



PCI 4DI Imaging System

Background

The Intelligent Automation Systems 4DI Imager is a non-contact gauging system that creates a three-dimensional wire frame model of an object under inspection. The system shines a series of laser-generated lines on an object and measures the line locations using three CCD cameras. The 4DI Imager board detects the laser line locations in the images and outputs a series of points. A PC-resident application package displays a wire frame image and performs image analysis functions.

System Overview

Bolton Engineering prototyped the design and created simulation test vectors by writing a set of 'C' programs. The Programmable Logic Device (PLD) was written in a high-level design language and fully verified against the vectors prior to board construction. Bolton Engineering wrote low-level routines to test the hardware. These routines were incorporated into the client's application software for final test.

- ~480 million multiply-accumulate operations per second.
- Three separate differential-input 9-bit accurate video channels with individual offset and gain.
- Flexible video front-end and video timing generator supports a wide variety of externally or internally sync'd cameras.
- All computational, formatting and timing logic contained in a single 100K gate PLD; front-end reconfiguration logic and interface to PCI controller contained in two other PLDs.
- Supports any combination of pixel interpolate or frame grab on any three cameras simultaneously.
- Designed to meet PCI V2.1, FCC part 15 class B, EN 55022 class B, IEC 1000-4-2, -3, -4.
- *For more information see www.ias.com/4di.htm*

Results

- Electronics met or exceeded all design goals, and came in at half the client's budgeted cost.

Project Scope

Bolton Engineering was responsible for writing the specification, creating schematics, designing PLDs, laying out the circuit board layout, writing test software, design verification and testing, creating test plan, and writing documentation.