

CAST Energizes Small, Fast Systems with New Low-Power, 32-Bit Processor Cores

Compact, High-Performance Processors Ideal for Systems Needing More than an 8- or 16-Bit Microcontroller but Less than a Typical 32-Bit Microprocessor

IN-STAT SPRING PROCESSOR FORUM, San Jose, CA, May 15, 2006 — Semiconductor intellectual property (IP) provider CAST, Inc. today announced the immediate availability of a new line of 32-bit microprocessor cores for the embedded systems market.

The new Advanced Processing Solution (APS) family of cores is developed by CAST partner Cortus, SA, in France. More capable than an 8- or 16-bit processor but with advantages over most 32-bit processors, the new APS line is an attractive step up for the many system designers seeking more than an 8051 or 6805 but less than a typical processor from ARM® or ARC™.

“We’ve helped hundreds of designers succeed with 8051s and other controllers, and that market’s clearly continuing to grow,” said Hal Barbour, president of CAST. “But some systems just need more horsepower. Those designers have had little choice but to live with the technical and business overheads of an advanced 32-bit processor without actually using all its capabilities. Now these APS cores provide an excellent 8/16-bit upgrade solution, and we’re excited to be bringing them to existing and new CAST customers.”

The APS cores use a RISC architecture in a full 32-bit design and have features that make them both a better technical fit and a better IP experience than competing processor cores. Their advantages include:

- Small size — APS is more compact than many 8-bit processors, requiring as few as 7,000 gates¹ and easily fitting in many low-cost FPGAs and a wide range of ASICs.
- High performance — APS is dramatically faster than the microcontrollers it replaces, benchmarking at 0.6 DMIPS/MHz¹.
- Low-power operation — APS operates with very little power, requiring just 18 μ W/MHz¹.

- Efficient development environment — APS is designed for effective coding in C or C++, and the cores come with a complete development tool set.
- Expanding tools and services — Third parties already supporting APS include MicroCross, Inc. — adapting their advanced development environment for APS — and SoC Solutions, Inc., IP platform experts who provide integrated cores, software, and services giving designers a head start developing APS-based systems.

The APS cores are backed by CAST's highly-regarded support, honed over 13 years delivering and working with IP. Customers also benefit from CAST's simple and cost-effective approach to licensing, as the company offers a flexible mix of straight usage fee or royalty-based licensing tailored to the customer's needs.

About the APS Processor Cores

Two APS processors are shipping now, APS2 and APS3.

The APS2 core is a general-purpose processor designed for high-performance, low-power, 32-bit computing. It is optimized for small chip size for a wide variety of applications.

The APS3 core uses the same 32-bit architecture, but is optimized to achieve the most compact programming code for applications sensitive to code density. This makes APS3 especially suitable for encryption, wireless communications, and other systems requiring considerable application code, as well as for hand-held, battery-driven, and other power-critical systems. It uses instructions of 16- and 32-bit length, and interfaces efficiently with 16-bit memories.

Both APS cores are modern RISC designs with a load/store architecture. They feature out-of-order instruction completion, fully-vectored interrupts, a programmable priority interrupt controller, and support for various peripherals and memory interfaces. Their patented co-processor interface makes it easy to extend the instruction set and optimize the processor for any specific application, such as increasing the speed of a digital signal processing algorithm. Barrel shifter and multiplier co-processors are available.

From their inception, the APS processors were designed for efficient high-level programming using C and C++, and an adapted version of the GNU Compiler Project (GCC) tool set is included with the cores to facilitate this. Unusually complete, this tool set includes a graphical debugger that connects through a JTAG link or via the serial port on a PC, a comprehensive instruction set simulator (ISS), and a standard library of C routines for embedded systems. An APS version of the productivity-enhancing MicroCross development environment will also be available this quarter, through a partnership with that company.

The new cores have been rigorously verified through thousands of test cases and many different applications, and have been successfully implemented in FPGAs from vendors such as Actel and Xilinx. Results with ASIC reference designs show the cores to be highly competitive in terms of speed and area.

Processor Core	ASIC Technology (process, microns)	Approximate Area (gate equivalents)	Frequency (MHz)
APS2	TSMC 0.09	9,300	300
	TSMC 0.13	11,300	280
	TSMC 0.18	12,000	250
APS3	TSMC 0.09	13,100	300
	TSMC 0.13	16,300	280
	TSMC 0.18	16,600	220

Notes: Results are for the core without wire load and configured with a 32-bit SRAM interface.

APS2 configured with one UART split into RX and TX modules, one timer, and one GPIO.

APS3 configured with one UART split into RX and TX modules, one timer, one multiplier, one shifter, and one GPIO.

Projects using the APS processor cores are already underway, with first silicon expected by the end of this year.

About Cortus S.A

Cortus S.A. is an innovator in high-performance, ultra-low-power 16/32 bit embedded processor cores for digital consumer, security, networking, automotive and industrial applications. Cortus' products include a complete GNU-based tool chain running on Linux, Windows XP and Unix operating systems, and a base set of peripherals at no additional cost. Along with its ecosystem partners, Cortus offers complete solutions for both FPGA and ASIC designers. The company is based in Montpellier, France with an office in Silicon Valley, CA, and can be reached at +33 4.67.13.01.90, +1 (650) 465-3855, or <http://www.cortus.com>.

About CAST, Inc.

CAST provides over 100 popular and standards-based IP cores for ASICs and FPGAs. Privately owned and operating since 1993, CAST has established a reputation for high-quality IP products, simple licensing, and responsive technical support. The company is headquartered near New York City, partners with IP developers around the world, and works with select sales consultants and distributors throughout Europe and Asia.

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¹ The area, performance, and power consumption results mentioned on the first page were achieved using the APS2 core in a minimum configuration with TSMC/Artisan 90nm ASIC technology. The power consumption figure was for the CPU only.

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