

INSIDERS' GUIDE: FPGAs, TOOLS, AND BOARDS



FEATURED INTERVIEW:

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PLDA: INTELLECTUAL PROPERTY ("IP") FOR FPGAS

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Q. First of all, tell us a little bit about yourself and your responsibilities at PLDA.

A. I am a co-founder and the CTO of PLDA and have been with PLDA since its inception in 1996. I wear a lot of hats at PLDA, but primarily, my team focuses on identifying the needs of the market for high-speed bus interfaces and spinning that knowledge into world-class products. We also take a great deal of pride in knowing the technology very, very well. This is a huge advantage that we get from our specialization. For example, we were first to market with a full-speed PCIe Gen II product for Xilinx and Altera and we recently announced a key design-win with JVC for our AHB-PCIe bridge. I really don't think that we could achieve those types of milestones without our pinpoint focus on our market space and its technology.

Q. PLDA focuses on IP for both ASICs and FPGAs. Tell us a little bit about the type of IP that you specialize in, and your business model for delivering IP to customers. Please also clarify how you "charge" for your IP.

A. PLDA's success is based on doing one thing very well—intellectual property cores (and related boards) for ASICs, Structured-ASICs, and FPGAs for high-speed busses, such as PCI Express, PCI-X, PCI, PXI Express, AHB-PCIe and AXI-PCIe. We believe busses are especially important because they are necessary in virtually every design and can be a "make it or break it" factor in an end product. If your interface bus is not functioning optimally, the entire design becomes less efficient. In the world of PCIe, this can be especially challenging because PCIe enables some advanced bus management features that require a real understanding of its integration.

PLDA designs IP for both ASICs and FPGAs and the platforms have a huge amount of commonality. Our business model allows a customer to prototype using FPGA boards and migrate to FPGAs or ASICs and know that their bus will perform as expected. We can deliver fully functioning FPGA prototyping boards to customers to help them fine-tune their designs in real-life hardware. RTL level IP is included in the board package, enabling customers to integrate it into their end design. This is a huge time savings and it minimizes risks for the client since they have almost no integration to worry about up front – they can begin their testing and know what they are getting immediately.

I believe we are unique in that the IP that comes with the board is free. A PLDA board customer gets a full featured IP core that can be used for an unlimited time period and with unlimited access to our technical support.

Q. One of the most confusing aspects of the FPGA ecosystem is that the major FPGA vendors like Xilinx and Altera often provide "free" development tools and "free" IP, yet other vendors like PLDA "sell" IP. Management might often then pressure

engineers to just look at the free (or low cost) stuff. Help us differentiate between your IP offerings and those of, say, Xilinx in the PCI space.

- A. Companies like Xilinx and Altera are key partners for PLDA. While they do provide basic IP building blocks for free, we have found that customers often require more flexibility or specific customization of their bus IP and this is not what free IP is designed to do. At PLDA, we don't even try to compete with free IP. We see ourselves as adding value to a design by enabling easy integration of interfaces such as PCIe, while delivering a higher level of customization and technical support that just isn't feasible for free IP. Often, our IP sits on the same devices as free IP, but adds incremental functionality and flexibility.

When an engineering manager really looks at what they need to accomplish with their third-party IP, they quickly realize that it is often more cost-effective to buy IP from an established vendor such as PLDA because it will be thoroughly tested, easier to integrate and more open to customization. It is a bit of an oxymoron - to get to the desired end result, free IP can actually cost more than paid IP because it requires so much engineering time and talent to integrate.

- Q. Another big hassle in the IP market is that there are quite a few vendors that sell IP, but they don't necessarily integrate it into "real" FPGAs on real boards. So the IP is often left out there in cyberspace, and the poor engineer is left with significant integration and verification challenges. Tell us about how PLDA delivers boards with IP and how this strategy hopefully helps customers.**

- A. Because PLDA has an established history of commercially manufacturing our IP into volume production FPGA-based end products, we are able to deliver a true silicon-proven experience. Our established partner relationships with key FPGA vendors such as Xilinx and Altera, help ensure that our products are compatible and easy to integrate by our customers using the industry's most current tools.

Additionally, our IP and prototyping boards can be used by a customer to immediately simulate an end-product scenario for testing purposes, with no costly integration time up front. When the customer knows that the IP is going to function as planned with their design, then they can begin the final integration. And PLDA can help in that process as well – PLDA is the Gartner-rated Number 1 supplier of PCI IP Cores and has provided ASIC and FPGA IP for literally thousands of designs. This uniquely enables us to assist our customers as needed.

- Q. PLDA specializes pretty heavily in PCI IP, so do you provide any assistance to customers who are integrating this IP with soft cores or other sorts of IP, whether third party or their own? Since a complete design is more than just PCI IP, how do you recommend customers coordinate with all vendors to get to a real solution quickly and efficiently?**

- A. The best decision a customer can make when it comes to IP is to verify their sources and ensure the vendors don't just provide IP, but also stand ready support the entire design. Established IP providers, including PLDA, all have standard documented application and design support for their IP that includes device and RTL integration, tool integration, application verification, physical implementation and verification, and test development.

At PLDA, our support engineers are also often the same people that helped create the IP itself. Our high degree of specialization on PCIe and related interfaces ensure our engineers know the designs inside and out and are 100% committed to helping our customers achieve first-time-right silicon. And because PLDA uses solely in-house designers, we are able to effectively support the IP in-house. Some IP companies rely on cheaper, contract labor to create blocks. While there is a cost advantage for IP vendors to using contract labor, when it comes time to

integrate those blocks, the customer – and even the IP vendor – often has no ability to troubleshoot the design issues.

Our experienced team of IP specialists can also customize our IP cores and development boards to fit specific requirements. Customization work may include adding optional features defined in the relevant specification but not supported by the core; modifying or extending the functionality of existing features inside the core or even modifying a development board to add, change, or expand its capabilities, often involving partial re-layout and re-manufacturing of the board. The modified IP is thoroughly verified using proprietary and 3rd-party verification IP and test benches as well as tested in hardware using our broad line of FPGA-based prototyping boards and backed up by state-of-the-art test equipment.

Q. Recently, you released a series of FPGA-based interface boards designed to streamline interface integration in specialized, embedded systems such as industrial automation, military apps and other small volume, high margin systems. Can you tell us a little about these new boards?

A. Earlier this year, we realized that while many traditional FPGA customers were using our prototyping boards just for prototyping, there was a segment of the embedded system community that used the boards in their end-systems. When we looked more closely at this, we realized that these systems were designed for applications such as industrial control, automation, military, and scientific equipment that require a high degree of functionality and customization in their interface designs, but are produced in fairly small volume. That made in-house custom interface design expensive and our boards were being seen as an attractive alternative.

Our interface board products provide proven, off-the-shelf solutions, in various FPGA sizes and with multiple options and interfaces, including PCI, PCI-X, PCI Express, Gigabit Ethernet, USB, SFP, DDR SDRAM, DDR2 SDRAM, Flash & many more.

With additional features like “just-in-time” product availability and quantity discounts on as few as 5 units, we are finding that our FPGA Board Solutions can significantly reduce lead time and cost-to-market when compared to custom design options for this specialized part of the market.

Q. Thank you for this interview.