

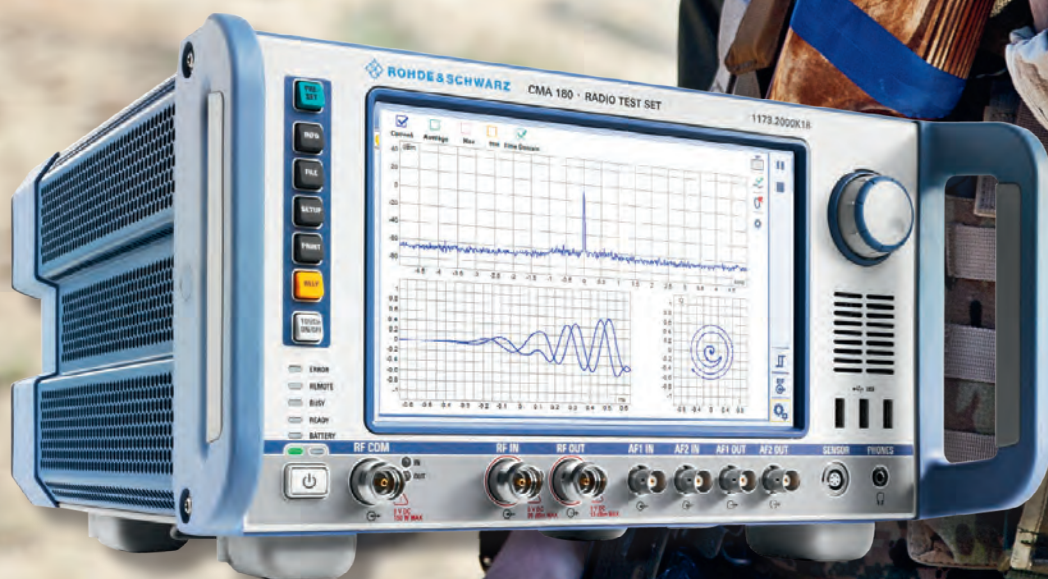
July/August 2014 Vol.34 No.1
PP100007394

AUSTRALIA DIGIKEY.COM.AU
NEW ZEALAND DIGIKEY.CO.NZ

FREE SHIPPING
ON QUALIFIED ORDERS



what's **new** in **e**lectronics



R&S CMA180 Radio test set revolution - analog goes digital.



ROHDE & SCHWARZ

**FREE
SHIPPING**
ON QUALIFIED ORDERS*



HOW MANY SUPPLIERS DOES IT TAKE TO MAKE A MASTERPIECE?

**Authorized distributor
for over 650 of the world's
most trusted manufacturers.**

AUSTRALIA

DIGIKEY.COM.AU

1800 285 719

NEW ZEALAND

DIGIKEY.CO.NZ

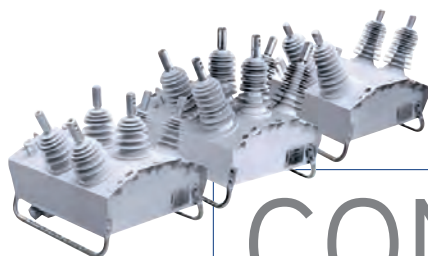
800 449 837

860,000+ PRODUCTS IN STOCK | 3 MILLION PARTS ONLINE | 100% AUTHORIZED DISTRIBUTOR



*All orders are shipped via UPS for delivery within 3-4 days (dependent on final destination). No handling fees. **Australia:** Free shipping on orders over \$200 AUD. All prices are in Australian dollar. **New Zealand:** Free shipping on orders over NZ\$125. All prices are in New Zealand dollar. If excessive weight or unique circumstances require deviation from this charge, customers will be contacted prior to shipping order. Digi-Key is an authorized distributor for all supplier partners. New product added daily. © 2014 Digi-Key Corporation, 701 Brooks Ave. South, Thief River Falls, MN 56701, USA

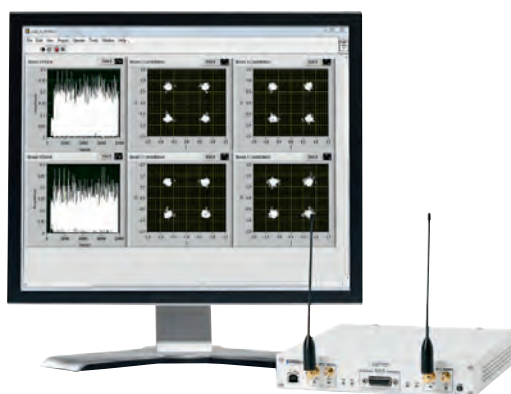
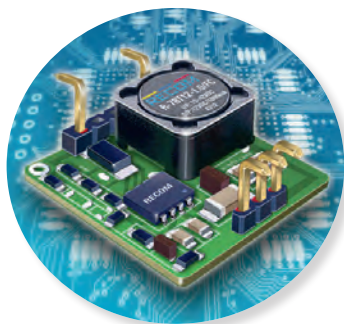




WHAT'S NEW IN ELECTRONICS
JULY/AUGUST 2014

CONTENTS

- 04 Powering up your LEDs with switch mode power supplies
- 10 **Vanishing electronics**
- 12 EMI guidelines for PCB design
- 16 **Liberating devices from power cords**
- 19 RF connectors explained
- 23 **ElectroneX returns to Sydney**
- 25 Ethics of drone warfare
- 29 **Anti-counterfeiting particles**
- 32 LED arrays light the way
- 34 **The Grumpy page**



TESTING APPROVALS
AND CERTIFICATION

Comtest
LABORATORIES

Email: comtest@comtest.com.au

www.comtest.com.au

- Safety - CB Scheme
- Telecommunications
- MEPS for Power Supplies
- Energy Star for Computers
- Standby Power

GREENHOUSE TESTING



COVER STORY



The R&SCMA180 is a radiocommunications tester for radio systems that operate in the 100 kHz to 3 GHz range, making it suitable for testing all common analog radio systems. Its technology is based fully on digital signal processing and advanced computing. Intuitive operation and efficient measurement capabilities make the R&S CMA180 an indispensable tool for performing radio measurements.

The tester can generate any test signal of up to 20 MHz bandwidth and process high input power levels of up to 150 W. The tester demodulates and modulates all common analog RF signals, making it suitable for testing transmitters and receivers. For receiver tests, audio signals from the internal generators or from external sources can be modulated onto the RF carrier. The audio signals demodulated by the device under test (DUT) are fed into the tester via analog or digital inputs and then analysed. For transmitter tests, the R&S CMA180 demodulates the received signal and measures the demodulated audio signal and the RF signal. Using the ARB generator, users can play back nearly any type of signal. These signals can be generated with MATLAB or R&S WinIQSIM, including proprietary waveforms from software defined radios (SDR), and then loaded into the tester and replayed. The advanced and efficient user interface makes it easy to learn to use the tester. Users can quickly reach all settings and easily perform measurements. Measurement results are clearly and conveniently displayed.

The flexible internal switching capabilities for the audio and RF paths make the tester suitable for a wide range of test requirements.

Rohde & Schwarz (Australia) Pty Ltd
www.rohde-schwarz.com



ROHDE & SCHWARZ



POWERING UP YOUR **LEDS**

WITH SWITCH MODE POWER SUPPLIES

*Suresh Chaudhari, technical manager**

Lifetime, form factor, packaging and a range of colours - from the outside, it would appear as though LED lighting has everything going for it. But for design engineers, there's a lot more to the story.

Driving multiple high-power LEDs in switch mode is not a trivial task assuming factors such as uniform brightness, dimming capability and power factor correction play an important role.

To the seasoned power supply designer, these requirements are all in a day's work. But if you're not an experienced power supply engineer, the design proposition can be more than a little intimidating. Don't let that stop you.

Thanks to the increased demand for LED lighting solutions, there are plenty of options to help you get started building your power supply. If your goal is to design the entire luminaire, there will be other design considerations, including thermal management and optics. But for the purpose of this article, we're focusing strictly on electrical power supply.

Before you begin any power supply design, consideration must be given to the load. Here are a few things to consider: **Power requirement:** How many LEDs will you be driving? Are you driving 1, 3 or 5 W LEDs? Is the number of LEDs in each string fixed, or does your supply need to accommodate a range of output voltages? And how bright do you need your source to be?

Connection scheme: Are you driving your LEDs in series, parallel or a combination of both? A series configuration is often recommended when LED brightness must be consistent across the string. If output voltage is a concern, you may want to arrange them in parallel.

Forward voltages: While VF varies from LED to LED, there is also variance in typical forward voltage among different colours or dice technologies. See Table 1 for Avago's data sheet for ASMT-Ax00 1 W devices.

While selecting supply rating, you should cover the maximum forward voltage of selected LED bin.

CV or CC mode: The next step is to choose between a constant voltage output (CV) or a constant current output (CC), depending

on the applications. While for most applications the CC mode is preferred, for applications such as linear strip lighting, the CV mode is more suitable.

Performance ratings: Efficiency, power factor correction (PFC) and total harmonic distortion (THD) are key performance measurements of the power supply. The conversion efficiency is the ratio of output power to input power. Typically, the efficiency lies between 80 and 90% for AC power supplies and between 95 and 98% for DC power supplies. Newer designs are able to support higher efficiency at a higher system cost.

The purpose of the power factor correction circuit is to minimise the input current distortion and make the current in phase with the voltage thus achieving a near ideal PF value of 1. If traditional power factor correction isn't in the cards due to size or budgetary constraints, you have other options.

THD of a signal is a measurement of the harmonic distortion present. It is defined as the ratio of the sum of the powers of all harmonic components to the power of the fundamental frequency. Standard topologies give a THD performance of <20%; however, with much more complex designs we can get a THD performance of <10%.

Features: Additional features will mean higher hardware cost and increased design complexity. Dimming is a common feature that can be achieved by changing the continuous forward current of the LED or through altering the duty cycle of digital signal by pulse width modulation. A low-cost microcontroller with pulse width modulation (PWM) output offers maximum flexibility and control, but it must be integrated carefully with the power circuitry. Traditional dimming is achieved with a Triac control device present in the power supply. Additional safety features such as short circuit/overcurrent/overvoltage/overtemperature, EMI emission should also be considered. In many countries, the power supply may



LED colour	Dice type	$V_{f,min}$	$V_{f,typ}$	$V_{f,max}$	Current
Warm white	InGaN	2.8	3.2	3.5	350 mA
Red	AlInGaP	1.7	2.1	2.3	350 mA
Cyan	InGaN	3.0	3.4	3.8	350 mA

need to have approvals from laboratories like CE and UL. Depending on the environment of operation you may want to choose the correct IP rating for the power supply. The designer could also look at the MTBF (mean time between failures) to determine the reliability of the power supply.

Topology: I don't want to seem biased, but having grown up in a semiconductor house I tend to favour switch mode anything. (Some of my best friends are linear designers.) Efficiency being the major selling point of both LED lighting and switching power supplies, why not design the supply accordingly? Within switch mode there will be multiple topologies such as Flyback, Quasi Resonant and LLC controllers and the like meeting various specification and performance requirements. With that in mind, consider the following: Is your application DC or offline? If it's offline, will you require isolation or universal input? Do you like your bucks/boost synchronous or asynchronous? Each topology has its merits and pitfalls relative to your application requirements.

An important final step in preparing for your design is to decide on your level of engagement. Again, seasoned power supply designers may have an easier time starting from scratch, but few of us can truly call ourselves power supply designers.

Here are three ways to proceed depending on your ambition:

Buy an off-the-shelf power supply: The easiest way to light up your LEDs is to let someone else do it, although for us engineers this is usually the least exciting option. If you decide to go this way, however, you do have a number of choices, for example, Mean Well's offline LED power supply.

Modify a proven reference design: If you're new to power supply design, this may be the best way to go, especially if

you are not confined to a proprietary design. Some semiconductor companies, such as TI and STMicroelectronics, publish complete reference designs on their websites that include original schematics, bills of materials, application notes and, in some cases, even Gerber files. And, please, keep it classy: if you're modifying a supplier's reference design, keep that supplier on your bill of materials (BOM) throughout design, prototype and production.

The same reference design can be modified if the design requirement does not match. In this case, the first thing that needs to be checked is the availability of components in the BOM and the exact equivalent of the components that you'd like to replace. In most cases, the magnetic components like the transformer may have to be custom built as per the design provided. If you are able to source all the components you may fabricate the PCB using the reference Gerber. In case you have to change the footprints of certain components, you may have to redesign the Gerber into the mechanical dimensions you wish to get the final product. You may also procure an evaluation board which could be used as a reference while you test your own board. Three reference designs are provided up to 15 W and are intended to drive from 4-15 LEDs at 350 mA. They can, however, be easily modified to support power levels ranging from 5 to 30 W. **Go all-in:** If you want to design your own supply from scratch, there really is nothing stopping you, except maybe a disinclination for singed fingertips and smoking hair. Importantly, going all-in doesn't mean 'going alone'. Life is too short to design in a vacuum; find a community of peers and experts, such as element14, to ask questions and share ideas. As with reference designs,

when it comes to research your best bet is to start with the suppliers. Cree offers some useful design guidance. TI offers design assistance with block diagrams and their online PowerLab Reference Design Library. Linear Technology offers designers an assortment of application and design notes and reference circuits on their website, and similar resources from STMicroelectronics, NXP and ON Semiconductor help shed light on LED power supply design.

