February 21, 2018

AMD Launches EPYC™ Embedded and Ryzen™ Embedded Processors for End-to-End "Zen" Experiences from the Core to the Edge

— EPYC Embedded processors deliver up to 2.7X more performance-per-dollar[1] and Ryzen Embedded processors deliver up to 3X more GPU performance[2] —

SANTA CLARA, Calif. , Feb. 21, 2018 (GLOBE NEWSWIRE) -- AMD (NASDAQ:AMD) today introduced two new product families – the AMD EPYC™ Embedded 3000 processor and AMD Ryzen™ Embedded V1000 processor – to enter a new age for high-performance embedded processors. AMD EPYC Embedded 3000 brings the power of "Zen" to a variety of new markets including networking, storage and edge computing devices, while AMD Ryzen Embedded V1000 targets medical imaging, industrial systems, digital gaming and thin clients. These new AMD Embedded processors deliver breakthrough performance, exceptional integration and on-chip security.

"Today we extend the high-performance x86 'Zen' architecture from PCs, laptops and the datacenter to networking, storage and industrial solutions with the AMD EPYC Embedded and AMD Ryzen Embedded product families, delivering transformative performance from the core to the edge," said Scott Aylor, corporate vice president and general manager, Datacenter and Embedded Solutions Business Group, AMD. "AMD EPYC Embedded 3000 raises the bar in performance for next-generation network functions virtualization, software-defined networking and networked storage applications. AMD Ryzen Embedded V1000 brings together the 'Zen' core architecture and 'Vega' graphics architecture to deliver brilliant graphics in a single chip that provides space and power savings for medical imaging, gaming and industrial systems. With these high-performance products, AMD is ushering in a new age for embedded processors."

Several customers announced products based on AMD EPYC Embedded 3000 and AMD Ryzen Embedded V1000, including:

- The Esaote ultra-performance MyLab™9 eXP ultrasound system for general medical imaging, women's healthcare and cardiovascular diagnostics, based on the Ryzen Embedded V1000 and targeting Q3 availability.
- The Quixant QX-70 4K Ultra HD casino gaming platform, based on the Ryzen Embedded V1000 and available today.
- Four products from Advantech based on the Ryzen Embedded V1000, including an integrated casino gaming platform and multimedia gaming engine, high-performance Com-E module for medical, automation and gaming applications, and a mini-ITX embedded motherboard.

Also, with support from more than 16 major ecosystem partners, companies can purchase boards and access software with AMD EPYC Embedded 3000 and AMD Ryzen Embedded V1000 technology. These include:

- The new IBASE MI988 Mini-ITX motherboard, SI-324 4x HDMI 2.0 digital signage player and FWA8800 1U rackmount network appliance that deliver datacenter class dependability, advanced integration and superior performance for a wide number of embedded applications.
- The Mentor Embedded Linux and Codesourcery software tools from Mentor Graphics that provide developers with improved performance and features to grow the embedded ecosystem, available today.

The excitement and momentum around today's announcement from AMD is supported by several significant proof points.

AMD EPYC Embedded 3000 processor portfolio delivers:

- Up to 2.7X more performance-per dollar than the competition[1]
- Up to 2X more connectivity than the competition[3]
- Enterprise-grade reliability, availability and serviceability (RAS) features

AMD Ryzen Embedded V1000 processor portfolio delivers:

- Up to 2X uplift in performance over previous generations[4]
- Up to 3X more GPU performance than the competition[2]
- Up to 46 percent more multi-threaded performance than the competition[5]
- Up to 26 percent smaller footprint than the competition for optimized board design[6]

In addition to performance, security remains a top concern for enterprise customers, whether they are designing top-of-rack switches, thin client devices or anything in between. AMD EPYC Embedded and AMD Ryzen Embedded processors help protect data at the hardware level with an on-chip secure processor, complemented by hardware validated boot capabilities to help ensure systems are booted up from trusted software. Additionally, Secure Memory Encryption (SME) deters unauthorized physical memory access while Secure Encrypted Virtualization (SEV) offers further deterrence by encrypting virtual machine (VM) memory, without the need to make changes at the application level.

