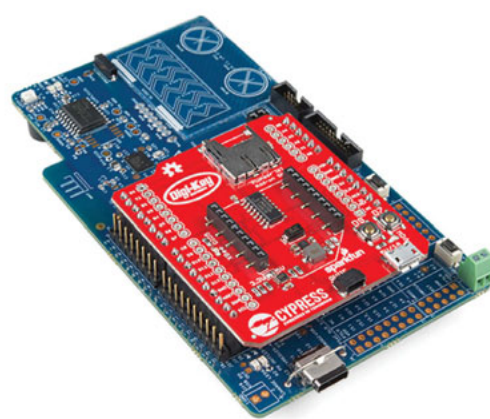


Figure 2: The PSoC Pioneer IoT add-on shield (red board) extends the capabilities of Cypress Pioneer boards such as the PSoC 6 BLE Pioneer Kit (blue) with its multiple connector options for adding off-the-shelf Qwiic and XBee-compatible boards. (Image source: SparkFun Electronics)

different levels of light intensity, varying light/dark cycles, and even different wavelength combinations, all at each stage of the growth cycle. Similarly, temperature and soil moisture content can cause variations in root length.

This optimal combination of characteristics for each factor can vary across different species, or even across different stages of growth within a single species. For example, many flowering plants require day length less than about 12 hours. In contrast to these "short day" plants, "long day" plants such as beets and potatoes only flower after exposure to more than 12 hours of light.

Greenhouse environments enable farmers and backyard gardeners to control most of the factors. Yet, the lack of cost-effective system platforms, peripherals, and even suitable light sources has remained an obstacle to development of greenhouse control systems. Building a

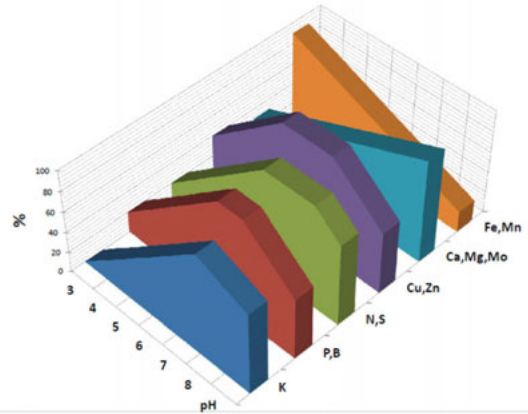


Figure 3: Small changes in pH level affect plant physiology directly, as well as indirectly through its impact on nutrient availability in soil. (Image source: Wikimedia Commons)

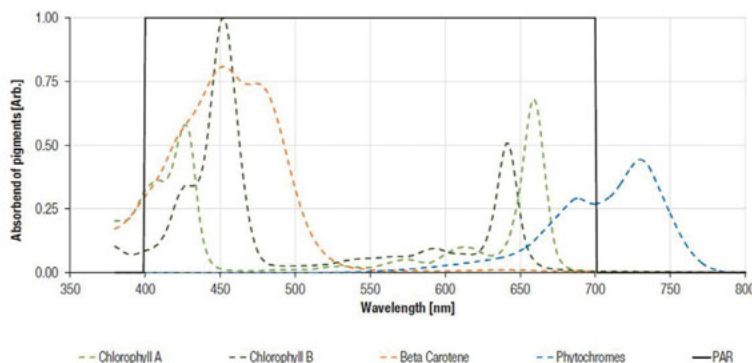


Figure 1: Plant growth depends on sufficient illumination at wavelengths corresponding to the absorption spectra of various photopigments active at different segments of the overall photosynthetic active radiation (PAR) region. (Image source: Wurth Electronics)

system capable of monitoring and managing these various factors has required complex systems akin to complex industrial programmable logic controllers.

The availability of off-the-shelf boards and specialised horticulture LEDs offers a simpler alternative. Developers can easily create sophisticated greenhouse automation systems by combining boards based on Cypress Semiconductor's PSoC microcontroller, specialised horticulture LEDs from Wurth Electronics, and an add-on board from SparkFun Electronics. The latter ties in the broad set of sensors and actuators needed in these systems.

High-performance platform

Designed for embedded applications, the Cypress PSoC family of microcontrollers integrates an Arm Cortex-M0 or Cortex-M3 core, and a full complement of programmable analog and programmable digital blocks called universal digital blocks (UDBs). Using the Cypress peripheral driver library (PDL), designers can use UDBs to implement a wide range of functions, including standard serial interfaces and waveform generators. Similarly, programmable I/O blocks called Smart I/O, support logic operations on signals passing to and from the GPIO pins, even while cores are in a power saving, deep sleep mode.

The latest PSoC device, the PSoC 6, extends the family with dual-core devices that combine the processing performance of a Cortex-M4 core with the low power capabilities of a Cortex-M0+ core. Along with the 1 megabyte (Mbyte) of flash memory, 288 kilobytes (Kbytes) of SRAM, and 128 Kbytes of ROM found in PSoC 62 devices, the PSoC 63 devices add additional capabilities, such as Bluetooth 5.0.

The PSoC 63 devices integrate a

complete Bluetooth 5.0 subsystem including hardware physical and link layers, as well as a protocol stack with application programming interface (API) access to the generic attribute profile (GATT) and the generic access profile (GAP) services at the heart of Bluetooth protocols. Within each series, devices such as the CY8C6347FMI-BLD53, include dedicated hardware crypto accelerators.

With their extensive capabilities, PSoC 6 microcontrollers are able to support the performance requirements of an emerging class of complex embedded applications. At the same time, their power efficiency enables them to support the tight power budgets typically found in these applications. With its user-selectable 0.9 or 1.1 volt core operating voltage, the PSoC 6 microcontroller requires minimal power, consuming 22 microamps (A) per megahertz (MHz) for the Cortex-M4 core, and 15 A/MHz for the Cortex M0+ core.

To simplify development of applications based on these devices, Cypress provides versions of its Pioneer kit line for both PSoC 63 and PSoC 62 devices. Based on the PSoC 63, the PSoC 6 BLE Pioneer Kit includes a 512 Mbit NOR flash, Cypress's KitProg2 onboard programmer/debugger, a USB Type-C power delivery system, and multiple user interface features. The PSoC 6 Wi-Fi-BT Pioneer Kit combines a PSoC 62 microcontroller with a Murata Electronics LBEE5KL1DX module, which is based on the Cypress CYW4343W Wi-Fi/Bluetooth combo chip.

Hardware extensions

Using the Cypress Pioneer boards to develop process control applications becomes easier thanks to an add-on board developed through a collaboration of

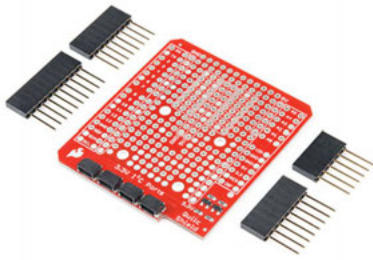


Figure 4: With the SparkFun Qwiic adaptor, developers can easily add custom circuits through Qwiic connections with the Pioneer add-on shield, or by using the provided headers to stack the adaptor with the add-on shield on Pioneer boards. (Image source: SparkFun)

SparkFun Electronics and Digi-Key Electronics. The PSoC Pioneer IoT add-on shield is an Arduino R3-compatible shield with Qwiic and XBee-compatible connectors (Figure 2). Plugged into a PSoC Pioneer board, the add-on shield lets developers easily extend the board set with devices such as sensors for monitoring air and soil quality in a greenhouse.

For monitoring greenhouse ambient conditions, a Qwiic-compatible board such as the SparkFun SEN-14348 Environmental Combo Breakout board uses the onboard Bosch Sensortec BME280 and ams CCS811 sensors to provide data for multiple environmental variables (see, "Add Compensated Air Quality Sensors to the Internet of Things").

The Bosch BME280 combines digital sensors able to deliver accurate readings on temperature, pressure, and humidity while consuming as little as 3.6 A at a 1 Hz update rate. The ams CCS811 provides equivalent CO₂ and total volatile organic compound (VOC) measurements.

Gas sensors such as the CCS811 need to heat an internal hotplate to perform gas measurements, causing power consumption to rise accordingly, reaching 26 milliwatts (mW) from a 1.8 volt supply in its operating mode 1. This mode provides the fastest available update rate of 1 Hz. Developers can choose other update rates such as mode 3, which performs measurements once a minute and reduces power consumption to 1.2 mW.

Developers simply use a Qwiic cable to connect the Combo board to the add-on shield to program the Combo board's Bosch BME280 and ams CCS811B sensors based on sample software available in the SparkFun github repo.

Soil quality

Besides ambient conditions in a greenhouse, proper soil pH and water content are essential for plant health. Most plants require soil pH levels that are neutral or only slightly acidic, but the optimal pH range can vary significantly. For example, potatoes grow best in acidic soils with a pH of around 5.5, whereas this level can damage plants like spinach that prefer slightly alkaline soils.

At the same time, small changes in pH level, even within the optimal range, can directly affect the availability of nutrients needed to sustain growth (Figure 3).

Developers can easily add pH sensing to their greenhouse systems using the SparkFun Electronics SEN-10972 pH Sensor Kit. The kit comes with a pH probe, interface board, and buffer

solutions for calibration. For communicating with the PSoC microcontroller, developers can use the default UART output from the pH board.

Alternatively, the pH sensor board can be used in I2C mode and connected through the SparkFun DEV-14495 I2C Qwiic adaptor. The SparkFun Qwiic adaptor breaks out the I2C pins from the Qwiic connectors and provides solder points allowing developers to easily use existing I2C devices with the Qwiic connector system.

Measuring soil water content is just as easy. The SparkFun SEN-13322 Soil Moisture Sensor provides two exposed pads designed to sit directly in the soil and serve as a variable resistor between a provided voltage source and ground. Higher moisture content increases conductivity between the pads, resulting in a lower resistance and higher voltage output.

For this sensor, the PSoC microcontroller's integrated digital-to-analog converter (DAC) can be used as the voltage source, and its successive approximation register (SAR) analog-to-digital converter (ADC) can be used to digitize the voltage corresponding to the soil's moisture level. Also, the microcontroller's internal op amps can be used to buffer both the DAC output and the ADC input.

Horticultural lighting with LEDs

As noted earlier, plant health depends on light illumination delivered at specific wavelengths. Although advances in LED lighting have delivered solutions for industrial lighting, vehicle headlights, and more, conventional LEDs have lacked the spectral characteristics required for photosynthesis. The Würth Electronics WL-SMDC series of mono-color ceramic LEDs addresses the need for illumination at wavelengths ranging from deep blue to hyper red (Figure 5).

Used in combination, the SL-SMDC series provides the wavelengths needed to promote numerous aspects of plant growth.

The 150353DS74500 deep blue LED (450 nm peak wavelength) and 150353BS74500 blue LED (460 nm dominant) provide illumination in the range of wavelengths associated with regulation of chlorophyll concentration, lateral bud growth and leaf thickness.

The 150353GS74500 green LED (520 nm peak) and 150353YS74500 yellow LED (590 nm dominant) provide illumination in a range of wavelengths once considered unimportant, but now known to play a part in shade avoidance responses in plants.

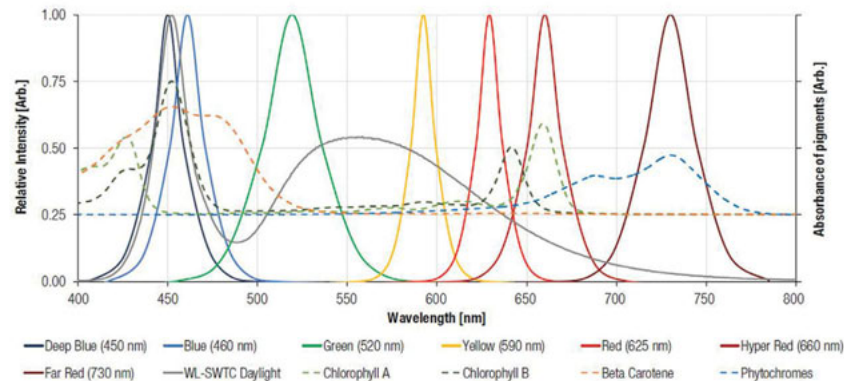


Figure 5: Individual members of the Würth Electronics WL-SMDC series of mono-color ceramic LEDs provide illumination at specific wavelengths required for plant growth and development. (Image source: Würth Electronics)

Developers can further extend their soil management capabilities with this same approach. For example, the PSoC 6 microcontroller supports multiple channels on both the DAC output and the ADC input, making it feasible to add multiple pH sensors. In addition, some applications may require greater resolution measurements that require a voltage range beyond the microcontroller's 3.6 volt (max) VDDA analog supply voltage. In these instances, the solution lies in adding external buffer op amps and a voltage regulator.

Along with measuring soil water content, ambitious developers can use the same approach to automate water irrigation by using the PSoC's GPIOs and pulse width modulation (PWM) functionality to control a DFRobot FIT0563 water pump with a DFRobot DRI0044-A driver board.

For additional components, such as these or others, use the SparkFun DEV-14352 Qwiic adaptor. This provides Qwiic connectors and a large prototyping area (Figure 4).

As the Qwiic adaptor conforms to the Arduino R3 shield layout, developers can use the headers included with the Qwiic adaptor kit to stack their own circuits between the Pioneer kit board and the SparkFun IoT Pioneer add-on shield.

harmful intensity levels to reach the retina. The use of constant current LED drivers, such as the Allegro ALT80800, help mitigate this effect.

Software design

Used in combination, the PSoC Pioneer board, add-on shield, and additional boards mentioned earlier, enable developers to physically build a greenhouse control system largely by plugging the hardware boards together. Development of software for managing sensors or driving LEDs is nearly as simple with the availability of components in the Cypress peripheral driver library (PDL).

PDL components abstract the functionality of PSoC features such as programmable analog, UDBs, and Smart I/O peripherals. Developers can quickly implement a software feature that causes the microcontroller to wake when the sensor output reaches a particular level. For example, when the output voltage from the soil moisture sensor indicates drier soil, using Cypress PSoC Creator, developers can configure one of the PSoC microcontroller's integrated low-power comparators to generate an interrupt when the level on the specific analog pin falls below (or above) a reference voltage level.

The 150353RS74500 red LED (625 nm dominant) and 150353HS74500 hyper red (660 nm peak) provide illumination at the wavelengths most involved in photosynthesis, but also involved in different plant stages including flowering, dormancy, and seed germination.

The 150353FS74500 far red (730 nm peak) provides illumination at wavelengths associated with plant germination, flowering time, stem length, and shade avoidance.

Finally, the 158353040 daylight white not only augments blue wavelength coverage, but also contributes to the overall daily light integral (DLI) levels needed for overall plant growth.

Developers can find a number of LED drivers such as the Würth Mag13C 171032401, or the Allegro MicroSystems ALT80800 to drive strings of the LEDs. Many of these devices support dimming regulation using PWM and/or analog voltage, reducing LED driver implementation to only a few additional components.

In designing a dimming feature, however, developers should be wary of very rapid changes in instantaneous illumination level. At high PWM rates, the human pupil may respond only to average light intensity, permitting pulses of light at

Developers can similarly employ other PDL components to support other interface and control requirements with minimal code development.

For deployment in a larger greenhouse environment, a cost-effective approach would distribute features such as soil pH measurement and ambient temperature measurement in ground-level board sets, using separate board sets to control the horticulture LED strings.

Conclusion

Automated greenhouse control systems used to require industrial-grade controllers linked to complex lighting systems, sensors, and actuators. As shown, developers can now take advantage of low-cost microcontroller boards and add-on boards to build cost-effective platforms able to leverage a broad array of available sensors and actuators.

Combined with the IoT and the availability of specialised horticulture LEDs, developers have a full complement of components required to implement sophisticated applications able to remotely monitor and control many of the factors associated with healthy plant growth and development.

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Choosing a Stereo Microscope that's right for you

A stereo microscope is an essential tool for a variety of different test, assembly and quality control stages within any manufacturing process. Selecting the wrong equipment can have a detrimental impact on the quality or accuracy of production, but, the right microscope will have a staggering impact on improving operator precision and workplace efficiency.

Before any choice is made, a user must firstly consider the task at hand. Different microscopes are better suited for some tasks than others. These will differ across applications in electronics, precision metal, plastics, ceramics, rubber engineering, medical and dental device manufacturing, aerospace, automotive engineering, biomedical laboratories, forensic science, and even hair transplants or jewellery and restoration projects.

