

SOLUTION BRIEF

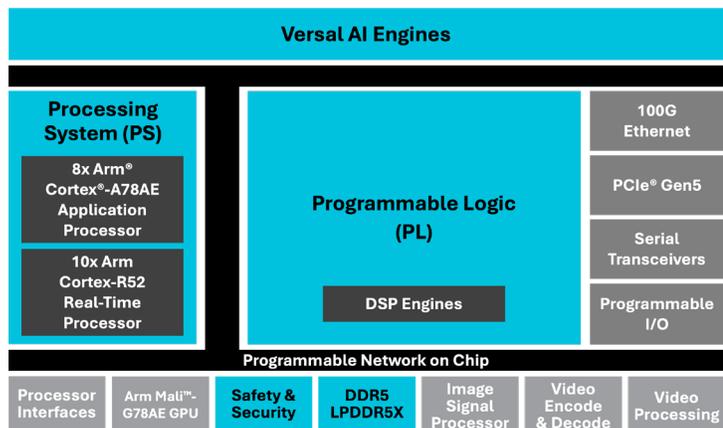
IMAGING & SURGICAL SOLUTIONS WITH AMD VERSAL™ ADAPTIVE SoCs



OVERVIEW

Healthcare applications in diagnostic medical imaging are presenting new challenges for next-generation devices. From advanced imaging techniques in ultrasound beamformers to multi-dimensional visualization to complex AI algorithm processing for diagnostic assistance, the requirements are growing. AMD Versal™ adaptive SoCs and particularly Versal AI Edge Series Gen 2 devices with heterogeneous compute are a giant leap over competing devices. The Versal portfolio addresses the following key challenges in healthcare:

- High internal and external bandwidth for large scanners and ultrasound
- High frame rates
- Real-time signal processing in ultrasound
- High resolution (4k-8k) video preprocessing in vision systems, combined with low latency for endoscopy and surgical robotics



HIGHLIGHTS

The Versal AI Edge Series Gen 2 is a one-of-a-kind platform offering exceptional scalar compute with Arm® multiprocessors and Versal AI Engines for AI and signal processing. This series offers:

- Advanced programmable logic (PL) with DSP Engines for preprocessing in real time
- Advanced interfaces such as high-speed transceivers, DDR5, PCIe® Gen5, and I/O programmability
- Portfolio-wide programmable network on chip (NoC) for high bandwidth and simplified data movement
- Post-Quantum Crypto for secure boot, user-accessible security resources, TRNG, and PUF for customers to future-proof their security requirements

These capabilities provide significant advantages over competing SoC solutions in the market today.

KEY BENEFITS

HETEROGENEOUS COMPUTE PLATFORM

Harness Versal AI Engine and DSP blocks to accelerate complex intensive algorithms like ultrasonic beamforming, filtered back projection image reconstruction in CT, or video preprocessing in surgical robotic systems

Leverage AI Engines to deploy AI models for tasks such as Region of Interest selection for surgical tool guidance

SOFTWARE SCALABILITY & PORTABILITY

Leverage the AMD Vitis™ unified software environment to implement custom accelerators using C++ or Python™

Implement MATLAB® algorithms using the Simulink® environment

LONG LIFECYCLE

Enjoy 15+ year product availability, which can minimize product design churns and costly regulatory re-approvals

SECURITY & SAFETY

Crypto, authentication, key management, and AES inline crypto for memory controller

TARGET APPLICATIONS

DIAGNOSTIC MEDICAL ULTRASOUND: HIGH-END TO PREMIUM

In diagnostic ultrasound, increasing channel count enhances the image resolution and scan depth—both critical factors for clinical diagnosis. But scaling the channel count can be challenging. AMD addresses this by enabling next-generation ultrasound design using advanced imaging techniques like Plane Wave UltraFast™ technology. This requires heterogeneous computing using the AI Engines, DSP Engines, programmable logic, CPU multiprocessing, and NoC capability of Versal devices. Additionally, these devices also help deliver very high frame-rates and strong AI performance.

