PRODUCT BRIEF

Xilinx Artix-7™ FPGAS:

New Performance and Bandwidth Standards for Power-Limited, Cost-Sensitive Markets

The digital revolution has changed expectations for novice and savvy FPGA designers alike. Competing in cost-sensitive markets, such as aerospace and defense, communications infrastructure, medical, industrial, and consumer electronics, calls for a strong portfolio of high-performance features over a broad density range. Without sacrificing performance, developers must be able to extend use models for greater processing bandwidth, portability, and application reach while keeping power — a critical resource — to a minimum.

The Xilinx® Artix®-7 family of FPGAs has redefined cost-sensitive solutions by cutting power consumption in half from the previous generation while providing best-in-class transceivers and signal processing capabilities for high bandwidth applications. Built on the 28nm HPL process, these devices deliver best in class performance-per-watt. Together with the MicroBlaze(TM) soft processor, Artix-7 FPGAs are ideal for products like portable medical equipment, military radios, and compact wireless infrastructure. Artix-7 FPGAs meet the needs of size, weight, power, and cost (SWaP-C) sensitive markets like avionics and communications.

KEY CAPABILITY OVERVIEW

New Levels of Performance

- 6.6Gb/s transceivers enabling 211Gb/s peak bandwidth (full duplex)
- Single and double differential I/O standards with speeds of up to 1.25Gb/s
- 740 DSP48E1 slices with up to 930 GMACs of signal processing
- 1,066Mb/s DDR3 memory, including SODIMMs support
- 200+ DMIPs MicroBlaze processor in Microcontroller, Real Time Processor, or Application Processor configuration
- Integrated memory interface for streamlined access to video and data

Scalable, Secure Connectivity for Next-Gen Compute and Networking Infrastructure

- 112G PAM4 transceivers adaptable to emerging network modules and protocols
- 100G and 600G Ethernet cores enabling a wide variety of data rates and protocols
- 600G Interlaken cores with FEC for chip-to-chip interconnect
- 400G High-Speed Crypto Engines for inline network security

Adaptable Acceleration for Evolving Algorithms and Protocols

- Adaptable Engines with programmable memory hierarchy for higher compute density
- Enhanced DSP Engines to support a wide range of data types for diverse workloads
- Programmable network on chip (NoC) for high bandwidth IP interconnect

The Challenge: The Need to Reduce Power & Cost

- MachineReducing power for greater portability
- Delivering highest performance while reducing cost
- Providing advanced functionality in a small form factor

The Solution: Xilinx Artix-7 FPGAs

- 50% lower power vs. previous generation
- Best-in-class performance-per-watt
- Over 200DMIPs of processing power, plus drag n' drop peripherals with MicroBlaze soft processor
- Small footprint and packaging
- Part of the broadest All Programmable cost-optimized portfolio

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Twice the Capacity, Half the Power, Comparable Cost

- 50% lower total power compared to previous generation
- Sub-watt performance ranging from 13,000–200,000 logic cells
- 2X logic, 2.5X block RAM, 5.7X more DSP slices than Spartan®-6 FPGAs
- Lowest-power Industrial speed grade offering (-1LI)

Smallest Package

- Low-cost, wire-bond, chip-scale BGA packaging
- Available in a 10x10mm package for maximum system integration
- Package migration across the family

Low Risk, Rapid Ramp-Up

- Production proven 28nm process, architecture, and quality
- Integrated IP blocks to reduce development time and risk
- Integrated wizards for rapid development of built-in blocks
- Baremetal, freeRTOS, and Linux support for MicroBlaze processor with drag n' drop peripherals
- Development kits with IP and reference designs for quick design starts

BEST-IN-CLASS PERFORMANCE AND BANDWIDTH FOR COST-SENSITIVE MARKETS

Artix-7 devices deliver the industry's most optimized transceivers, highest performance, and lowest power. This family is the perfect fit for cost-sensitive applications that need high-end features. The Artix-7 family is the industry's cost-optimized performance leader in nearly every category of performance, including logic fabric, signal processing, embedded memory, LVDS I/O, memory interfaces, and in particular, transceivers.

The MicroBlaze CPU is a highly configurable 32-bit RISC processor optimized for Xilinx FPGAs. For fast deployment, presets are available for Microcontroller, Real-Time Processor, and Application Processor use cases. Start with a preset, then further customize specific processor features to meet the specific needs of your application. Then expand your MicroBlaze processor system using drag n' drop IP from a catalog of driver-enabled peripherals such as PWMs, UARTs, serial interfaces, etc. The MicroBlaze processor, drag n' drop peripherals, Vivado® HLx Design Suite WebPack edition, and Eclipse-based Software Development Kit are all available at no cost from Xilinx.

As part of the 7 series, Artix-7 FPGAs also offer other system integration capabilities such as integrated, advanced Analog Mixed Signal (AMS) technology. Whether implementing a simple analog-to-digital converter or replacing more costly system-on-a-chip (SoC) functions, analog is the next level of integration that is efficiently accomplished with the independent dual 12-bit, 1MSPS, 17-channel analog-to-digital converters in Artix-7 FPGAs.

PART OF THE BROADEST PORTFOLIO

The Artix-7 family is part of the broadest All Programmable cost-optimized—delivering the best value for a given application. The portfolio also includes Spartan-6 and Spartan-7 FPGAs, which deliver I/O optimization, and Zynq®-7000 All Programmable SoCs, which deliver system integration and optimization for applications.

