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Express Logic has completed 14 years of successful business operation, and our flagship product, ThreadX, has been used in over 800 million electronic devices and systems, ranging from printers to smartphones, from single-chip SoCs to multiprocessors. Time and time again, when leading manufacturers put their company on the line, when their engineering team chooses an RTOS for their next critical product, they choose ThreadX.

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simply must succeed. Its royalty-free licensing model helps keep your BOM low, and its proven dependability helps keep your support costs down as well. ThreadX repeatedly tops the time-to-market results

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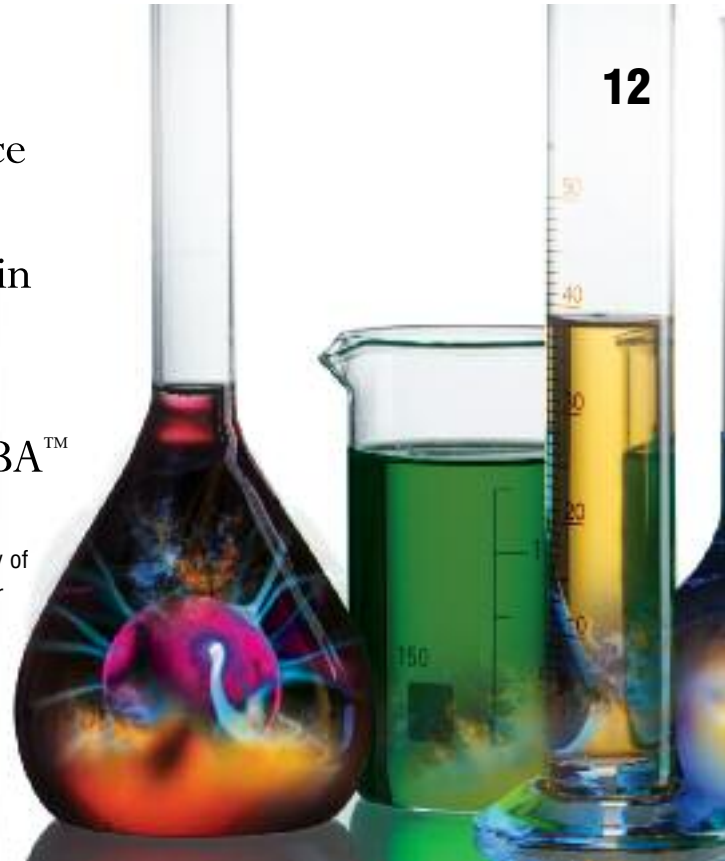
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ARM® TechCon 2011

By Erik Ploof, ARM

The fall has come around again and ARM® TechCon 2011 dawns, representing one of the most successful and energized ecosystems in the technology industry today.

Continuing with last year's successful change in format – the first day will be turned over to 'Chip Design' – an intensive conference and exhibition targeted at chip design teams working with ARM silicon IP and tools. The second two days will cover 'Software and System Design' for system developers utilizing the ARM architecture.

There will be representatives from more than seventy companies in the ARM Connected Community® ecosystem, now numbering over 850, representing every area of the industry. They will demonstrate how low-power technology from ARM is providing a platform for the high-performance requirements of today and tomorrow's devices, geared towards an energy efficient, connected and greener world.

The ARM architecture has become the de facto standard across the entire embedded marketplace. ARM IP-based technology in mobile phones and TV set top boxes is forecast to double over the next four years and client computing will triple. The enterprise and embedded markets are also scheduled for double digit growth.

Several of ARM Partners have chosen this event to introduce some exciting new products across these markets. ARM will also unveil some new technologies. You won't want to miss this opportunity to obtain a hands-on introduction to the products shaping the future of the embedded marketplace. When you couple this with over 90 classroom sessions and tutorials, this event promises to provide the most comprehensive education on designing with the ARM architecture in the industry.

In this issue, we also look at 'Solving SoC Design Challenges with ARM Hard Macrocells' (page 31). The ARM Hard Macro portfolio provides performance and power optimized hard macrocell implementations of the Cortex™-A series processors.

