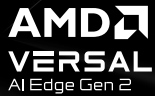


SOLUTION BRIEF

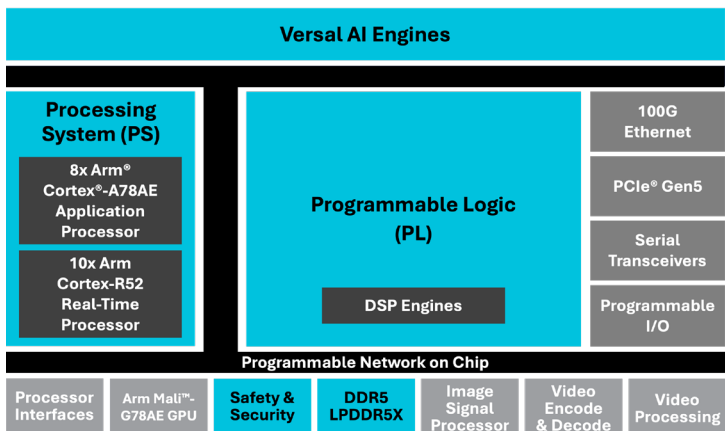
IMAGING & SURGICAL SOLUTIONS WITH AMD VERSAL™ ADAPTIVE SoCs



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.

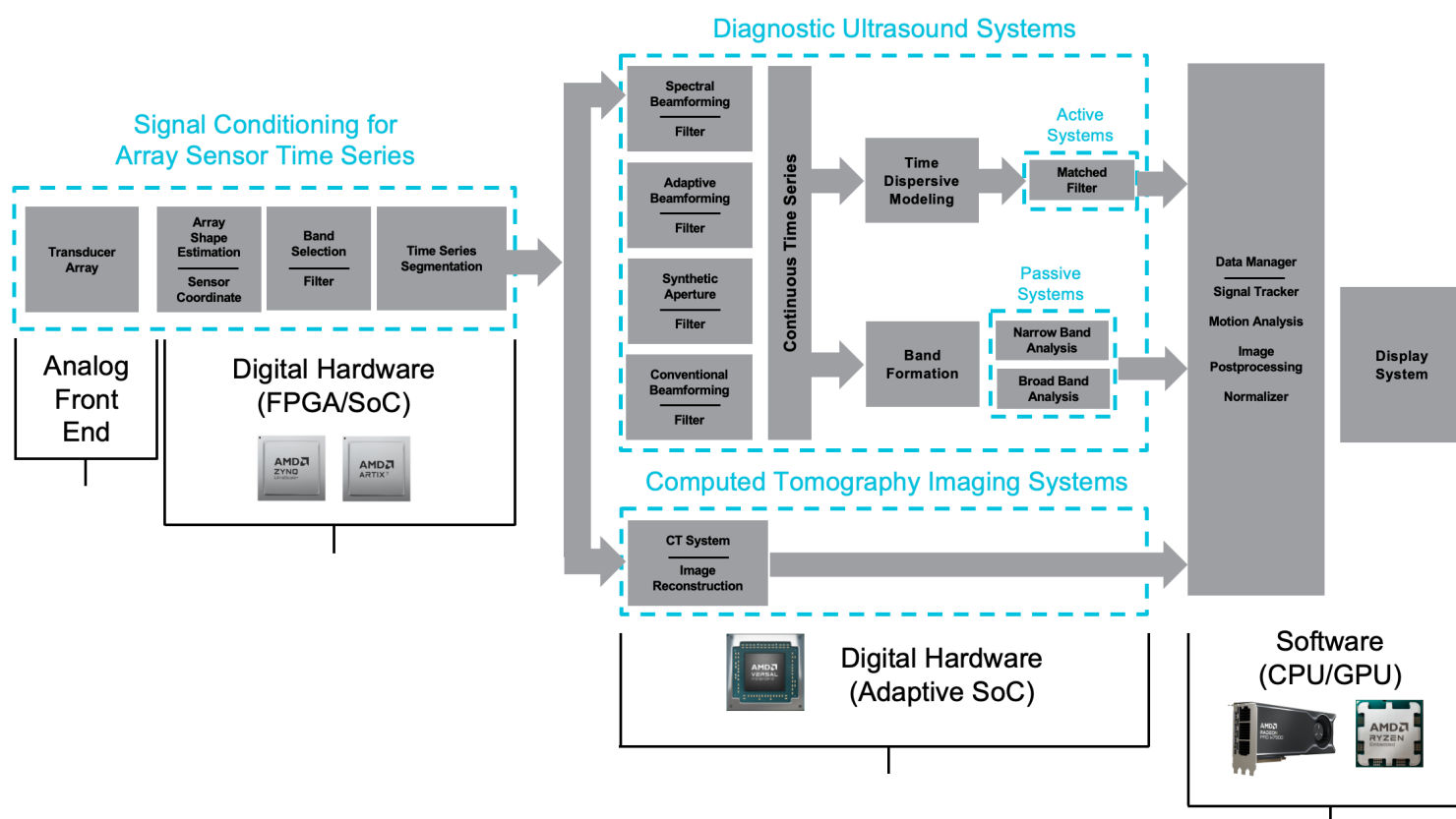
MRI AND CT SCANNERS

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



COMPETITIVE STRENGTHS

AMD Versal Prime Series Gen 2 adaptive SoCs and Zynq™ UltraScale+™ MPSoCs include dedicated hard IP for a variety of video functions that cannot be matched by the competition. These hard IP blocks save valuable “soft” PL resources, therefore speeding up development time and reducing development costs. The AMD portfolio of adaptive SoCs uniquely provides features such as lock-step and robust functional safety support, which are not available from competitors.

AMD VERSAL AI EDGE SERIES GEN 2 AND ZYNQ ULTRASCALE+ MPSoC VS. ALTERA AGILEX

FEATURES & CAPABILITIES	AMD VERSAL AI Edge Gen 2	AMD ZYNQ UltraScale+	ALTERA AGILEX PORTFOLIO
DEVICE-WIDE PROGRAMMABLE NETWORK ON CHIP	✓	-	-
ISP HARD IP	✓	-	-
VCU HARD IP	✓	✓	-
INTEGRATED GPU	✓	✓	-
AI ENGINES	✓	-	-
USB HARD IP	USB 3.2	USB 3.0	USB 3.1*
DISPLAYPORT™ HARD IP	✓	✓	-
UFS 3.1 AND OCTAL SPI BOOT MODES	✓	-	-
GRANULAR PROCESSOR SYSTEM POWER MANAGEMENT SCHEME	✓	✓	-
FUNCTIONAL SAFETY WITH LOCK-STEP SUPPORT	✓ SIL 3	✓ SIL 2 or 3	-
MX6, MX9 HARDWARE DATATYPE SUPPORT	✓	-	-
INTEGRATED REAL-TIME PROCESSORS	✓	✓	-
PROCESSING SYSTEM MAX DHRYSTONE kDMIPS (ESTIMATED)	223.7	18.8	33.5*
MAX LPDDR5 RATE (Mb/s)	8533	-	5600*
QNX SUPPORT	✓	✓	-

*These features are selected as the “best” from Altera’s entire Agilex portfolio

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](#)

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