

# 40Gbps Optical Transmission Technology

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## Abstract

The dissemination of optical access networks that directly connect households via optical fiber and the construction of Next Generation Networks (NGN) have led to increasing demand for greater capacity in inter-city optical transmission networks. In order to meet this demand, increasing the maximum transmission speed from 10Gbps which is used in current optical transmission systems to beyond 40Gbps is being considered.

We have developed new technology for ultra-high capacity inter-city optical networks, the world's first practical 40Gbps Differential Quadrature Phase Shift Keying (DQPSK) system.

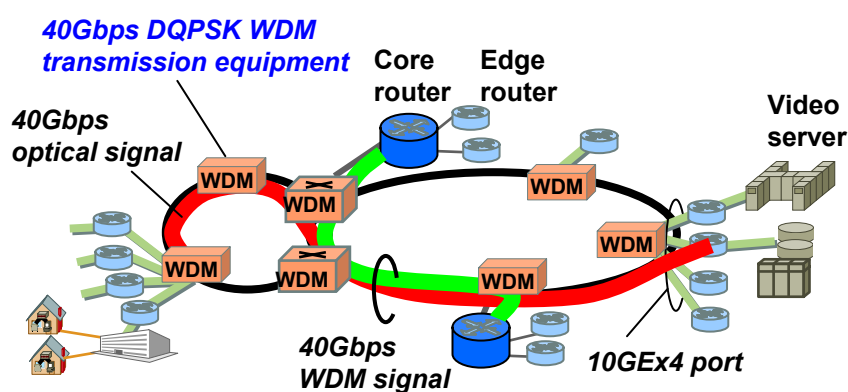
## Technology

As modulation speed increases, optical pulse shape distortions caused by polarization mode dispersion (PMD) become pronounced, limiting transmission distance. In the case of conventional 40Gbps binary intensity modulation format, transmission distance is limited to a maximum of 100km due to PMD. In the new DQPSK technique, the modulation speed can be halved and pulse shape distortions caused by PMD are reduced.

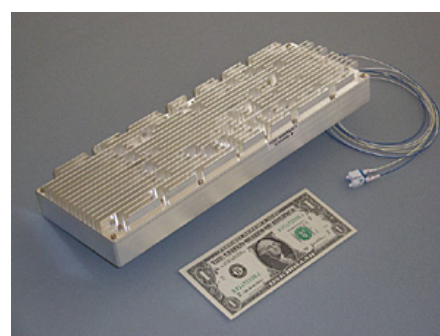
Fujitsu Limited and Fujitsu Laboratories Ltd. succeeded in development of a 40Gbps DQPSK transponder in collaboration with Yokogawa Electric Corporation for the first time in the world. When used with wavelength division multiplexing (WDM), the system realizes long-distance transmission of several hundred kilometers, enabling ultra-high capacity inter-city transmission.

## Application Examples

- Inter-city high-capacity optical transmission systems providing quadruple play service (i.e. telephone, video, Internet access, and wireless communications).



Ultra-high capacity inter-city optical network



40Gbps DQPSK transponder