



## AMD processors for Industrial Control and Automation Solutions:

### AMD Embedded SOC

AMD Embedded G-Series SOC  
optimized for low power

### AMD Embedded R-Series SOC

optimized for performance and power efficiency

### AMD Ryzen™ Embedded V-Series SOC

optimized for ultra-high performance, with  
support for up to four independent 4K displays

### AMD Embedded Processors

AMD EPYC™ Embedded 3000 processor  
for superior compute performance

## Target Industries:

INDUSTRIAL PCS

HUMAN-MACHINE INTERFACES/  
OPERATOR PANELS

MACHINE VISION

TEST AND MEASUREMENT

FACTORY AUTOMATION

ROBOTICS

### Application Brief: Industrial Control & Automation

## Performance and Power Scalability with Compute and Graphics Processing Versatility for Industrial Control and Automation Systems

From factory floor infrastructure to battery-powered portable devices, industrial control and automation systems are growing increasingly sophisticated, with exacting performance, power and thermal requirements. System designers are challenged to meet the diverse processing demands of graphics and compute intensive systems, ranging from human machine interfaces (HMIs) and machine vision systems to industrial PCs, test and measurement equipment, robotics and factory automation.

For graphics driven applications, high resolution displays – up to 4K – are in increasing demand, with processing performance to support 3D visualization where needed, and multi-display operator panel configurability. Smart cameras, automated inspection and security/surveillance systems will require ever increasing processing power to support advanced image detection and identification applications. And as machine learning and artificial intelligence (AI) capabilities come to the fore with next-generation 'smart factory' automation infrastructure, high-speed parallel processing and multithreading have emerged as critical necessities.

### The AMD Advantage

Current AMD Embedded solutions support a wide range of performance and power profiles, providing an optimal balance of graphics and compute processing capabilities for industrial control and automation applications. Delivering advanced multimedia features spanning 4K graphics processing and multi-display configurability, complemented with breakthrough compute performance for advanced machine intelligence applications, AMD Embedded solutions provide an ideal processing platform to help increase the efficiency, productivity and security of industrial process workflows.

For designers seeking the combined benefits of a CPU and GPU on a single die, AMD Embedded G-Series and R-Series SOCs, and AMD Ryzen™ Embedded V-Series SOCs are optimized for real time control applications with demanding graphics and compute workloads, such as advanced image processing, 3D visualization, and multi-axis motion control. AMD Embedded SOCs also support expansive multi-display configurations, with rich 4K graphics quality.

## Key AMD Benefits:

### Breakthrough Performance

AMD Ryzen™ Embedded V1000 SOCs deliver discrete-caliber graphics processing and sustained compute performance up to 3.7 TFLOPS 16FP with versatile multithreading capabilities. AMD EPYC™ Embedded 3000 processors deliver a 52% improvement in instructions per clock (IPC) compared to legacy CPU architectures.

### Power Efficiency

AMD Embedded processors support a wide range of thermal design profiles (TDPs) – with embedded processors that scale to as low as 5W, helping designers achieve the optimal performance-per-watt, and minimizing thermal constraints. Low-power AMD processors can also enable fan-less, vent-less system designs that prevent debris and particle ingress in harsh industrial environments, improving overall system reliability.

### GPU Computing Versatility for AMD Embedded SOCs

The Radeon™ Open eCcosystem (ROCm) compute platform, based on the GPUOpen initiative, equips designers to achieve breakthrough innovations in GPU-driven imaging and parallel processing capabilities leveraging open development tools and software. By balancing CPU and GPU workloads for optimal processing performance, system designers can achieve advanced machine intelligence capabilities for next-generation factory automation infrastructure. This feature is currently supported on select AMD Embedded solutions, with additional support in progress.

### Multi-display Flexibility

AMD Embedded SOCs enable designers to achieve a wide range of display configurations for more versatile HMI and operator panel designs. This can eliminate the need for additional processors and duplicate hardware to drive multiple displays. A single AMD Ryzen™ Embedded V-Series SOC can power up to four independent displays in brilliant 4K resolution.

### HD and 4K Graphics Quality

All AMD Embedded SOCs support conventional 1080p display resolution, and provide full 4K support for exceptional graphics and video quality targeting the next generation of industrial displays.

For designers seeking uncompromising compute performance, AMD EPYC™ Embedded 3000 processors harness the breakthrough performance-per-watt benefits of AMD's pioneering Zen architecture. System designers can exploit high-speed single-thread processing performance and/or multithread processing leveraging up to 16 cores to accelerate throughput for their unique application requirements.

### Advanced Security

AMD Ryzen™ Embedded V1000 SOCs and AMD EPYC™ Embedded 3000 processors feature an independent on-chip AMD Secure Processor designed to enable secure Hardware Validated Boot capabilities that help ensure systems are booted from trusted software, plus advanced capabilities including Secure Memory Encryption (SME) for defending against unauthorized memory access, and Secure Encrypted Virtualization (SEV) for securely isolating hypervisors and virtual machines (VMs). Additionally the AMD Ryzen™ Embedded V1000 family provides a one-time programmable (OTP) capability allowing customers to manage their own encryption keys.

### Rugged and Reliable

AMD Embedded solutions are available in small-footprint BGA package options to enable platform designs that perform reliably in high-shock and vibration operating conditions. Available multi-bit error correction helps ensure memory integrity and resiliency in harsh industrial environments affected by electromagnetic interference (EMI).

### Expansive I/O Options

AMD Embedded solutions provide robust, highly integrated support for new and established interconnects, spanning PCIe®, GbE, USB-C, SATA, eMMC 5.0 and NVMe, enabling myriad connectivity options. AMD Ryzen™ Embedded V1000 SOCs and AMD EPYC™ Embedded 3000 processors support up to 16 and 64 PCIe lanes, respectively, for new levels of I/O versatility and device configurability.

### Seamless x86 Compatibility

PC-compatible x86 architecture enables native support for Microsoft Windows®, Linux®, and a variety of popular real-time and safety certified operating systems. Smooth interoperability with network infrastructure and applications streamlines communication efficiencies and improves remote management capabilities.

### Supply Availability

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

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For more information about the specific features and specifications supported by select products in AMD's solution portfolio, or to learn more about AMD's industrial control and automation solutions, visit [www.amd.com](http://www.amd.com)

[AMD.com/embedded](http://AMD.com/embedded)