Our buying guide breaks down the important factors to consider when choosing a stereo microscope.

Magnification

Depending on the task, a user must consider the magnification they will require – anything from 2x-100x is common. In some instances a range of up to 300x magnification is required.

Working distance

When working with tools it is important to consider the space required to access the subject with those tools. Working distance is linked to magnification and the microscope's objective lens. Typically, higher magnification objectives produce a shorter working distance. However, by effectively selecting the optimal components of objective, zoom and other factors, a suitable configuration can be achieved.

Illumination

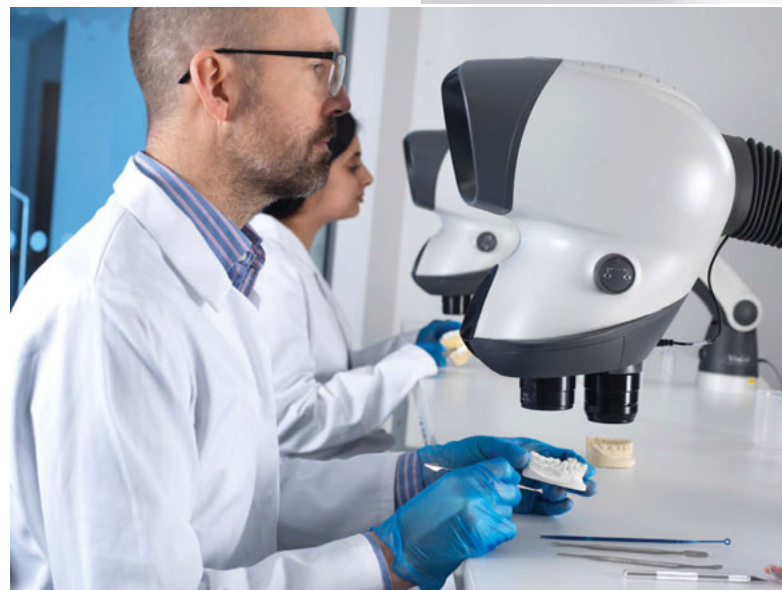
All stereo microscopes require light. Various illumination techniques are available, but most stereo microscopes rely on reflected light. If you are looking to invest in this sort of microscope you must ensure you acquire a suitable illuminator, often this is in the form of a ring light. In some cases, such as the inspection of transparent materials, the addition of a sub-stage light

is extremely useful. UV illumination is also available for use where subjects fluoresce under UV light.

Stereo Viewing Variations

The conventional stereoscopic microscope typically features eyepieces with a 3.5mm exit pupil. This is the tiny, circular area of light that the microscope presents to users' eyes. In order to properly see the subject, users must precisely align their eyes with the eyepieces. Not only is this tricky, but the user is forced to maintain a fixed body posture, potentially causing physical discomfort over any extended period of time.

Fortunately, some modern designs do away with traditional dual-eyepieces while



considerable eye strain, fatigue or loss of performance when using a microscope with conventional eyepieces.

An alternative to this, is to invest in an ergonomic microscope which allows the user to sit back from the viewing lens and inspect samples and components from an upright, natural position. This more natural posture also contributes to improved hand-eye coordination and reduces eyestrain.

Working environment

When considering microscope options it is beneficial to assess the working environment and the way in the microscope will be integrated into a workstation so that a suitable stand or mount can be included in the microscope purchase.

A bench stand offers a small footprint whilst boom stands are widely used in industrial applications, allowing users to mount the microscope directly to a desk or large workstation.

An articulated arm mount suits environments where users may need to occasionally swing the microscope away from the workspace. As an alternative, some universal stands combine various benefits of all these stand types.

Budget

Effective and useful equipment is a good investment, and one should also consider future needs. Some microscopes offer modularity for future upgrades, so making a wise investment early on can be more cost effective in the longer term.

Contact the experts

At Vision Engineering, experts are on hand to guide you through your choice, weighing up your options and offering sound, unbiased advice as to what microscope will fit your needs best, based on all of the above specifications and more.

It is highly recommended that any manager, worker or supplier consults the advice of an expert who will help you make the best possible choice in keeping workers happier, healthier and more productive.

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retaining the stereoscopic view. Eyepiece-less versions offer a substantially larger exit pupil, up to 30mm, allowing the user to move up and down and from side to side for comfort without compromising the view. By moving users are also able to change their perspective slightly giving an enhanced 3D understanding of the subject. This also makes for easier hands-free operation in applications, such as soldering or layer removal, where frequent subject manipulation is needed. With the eyepiece-less design, users do not need to remove prescription glasses and safety glasses, as they do not need to have their eyes up against the eyepieces.

Digital imaging and viewing options

Advances in digital technology have had an impact on the development of microscopes with some microscopes including accessories that allow you to attach a camera whereas others are pre-equipped with integrated cameras.

Whilst the traditional stereo microscopes are still a fundamental

requirement for countless inspection tasks many users are taking advantage of digital advances and adding are this element to their microscopy requirement.

Operators may simply want to view samples on a screen or there may be a need to capture images of the samples or parts.

The live-recording of a process or image capture of a particular component or sample offers the ability to share results with others for discussion or the option to document the task or subject for compliance purposes. This technology has now advanced to the point where a 3D image with exceptional clarity and depth perception can be shared on in real-time across multiple sites, providing operators are using the same viewing equipment.

User

Exactly how the microscope will be used should have an impact on your choice of design. Frequent users of conventional binocular microscopes are more at risk of back pain and discomfort as a result of leaning over upward facing eyepieces. Similarly, long-duration users might notice



Novel Optical LFD Reader: Pushing the limits of quantitative readout

Research by CDT (the European Research Centre of Sumitomo Chemical Group) has resulted in the development of a new technique that can improve the sensitivity of lateral flow devices (LFDs) by an order of magnitude, while speeding up testing and reducing errors.

LFDs consist of an immunoassay incorporated into a transport medium such as a nitrocellulose strip. These assays have traditionally been regarded as a convenient, low cost threshold test based on the presence or absence of a developing colour line. Incorporation of an electronic device as a reader has broadened LFDs' appeal by enabling easy collection of data, improving connectivity, removing many sources of human error, and potentially providing quantitative output. Further expansion of the appeal of LFDs is limited by some inherent flaws in the technology, particularly in detection limits, speed and defects/errors.

CDT has developed a dynamic two-colour optical reader technology that can expand the usefulness of the LFD strip by improving the quality and accuracy of



reader technology. Using novel optics and data analysis algorithms, CDT has developed a solution that can be easily integrated into typical LFD optical readers. The approach corrects for local background and thus has the potential to improve



assay lower limit of detection, compensate for sample viscosity errors, eliminate tests containing errors faster and allow measurement of coloured samples.

Such improvements can enable performance in a portable reader that would

normally be restricted to a desktop unit, opening up new diagnostic applications in human primary/distributed care, veterinary and agriculture environments.

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Dealing with increased expectations of display technology



Bazile Peter

Increasingly, today's professional industrial customers are demanding high quality displays that are versatile, easy to use and energy-efficient, writes Densitron's product manager Bazile Peter.

It's not easy to overstate how much the capabilities and expectations of professional display equipment have evolved during the last decade. From higher-resolutions low-latency touch-based control capabilities, high-quality displays are frequently the foundation of control and monitoring systems in broadcast and other permanent industrial environments.

At the same time, the demand for displays that can be more tightly customised to satisfy individual customer requirements has continued to grow. For system developers this has led to an increased focus on the availability of bespoke systems, as well as effective off-the-shelf products that can be swiftly deployed to handle more predictable display applications.

At Densitron we have become increasingly aware that modularity is really the only way to proceed as customer's needs become more specific and exacting. Hence our current modular solutions make it possible for customers to select their ideal display size, as well as other core preferences such as the means of interaction, the most suitable computer

hardware and software, and the type of interfaces to be used.

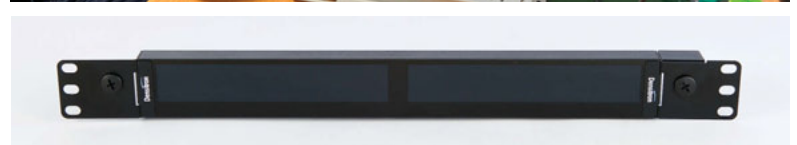
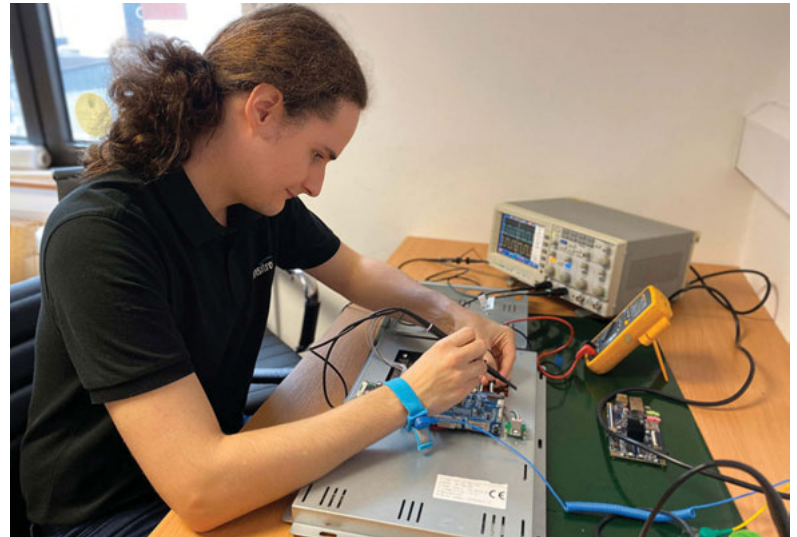
On the basis that the right display is fundamental to achieving an effective control and/or monitoring solution, our bespoke service begins with careful consultation about the display requirements. Key issues to be determined include: the size and format of the screen, as well as the need for features such as super-wide viewing angles, high luminance, large contrast ratios and long-term reliability. All of these criteria will be affected by the nature of the application and the working environment, as well as the broader remit of the installation and any possible future changes to the primary configuration.

Once the customer has made a decision about the display, we can then move on to determining the mode(s) of interaction (e.g. multi-point touch, haptics, tactile objects), as well as the hardware/software and interface requirements. With modular design allowing any of these elements to be combined in whatever desired configuration, the result is an ability to address any control or monitoring application - however niche or individual it might be.

'Ready to go' displays

All the same, it is also clear that customers do not always have the time or bandwidth to implement bespoke solutions, particularly in broadcast, where 'fast turnaround' production or remote production, requires flexibility and re-purposing of off-the-shelf hardware. With touchscreen displays and on-board intelligence it is extremely easy to reconfigure the UI and functionality of a control surface.

Densitron has responded to this requirement with the UReady range, which offers superb high-resolution graphics in ready-to-install rack displays. The incorporation of IPS technology enables 80/80/80/80 symmetric viewing that is clear in bright or low light, while long-life backlight and the capacity to operate in extreme temperature conditions mean the products are robust and reliable. Developed to address a number of common applications, the current UReady product line is based around three models, namely: the DMT066YYHLCMU-1D, with a size of 6.60" and resolution of 1440 x



240; the DMT132YYHLCMU-1D, with a 13.20" size and resolution of 2880 x 240; and the DM-163BD-MPGR02, with a 16.30" size and resolution of 1920 x 285.

While these off-the-shelf products have proven to be very popular, we also recognise that operating environments have become more diverse than ever before - and that customers may also wish to plan ahead regarding possible future changes in usage. Bearing this in mind we continue to expand our material options, which include soda lime, chemical and heat-strengthened, tempered and toughened glass, as well as PMMA, Polycarbonate and Optolite high-scratch resistant plastics. Our bespoke service also includes enhancements such as Anti-Glare (AG), Anti-Reflection (AR) and Anti-Smudge (AS) optical treatments.

Energy efficiency: the next frontier?

There is another important trend we should mention and that is the increased expectation that displays be energy-efficient and eco-conscious. More efficient

circuitry has allowed us to reduce energy consumption significantly, paving the way for users to benefit from systems that are less power-hungry and more durable. Reducing energy consumption and overall carbon footprint is now a priority for all industries, and pro-AV and broadcast are no exceptions. Continued improvements in this area therefore represent an important area of activity for us; the same can be said of the product's 'afterlife' so that more elements of each system can be recycled when the end of operational life has been reached.

With more diverse and specific requirements than ever before, the onus is on vendors to take a more responsive approach to display design, delivery, and life-time. The recent flurry of innovations showcased at events such as Integrated Systems Europe indicates that companies are rising to the challenge, meaning there is plenty of cause for optimism about the future of professional displays.

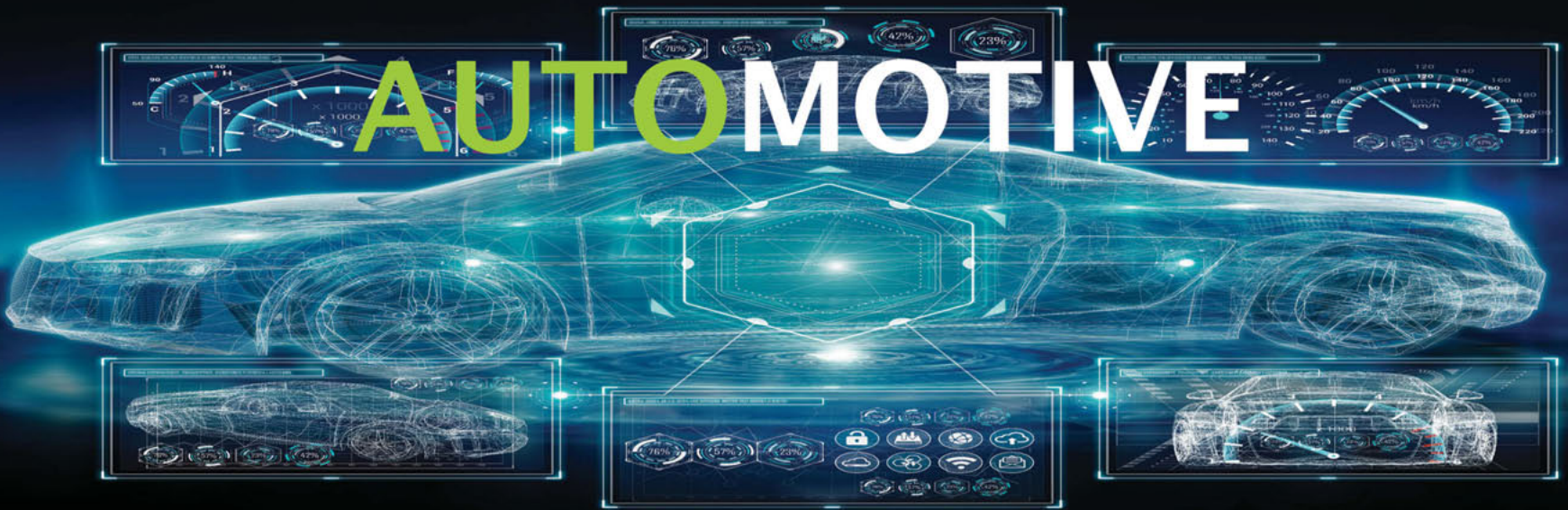
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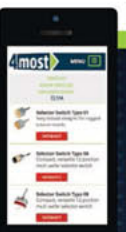
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Printed Electronics to take centre stage in Munich next March

LOPEC, the international exhibition and conference for the printed electronics industry showcases every aspect of printed electronics, from the theory and practice behind the technology to its business and application potential.

At a recent meeting, Armin Wittmann, Project Group Director Messe München, and Dr. Klaus Hecker, Managing Director of the OE-A (Organic and Printed Electronics Association) discussed the technology and provided an update on this year's LOPEC, taking place March 24-26, 2020 in Munich.

Printed electronics are conductive polymers and inks based on the combination of new materials with large area, high volume deposition and patterning techniques. Because of these materials and techniques, printed electronics can be – as the name says – printed onto various flexible substrates, in particular on to plastic films, but also on paper, glass or fabrics. All that at low cost to create extremely thin, flexible and transparent electronic components.

The technology is also often referred to as organic electronics, plastic electronics, flexible electronics, polymer electronics, large-area electronics or thin-film electronics – terms which all mean the same thing: a new way of adding electronics to a traditional, or entirely new, application.

