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Test Drive The Latest Design Tools And Components For Power Electronics And Electric Machines At ECCE 2017 Expo

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Now in its ninth year, the Energy Conversion Congress and Expo (ECCE 2017) continues to grow as a unique forum for presenting the latest developments in electrical and electromechanical energy conversion. This year's event will be held from October 1-5 at the Duke Energy Convention Center in Cincinnati, Ohio. Essentially, this is a conference devoted to power electronics and electric machines (mainly motors) with a focus on the higher-power applications where energy consumption is significant and its impact on society comes under increasing scrutiny.

Its papers, tutorials and special sessions are particularly strong in addressing applications in industrial drives, automotive and other areas of transportation, renewable energy, and grid-scale utility applications including timely topics such as microgrids, energy storage and wireless power. A quick scan of the 68-page preliminary program which is now available online, suggests the depth and breadth of the program.

Co-sponsored by the IEEE Power Electronics Society (PELS) and the IEEE Industrial Applications Society (IAS), this extensive conference attracts both academics and engineers in industry. Inline with its emphasis on addressing technology developments for energy conversion systems, this conference receives corporate backing from top "systems" companies. This year's sponsors include General Electric and General Motors.

When attendees are not in the oral, poster and special sessions learning about the latest R&D in power electronics, machines and the related areas, they have the opportunity to learn about the latest commercial products and tools for designing power electronics and machines in the ECCE Expo. Visitors to the expo, can watch demos of the latest test instruments, hardware and software for designing and prototyping, and the latest components for building power converters and electric motors.

ECCE 2017 Expo Days and Hours	
Monday, October 2, 2017	4:00 to 6:30 pm
Tuesday, October 3, 2017*	10:00 am to 5:30 pm
**Admission to the Expo is free on Tuesday.*	

This article offers a small sampling of some of these products which will be on display at the ECCE Expo in Cincinnati. The expo offers an invaluable opportunity for engineers to "test drive" test instruments and design tools as these can be major purchases for any organization. Similarly, the exhibits give engineers a chance to ask vendors of the latest power components, especially GaN and SiC devices, about the suitability of these components for the engineer's applications.

The exhibits are open on Monday, October 2 from 4:00-6:30 pm and Tuesday, October 3rd from 10:00 am to 5:30 pm. The conference offers a tiered pricing structure for registration that varies according to what you're attending and your IEEE affiliations. However, if you're just interested in browsing the exhibits, ECCE offers free expo passes on Tuesday.

Design Tools

Visitors to the ECCE exhibit can visit Powersim, developers of PSIM, in booth 301 will find out more about what PSIM can do for them and to experience what's described as the most robust power electronics simulator on the market. From design and simulation to hardware implementation, PSIM provides a complete set of functionalities to meet all of the user's simulation and design needs.

With the recent v11 upgrades and add-ons, PSIM has the addition of the SPICE engine module, support of Texas Instruments' InstaSPIN motor control algorithm, scripting capability for automation of multiple simulations and optimization, and much more. Visitors will be able to try out a live demo of PSIM on site, and the company's engineering and sales teams will be there to answer any questions.

Plexim in booth 304 is the sole provider of both a complete desktop simulation software and an integrated real-time platform. The RT Box is a state of the art simulator for real-time hardware-in-the-loop (HIL) testing and rapid control prototyping (RCP) that leverages PLECS' powerful software environment. A custom PLECS model can quickly and easily be transferred to the RT Box for a unified user experience. Large models can be deployed on multiple boxes for I/O expansion or increased computation power using SFP connectors for negligible latency. The comprehensive PLECS component library includes multiple physical domains, allowing real-time simulation of complex converter and drive systems.

Plexim's RT Box simulator for real-time hardware-in-the-loop testing and rapid control prototyping.

At ECCE, the company will show the workflow from offline simulation to real-time testing of a high-voltage dc system model. The demo uses a modular multilevel inverter topology, with each phase leg running on a separate box, and the ac grid on another. Virtual testing of such a large system would normally be quite costly, but with Plexim's competitive hardware pricing, such an opportunity is now accessible for industry and academia alike, according to the vendor.

Typhoon HIL invites that those who are new to hardware in the loop (HIL), or wonder how it can fit their application, to visit booth 406. The company will set up a live demo for visitors so that they can see how easy and quick it is to configure Typhoon's high-fidelity real-time HIL testbeds for "anything you may be working on—from a household inverter to a terrestrial microgrid or a shipboard power system. "

The company has prepared a wide range of informative and exciting hands-on demos which will show how its high-fidelity real-time HIL testbeds help you do more in virtually any power electronics application. According to the company, even if your power electronics project is very specific and you are not sure if controller-hardware in the loop (CHIL) can help you overcome some peculiar obstacles that you are facing, the company's engineers would be delighted to discuss it with you and make use of their expertise to try to find a CHIL solution for your problem.

