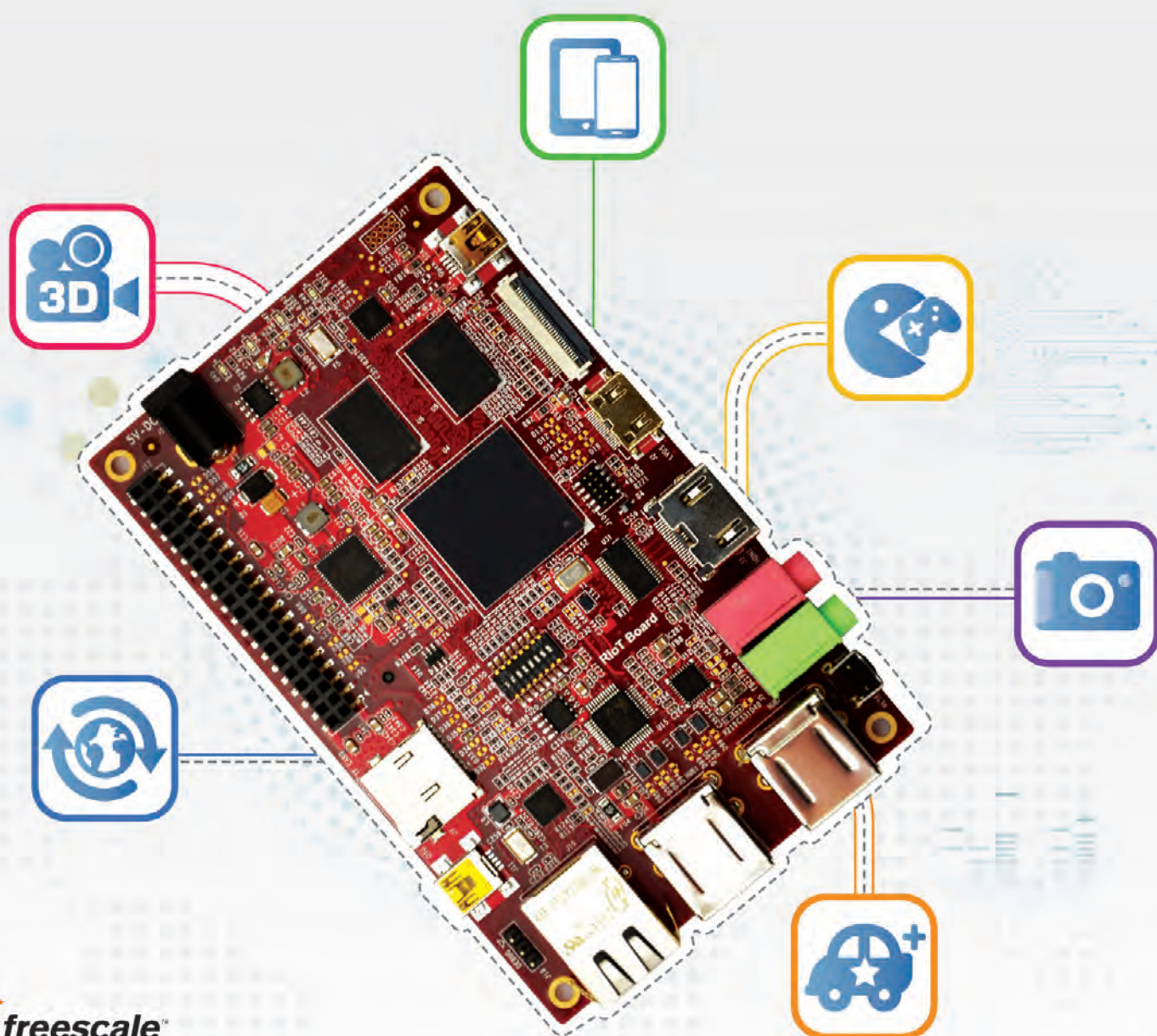


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SAFE POWER SUPPLY FOR PATIENTS

Thomas Rechlin, Senior FAE for Europe

Advancement in medical technology helps minimise risk to patients and ensure fast recovery. However, it also poses a number of challenges, not least as regards the power supply.



Decades ago, doctors had to rely on simple equipment such as microscopes and stethoscopes to make a diagnosis. Surgical procedures always posed a huge risk, as the equipment was somewhat rudimentary. The life and wellbeing of patients primarily depended on the skills and experience of the surgeon. Nowadays, hospitals are equipped with high-tech equipment and computerised devices that allow for detailed and early diagnoses and operations by keyhole surgery. These new technologies pose a number of challenges, including safe power supply. Insulation is one of the key issues here. This might not appear very obvious, as the relevant standard prescribes an insulation value of 3 kVDC/1 s. What exactly does that mean? To fully appreciate the complexity of the issue, let us have a closer look at what insulation actually means. The two main factors are the clearance and the creepage distance. The parameters define the distance that must be kept between the primary and the secondary circuit in a power supply. While the permissible values vary from application to application, they must always conform to binding standards. Closely related to the clearance and the creepage distance is the insulation level, which determines the insulation voltage.

Insulation level

The insulation level determines the voltage that a DC/DC converter or power supply can safely withstand over a defined period of time. However, the relevant specifications are not always referring to the same thing, as they differ with the actual voltage kVDC or kVAC, and obviously with the specified time period (per second, minute or permanent). In addition, one needs to take into account that the test voltage is often only applied for one second in the course of a hipot test. The values for longer periods of time are normally extrapolated and labelled in data sheets with 'rated'.

For medical technical equipment, the main standards prescribe an insulation of a minimum of 3 kVDC/1 s. As this value is not always disclosed in the data sheets of various manufacturers, it can be difficult to compare devices.

Insulation type

There are three insulation types. Functional insulation is the most straightforward and reliable type of insulation between the input and output ends of a device. It normally consists of a varnish applied to the winding wires of the transformer. With this type of insulation, the wires are wound in layers around a shared core. With this method, it is possible to achieve reliable insulation of up to 4 kVDC/1 s.

Much more effective and safe is double or basic insulation. With these methods, the primary and secondary windings are separated by an additional insulation barrier. In ring core transformers, this is achieved by placing a bridge at the centre of the ring core to physically separate the windings.

However, with this type of insulation, it is not possible to wind the wires one over the other, so that the electromagnetic properties might be impaired, leading to a lower rate of efficiency. Effective insulation can also be achieved with what is known as a 'potted core'. With this method of construction, the core and primary winding are placed in a plastic pot which is filled with epoxy. The secondary winding is then wound around the pot. This type of insulation is more expensive but it is the preferred choice where high efficiency is required. Basic insulation caters for insulation values of up to 6.4 kVDC/1 s.

The best insulation type, however, is reinforced insulation. Here, the primary and the secondary windings are separated by a minimum of two separate insulation barriers. This is normally done by using special winding technology and by placing special foils between the windings

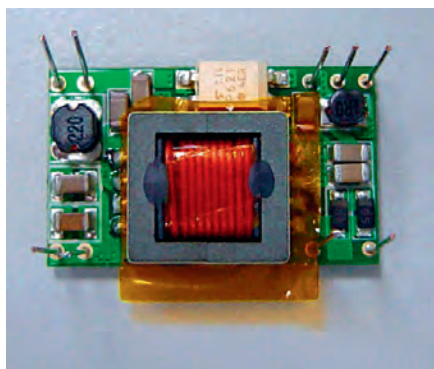


Figure 1: DC/DC converter with reinforced insulation.

Isolation requirements	MOOP			MOPP		
	Clearance	Creepage	Insulation Voltage	Clearance	Creepage	Insulation Voltage
Basis (1 X MOP)	2.0 mm	3.2 mm	1500 VAC	2.5 mm	4.0 mm	1500 VAC
Reinforced (2 X MOP)	4.0 mm	6.4 mm	3000 VAC	5.0 mm	8.0 mm	4000 VAC
Basis* (1 X MOP)	1.0 mm	2.0 mm	1000 VAC	1.0 mm	2.0 mm	1500 VAC
Reinforced* (2 X MOP)	2.0 mm	4.0 mm	2000 VAC	2.0 mm	4.0 mm	3000 VAC

Table 1: Insulation requirements for class up to 250 VAC and class up to 43 VDC or 30 VAC (white boxes).

Stray current	Type B		Type BF		Type CF	
	NC	SFC	NC	SFC	NC	SFC
Ground	500 μ A	1m A	500 μ A	1m A	500 μ A	1m A
Housing	100 μ A	500 μ A	100 μ A	500 μ A	100 μ A	500 μ A
Patient	100 μ A	500 μ A	100 μ A	500 μ A	10 μ A	50 μ A

Table 2: Leakage current limit by device type.

(Figure 1). In addition, certain specifications as regards the air clearance and creepage distances within the transformer as well as on the PCB must be met. Reinforced insulation provides effective insulation of up to 10 kVDC/1 s.

Certification for medical technical applications

On 1 June 2012, EN 60601-1, 3rd edition (Medical technical equipment and systems), came into force in EU member states. It would, however, be wrong to assume that the equivalent international standards based on the IEC standard were introduced on the same day. In some countries, including Japan and Australia, new standards are still being drawn up, and countries such as China have not even started the ratification process. In the US, the UL 60601-1 standard (3rd edition) only applies since 1 July 2013, while the Canadian equivalent (CSA C22.2 no. 601.1) came into force on 1 April 2013.

