Product Overview

The AMD Ryzen™ Embedded R1000 brings together the powerful performance of AMD’s pioneering “Zen” CPU and “Vega” GPU architectures to the R-Series family. With up to 3x generational CPU performance per watt and 4x better CPU and graphics performance per dollar than the competition, the R1000 is an ideal fit for embedded applications.

The R1000 SoCs provide platform scalability to the Ryzen™ Embedded V1000 series via pin-to-pin compatibility and common software foundation whilst leveraging the same high level of connectivity, including integrated 10Gb Ethernet.

The R1000 family delivers an optimal balance of performance and power efficiency that enables a new class of designs with thermal design power (TDP) between 12W and 25W. With a comprehensive set of advanced, integrated security features, AMD Ryzen™ Embedded R1000 SoCs enable sophisticated system protection complemented by an expansive breadth of I/O interconnect options.

The AMD Ryzen™ Embedded R1000 simplifies the design, form factor and thermal management challenges inherent to discrete CPU and GPU configurations. This highly integrated SoC enables system designers targeting thin clients, networking, casino gaming, digital signage, and many other applications to easily and elegantly scale their graphics and compute performance for advanced, feature-rich system designs. A single, small-footprint AMD Ryzen™ Embedded R1000 SoC can power up to three independent displays in brilliant 4K resolution, delivering stunningly rich and immersive visual experiences.
**A New Class of Performance**

AMD Ryzen™ Embedded R1000 SoCs provide a new class of performance to the Embedded R-Series portfolio, delivering up to a 52% IPC boost at the CPU. Utilizing a 14nm FinFET process, the AMD Ryzen™ Embedded R1000 enables 3x better performance per watt when compared to legacy AMD SoC offerings. Up to 2x “Zen” CPU cores/4x threads and 3x Vega GPU compute units can be harnessed to achieve breakthrough processing throughput for the most demanding graphics and compute workloads.

**Rich Multimedia**

AMD Ryzen™ Embedded R1000 SoCs can power up to three independent displays in crisp 4K resolution via DisplayPort™ 1.4b and/or HDMI™ 2.0b. The integrated Video Hardware Accelerator supports decode or encode for various widely used video codecs with resolutions up to 4K60: VP9 10-bit decode, H.265 10-bit decode and 8-bit encode, H.264 encode & decode.

**Seamless Integration & Security**

Integrating a high-performance CPU and GPU on a single die, the R1000 SoC enables significant space savings, smaller board designs and more efficient cooling architectures than can be achieved with heterogeneous CPU and GPU chipsets – with attendant CAPEX and OPEX savings opportunities.

The R1000 SoCs leverage an onboard AMD Secure Processor for Crypto Co-processing that encrypts data before it feeds to the I/O, complemented with Platform Secure Boot capabilities to help ensure systems are booted from trusted software, with one-time programmable (OTP) capabilities enabling system designers to manage their own keys.
Additional Key Benefits

- Equipped with dual-channel 64-bit DDR4 with performance up to 2400 MT/s, AMD Ryzen™ Embedded R1000 SoCs provide up to 8 PCIe® lanes, dual 1/2.5/10Gb integrated Ethernet, up to four USB 3.1 Gen 2 interconnects, with additional USB, SATA and NVMe support.
- Planned product availability extends up to 10 years, providing customers with a long-lifecycle support roadmap.

Performance

Next-generation x86 “Zen” Core
- Two cores / four threads with up to 1MB of shared L2 plus 4MB of shared L3 total
- Dual-channel 64-bit DDR4 Up to 2400 MT/s
- ECC support
- 1 DIMM / channel

Dual-channel 64-bit DDR4 Up to 2400 MT/s

<table>
<thead>
<tr>
<th>Model</th>
<th>TDP Range</th>
<th>CPU Core / Thread Count</th>
<th>Base Freq. (GHz)</th>
<th>IT Boost Freq. (GHz)</th>
<th>Graphics Computing Units (SIMD)</th>
<th>GPU Freq. (GHz)</th>
<th>Individual Displays</th>
<th>Package</th>
<th>Max DDR4 Rate (MT/s)</th>
<th>Dual Ethernet Ports</th>
<th>Junction Temperature Range (°C)</th>
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<tr>
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<td>12-25W</td>
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<td>1.2</td>
<td>3</td>
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<td>1/2.5 / 10Gb</td>
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For more information about the specific features and specifications supported by select products in AMD's solutions portfolio, or to learn more about AMD’s Ryzen™ Embedded R1000 Processor Family, visit [www.amd.com/ryzenembedded-r-series](http://www.amd.com/ryzenembedded-r-series)

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Product Brief: AMD Ryzen™ Embedded R1000 Processor Family

Security

Next-generation AMD Secure Processor (PSP)
- ftPM2.0, crypto-offload, platform secure boot, integrated DRAM
- Field Programmable Keys
- Secure Memory Encryption Support (SME)

Integration

Next-generation Graphics Core and Multimedia
- “Vega” GPU with up to 3 Compute Units
- Up to 3x DisplayPort™ 1.4™ or HDMI™ 2.0b

Enhanced I/O (FPS)
- Up to 4x USB 3.1 Gen 2 (10Gb/s) / 1 Type-C with ALT. DP power delivery capable
- Up to 2x USB 2.0
- Up to 2x SATA ports
- NVMe support
- eMMC5.0, SD3, or LPC
- Up to 8L of PCIe™ Gen3, 5x link max
- Up to 2x 10 Gigabit Ethernet (1/2.5/10Gb)
- Up to 2x UART, 4x 1C, 2x SMBus, SPI/eSPI, I2S/HDA/SW, GPIO