CorePCI v5.3

Key Features

- PCI Specification 2.2 Compliant
- Zero Wait-State Burst Mode Transfers
- Supports Actel SX, SX-A, RTSX, ProASIC and ProASIC^{PLUS} Families
- Silicon-Proven 33 or 66 MHz Performance[1]
- 32-bit or 64-bit PCI Bus
- Memory, I/O and Configuration Command Support
- Backend Support Options for Synchronous DRAM, SRAM and Generic I/O Subsystems
- Flexible Backend Data Flow Control
- Verilog and VHDL Source Files Available
- Comprehensive Test Bench
- Supported by Common Synthesis and Simulation Tools for Verilog and VHDL

PCI Cores in Actel Devices

Actel's suite of PCI intellectual property cores makes it easy for you to quickly incorporate PCI into your design. These cores meet or exceed PCI or Compact PCI standards for a variety of Actel devices. This core is compliant with PCISIG PCI 2.2 and PCIMG 2.1 (Compact PCI) and also supports hot swap in Compact PCI. Available in synthesizable code with basic timing constraints, Actel's CorePCI can be flexibly integrated into your design. Unlike competitors' FPGA solutions, this suite of cores is available as a synthesizable implementation, eliminating the need for hard placement to achieve the demanding performance requirements of PCI. This saves you money when moving that winning FPGA-based product to an ASIC.

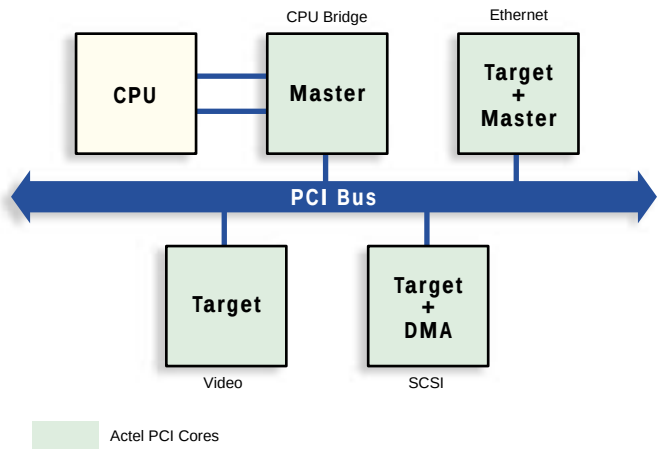

Figure 1: Example PCI-Based System Diagram[2]

[1] 33 MHz is supported across all families, 66 MHz is supported on SX, SXA and AX families.
[2] Rusling, David A. The Linux Kernel. Berkshire: 1999.

PCI Compliance with Multiple Functions

Actel's PCI core either meets or exceeds PCI standards in 32/33 or 64/66 configurations. Actel's FPGAs deliver simple 33 MHz and 66 MHz solutions, without the need for hand-routed, netlist-only solutions. This performance has been verified in silicon as well as by use of a combined logic synthesis and simulation.

When combined with Actel's nonvolatile FPGAs, this suite of PCI cores offers an ideal solution for communication, industrial, and aerospace applications where users need to hot swap chips without shutting down the board. It can also provide a vital contribution for any PCI-bus-based system-on-a-chip using Actel's large-gate count ProASIC and ProASIC^{PLUS} product families.

Table 1: PCI Performance Across Temperature Ranges

Application/ Temp Range	Internal Reg-Reg	Clock-Out T_{CO}	I/O Set-Up T_{SU}	I/O Hold T_{HI}
66/64 PCI Requirements	15.0 ns	6.0 ns	3.0 ns	0.0 ns
33/32 PCI Requirements	30.0 ns	11.0 ns	7.0 ns	0.0 ns
Commercial (Actel SX-A)	12.5 ns	<5.8 ns	<2.8 ns	0.0 ns
Industrial (Actel ProASIC^{PLUS})	22.7 ns	<8.5 ns	<5.1 ns	0.0 ns
Military (Actel RTSX)	23.8 ns	<9.5 ns	<5.0 ns	0.0 ns

PCI Performance

Meeting 66 MHz PCI speeds is a breeze with Actel FPGAs (Table 1). All of this is achieved without having to hand-place the PCI macro in the device. Actel's PCI core achieves compliant timing with Actel devices in commercial, industrial, and military temperature ranges.

Simple Design

In addition to a great PCI core and some of the world's fastest FPGAs, Actel provides engineers with everything necessary for a successful design. Actel supplies an accurate datasheet as well as a user's guide for PCI cores. Actel provides timing constraint and pin files to help integrate the PCI core into your design. Actel also has an evaluation board, with supported drivers to help evaluate the core and device capabilities. This board can serve as a development platform because the device is socketed and unused I/Os are made available through an expansion connector. CorePCI can be used with the popular synthesis tools from Exemplar, Synopsys, and Synplicity. Additionally, the cores can be simulated in any Verilog-compliant or VHDL/Vital compliant simulator. The RTL-based CorePCI can be simulated with the rest of your design prior to synthesis using the Actel supplied test bench.

So, How Do I Learn More?

Datasheets are available at Actel's Internet site: http://www.actel.com/products/ip/index.html. Actel has a worldwide staff of sales professionals ready to assist you, not only with the purchase of the core, but also with the instantiation of your design in an Actel FPGA.

Device Utilization Examples for CorePCI Functions

Device	Target		Master		Target + DMA		Target + Master	
	32-bit	64-bit	32-bit	64-bit	32-bit	64-bit	32-bit	64-bit
A54SX32A	22%	32%	45%	55%	44%	55%	47%	56%
A500K050	19%	N/A	39%	N/A	38%	N/A	40%	N/A
A500K130	8%	N/A	16%	N/A	16%	N/A	17%	N/A
APA150	16%	N/A	32%	N/A	32%	N/A	34%	N/A

For more information about Actel CorePCI, call 1.888.99.ACTEL or visit our website at http://www.actel.com

www.actel.com

Actel Corporation
955 East Arques Avenue
Sunnyvale, CA USA 94086
Telephone 408.739.1010
Facsimile 408.739.1540

Actel Europe Ltd.
Maxfli Court, Riverside Way
Camberley, Surrey GU15 3YL
United Kingdom
Telephone +44 0 1276.401450
Facsimile +44 0 1276.401490

Actel Japan
EXOS Ebisu Building 4F
1-24-14 Ebisu Shibuya-ku
Tokyo 150, Japan
Telephone +81 0 3.3445.7671
Facsimile +81 0 3.3445.7668

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