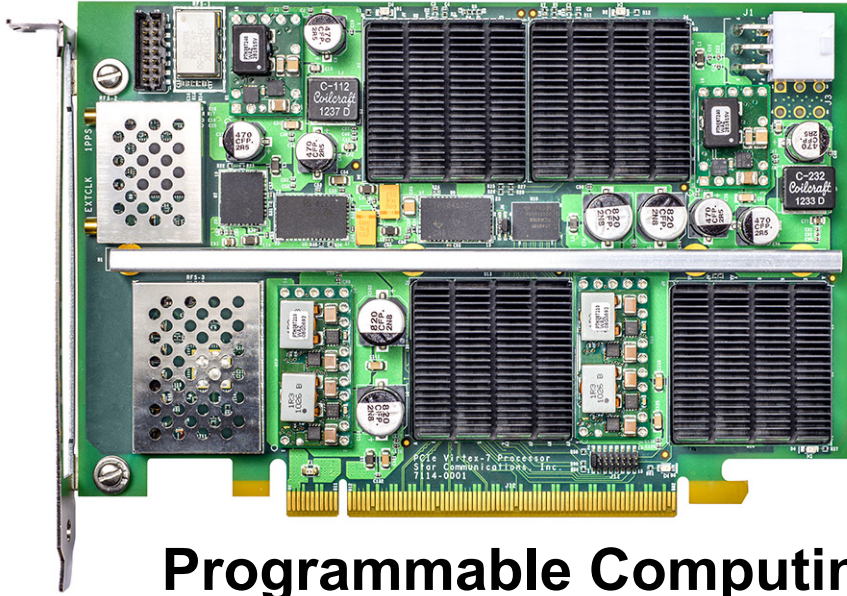


## PCA-70x Computing Accelerator

*Introducing  
the world's most  
powerful H/W  
Accelerators...*



## Programmable Computing Accelerator

Need to boost performance? The PCA-70x family makes it easy to use field programmable gate array (FPGA) technology to offload your software-intensive processes. Just plug a PCA-70x card into a standard PCI Express® slot in your host computer system. Then use the simple, intuitive application programming interface (API) to apply serious computing power to your application. A single PCA card can execute more than  $65 \times 10^{12}$  operations per second (65 Teraops), making it the most powerful hardware accelerator available today!

Card input/output is fast, too. PCI Express® communications transfer data to and from your host computer at speeds up to 40 Giga-bits per second. Transfers are conveniently accomplished using direct memory access (DMA). Not only does this offload your host CPU from performing the transfers, it also eliminates writing extra host code because your data is already in memory.

And once your data is in the card the processing power is intense. Each FPGA contains 2800 arithmetic logic units (ALUs) plus over

600,000 flip flops and 300,000 hardware lookup tables. In addition, each FPGA has 2060 dual-ported RAMs, providing a total memory read/write bandwidth of up to 270 Terabits per second on a single card.

Need even more computing power? PCA cards are compatible with industry standard expansion chassis, allowing up to 16 cards in a 4U, 19-inch rack mount system. All cards can be synchronized to the same processing clock, if desired, using the external clock input port. Onboard clock generation is also provided, allowing you to determine the processing clock frequenc(ies) best suited to your application. Users can also supply a trigger signal such as a 1PPS signal, to synchronize multiple PCA cards together.

In summary, the PCA-70x family of computing accelerator cards give you unprecedented processing power and ease of use. Take advantage of the latest hardware to boost the performance of your applications today!



# Ordering Information

## PCA-70x

└── Number of FPGA's (1-4)

### Processing

Made in the U.S.A.

Number of FPGAs	1, 2, 3, or 4 (Xilinx XC7VX485T)
Slices per FPGA	75900
Flip Flops per Slice	8 flip flops
LUTs per Slice	4 logic lookup tables having 6 inputs each
DSP48 per FPGA	2800 ALU cores, each with 25x18 multiplier plus 48-bit accumulator
BRAM per FPGA	2060 dual-port block RAMs of 18 Kilobits each

### Clocking

Clock Rate	Programmable
Clock Rate Range	10 to 450 MHz
Internal Reference	±2.5 ppm frequency stability
External Reference	50 Ω, -10 to +10 dBm, 10 to 250 MHz
External Trigger	50 Ω or TTL/CMOS, 1.8 to 5.0 Volts
External Connectors	MMCX jack (e.g. Amphenol 908-24100)

### Development

Operating System	Red Hat Enterprise Linux (RHEL) release 6.4
Firmware API	VHDL or Verilog
Linux Device Driver	C, using the GNU compiler (gcc-4.4.6-3.el6.x86 64)
Software API	C, using the GNU compiler (gcc-4.4.6-3.el6.x86 64)
FPGA Development Tool	Xilinx ISE™ version 14.5
Development Interfaces	Downloadable Flash, Xilinx Platform Cable USB (Model DLC9G)
Number of FPGAs	1, 2, 3, or 4 (Xilinx XC7VX485T)

### Host Interface

Interface Type	PCI Express version 1.1 (Gen1) or 2.1 (Gen2)
Signaling Rate	2.5 or 5.0 Gbit/sec per lane
Number of Active Lanes	1 to 8 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 (1024 R/W engines)

### Electro-Mechanical

Card Size (exact)	PCIe standard height, half length, x16 add-in card
Card Size (approx.)	6.6 by 4.4 by 0.8 inches
Power Consumption	Configuration dependent (50 to 125 Watts)
Auxiliary Power Connector	0 or 1, PEG-6 standard PCIe connector (e.g. Molex 39-30-0060)
Auxiliary Connector Location	Factory option (90° rear or top facing, vertical mount, or floating)

With the purchase of a PCA-70x card and software development kit license, customers receive the following items: one PCA-70x card with installed front panel, coaxial cables for external clock and trigger inputs, an FPGA software development kit compatible with VHDL or Verilog, and a C/C++ software development kit including Linux device drivers and API routines for use on the host system.

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