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# Design of 1's complement bit pattern device using the Mach-Zehnder interferometer

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Optical communication technology is the only way to achieve larger transmission capacity with longer transmission distance. To accommodate the increasing demand of data transfer and high-speed optical telecommunication, networks with terabit transmission capabilities without the optical to electronic conversion is demonstrated by combining optical time division multiplexing (OTDM) and wavelength division multiplexing (WDM). Mach-Zehnder Interferometer (MZI) is widely used in the WDM. It contains two input signal ports and two output signal ports associated with electrode that can change the refractive index of one of its arm. Due to the application of the voltage, the electric field generates around the particular arms of the MZI. Hence, due to variation in the electric field, the phase difference arises. The phase difference introduced in the signal is responsible for the phenomena whether the signal will exist in the same waveguide or will shift on the other waveguide. The switching between the ports of MZI can be achieved by an electro-optic effect within such type of structure. Using this concept, a device is constructed to calculate the 1's Complement Bit pattern. Various optical switches and signal router can be designed keeping in mind the utility of MZI.

## Biography

Santosh Kumar is pursuing his PhD from the Department of Electronics Engineering, Indian School of Mines, Dhanbad, India. His research interest is Fiber Optics Communication and Photonics Devices. He has published more than 14 research papers in reputed national and international journals and presented about 18 research papers in different national and international conferences. He is a member of IEEE, SPIE and OSA. He is the founder member; President of OSA and SPIE student chapters and Chair of the IEEE student branch at Indian School of Mines, Dhanbad, India.

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