Fortunately, there are good options for economical schematic capture and layout software for the design phase of your project. For professional engineers and makers alike, going all-in is the most fun option - and with access to a global knowledge base, affordable circuit design software and world-class prototyping facilities, there has never been a better time to be your own ODM.

element14
au.element14.com

**Suresh Chaudhari has been associated with element14 for the past five years. He is responsible for developing and managing the technical content for the element14 website and global community. With in-depth expertise in solid-state lighting, Chaudhari has created content for lighting applications and provided technical support for LED lighting in the organisation. Chaudhari previously worked with Future Electronics and was responsible for technical marketing of Philips Lumileds LED products. He has a total of 13+ years of experience in application engineering in the electronic design and component distribution business.*

Maximum speed in production.

That's so WOW!

R&S®SGT100A and R&S®FPS

The true superheroes for production tests of RF products.

Fast, compact, combinable and easy to integrate: ideal properties that make the R&S®SGT100A vector signal generator and the R&S®FPS signal and spectrum analyzer from Rohde & Schwarz the new production test heroes.

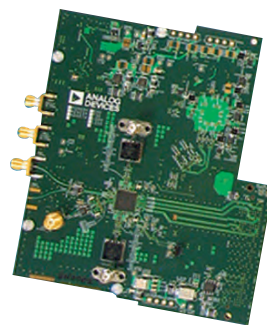
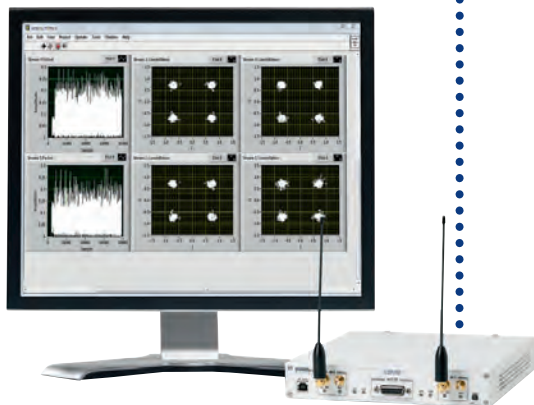
See for yourself:

www.rohde-schwarz.com/ad/production-tests

sales.australia@rohde-schwarz.com



ROHDE & SCHWARZ



SOFTWARE-DEFINED RADIO PLATFORM

National Instruments has announced the NI USRP RIO platform - an integrated software-defined radio solution for rapidly prototyping high-performance, multichannel wireless communication systems.

The product is built on the NI LabVIEW RIO architecture and combines a high-performance 2 x 2 multiple input, multiple output (MIMO) RF transceiver capable of transmitting and receiving signals from 50 MHz to 6 GHz with an open LabVIEW programmable FPGA architecture.

National Instruments Australia

www.electroline.com.au/products/66935

EVALUATION BOARD FOR ADC

Analog Devices has introduced an evaluation board for the AD9680, the AD9680-1000EBZ. The AD9680 is a dual 14-bit analog-to-digital converter (ADC) with good noise and dynamic range performance. The board allows developers to quickly evaluate the features and performance of the ADC.

Mouser Electronics

www.electroline.com.au/products/67576

PCB DESIGN SOFTWARE

Easy-PC from Number One Systems is a professional, low-cost PCB EDA software offering good performance. The product includes schematic capture and PCB layout performance said to be associated with more expensive tools.

The software is simple to learn and understand but not short of powerful features like online design rule checking and technology file support, assuring error-free PCB layout.

Embedded Logic Solutions Pty Ltd

www.electroline.com.au/products/66616



FANLESS EMBEDDED COMPUTER

Axiomtek has announced the eBOX635-881-FL, a fanless embedded box computer using 4th-generation Intel Core i7/i5/i3 and Intel Celeron processor with Intel H81 chipset. The light and compact product comes packaged in an IP40-rated aluminium and cold-rolled steel enclosure and is designed to operate at temperatures ranging from -20 to +50°C.

Braemac Pty Ltd

www.electroline.com.au/products/67725

CSP WHITE LEDS

Small, chip-scale package (CSP) white LEDs from Toshiba Electronics Europe are said to reduce the mounting area by 90% compared to conventional 3 x 1.4 mm package products. TL1WK series LEDs are designed for general lighting, including straight tube lights, light bulbs and ceiling lights. They use gallium nitride-on-silicon (GaN-on-Si) process technology and a process technology that fabricates the elements of a packaged LED on an 8" silicon wafer.

Toshiba (Australia) Pty Ltd

www.electroline.com.au/products/66963

HAMMOND MANUFACTURING
tel: 08 8240 2244

Standard and modified diecast aluminium, metal and plastic enclosures

See us on Booth C6 at Electrex

www.hammondmfg.com

Cable Assembly @ Ampec

Ampec Technologies

specialises in manufacturing of custom design cable assemblies at our local factory in Sydney.

We also have overseas manufacturing partners to cater for high volume production.

Our experienced team is at your service.



Local manufacturing capabilities for cable assembly with a fully equipped factory



Production team trained to IPC/WHMA-A-620A



Fully automatic cut, strip and crimp machines



High mix low volume and quick turnaround



e sales@ampec.com.au
w www.ampec.com.au

+61 2 8741 5000



VANISHING ELECTRONICS

Researchers from University of Illinois at Urbana-Champaign are developing a vast toolbox of materials - from magnesium and silicon to silk and even rice paper - to make biodegradable electronics that can potentially be used in a range of applications.

John Rogers, PhD, University of Illinois, Urbana-Champaign, and his team are developing sensors that can, for example, detect the early onset of swelling and temperature changes in the brain after head injuries and then vanish when they're no longer needed. Today, devices designed for these purposes are wired - they have to be implanted and later completely removed once they're no longer needed. Rogers' sensor could be implanted but work wirelessly and, after use, simply disappear. That eliminates the risk of infection and other complications associated with having to remove devices surgically. Rogers has successfully tested early prototypes of sensors in laboratory animals and envisions that such devices could be used one day in human patients.

His group is also working on biodegradable radiofrequency identification tags, or RFID tags. Currently, RFIDs are produced by the billions and used in everything from jeans for accurately tracking inventory to smart cards, and are injected into pets. They are also found in product packaging that ends up in landfills. Using cellulose, zinc and silicon, Rogers has successfully made dissolvable RFID tags in the lab. The next step would be figuring out how to scale production up and commercialise it.

"We're quite optimistic," Rogers said. "We see the way forward and are about halfway there."

Rogers and Emily Weiss, PhD, Northwestern University, are two scientists whose research was selected at this year's Kavli lectures at the 247th National Meeting & Exposition of the American Chemical Society (ACS), the world's largest scientific society. Rogers delivered 'The Fred Kavli Innovations in Chemistry Lecture', and Weiss delivered the 'The Kavli Foundation Emerging Leader in Chemistry Lecture'.

Weiss's lab is focused on getting the most power possible out of mixed and matched nanomaterials that are being developed to maximise renewable energy sources. Scientists can now engineer these materials with unprecedented precision to capture large amounts of energy - for example, from the sun and heat sources. But getting all that energy from these materials and pushing it out into the world to power up homes and gadgets have been major obstacles.

"Electric current originates from the movement of electrons through a material," Weiss explained.

"But as they move through a material or device, they encounter places where they have to jump from one type of material to another at what's called an interface. By interfaces, I mean places where portions of the material that are not exactly alike meet up. The problem is when an electron has to cross from one material to another, it loses energy."

As structures in materials get smaller, the interface problem becomes amplified because nanomaterials have more surface area compared to their volume. So electrons in these advanced devices have to travel across more and more interfaces, and they lose energy as heat every time.

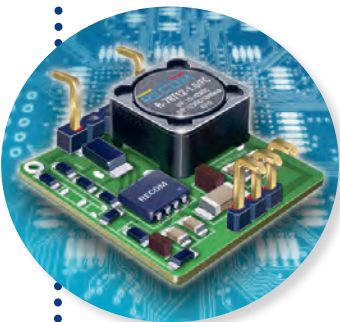
But thanks to the latest advances in analytical instruments and computing power, Weiss's group is poised to turn this disadvantage into a plus. "Rather than seeing all these interfaces as a negative, now we don't need to consider it a drawback," she said. "We can design an interface such that we can get rid of defects and get rid of this slowdown. We can actually use carefully designed interfaces to enhance the properties of your device. That sort of philosophy is starting to take hold."

SMD SWITCHING REGULATOR SERIES

In order to fill the gap created by TI's discontinuation of its Power Trends switching regulators, RECOM is introducing a 1:1 compatible SMD product line, the R-78T series, to help users still using Power Trends switching regulators avoid redesigns.

The compact and low-profile, open-frame modules feature efficiency of up to 95% and a wide input voltage range of 7 to 42 V, making the modules suitable for portable or battery-operated applications requiring a space-saving device.

RECOM Asia Pte Ltd
www.electroline.com.au/products/67105



DATA-LOGGING SOUND LEVEL METER

The Center Technologies Model 390 Data-Logging Sound Level Meter (SLM) features a 100 dB dynamic range covering 30 to 130 dB without the need to change ranges either manually or automatically.

Other SLMs cover this range of sound levels in two, three or even four ranges, requiring each range to be calibrated before use for optimum accuracy and switched when moving between differing level measurements.

TRIO Test & Measurement Pty Ltd
www.safetysolutions.net.au/products/66041

new
PRODUCTS



ETHERNET SWITCHES

Optimised and designed for use in harsh industrial environments, unmanaged Ha-VIS eCon Ethernet switches enable the expansion of existing network infrastructures as well as the development of new industrial networks. The plug-and-play switches can be easily and quickly put into operation. Two different compact, space-saving housing designs enable efficient use of available space in the switch cabinet.

HARTING Pty Ltd
www.processonline.com.au/products/67267

ELECTRONIC ACCESSORIES

- ✓ **USB Plugs**
- ✓ **Jack Screws**
- ✓ **QC Terminals**
- ✓ **Brass Standoffs**

We stock more than 10,000 items, including:

- Nylon PCB Supports
- Test Point Terminals
- Computer Brackets
- LED Lens Cap
- Coin Cell Holders
- Terminal Blocks
- IEC Connectors

**... Biggest Range,
 Best Service,
 Lowest Prices**
**Phone now for
 FREE SAMPLES**

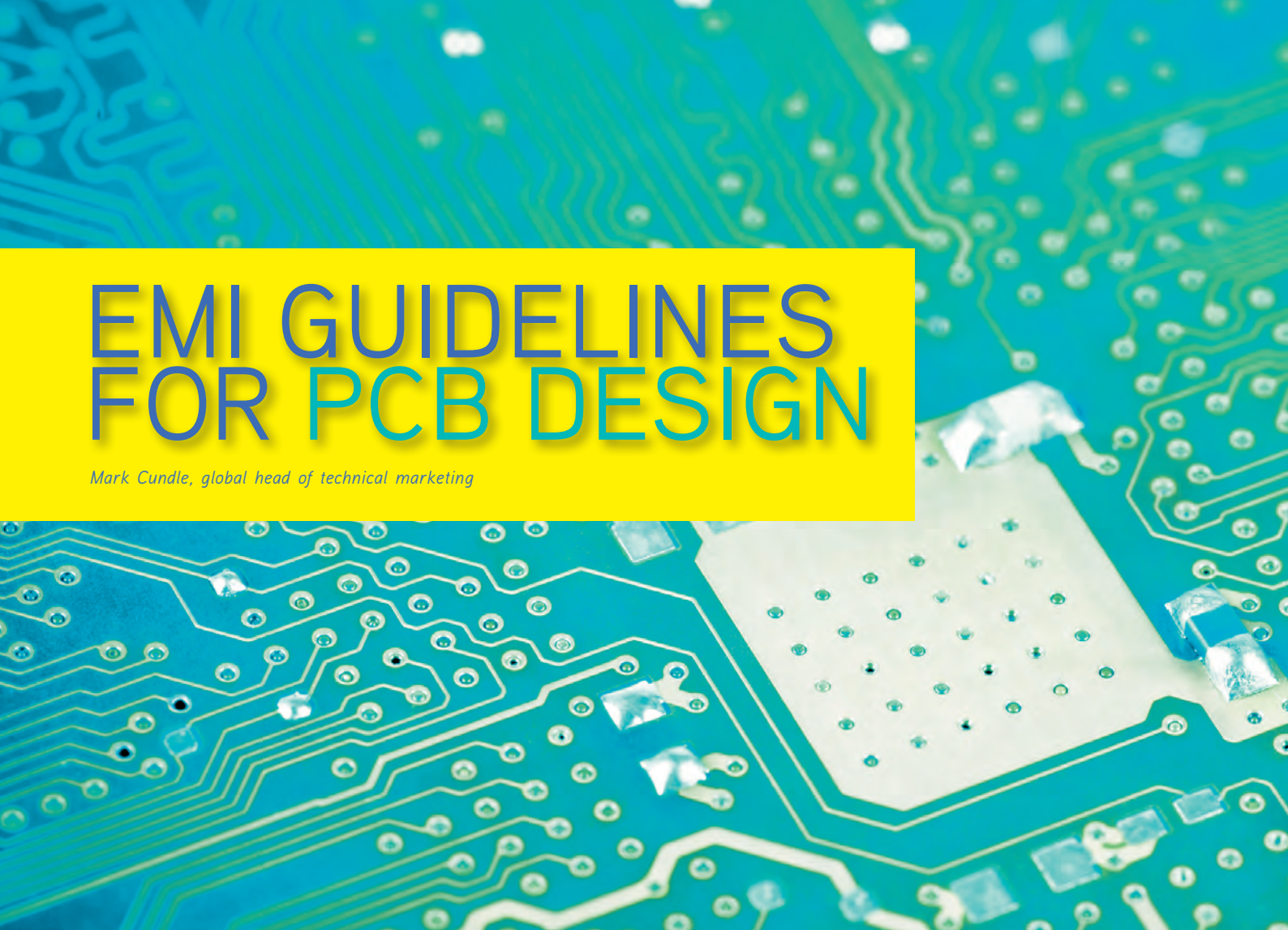


NPA PTY LTD
 10 Gray St, Kilkenny SA 5009
www.npa.com.au

(08) 8268-2733



Quality System
 Quality Endorsed Company



EMI GUIDELINES FOR PCB DESIGN

Mark Cundle, global head of technical marketing

Electromagnetic and interference (EMI) issues are key elements of almost every PCB design, and thinking about these issues in the board layout stage can help reduce many common problems.