AMD EPYC Embedded 3000 Product Overview

- Highly scalable processor family with designs ranging from four cores to 16 cores, available in single-thread and multi-threaded configurations.
- Support for thermal design power (TDP) ranges from 30W to 100W.
- Expansive, integrated I/O with support for up to 64 PCIe® lanes and up to eight channels of 10 GbE.
- Up to 32MB shared L3 cache with up to four independent memory channels.
- Unparalleled enterprise-grade RAS to address data detection, correction, recovery and containment, helping ensure that systems are continuously running even under the most stringent enterprise environments.
- On-board secure processor for crypto co-processing, SME to defend against unauthorized physical memory access, and SEV for encrypting VM memory to help protect against various administrator attacks without disrupting application codes.

- Product availability for up to 10 years, offering customers a long lifecycle support roadmap.

AMD Ryzen Embedded V1000 Product Overview

- Breakthrough Accelerated Processing Unit (APU) coupling high-performance 'Zen' CPUs and 'Vega' GPUs on a single die, offering up to four CPU cores/eight threads and up to 11 GPU compute units to achieve processing throughput as high as 3.6 TFLOPS[7].
- By combining the power of 'Zen' and 'Vega' architectures, the Ryzen Embedded V1000 family can deliver up to 200 percent more performance compared to previous generations[5].
- Support for TDP ranges from 12W to 54W, enabling scalability for high-performance devices and reduced power consumption for energy-conscious applications.
- Robust I/O capabilities that support up to 16 PCIe lanes, dual 10 GbE and expansive USB options, including up to four USB 3.1/USB-C interconnects, with additional USB, SATA and NVMe support.
- Incredible resolution in a small package, driving up to four independent displays running in 4K, with the ability to support 5K graphics for applications demanding next-generation visual clarity, including support for H.265 decode and encode, and VP9 decode[8].
- Equipped with dual-channel 64-bit DDR4, with performance up to 3200 MT/s.
- On-board secure processor for crypto co-processing, SME to defend against unauthorized physical memory access, and SEV for encrypting VM memory to help protect against various administrator attacks without disrupting application codes.
- Product availability for up to 10 years, offering customers a long lifecycle support roadmap.

Additional Resources

- AMD launch video
- Customer testimonial videos
- AMD EPYC Embedded 3000 blog post
- AMD Ryzen Embedded V1000 blog post
- AMD Embedded product page
- Become a fan of AMD on Facebook
- Follow AMD Embedded on Twitter

AMD EPYC Embedded 3000 Processor Portfolio	AMD Ryzen Embedded V1000 Processor Portfolio
EPYC Embedded 3000 Product Brief	Ryzen Embedded V1000 Product Brief
Networking Application Brief	Medical Imaging Application Brief
Industrial Application Brief	Print Imaging Application Brief
Storage Application Brief	Industrial Application Brief
	Digital Signage Application Brief
	Aerospace & Defense Application Brief
	Thin Client Application Brief
	Media & Collaboration Application Brief
	Digital Casino Gaming Application Brief

AMD EPYC Embedded 3000 Support

Seagate Technology

“We are in an age where stored information is exploding from megabytes to geopbytes, and as the global leader in data storage solutions, Seagate is committed to delivering technologies that access, analyze, store and interpret this data quickly, accurately and securely to get the most value out of living information that is produced everyday” said Mohamad El-Batal, chief technical officer, Seagate Technology Cloud Systems. “AMD strives to enable such vision with their new AMD EPYC Embedded 3000 processors, as they claim to offer improved enterprise-grade reliability, availability and serviceability, which are key features Seagate demands in our next generation of intelligent storage array technologies. Seagate’s customers continue to push for a minimum of 40 percent performance improvement over prior generation product architectures at a lower cost, which AMD helps enable through their EPYC Embedded 3000 processors.”