Printed Electronics - Applications and products

According to Dr Hecker, consumer electronics is obviously a significant market for OLED Displays in products like smart phones and tablets but another huge market and growth driver is the automotive industry. From displays and touch surfaces seamlessly integrated into the interior to self-darkening windows to new lighting and heating concepts: printed electronics is playing an increasingly important role in the vehicles of the future, whether in electric or autonomous driving cars. At the moment Dr Hecker sees that 3D structural electronics proves to be one of the most important future trends in the automotive sector.

Also, the medical sector and the pharmaceutical, sports and textile industries are expanding their products and applications to include printed electronics. Ultra-thin sensors or microfluidic chips are opening up new applications. Another interesting development is building-integrated organic photovoltaics (OPV) which are gaining in importance. In the future, roofs, windows, facades and other building sections will contribute to the generation of solar power.

What can participants expect to find at LOPEC?

"One of LOPEC's biggest strengths is that it really gives participants the chance to find out about every single aspect of the



printed electronics industry" said Armin Wittmann. "LOPEC covers the entire value chain, from research and development to mass production, including applications and business models.

"Participants can expect to see a wide variety of materials including



substrates, conductors and encapsulation materials as well as manufacturing processes such as patterning techniques, vacuum processes, photolithography, solution coating as well as assembly and packaging technology. Applications will of course also be on display, such as sensors, RFID, solar cells or smart textiles. The related service industry will be there with offers, specifically targeted at the industry, ranging from services for prototyping, R&D funding management or venture and equity capitalization," concludes Wittmann

Many LOPEC exhibitors will be showing examples of real applications for printed electronics. The Innovation Showcase also allows visitors to see printed electronics up close. A range of fascinating prototypes and product innovations will be presented there. As with previous LOPEC exhibitions there will also be a live "Demo Line" where the full production process of a smart object will be presented and explained. Several OE-A members will take part in the Demo Line and will show by video, in posters and of course in live demonstration of production equipment how this smart object is made. The Demo Line is another unique service for the



development of the printed electronics industry," says Dr Hecker. "In the latest business survey, conducted by us at the OE-A, our participants projected a sales revenue growth of three percent. This forecast, however, is significantly lower than the one made in the spring survey this year. A sales growth of nine percentage points was forecast for 2019. It is not surprising that the organic and printed electronics industry is also feeling the effects of the uncertainties and the general slowdown in the global economy. But we expect healthy growth for both this and upcoming year. For

2020, the companies expect a further increase in turnover of five percent. This positive outlook is reflected in other indicators such as investments and development expenses. He concludes

With more than around 200 conference presentations, the LOPEC Conference claims to be the world's leading communication platform for research, knowledge and solutions in the



printed electronics industry. Many experts and scientists from around the world will speak at the LOPEC Conference. These include John Rogers, Professor at Northwestern University (US), who will give insights into the fabrication of flexible bioelectronics for the next generation of wearables; Dr. Alain Schumacher, Chief Technical Officer, IEE (LU), who will talk about the challenges and perspectives on printed electronics for mobility. Other confirmed speakers for LOPEC 2020, come from Henkel, Quad Industries, Schreiner IEE, Fraunhofer ENAS and many more.

The conference is a three-day event beginning a day ahead of the exhibition.

There is a discount for advance online booking at

www.lopec.com/en/general/tickets/

visitors and is only offered at LOPEC.

Among the industry and technology leaders exhibiting at LOPEC 2020 are Coatema Coating Machinery, DuPont, Elantas Europe, Evonik Creavis, Fraunhofer, Henkel, NovaCentrix, VARTA Microbattery and VTT Technical Research Centre.

From the UK, visitors can expect to see CPI, DuPont Teijin Films UK, Dycotec Materials, GEW (EC), HORIBA and RK PrintCoat.

According to Armin Wittmann, there were more than 160 exhibitors from 19 countries at LOPEC 2019. He expects to see a slight increase for the 2020 event. The number of participants last time was around 2700.

"LOPEC has shown consistent growth which has mirrored the positive

Fiber optic systems get thermal enhancements

By Tony Armstrong, business development director at Analog Devices

Background

The global market for fiber optic systems is large. Estimates vary, but many forecasts place it somewhere between \$4B to \$4.5B in 2019, with a CAGR of close to 10 per cent through 2021. Fiber optics are predominantly used in communications applications such as those found in telecom, home utility, CATV, military, and industrial environments. Fiber optic-based communication has many advantages over other technologies, such as cable, including increased bandwidth, electromagnetic interference immunity, electrical isolation, data security, decreased cost, size, and weight, and low attenuation rates. Growth is fueled by these advantages, but mainly by the need for higher bandwidth communications in consumer and healthcare sectors, as well as government funding for the development of its own network infrastructure.

Taking a closer look at what is driving these promising growth projections, it is clear that it is not just one single trend, but a combination of factors. These include a combination of increasing investments and research being done by the major fiber optic cable manufacturers within the industry to develop and upgrade fiber optic technology. Fiber optic technology has had continuous research and development activities over the past few years, leading to its current prominence and the rising demand for high bandwidth fiber optic cable for communications and data services.

At the same time, the demand for high speed, bandwidth intensive, high data rate applications has altered the global fiber optics market. New fiber network deployments will be the main driver of the fiber market over the next five to seven years. An optical fiber system typically consists of a myriad of components such as transmitters, receivers, and optical cables. Furthermore, system installations are labor intensive; especially so if they are for underground and undersea connections. However, it is this wide range and diversity of applications that is driving

the global fiber optics market; thereby enabling its significant growth rate.

The growing demand for cost-effective, power efficient, and highly integrated information technology (IT) infrastructure will be the major driving force in the next few years. The overall fiber optic market can be segmented into a wide array of areas, including telecom, oil and gas, military and aerospace, railway, and medical. Of these, telecommunications will generate the greatest growth in demand for fiber optic equipment over the next few years.

Fiber optic system design challenges

Fiber optic systems usually consist of a large array of optical transport modules, contained in a very small space with virtually no cooling capability. Figure 1 shows a typical optical fiber transport system.

Figure 2 shows the size of a typical individual optical transport module, approximately the size of a pack of chewing gum.

These densely packed systems have limited cooling options, so getting the heat out is a significant design task. There can be upward of 192 individual optical transport modules in a typical rack system, probably with insufficient air cooling, especially when all the optical modules are in full utilisation mode. It is imperative that these optical modules do not significantly increase the operating temperature, since this could put the system in a thermal overload, resulting in shutdown. Normal operation can only resume after enough downtime to allow the system to cool.

As design resources are stretched by increased system complexity and tight design schedules, R&D energy is focused on the development of key intellectual property, leaving dedicated power supply design resources to be pushed to the fringes—even left as an afterthought. With limited time and sometimes limited experience, designers are pressured to

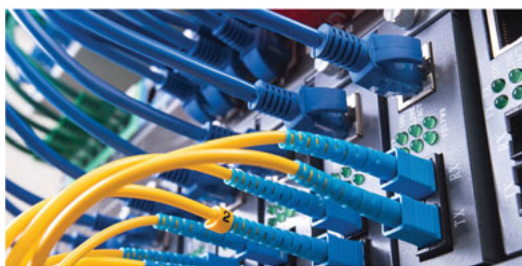
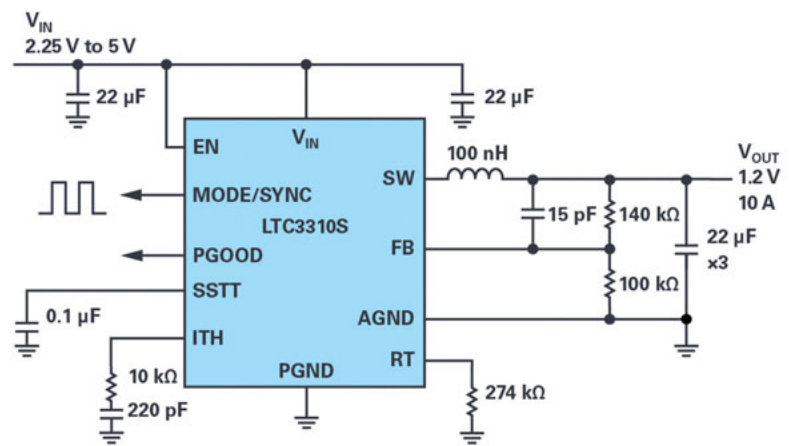


Figure 1. A typical optical transport system consists of multiple arrays of individual transport modules



Figure 2. An example of a typical standalone optical transport module



L = XEL4030-101ME, Coilcraft

Figure 3. LTC3310S complete schematic with minimal external components

come up with a high efficiency solution with the smallest possible footprint utilising the available PCB area for maximum space and thermal dissipation utilisation. The problem is that these two attributes are traditionally considered mutually exclusive.

New, Compact IC Solves a Difficult Problem

The good news for power supply designers of densely populated optical transport systems is that there is a new, unique solution to specifically address these space and thermal design constraints.

The LTC3310S is a very small, low noise, monolithic step-down dc-to-dc converter capable of providing up to 10 A of output current from a 2.25 V to 5.5 V input supply. The part employs Silent Switcher 2 architecture with internal hot loop bypass capacitors to achieve both low EMI and high efficiency at switching frequencies as high as 5 MHz. For systems with higher power requirements, a multiphased parallel converter setup is easily implemented. Up to four LTC3310S devices can be used in parallel to deliver an output current of 40 A—with no need to worry about thermal mismatch since current is automatically shared within 1 per cent among the ICs.

The LTC3310S is a constant frequency, current mode step-down dc-to-dc converter. An oscillator turns on the internal top power switch at the beginning of each clock cycle. Current in the inductor increases until the top switch current comparator trips and turns off the top power switch. The peak inductor current at which the top switch turns off is controlled by the voltage on the ITH node. The error amplifier serves the ITH node by comparing the voltage

on the FB pin with an internal 500 mV reference.

When the load current increases, it causes a reduction in the feedback voltage relative to the reference, leading the error amplifier to raise the ITH voltage until the average inductor current matches the new load current. When the top power switch turns off, the synchronous power switch turns on until the next clock cycle begins or, in pulse-skipping mode, inductor current falls to zero.

The LTC3310S is a small and compact solution, requiring minimal external components, as illustrated by the schematic shown in Figure 3. The LTC3310S uses a constant frequency PWM architecture. There are three ways to set the switching frequency: it can be programmed from 500 kHz to 5 MHz via a resistor (RT) tied to the RT pin to ground; it can be set from 0.5 MHz to 2.25 MHz by synchronising the internal PLL circuit to an external frequency applied to the MODE/SYNC pin; or it can be allowed to default to the internal nominal 2 MHz clock.

Conclusion

Designing the optimum power conversion circuit for optical transport systems traditionally involves significant performance trade-offs in solution footprint, EMI performance, and power dissipation. Even seasoned switch-mode power supply designers will concede that maximising all three is not possible. This is no longer the case. Analog Devices' Power by Linear LTC3310S makes it possible to achieve small size, low EMI, and low power dissipation in a single IC power supply. This is particularly important in fiber optic communications equipment, where low EMI emissions are required to prevent data transmission from being compromised, and space is highly constrained.



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Supporting advancements in the semiconductor industry

Daniel Hutton, director of engineering at Spicer Consulting and Jong Hwa Hur, president of Active Solution

Advancements in semiconductor manufacturing have made production of components on a nanometre scale more practical than ever before. Electron microscopy – such as TEM, SEM and FIB-SEM – is a vital quality control tool in the manufacture of these semiconductors, allowing structural analysis of devices to detect any problems. However, the image quality of these instruments is commonly affected by external factors, making it more challenging to identify manufacturing faults.

The advantages of smaller components

There is constant pressure in the semiconductor industry to make components smaller. The desire to continually increase computing speed and power – while saving costs – means that more transistors are needed within each chip. However, placing additional transistors on a chip produces more heat. One way to keep the transistors cooler is to make them smaller, as the distance that the electrons have to move to do the same job is smaller, and therefore takes less energy. This also makes the whole system faster, which is more economical, as there

is more functionality built into the same space on a silicon wafer.

External factors can limit resolution

Despite the advantages of miniaturisation, reducing the size of components poses a challenge during manufacture, as a higher level of magnification is needed to inspect the parts. This is often performed using electron microscopy, due to the high resolution that this technique provides. When imaging features on a chip with an electron microscope, the electron beam must be positioned with a level of accuracy that is similar to the size of feature being examined to achieve required resolution. Unfortunately, electron microscopes are particularly sensitive to magnetic fields, which can deflect the electron beam. The smaller the object, and therefore higher the necessary resolution, the more sensitive the technique is to the surrounding magnetic fields – as well as vibrations and sound.

Magnetic field interference is common in a manufacturing environment, as the most problematic frequency – around 60 Hz – is produced by an abundance of different machinery. As the space within most manufacturing sites is valuable, this leads to as many instruments as possible being packed into a given area, and this close proximity results in microscopy interference. In addition, newer semiconductor factories often feature ceiling-level monorail systems to transport components between stations for automatic loading and processing, which also helps with traceability of materials. These overhead systems typically create a 9



kHz magnetic field, which is incredibly detrimental to image quality and must be cancelled in order to improve resolution. Other contributing sources of magnetic field interference within semiconductor factories include magnetic stirrers used in plasma etchers and voice-coil actuated stages in lithography machines.

Assessing the problem

The semiconductor industry is unique in that highly-sensitive electron microscopes are often located next to large pieces of industrial equipment – which give out various types of radiation – and it's important to find a way to allow them both to work efficiently together. This level of sensitivity requires areas to be surveyed meticulously before microscope installation, to ensure that the image quality produced will be unaffected by any external factors. Instruments such as Spicer Consulting's purpose-designed SC 11 Analysis System are routinely used by microscope vendors and consultants to perform site surveys for SEMs, TEMs and similar equipment. These instruments measure and analyse magnetic fields, vibrations and acoustics in X, Y and Z directions, displaying results graphically and allowing the user to perform a direct comparison between the fields encountered and the microscope specifications. This information is invaluable to ensure that electron microscopes are installed in the most stable environment possible – whether that is in an existing facility or a new laboratory – ensuring the highest possible image quality.

Restoring image resolution

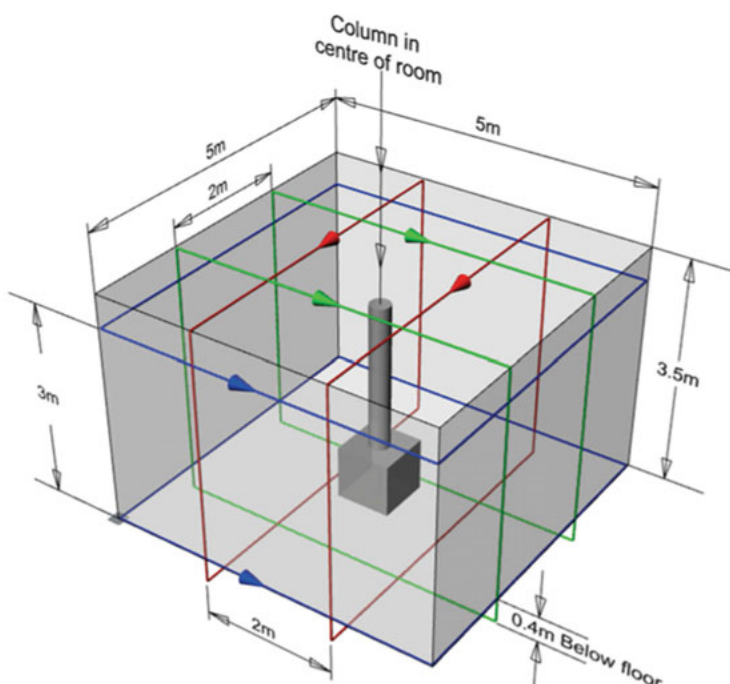
Top-end microscopes can only withstand minimal interference, so finding a suitable environment for the equipment can be extremely challenging. It is becoming

increasingly common for electron microscope users to seek advice from experts to mitigate unwanted interferences, with one solution being to install a magnetic field cancelling system. Spicer's proprietary field cancelling technology has been developed over many years, and there are now thousands of these systems in use worldwide. All Spicer cancelling systems – including the popular SC24 – consist of a Magnetic Field Control Unit and one or more Magnetic Field Sensors, as well as three multicore cables, which are installed around the electron microscope. There are two different types of sensors that can be used depending on the interference present; the first only measures AC fields, whereas the other more complicated and high performance sensor can detect both high frequency AC and low frequency fields down to DC. The control unit includes power amplifiers that drive currents through the cables when interference is present, creating a nearly equal and opposite field. This dynamic response – which automatically compensates for field changes – stabilises the ambient field, restoring resolution.

