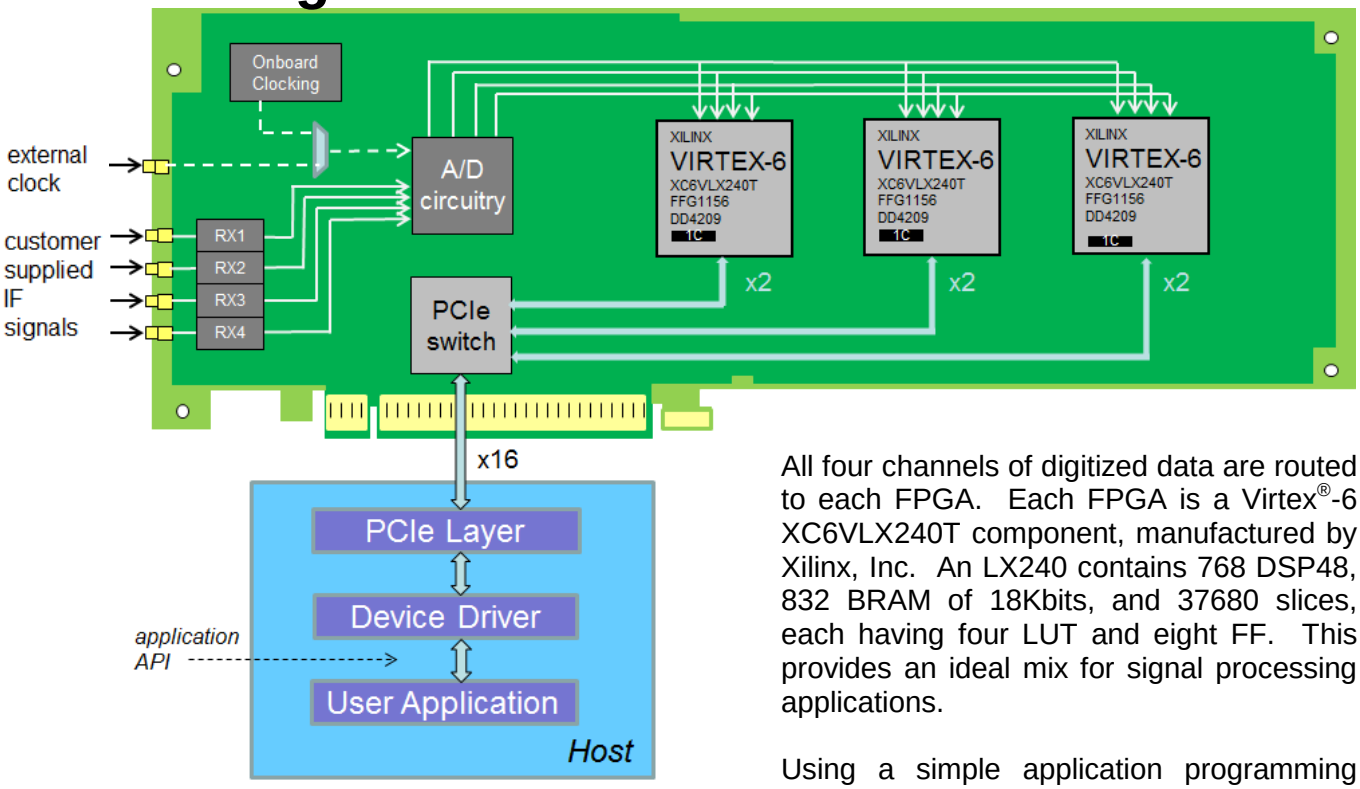
# Programmable Virtex® Processor Card




The PVP-643L card combines a multi-channel digital receiver with FPGA-based signal processing elements, on a standard PCI Express® (PCIe®) card. When installed in a customer's host system, such as a rack-mount server or other PCIe host, a PVP-643L provides a complete IF-to-DMA path for receiving wireless signals, processing them in an FPGA, and sending results to host CPU(s) via PCI Express.