AMD Ryzen Embedded V1000 Support

Arrow Electronics Intelligent Systems

“Arrow Electronics Intelligent Systems has partnered with AMD and Sapphire Technology to bring the latest Seneca Digital Signage product to market, the XK-QUAD, based on the new AMD Ryzen Embedded V1000 processor and designed for small video wall displays in retail environments, as well as digital displays in quick service restaurants,” said Jami McGraw, global product manager, Intelligent Systems, Arrow Electronics Intelligent Systems. “We are committed to developing extremely efficient and environmentally conscious video players and wall controllers, and the AMD Ryzen Embedded V1000 provides the performance, power and value our customers require to achieve success in their target markets.”

Esaote

“As one of the top global providers of diagnostic ultrasound systems, it is imperative that Esaote partners with technology leaders that support the sophisticated signal and image processing needs as well as graphics display capabilities that doctors and technicians rely on to make critical diagnostic decisions,” said Andrej Dvorak, chief technology officer, Esaote. “Not only does the new AMD Ryzen Embedded V1000 enable us to deliver world-class performance and crystal-clear diagnostic images, the degree of integration allows us to develop more compact ultrasound systems that pack the performance punch of much larger machines, improving total cost of ownership for our customers and offering a better experience for patients, doctors and medical staff.”

QTechnology

“QTechnology is dedicated to developing machine vision applications that enable real-time image processing to address unique challenges in industrial markets. In order to deliver a multi-camera device that can support complex algorithms and make critical decisions based on thorough analysis, we need a technology partner that strikes the optimal balance between power consumption and processing performance,” said Kristian Glode Madsen, general manager, QTechnology. “The new AMD Ryzen Embedded V1000, with leading graphics capabilities and high-performance CPU functionality integrated onto a single APU, provides us with a flawless platform for the machine vision applications of today and the future.”

Quixant

“Quixant is a leading supplier of computer platforms for casino gaming machines and skill-based gaming systems, and we depend on exceptional graphics performance combined with

multi-display configurability to attract and hold the attention of players in a highly competitive environment," said Jon Jayal, chief operating officer, Quixant. "The new AMD Ryzen Embedded V1000 delivers on every front, with striking levels of CPU and GPU performance on a single piece of silicon. Thanks to AMD, we can enable a stunning visual experience with four simultaneous Ultra HD displays, 3D acceleration and 4K playback, with the security features to help keep data secure and encrypted, making it a compelling proposition to drive the latest generation of gaming machines."

Sintrones

"Our customers expect exceptional longevity, durability and performance from our in-vehicle computing solutions. The new AMD Ryzen Embedded V1000 will only further these characteristics with next-generation CPU and GPU performance," said Kevin Hsu, chief executive officer, Sintrones. "Benefits such as advanced I/O design and extension, high-temperature endurance, and efficient power consumption ensure that we are well-positioned to support customers on their transportation and automation journeys."

SMACH Z

"The introduction of the SMACH Z handheld console will create new opportunities for portable gaming devices, enabling users to play AAA titles at HD framerates, delivering desktop-quality power and graphics in the palm of players' hands," said Daniel Fernandez, chief executive officer, SMACH. "By leveraging the new AMD Ryzen Embedded V1000 with superior graphics capabilities and mega processing power in our console, we are ready to revolutionize the on-the-go consumer gaming experience."

Hardware and Software Ecosystem Support

Advantech Innocore

"Advantech Innocore has a long history of collaboration with AMD in developing specialized embedded platforms for the casino and AWP gaming markets that demand high-performance, industrial-grade hardware for always-on environments," said Craig Stapleton, product director, Advantech Innocore. "We are pleased to launch a new all-in-one platform, the DPX-E140, that is based on the revolutionary AMD Ryzen Embedded V1000 and offers an unbeatable combination for gaming OEMs with 'cabinet-ready I/O,' a remarkable graphics engine, and a major boost in performance without compromising on power."

Advantech SOM

"Advantech SOM is focused on delivering platforms that provide outstanding graphics capabilities and high-performance CPU processing power for the medical, automation, machine vision, industrial control and digital signage market segments," said Rex Lee, SOM director, Advantech Embedded-IoT Group. "With the new AMD Ryzen Embedded V1000, we enable our customers to develop products that not only support a premium visual interface with features such as four simultaneous 4K displays, but also help to increase efficiency and scalability by offering a highly-integrated solution with the GPU and CPU available on the same platform."