In Tech Talk, Red Bend looks at the arrival of mobile device virtualization and how the ARM platform is helping the industry discover the real benefits offered by virtualization. Mobile device virtualization will provide benefits to the entire mobile ecosystem – from chipset makers to consumers (page 9).

Software quality is an increasing area of focus in the embedded arena, and now deeply integrated



tools are available for in-target test automation and test quality regarding software running on ARM® boards. Embedded developers who opt for automated in-target software testing often find it a challenge to find tools that fit into their environment. Atollic examines tools for testing in ARM IP-based embedded systems, in particular its TrueVERIFIER™ and Atollic TrueANALYZER® solutions (page 24).

There is a trend towards open, high volume ARM IP-based multimedia platforms. In this issue, Movial examines the value of ARM Open Source platforms and future trends (page 44).

Stereoscopic-3D (S3D) is quickly emerging as a buzz word, adding an additional dimension of reality to existing 2D videos, games, movies and images. Texas Instruments looks at how next-generation ARM architectures, such as the OMAP™ processors from Texas Instruments Incorporated (TI), addresses design challenges, and shares perspectives on how to successfully establish S3D experiences in the mobile world.

For something different don't miss our article 'Bottling a Star Using ARM's AMBA AXI4 in an FPGA'. Academics in the UK demonstrate a data acquisition system for synthetic-aperture imaging using the latest ARM AMBA AXI4 interface on Xilinx technology (page 12).

ARM has a vision of a world where all electronic products and services are based on energy-efficient technology from ARM and its Partners – creating a better environment for everyone. That world is fast becoming a reality. We hope to see you at ARM TechCon 2011 to meet the companies and individuals defining this future. If not you can catch up with all the latest news from the event at www.iqmagazineonline.com.

Erik Ploof

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ARM® VSTREAM Accelerates Functional SoC Validation on RTL Simulators

ARM® has extended the functionality of the VSTREAM™ Virtual Debug Interface to enable the connection of the ARM® Development Studio 5 (DS-5™) and RVD™ debuggers to ARM Cortex™ processors running in RTL simulation. Together, VSTREAM and DS-5 enable earlier and more efficient functional validation and software development for ARM processor-based SoCs on either RTL simulation or hardware-assisted validation platforms.

In the very early stages of the design cycle, VSTREAM may be used to:

- Verify the correct implementation of the debug and trace fabric of the SoC, including any CoreSight™ components, by running high-level test patterns and connecting an actual debugger
- Easily validate the connection of the processor to the memory system and memory-mapped peripherals, by opening memory views in the debugger
- Create and debug boot code and functional test software to prove the integration of SoC components. From the debugger it is possible to stop the processor, view and change the value of processor registers and system memory, and single-step through code

- Post-process PTM™ or ETM™ instruction trace after a simulation run in order to get a history of instructions executed by the processor in a non-intrusive way

DS-5, together with VSTREAM and the ARM DSTREAM™ target connection unit, provide a common software development environment throughout the complete design cycle: from models and RTL simulators, through hardware emulators and FPGAs, to ASICs and ASSPs. All current ARM Cortex processors are supported by VSTREAM. Furthermore, it enables the simultaneous connection of multiple debuggers to a target, an essential function in bringing up multicore devices, such as those based on the Cortex-A5, Cortex-A9 and Cortex-A15 MPCore™ processors.

Availability

VSTREAM is available now for usage with Cadence Incisive, Synopsys VCS and Mentor ModelSim and Questa simulators. The hardware emulators supported are Cadence Palladium, Eve Zebu and Mentor Veloce. For further details on VSTREAM visit www.arm.com/vstream or contact your ARM representative.

ARM® Wins Business Of Year At Prestigious UK Awards

ARM took the award for “Business of the Year” at the Prestigious City AM Awards in London last month.

ARM fought off stiff competition from BSKYB, Weir Group, Mann

Group and Aggreko, who were all shortlisted. After much deliberation by judges, the award was made to the “very well run” ARM Holdings, seen as a “good example of a British company becoming an international player.”

ARM® and University of Michigan Extend Research Collaboration to Explore the Limits of Energy Efficient Computing

ARM® has renewed a research agreement with the University of Michigan under which ARM will fund and work in collaboration with university researchers on ultra-low energy and sustainable computing. The five-year, \$5 million extension of the research partnership will run until 2015 and focus on these particularly topical areas of research.

