

RISC-V Processor IP Cores

System developers in many industries are finding RISC-V processors to be a smart and reliable alternative to conventional alternatives.

The RISC-V processors CAST offers build on our decades-long experience with thousands of microcontroller and processor IP customers. We focus on competitive 32-bit solutions in key areas: *Functional Safety* and *Ultra-Low Power*. All these RISC-V processors feature:

- **RISC-V ISA support** that is extensive and configurable,
- **High quality and exceptional reliability** through best design and coding practices and rigorous verification and testing,
- **Royalty-free** and other flexible licensing options,
- **Design for reusability** with easy integration and complete deliverables, and
- **Companion IP cores** for bus fabrics, peripherals, networking, security, and hardware accelerators for compression.

Compare RISC-V Processor Cores

Get these RISC-V cores in Verilog source code for ASICs or netlists optimized for all popular FPGA devices. They employ standard AMBA® interfaces, are designed for easy integration and verification, and are supported by all open-source and commercial RISC-V development and debugging tools.

With flexible terms to best suit your project requirements—including a royalty-free option—you can license a processor alone or in a platform with a bus fabric and peripherals such as GPIO, UART, Real-Time Clock, Timers, I2C, SPI, and memory controllers. Custom integration with other IP cores from CAST is also available, including one of the most complete lines of automotive IP on the market.

See processor feature comparisons in the following table, visit our website for more detailed product information, then contact CAST to discuss how we might satisfy your Functional Safety and low-power RISC-V processor needs.

CAST

RISC-V with A Better IP Experience

www.cast-inc.com
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EMSA5 Functional Safety Processor

ISO 26262 ASIL-D Ready
5-stage pipeline
Optional L0 Cache & FPU

BA51 & BA53 Ultra-Low Power Processors

Compact, from 16k Gates
2- or 5-stage pipeline
Optional L0 Cache & FPU

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Like Ubilite with Wi-Fi, CAST provides extremely competitive IP core products that are high-quality, complete, and easy to integrate and use,” said Peter Gammel, chief executive officer for Ubilite, Inc.



“We expect the RISC-V processor core we’ve licensed from CAST to help us maintain – and extend – the advantages of our low-power Wi-Fi SoCs over competing IoT products.”

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CAST is a member of
RISC-V International

RISC-V Processor IP Core Features	BA51 Ultra- Low-Power	BA53 Low-Power & Fast	EMSA5 Base Config.	EMSA5-FS Functional Safety
ISA	RV32 [I/E]	RV32 [I/E]	RV32 [I/E]	RV32 [I/E]
ISA Extension Options				
Compressed Instr. (C)	Yes	Yes	Yes	Yes
Multiplication & Division (M)	Yes	Yes	Yes	Yes
Code Size Reduction (Zc)*	Yes	Yes	No	No
Single Precision Floating Point (F)	Yes	Yes	Yes	Yes
Double Precision Floating Point (D)	Yes	Yes	Yes	Yes
Atomic Instructions (A)	Yes	Yes	Yes	Yes
User-Level Interrupts (N)	Yes	Yes	No	No
Control & Status Reg. (Zcsr)	Yes	Yes	Yes	Yes
Instruction Fence (Zicsr)	Yes	Yes	Yes	Yes
Vector Instructions	On-Request	On-Request	Yes**	Yes**
Custom Instructions	Yes (option)	Yes (option)	No	No
Architecture	Harvard	Harvard	Harvard	Harvard
Pipeline Stages	2	5	5	5
Instruction TCM	Yes	Yes	Yes	Yes
Data TCM	Yes	Yes	Yes	Yes
Instruction Cache	Yes (option)	Yes (option)	Yes (option)	Yes (option)
Data Cache	No	No	Yes (option)	Yes (option)
Hardware Multiplier	Yes (option)	Yes (option)	Yes (option)	Yes (option)
Hardware Divider	Yes (option)	Yes (option)	Yes (option)	Yes (option)
Memory Protection Unit (MPU)	Yes (option)	Yes (option)	Yes (option)	Yes (option)
Floating Point Unit (FPU)	HP*, SP, DP	HP*, SP, DP	SP, DP	SP, DP
SoC Bus Protocol	AXI4	AXI4	AHB-Lite	AHB-Lite
Dual Core Lockstep	No	No	No	Yes (option)
Triple Modular Redundancy	No	No	No	Yes (option)
ISO 26262	-	-	-	ASIL-D
Coremarks/MHz	3.00	2.53	2.43	2.43
Fmax @ 22nm	400 MHz	1 GHz	800 MHz	500 MHz
Area @ in Eq. Gates	16k	30k	23k	77k
RV JTAG & Trace	Yes (option)	Yes (option)	Yes (option)	Yes (option)
Configurable Subsystem	Yes (option)	Yes (option)	Yes (option)	Yes (option)
Royalty-Free Licensing	Yes	Yes	Yes	Yes

* Non ratified RV ISA extension

** Partial support

About CAST

Computer Aided Software Technologies, Inc. (CAST) is a silicon IP provider founded in 1993. The company'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 standard peripheral devices; and comprehensive SoC security modules. Learn more by visiting www.cast-inc.com.