AEWIN

"Our customers require exceptional graphics in their interactive slot machines, and the new AMD Ryzen Embedded V1000 enables us to develop a mini-ITX M/B that delivers the

performance they expect," said Vincent Lu, product manager, AEWIN. "The AMD R-Series family of processors has already shown excellent performance, efficiency and multi-display support in our AEWIN MB-8395 board, and the AMD Ryzen Embedded V1000 furthers this reputation of dependability and performance by leveraging a next-generation architecture, so we can continue to enhance the end-user gaming experience."

"We are pleased to incorporate the AMD EPYC Embedded 3000 into our AEWIN product portfolio," said Charles Lin, chief executive officer, AEWIN. "With up to 32 high-performance cores and a low power design, the AMD EPYC Embedded 3000 will be an ideal platform for network computing applications, and complements our other solutions based on the AMD Ryzen Embedded V1000 and AMD EPYC 7000 processors."

AOPEN

"The new AMD Ryzen Embedded V1000 is the ideal complement to our AOPEN media players, particularly with regard to the ability to simultaneously drive multiple 4K displays for a stunning visual experience," said Stan Tsui, head of the channel and customer division, AOPEN. "The Ryzen Embedded V1000 is the beginning of a new generation of AMD processors that we can continue to rely on for superior graphics performance and processing capabilities to enable even more advanced retail applications and deliver additional value for our customers."

Axiomtek

"Players have several options for entertainment when it comes to casino gaming, from slot machines to table top experiences. As a result, our partners and customers require board solutions that elevate the performance of their gaming systems to encourage participation," said Gary Tsao, vice president, Axiomtek Gaming. "The new AMD Ryzen Embedded V1000 with a 'Zen' core delivers excellent value and performance in a number of consumer and gaming focused markets, and we are excited to incorporate this new product into our Axiomtek GMB140 Mini-ITX board. The AMD Ryzen Embedded V1000 enables us to apply the processor's exceptional compute performance and advanced graphics to support a stunning gaming experience."

congatec

"As the leading Computer-on-Module vendor in EMEA, congatec provides state-of-the-art embedded computing technology with a high innovation level and excellent performance to its customers," said Christian Eder, director of marketing, congatec. "Therefore, the new groundbreaking AMD Ryzen Embedded V1000 with striking 'Vega' architecture-based graphics is an ideal choice for our extensive portfolio of standardized Computer-on-Modules."

DFI

"The new AMD Ryzen Embedded V1000 provides greater flexibility in how we use the DFI Mini-ITX board to target customers in visually intensive fields such as gaming and digital signage," said Clyde Chen, product manager, DFI. "With the 14nm architecture and powerful AMD Radeon 'Vega' graphics in the AMD Ryzen Embedded V1000, we plan to deliver superior graphics performance and CPU processing on a single chip that helps to lower the total cost of ownership for our end customers. Featuring up to four simultaneous native-display outputs, the AMD Ryzen Embedded V1000 processor offers scalability and power options to meet various thermal requirements."

IBASE

“The next-generation performance and scalability delivered by the AMD Ryzen Embedded V1000 and AMD EPYC Embedded 3000 processors translates to real-world differentiation and benefits for our customers across networking and digital media applications.” said Jackson Mao, product planning division vice president, IBASE. “We developed the SI-324 Digital Signage Player with the AMD Ryzen Embedded V1000 to empower businesses with a stunning new level of video performance, multi-display support and flexible power consumption to support rich multimedia capabilities. Additionally, we are leveraging the AMD EPYC Embedded 3000 to develop agile networking solutions that bring the efficiencies of the datacenter to mainstream server networking systems.”

Kontron

“We expect to see many new opportunities for our products with the new AMD Ryzen Embedded V1000 processors in the industrial and embedded fields including medical, digital signage and gaming,” said Peter Mueller, director of product, Boards and Modules, Kontron. “These applications require high-performance computing in a cost sensitive environment, and we are very confident that the performance and value of the AMD Ryzen Embedded V1000 will enable our COM Express compact computer modules and mini-ITX embedded motherboard to reach a broader base of customers.”