Another obstacle for manufacturers is the fact that the requirements regarding certification laid down in the existing standards vary greatly from country to country. In Europe, all devices (new and existing designs) must be certified according to the 3rd edition. In the USA and Canada, the new requirements only apply to new designs.

The main difference between the 2nd and the 3rd editions is the distinction between

patient and operator protection. The safety requirements for MOOP (means of operator protection) are significantly lower than those for MOPP (means of patient protection) and generally correspond to those laid down in EN 60950-1 (Information technology equipment - Safety). The requirements for MOPP are much more stringent than before, especially as regards insulation. Table 1 lists the insulation requirements for the two categories. It is important to note that all requirements for both means of protection must be met.

Another important change is the increase of the maximum permissible earth leakage current by factor 10. This is a consequence of the new MOOP/MOPP concept. The total patient leakage current is classified based on the type of the device with which the patient is in contact. The permissible leakage contact will be lower if the contact between the device and the patient is closer. Table 2 shows the applicable limits for normal operation (NC - normal conditions) and fault conditions (SFC - single fault conditions).

Apart from technical changes, the new standard now demands a formal risk analysis according to ISO 14971, which could pose a challenge to certain power supply manufacturers. Based on a risk index matrix, all risks that could arise from the power supply must be analysed

and weighted. The matrix takes into account the occurrence, probability (unlikely to frequent) and impact (insignificant to catastrophic) of the potential risk, based on a rating system from 1 to 5 in each category. If the risk index is ≤ 6 (probability \times impact), the risk is deemed acceptably low. Risks with a higher index must be completely eliminated.

These requirements are difficult to assess, especially for manufacturers of DC/DC converters, as the end device, which obviously has a major influence on the risk level, is often not known. When choosing a converter, it is advisable to obtain the respective risk management reports from the manufacturer. Only if these documents are in place is it possible to deal with the power supply as a 'black box', which speeds up the certification process for the actual medical technical device.

In order to meet the above requirements, and in particular the limits for insulation and leakage current, a combination of high-quality AC/DC for medical application and DC/DC converters is often the most efficient solution. This approach makes it easier to meet the stringent requirements of double patient protection (2x MOPP).

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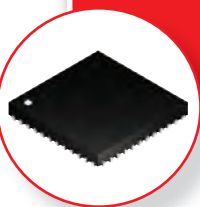
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STRONG GROWTH

FOR SEMICONDUCTOR WIRELESS SENSOR IOT MARKET

The semiconductor wireless sensor networks market is expected to reach \$12 billion by 2020, according to WinterGreen Research.

Semiconductor wireless sensor networks are used for bridge monitoring, implementing the smart grid, implementing the Internet of Things (IoT) and monitoring for security implementation. The systems are used to implement energy savings in homes and commercial buildings; almost anything can be monitored with sensors and tracked on a smartphone.

With 9 billion devices connected to the internet in 2014, phenomenal growth is likely to occur when that number rises to 100 billion by 2020, predicts WinterGreen Research. The research firm has published a new study *Wireless Sensor Network Market Shares, Strategy, and Forecasts, Worldwide, 2014 to 2020*.

Businesses control devices with sensors and wireless sensor networks (WSNs). The sensors connected to the internet promise to bring a big data explosion. Much of the data will be discarded, as users get simply overwhelmed by vast volumes. Analytics are expected to become popular inside the wireless sensor networks so that alerts are generated at the point of collection of data. The issue is how to embed analytics into the wireless sensor network control units so that only the alert data needed is transmitted. Users of information need to be able to find, control, manage and secure the information coming from sensors onto the network.

Users need to analyse and exploit the information coming from sensors. Advanced technologies for wireless sensor networks are associated with emerging ways of interconnecting devices that have never been connected before. Networking is based on leveraging the feasibility of making sensors work independently in groups to accomplish insight not otherwise available.

Advanced storage devices are emerging simultaneously with the energy-harvesting devices that are economical, making sensor networks feasible. Storage devices can leverage the power captured by energy harvesting when sensors and devices are interconnected as a network.

Data storage technologies connected to the sensors are permitting far better control of the world around us, implementing vastly improved energy efficiency as lights and heating are turned on and off just as needed. Wireless sensor networks implement cost-effective systems.

Wireless sensor networks are developing a market presence. They are set to power wireless sensor network proliferation. Independent sensor devices located almost anywhere have attained workable levels of efficiency.

The proliferation of apps on smartphones will drive growth of semiconductor wireless sensor networks markets because the sensors work directly as they are installed without excess labour

and wiring that has been necessary previously, making the systems more convenient to install and run.

Healthy lifestyle choices can increase the length of DNA sequences found at the end of a person's chromosomes and reverse ageing. This discovery is likely to increase interest in monitoring and testing DNA sequences and looking at the ends of the chromosomes. This discovery is likely to increase a shift towards wellness initiatives. It has stimulated the need for better communication between clinicians and patients. New sensor technology creates the opportunity for monitoring and testing. Wireless sensor network devices can be used to send alerts to at-risk people who are exercising.

Wireless sensor networking is set to grow as sensors are freed from the grid and networks implement connectivity that is mesh architecture based. Converting ambient energy to useable electrical energy harvesting (EH) systems creates the opportunity to implement wireless sensor networks. These networks interconnect an inexpensive and compact group of devices and sensors. The networks use wireless capability to power portable electrical devices.

According to Susan Eustis, lead author of the WinterGreen Research team that prepared the semiconductor wireless sensor network market research study, "Semiconductor wireless sensor network markets are evolving as smartphone devices and technology find more uses throughout the landscape of the Internet of Things. Sensors can provide monitoring that has not previously been available. Differential diagnostic tools support provides differential information that helps manage our daily lives from traffic patterns to crime detection, to medical treatment.

"The decision process takes into account clinical findings from the home monitoring devices and from symptoms verbally communicated in a clinical services setting. Improved economics of healthcare delivery implementation is facilitated by wireless sensor networks. This is true across the spectrum of things that can be monitored by sensors."

Wild growth, frequently measured as penetration rates, is a result of the change out of wired sensor networks for wireless ones. In addition, the wireless networks have a broader reach than the wired ones did, spurring market extensions in a variety of applications, some not even thought of so far. Market growth is dependent on emerging technology. As the wireless technology, the solid-state battery, the sensor technology, the smartphone technology and the energy-harvesting technology all become commercialised, these devices will be used to implement wireless sensor networks. The semiconductor wireless sensor networks markets will be driven by the adoption of 9 billion smartphones by 2020, creating demand for apps that depend on sensor networks.

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PLCs and drives for offshore supply vessels

Vard Electro's application-specific propulsion and thruster power solutions for offshore supply vessels include ABB's modular liquid-cooled drives and PLCs. The electric motor propulsion technology designed by Vard has been used on a series of six platform supply vessels (PSVs) - the first two of which are currently being built in Japan.

Vard Electro looked for a drives and control supplier that could provide a highly configurable drives platform and chose drives from ABB's ACS800 range, with control provided by ABB's AC500 PLCs. The high degree of modularity

of both the controller and drives, and the availability of sophisticated PLC development tools in the form of ABB's automation builder engineering software suite - together with valuable local programming and HMI capabilities of the drives themselves - provided the economy and versatility of platform that Vard Electro was seeking.

These system components also provided a number of tangible performance advantages for this particular motor control application. These included fast real-time control updates and low harmonics power conversion of the drives, and compactness that comes from liquid cooling - a valuable feature for the packed OSV engine rooms housing the main engines and thrusters.

For each vessel of the six PSVs which are being built in Japan, ABB has supplied five PLC-controlled variable speed drives to control a total of over 6 MW of power: two 2 MW drive systems for the main engines, two 730 kW drives for bow thrusters and one 730 kW drive for a dual-fed bow thruster that is able to survive the failure of either of the vessel's two power generators.

The ABB drives and controller system are featured in Vard Electro's SeaQ Power intelligent power systems range, which was created during the past year. To support the development process for the new propulsion power offering, ABB initially supplied the company with a small-scale version of the PLC-drive-motor package, plus development tools. Supplying the complete control and drive package ensured that there were no integration problems. Vard Electro also chose a version of the PLC with one of the fastest processor options - the PM590-ETH - to ensure good real-time control performance. The PLC is connected to the drive using Profibus DP fieldbus communications.

Vard Electro's control logic for the propulsion system includes all of the standard control features, as well as numerous variations to optimise performance in a number of situations, including a 'ride through' specification to overcome power supply glitches smoothly, seamless switchovers for dual-fed supply arrangements and rich local status, alarms/diagnostics and control possibilities on each of the drives - provided via the addition of a touch-screen HMI located on each cabinet's front panel. For this latter task Vard Electro chose to install large CP660 HMI panels from ABB's CP600 series which meet DNV standards - to display information to operators in very clear and detailed forms.

The integration of all these components was simplified by the use of ABB's integrated automation builder software, which provides a common development tool for the spectrum of automation components used in this application: PLCs, drives, HMIs, fieldbus, networks and web services.

Before delivering the new electric power propulsion control system, Vard performed detailed testing on the PLC and drive combinations at its test facility in Søvik, Norway. These trials were also witnessed by the company's Japanese shipyard customer. The integrated control system passed all of its tests and Vard has now shipped the propulsion systems for the first two vessels. The very first vessel with this technology will be launched in mid-2014 and will be destined for use in platform supply applications.

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CUSTOM OR OFF-THE-SHELF CONNECTORS?

