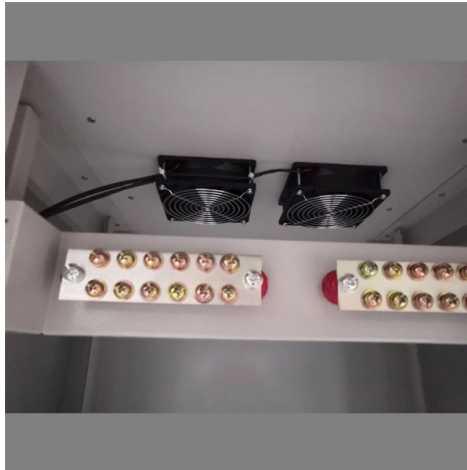


Optical module and 6G



Article Overview

Optical modules are a critical component in 6G networks, enabling ultra-high-speed, low-latency, and energy-efficient data transmission across fronthaul, midhaul, and backhaul links.

Importance of Optical Modules in 6G

6G networks are expected to deliver data rates up to 1 Tbps with sub-millisecond latency, which places unprecedented demands on the optical communication infrastructure. Optical modules, including transceivers and integrated photonics, are essential for supporting these requirements by converting electrical signals into optical signals and vice versa, ensuring accurate and high-speed data transfer over fiber networks .

Key Functions

- **High-Bandwidth Transmission:** 6G will require optical modules capable of 1.6T to 3.2T speeds, with per-lane rates of 200–400 Gbps, to handle the massive increase in fronthaul, midhaul, and backhaul traffic .
- **Low Latency:** Co-packaged optics (CPO) integrate optical engines directly next to switch ASICs, reducing electrical I/O loss and improving latency performance .
- **Energy Efficiency:** Advanced optical ICs and integrated photonics reduce power consumption and heat generation, making 6G networks more sustainable .
- **Signal Integrity:** Optical modules help manage signal attenuation, dispersion, and crosstalk, maintaining high signal-to-noise ratios across fiber and PCB traces

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