Power supplies generate noise that can reduce the performance of a design and interfere with other devices. Signals themselves can interfere with each other and reduce the performance of the system.

Knowing how the system functions, where the noisy lines are and where the sensitive lines with a low signal-to-noise ratio are in relation to each other can help optimise the board layout and avoid more problems later in the design.

EMI can be treated later on by adding filters at noisy points or using metal enclosures that block radiation, but these can be expensive options and add time and cost to the development process through more testing and re-spins of the board. With edge effects and connectors being a key part of the EMI issue, these re-spins can even involve moving key I/O lines. Taking EMI effects into account at the start of the board design can significantly improve the quality of the end product and avoid any nasty surprises.

Power supply

The board layout determines the success or failure of every power supply project, from the function to the EMI and thermal behaviour. The design of a switching power supply layout is not difficult but it is often left until too late in the design process.

A good layout on the first prototype does not add to cost, but actually saves significant resources in EMI filters, mechanical shielding, EMI test time and PCB runs. Switching supplies can radiate at frequencies that are very obvious, affecting nearby radios, but good layout can avoid the need to shield such systems.

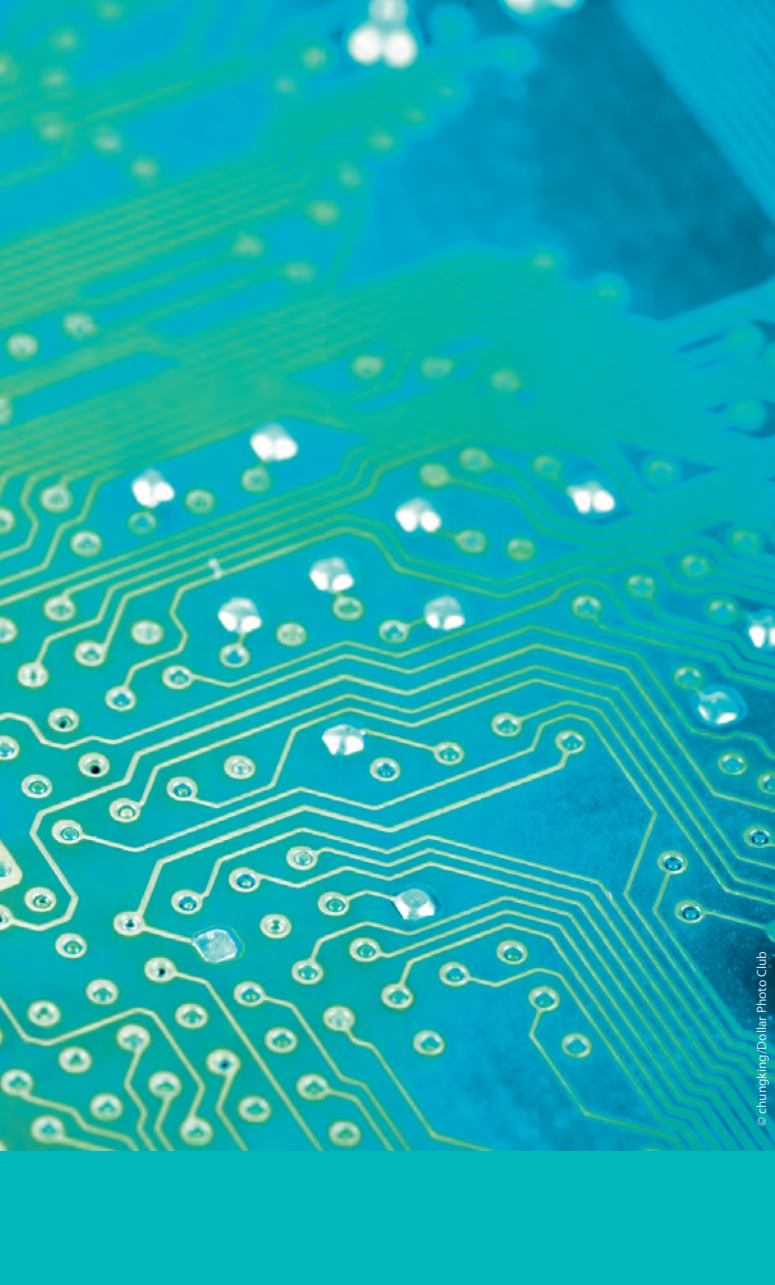
The EMI problems come from fast changing current loops, so avoiding these 'hot loops' or making sure they are not fast changing can make all the difference in the design. Different power supply topologies such as buck or flyback converters create different AC loops, but carefully positioning these, sometimes within the layers of a board, can help significantly. This helps to shield any radiating effects and minimises the need for filtering or expensive metal enclosures. Making sure these loops are away from the vias that connect the different layers and away from sensitive lines with low signal-to-noise ratio also helps reduce the impact the power lines have on the rest of the system.

Signal lines

The biggest problem for the signal lines is the noise from the I/O pins, which often form a large antenna. In a synchronous design, all the signal switching happens on the same edge and this can create a large noise spike at regular intervals. With the clock rates increasing, these signals become more important to address in the board design.

Capacitive and inductive crosstalk happens with traces that run parallel for even a short distance. The noise is proportional to the parallel distance, the frequency, the amplitude of the voltage swing on the source and the impedance of the victim, and inversely proportional to the separation distance.

This can be minimised by keeping noisy lines away from more sensitive traces and by avoiding running noisy traces on the outside edge of the board. Keeping noisy traces grouped together



© Chungking Dollar Photo Club

surrounded by ground lines will also help to reduce noise as any coupling is to ground rather than to other signal lines. This can be particularly important for the I/O lines where switching generates noise and can radiate out of the system.

Signals that may become victims of noise should have the return ground run underneath them. This reduces the impedance, reducing the noise voltage and any radiating area.

Clock tree

A third source of noise is the oscillator circuit, where the oscillator swings rail to rail. In addition to the fundamental frequency, harmonics are introduced on the output side. Keeping the crystal and its tank circuits separate from other components and traces on the PCB and keeping the loop areas small usually avoids this problem and prevents signals from coupling into other components such as large inductors. Many EMI-related crosstalk problems happen around the crystal, so keeping a minimum separation of at least 2 cm between the oscillator and other components helps to reduce any sensitivity. This usually happens as part of a zone.

Radiating antennas

Any trace that is around 8 cm or longer that is unterminated forms an antenna that radiates in the FM band. This is easily addressed by avoiding long signal lines and terminating them with a series resistor to provide damping without slowing down the data transmission. This is where the layout of the board feeds back into the netlist in an iterative process.

Lines that bend too sharply can also radiate from the corners, so the design tool rule checks should flag up where there are sharp bends. These corners are also risk factors for the yield in the manufacturing process, so avoiding them gives additional benefits.

Zones

Creating zones of similar functions can help focus the requirements for the board layout. Keeping all the analog elements in one area, shielded by a split ground plane or with ground lines designed to protect the zone from the power or digital circuitry can reduce the sensitivity of the design to coupled noise. This also allows more time to be spent on designing the analog area of the board, while the digital elements are less sensitive to noise. Similarly, keeping the power components in one area of the board, well away from other sensitive components, can also help.

Auto routing

While an automated routing tool may seem helpful, taking these factors into account and constraining the tool can help. Providing automatic routing within zones on the board can help speed up the layout process while at the same time minimise the impact of EMI in the design. Auto routing may not pick up on long signal lines or noisy lines that run alongside susceptible ones, particularly on I/O. Being aware of the impact of EMI on these lines can help tweak the automated design.

Tools such as DesignSpark PCB will provide design rule checking to ensure that lines are not too close together and don't curve too sharply, but they will not necessarily help with the EMI issues that the designer is facing. Paying attention to the susceptible lines, parallel signal traces and long strips and finding a way to optimise these manually will help significantly in improving the quality and performance of the design.

Conclusion

EMI is one of the key design criteria, but just relying on automated place and route and design rule checking on a board layout can leave the project with problems later on. Being aware of the EMI issues the design is likely to face and creating zones that can be automatically routed combines the value of automated design with the added value of the design expertise. All this can help optimise the design and avoid costly re-spins of the board, additional filters and even expensive enclosures. Taking EMI into account right from the start of the board design helps keep costs and timescales under control to produce the best possible product.

RS Components Pty Ltd
www.rsaustralia.com



APPLICATION BOARD

Advantech has released the Mini-ITX application board SOM-AB5810. Featuring pin-to-pin compatibility with COM Express Basic and Compact type 6 pin-out CPU modules, the product supports both normal and wide-range temperature demands, as well as a choice of ATX power supply or DC-in 19 V adapter. It is suitable for harsh environments, outdoor surveillance, industrial automation, digital signage, kiosk applications and more.

Advantech Australia Pty Ltd

www.electroline.com.au/products/67763

SUBMERSIBLE PRESSURE TRANSDUCER

The AST4530 submersible pressure transducer is constructed using PVDF material and a PTFE diaphragm. Designed to measure liquid level of harsh liquids, the product features a submersible PVDF cable, cord grip and housing.

The device features a conduit connection for turbulent installations such as on-board ships, turbulent tanks and rail cars. Voltage and 4-20 mA output signals allow users to interface for low current consumption or long-distance transmission applications.

Bestech Australia Pty Ltd

www.electroline.com.au/products/67735

RUGGED SMD PCB TERMINAL

Phoenix Contact is expanding its surface mount device (SMD) components with the SPT-SMD PCB terminal. The push-in connector with integrated spring-cage connection makes it easy to connect and disconnect wires up to 1.5 mm² without any special tools. Available in versions with two to 12 positions, the PCB terminals can handle currents up to 13.5 A and voltages up to 320 V.

Phoenix Contact Pty Ltd

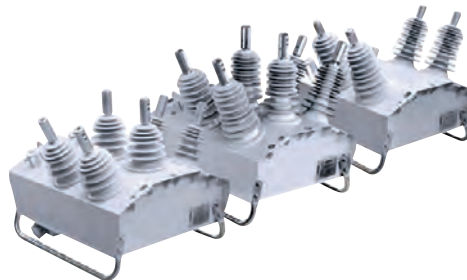
www.electroline.com.au/products/67079

AUTOMATIC CIRCUIT RECLOSERS

Noja Power has released its 310 series 15 and 27 kV automatic circuit reclosers (ACRs), extending the company's electricity distribution grid protection products by complementing the existing 300 series 38 kV ACR. The 310 series replaces older products, which were rated at 630 A, with units capable of up to 800 A continuous current operation.

Noja Power Switchgear Pty Ltd

www.electroline.com.au/products/66897



WIDEBAND SAMPLING AND DIGITAL TUNING DEVICE

The ADC12J4000 is a wideband sampling and digital tuning device. The core technology contained in the device is Texas Instruments' gigasample analog-to-digital converter (ADC) technology that enables a large block of frequency spectrum to be sampled directly at RF. This technology is combined with low-power digital-processing blocks that provide digital filtering and down-conversion.

The selected frequency block is made available on a JESD204B serial interface that is compatible with downstream system-processing elements. Data is output as baseband 15-bit complex information for ease of downstream processing. Based on the digital down-converter (DDC) decimation and link output rate settings, this data is output on one to eight lanes of the serial interface.

Texas Instruments Australia Ltd

www.electroline.com.au/products/65966

EMC EMR SAR SAFETY									
Accredited testing and global product approvals EMC Technologies Pty Ltd									
Melbourne	Telephone: +61 3 9365 1000	Bayswater	Telephone: +61 3 9761 5888						
Sydney	Telephone: +61 2 9624 2777	Auckland (NZ)	Telephone: +64 9 360 0862						
		www.emctech.com.au							

FlatFoil Transformers

- Custom Design & Manufacture
- Plants in New Zealand & China
- ISO Medical & 9001 Certified
- High Power / High Current



>> Talk to our team at: +(649) 818 6760

contact@marque-magnetics.co.nz

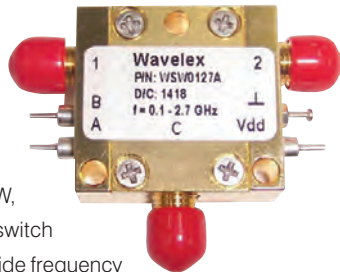
www.marque-magnetics.co.nz

MarqueMagnetics

WIDEBAND 10 W SPDT SWITCH

The WSW0127A is a wideband, 10 W, single-pole double-throw (SPDT) switch from Wavelex. The product offers wide frequency band operation, from 0.1 to 2.7 GHz, with a low insertion loss of 0.5 dB (typical), +40 dBm power handling, 25 ns switching speed and a built-in DC block.

