# PCI Reconfigurable Image Advanced Processor (PRIAP)

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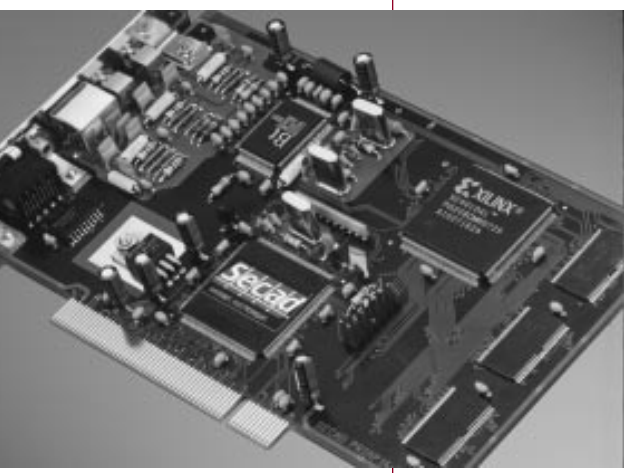
SECAD, a French company specializing in Xilinx FPGA design, real-time image-processing board design and manufacturing, recently designed a PCI-based Reconfigurable Image Advanced Processor (PRIAP) using the XC4010XL. This board includes a color or B/W video decoder and three 16-Mbit memory planes, expandable to 64Mbit. These memory planes and the output of the decoder are accessed by the FPGA simultaneously, allowing real-time computation with four data flows. The board includes a PCI interface and an 80 MHz 24-bit DSP, which can be devoted to data communication between the memory planes and the PCI interface.

The first application, developed for the Viewpoint company, is for real-time target tracking. Other possible real-time computations are:



- 2D or time filtering
- Mathematical morphology
- Correlation
- Thresholding
- Movement detection
- Any high-performance, reconfigurable computing, with or without image processing

SECAD chose the Xilinx 4000XL family for a number of reasons:

- SECAD has used Xilinx for more than 10 years in all of their image processing boards.
- Different densities are available within the PQ208 footprint, from 4005XL to 4044XL, allowing different processing capabilities without board redesign.
- The Foundation Series software is easy to use with the Metamor VHDL compiler, the ALDEC simulator, and other tools from Xilinx like X-BLOX.

The only problem at the beginning of the design was the use of the beta version of the software, running under Windows95, which caused some problems. Also it was the first design we have done in VHDL, and we had to learn a lot about it. VHDL allows us to reuse most of our design, and we will develop a VHDL library for this board, allowing us to rapidly develop new designs.

We do not plan to use a HardWire version, because, with the RAM-based version, we can program new algorithms without changing the board. A HardWire version will be interesting only if we find an OEM customer for 1K or 10K/year quantity, with a fixed image-processing algorithm need.

The SECAD company was founded in 1983. It has 19 employees, and its main activities are:

- Electronic board and systems design, and manufacturing for industry OEM market.
- Image processing board design and manufacturing for OEMs.
- Design and manufacturing of proprietary imaging products.
- Turn-key image processing applications for industry, military, medical.
- Xilinx FPGA development and service.
- VHDL and Xilinx FPGA training.
- Providing FPGA design expertise.
- FPGA and CPLD development, using VHDL or schematics.
- Complete board development, and manufacturing.

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