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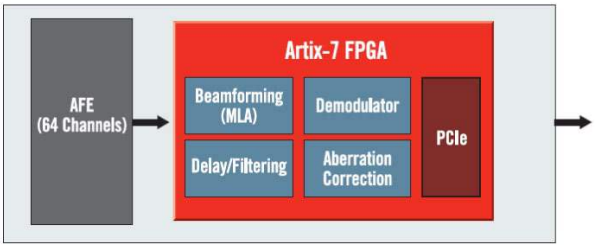
ENABLING NEXT-GENERATION SYSTEMS

MEDICAL: PORTABLE ULTRASOUND

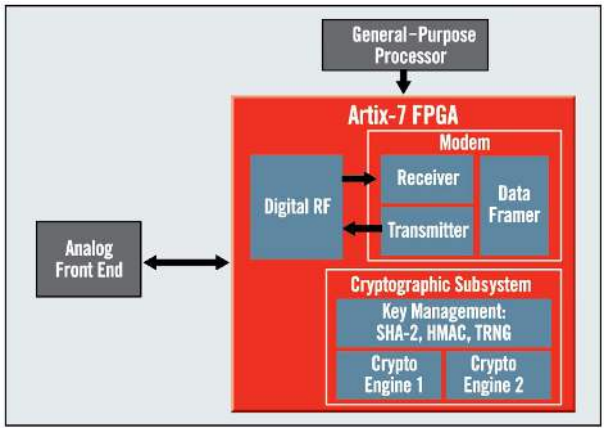
Designers can deploy a fully programmable 64-channel portable ultrasound implementation that scales up to 196 or 256 channels for high-end cart solutions or down to 32 channels for hand-held form factors.



- Lowest-power single-chip implementation of 64-channel portable ultrasound at 35% lower cost, and 57% smaller form factor compared to previous generation FPGAs
- Up to 930 GMACs of DSP processing for high quality image rendering
- Built-in support for PCIe® Gen2 x4 enables high-bandwidth interface to host system
- Small form factor for laptop- and tablet-sized devices
- 6.6Gb/s interface to support next-generation JEDEC JESD204B analog interface

AEROSPACE AND DEFENSE: SECURE SOFTWARE-DEFINED RADIO

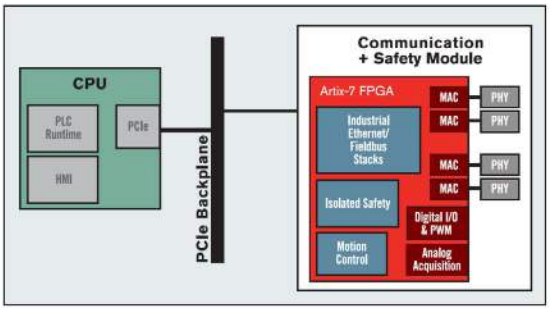
The Artix-7 FPGA delivers the industry's most integrated Type-1 single-chip cryptography (SCC) solution for superior, secure SWaP-C results. Extensive DSP resources allow for waveform processing capacity to integrate both the modem and cryptographic engine on a single chip.



- High parallel and serial I/O performance with 1.25Gb/s LVDS and PCIe Gen2 x4
- 1,066Mb/s DDR3 memory interfaces enables video data buffers using commodity memories
- Up to 930 GMACS for baseband signal pre-processing and RF signal improvements
- System integration in a 19x19mm package for battery-powered hand-held radios

INDUSTRIAL: PROGRAMMABLE LOGIC CONTROLLER

Employing the Artix-7 FPGA and Xilinx IP solutions enables a smaller form factor programmable logic controller (PLC) with greater flexibility, lower BOM cost, and lower power consumption compared to traditional architectures. Serving as a companion device to the main processor, the FPGA replaces communication expansion modules.



- MicroBlaze 32-bit processor for real-time control off loads Industrial Ethernet tasks from main CPU
- High-performance, high-precision motor control drive functions
- Isolation Design Flow to separate safe and non-safe hardware functions in a single device
- Small footprint (15x15mm) and single-chip solution for small form factor modules
- High-density I/O support for maximum connectivity
- Reprogrammable fabric for upgradeability and future-proof design

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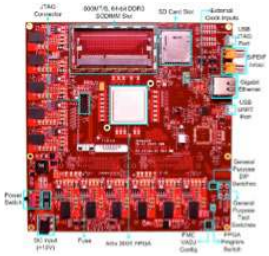
Artix-7 FPGA AC701 Evaluation Kit

Artix-7 50T FPGA Evaluation Kit

Artix-7 35T Arty FPGA Evaluation Kit

Nexys4 Artix–7 FPGA Board



Inrevium ACDC Artix-7 FPGA Evaluation Kit

GETTING STARTED WITH EVALUATION KITS

To get started with the Artix-7 family, Xilinx offers both the Artix-7 FPGA AC701 and Artix-7 50T FPGA Evaluation Kits, enabling quick prototyping for cost-sensitive applications. These include all the basic components of hardware, design tools, IP, and pre-verified reference designs.

Visit www.xilinx.com/boards-and-kits to learn more about Xilinx and partner development boards.

TAKE THE NEXT STEP

Visit www.xilinx.com to learn more about Artix-7 FPGAs. Download Vivado® design tools: www.xilinx.com/vivado

For more information, contact your local sales office.

For more product details or to watch the latest videos on topics such as the Artix-7 FPGA's low-power, cost-optimized transceivers, please visit: www.xilinx.com/artix7

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