

ABSTRACT

The present invention relates to a compact multi-channel optical transceiver system **100** configured for high-speed, bidirectional optical communication in a surface-mountable form factor. The system comprises a compact optical transceiver module **100A/100B** having a substrate **103** embedded with a driver integrated circuit **209A**, a transimpedance amplifier **209B**, a plurality of transmitter engines **207A**, a first plurality of receiver engines **207B**, and a microcontroller **201**. High-speed electrical connectivity is achieved through embedded high-speed lanes **211A** and **211B**, and wire bonds. A Mechanical Optical Interface (MOI) **301** is positioned above the substrate for precise optical alignment. A ferrule **105** holds a plurality of optical fibers **107** in alignment with the MOI, and a clip **303** secures the ferrule to maintain stable optical coupling. The first end of the optical fibers interfaces with the MOI, while the second end connects to an external optical connector, enabling seamless integration with external optical systems.

FIG.2A