Hank Mancini*

There are a number of factors to consider when deciding between custom or off-the-shelf medical connectors and the pros and cons of each might surprise you.

When designing a new medical device, one of the decisions manufacturers face is choosing a connector and mating receptacle. For some applications, a standard (or off-the-shelf) connector is a viable option. For other applications, a custom or hybrid connector may be more appropriate.

Reasons to consider a custom medical connector include: a unique design is required to ensure that only a specific cable or connector can be mated to the device; the shape of the connector needs to match the profile of the device; a variety of signal types must be carried within a single connector (high voltage, low voltage, high bandwidth, data, thermocouple); better able to meet the cost target; custom logo or markings are required; enhancing safety by preventing mating of incompatible connectors via unique pin-to-socket patterns or connector shapes.

A custom connector will typically involve engineering and tooling fabrication costs. These up-front charges can be a roadblock to choosing a custom connector solution. However, once the costs for connector design and tooling are realised, a custom connector can often cost much less than an off-the-shelf connector.

Physical properties

A custom connector solution allows each desired physical property to be addressed. A custom connector can be designed so that mate

and un-mate force matches specific customer requirements. This force is composed of the friction from each pin and socket as well as the mechanical interface of the connector and receptacle.

Moisture protection is often a consideration in medical inter-connect systems. Off-the-shelf connectors typically incorporate shells and pre-moulded boots or collars. When these components are assembled into a finished connector, they often do not offer the required degree of ingress protection. Custom overmoulded connectors can be designed with any required ingress protection (IP) rating.

Availability of connectors from major manufacturers can also be an issue, with lead times of eight to 16 weeks being common. Once tooling has been fabricated, the lead time for custom connectors can be much shorter than for off-the-shelf connectors.

Design requirements

Establishing detailed design requirements is one of the first steps in determining whether a custom or standard connector is the best option. Factors that may require consideration include:

- number and type of contacts (pins or sockets and specifications for each)
- cable configuration (ECG, defib, power, analog, digital, bandwidth, pneumatic, fibre optic, or combination of two or more)

MEDICAL CONNECTORS

- cable diameter, materials and shape
- regulatory and environmental ratings (RoHS, REACH, ISO 10993, UL)
- strain relief requirements
- shielding requirements for both the connectors and the cable
- voltage and current requirements
- size constraints and/or desired physical size
- ingress protection (IP) requirements or rating
- number of mate and un-mate cycles required
- locking mechanism - if any
- keying requirements
- desired mate and un-mate force
- cleaning, disinfection and sterilisation requirements
- logos, markings and serialisation

Components of custom connectors

A custom connector typically involves an injection-moulded, hard plastic insulator into which pins, sockets or both are inserted. Termination of conductors to the pins or sockets by solder or crimp is most common. This assembly is then overmoulded with a rigid material such as polypropylene, which holds the construction together and provides physical strength. A second overmoulding with a material such as a thermoplastic resin or silicone gives the connector the desired colour, finish, look and feel.

Hybrid connectors

For some applications, a hybrid connector may be the best option. A hybrid connector is an off-the-shelf connector with custom features such as an overmoulded grip or strain relief. Design and tooling costs for a hybrid connector can be less than for a custom connector, yet the finished product can have the look, feel and some of the additional performance advantages of a custom connector. In addition to lower engineering costs, a hybrid connector can have a shorter design and development schedule than a fully custom connector design.

A custom or hybrid connector can provide unique features and benefits for medical devices. Each design element can be addressed with less compromise as compared to using an off-the-shelf connector. Safety and reliability can be enhanced and a custom connector may be a more cost-effective solution. However, custom and hybrid connectors typically require a greater investment in engineering and tooling than an off-the-shelf connector.

**Hank Mancini is the business development manager for Affinity Medical. In his 30-year career in the medical industry, Hank has been exposed to almost every facet of the business, from marketing and manufacturing to new product development, sales and strategic management.*

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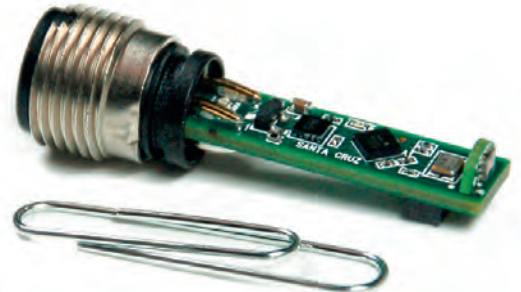


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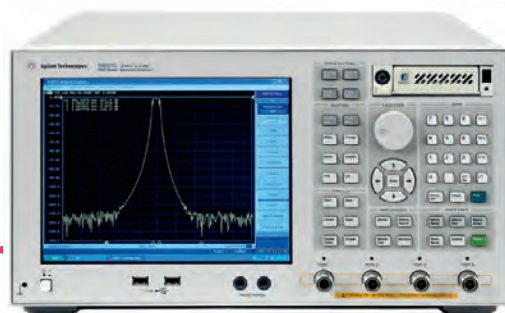
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**new
PRODUCTS**



TWO-PORT NETWORK ANALYSER

Available to rent from TechRentals, the Agilent E5071C-260 two-port, 9 kHz to 6.5 GHz network analyser is a fast, accurate and versatile product for RF component testing.

The unit incorporates an integral S-parameter test set and 85032F calibration kit. It is suitable for use in RF evaluation tests in component manufacturing and wireless design, and by R&D engineers and aerospace/defence contractors.

TechRentals Pty Ltd

For more info on this product wf.net.au/V958

POTENTIOSTAT

The Interface 1000 is a potentiostat/galvanostat/ZRA for use in general electrochemistry applications. It is suitable for corrosion measurements, battery testing, sensor development and physical electrochemistry. The product features nine current ranges and three gain stages, and covers everything from corrosion to batteries and sensors to supercaps. It has a full 1 A of current up to the compliance limit of ± 20 V.

Like all Gamry potentiostats, the product was designed from the ground up for true floating capability. Whether the user needs to measure earth-grounded working electrodes or multiple electrodes in a shared electrolyte, the unit is up to the task.

Scientific Solutions Pty Ltd

For more info on this product wf.net.au/W475

PROGRAMMABLE SAFETY CONTROLLER

The Banner Engineering SC26-2 Programmable Safety Controller provides PLC-level capability and control without the programming complexity and steep learning curve of traditional PLCs.

Micromax Pty Ltd

For more info on this product wf.net.au/W311

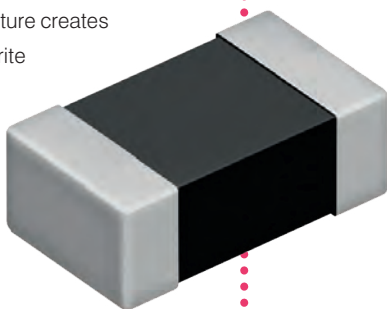


MULTILAYER FERRITE CHIP POWER INDUCTORS

TOKO has announced the MDT series of multilayer ferrite chip power inductors. The company's architecture creates robust, magnetically shielded, multilayer ferrite power inductors offering low resistance and high current handling in a miniature footprint.

Wireless Components

For more info on this product wf.net.au/W402



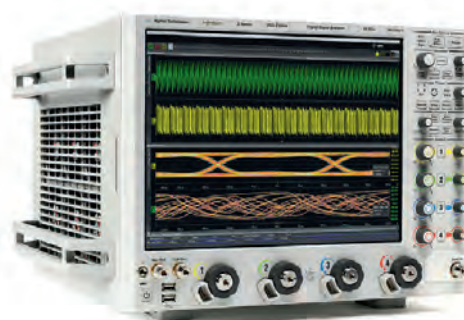
new
PRODUCTS

OSCILLOSCOPES

Synchronising Infiniium Z-Series oscilloscopes, from Agilent Technologies, can allow up to 40 measurement channels simultaneously with a maximum 63 GHz real-time oscilloscope bandwidth (on up to 10 oscilloscopes).

Agilent Technologies Aust Pty Ltd

For more info on this product wf.net.au/W744



15" AND 17" CONFIGURE-TO-ORDER PANEL PCS

To give users flexibility in their choice of product and to adjust their designs based on their requirements, Advantech is launching the PPC-8150 and PPC-8170 15" and 17" panel PCs.

The company's configure-to-order-service (CTOS) enables users to build the best solution for their business by selecting such items as the motherboard, memory, hard drive, power supply and other items.

Advantech Australia Pty Ltd

For more info on this product wf.net.au/W729

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NETWORK ANALYSER FOR TESTING SIMPLE RF PASSIVE COMPONENTS

Agilent Technologies has announced the E5063A ENA Series network analyser. The instrument offers optimised performance and functionality for testing simple RF passive components, such as handset/BTS antennas, RF cables and filters. The product provides high RF performance, including trace noise of 0.002 dBrms and stability of 0.01 dB/°C. This helps reduce test cost without sacrificing quality.

Agilent Technologies Aust Pty Ltd

For more info on this product wf.net.au/W415

PINK INDICATOR LED

Marl has added a pink version to its 676 series of standard indicator LEDs. The rugged IP67 sealed LEDs are suitable for panels and status indication applications due to their wide viewing angle.

With the addition of a pink version, the range of colours offered in the series is increased to six, including red, yellow, green, blue and cool white. The pink LED offers designers the opportunity to customise the appearance of their system and to assign different colours to different types of status and warning indication.