Typhoon's HIL Microgrid Testbed and HL604 HIL unit.

Typhoon also expects to showcase its new HL604, the latest addition (launched May 2017) to its long line of vertically integrated HIL solutions that is reshaping the HIL market. This product's Python-based, application software integrates seamlessly with the most powerful processor, it has twice the number of I/O ports, and connectivity capabilities that are said to be redefining expectations.

GaN Systems' 3-kW PFC reference design.

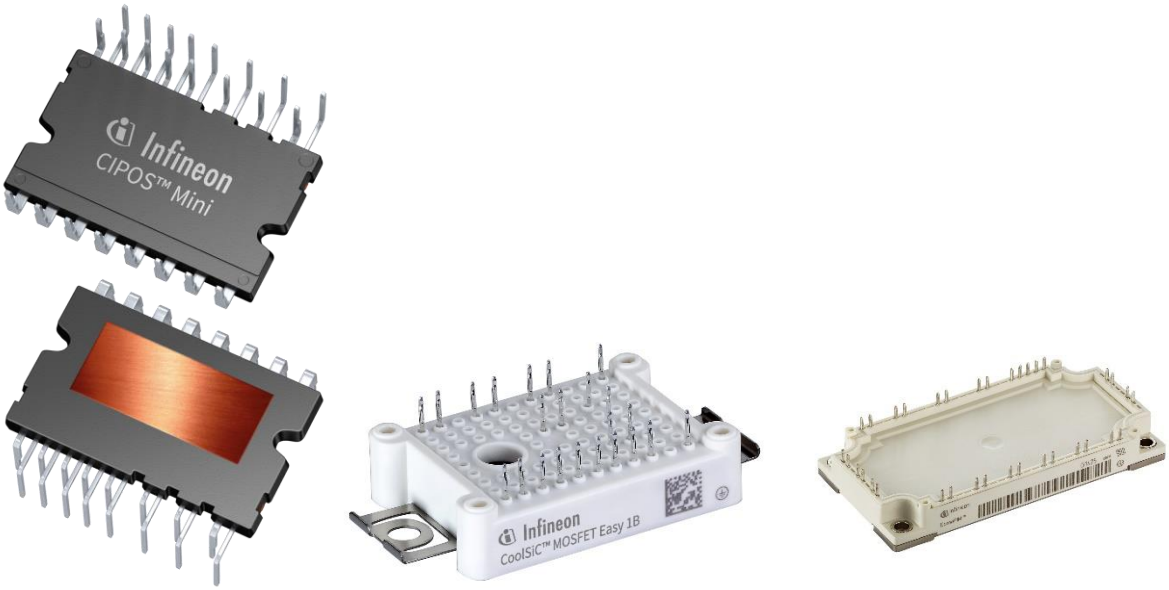
Components

In booth 200, GaN Systems will display a mix of application examples, eval boards and reference designs, partner reference designs and high power modules incorporating their GaN power transistors. Application examples will include a 10-kW solar inverter, an automotive on-board charger (OBC), a 200-W ac adapter, and a wireless charging-under-table pad. Eval boards and reference designs will feature a 3-kW PFC reference design and a GaN versus SiC comparison.

The partner reference designs will feature the work of three other semiconductor companies—Linear Technology, Analog Devices and

Peregrine. And finally there will be three high power modules including a 5-kW IMS module, a 3-kW industry standard module, and a 5.5-kW industry standard module.

In booth 220, Infineon Technologies will be showing its full range of high-power modules, including the latest EconoPIM 3, HybridPACK, HybridPACK Light, HybridPACK Drive, EconoDUAL, Easy 1B, Easy 2B, EconoPACK, and PrimePACK 2 & 3. The company will also have on display its new intelligent power module, the CIPOS Mini. Describing its power module portfolio, the company says, "Whatever the application—from automation, UPS, CAV, motor control and traction to renewables and home appliances—we have best-fit solutions designed to meet functionality, efficiency, reliability, size, weight and cost requirements."



Infineon Technologies' CIPOS Mini MDIP-24 DCB, CoolSic Easy1B, and EconPIM 3 power modules.

LEM has introduced three key sensor products in 2017 and will be displaying them at booth 215. One of these is the GO series of current sensors, which is LEM's first integrated primary product with excellent accuracy, speed, and external field immunity in a small SOIC-8 or SOIC-16 package. With 2.95% accuracy from -40°C to 125°C, the GO is described as the most accurate sensor on the market for its size.