After external equipment mixes radio signals down to an appropriate intermediate frequency (IF), the signals are filtered and then input to the PVP card. The PVP-643L has four input channels, which are sampled to 12-bit resolution using a programmable sampling clock between 100 and 250 megasamples per second. Onboard sample clock generation is provided, or customers may supply their own clock via the external clock input port.

All four channels of digitized data are routed to each FPGA. Each FPGA is a Virtex®-6 XC6VLX240T component, manufactured by Xilinx, Inc. An LX240 contains 768 DSP48, 832 BRAM of 18Kbits, and 37680 slices, each having four LUT and eight FF. This provides an ideal mix for signal processing applications.

Using a simple application programming interface (API), customers can access the sampled radio signals, and write VHDL or Verilog code to process the signals. Results can be forwarded to host CPUs using the direct memory access API. Each FPGA contains 1024 DMA write engines, for pushing data to the host, and 1024 DMA read engines, for pulling data from the host. On the host side, the job of interfacing to each FPGA is handled by a Linux device driver supplied with the card. Convenient access to the device drivers is provided by a set of C routines called the application API.

In summary, the PVP-643L provides four digital receivers supplying two FPGA processing elements on an industry-standard PCI Express card. Take full advantage of these features, and jump start your signal processing project today!

 *Contact: sales@starcommva.com (888)899-3555*

# PVP-643L Product Specifications

Made in the U.S.A.

## Digital Receiver

| | |
|---|---|
| Number of Channels | 4 |
| Resolution | 12 bits |
| Sampling Frequency | 100 to 250 MHz |
| Receiver Bandwidth | 50 to 250 MHz |
| Impedance | 50 Ω |
| Connector Type | MMCX jack (e.g. Amphenol 908-24100) |

## Clocking

| | |
|---|---|
| Sample Rate | Programmable |
| Sample Rate Range | 100 to 250 Msps |
| Internal Reference Clock | ±2.5 ppm frequency stability |
| External Reference Clock | +10 dBm sine wave at desired sampling frequency |
| External Clock Connector | MMCX jack (e.g. Amphenol 908-24100) |

## Processing

| | |
|---|---|
| Operating System | Red Hat Enterprise Linux (RHEL) release 6.2 |
| Radio Data API | VHDL-93 |
| Host Data API | VHDL-93 |
| Linux Device Driver | C, using the GNU compiler (gcc-4.4.6-3.el6.x86 64) |
| Application API | C, using the GNU compiler (gcc-4.4.6-3.el6.x86 64) |
| FPGA Development Tool | Xilinx ISE™ version 13.3 |
| Development Interface | JTAG using Xilinx Platform Cable USB (Model DLC9G) |
| Development Connector | Molex 87832-1420 (standard Xilinx JTAG connector) |
| Firmware Storage | Xilinx Platform Flash XL (1 per FPGA, 128 Mb each) |
| Number of FPGAs | 3 (Virtex-6 XC6VLX240T) |

## Host Interface

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|---|---|
| Interface Type | PCI Express version 1.1 (Gen1) |
| Signaling Rate | 2.5 Gbit/sec per lane |
| Number of Active Lanes | 1 to 16 lanes per card, 1 to 2 lanes per FPGA |
| PCIe Connector | x16 standard PCIe card edge connector |
| Configuration Registers | PCI™ Type 0 (Endpoint) Configuration Space |
| Data Transfer | DMA |
| Number of DMA Engines | 1024 per FPGA |

## Electro-Mechanical

| | |
|---|---|
| Card Size (exact) | PCIe standard height, full length, x16 graphics add-in card |
| Card Size (approx.) | 12.3 by 4.4 by 0.8 inches |
| Front Panel Bracket | Included (aka I/O bracket) |
| Power Consumption | Processing dependent; 225 Watts, maximum |
| Power Connectors | 2 PEG-6 standard PCIe connectors (e.g. Molex 39-28-8060) |
| Power Connector Location | Factory option (fixed or floating) |

With the purchase of a PVP-643L card and software development kit license, customers receive the following items: one (1) PVP-643L card with installed front panel, four (4) coaxial cables for MMCX-to-SMA adaption, an FPGA software development kit using VHDL, and a C software development kit including Linux device drivers and API routines for use on the host system.