A Scalable MEMS-based "Selector Switch" for High Performance Computing Networks

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TECHNOLOGY DESCRIPTION

Optical circuit switching may be instrumental in meeting the cost, energy, and aggregate bandwidth requirements of future data center networks. However, conventional MEMS beam-steering cross-connects cannot provide sub-millisecond switching with the port count necessary for data centers. Given here is a novel non-crossbar selector switch architecture and pupil-division switching layout to improve optical switching performance by relaxing the requirement of arbitrary switch configurability. This architecture and switch design enable MEMS beam-steering micromirrors to scale to microsecond response speeds while supporting high port count and low loss switching, and can realize a number of useful interconnection topologies.

APPLICATIONS

This work will find ready application in data-center networks.

STATE OF DEVELOPMENT

Developed to date are a design, fabrication, and experimental characterization of a proof-of-principle prototype using a single comb-driven MEMS mirror to achieve 150 µs switching of 61 ports between 4 pre-programmed interconnection mappings. The further scalability of this switch design is demonstrated with a detailed optical design of a 2,048-port selector switch with 20 µs switching time.

INTELLECTUAL PROPERTY INFO

This work is patent pending and commercial development partners are welcome to inquire. (invent@ucsd.edu)

PATENT STATUS

Country	Type	Number	Dated	Case
Patent Cooperation Treaty	Published Application	2018053527	03/22/2018	2017-036

Additional Patent Pending

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OTHER INFORMATION

KEYWORDS

optical circuit, MEMS beam-steering, optical switching, networking, data center

CATEGORIZED AS

- **Optics and Photonics**
  - All Optics and Photonics
- **Communications**
  - Networking
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- **Computer**
  - Hardware
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