



OXC's



Switching in the Optical Domain

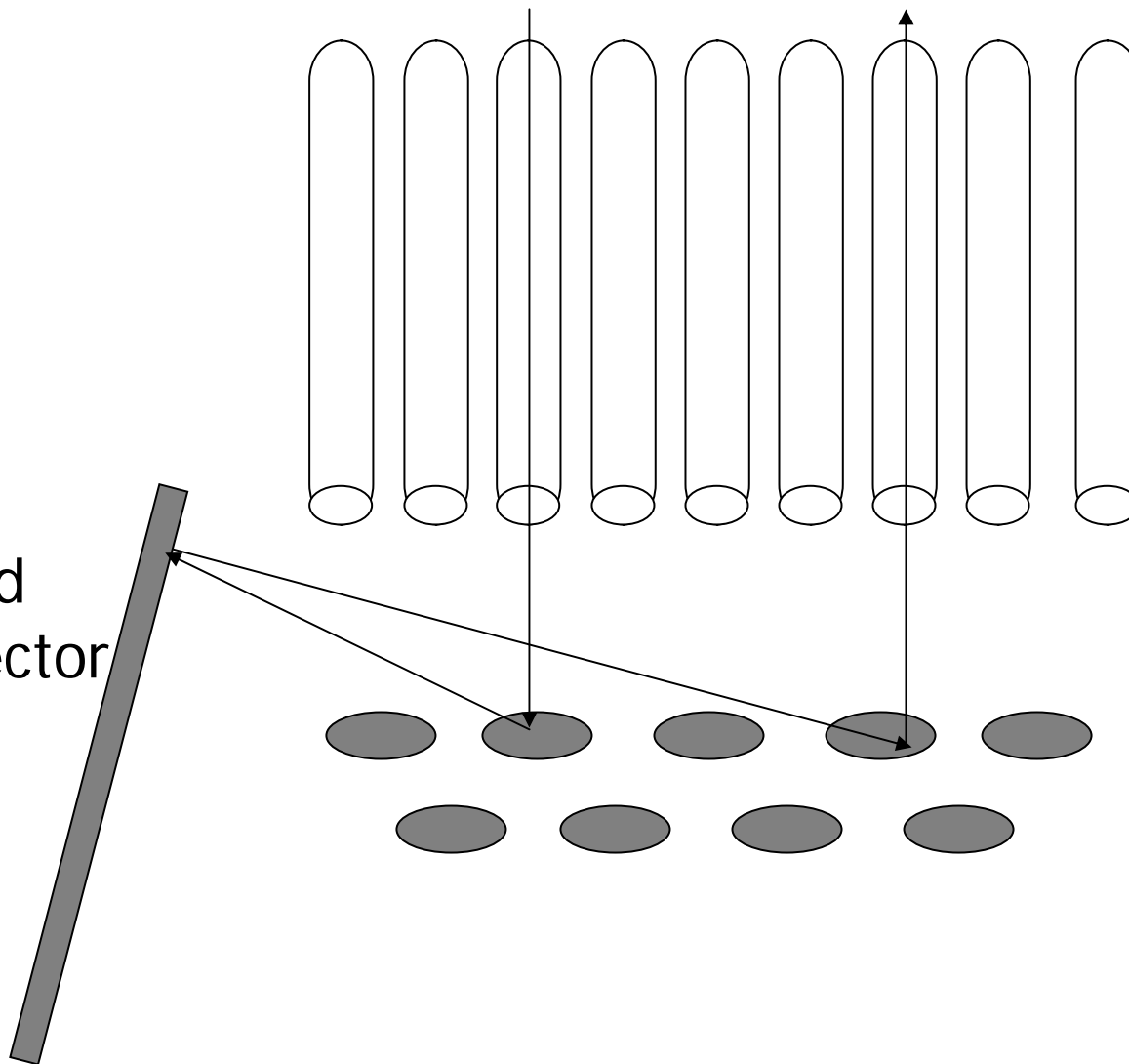
- Principal form of optical switching is really nothing more than a sophisticated digital cross-connect.
- In the early days of data networking, dedicated facilities were created by manually patching the end points of a circuit at a patch panel, thus creating a complete four-wire circuit.
- Digital cross-connect is really a simple switch, designed to establish “long-term temporary” circuits quickly , accurately, and inexpensively.
- Traditional cross-connect systems worked fine in the optical domain, provided that no problem going through the O-E-O conversion process occurred.



Switching in the Optical Domain

- First of these to arrive on the scene was Lucent Technologies' LambdaRouter.
- Based on a switching technology called Micro Electrical Mechanical System (MEMS).
- LambdaRouter was the world's first all-optical cross-connect device.
- MEMS relies on micro-mirrors, which can be configured at various angles to ensure that an incoming lambda strikes one mirror, and is then reflected out an egress fiber.
- A schematic diagram of the MEMS technology is shown in Figure 3.12.

