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PLS's debug tools for next-generation car architectures

UDE supports Stellar automotive microcontroller family from STMicroelectronics

Lauta (Germany), March 11, 2019 – With the support of the new Stellar automotive microcontroller family from STMicroelectronics, PLS Programmierbare Logik & Systeme provides the professional debug, trace and test functions of the Universal Debug Engine® (UDE) also for the next-generation automotive architectures.

The new Stellar family combines multiple leading-edge technologies to form an automotive domain controller for applications for Drivetrain, Chassis, and Advanced Driver Assistance Systems (ADAS). The first MCU samples of Stellar combine six Arm® Cortex®-R52 cores clocked at 400MHz and 16 Mbytes of high-temperature embedded Phase-Change Memory (PCM) for real-time multi-core performance. Stellar features advanced security and safety mechanisms, including a state-of-the-art Hardware Security Module (HSM) as well as lockstep capabilities. A hypervisor for software separation and memory protection further enhances functional safety and reliability and satisfies the automotive industry's demanding ISO26262 ASIL-D safety qualification. Additionally, three Cortex®-M4 cores with a floating-point unit and DSP extensions provide application-specific acceleration.

As a member of the ST Partner Program and thanks to a close and fruitful cooperation, PLS is already able to provide its extensive and professional debug and trace tools for the user with the availability of the first samples. The latest version of PLS's Universal Debug Engine® (UDE) allows real multi-core debugging for that heterogeneous microcontroller system. Demanding applications distributed of all or a subset of the six Cortex®-R52 cores as well as the M4 cores can be efficiently controlled and analyzed in a single debug session and within a single common debugger instance. Of course, the proven Multi-Core Run Control, which is a specific function of UDE, is also available for this high-end controller. It enables a synchronous starting and stopping of all cores or a selected set by utilizing the debug logic integrated on the Stellar MCU. Additionally, multi-core breakpoints employed in shared code simplify debugging of complex applications. The breakpoint always takes effect regardless of which core is currently executing the particular code. In addition to actual application cores, UDE offers debug support for the HSM as well. The user can also integrate HSM debugging into the Multi-Core Run Control.

The integrated FLASH programing of UDE, UDE Memtool, provides support for optimized programming the breakthrough Phase-Change memory (PCM) technology implemented in the Stellar devices. Compared to state-of-the-art FLASH programming the PCM allows a faster, safer and a more precise programming. In practice this means for example, that even single bytes can be written where previously only whole blocks were possible. Due to the characteristics of PCM, software-over-the-air (SOTA) can be implemented particularly efficiently and reliably for this memory technology. UDE Memtool provides the right tooling with additional functions for smooth support of SOTA.

For in-depth system-level analysis of multi-core applications, UDE provides support for the comprehensive trace capabilities of the CoreSight™ debug and trace system implemented in the Arm® Cortex®-R52 cores, in the Cortex®-M4 cores as well as for the on-chip interconnects.

The three devices UAD2pro, UAD2next and UAD3+ of the Universal Access Device family ensure a fast and reliable debug communication to the devices of the Stellar microcontroller family using JTAG or the Arm®-specific Serial Wire Debug (SWD) interface. For capturing and storing a large amount of trace data, the UAD3+ provides also support for the High Speed Serial Trace Port (HSSTP) and offers up to 4 GB trace memory.

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PLS Programmierbare Logik & Systeme

PLS Programmierbare Logik & Systeme GmbH, based in Lauta (Germany), is the manufacturer of the debugger, test and trace framework Universal Debug Engine® (UDE). Thanks to its innovative tools for embedded software development, PLS has developed into one of the technology leaders in this field since its foundation in 1990. The UDE combines powerful capabilities for debugging, testing and system-level analysis with efficiency and ease of use. The UAD2pro, UAD2next and UAD3+ devices of the Universal Access Device (UAD) family complete the comprehensive debug functions of UDE and enable fast, robust and flexible communication with the target system.For further information about our company, products and services, please visit our website at www.pls-mc.com.

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