Summary

There are many technical challenges involved in miniaturisation of semiconductor components, and both surveying instruments and cancelling equipment are essential in supporting the advancements within this industry. With a broad install base around the world, Spicer Consulting's solutions have proven to be highly effective in restoring resolution in electron microscopes in manufacturing environments.

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Enclosures

Verotec shows results of recent £500k investment at Southern Electronics

At Southern Electronics, Verotec showed examples of application-specific modified standard products manufactured on new equipment installed as part of a recent £500k capital investment in new CNC production machinery and production control systems. The recent investment has significantly increased capacity, giving customers reduced time to market and higher product quality. Verotec is a high mix, low batch manufacturer, offering customers in-house modification capability of its extensive range of standard electronic enclosures. In addition to modifications, Verotec have also expanded their design, integration and test capabilities, enabling it to offer a complete service from design through to finished system test.

The stand also featured examples of its well-established standard metal enclosures families, notably the KM6-II and KM6-HD subrack systems, Diplomat 19" desktop



enclosures, IMRAK 19" cabinets, 19" rack cases and 19" thermal management products. Also on show were rack mount or desktop integrated systems with power supplies, backplanes, EMC screening and cooling that give a ready-to-run environment for development or production requirements.

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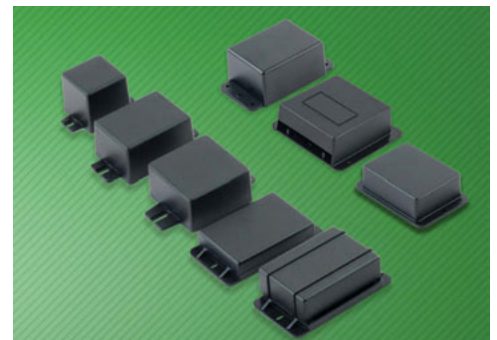


Expanded PBL Series flanged enclosures announced by BCL Enclosures

BCL Enclosures, the specialist UK manufacturer of standard and custom plastic enclosures, has expanded its PBL Series of flanged enclosures. PBL Series flanged enclosures are ideal for small assemblies or potting box applications and provide protection to small electrical systems. The flanged system assists surface mounting which secures the system to the appropriate surface. The PBL Series can also be used to house and mount small PCBs or used as potting boxes.

A robust solution for multiple applications, the general purpose expanded PBL Series is moulded in ABS for strength and durability. There are three variants within the PBL Series: PBL2 and PBL3 are general boxes with bases, available in black or white as standard. The base is loose fitting and can be secured in place by clamping to a panel or bulkhead. For applications requiring a tamperproof housing, the base can also be riveted to the box, protecting the contents from casual interference.

PBL7 is a flanged enclosure in black ABS featuring a separate self-locking base and seven numbered slots to take wires or 0.25" PCB mounting blades. There is also a raised panel to take labels for easy identification of contents and other information. Measuring 100mm x 95mm x 42mm high, it is a smart solution for design critical applications.



The third option in the PBL series is a range of models with fixing flanges, bases and slotted mounting lugs. Designed originally for automotive applications, this range is versatile and can be used in many different projects. These cost-effective general purpose boxes are moulded in black with the slotted lugs enabling simple fixing. Three versions, PBL04, PBL06 and PBL1 are designed for interference push fit, but can also be glued to provide a secure housing. On the larger PBL08 and PBL09 models, the base is retained with the four stainless steel screws provided.

Like the other standard enclosures in the very broad range offered by BCL, the PBL Series can also easily be punched or drilled to suit individual uses as BCL Enclosures specializes in customisation. All of the above are moulded in Black ABS as standard, other colours and materials are available upon request.

bclenclosures.com

EDAC

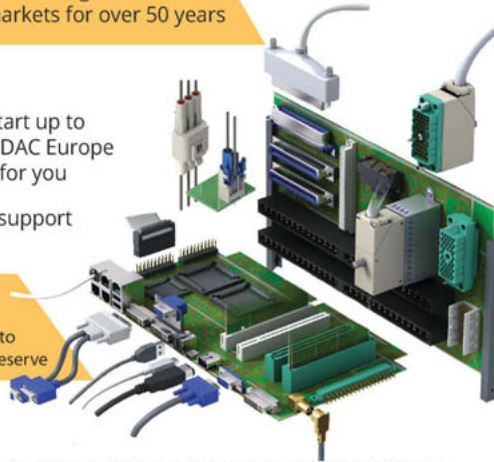
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X-coded M12 rail approved connectors announced by binder

binder announces a range of M12 X-coded connectors approved for use in railway applications. By meeting the following standards for vibration and fire - DIN EN 50155 and DIN EN 45545-2 respectively, these circular connectors will suit a variety of railway applications including rolling stock, passenger information and access control.

The 8-pole, X-coded connectors feature data transmission speeds of up to 10Gbit/s and will prove highly valuable in rail applications for ethernet protocols, communications, security, CCTV and passenger information systems.

The high bandwidth is achieved by isolating the four pairs of wires from one another with a cross or X-coding shield for separation of the transmissions. This ensures that the Ethernet wiring will remain compatible with the growing requirement to transmit high volumes of data.

The X-coding conforms to the industry standard IEC 61076-2-109 and is specified for broadband transmission by Ethernet protocols including PROFINET.



At 40 C, the contacts are rated at 0.5A at 50/60VDC and, when mated, these circular connectors protect to IP67 and, according to binder, are good for more than 100 mating cycles.
binder-connector.co.uk

RTI's connectivity middleware for in-vehicle communication for autonomous vehicles



Real-Time Innovations (RTI), an Industrial Internet of Things (IIoT) connectivity company, announced that Aptiv, a technology company that develops safer, greener and more connected solutions enabling the future of mobility, will work with RTI Connex DDS, the connectivity middleware for autonomous vehicles, as a secure tool for transferring data within self-driving vehicles.

Aptiv is a technology company that will usher in the next generation of safer, greener and more connected vehicles, leveraging decades of experience in solving its customers' most difficult challenges. The company's autonomous mobility team develops autonomous driving systems for commercialisation of Level 4 and 5 self-driving technologies.

Connex DDS is a standards-based framework to support autonomous vehicle development from research to production, offering the lowest risk solutions to tier one companies. Aptiv uses Connex DDS within its complex autonomous systems as secure connectivity middleware for exchanging and storing data, while providing an open platform to make software module integrations smoother.

"Aptiv is changing the future of the mobility industry with their expertise in safe and reliable autonomous driving systems," says Bob Leigh, senior market development director, Autonomous Systems at RTI. "We're thrilled to be working with Aptiv to help deliver market-leading solutions that have the power to change the world. These systems enable society to look forward to efficient and safe autonomous vehicle transportation. Together, RTI and Aptiv are solving the toughest challenges facing the future of automation."

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Secure memories in a connected world

Authors: Cliff Zitlaw, Sergey Ostrikov

Embedded systems increasingly allow for cloud-based data collection, event detection and software updates. These remote IoT devices are largely defined by the firmware stored in either the Host MCU or in the User Array of an attached non-volatile memory. The contents of these non-volatile memories are a primary target for malicious attacks. Countermeasures intended to prevent unauthorized alteration of the non-volatile memory have become a fundamental design requirement for all newly developed IoT devices.

This article describes the cryptographic and security infrastructure beginning to appear in discrete Flash memories and how these new features are used to secure connected IoT devices.

Next Generation Secure NOR Flash Products

NOR Flash manufacturers have developed products that integrate cryptographic infrastructure that can be used to provide a significant level of security. Device pairing

this new infrastructure, a number of security functions can be developed to support cryptographic security. Two features that are receiving a lot of attention in the NOR Flash area are access control of the User Array and layered code validation prior to execution.

Array Partitioning into Secure Regions

The User Flash Array of newer NOR devices can be partitioned into multiple regions with each region individually configured for legacy (non-secure) access or secure access. Regions configured for secure access can specify either controlled read/write access or authenticated access.

Secure regions configured for controlled access can independently enable or disable read/write operations. The enable/disable setting is managed by an authentication sequence that requires the Host MCU to prove knowledge of a shared key. The shared key is loaded into both the Host MCU and the memory during



Figure 1 - Connected Embedded System as a Leaf Node

(Host MCU and NOR Flash) and authenticated write (program and erase) operations have been implemented using symmetric cryptography. These devices have typically been state machine based using an HMAC engine and non-volatile monotonic counters. During the provisioning process, a symmetric key is loaded into both the Host MCU and the Secure NOR Flash device to be used during normal operations to perform authenticated read and write operations.

More recently, internal NOR Flash infrastructure have evolved beyond what can be practically managed by internal state machines. Newer devices have integrated a CPU subsystem (CPUSS) that is able to perform advanced functionality like transparent wear leveling and bad block replacement. Once a CPU subsystem became part of the Flash device infrastructure, it wasn't long before the idea of adding a crypto hardware block and a packet buffer became reality. With

manufacturing. Reads or writes attempting to access a region in the disabled state will return undefined data during reads and write attempts will be blocked. The power-up read/write access state for regions configured for controlled access is a configuration option. For example, a boot region might be configured to power-up as read-enabled and write-disabled while the remaining regions may have all read/write access disabled.

Secure regions can also be configured to only allow authenticated read and write accesses. Authenticated regions do not allow for legacy reads and writes. Authenticated reads and authenticated writes are performed using a packet transfer that includes an HMAC demonstrating knowledge of both a shared key and the value of a non-volatile command counter. The command counter used in the access request protects against replay attacks.

Security Between Software Layers

Validating software in a layered fashion has also become commonplace in a secure environment. The Device Identifier Composition Engine (DICE) Work Group at Trusted Computing Group has published specifications and guidance for architectures in which each layer of code

attests to the next layer before relinquishing control. A system level scenario becomes more complicated when Host MCUs are not able to integrate programmable memory. Discrete Flash devices are starting to appear that adopt the DICE strategy starting in the (presumed trustworthy) NOR Flash CPUSS ROM.

The NOR Flash CPUSS ROM is executed upon Power on Reset (PoR) and initially validates that its own captive Flash Device Boot Code (in CPUSS Flash, not exposed in the User Array) is intact before allowing code execution to pass to the CPUSS Flash. This DICE Layer 0 Compound Device Identifier (CDI) calculation combines a Unique Device Secret (unique for every flash device) with a measurement of the Flash Device Boot Code resident in Layer 0.

NIST SP800-56C describes acceptable cryptographic one-way functions to be used in the CDI calculation. The Unique Device Secret is used for the Layer 0 CDI calculation. Layer 0 CDI validation compares the calculated value with an expected value stored on-chip that has been provisioned by the NOR manufacturer.

Once the CPUSS Flash has been confirmed to be valid, code execution passes from the ROM Boot Code to the (Layer 0) CPUSS Flash Device Boot Code. Next, the NOR device validates the System Level Boot Code programmed into the User Array by the system manufacturer. The measurement of the System Level Boot Code is compared against a value that is stored on-chip during device provisioning. These two validation steps occur while the Flash device is performing its PoR sequence before the device is accessible by the Host MCU. Note that during the entire boot process, care must be taken to assure that the CDI values are not exposed to higher layers of code and, of course, malicious actors.

Upon completion of the Flash device PoR sequence, the System Level Boot Code is exposed to the Host MCU for execution. The system boot process can proceed with the knowledge that the System Level Boot Code is authentic. The layered validation strategy can continue with the Host MCU managing the validation of each new layer of software.

Figure 4 is drawn as a linear progression from the Flash Boot Code to a User Application. A real-world scenario is likely much more complicated, especially after program control has passed to the Operating System. Note that once the System Level Boot Code gains program control, each subsequent layer's attestation value can be compared against either a local value (stored in the Flash device) or preferably to a value residing remotely (perhaps a cloud server). Remote validation may be made more secure with the use of

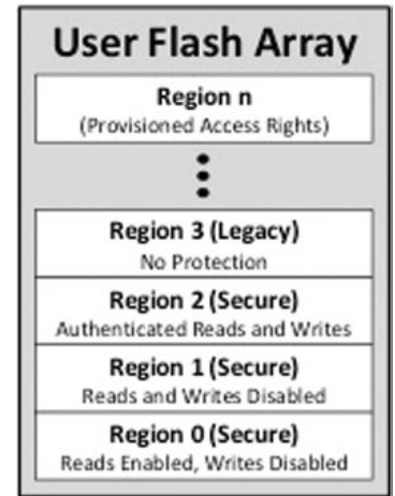


Figure 3 - Secure Partitioning of User Array

Digital Certificates as described in the DICE specification.

Conclusion

The security threats that have plagued legacy non-volatile memories are significantly mitigated with on-chip cryptographic infrastructure. Anti-cloning has been addressed with device pairing

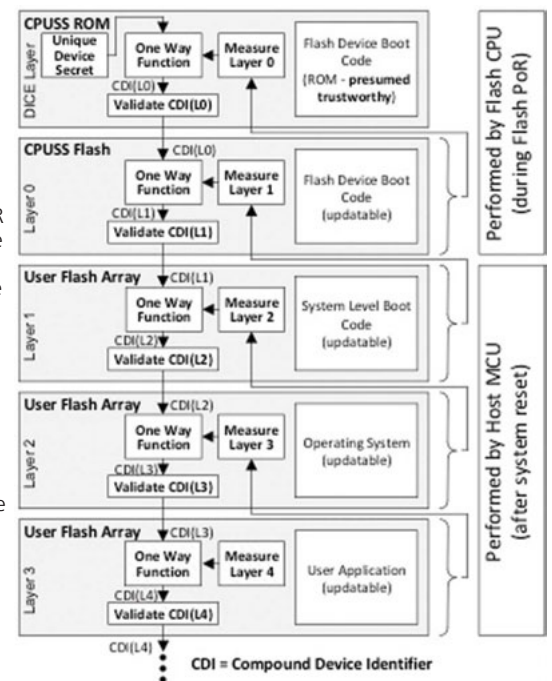


Figure 4 - Secure Software Layering

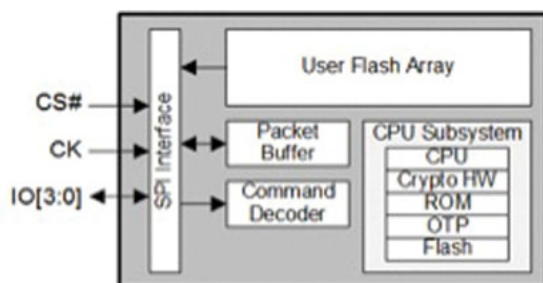


Figure 2 - Next Generation NOR Flash Device with Integrated Cryptography (using Serial Peripheral)



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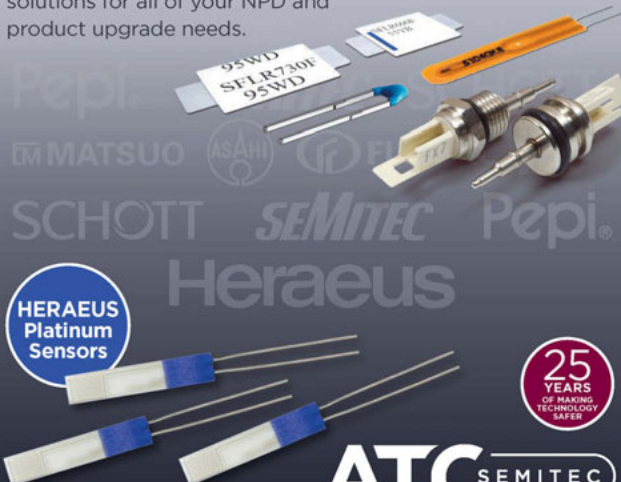
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Trends in the automotive electronics industry for 2020

By Joseph Notaro, vice president of worldwide automotive strategy and business development at ON semiconductor



Joseph Notaro

The automotive industry exhibited multiple facets in 2019. While on one side automotive production on a global basis slowed down due to headwinds coming from macroeconomic forces and trade tensions, the transformation of the market and, more in general, of the concept of mobility continued. Key secular trends driving automotive business remain intact and the momentum continues to accelerate. Despite the current slowdown in vehicle production, automotive will continue to be among the fastest growing semiconductor end markets for a long time. In the automotive market, the adoption of electric vehicles and active safety continue to accelerate driving strong growth in power semiconductor and sensor businesses.

