New modular control solution for efficient electric mobility - Synapticon showcases new developments at Embedded World

Filderstadt / Nuremberg, February 26, 2015 – Synapticon, specializing in sensor and actuator focused embedded systems and cyber-physical systems, presented at the Embedded World at the Nuremberg Fair (Booth 190 in Hall 5) a new e-mobility solution, specifically designed for the deployment in LEVs (Light Electric Vehicles). The modular control solution consists of the new built-in Bluetooth 4.0 LE + CAN module for communication, the new CORE module CA 11 and the drive DC 5000 as IFM (Interface Module).

SOMANET is a product line from Synapticon´s Dynarc platform for cyber-physical systems. All SOMANET solutions are based on three components: COM, CORE and IFM. The communication modules (COM) allow SOMANET nodes to communicate with each other as well as with any other devices that are connected to the local network or the Internet. In the core of each SOMANET node there is a processor module (CORE), which is equipped with one or more XMOS and ARM processors. Local interface modules (IFM) are the connection to the physical world for each SOMANET node. They fill the hardware gap between motors or sensors and their control processor.

The new communication module COM Bluetooth works thanks to the standard 4.0 LE (Bluetooth SMART) very energy efficient. It serves, amongst others, for the integration of smartphones for the use of fitness apps, remote maintenance and updates of the control software via Internet as well as for navigation etc. A CAN bus interface also allows the control of the battery management system (BMS) and mechanical HMI components (Human Machine Interface).

The new CORE module CA 11 consists of seven XMOS logical cores and an ARM Cortex M3 core. Thanks to the combination of XMOS and ARM architecture in one chip the CORE module CA 11 is a clever element of the overall solution. The XMOS cores allow the parallel execution of multiple software threads and offer native real-time determinism. This makes them suitable for real-time applications where sensor data, motor control and communication are simultaneously processed in real time - all in one chip. A XMOS core is more than a microcontroller and rather can be used as a substitute for FPGAs (Field Programmable Gate Array) and DSP (Digital Signal Processor). The ARM core makes it possible to adapt standard software for specific applications, or the integration of the customer´s existing software without porting effort. FreeRTOS (Real Time Operation System), which is a real-time operating system, also is designed to run on the ARM core.

The IFM module Drive DC 5000 - as third supplement of the SOMANET module system - can provide up to 5 kW continuous power at a system voltage of 48 volts for the high-precision operation of brushless DC (BLDC) motors. This includes not only e-bikes, but also slightly larger electric vehicles such as electric scooters, mobile robots, robot logistics and golf trolleys as potential fields of application.

"The target group of the now showcased package - consisting of OM, Core and IFM - are manufacturers of electric vehicles and other low-voltage drive systems. For the volume production of LEVs subsequent to a prototype or small batch production based on the standard modules, we also offer modified, individual, cost-effective and integrated solutions for the series production," explains Nikolai Ensslen, Managing Director of Synapticon GmbH, which has recently moved to Filderstadt, near Stuttgart in Southern Germany.

Synapticon´s complete solution, consisting of COM, CORE and IFM components, is characterized by specific features. Compared to competitive solutions it scores in different disciplines - including the high-performance and high quality control of the motor by Synapticon´s own FOC implementation (Field-Oriented Control), allowing control cycles up to 100 kHz. The very precise control offers more comfort, maximum control quality and a very sensitive motor control. Functional advantages are also the high energy efficiency and thereby longer battery life and greater range of the LEV and low heat generation and the preserving of the motor. The system is also very compact and supports applications up to 5 kW in a very small space. Overall, this solution enables accurate data capture and improved data processing between sensors and motor.

Synapticon combines in their new e-mobility solution communication and motor control in *one* solution. Customers can also run their own applications on the very powerful chip, such as custom software for special handling of the vehicle.

Ensslen adds: "Our SOMANET platform is a cheap alternative for the development of e-mobility solutions. It allows a faster product development and thus faster time-to-market. It also ensures greater efficiency both in development and production. During the development of this solution, we have been working with OEMs and automotive suppliers. Now, our new package, consisting of three powerful components, is available for all players in this highly innovative industry."

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About Synapticon
Synapticon GmbH, established in 2010, is a young embedded systems company based in the region of Stuttgart, Germany. The company specializes in hardware and software for sensor & actuator-intensive, internet-connected systems. Customers benefit from Synapticon´s cross-domain expertise through a range of customizable products and turn-key solutions for robotics, autonomous vehicles, smart industrial automation, special machinery and the Internet of Things. The Synapticon DYNARC platform for distributed computing & control comprises the vertical product lines SOMANET, NEOCORTEX and OBLAC. It enables developers of cyber-physical systems to easily configure, build and program distributed computing systems with fully integrated actuator control, sensor data acquisition and high bandwidth data processing. (www.synapticon.com)

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