

*BEST-IN-CLASS PERFORMANCE-PER-WATT WITH TRANSCEIVERS  
FOR COST-SENSITIVE MARKETS*

## **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. Designers can leverage twice the logic density for the same power budget. These devices are built on the 28nm High Performance, Low Power (HPL) process to deliver best-in-class performance-per-watt 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.

### **The Challenge: The Need to Reduce Power & Cost**

- Reducing 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
- Small footprint and packaging
- Part of the broadest All Programmable cost-optimized portfolio

## 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
- Integrated memory interface for streamlined access to video and data

### 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
- 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.

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.

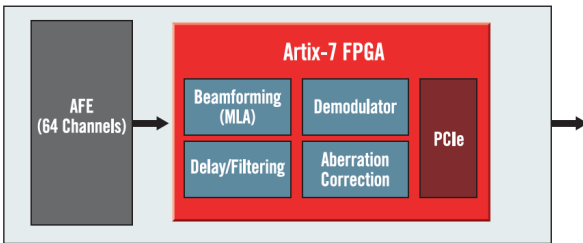
## Part of the Broadest Portfolio

The Artix-7 family is part of the broadest All Programmable cost-optimized portfolio—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.

## Enabling Next-Generation Systems

### MEDICAL: PORTABLE ULTRASOUND

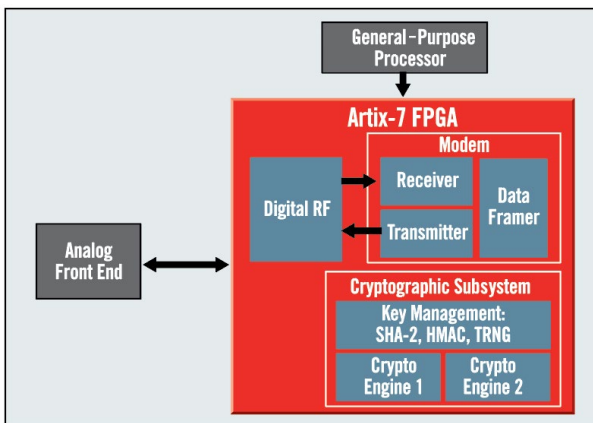
Designers can deploy a fully programmable 64-channel portable ultrasound implementation that scales up to 196 or 256 channels for high-end cart solutions or down to 32 channels for hand-held form factors.



- 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

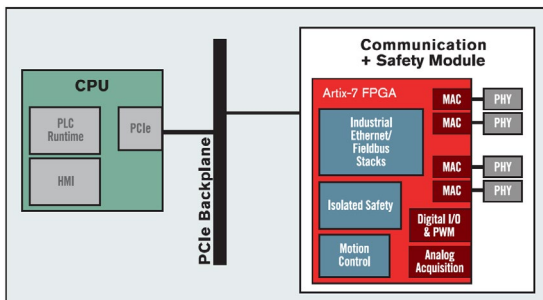
The Artix-7 FPGA delivers the industry's most integrated Type-1 single-chip cryptography (SCC) solution for superior, secure SWaP-C results. Extensive DSP resources allow for waveform processing capacity to integrate both the modem and cryptographic engine on a single chip.



- 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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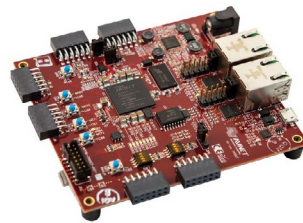
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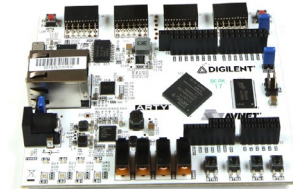
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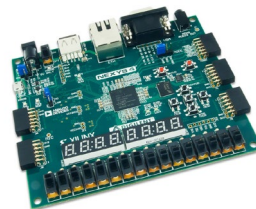
Artix-7 FPGA AC701 Evaluation Kit



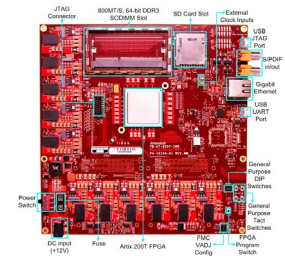
Artix-7 50T FPGA Evaluation Kit



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](http://www.xilinx.com/boards-and-kits) to learn more about Xilinx and partner development boards.

## Take the NEXT STEP

Visit [www.xilinx.com](http://www.xilinx.com) to learn more about Artix-7 FPGAs. Download Vivado® design tools: [www.xilinx.com/vivado](http://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](http://www.xilinx.com/artix7)