The transformation of mobility will continue in 2020. From a high level we are seeing disruptive developments such as commercially operated sharing services (from e-scooters to cars) in urban areas, making it even less necessary to own a vehicle if you live in a city. In certain areas and situations, the car is moving away from a pure ownership model towards a 'pay per journey' one. This trend will inevitably result in cars being more highly utilised, which puts increased pressure on the reliability of vehicles, down to the very last component.

Semiconductors are now critical for the car OEMs – they are the key enablers of this revolution and represent a significant portion of the cost of a vehicle. The traditional supply chain is changing, as OEMs and Tier 1 suppliers now see the benefit and value in working more closely with semiconductor manufacturers. At a lower level, where it impacts the engineer, we are also seeing change. The continued electrification of the drivetrain and move towards autonomous vehicles is a fundamental development impacting how vehicles are designed, built, utilised and recycled. This will continue to drive demand for semiconductor solutions designed specifically for this growing application area throughout 2020.

Reduction in vehicle emissions will continue to accelerate to meet more stringent government regulations. Environmental concerns are also creating increased consumer awareness. In the next years, more than half of vehicles produced globally will be electrified in some way – from Mild-Hybrid to PHEV / BEV. Innovations in traditional silicon and wide-band gap technologies will drive improved performance allowing to further reduce CO2 emissions, increase vehicle range and decrease charging times. Improved battery technology and cost are also contributing to better vehicle performance and are making these vehicles affordable for a larger group of consumers.

The request for power components in 2020 (and beyond) will grow exponentially due to the market penetration of



electrified vehicles. ON Semiconductor is a leader in the technologies, which are fundamental to the continued development of HEV/EV technology. The market release of power transistors based on Super Junction High Voltage MOSFETs, Silicon IGBTs, Silicon-Carbide (SiC) and Gallium Nitride (GaN), which are essential in high-voltage applications, is well underway. ON Semiconductor is one of the very few companies that can offer a fully independent, vertically integrated supply chain (from substrates to assembled finished components) with a global, extensive manufacturing footprint (including the recently acquired 300mm wafer fab in East Fishkill, NY).

Another major change on the horizon is, of course, autonomy and as the number of pilot projects increases, the enabling technologies continue to develop as well. While we can't expect to see Level 5 autonomous vehicles in 2020, the release to market of L2+ / L2.5 vehicles are accelerating. These vehicles have, in specific situations / use cases, the ability to operate at L4 autonomy levels.

The ecosystem surrounding autonomous vehicle development needs to expand as well. Vehicles are no longer a collection of independent sub-system but interconnected functions designed to work closely together. Data needs to be exhaustive, redundant, shared by multiple systems and users. This data needs to be

available locally and centrally; used to train the machine learning algorithms and, at the same time, to make decisions while the vehicle is operated. The data is generated by a variety of sensors – complementary and redundant. The demand for advanced sensors and sensor fusion, which provides vehicles with the input they need to be more aware of their surroundings, is increasing. This data will also be shared externally (with other vehicles and to the cloud) through V2X networking.

This will be essential in automated driving levels 2+ / 2.5 through 5, as vehicles not only become aware of their surroundings, but enabled and required to act in the face of unpredictable road conditions. This change isn't going to happen overnight, but the technology to support this vision is already being integrated into vehicles to provide automation levels 1 and 2. This is largely focused on sensing, using ultrasonic, vision, radar and LiDAR sensors. ON Semiconductor is actively developing and acquiring new sensing technologies to address this growing demand, which we predict will accelerate during 2020. The natural evolution of sensing technology will enable future levels of autonomy, based on developments being made right now.

The way we think about vehicles is already changing and it will continue to change as we strive to achieve Vision Zero; a world without road deaths, accidents, failures and emissions.

As the seventh largest supplier of semiconductors to the automotive electronics industry, ON Semiconductor is dedicated to the cross-industry Vision Zero initiative and driven by its own Zero Defects strategy. This philosophy is applied in every automotive product we design, manufacture, supply and support. As the global leader in power semiconductors and sensing technologies, we are enabling the continued electrification of vehicles and the development of ADAS / autonomous driving systems already today. ON Semiconductor will continue to focus and drive innovations on power management, in-vehicle networking and advanced sensing, during 2020 and the near future.



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Contrinex fiber-optic sensors ensure fast and safe automotive brake cable production

During manufacture of automotive parking-brake cable, multiple strands of steel wire are twisted together, forming a single cable. After twisting, the cable passes to the next process in an unsupported, continuous length. Occasionally, the cable breaks, compromising safety and damaging equipment. Although the cable's exact path is unpredictable, a multi-beam fibre-optic sensor detects its presence, interrupting the process if it breaks.

Customer application

During production of automotive parking-brake cable in a Portuguese factory, strands of steel wire are twisted together, forming a single cable with a nominal diameter of 3mm (0.1in).

The process operates continuously, and twisted cable passes between successive work-stations in an unbroken length. Between operations, the cable is largely unsupported, assuming the form of a suspended catenary.

Occasionally, a manufacturing defect causes the cable to break. In this event, safety is compromised and, unless processing is halted, machine breakdowns

occur. A sensor system must detect the presence of the cable as it passes from one operation to the next, interrupting the process if it breaks.

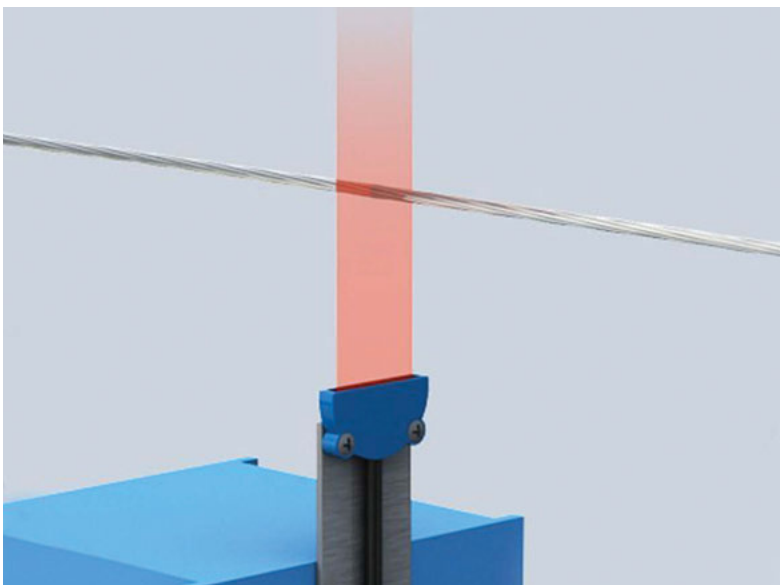
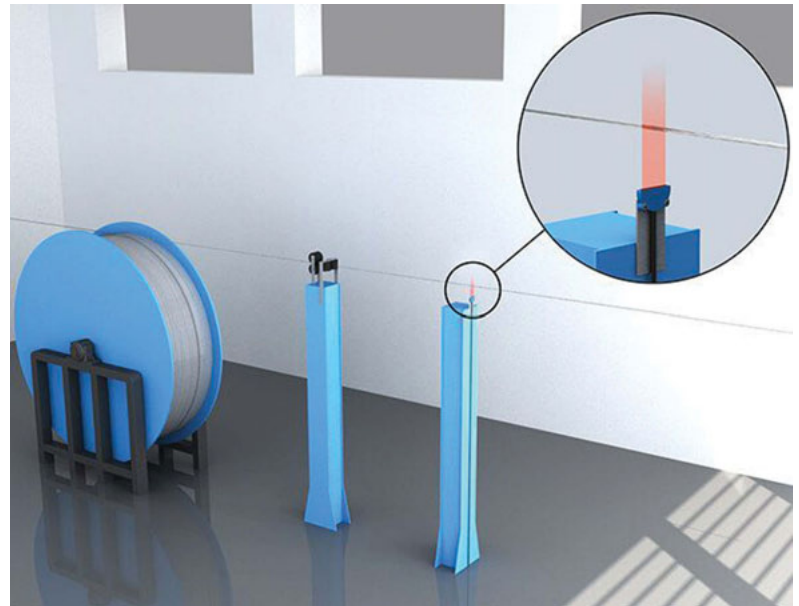
Because the cable is unsupported, its path is unpredictable and its exact position at any time, particularly in the vertical plane, is unknown. The sensor system must detect the presence of the cable reliably at any point within an envelope 90mm (3.5in) high and 20mm (0.75in) wide.

Customer solution

A Contrinex photoelectric sensor system, comprising a DIN-rail-mounted fibre-optic amplifier coupled with a multi-beam diffuse sensing head, provides an optimal solution for this application. With maximum switching frequencies of up to 4000 Hz and sensing distances of up to 150mm (6in), multi-beam fibre-optic sensors are ideal for detecting fast-moving targets. The PBTP construction of the sensing head ensures excellent mechanical protection in the production environment.

The 28mm-wide sensing face of the multi-beam sensor detects targets across its entire width, providing a detection envelope that comfortably accommodates the customer's 90mm x 20mm requirement. Initial set-up is accomplished by means of a manual teach-in function and integral signal-strength LCD, following which the system operates without manual intervention.

A 2m-long fibre cable allows remote mounting of the fiber-optic amplifier; connection to the customer's control system is via an industry-standard PNP interface and an integral M8 cable connector, allowing easy removal and replacement when necessary.



The system tolerates high ambient-light conditions and detection of a broken cable is both highly reliable and immediate. If the cable breaks, the system interrupts the process and sounds an alarm, alerting the operator. Downtime arising from broken cables has been eliminated since the system has been operational.

Key advantages include:

- Rapid, reliable detection of a small, fast-moving target with an erratic path

- Elimination of downtime arising from broken cables
- Highly cost-effective solution to a potentially costly problem
- System switching frequency of up to 4000 Hz
- Exceptionally reliable detection across a 90mm x 20mm envelope
- Diffuse detector with simple set-up and teach-in function

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Following the success of its first two events, the 2020 iteration will continue to give industry professionals the chance to have their say and help decide the winners in every category.

The awards ceremony will return to the stunning Tower Hotel in London on Thursday 24 September 2020 to bring leading figures from across the trade together for an evening of celebration and networking.

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With entries and nominations now open, members of the electronics industry are encouraged to put their inspirational products, companies and employees forward in hope of clinching a prestigious Electronics Industry Awards trophy!

Unlike any other event of its kind, the scheme's unique decision-making process - which places the power to decide who wins in a number of categories in **YOUR** hands - makes winning an award from the event a truly unrivalled stamp of excellence.

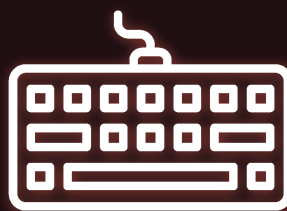
Industry votes will be combined with judges scores in each of the Product and Individual categories, while for all of the Business awards the winners will be solely decide by **YOUR** online votes.

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Enter any relevant categories and provide supporting information where necessary.



Tell us a bit of information about yourself and hit submit!

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The guide to effective battery maintenance

While most car owners understand that properly maintaining brakes is one of the best ways to avoid accidents, defective brakes are the most common cause of road accidents. Overlooking proper component maintenance isn't exclusive to car owners however — it's also true of battery-powered device users. Here, Neil Oliver, technical marketing manager at professional battery manufacturer Accutronics, explains how technical staff and device manufacturers can ensure batteries are safely maintained.

Battery-powered devices are becoming increasingly commonplace in sectors where failure is not an option. The continual shrinking of component sizes, alongside the advent of wireless technology and exponential increases in processing power, has meant that sectors such as medical are now condensing mission-critical equipment into smaller, portable forms.

For example, mechanical ventilators have been decreasing in size in recent years and medical staff are increasingly using portable ventilators to treat patients in emergencies. These life-critical systems require a safe and reliable power supply, which means that the battery must be suitable for use and properly maintained.

But how can technical staff ensure that batteries are properly maintained? While most original equipment manufacturers (OEMs) will supply rudimentary information for safe handling of the battery, there are three key considerations that are often neglected.

Storage

The first battery maintenance issue that many users neglect, but one that is easy to

address, is that of improper storage. Some considerations are fairly obvious, such as how long a battery has been in storage, which can be managed by enforcing a strict first in, first out approach to stock control. Other considerations are less apparent, such as storage temperature.

Every battery has an optimum operating temperature, which indicates the temperature range at which it can perform safely. Likewise, they also have an optimum storage range that must be adhered to.

The reason for taking note of this storage temperature is two-fold. The first is that, by choosing a location that does not exceed the temperature, technical staff can ensure the battery will safely perform within operating temperature limits during next use. The second, is that it eliminates the risk of the battery losing capacity.

The rate at which a battery loses capacity in storage varies depending on the battery chemistry. Most electronic medical devices, such as portable ventilators, use lithium-ion (Li-ion) batteries, which should not be stored in temperatures higher than 30 degrees Celsius to minimise capacity losses. An effective way of storing Li-ion batteries is in an open circuit condition in a dry, cool environment. Ideally, the storage area should be at or below room temperature.

In addition to temperature, the state of charge (SoC) of a stored battery affects how well it operates after extended periods of storage. Due to transportation regulations, most Li-ion batteries are shipped at or below a 30 per cent SoC, which in most cases can allow for up to 12 months of storage without the battery incurring damage.

Crucially, a battery should not be stored at a fully charged state, as this may result in a higher level of irrecoverable capacity loss. As such, the safest approach in general is to aim for the 30 per cent. Depending on how long the battery will be in storage, technical staff will need to periodically recharge it in line with OEM guidelines.

Calibration

Smart batteries are, in effect, two systems: the electrochemical battery, which provides the electrical energy, and the digital battery, which provides users with protection, charge control, performance data and SoC calculations based on discharge cycles. These two systems should complement each other perfectly, but the digital battery slowly loses precision as time passes and calibration is required to correct this.

The latest smart batteries use fuel gauges that use both coulomb counting and impedance tracking to maintain a high degree of fuel gauge accuracy. However, in some applications, especially those where the battery is rarely discharged, the fuel gauge can become out of sync with the cells.

These applications may require the battery to be periodically calibrated, either by forcing a deeper level of discharge or by using an external calibrator, such as the Inspired Energy CH5050X desktop dual-bay smart charger and calibrator.

This exercises the battery over a full charge and discharge cycle to realign the digital and chemical batteries, allowing for accurate readings.

Conducting this calibration once every couple of months is enough to keep readings reliable and prevent any unexpected failures during use.

Transportation

The final consideration is that of transporting batteries. Most device OEMs know about amendments to the dangerous goods regulations in 2016 that prohibit Li-ion batteries from being transported by air with more than a 30 per cent SoC, but technical staff may not be aware.

This is important to note because some specialist physicians may be required to travel by air to practice at different healthcare facilities. Technical staff should also be aware that the 30 per cent SoC limit does not affect batteries that are being transported with, or inside, equipment.

By considering these three aspects, OEMs can include the best advice in technical guidelines to ensure that batteries in critical medical devices are handled properly and can operate effectively. This advice will be cascaded down to technical staff, who can then ensure ongoing device effectiveness.

As with car brakes, keeping batteries properly maintained is one of the best ways to avoid accidents. With an effective understanding of proper battery maintenance from both technical staff and OEMs alike, medical practitioners can avoid unexpected accidents and keep operations running smoothly.