Aerospace & Defence Products

For more info on this product wf.net.au/V520

TEST AND TAG PRINT KIT

The PAC3760 DL is a data logging appliance tester and test tag printing kit. The tester stores test results that download to any PC spreadsheet or database program. No special software is required to generate an electronic logbook.

Emona Instruments Pty Ltd

For more info on this product wf.net.au/W580

LTE/HSPA+ MODULE

The Sierra Wireless MC7304 module is suitable for M2M applications demanding high-speed connectivity. The product operates on all LTE networks with fallback to all 3G frequencies in use in Australia/NZ (850/900/2100 MHz).

The mini PCIe LTE module can be easily integrated into a variety of devices. Target markets include applications with security cameras for video upload, digital signage with high-data download needs and routing over LTE.

M2M Connectivity

For more info on this product wf.net.au/V605



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IMPORTANCE OF IGBT DRIVERS

Johannes Krapp, Product Manager, Driver Electronics

To ensure that power electronic components are reliably protected from the effects of non-permissible operating conditions, fast and reliable error detection and effective protective measures are essential.

In power modules, error management can be provided either by the system controller or by IGBT drivers. The system controller is suitable for reacting to slow failure modes such as overheating caused by excessive temperatures. Driver electronics, in contrast, are needed to detect and respond to sudden errors. Various driver concepts are available on the market today and differ as regards their applicability, efficiency and reliability.

Fast errors in power converter systems include short circuits and circuit-induced overvoltages. Short circuits are the fastest errors.

When power electronic systems are commissioned, connection and isolation errors are often the cause of short circuits, while in field applications short circuits may be due to faulty components.

If a short circuit occurs in the load path or bridge branch, the collector current in the IGBT increases starkly, causing transistor desaturation. The IGBT modules available on the market today are short-circuit-proof for a brief time only. To prevent the IGBT from being destroyed by thermal loading, it is crucial that the short circuit be detected within this safe period and turned off reliably.

Detecting short circuits

Driver electronics can detect short circuits by way of the di/dt measurement or VCE monitoring.

In di/dt detection (Figure 1a), the driver electronics measure the rate of change in current in the IGBT. The voltage drop at the stray inductance between auxiliary and power emitter is proportionate to the rate of change (di/dt) of the collector current. By comparing the voltages with a reference voltage, a fast short circuit can be detected. To monitor slow short circuits, this method uses the resistive components in the wire bonds and internal busbars between power and auxiliary emitters. This method also depends, however,

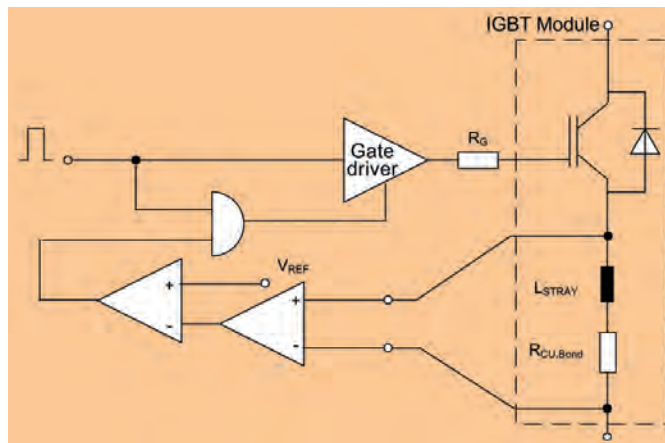


Figure 1a: Circuit diagram.

on the screw connections used for the power connections. These display a certain distribution in the contact resistance characteristic, and are to be taken into consideration in series connection with the other ohmic components. This calls for precise adaptation to the given system. In general, di/dt detection can only be used for IGBT modules with an auxiliary emitter output.

VCEsat monitoring (Figure 1b) uses the correlation between collector current and on-state voltage. To do so, the collector-emitter voltage is measured and compared with a dynamic reference voltage by a comparator. If the voltage reading exceeds the reference voltage, the driver electronics automatically turns the transistor off. Owing to the rapid increase in transistor voltage,

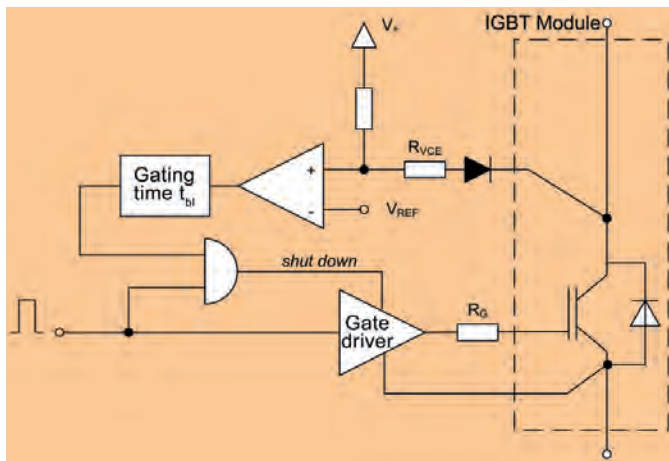


Figure 1b: Circuit diagram for VCE monitoring.

VCE monitoring is a reliable short circuit detection method. The advantage of VCE monitoring is that short circuits are detected quickly and it is suitable for use with any standard IGBT.

If the short circuit occurs in combination with a high inductance, for example on the power side, the collector current rises more slowly. In this case, the VCE threshold has to be adapted accordingly. To be able to apply the VCE method to overcurrent detection, multistage VCE monitoring can be used. Here, several trip thresholds with given reference times are defined. The disadvantage of this method, however, is its temperature-dependence, as well as the complexity involved in adapting the individual stages to the given system. In general, a more effective and reliable way of detecting slow overcurrents is to use integrated current sensors.

Besides fast error detection, an effective and reliable response to a short circuit is also crucial. If drivers are used in multilevel applications or in drives for synchronous motors, the master controller should be responsible for system turn-off. In this case, the driver sends only the isolated error signal to the controller and waits for instructions. In multilevel applications, for example, if the driver turns off the power semiconductor directly and then sends the signal to the controller, the entire DC link voltage may be present across one IGBT for the entire signal transmission and response time. This would lead to the destruction of the module. In the majority of applications, however, it is safer to allow the power modules to be turned off directly by the driver. The driver can respond more quickly, since it does not have to wait until the signal transmission process is complete, but can independently turn off the module from the secondary side. The avoidance of voltage spikes when turning off short circuit currents is ensured by the driver by way of a soft-off or two-level turn-off function. Here, the driver turns off the IGBTs that have higher gate resistances more slowly, in doing so protecting the module from exceeding the safe operating area (SOA).

Circuit-induced overvoltage

The second fast error mode results from circuit-induced overvoltages. Overvoltages that occur during turn-off have to be detected and reduced quickly in order to prevent the IGBT module from being damaged. The switching surges result from stray inductance in the power circuitry, for example as a result of busbars. Externally induced overvoltages are slow and can be controlled more effectively by way of DC link voltage monitoring.

Driver electronics can control overvoltage directly by way of active clamping, or by use of IntelliOff, an intelligent turn-off fea-

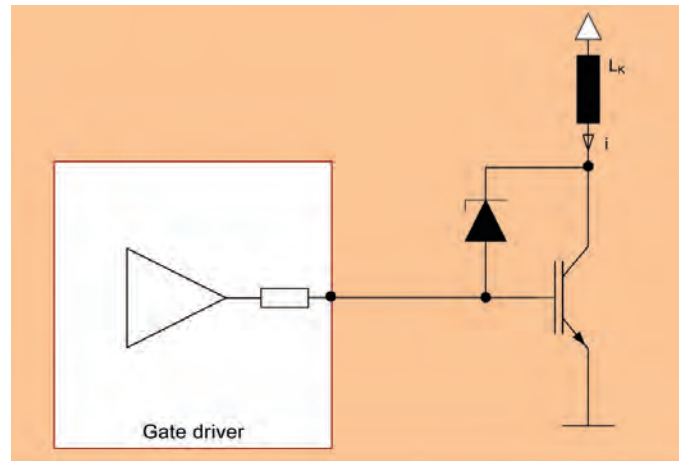


Figure 2: Active clamping circuit diagram.

ture used to reduce critical voltage spikes. Active clamping turns the IGBT back on as soon as an overvoltage occurs. The gate recharging process is essentially controlled by a central element between collector and gate in order to reduce the overvoltage.

Here, the overvoltage value corresponds at a maximum to the Zener voltage. The transistor operates once again in the safe operating area, but converts the energy stored in L_k to heat. During this process, substantial additional losses occur in the IGBT within a very short time. These losses accelerate the ageing process of the components and limit the reliability of the converter system.

One way of preventing the occurrence of overvoltages would be to use the IntelliOff turn-off feature. IntelliOff offers optimised turn-off, combining the advantages of virtually immediate switch response with soft turn-off. The turn-off process itself is optimised by IntelliOff thanks to different-speed gate discharging. To start with, the driver initiates the IGBT turn-off process as quickly as possible. As soon as the turn-off process enters the overvoltage phase, the driver slows down the turn-off process, in doing so working proactively against the overvoltages. Finally, the IGBT driver turns off the module safely and reliably.