Arrow Electronics Australia Pty Ltd
www.electroline.com.au/products/67356



new
PRODUCTS



SEALED MICRO-USB CONNECTORS

Conxall has introduced the sealed micro-USB connector to its family of Data Con-X products. The connector is sealed to IP67, IP68 (when mated) and NEMA 250 (6P), making it suitable for sealed data transmission, military or industrial GPS location devices and medical data applications.

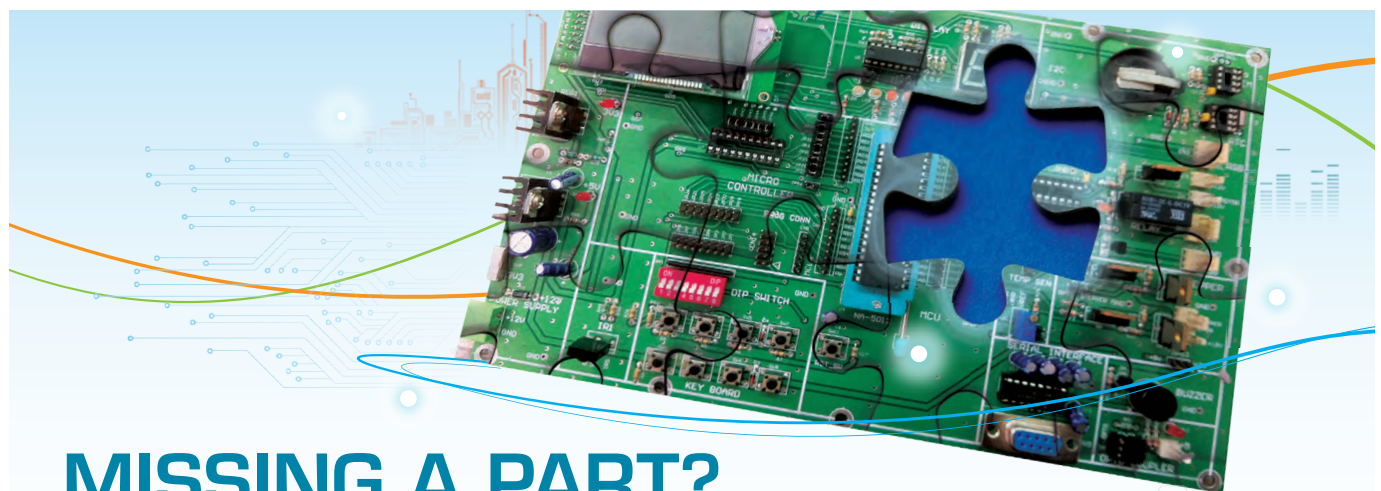
Clarke & Severn Electronics
www.electroline.com.au/products/67350

400 W CONVECTION-COOLED POWER SUPPLIES

XP Power has announced the SDH400 series of single- and dual-output 400 W highly efficient convection-cooled power supplies. The compact 1U profile chassis-mount supplies, measuring 203 x 127 x 40.64 mm, can deliver the full 400 W output without the need for any cooling fans or forced air flow.

The single-output models have a peak power capability that allows them to deliver 700 W for up to 0.5 s. This feature is suitable for accommodating applications that have momentary high start-up currents such as that of a motor, but removes the need for a higher-rated, larger power supply being specified.

Amtex Electronics
www.electroline.com.au/products/67731



MISSING A PART?

At element14, we know the small details make or break designs. With access to local and globally stocked inventory, we have the products you need from the brands you trust delivered to your doorstep. From local customer service to quick delivery and 24/5 technical support, we help complete your design.



Dedicated
Customer Service



Competitive
Quotes Service



24/5 Technical
Support



Innovative
Technologies



Free Next Day
Local Delivery



3 Day
UK Express

Terms & conditions apply

CONTACT US TODAY!

au.element14.com
1300 361 005

nz.element14.com
0800 90 80 80

element14

AUTHORISED DISTRIBUTOR OF 3500 BRANDS IN ELECTRONIC COMPONENTS & MAINTENANCE INDUSTRY.

LIBERATING DEVICES FROM POWER CORDS

Imagine ... a laptop's casing serving as its battery, an electric car powered by energy stored in its chassis, or a home where the dry wall and siding store the electricity that runs the lights and appliances.

This could soon be a reality as US researchers have developed a supercapacitor that stores electricity by assembling electrically charged ions on the surface of a porous material, instead of storing it in chemical reactions the way batteries do. As a result, supercaps can charge and discharge in minutes, instead of hours, and operate for millions of cycles, instead of thousands of cycles like batteries.

In a paper appearing online 19 May in the journal *Nano Letters*, graduate student Andrew Westover and Assistant Professor of Mechanical Engineering Cary Pint at Vanderbilt's Nanomaterials and Energy Devices Laboratory report that their new structural supercapacitor operates flawlessly in storing and releasing electrical charge while subject to stresses or pressures up to 44 psi and vibrational accelerations over 80 g (significantly greater than those acting on turbine blades in a jet engine).

"These devices demonstrate - for the first time as far as we can tell - that it is possible to create materials that can store and discharge significant amounts of electricity while they are subject to realistic static loads and dynamic forces, such as vibrations or impacts," said Pint. "Andrew has managed to make our dream of structural energy storage materials into a reality."

When you can integrate energy into the components used to build systems, it opens the door to a whole new world of technological possibilities. That is important because structural energy storage will change the way in which a wide variety of technologies are developed in the future. Furthermore, the mechanical robustness of the device doesn't compromise its energy storage capability. "In an unpackaged, structurally integrated state, our supercapacitor can store more energy and operate at higher voltages than a packaged, off-the-shelf commercial supercapacitor, even under intense dynamic and static forces," Pint said.

One area where supercapacitors lag behind batteries is in electrical energy storage capability: supercaps must be larger and heavier to store the same amount of energy as lithium-ion batteries. However, the difference is not as important when considering multifunctional energy storage systems. Supercapacitors store 10 times less energy than current lithium-ion batteries,

but they can last a thousand times longer. "Battery performance metrics change when you're putting energy storage into heavy materials that are already needed for structural integrity," said Pint. "Supercapacitors store 10 times less energy than current lithium-ion batteries, but they can last a thousand times longer. That means they are better suited for structural applications. It doesn't make sense to develop materials to build a home, car chassis or aerospace vehicle if you have to replace them every few years because they go dead."

Westover's wafers consist of electrodes made from silicon that have been chemically treated so they have nanoscale pores on their inner surfaces and then coated with a protective ultrathin graphene-like layer of carbon. Sandwiched between the two electrodes is a polymer film that acts as a reservoir of charged ions, similar to the role of the electrolyte paste in a battery. When the electrodes are pressed together, the polymer oozes into the tiny pores in much the same way that melted cheese soaks into the nooks and crannies of artisan bread in a panini. When the polymer cools and solidifies, it forms an extremely strong mechanical bond.

"The biggest problem with designing load-bearing supercaps is preventing them from delaminating," said Westover. The use of silicon in structural supercapacitors is best suited for consumer electronics and solar cells, but Pint and Westover are confident that the rules that govern the load-bearing character of their design will carry over to other materials, such as carbon nanotubes and lightweight porous metals like aluminium.

The intensity of interest in 'multifunctional' devices of this sort is reflected by the fact that the US Department of Energy's Advanced Research Project Agency for Energy is investing \$8.7 million in research projects that focus specifically on incorporating energy storage into structural materials. There have also been recent press reports of several major efforts to develop multifunctional materials or structural batteries for use in electric vehicles and for military applications. However, Pint pointed out that there have not been any reports in the technical literature of tests performed on structural energy storage materials that show how they function under realistic mechanical loads.

COMPUTER PLATFORMS FOR SMART HOME LIVING

Axiomtek has released a series of computer platforms for smart home solutions. The GOT3187W-832-PCT and rBOX101-6COM offer high performance with low-power Intel Atom processors and operate efficiently in wide temperature ranges, making them suitable for indoor and outdoor operations.

Adept Total Turnkey Solutions

www.electroline.com.au/products/67819



new
PRODUCTS

CONNECTOR SERIES

The Phase 3 Powersafe connector series offers good ingress protection. The sequential mating box is IP54-rated before the Powersafe connectors - which are IP67-rated - are installed. Once the connectors are installed, the complete assembly is IP67-rated. If an IP67 rating is required to withstand exposure to wet conditions at all times, Phase 3 recommends surrounding the sequential mating box with an IP-rated electrical enclosure.

Two levels of cap are offered to provide protection when the connectors are unmated. Both levels of cap can be secured with the included wire lanyard. The Push-Pull Cap prevents abrasion and impact damage from affecting the connector and stops dirt and water from reaching the contact.

Connector-Tech ALS Pty Ltd

www.electroline.com.au/products/66006

REAL-TIME SPECTRUM ANALYSER

The Signal Hound BB60C is a real-time spectrum analyser and RF recorder. The product has a frequency range of 9 kHz to 6 GHz, an instantaneous bandwidth of 27 MHz and the ability to sweep the RF spectrum at 24 GHz/s.

Compared to the Signal Hound BB60A, the analyser has improved SFDR (spurious-free dynamic range) by typically 20 dB; the noise floor has been flattened by reducing frequency band transitions more than 8 dB; operating temperatures have been extended down to -40°C and up to +65°C; and streaming I/Q (in-phase quadrature) bandwidth is selectable from 250 kHz to 27 MHz.

Silvertone Electronics

www.electroline.com.au/products/67800

Enclosure Solutions Your Design or Ours.



Modular



Outdoor



IP Rated



Sheet Metal



Plastic

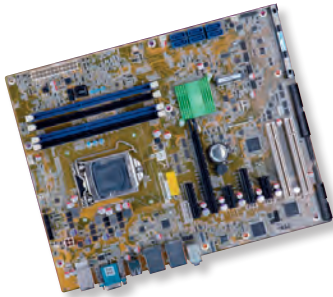


Aluminium

ERNTEC

1300 376 862 www.erntec.net

Find us on
Facebook



ATX MOTHERBOARD

The IMBA-C2260-i2 high-performance ATX motherboard supports 22 nm LGA1150 Intel Xeon E3, Core i3, Pentium and Celeron processors and features the Intel C226 system chipset. The industrial-grade, jumperless motherboard has four 240-pin DDR3 1600/1333 MHz dual-channel DIMM sockets supporting up to 32 GB memory.

**ICP Electronics
Australia Pty Ltd**
[www.electroline.com.au/
products/66662](http://www.electroline.com.au/products/66662)



3G IP GATEWAY

Moxa has released the OnCell G3111/G3151-HSPA series, a 3G communication solution suitable for a variety of cellular industrial applications. The product is suitable for optimising 3G cellular applications. Featuring a high level of EMS protection, the units are designed to meet industrial-grade standards. They can withstand harsh environments and are suitable for mission-critical tasks for wireless applications.

MOXA Inc
www.electroline.com.au/products/66895

DEVELOPMENT BOARD

The Arduino Zero is a simple and powerful 32-bit extension of the platform established by Arduino UNO. The board aims to provide users with the potential to realise innovative ideas for smart IoT devices, wearable technology, high-tech automation, robotics and more. It is powered by Atmel's SAMD21 MCU, which features a 32-bit ARM Cortex M0+ core.

The flexible feature set enables several opportunities for devices and acts as an educational tool for learning about 32-bit application development. Atmel's Embedded Debugger (EDBG) provides a full debug interface without the need for additional hardware, increasing the ease of use for software debugging. EDBG also supports a virtual COM port that can be used for device programming and traditional Arduino boot loader functionality.

Ocean Controls
www.electroline.com.au/products/67878

**"50 units this week
100 next week and
2000 the following week?
No problem."**

DUET
ELECTRONICS

CONTRACT MANUFACTURING

- **SMT & Through Hole Assembly**
- **Component Procurement**
- **Full Turnkey Solutions**
- **ISO 9002 Accredited**
- **IPC 610 Standard**

Duet Electronics build relationships on priceless values that never change: quality, service, innovation, integrity, honesty and dedication.

Duet Electronics is unique in that we offer world class electronic manufacturing services and support, targeted specifically to meet the requirements and budgets of small to medium sized customers.

(03) 9380 6454 | info@duet.com.au
www.duet.com.au

RF CONNECTORS EXPLAINED

Mike Smyth, specialist technical writer

RF coaxial connectors have been around for so long that their beginnings are lost in the mists of time. Most people, however, are familiar with the traditional 50 Ω coax plug that went into the back of the family television set.

Today, there is a much wider market for these RF devices as frequencies have increased and the demand for high data rates has put pressure on makers to produce inexpensive but reliable connectors to suit a wide variety of applications. The original connectors were designed to work in the multi-MHz range and to effectively shield the signal core of coaxial cable. Top-of-the-tree models had little effect on the line impedance and the actual connector had a very low resistance offering little or no attenuation.

This brief overview covers only a few of the mainstream types, there being many variants on those discussed here, including precision types, flange connectors and quick lock devices.

The original Belling-Lee coax plug, as it was called, was the VHF/UHF domestic television cable termination and was only ever intended for medium frequency use where it was not vital for impedance matching. With the current 75 Ω cable there is a serious mismatch with this connector, leading to distortion on TV band signals.