“We are currently developing a new edge computing product line that – after doing extensive benchmark studies – is particularly useful when designed with the AMD EPYC Embedded 3000 processor for a specific use case,” said Benoit Robert, vice president, Strategy and Marketing, Communications Business, Kontron. “This is being supported with an engagement with a major customer and we plan to have trial seed units available by Q2.”

Medwell

“Medical imaging has greatly benefited from recent advancements in graphics and displays, providing more clarity and a faster time to diagnosis. The enhanced resolution of the new AMD Ryzen Embedded V1000 helps to further improve the certainty of diagnosis and approach to procedures by offering crystal-clear imaging,” said Ping Huang, vice president, Medwell. “The AMD Ryzen Embedded V1000 is also available in a compact form factor with a 25W to 35W configurable TDP, making it a compelling processor for both our MEDM-B603 board designed for ultrasounds and our MEDM-B603 board designed for ultrasounds and surgical navigation equipment.”

Mentor Graphics

“Mentor is excited to continue its collaboration with AMD to now provide Embedded Linux solutions for the new AMD Ryzen Embedded V1000 and AMD EPYC Embedded 3000 processors. The suite of security features that AMD enables for these processors is well aligned with the extensive set of security features available in Mentor’s Linux products,” said Scot Morrison, general manager, Embedded Platform Solutions, Mentor. “With embedded Linux solutions that scale across the broad range of power and performance enabled by these new AMD processors, this partnership can continue to provide significant value to our customers, and enable a host of connected, secure devices utilizing the outstanding computational throughput of the new AMD products.”

Sapphire

“Sapphire Technology is a longstanding AMD partner and leading supplier of components and solutions for a broad range of consumer and embedded products, with expertise in next-generation motherboards and graphics add-in boards for display-centric applications,” said Adrian Thompson, vice president of marketing, Sapphire Technology. “By leveraging the new AMD Ryzen Embedded V1000 as a key pillar in our latest Sapphire board, we can increase CPU and GPU performance in an integrated 5x5 inch form factor, driving extraordinary graphics capabilities, support for up to four simultaneous displays in 4K resolution, and unprecedented performance-per-watt for our customers.”

SECO

“We are pleased to announce the SECO COMe-B75-CT6 module based on the new powerhouse AMD Ryzen Embedded V1000 processors, which represents a significant milestone in our company roadmap,” said Gianluca Venere, director of global sales and chief strategy officer, SECO. “With an extraordinary balance between performance, graphics and power consumption, the AMD Ryzen Embedded V1000 will be the flagship foundation for our COM Express™ line of products, and the first in a long series of AMD-based SECO solutions.”

About AMD

For more than 45 years, AMD has driven innovation in high-performance computing, graphics and visualization technologies — the building blocks for gaming, immersive platforms, and the datacenter. Hundreds of millions of consumers, leading Fortune 500 businesses and cutting-edge scientific research facilities around the world rely on AMD technology daily to improve how they live, work and play. AMD employees around the world are focused on building great products that push the boundaries of what is possible. For more information about how AMD is enabling today and inspiring tomorrow, visit the AMD (NASDAQ:AMD) website, blog, and Facebook and Twitter pages.

1. Estimates based on SPECint®_rate_base2017 using the GCC-02 v6.1 compiler. AMD-based system scored 24.2 in tests conducted in AMD labs as of 12 January, 2018, configured with 1 x EPYC 3251 SOC ($315 per processor at AMD 1ku pricing), 32GB memory (2 x 16GB 2Rx4 PC4-2666 running at 2666), 1x 250 GB SSD, AMD Wallaby Rev C, RHEL 7.4. Intel Xeon D 1540 scored 16.1. based on tests conducted in AMD labs as of 12 January, 2018 using Supermicro Server System X10SDV-8C-TN4F, configured with 1 x Xeon D 1540 ($581 each processor per ark.intel/com), 32GB memory (2 x 16GB 2Rx4 PC4-2666 running at 2133), 1x 250 GB SSD, RHEL 7.4.EMB-152.