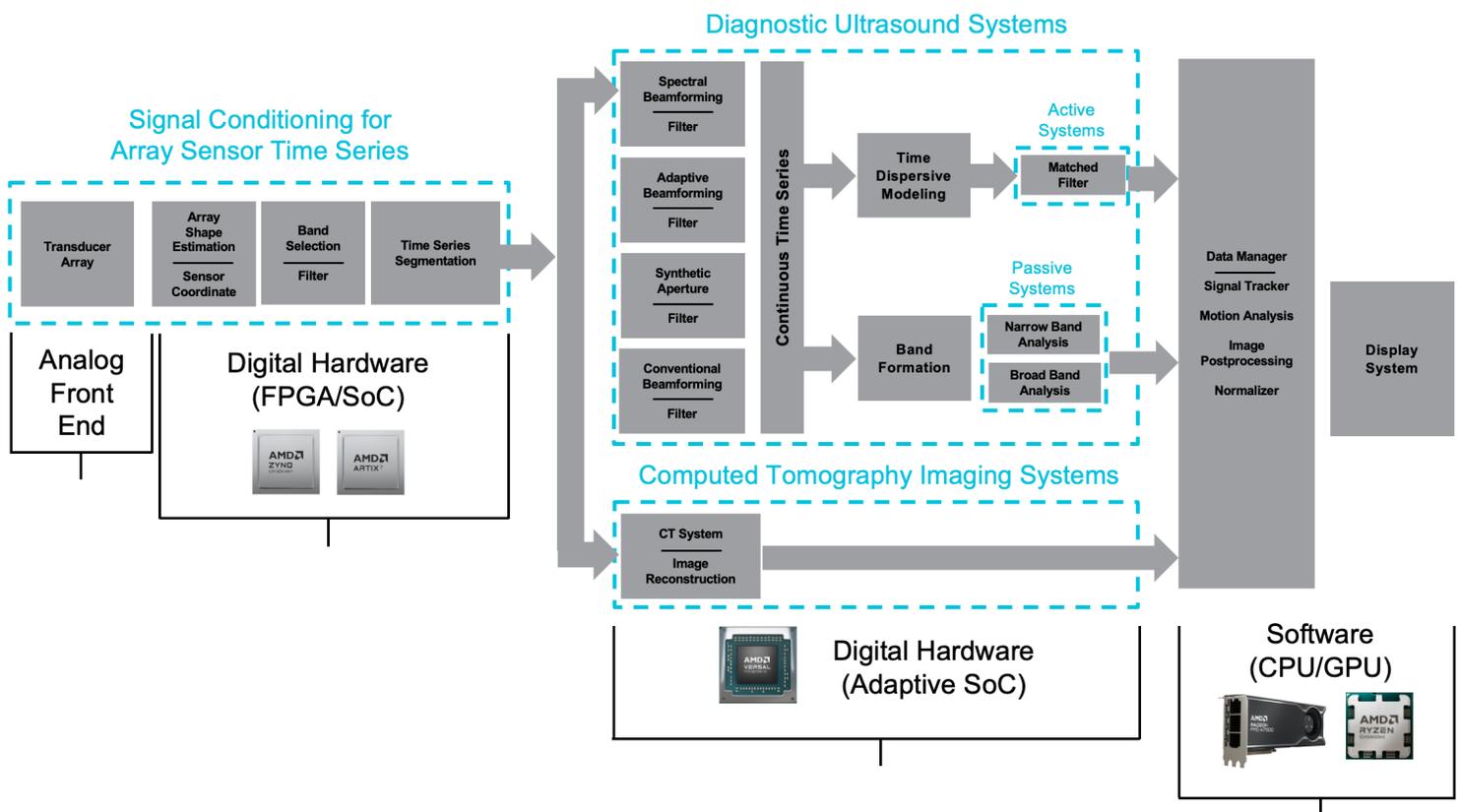
MRI AND CT SCANNERS

MRI, CT, and PET scanners are large, highly synchronous machines that require significant computational capabilities to handle tasks like advanced image reconstruction and AI image analysis. Versal AI Edge Series Gen 2 is one of the most capable adaptive SoCs available today to handle CT algorithms like filtered back projection (FBP) or 2D FFT in MR imaging.

ENDOSCOPY & SURGICAL ROBOTICS

Advanced visualization and real-time high resolution processing is required for both robotic surgeries and surgical endoscopy systems. These systems require very low latency. Competitive GPGPUs or multichip implementations historically used for these applications typically introduce latency. The Versal portfolio and specifically Versal AI Edge Series Gen 2 adaptive SoCs satisfy the computational bandwidth and very low latency simultaneously to resolve today’s challenge in these systems.

APPLICATION BLOCK DIAGRAM



NEXT STEPS

- Learn more about [AMD Versal AI Edge Series Gen 2](#)
- Visit [Healthcare at the Edge](#) to start designing your medical imaging applications
- Test drive the [Vitis Ultrasound Library](#), which implements advanced beamforming techniques
- Contact your local AMD sales representative or visit [Contact an AMD Embedded Computing Representative](#)

DISCLAIMERS

The information contained herein is for informational purposes only and is subject to change without notice. While every precaution has been taken in the preparation of this document, it may contain technical inaccuracies, omissions and typographical errors, and AMD is under no obligation to update or otherwise correct this information. Advanced Micro Devices, Inc. makes no representations or warranties with respect to the accuracy or completeness of the contents of this document, and assumes no liability of any kind, including the implied warranties of noninfringement, merchantability or fitness for particular purposes, with respect to the operation or use of AMD hardware, software or other products described herein. No license, including implied or arising by estoppel, to any intellectual property rights is granted by this document. Terms and limitations applicable to the purchase or use of AMD products are as set forth in a signed agreement between the parties or in AMD's Standard Terms and Conditions of Sale. GD-18u.

COPYRIGHT NOTICE

© 2025 Advanced Micro Devices, Inc. All rights reserved. AMD, the AMD Arrow logo, UltraScale+, Versal, Vitis, Zynq, and combinations thereof are trademarks of Advanced Micro Devices, Inc. Arm is a registered trademark of Arm Limited (or its subsidiaries) in the US and/or elsewhere. DisplayPort and the DisplayPort logo are trademarks owned by the Video Electronics Standards Association (VESA®) in the United States and other countries. MATLAB and Simulink are registered trademarks of The MathWorks, Inc. PCIe is a registered trademark of PCI-SIG Corporation. Python is a trademark of the Python Software Foundation. Other product names used in this publication are for identification purposes only and may be trademarks of their respective owners. Certain AMD technologies may require third-party enablement or activation. Supported features may vary by operating system. Please confirm with the system manufacturer for specific features. No technology or product can be completely secure. PID4137250