Xilinx Alliance Design Services Partner

Product development has risks. Reduce uncertainty with Cardinal Peak — a comprehensive team with 200-plus successful product launches. From design and engineering to development and support, we cover every angle.

Whether your project requires hardware development, embedded software, security integration or cloud and mobile applications, we are experts in product engineering. We solve difficult problems at every stage to bring innovations to market quickly. Our engineering services bring together senior-level development, testing and support professionals on a single team – ensuring your project has the right pieces in the right places, from end to end.

30K+ EMPLOYEES GLOBALLY

2000+ IoT ENGINEERS

200+ PRODUCTS LAUNCHED

FPGA DESIGN SERVICES

As a Xilinx Design Partner since 2012, Cardinal Peak has developed dozens of products using their field-programmable gate arrays (FPGAs) and programmable SoCs. These highly flexible programmable silicon components enable complex solutions without the need for custom silicon. Our experience with Xilinx design and verification tools includes both current and legacy systems.

Having provided long term support to multiple aerospace contractors, we are well versed in the unique requirements of working with those firms. Our FPGA skills are often used to support high-speed Audio, Video, and Software Defined Radio applications in commercial markets.

Our Xilinx Capabilities & Experience

Current Xilinx Tools	Legacy Xilinx Tools	Devices	
Vivado	ISE Design Suite	Virtex	MIG
Vitis including SDK	EDK	Spartan	Zynq SoC & MPSoC
IP Integrator	MicroBlaze	Artix	Kintex Ultrascale
Vivado Simulator	PowerPC	Kintex	Zynq Ultrscale+
ChipScope		PCIe	Most legacy devices

Cardinal Peak FPGA Design Examples

• Tasked with providing a high-speed, ultra-low-latency wireless link that demanded more than any off-the-shelf radio could provide, we opted to develop a custom modem implemented in programmable logic. We mated a **Xilinx Zynq processor** with an Analog Devices transceiver, enabling us to build a powerful, frequency-agile radio capable of meeting the application's extreme requirements (sub-ms latency for sustained bi-directional 10 channel audio). Building the modem entirely in the FPGA fabric offered the speed and reliability of a dedicated ASIC with the flexibility to design a perfectly tailored solution to meet the customer's needs.

• Utilizing a **Xilinx Kintex FPGA** we designed a multi-node, networked, digital signal processing system used for non-destructive testing. We also supported and improved upon legacy products needing additional functionality and fixes. These systems function similar to both active and passive doppler radar, by measuring arrival time/intensity of pulses received at multiple transducer points and cross-correlate channels to infer the location of defects in the vessel or the presence of water droplets within the vessel. This was an excellent application for FPGAs as the manufacturing volume is low, and the application required very high-speed measurement and processing in parallel.

• We have worked with several Pro-audio customers. One such design was a PCIe based Dante® networked audio system controller card. This design featured multiple **Xilinx Spartan 6 and Artix 7 FPGAs**. Critical to this design was an RTL architected to be capable of high bandwidth throughput, for which the FPGA is ideally suited. Additionally, we were required to optimize the Linux kernel, on the computer hardware (PC), to guarantee it would be able to keep up with the hardware.

• For another Pro-audio customer, we were approached for a cost-reduction redesign of one of their network-centric digital signal and control processor lines, supporting over 400 bidirectional audio channels. The original Power-PC based design was re-architected using a **Xilinx Artix-7** as a central router and variable number of Analog Devices DSPs for various product model configurations and options.

• We continue to work with several aerospace clients. Their needs vary and, due to security, we do not detail what we do for them. What we can say is, most involve quite large **Xilinx Kintex and UltraScale FPGAs** used for terrestrial and flight systems. These are predominantly image processing applications involving extremely high speed "fat" data pipes (PCIe, Rapid-IO, Aurora, etc.), using DMA, and low-latency processing.

Learn more and read our case studies at cardinalpeak.com/product-development-case-studies/fpga-capabilities-and-design-experience.

WHO WE WORK WITH

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RECENT EXPERIENCE

IoT Devices & Connected Products
- Smart Thermostat
- Tankless Hot Water Heater
- Water Softener & Water Purifier
- Air Conditioner & Air Purifier
- Automated Window Coverings
- Feedback Now by Forrester

Health & Wellness Products
- Connected Beauty Device
- Cloud Connected Lab Instruments
- Portable Ultrasound Device
- In Vitro Diagnostic Device
- Electrosurgical Device
- Wearables

Security Products
- Remote Surveillance Camera System
- Home IoT/Security Hub
- Cryptocurrency Wallet
- Building Access Control
- Wi-Fi Locks
- Security Video Camera & Cloud Content Management
- Multi-Camera CCTV & Security Management System

Consumer Audio Products
- True Wireless Earbuds
- Gaming Headset
- Multiple Headphones
- Portable Recording Studio

Pro-Audio/Video Products
- Personalized HLS Streaming Platform
- Proprietary Next-Gen Streaming Platform
- Police Radar & Video System
- Dante & AES-67 Pro-Audio Products