2. Comparison is based on performance measured using the 3dMark® 11P benchmark. The AMD V-series V1807B scored 5618; the Intel Core i7-7700HQ scored 1783. The score for the Intel Core i7-7700HQ was measured using HP Omen with 8GB, Intel® HD 630 Graphics, 1x8GB DDR4 2400 RAM, 1TB 7200rpm HD, Microsoft Windows 10 Pro, Graphics Driver 21.20.16.4627, BIOS F.24. The score for AMD Ryzen Embedded V-Series V1807B was measured using the AMD “Dibbler” Platform, 2x8GB DDR4 3200 RAM, 250GB SSD Drive (non-rotating), TDP 45W, STAPM Enabled, ECC Disabled,

Microsoft Windows 10 Pro, Graphics Driver 17.40-171114a-320676E-AES-2-wRV-E9171, BIOS TDB1100EA. EMB-146.

3. AMD EPYC™ Embedded 3451 supports up to 64 PCI Express high spend I/O lanes, 8 10 GbE, 16 SATA, and 4 memory channels versus Xeon D 1587 supports 32 PCIe lanes, 4 10GbE, 6 SATA, 2 memory channels. EMB-153.

4. Testing done at AMD Embedded Software Engineering Lab. The AMD R-series Embedded SOC formerly codenamed "Merlin Falcon" scored 2399 and the AMD V-series V1807 scored 4978, when running 3dMark® 11P benchmark which measures GPU performance. (4978/2399=2.075) The AMD R-series Embedded SOC formerly called "Merlin Falcon" scored 273 and the AMD V-series V1807 scored 665 on Cinebench R15 nT which measures multi-threaded CPU performance. (665/273= 2.435). AMD Embedded R-Series RX-421BD used a AMD “Bettong” Platform, with a 2x8GB DDR4-2400 RAM, 250GB SSD Drive (non-rotating), TDP 35W, STAPM and ECC Disabled, Graphics Driver 17.40.2011-171026a-320350C-AES, BIOS RBE1306A. AMD Ryzen Embedded V-Series V1807B used the AMD “Dibbler” Platform with 2x8GB DDR4 3200 RAM, 250GB SSD Drive (non-rotating), TDP 35W, STAPM and ECC Disabled, Graphics Driver 17.40-171114a-320676E-AES-2-wRV-E9171, BIOS TDB1100EA. Both systems ran Microsoft Windows® 10 Pro. EMB-144.

5. Testing done at AMD Embedded Software Engineering Lab on the Intel Core i3 -7100U. The Ryzen 3 2200U was used to approximate the V1202B. The i3-7100U scored 254 and the AMD Ryzen 3 2200U scored 372 on Cinebench R15 nT benchmark which measures multi-threaded CPU performance. System Configurations: Intel Core i3-7100u: HP 15inch Notebook, i3-7100u with Intel® HD Graphics 620, 1x8GB DDR4-2133 RAM, 1 TB 5400 rpm SATA, Microsoft Windows 10 Pro, Graphics Driver 21.20.16.4627, BIOS F.07. AMD Ryzen 3 2200U: AMD “Mandolin” Platform, TDP 15W, STAPM enabled, ECC Disabled 2x4GB DDR4 2400 RAM, 512GB SSD Drive (non-rotating), Microsoft Windows 10 Pro RS3, Graphics Driver 23.20.768.0. EMB-147.

6. The Intel i7-7700HQ package size in FCBGA1440 is 28mm x 42mm = 1176mm2 versus the V1000 family in FP5 package 25mm x35mm = 875mm2 which is 26% smaller than the i7-7700HQ. Source From intel ARK website: https://ark.intel.com/products/97185/Intel-Core-i7-7700HQ-Processor-6M-Cache-up-to-3_80-GHz. EMB-150.

7. The equation makes assumptions for clock and uses16-bit floating point operands. FLOPS = 11 CU * 4 SIMD/CU * 4Shaders/SIMD * 4 MAC/Pixel * 4 FLOPS/Cycle/ALU * 1300MHz = 3.661 TFLOPS. EMB-151.

