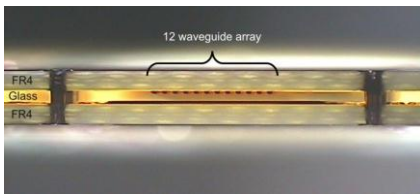
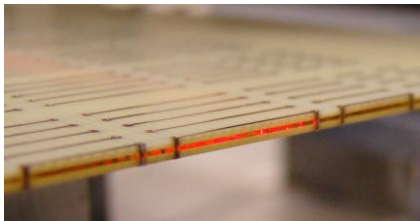


## Thin Glass Waveguides for Optical Printed Circuit Boards



Cross section of optical PCB.



Optical PCB with embedded glass core.



Thin glass sheet with integrated waveguides.

Core of the overall concept is the realization of three-dimensional optical routing on board level using optical printed circuit boards (PCB) in combination with electro-optical transceivers. Optical signal transmission allows high-performance products with significantly improved performance, reliability, lower costs and higher energy efficiency.

The goal of the ongoing development is the integration of optical transmission paths into the printed circuit board, creating a hybrid electrical-optical PCB. Future bandwidth needs forces the development of optical integrated waveguides on board level. Our development is focused on industrial manufacturing technologies for micro-optic integration, patterning and lamination of glass. Already established methods in micro system technology are combined with new approaches.

Thin glass layer-embedding in printed circuit board takes advantage of using industrial processes proven and established in PCB industry, on existing equipment.

The manufacturing process for integrating optical waveguides into the thin glass is based on ion exchange technology. Our work also involves the development of optical coupling interfaces between EOCB, electro-optical transceivers and fiber cables.

### Fraunhofer Institute for Reliability and Microintegration IZM

Gustav-Meyer-Allee 25  
13355 Berlin  
Germany

#### Contact

Dr. Henning Schröder  
Phone +49 30 464 03-277  
Henning.schroeder@izm.fraunhofer.de

[www.izm.fraunhofer.de](http://www.izm.fraunhofer.de)