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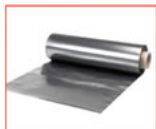
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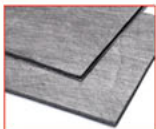
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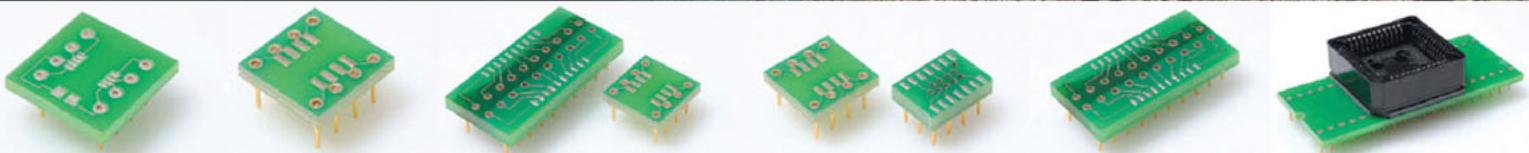
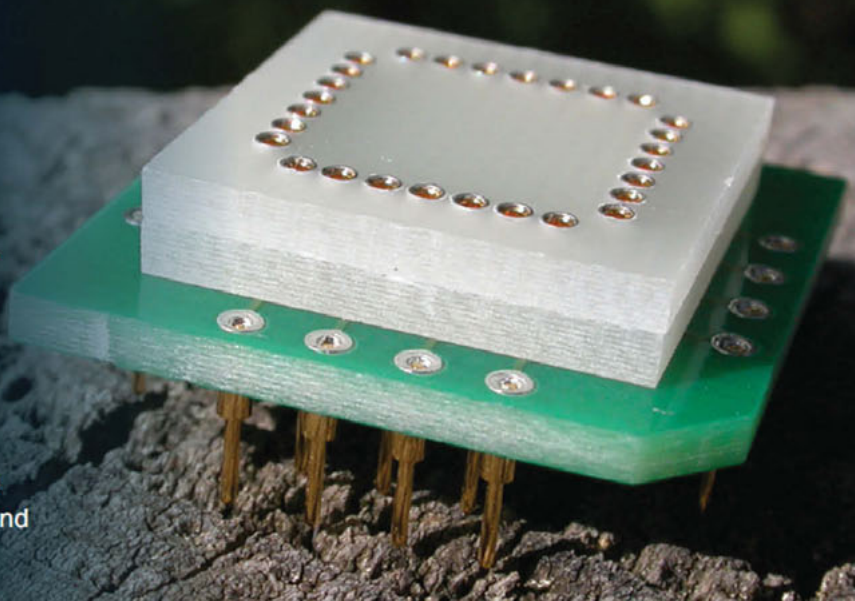
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TT Electronics acquires US aerospace power supply business

TT Electronics, provider of engineered electronics for performance critical applications, has completed the acquisition of a US-based business that designs and manufactures power electronics for defence and aerospace markets, enhancing TT's ability to engineer complete power converters.

TT has acquired the Covina, California-based business unit from Excelitas Technologies Corp.

The acquisition of this business unit from Excelitas enhances TT's US presence in power electronics for aerospace and defence, providing access to growth programmes with sole-source positions. The acquisition adds a number of blue-chip US defence primes to the company's customer base. TT is committed to investing in the business to further

improve its growth prospects and engineering capabilities, and customers will see increased value from TT's ongoing focus on R&D, operational excellence and lean activities.

Michael Leahan, EVP Power Solutions North America, TT Electronics comments: "The Covina business is a clear fit with TT's strategy to build leading positions in the aerospace and defence markets where the proliferation of electronics is driving demand for our power solutions. We are excited to welcome Covina employees and customers to TT, and remain committed to providing value-added engineering solutions and world-class service through the development of strategic partnerships."

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HARTING interface supplies power, data and signals for the "metroSNAP"

Swiss automobile manufacturer Rinspeed is presented its new "metroSNAP" concept vehicle at the Consumer Electronics Show (CES) in January. Rinspeed has used HARTING technology; the company has provided Rinspeed with a specially designed interface that supplies the vehicle with power, data and signals.

HARTING is taking the next step in the direction of the mobility concepts of tomorrow with the Rinspeed "metroSNAP". Whether passenger transport or freight logistics, the metroSNAP can be used in highly versatile manner. The HARTING module helps the driver use the vehicle for a wide range of tasks in a fast, flexible manner. Like its predecessors, the "SNAP" and "microSNAP", the vehicle is divided into two elements. On the one hand, there is the Skateboard that serves as an optimised electric vehicle, and on the



other there is the "Pod", which can be switched out in flexible manner to accommodate different tasks.

Communication, signal transmission and the power supply must all work

smoothly between these two elements. Connectivity between them is automatically established as soon as the Pod and the skateboard are securely connected. With considerations to the special requirements for mechanical plugging, the power, signals and data begin to flow.

Rinspeed has relied on HARTING's reliable solutions in recent years. Both of the past two years have seen Rinspeed go with a Fast-Charging solution from subsidiary HARTING Automotive. HARTING Automotive has long been at home in the automotive supplier industry and recently saw a sharp increase in demand for e-mobility solutions. The company leverages its decades of experience in the field of connection and transmission technology to develop and produce charging equipment for electric and plug-in hybrid vehicles.

Rinspeed and HARTING have been working together successfully since 2016. The MICA, which garnered HARTING the prestigious HERMES AWARD at the HANNOVER MESSE in April 2016, was integrated into the "Etos" vehicle for autonomous emission and condition monitoring. In 2017, HARTING used its miniMICA – another component from the evolutionary MICA ecosystem – to support Rinspeed's "Oasis" car. In 2018, HARTING provided the fast-charging technology for the "SNAP". Last year, the "microSNAP" was charged using the fast-charging push, with HARTING thereby living up to its ambition to be an innovative driver of technological development.

harting.com



Ultra-compact 200W desktop power supply from FiDUS features Gallium Nitride switching

2.5x smaller than comparable products

FiDUS Power, the technical power supply distributor specializing in innovative solutions and new products that benefit system designers as they seek to differentiate their end products, sets a new bar for the size of external power supplies with the launch of the new model GDA200. The use of Gallium Nitride (GaN) rather than silicon semi-conductor switches provides increased efficiency, reduced heat losses and operation at higher-frequencies, allowing the size of magnetics and other components to be reduced. The result is an amazingly-compact 200W external desktop power supply with market leading 12.5W/In³ power density.



The FiDUS GDA200 will be welcomed by system designers looking for a sleek power supply to accompany and enhance innovative new products that deliver an image of quality and leading edge technology. It will be advantageous to designers of portable equipment and instrumentation in markets including; high end audio, test and measurement, bench top and audio broadcast equipment.

The ultra-compact size is also advantageous to customers incorporating external power supplies into their designs to speed up the approvals process. The very small size, just 150 x 54 x 33mm (5.9 x 2.12 x 1.3") may also reduce total system package size resulting in higher shipping and storage densities, especially when the closest competitive product is some 2 1/2 times larger.

To evaluate a free sample, please call: 01 183 420730.

Lattice Diamond FPGA development tool receives key industrial and automotive functional safety certifications

- Lattice Diamond software tool for low power FPGA design receives IEC 61508 (Industrial) and ISO 26262 (Automotive) Certifications
- Certification of design tool accelerates time-to-market for development of Lattice FPGA-based systems

Lattice Semiconductor Corporation (NASDAQ: LSCC), the low power programmable leader, today announced that its easy to use Lattice Diamond® FPGA design and verification software environment (version 3.10 Service Pack 3) is certified as compliant with the IEC 61508 and ISO 26262 functional safety standards. These standards are widely used by developers in automotive and industrial applications, as OEMs require mission-critical systems used in their industrial control equipment and vehicles to deliver highly reliable performance with minimal system failures.

Lattice Diamond design software is a complete FPGA design and verification environment optimized for use with low power Lattice FPGAs. It contains all of the design tools and features developers need to program Lattice FPGAs, from initial design concept to downloading the final bitstream to the Lattice device. Designers can get started quickly as the software can accommodate their preferred style of working and provides tools that make common tasks easier, enabling them to complete designs faster and with greater ease-of-use. Designers can choose to use VHDL, Verilog, or a mix of both languages, as well as incorporate IP by dragging and dropping IP components into the design with Lattice Diamond's IP Catalog tool. The Lattice Diamond software automatically performs the necessary place and route functions to integrate the new IP block.

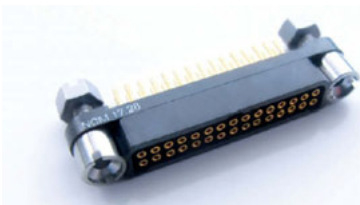


For more information, please visit:

www.latticesemi.com/en/Products/DesignSoftwareAndIP/FPGAandLDS/LatticeDiamond

Nicomatic and Amphenol Socapex conclude an agreement on the rectangular 1.27 mm pitch connector developed by Nicomatic

Nicomatic, the French company recognized for the design and manufacture of miniature, rugged connector systems, and Amphenol Socapex, the world-renowned manufacturer of rugged interconnection solutions have signed a dual-sourcing agreement, whereby Amphenol Socapex will sell Nicomatic's modular, 1.27mm pitch rectangular EMM connector family under the brand MICRO HDAS. This will benefit customers in hi-rel industries who require a dual source for this innovative connector.



Under the global agreement, a selection of Nicomatic's EMM series connectors will be integrated into the Amphenol Socapex portfolio. Both companies will use their respective channels and customers to address new markets with the high performance connector, and each company will deploy its own strategy and use its own networks to respond to satisfy the demands of its customers, regardless of the geographic area targeted.

Comments Olivier Nicollin, CEO of Nicomatic: "We approached this partnership in the spirit of co-operation. We are looking to accelerate the adoption of a connector that we are proud of, but above all, we are convinced that this agreement offers added value to our customers. Our partners have trusted us for a long time because our connectivity meets their requirements."

We are committed on a daily basis to developing an ecosystem in which our customers are central, thanks to the strong links we create and develop with our employees and also with our suppliers, or in this case, even with our 'competitors'. This philosophy guides the commitments we make, and this initiative with Amphenol Socapex is a perfect example of where we choose to work together to better serve our customers."

www.nicomatic.com

OMC's new hermetically-sealed FDE851HLBF infra-red fibre optic emitter optimises long-term reliability in challenging environments

Specialist 850nm device delivers signal integrity with high intensity beam

OMC, the pioneer in optoelectronics design and manufacture, has released a hermetically-sealed 850nm fibre optic transmitter diode which delivers a high intensity output for coupling into multimode fibres even in challenging environments. Designed for applications where long term reliability is paramount, this device is highly specialised with very few similar products available on the market globally. It suits a wide range of fibre optic applications including datacomms, sensing, encoding, instrumentation and signalling, ensuring speed and integrity of signal over a long operating life.



The FDE851HLBF 850nm emitter features a hermetically-sealed TO-can body with glass optical window that helps protect the device internals from atmospheric conditions. The device features fast rise/fall times allowing high speed operation in the tens of MHz, and contains integral micro-optics which focus the beam to a very narrow point which delivers efficient coupling into multimode glass optical fibres as small as 50µm, achieving a typical launch power of 30µW at 100mA into 50/125 fibre.

Many fibre-optic emitters make use of a clear plastic cap which is pressed on to the device header. While this provides a degree of physical protection to the LED chip, wire-bond and internal optics, it is unusual for such a cap to provide a hermetic seal, meaning that the potential long-term effects of environmental characteristics such as humidity on the device internals must be carefully considered in applications where long service-life is important. By contrast, the hermetically sealed housing of the FDE851HLBF eliminates this variable, as air from the operational environment cannot reach the internal components.

omc-uk.com

Pickering Electronics announces miniature, cost-effective relays used extensively in PXI switching matrixes

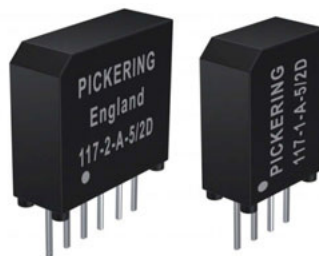
Series 117 reed relays offer high performance and reliability at a competitive price point

Pickering Electronics, the reed relay company which has pioneered miniaturisation and high performance for over 50 years, has announced that its two-pole single-in-line (SIL) 117 series reed relay is being extensively used in large switching matrixes due to a combination of small size, performance and cost.

All models in the 117 series are rated at 100V and can carry up to 0.5A signal current and switch 5W of signal power. Versions are available that support 3V coil drives for systems working at low supply voltages. The two pole version has a footprint of just 10.16mm x 3.81mm, while the single pole device occupies just 6.86mm x 3.81mm - just 38% and 26% respectively of the board area required for industry-standard SIL relays.

The 117 series reed relays are constructed using Pickering Electronics SoftCenter technology with an integral magnetic screen, ensuring that the relays exhibit excellent reliability and avoid magnetic interaction issues when closely packed together. Devices are also priced very competitively, and it is this combination of attributes - size, performance and price - that suit them so well for use in high volumes in PXI and other switching matrix solutions.

www.pickeringrelay.com



Power Integrations' highly robust SCALE-iDriver gate drivers achieve AEC-Q100 automotive qualification

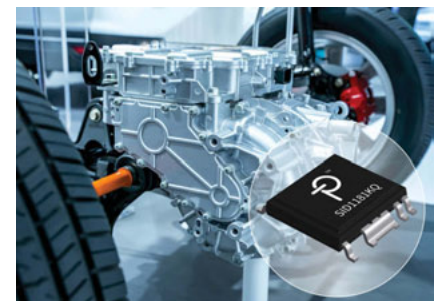
Compact, efficient SID1181KQ gate drivers ensure system safety

Power Integrations (Nasdaq: POWI), the leader in gate-driver technology for medium- and high-voltage inverter applications, today announced the launch of its automotive-qualified SID1181KQ SCALE-iDriver™ gate driver for 750 V-rated IGBTs. The new part expands the company's range of auto-qualified driver ICs, following the introduction of the 1200 V SID1182KQ driver IC.

Compact, efficient and highly robust, the new driver IC uses Power Integrations' high-speed FluxLink™ communications technology to ensure system safety even during fault conditions. FluxLink technology dramatically improves the reliability and isolation capability of the new AEC-Q100-qualified gate drivers, replacing optocouplers and capacitive or silicon-based inductively coupled solutions. SCALE-iDriver devices also include critical protection features such as desaturation monitoring, primary and secondary Undervoltage Lock-out (UVLO) and Advanced Soft Shut Down (ASSD) that protect the switch during short-circuit turn-off.

Technical information is available from the Power Integrations website at:

www.power.com/products/scale-idriver-ic-family/sid1181kq/



New 70mm Ø x 20mm centrifugal fan delivers up to 39.9CFM airflow and 560Pa static pressure

EAO Ltd has introduced the new Sanyo Denki 9TD12P6G001 70mm Ø x 20mm centrifugal fan with for use in electronic equipment and ventilation systems.

Developed by Sanyo Denki, the San Ace 9TD compact centrifugal fan measures just 70mm Ø by 20 mm but delivers the high static pressure and the airflow demanded by thin high-density equipment with restricted space such as graphics cards, digital signage and for ventilation systems. With its extremely compact size and centrifugal airflow direction it can provide high static pressure and airflow in a smaller depth than an axial fan or typical 76mm blower fan.

When compared to the existing 76 x 20mm Sanyo Denki blowers the new fan provides 1.9 times higher static pressure and 3.9 times higher airflow.

The new San Ace 9TD12P6G001 centrifugal fan is available in 12VDC with a matching inlet nozzle type 109-1106 and features PWM control, which facilitates external control of fan speed for lower noise and high efficiency. Engineered with dual ball bearings the new fan provides reliability figures of 70,000 hours MTBF at 40°C (40,000 hour at 60°C), ensuring trouble-free long-term operation.

The 9TD blower fan is part of range of Sanyo Denki, San Ace brand centrifugal fans that also includes 100, 133, 150, 175, 221, 225 and 270mm diameter fans.

<https://eao.com/uk/en/countries/sales-companies/united-kingdom/sanyo-denki/news/details/article/new-70mm-oe-x-20mm-centrifugal-fan-delivers-up-to-399cfm-airflow-and-560pa-static-pressure/>



Problem solved: Discontinued passives and long lead times with current components

To help engineers and buyers in the Electronic Components Industry with End-of-Life (EoL) issues and today's long lead times for current products, BEC Distribution has announced the availability of direct alternatives to TOKO/Murata, Coilcraft, Vishay and Sumida lines, with short lead times of 6-8 weeks, where most manufacturers are currently working on 16-30 weeks.

BEC's range of EoL replacements and pin-for-pin replacements for current passives includes: shielded power inductors, multi-layer ceramic chip inductors, radial peaking coils, open wire-wound chip inductors and thin-film chip inductors.

Typically, large component manufacturers discontinue product lines after 5-10 years. This can have a potentially disastrous impact on customers whose products have longer expected lifetime eg Aerospace, Medical, Surveillance or Defence industry equipment. The availability of BEC's component replacements will far exceed 10 years.