Cautionary Statement

This press release contains forward-looking statements concerning Advanced Micro Devices, Inc. (AMD) including the features, functionality, availability, timing, deployment, and expected benefits of the EPYC™ Embedded 3000 processor and Ryzen™ Embedded V1000 processor and the products being developed by customers based on the EPYC™ Embedded 3000 processor and Ryzen™ Embedded V1000 processor as well as the expected support from major ecosystem partners, which are made pursuant to the Safe Harbor provisions of the Private Securities Litigation Reform Act of 1995. Forward-looking statements are commonly identified by words such as "would," "intends," "believes," "expects," "may," "will," "should," "seeks," "intends," "plans," "pro forma," "estimates,"

"anticipates," or the negative of these words and phrases, other variations of these words and phrases or comparable terminology. Investors are cautioned that the forward-looking statements in this document are based on current beliefs, assumptions and expectations, speak only as of the date of this document and involve risks and uncertainties that could cause actual results to differ materially from current expectations. Such statements are subject to certain known and unknown risks and uncertainties, many of which are difficult to predict and generally beyond AMD's control, that could cause actual results and other future events to differ materially from those expressed in, or implied or projected by, the forward-looking information and statements. Material factors that could cause actual results to differ materially from current expectations include, without limitation, the following: Intel Corporation's dominance of the microprocessor market and its aggressive business practices may limit AMD's ability to compete effectively; AMD has a wafer supply agreement with GF with obligations to purchase all of its microprocessor and APU product requirements, and a certain portion of its GPU product requirements, from GLOBALFOUNDRIES Inc. (GF) with limited exceptions. If GF is not able to satisfy AMD's manufacturing requirements, its business could be adversely impacted; AMD relies on third parties to manufacture its products, and if they are unable to do so on a timely basis in sufficient quantities and using competitive technologies, AMD's business could be materially adversely affected; failure to achieve expected manufacturing yields for AMD's products could negatively impact its financial results; the success of AMD's business is dependent upon its ability to introduce products on a timely basis with features and performance levels that provide value to its customers while supporting and coinciding with significant industry transitions; if AMD cannot generate sufficient revenue and operating cash flow or obtain external financing, it may face a cash shortfall and be unable to make all of its planned investments in research and development or other strategic investments; the loss of a significant customer may have a material adverse effect on AMD; AMD's receipt of revenue from its semi-custom SoC products is dependent upon its technology being designed into third-party products and the success of those products; global economic uncertainty may adversely impact AMD's business and operating results; the markets in which AMD's products are sold are highly competitive; AMD may not be able to generate sufficient cash to service its debt obligations or meet its working capital requirements; AMD has a large amount of indebtedness which could adversely affect its financial position and prevent it from implementing its strategy or fulfilling its contractual obligations; the agreements governing AMD's notes and the Secured Revolving Line of Credit impose restrictions on AMD that may adversely affect its ability to operate its business; the products that AMD sells are complex and may be subject to security vulnerabilities that could result in, among other things, the loss, corruption or misuse of confidential data by unauthorized third parties or system performance issues. AMD's efforts to prevent and address security vulnerabilities can be costly and may be partially effective or not successful at all; AMD's issuance to West Coast Hitech L.P. (WCH) of warrants to purchase 75 million shares of its common stock, if and when exercised, will dilute the ownership interests of its existing stockholders, and the conversion of the 2.125% Convertible Senior Notes due 2026 may dilute the ownership interest of its existing stockholders, or may otherwise depress the price of its common stock; uncertainties involving the ordering and shipment of AMD's products could materially adversely affect it; the demand for AMD's products depends in part on the market conditions in the industries into which they are sold. Fluctuations in demand for AMD's products or a market decline in any of these industries could have a material adverse effect on its results of operations; AMD's ability to design and introduce new products in a timely manner is dependent upon third-party intellectual property; AMD depends on third-party companies for the design, manufacture and supply of motherboards, software and other computer platform components to support its business; if AMD loses Microsoft Corporation's support for its products or other software vendors do not design and develop software to run on AMD's

products, its ability to sell its products could be materially adversely affected; and AMD's reliance on third-party distributors and AIB partners subjects it to certain risks. Investors are urged to review in detail the risks and uncertainties in AMD's Securities and Exchange Commission filings, including but not limited to AMD's Quarterly Report on Form 10-Q for the quarter ended September 30, 2017.

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