AMD EMBEDDED SOLUTIONS

AMD Embedded Networking Solutions:

AMD Embedded Processors

AMD EPYC™ Embedded 3000
for superior performance, I/O flexibility and security protections

AMD Embedded SoCs with Onboard GPU Compute

AMD Embedded G-Series
optimized for low power

AMD Embedded R-Series
optimized for performance and power efficiency

AMD Ryzen™ Embedded V-Series
optimized for ultra-high performance

Target Applications:

- **ENTERPRISE AND SERVICE PROVIDERS ROUTERS AND SWITCHES**
- **SECURITY APPLIANCES**
- **TOP OF THE RACK SWITCHES**
- **5G / vRAN EQUIPMENT**
- **LINE CARDS**
- **NFVI**

Application Brief: AMD Embedded Networking

Agile and Secure High-Performance x86 Processing for Ultra Versatile Embedded Networking Infrastructure

Across every node in the network, from the network edge to the data center, service providers are evolving their communications infrastructure to exploit the management and cost efficiencies enabled with advanced NFV and SDN technologies. Dynamic network scalability and adaptability are key imperatives on the path to next-generation connectivity architectures, with sophisticated network intelligence and security capabilities driving significant gains in reliability, availability, and data integrity.

Agile embedded networking and communications infrastructure demands a highly versatile, high-performance x86 processing platform for frictionless service provisioning and centralized management control. Taking advantage of the expansive x86 ecosystem, service providers can minimize dependencies on customized chips and hardware, accelerate development cycles, ensure seamless code portability, and eliminate vendor lock-in.

The AMD Advantage

AMD Embedded solutions support a wide range of performance and power profiles, providing breakthrough processing agility for next-generation, x86-based embedded networking infrastructure.

For designers seeking uncompromising processing performance, I/O flexibility and security capabilities, AMD EPYC™ Embedded 3000 processors harness the breakthrough performance benefits of AMD's pioneering "Zen" architecture. System designers can exploit high-speed single-thread processing performance and/or multithread processing scaling from 4 to 16 cores to accelerate network processing speeds.

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For designers seeking the combined benefits of a CPU and GPU on a single die for compute-intensive parallel processing applications, AMD Ryzen™ Embedded V-Series, AMD Embedded R-Series and G-Series SoCs provide an optimal balance of performance and power efficiency in a compact footprint. The AMD Ryzen™ Embedded V1000 processor family brings together the breakthrough performance of the pioneering AMD "Zen" CPU and "Vega" GPU architectures in a seamlessly-integrated SoC solution that sets a new standard in processing power for next-generation embedded designs. Delivering discrete-GPU caliber graphics and multimedia processing, and compute performance up to 3.6[1] TFLOPS with thermal design power (TDP) as low as 12W and as high as 54W.

Key AMD Benefits:

Breakthrough Performance
AMD EPYC™ Embedded 3000 processors deliver a 52% improvement in instructions per clock (IPC) compared to legacy CPU architectures[2] processing speed to help meet demanding network throughput requirements.

Power Efficiency
AMD Embedded solutions support a wide range of thermal design profiles (TDPs) – with embedded processors that scale to as low as 6W, helping minimize thermal constraints and associated system size and cost penalties.

Advanced Security
AMD EPYC™ Embedded 3000 processors provide seamless support for security protocols, with integrated crypto acceleration supporting the IPsec. These processors and AMD Ryzen™ Embedded V1000 also feature an independent on-board AMD Secure Processor designed to enable secure Platform Secure Boot capabilities that help ensure systems are booted from trusted software, with one-time programmable (OTP) capabilities allowing customers to manage their own encryption keys. Advanced capabilities include Secure Memory Encryption (SME) for defending against unauthorized memory access, and Secure Encrypted Virtualization (SEV) for securely isolating hypervisors and virtual machines (VMs).

Expansive I/O Options
AMD Embedded solutions provide robust, highly integrated support for new and established interconnects, spanning GbE, PCIe, USB-C, SATA, eMMC 5.0 and NVMe, enabling myriad connectivity options. AMD EPYC™ Embedded 3000 processors support up to 64 PCIe lanes and eight integrated 10 Gigabit Ethernet ports for new levels of I/O versatility and device configurability.

Enterprise-Class Dependability
AMD EPYC™ Embedded 3000 processors provide enterprise class reliability, availability and serviceability features, with advanced error detection, correction, recovery and containment capabilities designed for superior data integrity.

Seamless x86 Compatibility
x86 architecture enables smooth interoperability with virtualized network and data center infrastructure, streamlining development and management efficiencies, while reducing overall cost of ownership.

Supply Longevity
AMD's planned processor availability extends to up to 10 years, providing customers with a long-lifecycle support roadmap.

For more information about the specific features and specifications supported by select products in AMD's processor portfolio, or to learn more about AMD's embedded networking solutions, visit **www.amd.com/networking**

AMD.com/embedded

1. 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.
2. Updated Feb 28, 2017: Generational IPC uplift for the "Zen" architecture vs. "Piledriver" architecture is +52% with an estimated SPECint_base2006 score compiled with GCC 4.6 –O2 at a fixed 3.4GHz. Generational IPC uplift for the "Zen" architecture vs. "Excavator" architecture is +64% as measured with Cinebench R15 1T, and also +64% with an estimated SPECint_base2006 score compiled with GCC 4.6 –O2, at a fixed 3.4GHz. System configs: AMD reference motherboard(s), AMD Radeon™ R9 290X GPU, 8GB DDR4-2667 ("Zen")/8GB DDR3-2133 ("Excavator")/8GB DDR3-1866 ("Piledriver"), Ubuntu Linux 16.x (SPECint_base2006 estimate) and Windows® 10 x64 RS1 (Cinebench R15). SPECint_base2006 estimates: "Zen" vs. "Piledriver" (31.5 vs. 20.7 | +52%), "Zen" vs. "Excavator" (31.5 vs. 19.2 | +64%). Cinebench R15 1t scores: "Zen" vs. "Piledriver" (139 vs. 79 both at 3.4G | +76%), "Zen" vs. "Excavator" (160 vs. 97.5 both at 4.0G| +64%). GD-108

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