BEC Distribution's EoL component supplies will be a lifeline to R&D engineers and buyers, where components have been designed into their product lines. With a stock of 15m passive components and franchised distribution agreements with quality alternative component manufacturers, BEC can provide high quality, pin-for-pin direct replacement or alternatives. If the required components are not in stock, then BEC will track down and source matching alternatives, ensuring that EoL issues will not hinder customers' projects.

With support from BEC, engineers and buyers alike can plan ahead right from the beginning when components are first used or when they are designed-in, ensuring that EoL does not necessarily mean end of supply or support.

BEC Distribution offers drop-in alternates for most manufacturers including Toko, Sumida, Murata, TDK, Coilcraft, Cooper, Bourns, Vishay, Wurth... etc.

**For stock availability, pricing or free samples please contact BEC's sales office:
Tel: 0845 4900 405 or email sales@bec.co.uk**



New Micro Series waterproof connectors

Selwyn Electronics, the interconnection specialists, have added another series to their extensive range of Waterproof Connectors. These connectors offer an easy push together mate and un-mate friction lock, with up to 6 contacts. With body diameters of less than 10mm, they offer a low cost, robust and reliable connection for a wide variety of applications where small size and water sealing (IP66) is required.



The Micro A series is a 2 way panel mount male with a moulded female plug and is rated at 2A.

The Micro B series is available with a panel mount receptacle, cable mount plug, and cable mount in-line receptacle for cable to cable connection. The mixed 2+2 arrangement has 2 contacts rated at 10A and 2 at 2A. The B series also has 2 through to 6 way versions all with 2A contacts.

Take a look at their website for more details.

Tel: 01732 765100

**Email: interconnect@selwyn.co.uk
www.selwyn.co.uk**

Smiths Interconnect opens a new qualification and test laboratory in Dundee

The Centre of Excellence will offer a one-stop-shop to the global customer base for the certification of products used in space applications

Smiths Interconnect proudly celebrated the Grand Opening of its new Qualification and Test laboratory in its site in Dundee, Scotland.

The new laboratory offers a one-stop shop for critical qualification and testing of Smiths Interconnect's products in Europe. The structure is equipped with in-house multipaction testing and SRS mechanical shock testing system, both in dedicated and environmentally controlled areas.

The Dundee facility can now replicate deep space in terms of vacuum and heat with high power amplifiers and vacuum systems. It can therefore analyse high power devices that are used in space with regards to their breakdown voltage behaviour in a vacuum or near-vacuum environment. This effect, called multipaction, can render a device useless and, thus degrades the reliability of the satellite.

www.smithsinterconnect.com



Ribbon cutting by President Karen Bomba



Extension of miniature cooling aggregates

The so-called miniature cooling aggregates are very efficient and reasonable to use for dissipating heat in larger amounts in smallest space. The combination of a fin structure, optimized in terms of flow technology, in connection with powerful fans leads to a significantly greater heat dissipation per volume unit than natural convection. To this end, Fischer Elektronik is expanding its existing product range of miniature cooling aggregates with the LAM 6 and LAM 6 K design. The new versions have the dimensions 60x60mm and are available for transistor screw mounting or special clip mounting. The basic profile of the miniature cooling aggregates consists of one piece and is manufactured using the aluminum extrusion process. The basic structure of the individual cross sections consists of a circumferential rectangular base frame with a material thickness of 5.5 mm, which also serves as a component mounting surface.

For better heat dissipation of the power loss arising on the device, the semiconductor mounting surfaces on the back, which means inside the closed channel structure, have an additional cooling fin geometry. This absorbs the heat given off by the device and dissipates it to the inner air of the chamber structure. The axial fans, which are adapted to the channel structure of the aluminum profile, are of very high quality and can be installed in mounting holes which are already integrated in the profile. The new miniature cooling aggregates LAM 6 and LAM 6 K are optionally available with the fan voltages 12V, 24V and 48V, depending on the customer's requirements. On the LAM 6, device assembly is made by using the classic screw mounting using additional threads, or on the LAM 6 K using so-called snap-in transistor retaining springs.

Designs of the LAM K series contain a special groove geometry in the lateral semiconductor mounting surfaces, which means that the device can be securely and quickly attached to the semiconductor mounting surface using snap-in transistor retaining springs that are also adapted to the geometry. The respective contact pressure achieved by the springs provides an optimal heat transfer between the device and the unit. The universal snap-in transistor retaining springs THFU 1-7 have been developed for the transistor designs TO 218, TO 220, TO 247, TO 264 and various SIP Multiwatt as well as hole-free power transistors. After installing the snap-in transistor retaining spring, regardless of the type of mounting, the spring stays in place and fixes the transistor on the mounting surface with high contact pressure. Falling out in the transverse direction is not possible due to the overall construction. Additional mechanical CNC processing, modifications or special designs and surfaces are realized according to customer-specific specifications.

Please contact us, for further information and inquiries the product experts of Fischer Elektronik are pleased to be at your disposal, also at:

www.fischerelektronik.de

The first of its kind, non-flammable displays, the new BLO Series meets DIN EN I3501-I standards

Unique to the display market, Display Technology Ltd are pleased to announce their sister company Distec GmbH have launched their new range of monitors the BLO series, the new range are certified to DIN EN I3501-I safety standards and come in sizes 24" to 65" with a touchscreen option.

The monitors are fitted with sturdy sheet steel housing and fire protection glass.

To meet the DIN EN I3501-I safety standard the product was tested through a European fire testing service 'Euroclass' – Euroclass is a reaction to fire testing and classification systems for linings and materials in Europe. The monitor was exposed to open fire for 30 minutes and the flue gas emission was measured.

- The classes are divided into 7 main levels A1, A2, B, C, D, E and F, A1 is the best
- The classes for smoke are divided into s1, s2 and s3, s1 is the best
- The classes for flaming droplets and particle are divided into: d0, d1 and d2, d0 is the best

The BLO monitors reached A2-s1, d0 when tested, receiving certification for DIN EN I3501-I

The new BLO monitors can be fitted with an optional fire extinguisher. This is a small capsule built within the monitors chassis.

Once the exterior of the capsule reaches a certain temperature, the capsule releases the specially designed fluid within to extinguish any fire that has reached the interior of the monitor.

In addition there is an option to have higher IP protection classes if required

This makes Distec the first supplier on the market to offer an independent fire load and flue gas optimised monitor according to the highest fire protection class DIN EN I3501-I (A1-s1 d0).

www.displaytechnology.co.uk

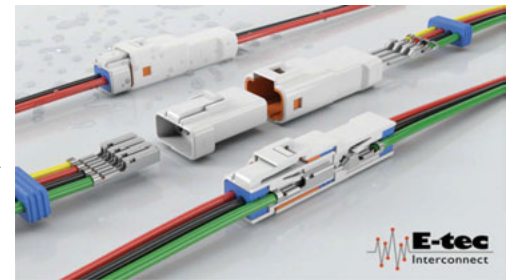


Secure and safe waterproof connections from E-tec Interconnect

When waterproofing is a consideration for reliably connecting wires, the IPX7 rating afforded by the use of solid rubber seal rings is a proven method. The 2mm pitch E-tec range allows 2, 3 or 4 wires to be plugged and unplugged. These are held securely in place with an inner housing lock. The sprung construction of the phosphor bronze contact receptacle and mating plug deliver a reliable 3A rating for wires AWG #22 to #26.

This connector system can be supplied incorporated in a complete cable assembly terminated to customer requirements. For more information, technical details and pricing, please use the contact details below or email info@e-tec.co.uk.

E-tec Interconnect (UK) Ltd
Tel: 01892 530 260
www.e-tec.co.uk



Optical rotary torque sensors suitable for low torque and high band width measurements

Sensor Technology has set new benchmark performance standards for optical rotary torque transducers, with the launch of the digital ORT 230/240 series. These new optical rotary torque sensors are ideal for applications when the demand is for low torque and/or high bandwidth, providing precise, dynamic measurement of rotary and static torque from 10mNm up to 100Nm and for bandwidths of up to 50kHz.

The new ORT 230/240 devices replace Sensor Technology's E200 ORT series, benefiting from all-new electronics that deliver significant gains in resolution, frequency response, reduced sensor current consumption and faster digital data throughput.

The high speed capability comes from an inherently low inertia, since the electronics are not fixed to the shaft, while non-contact operation ensures a long and reliable life (backed up by Sensor Technology's lifetime warranty) with high accuracy. The optical operating principle also ensures excellent noise immunity.

TorqSense ORT 230 series sensors provide fixed voltage or current analogue outputs – one for torque and one for either speed or power. The TorqSense ORT 240 provides two user selectable voltage or current analogue outputs – one for torque and the other for either speed, power or peak torque – plus digital outputs including RS232, CANbus and USB for interfacing with modern instrumentation and laptops. The ORT 240 enables users to connect up to 10 transducers via USB, and transducer configuration software for making changes to transducer variables.

Features of both devices include self-diagnostics to report if the transducer's torque, speed ratings or calibration date have been exceeded, while inbuilt sensors monitor shaft temperature for better compensation and accuracy. The device also offers a simple 'sensor status' output.

Complementing these products is Sensor Technology's TorqView software, providing an easy-to-use advanced torque monitoring package for Windows PCs to assist with data display and recording. It offers real time chart plotting, and is compatible with both Matlab and Excel. Further, LabVIEW VIs are available for users to design their own process control applications, and DLLs are available for users who wish to write their own custom software.

These latest optical rotary torque sensors are an important extension to the Sensor Technology torque monitoring range, and offer an alternative solution when low torque or bandwidth requirements preclude the use of the more cost-efficient SAW-based TorqSense products.

Optical rotary torque sensors use a pair of gratings attached a short distance apart on a strain-sensitive shaft to modulate a light source. As torque is applied to the shaft, a slight twist results which changes the alignment of the gratings and thus varies the light transmitted through to a detector. The use of this technique results in a transducer which is able to detect torque bi-directionally, and which has a fast mechanical and electrical response, low inertia and complete freedom from brushes or complex electronics.

The absence of brush gear allows high-speed operation with a continuous rating up to 30,000rpm standard. Further increases in rpm are available depending upon shaft size. The torque shaft is of low compliance 1/2° maximum torsion deflection on the smaller transducers and 1/4° maximum on the larger transducers at full-scale deflection. Any full scale torque can be specified within the range 10mNm to 100Nm.

Sensor Technology Ltd.
Tel: 01869 238400
Email: info@sensors.co.uk
www.sensors.co.uk



0.96" IPS TFT LCD

The latest addition to Craft Data's range of TFT LCD is probably the smallest module readily available today. The 0.96", 80 x 160 resolution display is an IPS panel offering ultra-wide viewing angles of 80°/80°/80°/80°. It has a "Free View" viewing direction meaning it can be mounted in both portrait (default) and landscape orientations without the loss of image quality or colour. A contrast ratio of 800:1 and a 262K colour palette plus a single LED backlight producing a brightness of 400cd/m² further enhances the displays optical performance. The compact module measures just 13.5 x 29.95 x 1.5mm with an active area of 10.8 x 21.7mm, it incorporates the ST7735S driver IC which includes a versatile 4-line SPI interface. The module's low current consumption for both the VDD at just 2mA and the LED backlight at between 15~20mA makes it highly suited to battery powered applications.

Craft Data Limited
Tel: 01296 332000
www.craftdata.co.uk



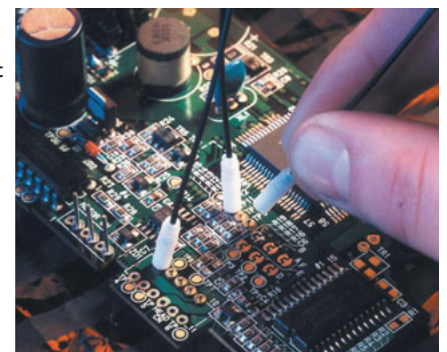
Oxley Developments surface mount applications

Surface Mount Oxley (SMOX) available for hand or automatic assembly with a compatible mating socket for quick test set up can be used for a range of applications; the ability to quickly and individually identify faulty components, cracked solder joints or short circuits.

SMOX have a minimum contact resistance (less than 2mΩ) through 8 points of contact. On thick multi-layered boards, where complex track designs can lead to very expensive PCBs, the benefits of quickly and effectively identifying and repairing any faulty populated PCB can be easily recognised.

In order to guarantee excellent solder fillets to be formed we use a chamfer design on our low profile SMOX, ensuring a stronger connection to the board.

Why not contact Oxley today on 01229 483270 or sales@oxleygroup.com for more information?



Components Bureau welcomes the latest digital configurable power supplies from Artesyn Embedded Power

The latest MP series GEN II that complements the existing 750 Watt to 50000 Watt (microMP) series can offer the lower power range offering 400 Watt to 1,800 Watts and comes in 4 models. The MP series is certified and meets safety approvals for Industrial EN 60950, Medical EN 60601 and rugged use for Military MIL-STD-810E.

The robust power supply comes with the option of conformal coating, offers a wide temperature range of -40°C ~ 70°C, low noise intelligent fan (speed control/fault status) and comes in 4 sizes μ MP04: 10.8 W/cu-in, μ MP09: 18.5 W/cu-in, μ MP10: 15.1 W/cu-in and the μ MP16: 22.9 W/cu-in.y (13.9 W/cu-in). Features 12 outputs, an input voltage of 85 – 264 Vac and MTBF demonstrated at 350,000 hours at full load.

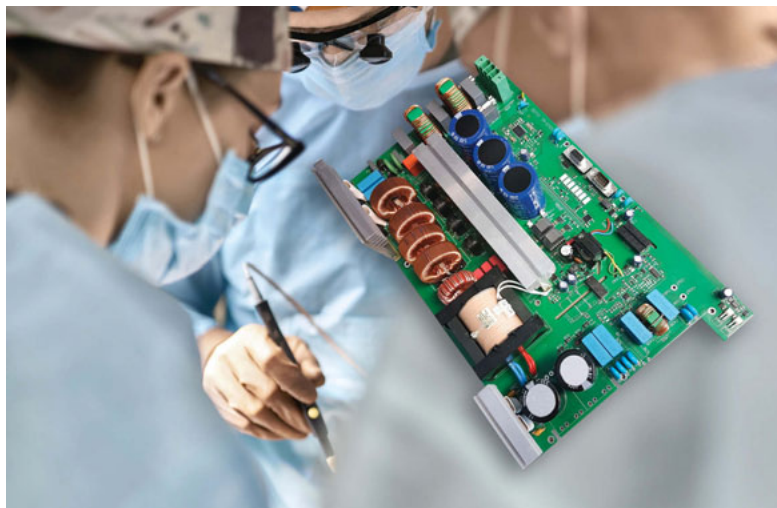
The μ MP meets industrial shock and vibration (> 50G) making it ideal for heavy industrial use.

The μ MP series is PMBus® compliant and controllable by a free GUI download available through Artesyn's website.

Other features the μ MP series offer are I2C interface and monitor of PFC, individual module inhibit and EMI Level B.

The MP series offers so much in a maximum of 256.9 mm x 127 mm x 40.0 mm dimensions

For more information about the full range of the μ MP please contact Components Bureau at: www.componentsbureau.com



Powerbox announces high peak load power supply for medical laser applications

Powerbox, one of Europe's largest power supply companies, and for more than four decades a leading force in optimizing power solutions for demanding applications, has announced the release of its new power supply solution for high peak load applications in the medical sector. Based on digital control and high energy storage management techniques, the SMM3000A80024C series delivers 2.25kW repetitive peak power to medical lasers with high efficiency. The SMM3000A80024C complies with medical safety standards and for silent operation it includes a thermo-controlled cooling system.

The power supply provides a level of protection, primary to secondary main output of 2xMOOP, and 2xMOPP to auxiliary output. To accommodate different capacitor banks and applications, the output voltage can be adjusted from zero to 800VDC (600VDC nominal) with an output current of 5.5A at nominal. An automatic current controller guarantees that the power envelope is always within safe limits, reducing capacitor aging and overstressing of components, thus contributing to a longer lifetime. The SMM3000A80024C has a built-in microprocessor constantly monitoring the charging status, reporting end of charge and discharge level, as well as all protection warnings due to abnormal operation such as over-temperature, over-voltage and current.

To reduce line disturbances the SMM3000A80024C includes a very high efficiency power factor corrector (PFC), soft-start circuitry, filtering and is housed in a six-sided shielded case. To limit audible noise to a minimum, the SMM3000A80024C's fans are thermo-controlled, regulating their speed to the minimum required for normal, safe operation.