Its successor, the BNC connector, has two bayonet lugs and mating is accomplished by a quarter-of-a-turn twist. Now widely used for television, test instruments and video signals, they can be made to match either 50 or 75 Ω cables, usually at frequencies below 4 GHz and voltages of less than 500. There is also a threaded version that can be used as an alternative to an RCA connector.

The 7-16 DIN connector is threaded and used as joiner for coax cables. It is widely used in network antenna systems where it is superior to N connectors or BNC for interference and intermodulation rejection. There is also the DIN 1.0/2.3 connector which has a push/pull lock and release and is suitable for use where space is at a premium.

One of the first connectors capable of carrying microwave frequency signals was the N device. It was developed in the 1940s to carry frequencies up to 1 GHz. Current types can handle 11 GHz easily and greater manufacturing precision has pushed the handling frequency to 18 GHz. It is a threaded and waterproof connector for joining coax. Available in both 50 and 75 Ω versions, the 50 Ω

is mainly used in land mobile, wireless data and paging systems while the 75 Ω has been adopted by cable television.

The F connector is common for terrestrial television installations, satellite television and cable modems. It is a relatively inexpensive connector as it uses the solid core of the cable as the pin of the male connector. Good 75 Ω impedance match up to 1 GHz is possible and the bandwidth can stretch to several GHz.

The almost universal connector between a car radio and its antenna is the Motorola device where the sleeve is folded back over the cable while the centre core is soldered to the pin. Spring surfaces ensure a good electrical connection.

As well as the standard connectors, there is also a range of miniature devices, one of which is the U.F.L., designed for use when space is critical as in portable computers and embedded systems where they can connect with a Wi-Fi antenna and mini PC card. The 50 Ω connectors will handle signals up to 6 GHz on as little as 3 mm² of PCB space.

The MMCX microminiature 50 Ω connectors have a lock-snap mechanism allowing them to rotate 360°. They are commonly used as antenna connectors on Wi-Fi, PCMCIA cards or for attaching GPS antennas.

A screw-type coupling gives the subminiature SMA a minimal interface with the cable. Designed for DC to 18 GHz, the male device has inside threads while the female internal threads.

The subminiature SMC is unusual in that the normal polarity is reversed with the centre pin being female and the socket being male. They have an electrical performance of DC to 10 GHz.

There are also special high-voltage types such as the SHV (Safe High Voltage) connectors which are normally used in laboratories, especially in Geiger-Muller tube detectors. Because the connectors can handle up to 5000 VDC (and in some cases up to 20 kV) at 5 A, the connector is designed to disconnect the high voltage before the ground contact to prevent operator shocks.

As a major electronics component, connectors are continually evolving as more specialised uses are found for them. This seems to be a trend that will continue well into the future.



BRUSHLESS DC MOTOR AND PLANETARY GEARBOX

maxon motor has released its latest brushless DC motor and high-speed planetary gearbox. There are seven different windings and two power levels available for the motor and many different gearbox ratios, allowing designers to select the products in a modular fashion to best suit the application requirements.

maxon motor Australia Pty Ltd
www.labonline.com.au/products/67264



ENVIRONMENTAL MONITORING SYSTEM

The ENVIROMUX-5D uses sensors to monitor critical environmental and security conditions. When an environmental sensor goes out of range of a configurable threshold or a security sensor is triggered, system administrators will be notified via email, alarm beacon, front panel LED indicators, web page notification, network management (SNMP) software or SMS.

**Interworld Electronics
and Computer Industries**
www.electroline.com.au/products/65928

HF READ/WRITE HEAD

Turck announces the Q80L800 HF read/write head, the latest addition to the company's RFID portfolio. With a sensing range of 800 mm, the product is suitable for close and medium HF applications such as conveyor applications, and expands the sensing area, providing improved performance and higher read rates of tags. The device can be operated on the company's BL ident solution, which allows for easy integration into existing control systems and supports all of the major protocols. It can be operated simultaneously with UHF solutions.

Turck Australia Pty Ltd
www.electroline.com.au/products/67757

ElectroneX

electronics design & assembly expo

Australia's largest dedicated electronics industry event
Design, Develop, Manufacture with the Latest Solutions!



In association with



Register Online Now
www.electronex.com.au



+61 3 9676 2133

Supporting Publication



Australian Technology Park - Sydney 10-11 September 2014



MOSFETS

ON Semiconductor has introduced six N-channel Metal Oxide Semiconductor Field Effect Transistors (MOSFETs). The NTMFS4Hxxx and NTTF54Hxxx series of MOSFETs are suitable as switching devices in a wide range of applications including server and networking equipment and high-power density DC-DC converters, or to support synchronous rectification in point-of-load (PoL) modules. Versions are available with or without an integrated Schottky diode that can help engineers achieve high efficiency.

RS Components Pty Ltd
www.electroline.com.au/products/67646

GRID RESISTORS

Vishay Intertechnology has introduced a series of high-power, high-current grid resistors. Vishay Milwaukee GRE1 devices combine high power ratings to 6.5 kW and high operating temperatures to 400°C with a robust design. With high power capability from 1 to 6.5 kW at 40°C, the grid resistors are optimised for capacitor pre-charge and discharge, dynamic braking, load testing, heater and neutral grounding applications in locomotives, harmonic filters and renewable energy and industrial systems. The devices feature a wide resistance range from 0.1 to 24 Ω , with tolerance of $\pm 10\%$, and low inductance from 5 to 40 μH .

Fastron Technologies Pty Ltd
www.electroline.com.au/products/67734

RF LOAD TERMINATION

The WLD000130A1 is a wideband load RF termination from Wavelex. The product offers wide frequency band operation, from DC to 13 GHz, and features 20 W continuous wave (CW) power handling. It is versatile for a range of applications, including satellite communications, broadcast, RF bench test, and mobile base station.

The device is SMA connectorised and packaged with precision machine housings in the company's 0.7 x 0.7" Terminators & Loads package. The product is 100% production-tested on all minimum and maximum electrical specifications.

Wireless Components

www.electroline.com.au/products/67588



new
PRODUCTS

"Rigol offer Australia's Best Value DSOs"



RIGOL DS-1000E Series

- ▶ 50MHz & 100MHz, 2 Ch
- ▶ 1GS/s Real Time Sampling
- ▶ USB Device, USB Host & PictBridge

FROM \$339 ex GST



RIGOL DS-2000 Series

- ▶ 70MHz, 100MHz & 200MHz, 2 Ch
- ▶ 2GS/s Real Time Sampling
- ▶ 14Mpts Standard Memory Depth

FROM \$934 ex GST



RIGOL DS-4000 Series

- ▶ 100/200/350/500MHz, 2 & 4 Ch
- ▶ 4GS/s Real Time Sampling
- ▶ 140Mpts Memory Standard

FROM \$2,236 ex GST



RIGOL DS-6000 Series

- ▶ 600MHz & 1GHz, 2 & 4 Ch
- ▶ 5GS/s Real Time Sampling
- ▶ 140Mpts Memory Standard

FROM \$6,145 ex GST

Buy on-line at www.emona.com.au/rigol

Sydney

Tel 02 9519 3933
 Fax 02 9550 1378

email testinst@emona.com.au

Melbourne

Tel 03 9889 0427
 Fax 03 9889 0715

Brisbane

Tel 07 3275 2183
 Fax 07 3275 2196

Adelaide


Tel 08 8363 5733
 Fax 08 8363 5799

Perth

Tel 08 9361 4200
 Fax 08 9361 4300




web www.emona.com.au

EMONA



1W Isolated DC/DC Converters with 30% Price Reduction

- Efficiency up to 76%
- 1:1 Input range = 5Vin - 5Vout
- Up to 4kVDC isolation (RKE/H series)
- Op. temperature: -40°C to +85°C without derating
- Packages: SIP4, SIP7, 5 & 8 Pins SMD
- Suitable for vapor phase soldering (R1SE series)
- Series includes RBE, R1SE, ROE, RKE/H & REE
- UL 60950 Certified

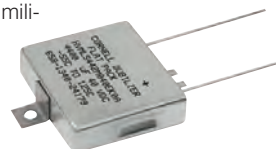




RECOM
WE POWER YOUR PRODUCTS
www.recomasia.com

new PRODUCTS

FLATPACK ALUMINIUM ELECTROLYTIC CAPACITORS

Cornell Dubilier has announced an expanded line of MLS flatpack aluminium electrolytic capacitors. The additions to the MLS Series include a high-vibration package (HVMLS) and a high-reliability burn-in option (HRMLS). The devices are suited to military and commercial flight-based power systems that require high energy density, rugged capacitors for bulk storage.



KD Fisher & Co Pty Ltd

www.electroline.com.au/products/67690

CABLING CERTIFICATION AND TESTING PRODUCTS

Fluke Networks has unveiled three additions to its family of cabling certification and testing solutions for the data communications and cabling market. The Accelerator solutions - the FI-7000 FiberInspector Pro, Singlemode MultiFiber Pro and SmartLoop OTDR - speed-up fibre test, inspection and certification within data centre, datacom installation and large enterprise operations.

Fluke Networks

www.electroline.com.au/products/67306



SMBUS TEMPERATURE SENSORS

The Microchip EMC1043 family of System Management Bus (SMBus) temperature sensors monitors three temperature zones - one internal diode and two externally connected diodes - for PC and embedded environments.

The product includes beta compensation circuitry to correct for variation in the beta of measurement transistors. Other extended features include resistance error correction and ideality factor configuration to eliminate major sources of temperature measurement error.

Microchip Technology Hong Kong

www.electroline.com.au/products/66500



Electronex, the annual electronics design and assembly expo, returns to Sydney on 10-11 September this year at the Australian Technology Park.

This event is designed to help professionals across different industry sectors to stay in touch with the latest electronics technology developments. The competitive future of every Australian industry sector is more and more reliant on the use and integration of the latest electronics innovations in production, assembly, systems development, maintenance and service.

Design, electronic and electrical engineers, OEM, scientific, IT and communications professionals and service technicians are invited to attend the event.

The event features a major trade show with over 80 companies showcasing and demonstrating the latest new product releases for industry, scientific and commercial applications. The SMCBA - Electronics Design & Manufacture Conference is being held in conjunction with the exhibition and attracted over 200 delegates at the last Sydney event. This year's conference will feature international presenters including Happy Holden, Dr Charles Bauer and Phil Zarrow. The event will deliver a wealth of information on electronics design and manufacture but

will also feature new streams on embedded systems and new product development. The Best Practice in Electronics Assembly workshop will examine the adverse impact that non-optimal assembly practices and processes have on product quality and the financial success of electronic assembly businesses, and will provide solutions for these issues. It will also examine these issues in relation to the manufacture of Class 3 high reliability products. The High Density Interconnect Technology workshop has been developed by HDI expert Happy Holden to relate the successful design methodologies and processes used by a number of large aero/military, telecom OEMs, computer/notebook OEMs and consumer portable product OEMs to successfully implement HDI technologies in their printed circuit board programs. Case studies will be used to demonstrate the effectiveness of this technology in achieving reduced costs while increasing PCB layout densities. For exhibition information and free trade registration, visit www.electronex.com.au.

Australasian Exhibitions and Events Pty Ltd
www.electronex.com.au







PROFESSIONAL BATTERIES FOR ALL YOUR REQUIREMENTS

- Two-way radio batteries**
- V-lock professional camcorder batteries**
- Sealed lead acid general purpose and deep cycle**
- Lithium ion cells and assemblies**
- Powerbanks for charging mobiles, kindles etc**
- Also batteries for Powertools, Laptops, Scanners, Medical equipment**

Quality battery packs custom manufactured in Australia

9/15 Childs Road, Chipping Norton NSW 2170
 Phone: (02) 9755 1845 Fax: (02) 9755 1354
 Email: info@premierbatteries.com.au
 Website: www.premierbatteries.com.au



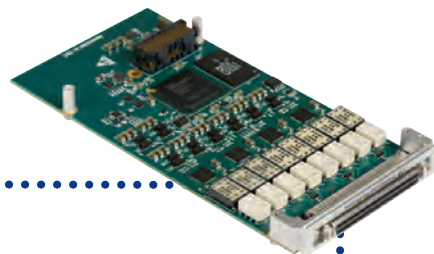
150 V, 20 A DC POWER SUPPLY

Available to rent from TechRentals, the Sorensen DCS Power Supply is suitable for a wide range of applications requiring DC power in small form factors.

The product features high power density/low ripple and noise; constant voltage and current mode; remote sensing; and overvoltage protection for DUT.

