

Change you can count on.

By Erik Ploof, ARM

Barak Obama's mantra for this year's US Presidential elections was "Change you can believe in". From economics to foreign affairs, change was the byword during 2008. Change has been a consistent hallmark of the technology industry, too. A glance back at the progress in semiconductors since the first working three terminal solid state device (transistor) was invented by American physicists at the Bell Telephone Laboratories a short 60 years ago, confirms it.

Change also fuels evolutions and no where is evolution in the technology industry more dramatic than in the mobile and MCU markets. ARM continues to be at the heart of that evolution, as evident from the headlines at the recent Mobile World Congress and Embedded world events. Headlines from this month's world press proclaim: "ARM Launches Cortex-M0--its Smallest, Lowest Power, Most Energy Efficient Processor, ARM Acquires Video Technology Company, ARM NEON Technology to Help Enable Deployment of Dolby Mobile Technology, and Fujitsu selects ARM Cortex technology for automotive applications", demonstrates the leadership role ARM is playing driving change forward in the embedded marketplace.

Newspapers say "Ripped from the Headlines" to show how fast adaptation of an idea takes place, and the articles in this issue of IQ indicate how fast the is being implemented. "Power Management for Optimal Power Design" (pg. 20) and "A Methodology for Low Power Verification" (pg. 56), work together with the NXP articles "An Introduction to NXP's Cortex-M0 Family" and "Low Power Design using the LPC1000 Family" (pgs. 14-18), to set the stage for applications ranging from home networks to handhelds. "HANA Provides a Clear Vision for Home Entertainment" (pg.40) and "Techniques for Optimization of Audio Codecs on NEON" (pg. 36), discuss how ARM technology is in enabling HD TV and superior audio in portable devices, respectively.

Consumer Lifestyles is a snapshot of some of the end-user applications employing ARM Core-based Processors: "Big Cat" (pg. 62) is a new motor speed controller for industrial use, and "Printer with an Attitude"(pg. 60), is a Konica color printer running on an ARM11.

By now, even the most casual reader must have noticed the obvious: To celebrate the new era of change, IQ Magazine offers "Change you can Experience". The magazine you hold in your hand marks the inaugural issue of our new IQ Magazine. Using your suggestions as a

design playbook we have completely re-designed IQ from front to the back. We've used contemporary typestyles, exciting photos, engaging new reader-friendly designs, and added new sections to usher in this new climate of change. The re-design, like change itself, was inevitable: now in its 8th year as the leading 32-bit publication in the embedded industry, IQ needed to convey the same sense of change as the articles published inside. Perhaps Isaac Asimov, the great science-fiction author said it more succinctly: "The only constant is change, continuing change, inevitable change that is the dominant factor in society today. No sensible decision can be made any longer without taking into account not only the world as it is, but the world as it will be."

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New ARM9 processor-based Module family unveiled at Embedded World

Digi International has introduced what it describes as the 'industry's fastest ARM9 wired and wireless embedded core module family.' ConnectCore 9M 2443 and ConnectCore Wi-9M 2443 support Windows CE and Linux Os. The pin compatible wired and 802.11a/b/g core modules are suitable for display and embedded multimedia applications such as networked displays, medical devices, building access controls, energy management devices and time and attendance devices.

Based on the Samsung S3C2443 ARM9, it operates at up to 533MHz. Both feature a multilayered memory bus architecture that allows simultaneous data transfer between processor, memory and peripherals. This is designed to eliminate the traditional bus bandwidth bottlenecks common on other platforms.

ARM Acquires Sweden-based Video Technology Company

ARM has acquired Logipard AB, a leading Sweden-based video IP company. The privately-owned designer of power-efficient video encode and decode acceleration technologies for the mobile and consumer markets is the leading provider of video IP to one of the world's leading mobile technology suppliers for platforms used by LG Electronics and two other leading mobile handset OEMs. The Logipard video IP has shipped in more than 30 million mobile phone units to date.