This collaboration will significantly expand the scope of research activities which focus on new applications areas to develop enabling technology for ultra-low energy computing. These application areas include energy efficient cloud computing; wearable medical and lifestyle devices; energy efficient trusted computing; and ubiquitous sensor networks.

The University of Michigan researchers are led by Trevor Mudge, Bredt Professor of Electrical Engineering and Computer Science. Over a decade ago, Mudge recognized that the future of computing was in miniature form factor microprocessors, and shifted his

focus from the development of high-performance computers to the pursuit of new technologies for ultra-low energy computing.

Extending the limits of low-power computing is a goal shared by many businesses, including ARM. Five years ago, at the invitation of his former graduate student and current ARM Vice President of Research and Development, Krisztián Flautner, Mudge and several of his University of Michigan colleagues entered into the first five-year, \$5 million research partnership with ARM. One of the first outputs of this collaboration was an energy management system, enabling mobile phones to automatically optimize their battery usage. Overall, the outcomes of the research partnership have been impressive with over 40 patents and numerous publications detailing this research. This success has led to the extension of the partnership. The extended partnership agreement runs until 2015, and the program takes place at the University of Michigan College of Engineering campus.

Global Unichip Corporation Selects ARM® Technology for a Wide Variety of Applications in Emerging Markets

ARM® and Global Unichip Corporation (GUC), an Advanced Technology ASIC company, today announced that GUC has licensed a broad range of ARM® Intellectual Property (IP). This includes the high performance, energy efficient ARM Cortex™ processor and ARM Mali™ Graphics Processing Unit (GPU) families, ARM CoreLink™ interconnect and system IP, and ARM Artisan® Physical IP. Access to this broad range of ARM IP will enable GUC to deliver solutions to a number of markets, from entry level smartphones and low cost tablets in emerging markets, to high performance tablets and Smart TVs.

GUC licensed the ARM Cortex-A9 MPCore™ processor in 2009, and the new agreement now includes the ARM Cortex-A5 MPCore processor and ARM Mali-300 GPU, as well as other ARM IP. GUC will be developing products based on ARM technology that include:

- **Entry level smart phones and low cost tablets in emerging markets**, using the ARM Cortex-A5 processor and ARM Mali-300 GPU.
- **Smart TVs and high performance tablets** using the ARM Cortex-A9 MPCore processor and ARM Mali-400

- **MP GPU**. A 28nm test chip will be taped out later in 2011 by GUC.
- **Additional ARM IP** used by GUC includes ARM Physical IP, such as Artisan® Processor Optimization Packs (POPs) for Cortex-A5 and Cortex-A9 processors, Artisan high speed memory compilers and Artisan DDR-3 Interface IP. GUC is also using ARM Fabric IP, including ARM® AMBA® 3 AXI Configurable Interconnect and ARM TrustZone® Protection Controller.

“GUC’s silicon manufacturing customers require differing solutions that are optimized to meet the needs of a wide range of smart devices, from entry level smart phones through to Smart TVs, targeted at consumers with a range of budgets and from a variety of demographics,” said Jim Lai, President, GUC. “This new agreement means that end users will ultimately benefit from the combination of GUC’s extensive experience in advanced design technology and the proven technology leadership of ARM IP. This will provide a choice of high performance, energy efficient SoCs with visually compelling multimedia capabilities for advanced platforms, such as Android™.”

ARM® Releases Fast Models v6.1

Later this month, Freescale plans to begin sampling the sixth Kinetis MCU family, built on the ARM® Cortex™-M4 – the K50 medical applications – and release details about the Kinetis K70 MCU family, featuring a floating point unit (FPU), tamper detection and graphic LCD capabilities.

In the fourth quarter of 2011, Freescale plans to introduce new devices in the Kinetis K10, K20 and K60 families. The devices are designed to feature up to 150 MHz CPU performance, 1 MB of flash memory and several new feature options, including a single-precision FPU. In addition, Freescale plans to begin sampling the Kinetis K70 MCU family, which adds an on-chip graphic LCD controller for advanced HMI applications.