TechRentals

www.electroline.com.au/products/66108



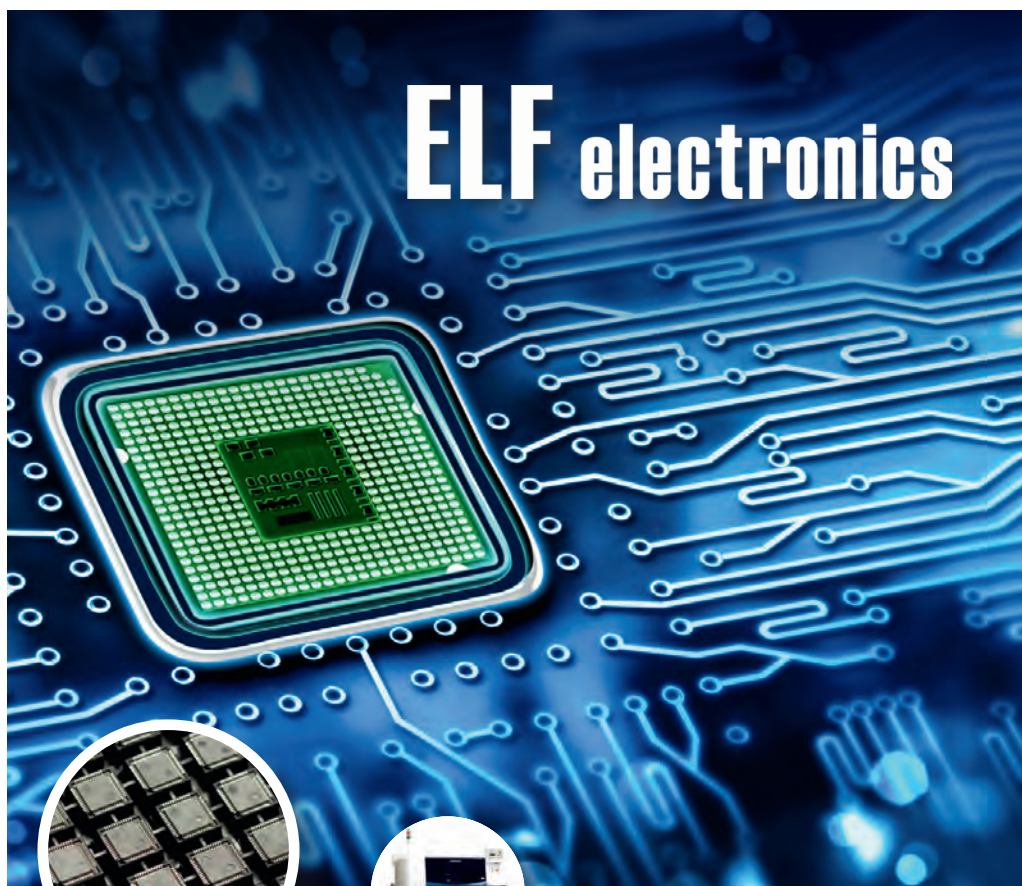
AVIONICS MODULE

GE Intelligent Platforms has announced the RAR15-XMC-FIO for the MIL-STD-1553 and ARINC 429 XMC front I/O module. A multiprotocol embeddable avionics module featuring front I/O, it is designed to save space, weight and power.

The product delivers functionality that would previously have required the use of two XMCs. It will be used by a broad range of avionics organisations for simulation and testing, as well as for deployment in embedded applications.

Metromatics Pty Ltd

www.electroline.com.au/products/66792



Product Design
Procurement
SMT assembly
Manufacturing

1300 367 353

Unit 5 Richmond Business Centre
Corner Hobart & Bowman Sts. Richmond NSW

www.elfelectronics.com.au



POLYMER CAPACITORS

The SP-Cap, POSCAP, OS-CON and Polymer Hybrid capacitors from Panasonic provide high efficiency and low ESR alternatives to traditional capacitors. The range benefits from lifetime extension as well as high safety and reliability. The capacitors each provide their own individual specifications. These vary in terms of temperature range, voltage, endurance and ripple current, allowing a broad usage potential throughout the Panasonic range.

element14

www.electroline.com.au/products/67183

ETHICS OF DRONE WARFARE

With the increasing use of drones in military operations, it is perhaps only a matter of time before robots replace soldiers.

In her recent thesis on the ethics of automation in war, Linda Johansson, a researcher in robot ethics at KTH Royal Institute of Technology, suggests that it is necessary to reconsider the international laws of war, and to begin examining whether advanced robots should be held accountable for their actions.

The use of drones - or unmanned aerial vehicles (UAVs) - is increasing, and more money is being poured into developing them, clearly changing the context of conflict and raising new questions.

According to a UN survey, civilians have been killed in 33 separate drone attacks around the world. In Pakistan, an estimated 2200 to 3300 people have been killed by drone attacks since 2004, 400 of whom were civilians. According to the latest figures from the Pakistani Ministry of Defense, 67 civilians have been killed in drone attacks in the country since 2008.

"Soldiers may kill other soldiers in a war - would it be permissible for someone on the other side of the earth to attack the operators who control the drones?" Johansson asks.

Johansson also questions the ethics of assigning drone operators the task of tracking a targeted person from a safe distance for days, perhaps even a week, before striking. "The post-traumatic stress syndrome that affects an operator may be just as severe as for a regular soldier," she says. Currently, drones are still operated remotely by a human being, but technological advancement

is so rapid that full automation is more than just a grim science fiction fantasy. Johansson sketches out a scenario to show how reaching that point presents other ethical questions:

"Soon we may be facing a situation where an operator controls two drones instead of one, on account of cost reasons," Johansson says. "Add to that the human tendency to rely on technology. Now imagine a situation where very quick decisions must be made. It becomes easy to step out of the decision loop and hand over control to the robot or computer.

"Man becomes the weakest link."

It could also be argued that robots are not entitled to defend themselves, since under the rules of war they are not in danger of losing their lives. "Does it mean that they have lost the right to kill human soldiers?" she asks.

Robots, especially drones, can also facilitate the conduct of 'secret war', with low transparency and minimal involvement of troops.

Linda Johansson's research has resulted in a compilation of seven articles. In addition to autonomous systems in the war, she studied other aspects of robots. One of the articles is about caregiver robots and the ethics around them. Two of her articles focus on the so-called "agent landscape" - or if and when advanced robots can be held responsible for their actions.

Infinite Designs on One Platform



NI LabVIEW is at the heart of our graphical system design approach, which combines open platform software and reconfigurable hardware to accelerate the development of any measurement and control system.

**Accelerate your system design
productivity at
ni.com/labview-platform**

**Australia: 1800 300 800
New Zealand: 0800 553 322**



©2013 National Instruments. All rights reserved. LabVIEW, National Instruments, NI, and ni.com are trademarks of National Instruments. Other product and company names listed are trademarks or trade names of their respective companies. xxxxx

new PRODUCTS

WAVEFORM GENERATOR

The Siglent SDG800 waveform generator inherits main features from SDG1000, inserting EasyPulse tech from SDG5000, and can be widely applied in electronic function test, environmental signal analog, researching and education.

Nesco Electrical Products

www.electroline.com.au/products/67663



CURRENT SENSOR

Claimed to require just one-sixth of the board space taken up by other sensors, the Infineon TLI4970 current sensor measures alternating and direct currents up to ± 50 A. The digital sensor does not require external calibration.

Due to implemented stray field suppression, the product is robust against external magnetic fields. It continues to measure with absolute precision even after years of continuous operation, with its efficiency remaining constant.

Infineon Technologies Asia Pacific Pte Ltd

www.electroline.com.au/products/66742

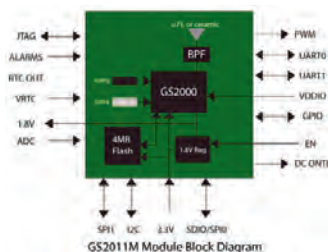
WI-FI MODULE

The GS2011M module by GainSpan provides a quick and easy way for device and appliance manufacturers to add Wi-Fi connectivity to their products. It adds low-power, high-speed Wi-Fi and internet connectivity to any device with a microcontroller and serial host interface.

The module provides a high-speed serial interface connection to an embedded design built on an 8/16/32-bit microcontroller, achieving up to 40 Mbps throughput over an SDIO interface. It is suitable for organisations with limited Wi-Fi or RF expertise or seeking faster time to market, as it reduces RF design time and removes the burden of testing and certification.

Glyn Ltd

www.electroline.com.au/products/66000



8-BIT SINGLE-CHIP CONTROLLER

The Panasonic MN101EFA6AXW is an 8-bit single-chip controller which is suitable for use in applications such as home appliance, fax machine, camera, TV, CD, automotive power window and similar systems.

Incorporating various peripheral functions, the product brings a simple, efficient instruction capability with optimised hardware configurations and functions such as five external interrupts, eight timer counters, three types of serial interfaces, an A/D converter and watchdog timer.

Panasonic Australia

www.electroline.com.au/products/66495

LOW-NOISE AMPLIFIERS

Pasternack Enterprises has released a family of low-noise amplifiers which are widely used across the spectrum of military and commercial applications. A total of 14 amplifiers is offered, providing a choice of noise figures, gain levels, frequency ranges and power outputs depending on the intended use. The series exhibits good broadband performance from 9 kHz to 18 GHz, noise figures between 0.8 and 3 dB, gain levels from 25 to 50 dB, gain flatness from ± 0.75 to ± 1.25 dB and power output levels between 10 and 18 dBm. The performance of the amplifiers is achieved using a hybrid microwave integrated circuit design and advanced GaAs PHEMT technology.

Rojone Pty Ltd

www.electroline.com.au/products/67856

new
PRODUCTS

SOLID-STATE DRIVE

Micron Technology has announced its latest personal storage class solid-state drive. The M550 SSD is designed to meet the needs of high-performance computing, ultrathin and media/video applications. It is said to offer 20 times higher performance than a traditional hard drive while consuming less power. It enables quick boot-up, file access, program access and wake from sleep; and efficient power management, drawing as little as 0.15 W during normal operation.

The design integrates Micron NAND and firmware to deliver up to 95,000 input/output operations/s. The drive's sequential speeds reach up to 550 MBps for reads and 500 MBps for writes, which maxes out the capabilities of the SATA 6 Gbps interface. Other features include hardware encryption; device sleep low-power mode; data protection; and adaptive thermal management.

Digi-Key Corporation

www.electroline.com.au/products/66432

BLUETOOTH SYSTEM-ON-MODULE

The System-on-Module OBP421 is a Bluetooth Smart Ready module from connectBlue. The product is compact, fully customisable and particularly suitable for industrial, medical and Internet of Things (IoT) applications.

M2M Connectivity

www.electroline.com.au/products/67158



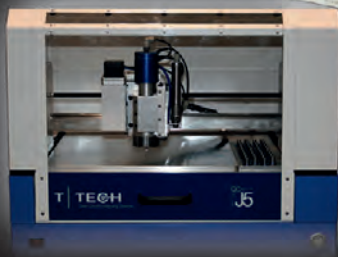
CIRCUIT BOARDS?

For all your prototyping requirements

from budget ...



... to fully-featured



Quick Circuit allows you to make your own prototype circuit boards and perfectly machined panels in next to no time.

Shouldn't there be one on your bench?



Distributed throughout Australasia by
SATCAM

Tel +61 2 9807 7081
satcam@satcam.com.au
www.satcam.com.au



Superior EMC solutions

- EMC line filters for 1- and 3-phase systems
- Power entry modules with filter
- Filters for AC and DC applications
- Various chokes and pulse transformers
- Customized solutions

More information available on:
emc-service.schurter.com

SCHURTER
ELECTRONIC COMPONENTS



ELECTRONIC SWITCH TECHNOLOGY

Duraswitch electronic switch technology combines features of both electromechanical and flat panel membrane switches. The technology utilises magnets, eliminating parts that wear out in other technologies.

Entech Group

www.electroline.com.au/products/67797

HIGH-FUNCTION POWER SWITCH

The XC8108 series is a P-channel MOSFET power switch IC with a low ON resistance. A current limit, reverse current prevention, soft start, thermal shutdown and an undervoltage lockout are incorporated as protective functions. A flag function monitors the power switch status. The flag output has N-channel open-drain structure and outputs a low-level signal while overcurrent or overheating is detected, or while the reverse current prevention is operated.

Torex Semiconductor(s) Pte Ltd

www.electroline.com.au/products/67733

SLIM INLINE CONNECTORS

Hirose has developed the robust DF62 Series slim inline connectors, designed to take advantage of small/confined spaces. They come equipped with a locking structure that gives the user two lock completion indicators - a tactile click and a visual check of the socket lock through the plug slit. The series utilises its smooth contours and a multirow pin layout that arranges its contacts in a grid pattern, reducing the diagonal diameter by 50%. There is no exposed metal on the connector, which eliminates the possibility of short circuits between the connector and the inside of metal conduits. The small size and high durability of the connector make it suitable for servo amp, LED lighting and portable medical device applications.

Excelpoint Systems (HK) Limited

www.electroline.com.au/products/67874

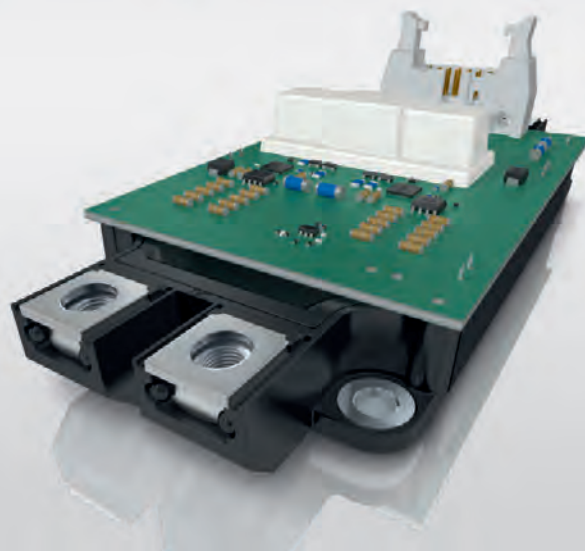
SEMIKRON
innovation + service

Drives up to 600A and 1700V
ROHS, UL recognized
EMC with short pulse suppression
Digital ASICs for safe gate control
Over temperature and Soft-Off
Plug and play with qualified SOA

 **Motor Drives**  **Solar Energy**  **Power Quality**  **Urban Transport Equipment**

www.semikron.com/contact

SKYPER® 12 PF
Robust IGBT Driver for
Press-Fit Mounting





ANTI-COUNTERFEITING PARTICLES

Around 2-5% of all international trade involves counterfeit products, according to a 2013 UN report. Counterfeit products - including electronics, automotive and aircraft parts, pharmaceuticals and food - can pose safety risks and cost governments and private companies hundreds of billions of dollars annually.

