

Risc-V processor embedded in motion controller

During the Electronica 2018 tradeshow, Trinamic Motion Control (Germany) unveils its Rocinante monolithic motor drive family featuring embedded Risc-V core. They support Classic CANopen and CANopen FD.

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Trinamic CEO Michael Randt (left) and project leader Dr. Onno Martens (right) present the Risc-V motor driver silicon (Photo: Trinamic)

The product allows direct driving of N-channel Mosfets, controlling stepper, BLDC motors, brushed DC-motors, and voice-coil motors found in growing markets like service robots, home and office automation, light electric vehicles, and power tools. At the core of any embedded motor-controlling system is a micro-controller, running the application layer, providing a user interface or executing bus protocols. The company offers these embedded board-level micro-controllers. The single chip solution enables embedded standalone devices.

Actuators, motors, and mechanical components typically have a much longer product lifetime than e.g. user interfaces or protocols, so the longevity of the components is crucial for device manufacturers. With Risc-V ISA there are no obligations or license agreements which could prohibit long-term road-mapping, development, or technology transfer, said the company.

Trinamic, which has already implemented Risc-V cores on FPGAs, is an early member of the Risc-V group. They are committed to the idea of an open instruction set. According to the company, the design uses self-developed IP in combination with selected, tested, and strictly European-sourced IP blocks.

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Top level block diagram for BLDC motors - Rocinante family (Photo: Trinamic)

The debut members of the family are a BLDC/PMSM driver with six integrated gate-drivers and a stepper motor and stepper servo driver with eight integrated gate drivers. Both components share a set of integrated diagnostics and interfacing features. The whole family is equipped with a 32-bit Risc-V core, hardware-based field oriented control, CAN FD port, serial interfaces, USB, and gate drivers for 2-phase or 3-phase motors. Integrated switching regulators allow for one-chip drive solutions. 128-KiB EEPROM based non-volatile memory and 32-KiB SRAM enable to handle standalone applications as well as high-level industrial protocols like Classic CANopen (CiA 301/402) or CANopen FD (CiA 1301).

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The Rocinante chip (Photo: Trinamic)

“Embedding powerful processors into motor controllers gives us a new degree of freedom and enables features that will be indispensable in the future, e.g. condition monitoring and predictive maintenance,” explained Trinamic CEO and founder Michael Randt. “There are companies who excel in analog, and a lot of companies doing digital ICs. There’s also mixed-signal and, even more challenging, smart power. The monolithic mixed-signal smart power IC with an embedded processor core is the full culmination thereof, offering ultimate flexibility and reliability at attractive price point.”

The family is shown on 13 November, 2018 at the Electronica in Munich, hall B5, booth 449. The first engineering samples, together with Landungsbruecke evaluation boards and motion control and application code libraries are expected in quarter one of 2019.

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