The acquisition enables ARM to bring to market the ARM Mali-VE multi standard video engine family of products. The acquisition adds world class video and imaging technology to the ARM portfolio, making ARM the only IP provider with the in-depth experience and understanding required to meet the market need for an entire range of system elements, from memory controllers, interconnect, application and embedded processors to graphics processors, video engines, physical IP and embedded firmware.

"Video acceleration and processing technologies have become critical for the development of many consumer electronics products, complementing the ARM Cortex™ CPU and ARM Mali GPU IP already incorporated into many high-performance mobile devices," said Lance Howarth, VP and GM, Media Processing Division, ARM. "Through the adoption of Mali-VE technology, ARM Partners will be able to complement their use of ARM graphics and CPU IP to deliver more efficient system-on-chip (SoC) solutions, while reducing risk and accelerating time-to-market."

The New Cortex-M0

ARM Launches Smallest, Lowest Power, Energy Efficient Processor

The exceptional low-power, small gate count and code footprint of the Cortex-M0 processor enables MCU developers to achieve 32-bit performance at an 8-bit price point. The ultra low gate count also enables it to be deployed in analog and mixed signal devices as well as MCU applications, and promises substantial savings in system cost while retaining tool and binary compatibility with the feature-rich Cortex-M3 processor. Licensees include NXP Semiconductors and mixed signal ASIC provider, Triad Semiconductor.

Geoff Lees, vice president and general manager, Microcontroller Division, NXP Semiconductors, states "By providing 32-bit performance in a 16-bit footprint, the ARM Cortex-M0 processor, enables us to reduce silicon and energy costs without compromising product enhancements or upward code compatibility, making it an ideal complement to the Cortex-M3 architecture that we use across our products."

Combining the ARM Cortex-M0 processor with our silicon proven configurable analog and digital technology will provide Triad Semiconductor customers with the fastest, safest and most cost-effective way to design, prototype and produce advanced mixed signal ASICs." said Jim Kemerling, VP and CTO of Triad Semiconductor.

"The Cortex-M0 processor is yet another demonstration of ARM's low-power leadership and its commitment to drive the industry forward towards higher performance with ever lower power consumption," said Mike Inglis, executive vice president and general manager, Processor Division, ARM. "With its expertise in low-power technology, ARM has worked closely with its Partners and their customers to ensure that our processor architectures enable the cost and energy-efficient creation of tomorrow's electronic devices and systems."

Enabling Audio

ARM NEON Technology Helps Enable Deployment of Dolby Mobile

Dolby Mobile from Dolby Laboratories, Inc., which enhances the listening experience on mobile phones and portable media players, is now available with ARM NEON technology. The combination of Dolby Mobile and NEON technologies enables manufacturers to offer a premium-quality listening experience over headphones on mobile devices, while efficiently maximizing battery life. NEON technology is designed to enable multimedia applications such as Dolby Mobile to be deployed easily across ARM Cortex processor-based products.

"With the advent of powerful processors, larger color displays, greater storage capacity and expanded wireless connectivity, mobile devices are becoming increasingly complex. NEON technology simplifies the implementation of multimedia applications such as Dolby Mobile across ARM Cortex processor-based mobile devices," said Ian Drew, EVP Marketing, ARM. "NEON technology is having an enormous impact on the enhancement of quality multimedia applications on today's smartphones."

ARM Assembly: Fundamentals and Techniques

This undergraduate textbook presents examples, diagrams, and training materials produced by ARM specifically for students new to programming in assembly language. Starting with a short review of computing systems in general, it covers the basics of assembler directives, load and store instructions, methods for passing parameters to functions, and all required arithmetic operations, including an optional section on fractional notation. Later sections cover memory mapped peripherals, exceptions, and mixing C and assembly.

Order directly from the publisher or Amazon.com.

Fujitsu selects ARM Cortex for Automotive Applications

Fujitsu Microelectronics Europe GmbH has signed a major licensing agreement for the ARM Cortex-R4F processor for use in automotive applications including safety and chassis.