As soon as the turn-off signal comes, the driver generates the negative gate charge. The discharging process of the gate collector and emitter capacitances begins and the gate current reaches its negative peak (period 0). Owing to the Miller effect, which describes the process of capacitive feedback that opposes the turn-off process, the gate emitter voltage remains at a higher level for a certain time (period 1). IntelliOff reduces this discharging time thanks to a low-ohmic turn-off resistance and allows for the process to speed up. During period 2, a high-ohmic resistance slows down the turn-off process, in doing so avoiding circuit-induced voltage spikes (period 2). Without IntelliOff, an overvoltage may occur in this phase which, in the case of active clamping, will produce additional losses and, if suitable protective measures are not taken, might ultimately lead to the destruction of the module. Once the critical, voltage spike time frame has passed, the driver establishes - by way of the IntelliOff function - the parallel connection of the turn-off resistances, ensuring that the IGBTs are switched off safely and efficiently. The simple adjustment is possible thanks to an adjustable time constant between high and low turn-off resistances.

New IGBT generations, in particular, have very fast and hard switching characteristics. The IntelliOff function can ensure faster turn-off without the risk of critical voltage spikes and, consequently,

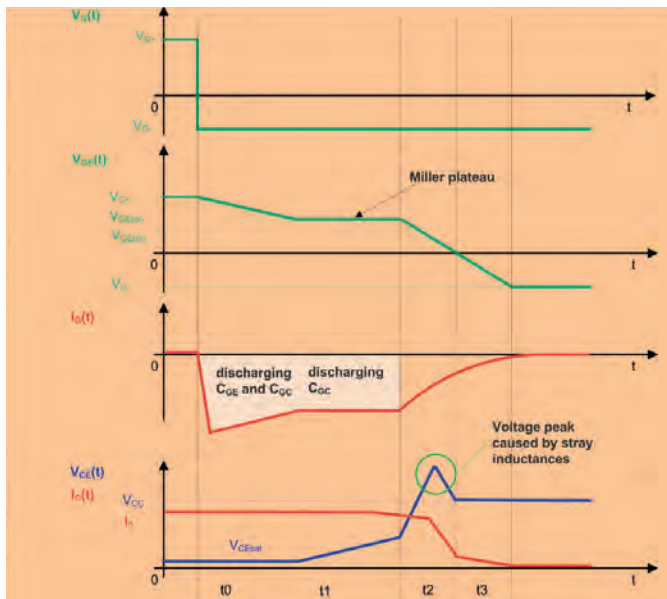


Figure 3: IntelliOff, proactive overvoltage protection.

help ensure optimum performance in new IGBT modules. Alternative protective concepts, in contrast, respond by limiting the performance of the IGBT module, in doing so producing additional losses.

Conclusion

The ideal protection concept for gate drivers depends on the given application. In general, however, it is advisable to investigate and analyse the error mechanisms during the system dimensioning stage. Using the gate driver to permanently compensate for non-permissible conditions is not an efficient solution and reduces reliability into the bargain. A more effective way of providing over-voltage protection is to use the IntelliOff function, which prevents voltage spikes from occurring in the first place. VCE monitoring is a reliable short circuit detection method and has a number of advantages over di/dt detection owing to its easy adaptability and applicability with any standard module.

Many different driver protection solutions are on the market today, ranging from standard protection functions to highly complex driver solutions. With simple driver solutions, however, users have to integrate protective functions themselves and provide driver protection for the overall system themselves. This can be rather costly, and driver protection is often underestimated. Highly complex driver solutions, by way of contrast, often have the disadvantage that system implementation is rather complex and service life is often limited. An optimum driver solution has to meet system reliability requirements but should also factor in the all-important price considerations of mass-production applications.

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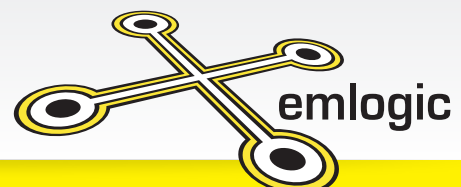
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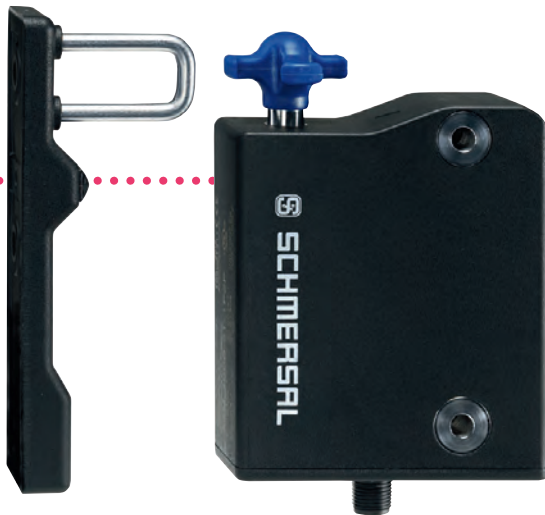


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SAFETY SWITCH

The external cam on the Schmersal AZ300 mechatronic safety switch, in the shape of a Maltese cross, allows the product to accept the actuator from any of three sides, providing flexibility for either left- or right-hinged doors, or sliding guards.

Control Logic Pty Ltd
www.control-logic.com.au



USB 3.0 HUB CONTROLLER

Cypress Semiconductor has announced the EZ-USB HX3 USB 3.0 hub controller, certified by the USB Implementers Forum (USB-IF) for the SuperSpeed USB 5 Gbps standard.

The product offers robust interoperability, extensive charging support and full configurability, making it suitable for docking stations, monitors, ultrabook devices, digital TVs, set-top boxes, printers and servers.

Mouser Electronics

For more info on this product wf.net.au/W720

LED DRIVER SERIES

Recom Lighting has released two high-power, dimmable, constant current AC LED driver series - the RACD100A series and RACD150A series - for applications that require a high output voltage to drive long LED strings.

RECOM Asia Pte Ltd

For more info on this product
wf.net.au/W708



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HIGH-DEFINITION HDMI MATRIX SWITCH WITH POE

Interworld Electronics has released the SM-8X8-C6HDB-POE-HDBT high-definition HDMI video matrix switch with Power over Ethernet (PoE). PoE allows the switch to be powered from a remote DC supply via its CAT6 Ethernet cable.

Interworld Electronics and Computer Industries

For more info on this product
wf.net.au/W572



MAINS-DIMMABLE LED LAMP DRIVER

The AP1694 is an AC-DC controller providing a universal high-performance driver solution for a variety of mains-dimmable LED lamp designs. Suitable for 120 and 230 VAC inputs while supporting non-isolated buck, buck-boost and isolated flyback topologies, the part enables 10-50% reductions in BOM costs.

Digi-Key Corporation

For more info on this product
wf.net.au/W578

COLOUR-CHANGING LIGHTING

Marl's RGB light engines mix light colour at the source, eliminating the annoying effects that can take the shine off a lighting display.

Triple shadows and fringes are prevented - instead, the colour change lights fade elegantly from colour to colour, continuously giving the appearance of a single, homogenous light source.

Aerospace & Defence Products

For more info on this product wf.net.au/V533

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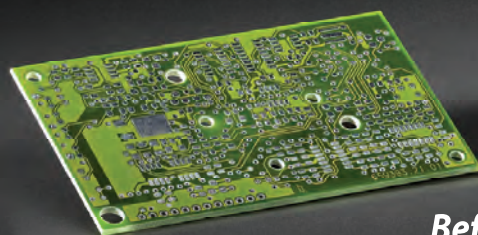
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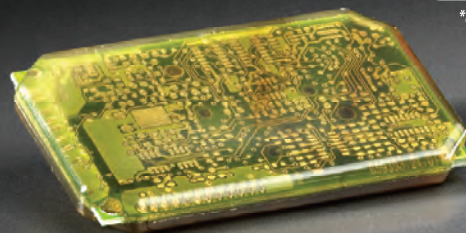
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SINGLE- AND DUAL- LOOP TEMPERATURE CONTROLLER

West Control Solutions introduces the Pro-EC44, a user-friendly, single- and dual-loop temperature controller. The product has been designed to simplify user operation through an intuitive HMI combined with easy-to-use configuration and simulation software, Blue Control.

Automated Control Pty Ltd

For more info on this product wf.net.au/W573

SMD FUSE

Schurter has extended its SMD fuses product family with a series which has high breaking capacity. Named UMT-H, the product has a breaking capacity of 1500 A. This makes the time-lag fuse suitable for applications with large short-circuit currents. Initially having six rated currents from 160 mA to 2 A, and having rated voltages up to 277 VAC and 250 VDC, it is an all-purpose component.

With all equal electrical specifications, the product has a competitive size, with dimensions of 5.3 x 16 mm making it more compact than traditional cylindrical fuses in 5 x 20 mm format. The square-shaped design keeps the device in place during reflow soldering. Due to the position of the device markings, key information about the fuse can be seen immediately.