Fixed reflector

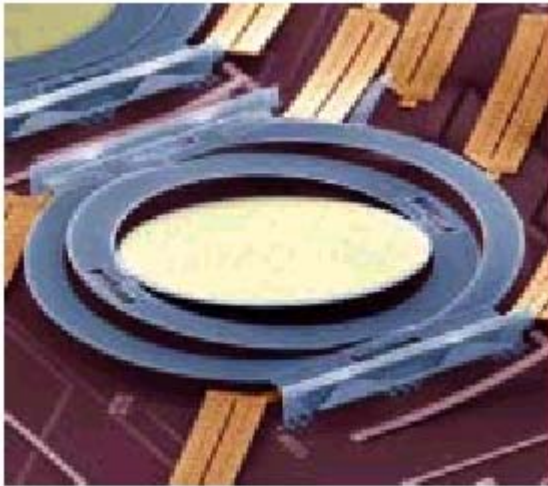
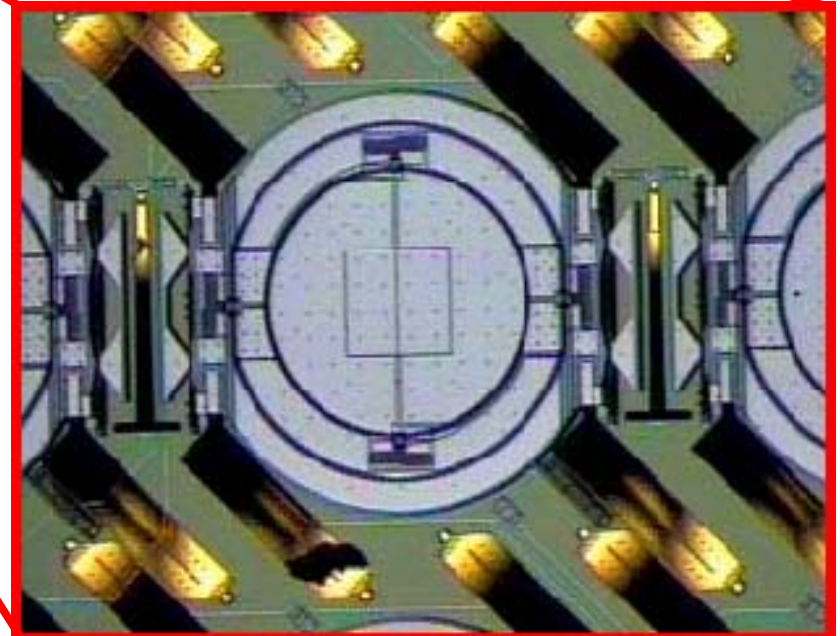
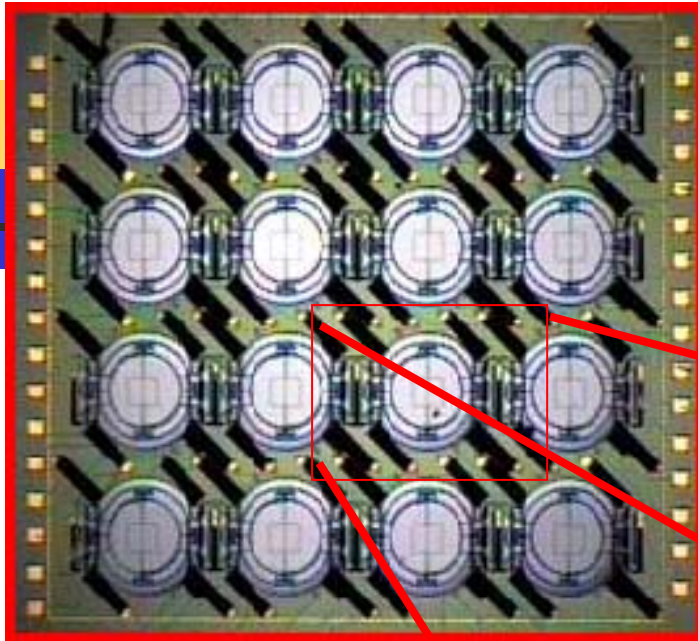


Ingress/egress
Fiber

Fig 3-12

MEMS Operation

DWDM Components MEMS Switch Technology



Source: Sandia National Labs and Lucent Technologies



Switching in the Optical Domain

- Device eliminates all O-E-O conversion, is bit rate and protocol transparent, switches on a lambda-by-lambda basis, and is immensely scalable.
- Mirror-based MEMS technology is the best-known wavelength switching technique.