The SMM3000A80024C also delivers an auxiliary output voltage of 24VDC, reducing the need for an additional power supply to power laser controller and interfaces. For additional power, the SMM3000A80024C can be connected in parallel.

PRBX (POWERBOX) LIMITED
info.uk@prbx.com
www.prbx.com/



Telonic Instruments presents SIGLENT Technologies new Flagship 1 GHz Oscilloscope

The new SDS5000X Oscilloscope series is available with a bandwidth up-to 1 GHz, a maximum sample rate of 5 GS/s, and a maximum acquisition memory of 250 Mpts. It features powerful data analysis and measurement features and is well equipped to solve the complex challenges of embedded circuit design.

SDS5000X-series is available with bandwidths of 350, 500, and 1 GHz, features a maximum sample rate of 5 GS/s, 250 Mpts of acquisition memory and a waveform-update rate of up-to 110,000 wfms/s. To help maintain high test speeds, many of its waveform analysis features are implemented in hardware.

The SDS5X includes a full digital trigger with qualified and zone triggering to help isolate faults more quickly. This technique enables a highly sensitive and accurate trigger control. It also includes a new low noise front end that delivers an industry leading vertical sensitivity of 500 μ V/div, making the SDS5X a perfect tool for debugging small signals.

One of the best features of this new platform is the usability. The scope includes a large 10.1" touch screen that includes gesture operation and a clear layout that makes the scope extremely easy-to-use. For example, setting up the zone trigger is as simple as drawing a square with your finger.

For multi-domain analysis, the oscilloscope has hardware-based frequency analysis utilising up-to 2 Mpts for the FFT-calculation. This deep memory FFT provides higher frequency resolution than many other FFT based systems. Furthermore, the SDS5X can be upgraded to include MSO/16 digital channels and an external 25 MHz arbitrary waveform generator at any time.

For serial bus troubleshooting, the SDS5X includes free decoding on all low speed serial buses (RS232, CAN, LIN, and I2C) and can be upgraded with decoding kits for more specialised buses (CAN-FD, I2S, FlexRay and MIL1553B) at any time. The scope also features bandwidth upgrade options that give you the flexibility to get the performance you need at a price you can afford.

Please contact Telonic Instruments for further details.

Tel: 0118 9786911
www.telonic.co.uk
www.siglent.co.uk

New, HBB high power circular connectors from Smiths Interconnect – now assembled by Aerco Ltd

Ruggedized High Performance Circular Power Connectors for Harsh Environments.

The newly re-launched HBB series of single pole high power 300A and 500A circular connectors from Smiths Interconnect offer a compact, lightweight and ruggedized heavy duty connector designed for use in all types of harsh environment applications, including electric vehicle drive systems, rail transport and industrial applications. Now assembled by Aerco, they are available with no MOQ and two week lead-times.

Available in a RoHS compliant Black Zinc Nickel finish, the durable HBB delivers a more efficient, higher current transmission in a more compact and lighter connector compared to similar sized 38999 style products and has a superior endurance of 5000 mating cycles. Meeting design SWaP goals of high power within a small size and minimal weight interconnect solution, the 300A connector is achieved in a size 17 shell and the 500A connector in a size 21 shell, with current specified at 100°C. The robust aluminium shell is available in three different shell polarizations, fully sealed to IP67 ingress protection and featuring 360° EMI/RFI shielding via a customer serviceable conductive 'O' ring, which is fitted as standard to receptacles.

The HBB series is rated for surge/inrush currents of 6 kA for the 300A and 10kA for the 500A for 1 sec, making it suitable for deployment in applications like induction motors and power converters.

The connectors assemble using a straight push on procedure to fully mate with a traditional quick release bayonet un-mating mechanism, resulting in a minimal axial force required to assemble and separate with zero applied mating torque. The tactile 'push mate' mating provides confirmation of a full mate preventing "attached not locked" condition. The design facilitates easy mating and un-mating while near to neighbouring devices, supporting applications where higher density packing is required in space constrained environments. Safety protection includes a safety interlock last make, first break with full IP2X finger protection on pin and socket contacts.

www.aerco.co.uk



Peel-A-Way® Removable Terminal Carriers

Peel-A-Way® Removable Terminal Carriers from Advanced Interconnections Corp. reduce PC board assembly time by eliminating hand-loading of socket terminals and pins. Available in virtually any pattern to match your existing board layout – simply solder to the PC board and peel away the polyimide film carrier. Ideal for socketing heat sensitive devices and board-to-board mating. Configurations are available for a variety of board stack heights, and unique options include staggered patterns and solder preform terminals.



- Ultra-thin 0.13mm polyimide film carrier
- High reliability screw-machined terminals with multi-finger contacts
- RoHS Compliant with Matte Tin or Gold plating options
- Request a sample, watch a video, or build a part number online at www.advanced.com

Advanced Interconnections Corp.
USA Tel: 1 (401) 823-5200
Email: info@advanced.com
www.advanced.com

Rochester Electronics supports your PROFET® smart highside power switch needs

Rochester has secured significant inventory to support ongoing demand of these obsolete Infineon devices. This will be the last authorized stock available in the marketplace.

The highly integrated PROFET® family (PROtected FET) incorporates a broad range of smart features. PROFET intelligent power highside switches consist of a DMOS power transistor and CMOS logic circuitry for complete built-in protection.

The Infineon BTS550P and BTS555, Smart Highside High Current Power Switch devices, are part of the PROFET family. These devices provide embedded functions such as; overload, over-temperature, over-voltage and short circuit protection for automotive and industrial applications.

Rochester Electronics has been a proud partner of Infineon Technologies for over 15 years providing customers with 100% Authorized, traceable, certified, and guaranteed solutions.

Rochester Electronics Ltd.
Tel: 01 480 408400
Email: emeasales@rocelec.com
www.rocelec.com



Encapsulated AC-DC converters provide up to 36W and protect to IP67

Powersolve Electronics Ltd, specialists in power supplies for the widest range of applications for over 30 years, announces three new series of plastic encapsulated AC-DC converters that offer protection to IP67. These are therefore suitable for use where the ingress of moisture, oil and dust need to be avoided.

The PS12MK (10-12 Watts), PS20MK (15-20 Watts) and PS36MK (25-36 Watts) are AC-DC switch mode power supplies that operate from a wide universal input range of 90 to 264VAC, 50/60Hz. Output voltages of 5V, 9V, 12V, 15V and 24V DC are available for each model range or in fact any voltage between 5V and 24V could be supplied if quantities make it viable.

The power supplies are housed in robust plastic encapsulated enclosures rated to IP67 and they can be either chassis or wall mounted. Input and outputs are via 500mm flying leads as standard. However these can be other lengths and terminated with any connector required to suit the customers' specific application if required.

All models feature over voltage, over current and short circuit protection. Operating temperature range is -10 to +40 degrees C and humidity 10 to 90% RH non-condensing. Standby power consumption is ≤ 0.3 Watts max with no output load connected.

Input is Class II safety with 3000VAC input to output isolation. All models meet all relevant EMC requirements and TUV safety approvals.

These products are very compact with the PS12MK unit measuring only 56 x 39 x 26mm, the PS20MK 64 x 47 x 28mm and the PS36MK unit 133 x 50 x 34mm.

The PS MK Series are ideal for a variety of applications such as LED lighting, CCTV cameras or any other low power electronic equipment requiring a power supply for harsh environments. Pricing is very competitive and full details of these and similar products can be found on our website:

www.powersolve.co.uk

Yokogawa introduces wide band Optical Spectrum Analyzer unlocking new possibilities for environmental sensing and medical applications

AQ6377 is the world's first OSA that allows side mode analysis of MWIR lasers

For environmental sensing applications, lasers are increasingly being used to detect gases such as CO₂, N₂O and NO. They achieve this by identifying the wavelength absorption lines of the different gases. However, the side modes of the laser, which are normally hard to detect, reduce the laser's capability to distinguish between the various gases.

In the 3.5 to 5µm range (mid infrared) the AQ6377 is the only OSA that is capable of analysing the wavelength spectrum of lasers, including their side modes, with high accuracy.

Gas sensor system manufacturers will now be able to evaluate the purity of the emissions and to characterise the lasers more precisely, thus enabling the selection of the best laser(s) for specific applications.

Quantum Cascade Lasers (QCL), which are increasingly being used for medical spectroscopy diagnostics, operate using a pulsed technique, across a very wide wavelength range. The Yokogawa AQ6377 is now able to offer the capability to perform stable measurements in this wide wavelength range and also to evaluate pulsed QCL signals with low repetition rates, which has hitherto been difficult to achieve. The AQ6377 therefore delivers a true step change, allowing researchers to work with various pulse lengths and repetition rates.

Key features of the AQ6377, which together provide the capability to visualise the side-modes of MWIR lasers, include a wavelength resolution of 0.2 nm, a wavelength accuracy of ± 0.5 nm, a high dynamic range of 50 dB, and a level sensitivity down to -60 dBm. The wide dynamic range and high sensitivity have been achieved by reducing the influence of stray-light in the monochromator. The built-in calibration light source takes advantage of the natural absorption properties of acetylene gas to deliver a wavelength calibration signal which is accurate to 0.6 picometres. This source is also used in conjunction with the automatic optical alignment capability to compensate for any deviation in the optical axis caused by vibrations and shock suffered in transit, and those due to temperature changes. Using those features, the AQ6377 can maintain its high optical performance on site.

For further information about the AQ6377 5 µm Optical Spectrum Analyzer please visit:

<https://tmi.yokogawa.com/eu/solutions/products/optical-measuring-instruments/optical-spectrum-analyzer/aq6377-optical-spectrum-analyzer/>



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High performance RF Signal Generator with built in complex modulation option.

The TGR2051 and TGR2053 are the next generation of RF signal generators from Aim-TTi, offering both exceptional performance and new improved functionality with touch screen operation.

The high-performance RF generators provide high frequency accuracy and stability. High signal purity with excellent Phase noise, Output power levels of -127dBm to +13dBm, and flexible analog and digital modulation capabilities, making it ideal for development, test and service work.

The sweep function enables signals of varying frequency and/or amplitude to test a full range of input conditions, quickly and efficiently. Step sweeps are created according to a formula over a specified number of points, in the range 2 - 1000. Formula specifics include: start and stop values and dwell time following SYNC at each point. Sweeps can be set to run in either direction, with linear or logarithmic spacing. Alternatively, list mode can be used to analyse the response at set frequencies and amplitude - dwelling on set values for specified amounts of time; useful for testing at known problematic frequencies within a setup. The list can be created within the instrument or downloaded via the remote interfaces. The sweep setups can either be run through as a single sweep or in a continuous loop and prompted by an internal, external or manual trigger. Complex sweep triggering is available to control complete sweeps and/or each point within a sweep.

The TGR-U01 option adds an extensive range of digital modulations: FSK, GFSK, MSK, GMSK, HMSK, 3FSK, 4FSK, PSK, ASK and OOK. Built in NRZ patterns include Square wave, 7, 9, 11 & 15-bit PRBS. Digital modulation capabilities also include advanced filtering: Gaussian, Raised Cosine, Root Raised Cosine and Half Sine as well as Grey Code and Binary Encoding. External digital modulation signals can be applied to the carrier waveform via the MOD in/out on the rear panel.

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ElectroTest Expo 2020

ElectroTest Expo 2020 is the 10th anniversary of the unique PCB test and debug event aimed at design and test engineers and hosted by leading T&M equipments suppliers.

This year's expo takes place on 29th April 2019 at Mini Visitor Centre, Cowley near Oxford - close to the centre of the country and accessible via excellent infrastructure links.

On show will be test, measurement and inspection instruments ranging from oscilloscopes, RF generators and other bench tools to integrated production test systems based on technologies including PXI, Flying Probe testers and JTAG/Boundary-scan. The free seminar program will also offer great value to those seeking the latest information in test and inspection. Choose from talks on JTAG/Boundary-scan, ATE Building, signal switching and high-integrity mass interconnection systems.

More details and registration at www.electrotestexpo.co.uk/

Attendees will receive free refreshments and will be entered into a draw for one of 15 places on a fascinating factory tour of the Mini assembly plant.



GTK launches Circular TFTs

GTK announces the recent addition of circular TFTs to their display range. These new displays are 2.1" and 2.5" in diameter and both have an excellent 480 x 480 resolution and 1:1 aspect ratio. They also incorporate IPS (in-plane switching) technology, which results in high contrast ratios and exceptional all-round viewing angles. Both displays use ZIF connectivity, with the 2.1" version having an MCU interface and the 2.5" utilising a MIPI interface.

Clive Dickinson, business manager for Displays at GTK, said, "These circular TFTs open up really creative design opportunities for OEMs. Up until now they have been confined to laying out a design using the available rectangular or, more recently, square footprints. Now they can design the display area to be the most intuitive for the user and end application.

"These displays can be used in a wide range of different applications and are ideal where a dial type view is required. I can see great benefits of using this layout for products required for elderly home care devices. We are already exploring opportunities with OEMs who are working on new product designs."

Customisation options for both displays include custom sensors and cover lenses, and GTK's technical experts can help OEMs with display selection, customisation and the connectivity to provide the required PCB interface.

For more information, get in touch with GTK at displays@gtk.co.uk

www.gtk.co.uk

Mini displays with DOUBLE HEIGHT characters SPI and I²C

MMS Electronics Ltd has available an exceptionally versatile line of DOG (Display-On-Glass) alphanumeric and graphic displays. The DOGS104-A and EA DOGS164-A are small high-contrast easy-to-read STN and FSTN displays. The double height character option transforms the EA DOGS104 4x10 into a 2x10 or 3x10 line x char display and the EA DOGS164 4x16 into 2x16 (6mm height char) display. The integrated SSD 1803A controller has 3/4-wire SPI and 2-wire I²C interface. 3 fonts: Cyrillic, English-Japanese and European. Supply voltage is low power +3.3V. Typical only 440µA (with LED backlight off) makes it ideal for battery powered applications. Display and optional backlights are "mix & match"; there are 3 display variants transmissive, transreflective and reflective with a combination of 3 different LED backlights: Amber, dual Yellow-Green/Red and a trio Green/Red/White. For quick evaluation without the need to write any code demo board EA 9780-4USB is available. MMS Electronics Ltd in Leeds is the authorised UK distributor for Electronic Assembly GmbH / Display Visions.

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New Omron I00A relay runs exceptionally cool

Omron Electronics Components Europe is moving into the high power relay market with the launch of a new I00A device featuring exceptionally low heat generation due to an ultra-low contact resistance. The new Omron G7EB is aimed at distribution power conditioning systems (PCS) as well as test equipment such as semiconductor testers.

According to Andries de Bruin, Senior European Product Marketing Manager, Omron, "The market for the distribution type of PCS is growing rapidly driven by the trend towards micro-generation from renewable sources. The challenge in these high current designs is controlling heat generation - a challenge which Omron directly addresses with this new design suitable for emergency cut off and similar high carry current applications."

Omron G7EB can switch up to 100A at 800Vac. A key feature is the ultra-low 5 milli-ohm contact resistance, an industry leading figure which greatly reduces heat generation within the component. This not only improves reliability by reducing the heat stress on the device and the surrounding circuit, but also minimizes energy wastage. As a result, the G7EB experiences a temperature rise to about +40 deg. C with a 100A carry current, as opposed to +80 deg. C for competing designs.

PCS designs commonly feature three or more of this type of relay, and the Omron device helps reduce system size with its compact dimensions of 40.5 x 50.5 x 37mm. The reduced requirement for heat sinks as a result of its cool operation yields further space savings for the system designer. Omron is offering the G7EB with both industry standard and Omron proprietary pin layouts.

<http://components.omron.eu/Product-details/G7EB>



Omron Electronics Components Europe is moving into the high power relay market with the launch of a new I00A device featuring exceptionally low heat generation

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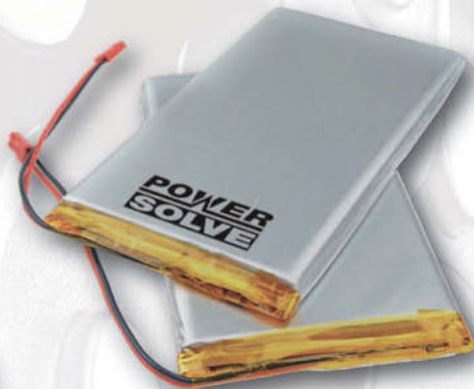
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