Kinetis K50 MCU family sample and tool availability is planned for June 21, 2011. Users can leverage a powerful analog signal measurement and conditioning engine that delivers fast, single-chip processing capability for portable medical, instrumentation and test and measurement applications. USB, Ethernet, segment LCD and encryption modules provide options for secure data transmission between system components and the end user via a display, the company explained.



Initially, Freescale plans to offer 100 MHz Kinetis K53 and K52 MCUs in 144 MAPBGA/LQFP packages, with smaller-pin-count devices planned for Q3 2011. Customers can explore the features of the Kinetis K50 MCU family using the TWR-K53N512-KIT development system. Technical sessions and live demonstrations of the Kinetis K50 MCU family in various medical applications will be featured at FTF Americas 2011.

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ZeBu - Server

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- Most cycles per dollar in emulation

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Visit us at ARM® TechCon™ - Table Top

Mobile Virtualization is Real, and the ARM[®] Architecture is a Driving Force

By Richard Kinder, VP, Technology & New Business, EMEA, Red Bend Software



Richard Kinder - Red Bend

If you haven't already heard about mobile device virtualization, you soon will. ARM's introduction of hardware support for virtualization in the ARM[®] v7a architecture extensions and the impending availability of partner silicon implementing the ARM Cortex™-A15 core are driving many in the industry to discover the benefits of virtualization. In different market segments the desire to derive maximum performance with lowest effort from Cortex-A8 and Cortex-A15 processor-based devices is already driving real implementations today.

Stacy Crook, senior analyst at IDC, recently completed a Technology Assessment of the Mobile Virtualization market. She saw a number of ways mobile device virtualization can benefit the entire mobile ecosystem, from chipset makers, OEMs and carriers to enterprises and consumers. Crook said mobile device virtualization is interesting because there are very few technologies that provide such versatility to stakeholders throughout the mobile market. The full report can be downloaded at

http://www.redbend.com/index.php?option=com_downloads&view=typelist&type=Reports&Itemid=48&lang=en.

There are a couple of approaches for delivering mobile virtualization. The best is a Type-1 hypervisor – specialized software that sits directly on the device chipset – which offers unique security benefits as it protects the device software from the operating system level on up. Mobile device virtualization truly has the ability to change the industry by providing a significant way for mobile operators to increase their value to consumers and enterprises by offering new services and value propositions. Among these are:

- Low-cost Android™ smartphones
- Isolating rich, trusted services on open operating systems
- Enabling enterprise IT administrators to securely manage corporate data and applications on employee-liable smart devices.

Smartphones at feature-phone prices are possible because virtualization can lower the BOM of mobile devices and reduce time-to-market; a boon for chipset makers and manufacturers. Virtualization

also enables network operators to offer smartphones to a broader market at a very competitive price, and sell additional data plans. Mobile device virtualization enables vendors to isolate important trusted services (e.g., billing, authentication, phone service) from the open OS and run them in isolated and tamper-proof virtual machines. The end result is that trusted services are not affected, even if the open environment is compromised.

According to IDC, within the next few years more than 60 percent of all smartphone business use will be conducted on devices owned by the employee, not the enterprise (Worldwide Business Use Smartphone 2010 – 2014 Forecast and Analysis, IDC# 225054, September 2010). The first issue this raises is how to keep the enterprise data safe when employees' phones are also surfing the Web, checking out Facebook and playing Angry Birds, which, by the way, has full access to your contacts.

That's the beauty of mobile device virtualization. The hypervisor makes it possible to run isolated virtual machines on the device, each with a separate OS. For example, you could have a secured enterprise domain where mobile enterprise applications, management and security software reside, and another domain for the user's contacts, applications, pictures, music, etc. So, for example, if a virus compromises the consumer domain, the enterprise domain will be unaffected.

Mobile device virtualization is still in the early stages, but it's poised for significant growth in the very near future. As the market matures during the next few years, new use cases will be developed that will bring even greater benefits to all segments of the mobile ecosystem. The mobile phone revolution began when the technology advanced to where you could carry your phone in your pocket, instead of having a heavy unit bolted into your car. Now, the smartphones and mobile devices that we can't live without will be even smarter, deliver better performance and be more secure, thanks to mobile virtualization.

END