

# CPLDs Provide Needed Design Flexibility in Vision Systems

At the world's top machine vision company, **Cognex**, designers of the new Checkpoint 900C have taken full advantage of the proven pin-locking capabilities and in-system programmability (ISP) of the XC9500 family. This new line of machine vision and pattern recognition products greatly accelerates image analysis for color vision applications running on high-speed production lines.

Based in Natick, Massachusetts, Cognex has been using Xilinx XC9500 devices since early 1996 in a multitude of new designs. It began shipments of this new system in June 1997.

"XC9500 components are key to the Checkpoint 900C, Cognex's first color vision processor. Xilinx's flexible pin-locking architecture, high-speed CPLD specs, and in-system programming capability have been instrumental in the development of our latest Checkpoint product. Changes to the design have been quick to implement — the re-programmability through the JTAG port has allowed quick transition from prototypes to production," noted Cognex's Steven Goodspeed.

Cognex has focused on keeping pace with ever faster production lines, resulting in improved productivity, higher quality, and reduced costs for manufacturers. The robust performance and re-programmability of its systems have fueled its worldwide popularity.

As the first full-scale color machine vision system designed for the PC, the Checkpoint 900C is capable of a wide range of challenging machine vision applications in a number of major industries. For example, the Checkpoint 900C system can be used in the pharmaceutical in-

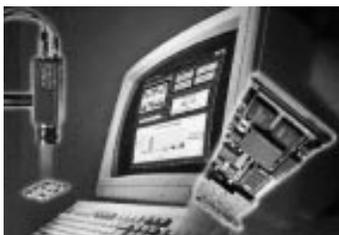
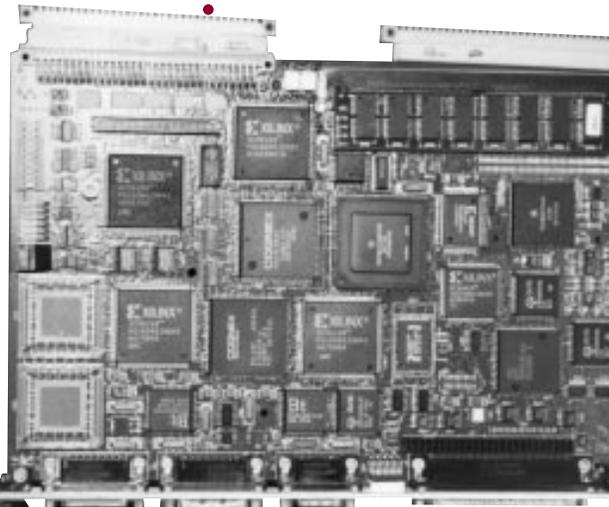
dustry to inspect blister packs and sort color tablets and capsules; in the automotive industry to verify that color fuses have been inserted in the correct position in fuse blocks; and in the electronics industry to ensure that LEDs, cellular phone keys, and pager buttons are the correct color.

"The primary reason for selecting ISP technology was that this part of our design was extremely complex, and large functional blocks could be incorporated into single devices," Goodspeed said. "During the debug process, hardware changes could be contained and fixed within a single Xilinx XC9500 device, then quickly evaluated by reloading the device through the ISP JTAG connection. No messy rework and component replacements were required."

System components include an embedded 68060 processor, a PCI interface, vision processing ASICs, CPLDs, and FPGAs. The CPLDs implement the major control logic, including the SDRAM controller and IO controller.

"Pin-locking and ISP have been key to upgrade flexibility of the Checkpoint 900C system. New product functionality can be downloaded using the JTAG port," said Goodspeed. "Not having to remove a component eliminates any need for sockets and extra handling of the hardware if rework is ever required."

The XC9500 family is a proven winner, especially in those applications that take advantage of the rock-solid pin-locking and ISP capability for design re-programmability. ◆



Cognex's Checkpoint 900C color system.