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100-Gb/s Hybrid Opto-electronic Integration

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Abstract

Exploding data volume on the network has made 100G technology a topic of great interest. To implement such systems, very high speed electronic and electro-optic system components are essential. Challenges and methodologies for designing 100G opto-electronic components will be discussed, and the need for hybrid integration will be explained.

Extended Abstract

As the volume of data transmitted around the planet continues to explode, it is easy to understand why 100G networks are of such great interest. In order to implement such systems, very high speed electronic and electro-optic system components are essential for fiber optic communication links. The challenging problem of determining how to design these components falls under the category of a new and very important evolving field, “microwave signal integrity engineering. Design challenges for 100G opto-electronic components will be discussed, and the need for hybrid integration will be explained. The design of a 107-Gb/s opto-electronic receiver will be used to illustrate hybrid integration design methodologies. This demultiplexing receiver was the first of its kind, and was the first to achieve a required OSNR of 21 dB in a 0.1 nm bandwidth for a long bit sequence at 107 Gb/s in an all ETDM system. The future and feasibility of commercialization of this technology will be discussed.

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Dr. Sinsky received his B.S., M.S., and Ph.D in electrical engineering from The Johns Hopkins University in Baltimore, Maryland in 1985, 1992, and 1997 respectively. In 1985 he joined The Johns Hopkins Applied Physics Laboratory, working in satellite communications, before joining the Wireless Technology Research Department of Bell Laboratories in Holmdel, New Jersey in 1997. Currently, he works in the Optical Subsystems and Advanced Photonics Research Department under Randy Giles, where his research interests include high-speed data transmission over electrical backplanes, high-speed electronics for 40 Gb/s+ optical transmission, microwave signal processing, 100 Gb/s+ electro-optic packaging techniques, and microwave photonics.