SCHURTER (S) PTE LTD

For more info on this product wf.net.au/W116

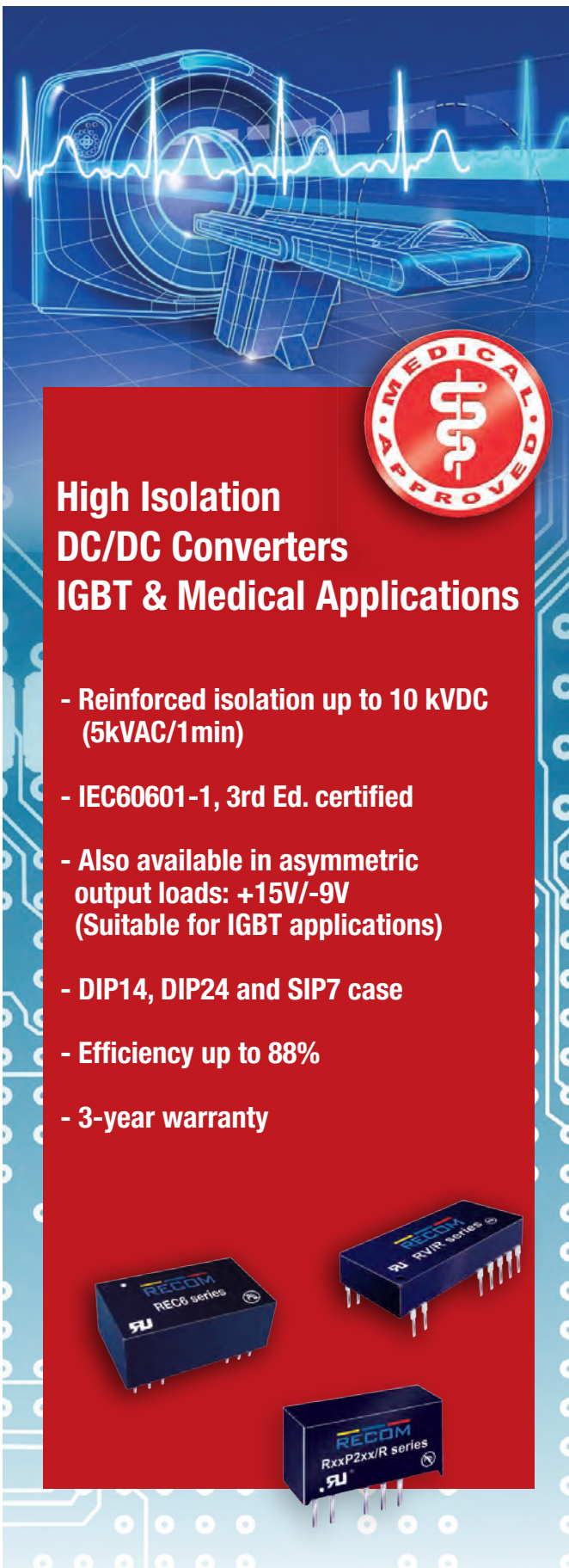


TRUE-RMS DIGITAL MULTIMETER

Available to rent from TechRentals, the Fluke 28II Ex is a completely sealed, IP67-rated, intrinsically safe digital multimeter. It is suitable for hazardous environments found in the petroleum, chemical and pharmaceutical industries.

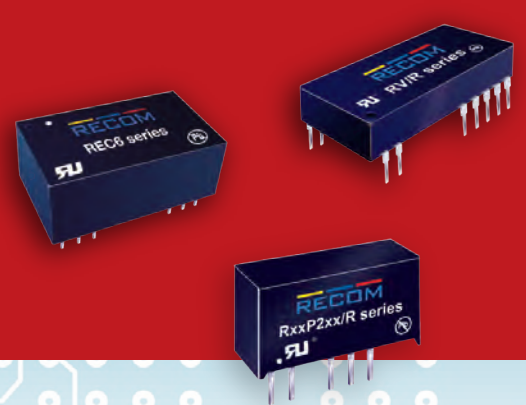
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For more info on this product wf.net.au/W489



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NEXTGEN BENCHTOP INSTRUMENTS

Chris Delvizio, Product Manager



Each generation of engineer has seen new generations of instrumentation. Baby boomers used cathode-ray oscilloscopes and multimeters with needle displays. Generation X ushered in a new generation of 'digital' instruments that used analog-to-digital converters and graphical displays. Generation Y is now entering the workforce with a new mindset that will drive the next generation of instrumentation.

Each generation of engineers has seen a new generation of instrumentation. From computers, to the internet, and now mobile devices, this technology has evolved at a faster rate than ever before. A recent report from Cisco delved into the nature of Generation Y and their relationship with technology: smartphones rated twice as popular as desktop PCs; 1/3 of respondents check their smartphones at least once every 30 minutes; 80% use at least one app regularly; two out of three spend equal or more time online with friends than in person.

The innovation in consumer electronics, which Generation Y engineers use in their daily lives, has outpaced the instruments they use in the professional setting. In fact, the form factor of benchtop instruments has remained mostly unchanged over the years. All components - display, processor, memory, measurement system and knobs/buttons - are integrated into a single, stand-alone device.

With the current era of instrumentation reaching maturity, Generation Y engineers will demand that modern technologies be incorporated with instruments. Instrumentation in the era of Generation Y will incorporate touch screens, mobile devices, cloud connectivity and predictive intelligence to provide significant advantages over previous generations.

Touch screen

According to Frost & Sullivan, "Engineers will increasingly associate the concept of a user interface with the one they use on their consumer electronics devices." The touch-screen-based user interfaces found in today's mobile devices provide a drasti-

cally different experience compared to the physical knobs and buttons on today's instruments, which will be unsatisfactory for Generation Y.

As instruments have added new features, they've also added new knobs and buttons to support them. However, this approach is not scalable. At some point, the number of knobs and buttons becomes inefficient and overwhelming. Some instruments have resorted to multilayered menu systems and 'soft buttons' that correspond to variable actions, but the complexity of these systems has created other usability issues. Most Generation Y engineers would describe today's instruments as cumbersome.

An instrument that completely ditches physical knobs and buttons, and instead uses a touch screen as the user interface, could solve these challenges. Rather than presenting all of the controls at once, the touch screen could simplify the interface by dynamically delivering only the content and controls that are relevant to the current task. Users could also interact directly with the data on the screen rather than with a disjointed knob or button. They could use gesture-based interactions such as performing a pinch directly on the oscilloscope graph to change the time/div or volts/div. Touch-screen-based interfaces provide a more efficient and intuitive replacement for physical knobs and buttons.

Mobile-powered

By leveraging the hardware resources provided by mobile devices, instruments can take advantage of better components and newer technology.

keep users continuously connected, they can access and edit their documents from anywhere at any time. In addition to just storing files in the cloud, some services host full applications in the cloud.

With services like Google Docs, users can remotely collaborate and simultaneously edit documents from anywhere.

Instrumentation that incorporates network and cloud connectivity could provide these same benefits to engineers. Both the data and user interface could be accessed by multiple engineers from anywhere in the world. When debugging an issue with a colleague who is off-site, rather than only sharing a static screenshot, engineers could interact with the instrument in real time to better understand the issue. Cloud technologies could greatly improve an engineering team's efficiency and productivity.

Intelligent

Context-aware computing is beginning to emerge and could fundamentally change how we interact with devices. This technology uses situational and environmental information to anticipate users' needs and deliver situation-aware content, features and experiences. A popular example of this is Siri, a feature in recent Apple iOS devices. Users speak commands to or ask questions of Siri, and it responds by performing actions or giving recommendations. Google Now provides similar functionality to Siri, but also passively delivers information that it thinks the user will want based on geolocation and search data: weather information and traffic recommendations appear in the mornings; meeting reminders are displayed with estimated time to arrive at the location; and flight information and boarding passes are surfaced automatically.

Similar intelligence when combined with instrumentation could be game-changing. A common challenge engineers face is attempting to make configuration changes to an instrument at the same time that their hands are tied up with probes. Voice control could not only provide hands-free interaction, but also easier interaction with features. In addition, predictive intelligence could be used to highlight relevant or interesting data. An oscilloscope could automatically zoom and configure based on an interesting part of a signal or it could add relevant measurements based on signal shape. An instrument that leverages mobile devices could integrate and take advantage of context-aware computing as the technology is developed.

The Generation Y edge

Technology in consumer electronic devices is evolving rapidly and influencing the expectations of Generation Y. As more and more Generation Y engineers enter the workforce, it is only a matter of time before their expectations are applied to the instrumentation they use for their jobs. Not only will this evolving technology provide significant benefits to instrumentation, the technically savvy Generation Y engineer will leverage it to solve engineering challenges faster than previous generations ever thought possible.

National Instruments Australia
www.ni.com/oceania

This approach would look very different from today's instruments. The processing and user interface would be handled by an app that runs on the mobile device. Since no physical knobs, buttons or a display would be required, the instrument hardware would be reduced to only the measurement and timing systems, resulting in a smaller size and lower cost. Users wouldn't be limited by the tiny built-in displays, small onboard storage and slow operation. They could instead take advantage of large, crisp displays, gigabytes of data storage and multicore processors. Built-in cameras, microphones and accelerometers could also facilitate new possibilities such as capturing a picture of a test set-up or recording audio annotations for inclusion with data. Users could even develop custom apps to meet special requirements. While it's entirely possible for traditional instruments to integrate better components, the pace at which this can happen will lag mobile devices. Consumer electronics have faster innovation cycles and economies of scale, and instruments that leverage them will always have better technology and lower costs.

Cloud-connected

Engineers commonly transfer data between their instruments and computers with USB thumb drives or with software for downloading data over an ethernet or USB cable. While this process is fairly trivial, Generation Y has come to expect instantaneous access to data with cloud technologies. Services like Dropbox and iCloud store documents in the cloud and automatically synchronise them across devices. Combined with Wi-Fi and cellular networks that

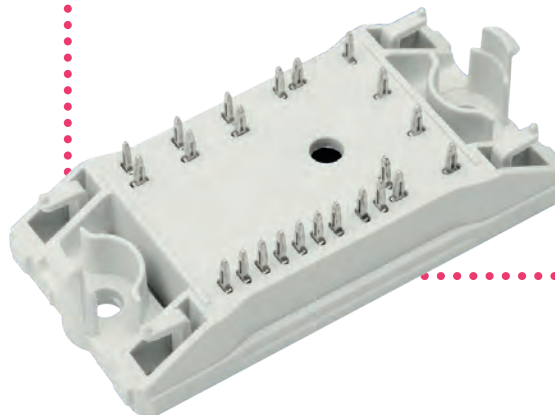
CONNECTOR SYSTEM

TE Connectivity's Cloudsplitter connector system delivers Cat5e data performance and up to 250 W of DC power in a single cable, integrating eight signal and two power positions to provide a compact single solution that helps standardise inventory.