Efforts have been made to label legitimate products and prevent illegal trade, but these tags are often too easy to fake, are unreliable, or cost too much to implement, according to MIT researchers who have developed a new alternative to crack down on counterfeiting.

The researchers, led by MIT chemical engineering professor Patrick Doyle and Lincoln Laboratory technical staff member Albert Swiston, have invented a new type of tiny, smartphone-readable particle that they believe could be deployed to help authenticate currency, electronic parts and luxury goods, among other products. The particles, which are invisible to the naked eye, contain coloured stripes of nanocrystals that glow brightly when lit up with near-infrared light.

These particles can easily be manufactured and integrated into a variety of materials, and can withstand extreme temperatures, sun exposure and heavy wear, says Doyle. They could also be equipped with sensors that can 'record' their environments - noting, for example, if a refrigerated vaccine has ever been exposed to temperatures too high or low.

The new particles are about 200 microns long and include several stripes of different-coloured nanocrystals, known as 'rare earth upconverting nanocrystals'. These crystals are doped with elements such as ytterbium, gadolinium, erbium and thulium, which emit visible colours when exposed to near-infrared light. By altering the ratios of these elements, the researchers can tune the crystals to emit any colour in the visible spectrum.

To manufacture the particles, the researchers used stop-flow lithography, a technique developed previously by Doyle. This approach allows shapes to be imprinted onto parallel flowing streams of liquid monomers - chemical building blocks that can form longer chains called polymers. Wherever pulses of ultraviolet light strike the streams, a reaction is set off that forms a solid polymeric particle.

In this case, each polymer stream contains nanocrystals that emit different colours, allowing the researchers to form striped particles. So far, the researchers have created nanocrystals in nine different colours, but it should be possible to create many more, Doyle says.

NANOCRYSTALS

“

THE MICROPARTICLES COULD BE DISPERSED WITHIN ELECTRONIC PARTS OR DRUG PACKAGING DURING THE MANUFACTURING PROCESS, INCORPORATED DIRECTLY INTO 3D-PRINTED OBJECTS, OR PRINTED ONTO CURRENCY, THE RESEARCHERS SAY. THEY COULD ALSO BE INCORPORATED INTO INK THAT ARTISTS COULD USE TO AUTHENTICATE THEIR ARTWORK.

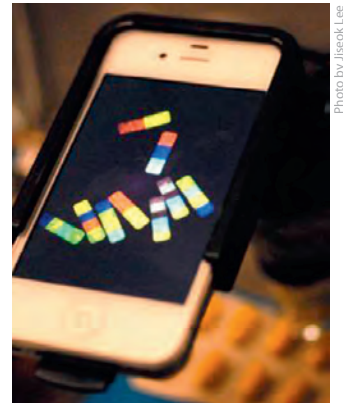


Photo by Jiseok Lee

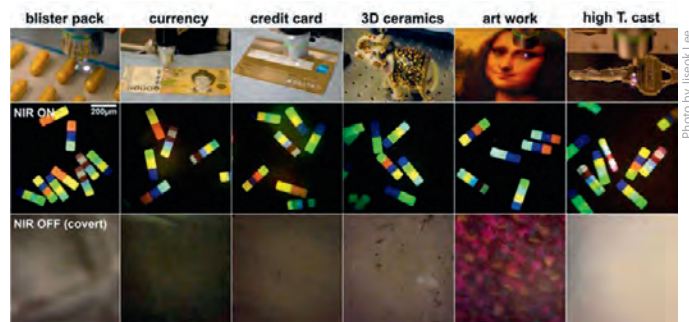


Photo by Jiseok Lee

Using this procedure, the researchers can generate vast quantities of unique tags. With particles that contain six stripes, there are one million different possible colour combinations; this capacity can be exponentially enhanced by tagging products with more than one particle. For example, if the researchers created a set of 1000 unique particles and then tagged products with any 10 of those particles, there would be 1030 possible combinations - far more than enough to tag every grain of sand on Earth.

"It's really a massive encoding capacity," says Bisso, who started this project while on the technical staff at Lincoln Lab. "You can apply different combinations of 10 particles to products from now until long past our time and you'll never get the same combination."

"The use of these upconverting nanocrystals is quite clever and highly enabling," says Jennifer Lewis, a professor of biologically inspired engineering at Harvard University who was not involved in the research. "There are several striking features of this work, namely the exponentially scaling encoding capacities and the ultralow decoding false-alarm rate."

The microparticles could be dispersed within electronic parts or drug packaging during the manufacturing process, incorporated directly into 3D-printed objects, or printed onto currency, the researchers say. They could also be incorporated into ink that artists could use to authenticate their artwork. The researchers demonstrated the versatility of their approach by using two polymers

with radically different material properties - one hydrophobic and one hydrophilic - to make their particles. The colour readouts were the same with each, suggesting that the process could easily be adapted to many types of products that companies might want to tag with these particles, Bisso says.

"The ability to tailor the tag's material properties without impacting the coding strategy is really powerful," he says. "What separates our system from other anti-counterfeiting technologies is this ability to rapidly and inexpensively tailor material properties to meet the needs of very different and challenging requirements, without impacting smartphone readout or requiring a complete redesign of the system."

Another advantage to these particles is that they can be read without an expensive decoder like those required by most other anti-counterfeiting technologies. Using a smartphone camera equipped with a lens offering twentyfold magnification, anyone could image the particles after shining near-infrared light on them with a laser pointer. The researchers are also working on a smartphone app that would further process the images and reveal the exact composition of the particles.

The research was funded by the US Air Force, the Office of the Assistant Secretary of Defense for Research and Engineering, the Singapore-MIT Alliance, the National Science Foundation, the US Army Research Office and the National Institutes of Health.



Silvertone *The Flamingo*

The Flamingo - proudly Australian designed and built UAV.
Fifty years of remote control experience.

- Fire - spotting • Incident Monitoring
- Security and Surveillance • Airborne communications platform
- Use as a mobile repeater in the sky.

Removes the need to tie up expensive manned aircraft.
Interchangeable nose-cones permit multiple missions with minimum fuss.
4m wingspan and 25kg operating design.
Single or twin-boom and enhanced payload variants available.
Payload integration assistance can be provided.

Silvertone Electronics | 1/8 Fitzhardinge Street, Wagga Wagga NSW, 2650 Australia | +61 2 6931 8252
www.silvertone.com.au | contact@silvertone.com.au



Australian UAV Technologies Pty. Ltd. ABN 65 165 321 862 T/A Silvertone Electronics

BLUETOOTH 4.0 LE MODULE

TDK has available an ultracompact Bluetooth low-energy module designed for the Bluetooth 4.0 low-energy (LE) specification (Bluetooth Smart). With its miniature footprint of 4.6 x 5.6 mm and slim insertion height of 1 mm, the SESUB-PAN-T2541 Bluetooth 4.0 LE module is designed for Bluetooth Smart devices. Due to its compact size, the module is suitable for use in wearable devices.

The module is based on TDK's SESUB technology (semiconductor embedded in substrate). The Bluetooth IC die is embedded into the thin substrate and all the peripheral circuitry, including a quartz resonator, bandpass filter and capacitors, is integrated on top. As a result, the product is nearly 65% smaller than modules that employ discrete components.

TDK Australia

www.electroline.com.au/products/65923



new
PRODUCTS

LIN TRANSCEIVER IC

To address the need for multi-LIN transceiver systems, Melexis has introduced its 2- and 4-channel LIN transceiver IC. The MLX80002/4 is said to reduce system costs of the LIN physical layer by 20% compared to multiple single transceiver ICs found in a body control module (BCM).

The product combines two or four LIN transceivers on one die and is functionally backward compatible to the current reference standard, MLX80001. It is said to enable the development of simple multi-LIN network master modules, with integrated 1 k Ω LIN master termination resistors and decoupling diodes further reducing system costs. The integrated power management function enables easy management of the different LIN channels.

Future Electronics

www.electroline.com.au/products/67732

POWER MODULES

Vincotech has announced a set of modules for UPS and solar applications. The flowMNPIC 4w second-generation modules come in flowSCREW 4w housings and feature MNPIC topology. The 400 and 600 A devices have been equipped with a different class of 1200 V and 650 V IGBT and diodes to improve efficiency and optimise inverters. They are also available with a thermal interface made of phase-change material (PCM).

Wireless Components

www.electroline.com.au/products/67621

AUTOMATIC SMT PICK & PLACE

SAVE TIME AND MONEY

Automate your SMT prototype assembly process and free engineering time, improve prototype quality and cut prototyping costs.

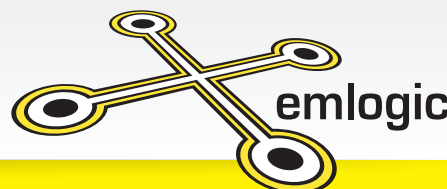
- Fast | Flexible | Affordable
- Ideal for Prototype and Low Volume
- Fine Pitch SMD down to 0.4mm
- Pitch from 0201 to 40x40mm
- Cut Tape, T & R, Tubes, Trays
- Placement Rate up to 1600CPH
- Dispensing Rate up to 8000DPH
- Up to 80 Feeders, 2 Trays

SEE IT IN ACTION | **ELECTRONEX 2014** | STAND D12

Call us today... **+61 2 9687 1880**

Embedded Logic Solutions Pty Ltd ABN 44 109 776 098
Email | sales@emlogic.com.au

www.emlogic.com.au



LED ARRAYS

LIGHT THE WAY

Bob Hult, Bishop & Associates

The real advantages of solid-state lighting are realised when lamp designers shake off limitations imposed by traditional lamps and take advantage of the low power, low heat and low profiles of LED light sources, as LED arrays light the way.

Alternatives to the incandescent light bulb have come a long way over the past 10 years. Demand from both government agencies as well as consumers for improved energy efficiency drove development of the compact fluorescent bulb but raised concerns about the quality of the light, dimming limitations and mercury contamination.

LEDs entered the general lighting market as individual lamps, often mounted on a PCB substrate to form a matrix of lamps necessary to provide the required light output. Major advances in the materials and fabrication of LEDs have dramatically increased their performance while the price per lumen has dropped. LEDs packaged in bulb and tube form factors that are designed to retrofit standard light bulbs and fluorescent tubes have simplified consumer adoption of solid-state lighting.

The real advantages of solid-state lighting are realised when lamp designers shake off limitations imposed by traditional lamps and take advantage of the low power, low heat and low profiles of LED light sources. The abilities to dim, operate in temperature extremes and dynamically adjust colour hue introduce attractive options to the designer and consumer.

Entirely new light fixture designs are possible using LEDs. Manufacturers now provide LED light sources as individual emitters, LED modules that may include current-limiting resistors and light engines with integrated drivers. The chip-on-board (COB) module has emerged as the most effective package for commercial and residential lighting fixtures.

Leading COB module suppliers, including Bridgelux, Citizen, Cree, Osram, Philips and Sharp, have introduced multiple series of packaged LED arrays that combine ease of manufacture, lower cost per lumen and higher efficiency. Many of these modules feature solder pads that allow permanent wire attachment, while others are designed for socketing.

The ability to replace an LED module that claims an operational lifetime of up to 20 years may seem unnecessary, but this feature is not for the consumer's benefit. Luminaire manufacturers want design flexibility to take advantage of fixture platforms that may extend over many models.

Pluggable LED modules allow manufacturers to select from a variety of photometric, mechanical, thermal and electrical

variables in order to match the requirements of a specific application. A common LED platform also provides an upgrade path as LED technology continues to evolve.

To minimise the risks of hand soldering, such as poor solder joints and damage to the COB, skilled labour must be used, increasing assembly time and cost.

Connector manufacturers such as BJB, Molex, Ideal Industries and TE Connectivity have solved this problem with a series of low-profile, solder-less LED array sockets that enable simple snap-in pluggability. Also known as LED holders, these connectors provide mechanical support, thermal mitigation, optical attachment and electrical interconnection.

Up to this point, there has been little standardisation among solid-state lighting manufacturers. Each supplier has gone its own way in establishing the shape, mechanical dimensions and performance of its lighting products. The Zhaga Consortium focuses on a series of global specifications that will make LED lighting components interchangeable between manufacturers. Several module, holder, electronic controller and luminaire manufacturers now offer Zhaga-compliant products, which require testing by a Zhaga-certified laboratory. Creating an ecosystem of interchangeable SSL components is expected to lower the cost and accelerate the mass adoption of LED lighting.

As rapid as the development of solid-state lighting has been, we may still be in the early stages of a revolution in general lighting. Cost is still relatively high as compared to the incandescent bulb but is becoming more competitive. New materials used in the fabrication of LEDs continue to increase the lumens per watt, quality of light and power efficiency. Solid-state lighting fixtures that have their own IP address can be remotely controlled by a smartphone. Low-voltage DC power generated by solar panels is an ideal energy source for solid-state lighting devices. Organic LEDs (OLEDs) and quantum dot technology are providing a roadmap to the future of lighting. Connectors will continue to play a key role in this burgeoning new market.

