To help OEMs who have been tied into just one vendor’s solution from generation to generation, OpenCL™ – the royalty-free open standard for parallel processing software development – can help to reduce system costs through compatibility with CPUs, GPUs, and some DSPs and FPGAs from a variety of vendors. And OpenCL compatibility across the AMD G-Series SoC, AMD R-Series APU, and AMD Embedded Radeon™ discrete graphics platforms enables software-defined solutions that can leverage a single code base to scale across a portfolio of products, which can help reduce software development costs.

For products that target cost sensitive emerging markets or where healthcare reform is applying cost pressure on medical imaging applications, the AMD G-Series SoC and AMD R-Series APU offer up to 10 years of product availability.¹ This can reduce frequent system redesign and certification, helping to make products more competitive.

• The AMD R-Series APU can deliver high image transformation performance in a low-power and highly integrated solution through HSA (Heterogeneous System Architecture), which can help balance the performance between the CPU and GPU, and via hUMA (heterogeneous Unified Memory Architecture), which can help reduce latencies and maximize memory access to both the CPU and GPU for data-intensive imaging applications.

• The exceptional computation capabilities of the AMD R-Series APU and AMD Embedded Radeon discrete graphics processors, with up to 746 GFLOPS and to more than 1.7 TFLOPS respectively,² can reconstruct images from sparse data. This helps to make low-dose X-ray imaging feasible, an attractive option for those medical practitioners and patients concerned with the possibility of increased cancer risk associated with exposure to radiation.

• To increase efficiency and reduce fatigue of surgical staff, imaging-assisted surgical systems based on the AMD R-Series APU and AMD Embedded Radeon discrete graphics can help to enable real-time procedure visualization from multiple angles on multiple independent displays.

• To help reduce the size, weight, power, and cost for full-featured imaging applications, the highly integrated AMD R-Series APU Platform offers high-performance image processing and support for up to four independent display outputs, which can help to eliminate the need for a discrete graphics card in some applications.³

• The AMD G-Series SoC for low-power and small form factor applications can help to enable mobile emergency medical response teams with advanced medical imaging capabilities.

Application Brief:
Medical Imaging: AMD Meets the Demands for Performance, Scalability, and Longevity

Medical imaging applications – including mobile, portable, or cart-based ultrasound systems, endoscopes, X-ray, and high-end MRI and CT scanners – all have unique data throughput, image transformation, and post-processing requirements. AMD embedded solutions offer the capabilities necessary to meet these requirements through scalable offerings that can help to reduce development and system costs while delivering a versatile and high-performance software-defined solution to support next-generation features.
**AMD Embedded Solutions Example:**

**BENEFITS FOR ULTRASOUND PROCESSING PIPELINE**

- Gen 3 PCIe x16 dGMA support for 10+ GBps: OCL_DirectGMA helps to move high bandwidth RF data into memory.
- Having full dataset in memory enables change from Simple Summing to compute in the Fourier domain. Can help to reduce compute requirement for image transformation.
- Helps to enable things such as aberration correction to dynamically adjust for refraction of sound waves in the body.
- Performance-optimized post-processing functions can deliver excellent image quality on AMD GPUs.

**IMAGE FORMATION**
- STOLTS FK Migration with Optimized FFT/IFFT
- IQ Demodulation and Log Compression

**IMAGE POST PROCESSING**
- Separable Filters (Sobel and Box Filters)
- Nonseparable Filter (Laplacian of Gaussian)
- Despeckle Filter (Median Filter)
- Frequency Domain Filter (Gaussian Blur and Edge Enhancement Filters)
- Other Filters Available...

**OUTPUT**
- Coherent compounding delivers excellent image quality.

Ask your AMD sales representative about the tools that AMD provides to help you build a high-performance AMD-based medical imaging solution.

For board and system-level solutions based on the AMD G-Series SoC, AMD R-Series APU, and AMD Embedded Radeon discrete graphics, please visit [www.amd.com/embedded/catalog](http://www.amd.com/embedded/catalog)

For more information about AMD Embedded Solutions for Medical Imaging, please visit [www.amd.com/medicalimaging](http://www.amd.com/medicalimaging)

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1. 5-year, 7-year and 10-year support offered, depending upon the AMD product. Please contact your AMD representative for more details.
2. Calculated APU SP GFLOPS = (# of x86 cores x (128 bit (FPUs) / 32 bit (SP Operation)) * CPU Base Frequency) + (# of shader units * (64 bit (shader) / 32 bit (SP Operation)) * GPU Max Frequency)
3. Calculated GPU SP TFLOPS = (# of shader units * (64 bit (shader) / 32 bit (SP Operation)) * GPU Max Frequency)/1000

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