The system is suitable for a variety of applications, including audio-visual equipment, industrial equipment, lighting controls, network servers, security systems, set-top boxes and telecommunications.

TE Connectivity

For more info on this product wf.net.au/W712



SIC-MOSFET POWER MODULES

Vincotech has rolled out its latest SiC-based products for efficient, high-frequency operation in solar inverter, UPS and battery management applications. The flowSiC 0 modules come in two versions.

Wireless Components

For more info on this product wf.net.au/W382

INDUSTRIAL PCS FOR AUTOMATIC FARE COLLECTION SYSTEMS

ITA industrial PCs are specifically targeted towards automatic ticketing and fare collection systems. The rugged computers provide users with intelligent, high-performance operating platforms that can control automatic gate machines, ticket vendors and booking office machines.

ITA-1710 and ITA-1910 are fanless, compact-size industrial PCs recommended for service as AFC controllers or in automated ticketing systems. The systems are built to handle the demands of 24/7 public service. They feature an Intel Atom D525 dual core processor and plentiful, rich I/O ports, satisfying the need to link with all kinds of external sensors, controllers and displays. ITA-1710 supports 10 COM ports and six USBs, while ITA-1910 supports 16 COM ports and eight USBs.

Advantech Australia Pty Ltd

For more info on this product wf.net.au/W448

6-IN-1 OSCILLOSCOPE

Tektronix introduces the MDO3000 series of mixed domain oscilloscopes. The integrated 6-in-1 oscilloscope includes a spectrum analyser, logic analyser, protocol analyser, arbitrary waveform generator (AFG) and digital voltmeter (DVM).

Tektronix Southeast Asia Pte Ltd

For more info on this product wf.net.au/W433



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REMOTE SPECTRUM ANALYSER

Aaronia's Spectran NF RSA 9000 is an EMC remote spectrum analyser which can be controlled from any location using a PC, PDA, iPad or smartphone.

The spectrum of interest can be streamed in real time (LAN/WAN or USB) and stored remotely, eliminating trips to difficult locations, such as communication towers.

Clarke & Severn Electronics

For more info on this product wf.net.au/W682

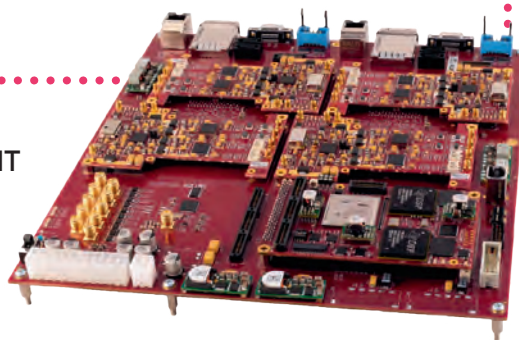
new
PRODUCTS

DUAL-FPGA DEVELOPMENT PLATFORM

Sundance Multiprocessor Technology has launched the SMT166 dual-FPGA platform for R&D into the use of large FPGAs for high-performance reconfigurable computing and large-scale embedded systems applications, as well as system-on-chip (SoC) simulation.

Sundance

www.sundance.com/index.php

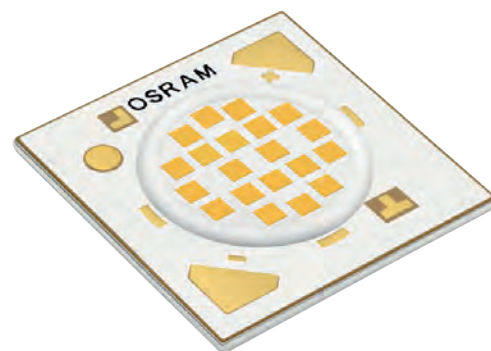


CHIP-ON-BOARD LED

Osram is offering a chip-on-board LED, the Soleriq P 9, which is suitable for compact powerful spotlights such as the ones used in retail outlets and museums.

Osram Australia Pty Ltd

For more info on this product wf.net.au/W647



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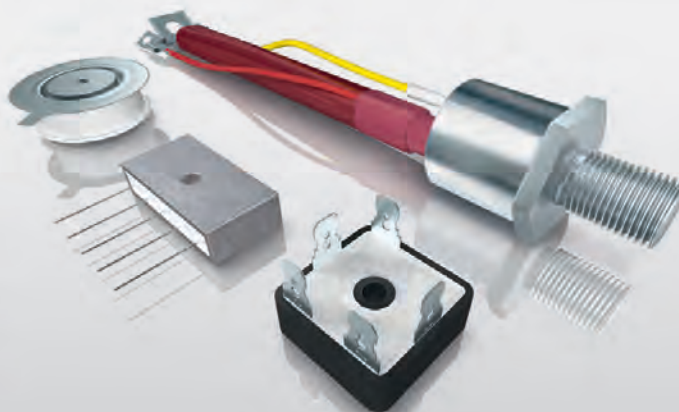


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SURGE PROTECTION 101

Mike Smyth, specialist technical writer

Surges or sudden bursts of voltage and current can be disastrous to electronic and electrical equipment and to the cables feeding them. Surge protectors limit the voltage getting through to equipment and often the feed lines, either by blocking it or diverting to earth voltages above a predetermined level.

The protecting device has a clamping voltage which determines the point at which excessive energy will be diverted or blocked. A low clamping voltage may give better protection but it's at the expense of a shorter life and possible damage to what it is protecting.

Metal oxide varistors (MOV), one of the most common components of protectors, are often arranged to redirect voltages to earth rather than absorb them.

The device is a mass of semiconductor material of sintered, granular zinc oxide. They can comfortably conduct large currents even when fed a voltage greater than their design figure. They are sometimes connected in parallel but they must be in matched sets otherwise one unit may overwork to create a phenomenon called current hogging, which substantially reduces its operating life.

All MOVs have a finite life with their triggering voltage falling lower and lower over time and use. Thermal runaway can be a problem if a failing MOV is used as a power filter because it starts behaving like a short circuit and heats up. To overcome this MOVs are normally thermally fused.

Electrical spikes take a few microseconds to reach their peak voltage and similarly the protectors have a time lapse before they operate. In practice, most surge protectors kick in before the dangerous part of the spike reaches the equipment and most MOVs respond in microseconds.

Transient voltage suppression diodes, sometimes known as avalanche diodes, are the fastest protectors of all, reacting to sudden power spikes in picoseconds. However, they absorb a much lower energy level than MOVs, but if voltages are kept well within their rating they have a very long life. If the rating is exceeded, the diode may short circuit yet protection remains intact.

A glass discharge tube (GDT) comprises a glass bulb in which two electrodes are separated by a special gas mixture. When the gas is ionised by a high voltage, current flows between the

electrodes. As with MOVs, the GDTs can deal with a few large transients or rather smaller transients. Lightning surges may result in a short. The downside of GDT devices is that they are quite slow to trigger, which means a high voltage can pass before they kick in. Pulses of 500 V at 100 ns are often allowed through, which may result in additional protection being required.

Once triggered, the device will carry on conducting until the voltage drops and the gas is quenched. It will continue to conduct at a voltage lower than that needed to ionise the gas. Some GDTs are sensitive to light, which lowers their trigger voltage. Telecommunications and power lines are their principal areas of use where their high current handling is a desirable feature.

Thyristors are also used as surge protectors often in crowbar circuits where protection against overload is needed. Its operation is similar to a gas discharge tube but it operates much faster. A low clamping voltage permits large currents to flow, generating minimum heat.

Selenium is another mass semiconductor, although its clamping qualities are not as good as MOVs. With a longer life than an MOV, this semiconductor is mainly used in high-voltage DC circuits such as the exciter field of an alternator.

The spark gap is a carbon rod held close to an electrode. A predetermined voltage decides the distance of the electrode from the rod. It is one of the oldest protection devices, with a history going back to the nineteenth century. Today, it is used in telephone circuits but it has obvious limitations in that it can never be used in an explosive atmosphere.

Protecting power feeds are series mode suppressors that differ from the solid-state and gas discharge types in being heavy-duty, low-pass filters that allow 50 Hz to the equipment and block higher frequencies. Inductors, capacitors and resistors suppress the spikes and as the inductors are in series with the circuit they slow the energy down, which is then spread out and slowly released from a bank of capacitors.

HANDHELD OSCILLOSCOPES

Micsig handheld oscilloscopes feature touch-screen technology. With bandwidths ranging from 70 up to 200 MHz, two channels and a 1 GSa/s sampling rate, the unit is suitable for laboratory testing or field service applications across a wide range of industry sectors.

Emona Instruments Pty Ltd

For more info on this product
wf.net.au/W405



AUTOMATIC SMT PICK AND PLACE MACHINE

The Mechatronic Systems P10 is a desktop, automatic, pick and place machine for SMT component assembly. Targeting the prototyping and small batch assembly market, the product can handle SMD sizes from 0402 to 25 x 25 mm in strip, reel, tube or tray packaging.