LEM's GO series current transducers.

The company will also be showing its LxSR series current transducer, a proprietary ASIC that provides the accuracy and speed of Fluxgate performance with Hall technology within a small PCB-mount package. Various configurations are available for the footprint, optional aperture, primary jumpers, and overcurrent detection features resulting in 22 different available models and ratings up to 50 A nominal with a ±150 A measuring range.

LEM's LxSR series current transducers.

Finally, LEM has developed a new digital ASIC for open-loop transducers with an on-board second-order sigma-delta modulator. With the same footprint and accuracy as LEM's successful HLSR and HO analog series, the improved ASIC has been added to these transducers to provide a digital output.

Mersen's newly designed booth for ECCE 2017 (booth 201) has been formatted to better showcase the company's expertise and basket of product solutions for power management. While continuing to expand its services to its traditional market segments such as transportation, alternative energy, military and power conversion applications, Mersen will be highlighting dedicated product solutions for its focus emerging markets such as electric vehicle and battery-related dc applications.

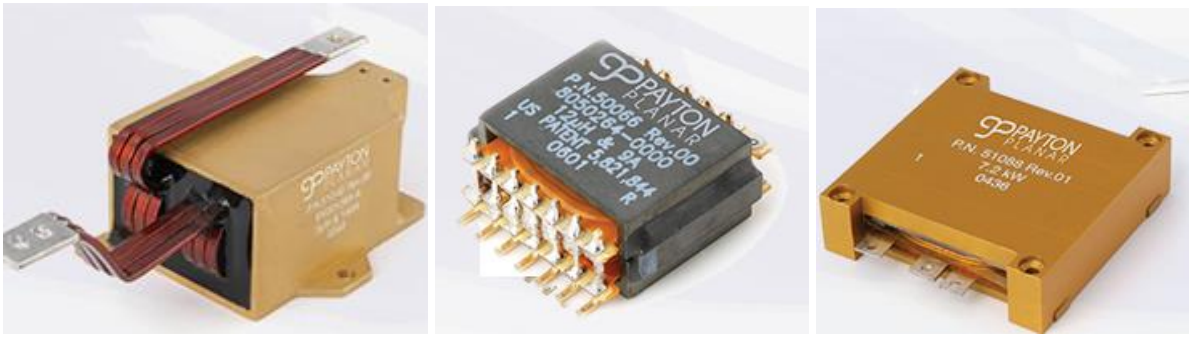
Mersen's XS and XP series hybrid overcurrent protection devices, EVpack-fuse for battery disconnect and other fuses. In the lower left corner, high-power density dc-ac inverter stack reference models are pictured.

In the area of circuit protection, highlights will include a newly developed line of dc fuses and overcurrent protection devices specifically designed for today's demanding dc battery loads in energy storage applications. There will also be new 1500-V and 1000-V crimp cap and NH style fuses, supporting fuse gear, surge protective devices , power distribution blocks, and switches developed for reliable solar installations. In the interconnect area, the company will show its new flexible monitoring bus bars for battery applications.

The company will show its power electronics packaging expertise with its new high-power density dc-ac inverter stack reference models for grid and electrical energy applications. These stack reference models, which were designed in close collaboration with Mersen's partners Infineon, AgileSwitch, and FTCAP and were optimized by Mersen Cooling and Bus Bar engineering teams, are a testimony to the spirit of the "Integrated Architecture approach".

The Integrated Architecture approach allows inverter designers to save time and confusion in selecting individual components and enables them to benefit from a solution that is optimally pre-designed for their specific application. According to Mersen, power modules, bus bar, cooling, gate drivers and capacitors can now be optimally designed together in one step to answer electrical, mechanical and thermal challenges of the system.

Planar magnetics specialist Payton (booth #310) offers complete design and production capabilities for planar magnetics in the Americas, Asia, the Middle East and the U.K. At ECCE, Payton will be displaying a complete line of planar magnetics from a few watts to over 100 kW.



Power Electronics Media

How2Power.com**,** which is a longtime media sponsor and exhibitor at ECCE, will also be exhibiting at this year's expo. Please stop by the How2Power booth #412, say hello, and learn about the new features available at How2Power.com such as the Space Power section, the new Safety and Compliance column, and more.

In addition to the companies profiled in this article, numerous other suppliers and organizations are scheduled to participate in the expo. For the most up-to-date list of the exhibitors for ECCE 2017, see the ECCE website.

And for more news about this year's conference program, see How2Power's recently updated ECCE section.