

## **STMicroelectronics Sets New Performance Record in Industry Benchmark Tests for World's Most Powerful Cortex™-M Microcontroller**

*STM32 F4 series featuring unique ART accelerator achieves record-breaking CoreMark™ benchmark with latest compiler upgrade from Green Hills Software*

**Geneva, December 6, 2011** – STMicroelectronics (NYSE: STM), a global semiconductor leader serving customers across the spectrum of electronics applications, has announced that independent processor-performance tests using the latest software tools from Green Hills Software have confirmed the STM32 F4 series, as the world's highest performing ARM® Cortex™-M microcontroller.

The Green Hills Software compiler version 2012 has unleashed 29% extra performance from the STM32 F4 series in industry-standard CoreMark™ tests<sup>1</sup>. CoreMark tests produce a single-number score that helps developers compare processors from various manufacturers. This new elevated CoreMark score reassures customers using the STM32 F4 series that they have chosen the highest performance Cortex-M microcontroller available on the market, suited to fit even the most creative application requirements.

In executing from Flash memory, which is the most meaningful and challenging condition to measure the performance of an architecture, the CoreMark tests compiled using the Green Hills compiler version 2012, ST's STM32 F4 series produced the highest ever score of 469, operating at its maximum frequency of 168MHz. This score is equivalent to 2.79 CoreMark/MHz, another record among embedded processors. When executing from RAM, performance is even higher at 481 CoreMark or 2.86 CoreMark/MHz.

Helping establish the STM32 F4 series' advantage over other Cortex-M processors is the device's unique architecture that includes ST's Adaptive Real-Time (ART) accelerator. The ART accelerator speeds up code and data retrieval from Flash memory to increase the performance of the standard Cortex-M4 processing engine, which comprises a 32-bit microcontroller, floating-point unit and enhancements that enable the efficient execution of digital-signal-processor single-cycle instructions.

“In combination with the enhanced Green Hills compiler, the ART accelerator is a key feature enabling the STM32 F4 series to extend its world-beating performance,” said ST's Michel Buffa, General Manager, Microcontroller Division. “The advanced architecture of the STM32 F4 series allows customers to draw maximum benefit from the market-leading performance improvements of the latest Green Hills compiler. It is already the world's most powerful Cortex-M processor based microcontroller available in the market, and compiler version 2012 demonstrates even more performance from the unique ART accelerator and other outstanding features of the family.”

Christopher Smith, Vice President of Marketing, Green Hills Software said, “With the new compiler version 2012, Green Hills Software has achieved a milestone by boosting the Cortex-M based STM32 F4 series to new performance records.”

The STM32 F4 series is available now in four variants. All variations are in volume production, with prices beginning from \$5.74 for the STM32F407VET6 with 512 Kbytes of Flash and 192 Kbytes RAM in the LQFP100 package, for orders of more than 1,000 units.

\* STM32 is a registered trademark of STMicroelectronics; ARM and Cortex are registered trademarks of ARM. All other trademarks are the property of their owners.

#### **About the ARM Cortex-M processor and STM32 family:**

The ARM Cortex-M3 and Cortex-M4 licensable processor cores have revolutionized the embedded microcontroller marketplace. Providing 32-bit processing capability at a price competitive with proprietary 16-bit and some 8-bit processors, it has been chosen by microcontroller manufacturers worldwide as the basis for next-generation product families. The M4 core also features a floating-point unit and supports the efficient execution of digital-signal-processing single cycle instructions, which save designers adding a co-processor for special functions such as digital audio or high-speed sensing.

As one of the first ARM Cortex-M licensees, ST has built its extensive STM32<sup>®</sup> family of microcontrollers using these cores, adding many differentiating features to the processors' inherently high performance and value for money. These include pin and software compatibility between devices, allowing developers to re-use proven software, standardize pc boards, and scale their designs easily. The integrated peripherals, such as communication interfaces, controllers and converters are also consistent across all devices. In all, there are over 250 STM32 variants, including the Value Line, Performance Line, Access Line, USB Access Line, Connectivity Line, and High-Density Line based on the M3 processor. The high-performance entry level M3-based STM32 F2 series, which features ST's ART accelerator as well as a multi-layer bus matrix for high-speed program execution, is also available.

In addition, ST has combined the M3 processor with proprietary ultra low-power technology to create the STM32L family for energy-wise applications, such as battery operated applications. ST introduced the STM32 F4 series featuring the M4 DSP-enhanced core, multi-layer bus matrix and multi-DMA controllers delivering ultimate performance and allowing concurrent processing and data transfers in September 2011. This high-performance device provides features to optimize speed and dynamic power consumption such as back-up SRAM supporting low-power modes and integrated voltage-scaling capability. Its extensive peripheral integration including a 2.4 MSPS 12-bit ADC, and 12-bit analog-digital and digital-analog converters, camera interface, security co-processor, and serial interfaces such as Ethernet, USB, CAN and SD-card allows the STM32 F4 to target applications such as high-end automation, surveillance, home audio, networking, communications and digital media.

#### **About STMicroelectronics**

STMicroelectronics is a global leader serving customers across the spectrum of electronics applications with innovative semiconductor solutions. ST aims to be the undisputed leader in multimedia convergence and power applications leveraging its vast array of technologies, design expertise and combination of intellectual property portfolio, strategic partnerships and manufacturing strength. In 2010, the Company's net revenues were \$10.35 billion. Further information on ST can be found at [www.st.com](http://www.st.com).

## **About Green Hills Software**

Founded in 1982, Green Hills Software is the largest independent vendor of embedded development solutions. In 2008, the Green Hills INTEGRITY-178B RTOS was the first and only operating system to be certified by NIAP (National Information Assurance Partnership comprised of NSA & NIST) to EAL6+, High Robustness, the highest level of security ever achieved for any software product. Our open architecture integrated development solutions address deeply embedded, absolute security and high-reliability applications for the military/avionics, medical, industrial, automotive, networking, consumer and other markets that demand industry-certified solutions. Green Hills Software is headquartered in Santa Barbara, CA, with European headquarters in the United Kingdom. Visit Green Hills Software at [www.ghs.com](http://www.ghs.com).

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<sup>i</sup> The CoreMark scheme is managed by the Embedded Microprocessor Benchmark Consortium (EEMBC), an industry association that develops software to assess the performance of embedded processors and systems. EEMBC publishes a number of microprocessor benchmark suites, including CoreMark, as well as suites optimized for applications such as digital imaging, graphics, automotive or industrial electronics, networking and telecommunications.