



# Optical CrossLinks Inc.

## Company Overview

Optical CrossLinks is a development stage company specializing in the design, fabrication, packaging, and marketing of optical waveguide circuits and interconnection products using proprietary polymer and glass fiber technologies.

Optical CrossLinks, a Delaware corporation founded in 1998 as Polymer Photonics, Inc., operates from a 15,000 square foot facility in Kennett Square, Pennsylvania. The Company formerly had 12 employees late in 2002. Since early 2003 only former employees are used as independent contractors and consultants on an as needed basis until new investment or an acquisition is consummated. Optical CrossLinks is owned by its management, directors, employees, and Series A Preferred investors.

## Technology Overview

Optical CrossLinks' intellectual property and processing techniques allow optical circuits to be printed directly into its hybrid polymer films using a "reel-to-reel" or "printing press" process that offers rapid scalability to high-volume, low-cost production. Key members of Optical CrossLinks' team began developing this acrylate polymer waveguide technology over 17 years ago at DuPont.

Optical CrossLinks has contractually secured non-exclusive rights to a portfolio of 11 patents from DuPont to the original PolyGuide™ polymer optical waveguide manufacturing process and related applications. Although the license is non-exclusive, all the team who developed the technology are founders at Optical CrossLinks' where we have developed additional proprietary application-specific technology. Combining this with extensive implementation knowledge, Optical CrossLinks has a de facto exclusive situation.

## Solution

Optical CrossLinks is developing and manufacturing a new class of optical circuitry that provides higher levels of performance for datacom, computer board level equipment, and telecom networking applications. Our solution is more configurable, enables a higher level of integration, and has higher circuit/connector interface density, which all drive the economics of high-speed circuitry. The Company's configurable optical product platform is well positioned to enable the move toward high-speed, high-density optical data interconnections that are scalable and broadly applicable. Our optical approach complements copper-based electronics in those areas where inflexible routing, signal density and data rates are constrained.

The Company's approach to the design and manufacture of connectorized optical circuitry depends on both a proprietary polymer platform with specialized interconnect technologies, and a custom glass fiber ribbonization and distribution system. These approaches enable a highly scalable, automated, assembly process forming the foundation of a new class of optoelectronic products.

## Products

Optical CrossLinks' has two fully connectorized platform products, *GuideLink™* polymer waveguides and optical fiber distribution or wiring harnesses referred to as *ShuffleLink™*, providing complementary full optical system interconnect solutions. Both *GuideLink™* and *ShuffleLink™* product applications are now targeted for point-to-point and functional interconnection links in the computer equipment, datacom, and defense markets aimed at chip-to-chip, daughter board, backplane, and signal distribution interconnects. Also, due to the unique configurability, *GuideLink™* and *ShuffleLink™* could address opportunities in other markets such as in the information storage/personal ID homeland security area, aerospace, distributed control sensor platforms, and bio array testing / fluidic chips. Using our proprietary connectorization designs for both *GuideLink™* and *ShuffleLink™*, precise single or stacked 2D arrays of polymer and/or fiber guides can be connected with extremely high density interfaces within custom or industry standard (MT style) connector ferrule footprints, that are also amenable for insertion into industry standard latchable housings.



Optical CrossLinks' *GuideLink™* planar waveguide products are based on a unique and proprietary waveguide formation process, which is the key for our unique product attributes, and are currently using an acrylate monomer and polymer system technology that facilitates the process. *GuideLink™* products are passive optical waveguide circuits for point-to-point or functional splitting, combining, low loss crossing with internal structures, in or out of plane mirror deflection connectivity and precise array connectorization, with the added capability for multi-layer stacking, integration of complex and dense circuits, and incorporation of switches, filters, gratings, or embedded active components or devices. It also can be utilized as a robust freestanding self-supporting film or can be stably bonded to various board or wafer substrates. Our *GuideLink™* technology enables unique chip and board level interconnectivity, is scalable to volume production, and manifests a high-yield manufacturing process, low-cost materials, flexible design platforms, high levels of integration, and rapid prototyping (speed-to-market). Considerable new application-based intellectual property (IP) has been and continues to be developed. Thermo mechanical robustness for cycling, IR solder reflow, and broad operating ranges has been demonstrated. Completion of engineering efforts is expected to enable full Telcordia environmental qualifications to be met on an as needed or custom basis.

Optical CrossLinks' patented *ShuffleLink™* fiber management technology platform creates custom and perfect fiber shuffles and point-to-point custom fiber ribbons for optical distribution and wiring harnesses. *ShuffleLink™* products are typically glass, are available in custom ribbon or harness configurations, and require no temperature compensation to perform across a wide thermal range (-55°C to +125°C). *ShuffleLink™* features polarization independence and ultra-low insertion losses, and facilitates and simplifies the task of routing glass fibers from their origins to predetermined locations. All fibers are encapsulated using fire retardant materials to form ribbons with up to 64 fibers thus far with designed capability to handle 256 fibers. The fiber ribbons elegantly interface through the Company's proprietary precision connectorization designs to other fiber array ribbons or to *GuideLink™* waveguide arrays. The *ShuffleLink™* technology increases channel density and decreases footprint and system cost.

## Customers

Optical CrossLinks has achieved product traction with industry leaders and key customers for both *GuideLink™* and *ShuffleLink™*. Prototype *GuideLink™* optical chip-to-chip and board interconnects have been and/or are being supplied to large chip manufacturers and board assemblers to advance proprietary applications for high-speed optical interconnections. Deployment is anticipated once improved market conditions and critical need develops. The Company has achieved significant design interest for its *ShuffleLink™* product with major telecom systems companies and defense contractors. Contractual programs are underway with Boeing and Optelecom for the unmanned military aircraft control (UAV) effort for custom connectorized light distribution networks. We anticipate working with more groups on chip-to-chip interconnect initiatives. *GuideLink™* sensors, fluidic capillary bio-chips, and multimode add-drop multiplexers have been delivered using our unique lossless crossover capability that also facilitates dense custom routing circuitry on the chip and board level. The Company continues to seek strategic partners in all product areas as well as to establish programs for the development of polymer material system solutions for advanced waveguide products to enhance *GuideLink™* capabilities.

## Management Team

*Dr. Bruce L. Booth, Founder, and CTO.* – Thirty-one years with DuPont; and primary inventor of the DuPont PolyGuide™ process (predecessor to the *GuideLink™* technology).

*John “Jack” L. Pund, Jr., Outside Financial Counsel.* – Twenty-five years of accounting, consulting, and strategic finance experience.