

PROCe IV™

PCIe x4 Computation Accelerator

Key Features

- Stratix IV E530 and other Stratix IV family FPGAs
- 4-lane PCI Express (PCIe x4) host interface
- Five level memory structure (8.5 GB+).
Maximum sustain throughput of **3,259 GB/s** for internal memories and **10 GB/s** for DRAMs as follows:
 - Up to 1280 M9K (9K-bit) DPRAM blocks
 - Up to 64 M144K (144K-bit) RAM blocks
 - Up to 10,624 MLAB (320-bit) RAM blocks
 - A 512 MB DDR2 memory with **4 GB/s** sustain throughput using up to 8 ports. (Up to 16 ports with lower access rate)
 - 2 DDR2 SODIMMs with up to **4 GB** each at a maximum sustain throughput of **6 GB/s** (designed to support future 8GB SODIMMS)
 - Onboard SRAM options on SODIMM modules
- Supports 2 PROCe IV Daughter Boards:
Camera Links, SDI, User's Ethernet and other interfaces
- Typical system frequencies: 100-325 MHz.
- Flexible clocking system.
- Volatile and non volatile design security
- Supported by GiDEL's **PROC Developer's Kit**

Benefits

- Leading edge performance
- Advance development tools
- Low power consumption
- Maintainability
- Reliability
- Long life cycle



Overview

The **PROCe IV™** system provides a high-capacity, high-speed FPGA-based platform fortified with high throughput and massive memory, resulting in a powerful and highly flexible system. The **PROCe IV** can be hosted via 4-lane PCI Express. The board's high speed performance coupled with memory and add-on daughter boards' flexible architecture enable the system to meet almost any computational needs. In addition to 512MB on-board memory, two SODIMM sockets provide up to 8GB of memory or additional connectivity and logic. Abundant memory conjoined with fast PCIe connection enable strong co-processing between a standard PC operating system and the FPGA acceleration. The **PROCe IV** system, with GiDEL's **PROC Developer's Kit** and tools, offers incredible performance yet supports quick implementation of your unique design. These unique features are achieved by eliminating the need for a high-speed board design, a PCI Express application driver, board constraints and environment FPGA code. The generated HDL code enables high throughput, easy-to-use parallel access to large memories. As a result, designers can focus on their proprietary value-added design. User designs may be in HDL, C-based, Simulink (graphical design) or any combination of them.

Target Applications

- COTS acquisition and accelerator boards in:
 - ✓ HPC (High Performance Computing)
 - ✓ Machine Vision and Imaging
 - ✓ High performance acquisition systems
 - ✓ Bioinformatics Applications
- Small ASIC and SoC Prototyping
- Complex algorithm and IPs validation.

Development Environment

The *PROCDeveloper's Kit*, GiDEL's intuitive design and debug environment, facilitates design development effort on the *PROCe IV* system. The kit contains *PROCWizard™*, *PROCMultiPort™* and other memory control IPs, *Quartus*, *USBBlaster*, and a *PROC_HILs™* option.

The *PROCWizard* performs hardware initialization and automatically generates the following:

- Interface documentation in HTML or Microsoft Word.
- C++ class(es) application driver(s) enable simultaneous accesses of multiple applications, each to its' dedicated section of the PROC board.

Top-level designs, interface modules / entities and on-board memory controllers for the application use.

- Device constraints (as pin-outs).

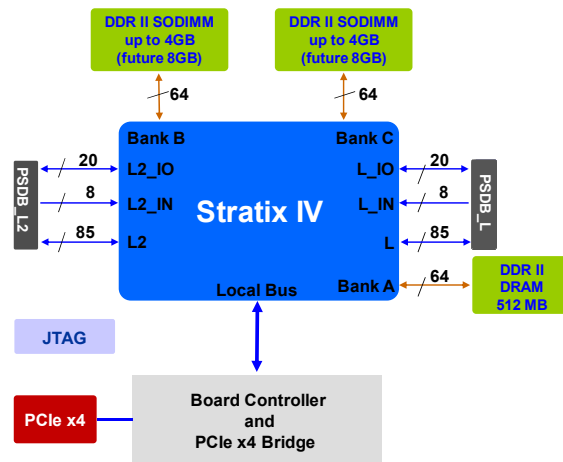
The *PROCMultiPort* and other memory control IPs provides simple access as FIFOs and frame delays to the on-board DRAM. It enables parallel access to the on-board memory while enabling to split the physical memory into multiple logical memories. As a result the main benefits are:

- Simplifies design and enhances system performance.
- Replaces the need for inventory of special memories by using standard memory and IP.

The *USBBlaster* enables visibility of internal signals using the available FPGA memory.

The *PROC_HILs™* enables the users to design in *Simulink™* while accelerating enormously the design simulation on the *PROCe IV* board. Alternatively, the *PROC_HILs* may be to used, via Simulink, as a design entry tool for an FPGA based accelerator.

Other high-level design entry options, such as C++, are available via GiDEL's partners.



PROCe IV board diagram



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