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# AMD, ARM, Imagination, MediaTek and Texas Instruments Unleash the Next Era of Computing Innovation

## Technology Leaders Establish the HSA Foundation to Create a Unified, Open Industry Standard Architecture for Heterogeneous Processing; Heterogeneous Processors, Which Combine Two or More Different Types of Processors Into a Single Chip, Accounted for Nearly Half of All Microprocessor Revenue in 2011(1)

BELLEVUE, WA -- (Marketwire) -- 06/12/12 -- Today at the AMD Fusion Developer Summit (AFDS) (NYSE: AMD), global technology leaders came together to announce the formation of the Heterogeneous System Architecture (HSA) Foundation. The HSA Foundation is a non-profit consortium established to define and promote an open, standards-based approach to heterogeneous computing that will provide a common hardware specification and broad support ecosystem to make it easier for software developers to deliver innovative applications that can take greater advantage of today's modern processors.

AMD, ARM, Imagination Technologies, MediaTek Inc., and Texas Instruments (TI) (NYSE: TXN) are the initial founding members of the HSA Foundation. The companies will work together to drive a single architecture specification and simplify the programming model to help software developers take greater advantage of the capabilities found in modern central processing units (CPUs) and graphics processing units (GPUs), and unlock the performance and power efficiency of the parallel computing engines found in heterogeneous processors.

By standardizing the heterogeneous programming model, developers can more easily and cost-effectively develop new software tailored to take advantage of the expanding $55.5B heterogeneous (also known as "hybrid") processor market(1). The HSA Foundation will help usher in the next era of software innovation, from enabling unprecedented user experiences to improving cloud-based data management, streaming, and security.

"HSA moves the industry beyond the constraints of the legacy system architecture of the past 25-plus years that is now stifling software innovations," said Phil Rogers, HSA Foundation President and AMD Corporate Fellow. "By aiming HSA squarely at the needs of the software developer, we have designed a common hardware platform for high performance, energy efficient solutions. HSA is unlocking a new realm of possibilities across PCs, smartphones, tablets and ultrathin notebooks, as well as the innovative supercomputers and cloud services that define the modern computing experience."

As an independent consortium, the HSA Foundation is open to any and all computing industry professionals with an interest in driving the next era in computing performance and energy efficiency. The HSA Foundation welcomes forward-thinking semiconductor companies, platform and OS vendors, device manufacturers, independent software vendors, academia and open source developers. Members of the HSA Foundation plan to deliver robust development solutions for heterogeneous compute to drive innovative content and applications with developer tools, software developer kits (SDKs), libraries, documentation, training, support and more.

"One year ago, AMD boldly announced a roadmap for making HSA a reality, starting with combining the CPU and GPU as a unified processing engine to create an architecture that would greatly simplify the programming of heterogeneous platforms," said Manju Hegde, corporate vice president of Heterogeneous Applications and Developer Solutions for AMD. "Today, we are continuing our heterogeneous computing leadership and dedication to driving broad industry adoption by making the HSA architecture an open standard."

"We are all demanding more from the technology that connects us to our digital worlds. Graphical interfaces are critical to the user experience but can have a power impact. With open standards, developers can now

provide outstanding graphics without compromising power-efficiency," said Jem Davies, ARM Fellow and vice president of Technology, Media Processor Division, ARM. "ARM welcomes the formation of the HSA Foundation and is pleased to be one of the founding members. ARM's extensive experience with heterogeneous systems brings a unique leadership perspective to developing the right compute processor for the right tasks based on the latest ARM technology, such as ARM® Mali™ GPUs and Cortex™ processors."

"Imagination is delighted to be one of the founders of the HSA Foundation. Our long-held view is that heterogeneous processing architectures are fundamental to scalability, flexibility and performance for future SoC (Systems-on-Chip) design," said Tony King-Smith, vice president of Marketing, Imagination Technologies. "We believe that the combination of CPUs with increasingly powerful on-chip GPUs, using industry standard APIs such as OpenCL™, Renderscript Compute, and Direct Compute, is the vital first step along this path. The HSA APIs and tools complement these higher level APIs to help SoC systems engineers create future generation computing platforms. As applications developers embrace the benefits of embracing such architectures, the HSA Foundation will provide a valuable cross-platform, cross-OS means of ensuring maximum heterogeneous application portability and optimization. We look forward to working closely with all of the founders and other members of the HSA Foundation to deliver this key open standard that is set to fuel the future of mass market high performance computing."

"MediaTek is excited about the potential of heterogeneous computing in enabling innovative mobile applications. We believe that an open standard is key to bringing the technology to the mainstream smartphone market," said Chien-Ping Lu, senior director, Corporate Technology Office, MediaTek. "As a chipset and platform supplier with a strong focus on mainstream smartphones, we are excited to join AMD, our IP partners, Imagination, ARM, TI and other industry leaders to promote HSA as the open standard for heterogeneous computing."

"TI's expertise in delivering low-power, high-performance experiences via the smart, multicore architecture of our OMAP™ platform undoubtedly makes our position as a founding member of the HSA Foundation a natural fit," said Matthew Locke, director, Linux Development Center, TI. "We look forward to working with other leaders in the industry to drive adoption of heterogeneous computing as a standard platform across embedded, mobile, personal and cloud computing."

In addition to the founding members, contributor and supporting-level members will assist with research, development, production, manufacture, use, and the sale of HSA and heterogeneous computing software. For more information about the HSA Foundation's membership levels and benefits or to join the organization, please go to www.hsafoundation.com.

*Supporting Resources*

- For additional information about HSA and the HSA Foundation visit the HSA Foundation website at www.hsafoundation.com.
- Follow the HSA Foundation on Twitter: @HSAFoundation.
- "Like" the HSA Foundation on Facebook: www.facebook.com/HSAFoundation.
- View Phil Rogers' AFDS keynote presentation via AFDS-D. Register here.

*About Heterogeneous System Architecture (HSA)*
Developers will benefit from the open standard programming of HSA for both the CPU and GPU, which allows the two processors to work cooperatively and directly in system memory. Additionally, HSA provides a single architecture across multiple operating systems and hardware designs. By maximizing the full compute capabilities of systems with both CPUs and GPUs, users can see performance and energy efficiency boosts across a variety of applications.

*About the HSA Foundation*
The HSA (Heterogeneous System Architecture) Foundation is a not-for-profit consortium for SoC IP vendors, OEMs, academia, SoC vendors, OSVs and ISVs whose goal is to make it easy to program for parallel computing. HSA members are building a heterogeneous compute ecosystem, rooted in industry standards, for combining scalar processing on the CPU with parallel processing on the GPU while enabling high bandwidth access to memory and high application performance at low power consumption. HSA defines interfaces for parallel computation utilizing CPU, GPU and other programmable and fixed function devices, and support for a diverse set of high-level programing languages, thereby creating the next foundation in general purpose computing.

*About AMD*
AMD (NYSE: AMD) is a semiconductor design innovator leading the next era of vivid digital experiences with its groundbreaking AMD Accelerated Processing Units (APUs) that power a wide range of computing devices. AMD's server computing products are focused on driving industry-leading Cloud computing and virtualization environments. AMD's superior graphics technologies are found in a variety of solutions ranging from game consoles, PCs to supercomputers. For more information, visit http://www.amd.com.

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(1) Half of $111B 2011 processor revenue generated by hybrids, according to IMS Research, recently acquired by IHS. http://imsresearch.com/press-release/Half_of_111_Billion_2011_Processor_Revenue_Generated_by_Hybrids_According_to_IMS_Research

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