Using a smart vision non-contact optical alignment system, the unit achieves a resolution of 8 µm and can place SMDs with pitch as low as 0.4 mm with an accuracy of ±30 µm. The product will handle standard and fine pitch components including BGA, µBGA, CSP, QFN and SMD LED packages.

Embedded Logic Solutions Pty Ltd

For more info on this product
wf.net.au/W458

HIGH-TEMPERATURE CONNECTORS

HARTING's high-temperature connector family, the Han HighTemp Series, enables the reliable transmission of signals and power at temperatures up to 200°C in industrial environments.

The design of the series is based on established Han B and Han E series technology with the addition of temperature-resistant materials and heat-resistant design applied to all components such as contacts, insulating materials, housing, seals and grounding elements.

HARTING Pty Ltd

For more info on this product wf.net.au/W711

Your Broadcast and Television Signal Test and Measurement Solution The Promax HD Ranger DVB-T/C/S/S2 TV Analyser

The Promax HD Ranger covers DVB-T/C/S/S2 with MPEG-2 as well as MPEG-4 video with an ultra-fast spectrum analyser. It also boasts data logging with an intelligent file management system. Create container files for each installation and bundle all relevant screen shots, measurements and channel tables. Constellation diagrams are available for DVB-T/C/S/S2.

Applications include TV installation, maintenance and surveillance.

Features:

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FANLESS DIGITAL SIGNAGE PLAYER

The SI-22 is a fanless digital signage player with AMD Quad Core processor, helping retail and hospitality segments provide high-quality digital signage experiences to users with interactive media technology.

Backplane Systems Technology Pty Ltd

For more info on this product wf.net.au/W561

FLYBACK POWER PRODUCTS

Texas Instruments has introduced two flyback power solutions which achieve high energy efficiency and low standby power consumption for 5 to 100 W AC/DC power supplies.

The UCC28910 700 V flyback switcher and UCC28630 high-power, Green-Mode controller expand TI's portfolio of flyback controllers used in personal electronics, printers, white goods and smart meters.

Texas Instruments Australia Ltd

For more info on this product
wf.net.au/W724

SUPERCAPACITORS

Designed to deliver technology to last an application's life span, Cooper Bussmann XB series supercapacitors are now available. Ultralow ESR and high capacitance supply pulse power, making energy sources more efficient.

The 20-year operating life and broad temperature range results in low cost of ownership. The series features an electrochemical double-layer capacitor (EDLC) construction and high-performance materials, making the devices suitable for a variety of capacitor solutions tailored to specific applications.

Digi-Key Corporation

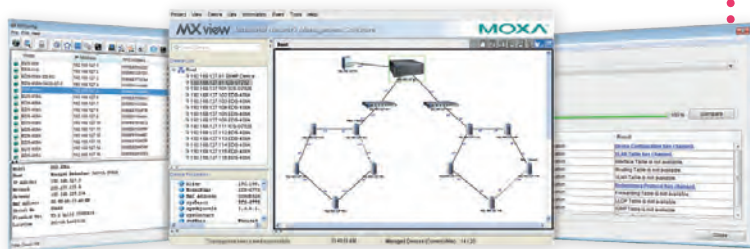
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NETWORK MANAGEMENT SOFTWARE SUITE

Moxa has announced the network management software suite MXstudio, which combines all the tools required for installation, operation, maintenance and diagnostics.

MOXA Inc

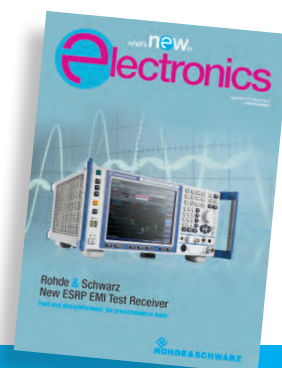
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FANLESS EMBEDDED CONTROLLER

Neusys Technology's Atom Bay Trail fanless embedded controller, the POC-200, has ultracompact dimensions (146 x 102 x 58 mm) and is similar in size to a 3.5" hard disk drive.

Backplane Systems Technology Pty Ltd

For more info on this product wf.net.au/W568



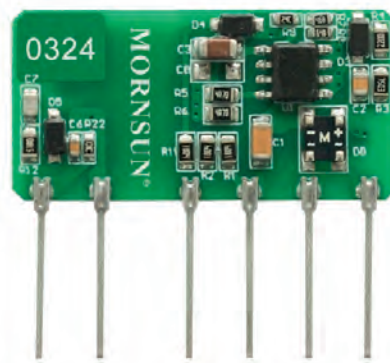
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PRODUCTS

3 W AC-DC CONVERTER

The LS03-R2S AC or DC input series (high-voltage DC-DC) is offered in a small 35 x 27 x 11 mm size with open frame construction. The series is designed for use in less demanding EMC applications.).

DLPC Pty Ltd

For more info on this product wf.net.au/W669



LED

The Osram Ostar Headlamp Pro is an LED for use in advanced forward-lighting systems. Its chips can be controlled individually and switched on according to the positions of other road users.

The control uses sensors and electronic components for high-beam light without glare by concealing areas within the light cone of the headlight. The LED allows for adaptable cornering lights and spotlights to be implemented for illuminating road obstacles.

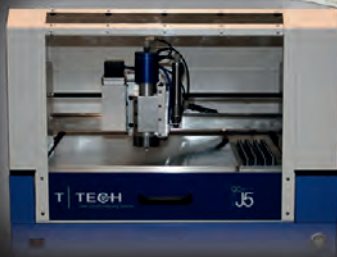
Mouser Electronics

For more info on this product wf.net.au/W710

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the **GRUMPY** page

INNOVATION NATION

Mike Smyth, specialist technical writer

Now that the furore over the closure of Holden, Ford and Toyota seems to have subsided a little and now that we have stopped crying into our beer, gnashing our teeth and swearing into the sunset, we might pause for a moment and consider.

Perhaps this is a blessing in disguise, although I doubt that those people facing a grim future would quite see it that way, especially if they are over 50, still well short of retirement and have been with the firm man and boy for more than 40 years. It's hard to retrain at that age, assuming there is something to retrain for.

But perhaps we could re-employ some of these displaced workers to making an all-electric car, which many people would buy if the price was right - and the price could be right if they were made here. Many of the car subsidiary industries could perhaps make a sideways shift rather than a shutdown.

If we do nothing we are facing further erosion in our manufacturing skills that would appear to be largely wasted on producing cars that nobody wanted or could afford. We need to stop paying ourselves outrageous salaries and become more competitive before we forget how to make anything other than a wailing noise.

So, if we don't like the idea of electric cars, maybe we could become a country of innovation making niche products with high value and a worldwide demand. After all, we already have a track record of providing unique products, for example, the Victa mower, the Hills Hoist and the aircraft black box.

While these industries do not employ the thousands in the car industry, they are at least making things that people want. But there are other directions in which we could travel. The bionic ear is an example of technology that is now known and sought after globally. The bionic eye is in its early development stages but will no doubt eventually be perfected, and that could happen here. The Scramjet could in the future whiz us to London in two hours and loaf-size satellites used for environmental monitoring could have widespread uses in other fields.

This might well be the tip of the iceberg, and with suitable government encouragement what else might come out from behind doors that are now closed because help is needed to open them? Most of these developments employ electronics, fine machining, precision assembly and reliable construction, and many of our redundant car workers could be redeployed into such industries. Not for a moment would such industries absorb all the car workers who will be looking for new jobs in a few years' time. Some will retire, others may start their own businesses, others may leave the states and seek the sunshine of Queensland.

Now is the time for governments to forget the weasel words and actually do something. We need to plan projects, decide if new factories need to be built, decide where the money is coming from, set up training schemes and forget the election-type rhetoric. We have here a golden opportunity to raise even higher Australia's already high stake in the technology field. The question is, do governments have the ears to listen and the wisdom to act? For once, let's look to our own shores when it comes to handing out money and forget those heavy donations to countries that largely fritter away the cash we give them before they raise the single digit to us when we ask for cooperation.

To the man in the street it is simple. Stop the blame game, engage the imagination and let governments give money to develop new products that could bring value and prestige to Australia.



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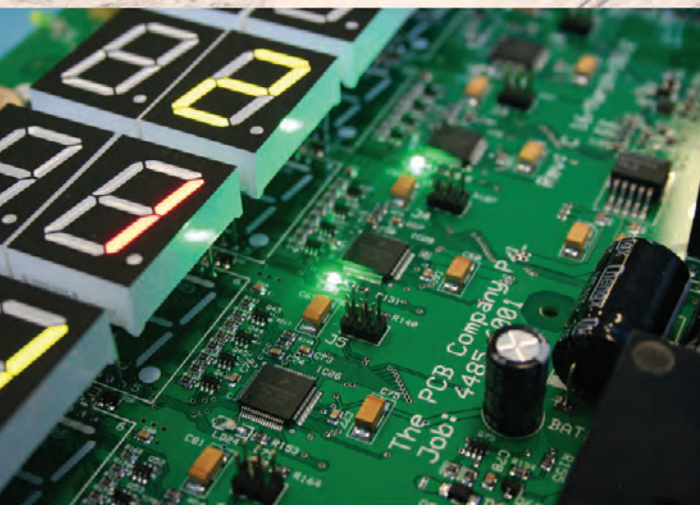
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