The agreement is a significant endorsement of the ARM architecture in the automotive market as manufacturers endeavour to consolidate their automotive functions into a reduced number of more capable processors. It has been predicted that automotive semiconductor revenue will grow by an annual compound rate of 7.7 percent between 2007 and 2012 as new and potential applications for the deployment of electronics in current and next generation vehicles increases. Benefits such as adaptive cruise control, lane departure warning systems and monitoring driver fatigue and inattention are examples of driver-assistance safety enhancements that are expected to be widely deployed in future vehicles. Furthermore, numerous applications are emerging in the industrial space where the Cortex-R4F processor could prove to be an ideal fit.

In addition to the Cortex-R4F processor, the agreement includes the ARM AMBA Designer tool and ARM CoreSight technology for advanced on-chip debug and real-time trace.

ARM Selects TSMC Forum to Unveil Cortex Processor-based Solutions

ARM will use the widely attended TSMC forum to introduce two co-developed projects with TSMC; white paper on designing a low-power, low-cost smart meter and their robust 40 G nm design platform. ARM has developed a white paper detailing the design of a low-power, low-cost solutions for smart meters. These highly integrated SoCs use a power-efficient Cortex CPU with physical IP, and are produced in TSMC 0.18µm, ultra-low-leakage process. They can be used in standalone smart meters or in appliances that combine power monitoring with other tasks. The meter concept can further extend to a variety of applications, including industrial, consumer and medical systems.

In addition, ARM will be on hand to discuss their new 40nm G Physical IP platform, the broadest of its kind in the semiconductor industry. This new offering gives designers unsurpassed flexibility and balance in performance, power, area and manufacturability, resulting in integrated 40nm System-on-Chip (SoC) designs optimized for the company's comprehensive line of Cortex™ processors. The TSMC Forum is on April 21, 2009 at the Santa Clara Convention Center. ARM will distributing to all attendees the March '09 issue of IQ featuring a special section on MCU design along with their white paper on smart meters solutions based on the Cortex processor and 0.18µm, ultra-low-leakage process.

ARM Invests in Japanese Software Vendor eSOL

ARM has made a strategic investment in eSOL Co., Ltd, a leading Japanese embedded software developer, and that the two companies plan to collaborate on a series of initiatives aimed at leveraging their combined strengths and delivering compelling ARM® processor-based solutions to the automotive industry, in addition to the digital consumer products. The collaboration will enable the two companies to build on their existing relationship to develop automotive solutions, extending from automotive information systems based around ARM MPCore™ multicore

processor technology and eSOL's groundbreaking multicore RTOS (eT-Kernel Multi-Core Edition), through to longer term strategic alignments based around the AUTOSAR standard running on ARM Cortex™ microcontrollers. The results of this collaboration will enable automotive device manufacturers to improve the development efficiency of their products by standardizing on a single processor architecture together with validated software components and corresponding development environment.

What's the Buzz?

New On-Line for April

We start by looking at the latest addition to the ARM processor family, the low-power energy efficient ARM Cortex-M0 which will change the face of many technologies and extends ARM's microcontroller roadmap into ultra low-power MCU and SoC applications.

The exceptional low-power, small gate count and code footprint of the Cortex-M0 will help MCU developers to achieve 32-bit performance at an 8-bit price point. IQ Online will get the low-down from ARM experts on the importance of the Cortex-M0 in the ARM quest for ever-high performance with ever-lower power consumption. IQ Online is also catching up with Dr. Phil Culverhouse, principle lecturer at the Center for Robotics & Intelligent Systems at the University of Plymouth in the UK, to get an update on moving its Robot Bunny project across to Texas Instruments' OMAP platform, built on the ARM Cortex™-A8 core.

Next we go to Altia Inc., which provides state-of-the-art GUI development and code generation tools for embedded displays.

In technology, IQ Online will look at home networking, which is expanding and costing less thanks to a fall in the cost of networking technologies and improvements in interfaces for networked entertainment and home appliances.

ARM7
ARM9/9E
ARM11
OMAP
XScale
Cortex-M1
Cortex-M3
Cortex-R4
Cortex-A8
ARM7
ARM9/9E
ARM11
OMAP
XScale
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