Further information, please contact Robin S Pearce, Bishop and Assoc - ANZ, apearce4@bigpond.net.au.

EMBEDDED COMPUTER

Neosys Technology's fanless box PC, the NUVO-4000 Series, is designed with 4x PCIe/PCI expansion slots. The product is a suitable application platform and replacement for traditional rack- or wall-mount industrial computers.

Backplane Systems Technology Pty Ltd

www.electroline.com.au/products/67723



new
PRODUCTS

CHIP-ON-BOARD LED ARRAY HOLDERS

Molex chip-on-board (COB) LED array holders simplify light fixture installation by providing a range of solderless solutions for mounting LED COB arrays. The high-temperature holders make it easy to integrate LEDs into lighting applications without the need for special tools.

The units provide good thermal, electrical and optic performance and are available in two options. The plastic substrate interconnect (PSI) provides a low-profile interconnect solution when used with an integrated Pico-EZmate header in select LED arrays. The dual-ended wire trap offers single-ended and double-ended wire trap terminals to enable wiring serial or parallel LED sequences.

Molex Premise Networks Pty Ltd

www.electroline.com.au/products/67727



BATTERIES

The Powerbanks series batteries allow users to charge their smartphone or iPad while on the beach, shopping, travelling or camping. The batteries are supplied with five interchangeable connectors.

Premier Batteries Pty Ltd

www.electroline.com.au/products/61157

Email: sales@ecg.entechgroup.net
Web: www.entechelectronics.com.au
Phone us now on 08 8245 6789

**Serving the Australasian
Electronics Industry
since 1986**



ENTECH
ELECTRONICS

**Spend over \$900 on PCBs
and receive one framed
laser cut stencil at no cost...**

- Limit one per company on new designs only
- Offer ends 31st August 2014
- Mention this advert when ordering to receive offer

- 30+ Layers
- Exotic Materials
- Flex/Rigid
- Blind & Buried Vias
- Controlled Impedance
- Aluminium Backed PCB
- World's Best Pricing
- Local Tech Support





the **GRUMPY** page

BREAKING RULES

Mike Smyth, specialist technical writer

It's a peculiar thing, but electronics and rule breaking seem to go hand in hand - at least as far as the average driver is concerned. It is hard to hide from electronics. The ubiquitous microchip is everywhere, from the kitchen to the lounge to the garden and especially in the motor vehicle - where there are now more electronics than ever were involved in the moon landing.

But the rise of technology in the vehicle seems to have given drivers a false sense of security and an arrogance that are both dangerous and deadly. There is no doubt that the modern vehicle is safer, more economical to run and emits fewer emissions than its predecessors, but is this technology contributing to law breaking?

Take the average speeding driver. He sweeps past at 20 km/h above the speed limit knowing he has Buckley's chance of being caught by a handheld camera operated by a policeman disguised as a roadside bottlebrush. The driver is confident, probably subconsciously, that his ABS and stability control systems will keep him out of trouble.

Within the vehicle we have computerised engine management and diagnostic systems. We have the abovementioned ABS and traction control. We have systems to warn of drifting into the adjoining lane. We have parking assist cameras and sensors, and still more sensors that automatically apply the brakes if we get overfriendly with the vehicle in front.

Then we have the 'convenience' devices such as rain-sensing wipers, dark-sensing lights and warnings of low tyre pressures. The list goes on. So it seems surprising that despite all this technical wizardry, the roads teem with drivers determined to break the driving rules because "rules were made to be broken".

The 'no speed limit here' cowboys are the worst. They are often to be seen half hanging out of the window as if they haven't quite made up their mind whether to get in or not - driving a ute or a flat tray. Then there are the U-turn turners at traffic lights or at the spots where it says in large letters "No U turn". Then there is the driver so close behind you that you can see the colour of his eyes, tempting you to open the boot and welcome him in for a free ride.

And how often do you see a driver getting into all sorts of contortions as he tries to carry on a conversation on his mobile phone. I wish I could have a quid for the number of times I have seen a woman manoeuvring a four-wheel drive round a shopping centre car park with a mobile phone clamped to her ear, mouth going at 60 km/h; and to keep the instrument in place, her shoulders twisted into a very good imitation of Quasi Modo. Again, it's electronics offering up the chance to break the law and risk injury.

The list of broken rules is endless from P-platers who seem to think that so long as the plate is on the vehicle, they comply with the law. For other drivers it becomes a guessing game to spot the plates, a corner of which is often all that can be seen peeping shyly from behind the number plate. Then there are the drunks and drug-affected who get behind the wheel. Maybe we should make mandatory the use of a breath device that prevents the engine being started until the driver has 'passed' his drug and alcohol 'test'. Although we already have cars that park themselves and driverless cars are just round the corner, so to speak, we haven't yet reached the electronic sophistication where a few microchips can replace the complexities and judgemental ability of the human brain.

The next generation of motorists may well be driving mechanically silent, all-electric vehicles hopefully fitted with a klaxon to warn of their approach rather than the driver breaking another rule by leaning out of the window and vigorously shaking a hand bell.



A.B.N. 22 152 305 336

www.westwick-farrow.com.au

Head Office

Cnr Fox Valley Road & Kiogle Street,

(Locked Bag 1289)

Wahroonga NSW 2076 Australia

Ph: +61 2 9487 2700 Fax: +61 2 9489 1265

Editor

Mansi Gandhi

wnie@westwick-farrow.com.au

Editorial Assistant

Lauren Davis

Chief Editor Janette Woodhouse

Publisher Geoff Hird

Art Director/Production Manager

Julie Wright

Art/Production

Tanya Scarselletti, Odette Boulton

Circulation Manager Sue Lavery

circulation@westwick-farrow.com.au

Copy Control Mitchie Mullins

Advertising Sales

National Sales Manager:

Nicola Fender-Fox

Ph: 0414 703 780

nfender-fox@westwick-farrow.com.au

NSW, QLD - Liz Wilson

Ph: 0403 528 558

lwilson@westwick-farrow.com.au

VIC, SA, WA - Lachlan Rainey

Ph: 0402 157 167

lrainey@westwick-farrow.com.au

New Zealand - Mark Ryu

Ph: 0800 442 529

mryu@westwick-farrow.com.au

ASIA - Lachlan Rainey

Ph: +61 (0) 402 157 167



Contact the editor

If you have any queries regarding our privacy policy
please email privacy@westwick-farrow.com.au

Subscriptions: For unregistered readers price
on application



March 2014 Total CAB

Audited Circulation (Aust + NZ)

5,291 (91% personally requested)

Printed and bound by Pegasus +61 2 8822 0716

Print Post Approved PP100007394

ISSN No. 0728-3873

All material published in this magazine is published in good faith and every care is taken to accurately relay information provided to us. Readers are advised by the publishers to ensure that all necessary safety devices and precautions are installed and safe working procedures adopted before the use of any equipment found or purchased through the information we provide. Further, all performance criteria was provided by the representative company concerned and any dispute should be referred to them. Information indicating that products are made in Australia or New Zealand is supplied by the source company. Westwick-Farrow Pty Ltd does not quantify the amount of local content or the accuracy of the statement made by the source.



REGISTER TODAY FOR YOUR

FREE SUBSCRIPTION

If you live in Australia[†] and your job title matches those on this form, we will deliver you 6 complimentary issues a year!

THREE QUICK WAYS TO REGISTER

- + WWW.ELECTRONICSONLINE.NET.AU/SUBSCRIBE
- + FAX THIS COMPLETED FORM TO (02) 9489 1265
- + MAIL THIS COMPLETED FORM TO LOCKED BAG 1289 WAHROONGA NSW 2076

Wrapper number:
(if known)

--	--	--	--	--	--

*All fields required to qualify for your FREE magazine

NAME*

JOB TITLE*

ORGANISATION NAME*

ADDRESS*

POSTCODE*

COUNTRY*

PHONE NUMBER*

MOBILE NUMBER*

EMAIL*

SIGNATURE*

DATE*

JOB FUNCTION* [] INDUSTRY* []

[select one from lists to the right>]

PRIVACY POLICY AVAILABLE ONLINE AT WWW.WESTWICK-FARROW.COM.AU

OPTIONS

I WOULD LIKE TO RECEIVE THIS MAGAZINE [] DIGITAL [] PRINT [] BOTH

I WOULD ALSO LIKE TO RECEIVE THE *ELECTRONICS ONLINE* E-NEWSLETTER []

JOB FUNCTION

(please choose one only)

- 1 Management - Corporate/General
- 2 Management - Manufacturing/Engineering/Specialist
- 3 Engineer - Electrical
- 4 Engineer - Electronics
- 5 Engineer - Process
- 6 Engineer - Project
- 7 Purchasing/Procurement
- 8 Technician - Maintenance/Service
- 9 Technician - IT
- 10 Technical Officer
- 11 Scientific Officer - R&D
- 12 Scientific Officer - QA
- 13 Consultant
- 14 Contractor/Tradesperson
- 15 OHS/EHS
- 16 Education/Training
- 17 Student-Undergraduate/Apprentice
- 18 Analyst
- 19 Sales/Marketing

INDUSTRY

(please choose one only)

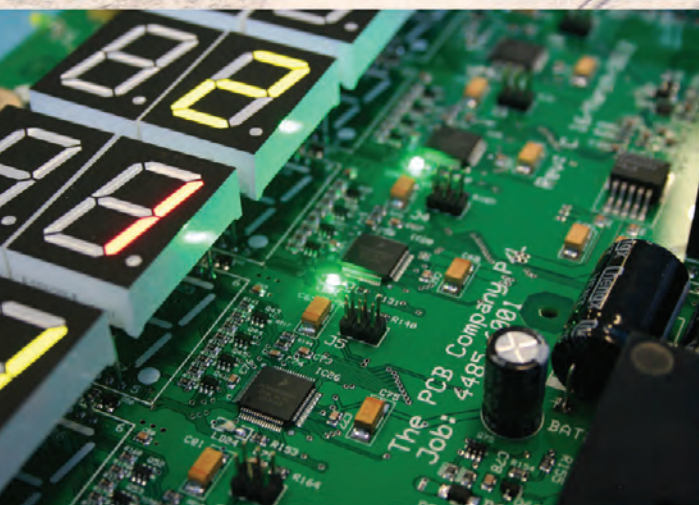
- 1 Agriculture/Rural
- 2 Building/Construction
- 3 Chemicals/Allied Products
- 4 Communications Systems
- 5 Defence/Military
- 6 Education
- 7 Emergency Services/Law Enforcement/Security
- 8 Engineering Services
- 9 Environmental Services
- 10 Finance/Banking/Insurance Legal
- 11 Food Industry - Bakery
- 12 Food Industry - Beverages
- 13 Food Industry - Confectionery
- 14 Food Industry - Dairy
- 15 Food Industry - Fruit & Vegetables
- 16 Food Industry - Meat
- 17 Government - Federal
- 18 Government - State
- 19 Government - Local
- 20 Health/Hospital
- 21 Instrumentalities (eg CSIRO)
- 22 IT - Networking
- 23 IT - Security
- 24 IT - Storage
- 25 IT - Wireless
- 26 Laboratory - Analytical
- 27 Laboratory - Clinical/Medical
- 28 Laboratory - Life Sciences
- 29 Logistics/Transport/Warehouse
- 30 Manufacturing
- 31 Mining
- 32 Oil/Gas/Coal
- 33 Packaging
- 34 Processing
- 35 Retail/Wholesale/Hire
- 36 Service/Maintenance
- 37 Telecommunication
- 38 Testing/Certification (eg NATA)
- 39 Utilities

[†] For qualified industry professionals outside Australia, the digital magazine and eNewsletters are available FREE of charge. If you would like the print magazine, contact circulation@westwick-farrow.com.au for subscription prices in your region.

The PCB Company Pty Ltd

*Bare PCB's, Full turn key service
and everything in between*

Local technical & sales
support by our in-house
electronic engineers



PCBco is one of Australia's leading electronics companies supplying to both small and multinational companies, on both a national and international level.

We utilise a vast supply chain incorporating plants in Singapore, China and the USA as well as local manufacturing facilities.



Quality Accredited ISO9001-2008

- Leading Australian PCB supplier since 1995
- Committed and focused to the most stringent quality control and product conformity
- Committed to ensuring the viability of the Australian manufacturing sector, by helping our customers be globally price competitive

Australia's No "1" supplier of PCB's

**WORLD COMPETITIVE
LOW PRICES**

PCB Tooling Prices:

Single Sided ~~\$115*~~
Double Sided ~~\$195*~~
Four Layer ~~\$350*~~

Prices slashed

- Price includes 1mm probe BBT
- Price includes shipping and local engineering support
- LOW PCB UNIT PRICING (based on size and quantity)

Free Delivery Into Store!

(* Price EXCLUDES GST)

DEMAND EXCELLENCE!!!

SPECIALISTS IN

- Printed Circuit Boards (Diverse Range)
- Membrane keypads
- Standard labels
- LED embedded labels
- Electronic design
- Embedded micro controller expertise
- Board loading and assembly
- Testing
- Full turn key service from concept to delivery of finished products

www.pcbco.com.au

Phone: (03) 9330 4100

