

CAST Enhances RISC-V Processor Line for Low-Power and Functional Safety Applications

Introducing a new, faster low-power embedded processor and upgrades to the current Functional Safety processor

Woodcliff Lake, New Jersey — March 3, 2023 — Semiconductor intellectual property provider CAST today announced the immediate availability of a new deeply embedded, low-power RISC-V processor IP core and enhancements to its functional safety RISC-V processor IP core.

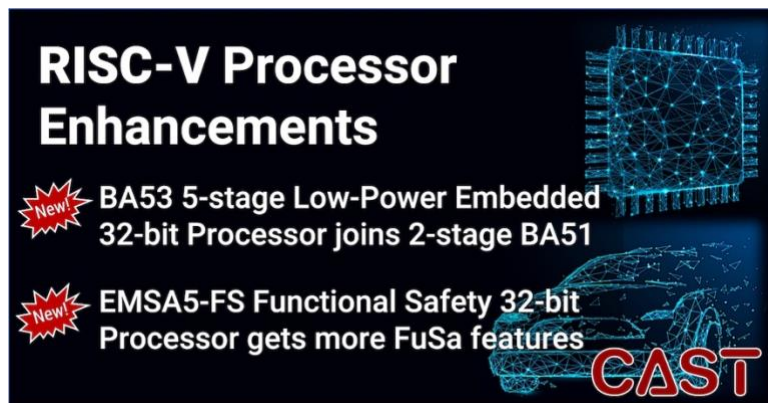
New Low-Power Embedded RISC-V Processor

The BA5x™ RISC-V Deeply Embedded Processor Series IP cores are low-power, 32-bit, RISC-V processors designed to replace 8- and

16-bit microcontrollers or to manage secondary or peripheral functions in a complex SoC. The new [BA53 Low-Power Deeply Embedded RISC-V Processor](#) IP core joins the existing BA51 processor, offering higher performance through:

- a five-stage pipeline in the BA53 versus two-stage in the BA51, and
- registers at the boundaries of the BA53's SRAM interfaces.

These features allow the BA53 to be clocked at frequencies exceeding 1GHz even in low-power 22nm technologies (versus 500MHz with the BA51). Both processors support the 32-bit Base RISC-V ISA (I/E) with optional M, A, Zicsr, Zifencei, C, N, F, D, and Zc Extensions. They also have the same AMBA® AXI and QMEM interfaces, allowing customers licensing one of the BA5x processors to conveniently switch to



the other if their evolving system requires more processing power or lower area and energy consumption.

Low-power BA53 configurations start at only 30K gates and run at 2.53 CoreMarks/MHz; the ultra-low-power BA51 starts at 16K gates and runs at 3.0 CoreMarks/MHz. Developers can use any RISC-V compatible toolchains, libraries, and IDEs with the BA5x series, or the comprehensive, Eclipse-based BeyondStudio™ IDE that is available for free with the core.

Enhanced Functional Safety RISC-V Processor

The [EMSA5-FS Functional Safety Embedded RISC-V Processor](#) is a five-stage pipeline processor that is certified ASIL-D ready for functional safety (FuSa) automotive applications. The first RISC-V ISO 26262 certifiable processor core to be available, the EMSA5-FS was named 2022 Product of the Year in Elektronik Magazine's Automotive category. Major enhancements to the EMSA5-FS include:

- an improved FuSa software package that now includes Autosar MCAL drivers for the MCU and some peripherals and a Safety Test Library (STL) for checking for errors at boot or runtime,
- an expanded set of peripherals and bus fabrics (single and multilayer AMBA® AHB), with FuSa features such as parity error code checking for the bus fabrics, and
- a new optional cache memory for the combined instruction and data AHB bus.

Variations of the EMSA5-FS are available, using dual or triple modular redundancy, just the CPU core in standalone form, or as a complete microcontroller platform with integrated peripherals and more. Area usage starts at 40K gates, with performance exceeding 1GHz in advanced processes technologies. The EMSA5-FS is supported by IAR's safety-certified toolchain and Lauterbach's popular debugger, or users can employ any other tools from the RISC-V ecosystem.

Availability

The BA53 and BA51 processors are sourced from Beyond Semiconductor and are available now. The EMSA5-FS processor is sourced from Fraunhofer IPMS and is also available now. All are available in synthesizable Verilog source code for ASICs

or as an optimized netlist for FPGAs. Flexible, royalty-free licensing terms are available. Visit the [CAST website](#) or contact [CAST Sales](#) for more information.

About CAST

Computer Aided Software Technologies, Inc. (CAST) is a silicon IP provider founded in 1993. CAST's ASIC and FPGA IP product line includes microcontrollers and processors; compression engines for data, images, and video; interfaces for automotive, aerospace, and other applications; various common peripheral devices; and comprehensive SoC security modules. Learn more by visiting www.cast-inc.com.

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Media Contact:
Artemis Couroupaki, a.couroupaki@cast-inc.com