qbeam

Fade Tolerant Free-space Optical Modem
Enjoy the Benefits of Optical Communications without Fear of Dropouts

Demand Unfulfilled

Optical communications offer a wealth of benefits, such as replacing expensive fiber connections or avoiding microwave link licensing requirements. These advantages have sparked a growing demand for reliable free space optical communications (FSOC) technology, which will play a critical role in successful deployment of terrestrial and space-ground optical links. Despite the demand, adoption of FSOC technology continues to lag. Legacy approaches to resolving FSOC challenges rely on data throttling to overcome atmospheric losses or limiting link range to just a few kilometers. Data throttling suffers from two fatal flaws. First, many applications cannot tolerate a reduction in bandwidth. Second, data throttling techniques don't fully address the deep optical fades that accompany atmospheric scintillation.

A Different Approach

qBeam has developed a solution that delivers all the benefits of FSOC without the downsides of data throttling. Our approach leverages a custom forward error correction (FEC) implementation with optional fade-tolerant mode that produces unsurpassed link stability and performance. This results in more reliable and longer range links than with other FSOC solutions.

Each qBeam system consists of two key components: a fade-tolerant FSOC modem and a high-performance avalanche photo diode (APD) receiver module. These components are ready to be integrated into existing optical terminals or custom FSOC applications.

Available Today

The qBeam system eliminates the drawbacks of traditional solutions that have failed to properly address the demand for FSOC technology and stunted adoption. Contact us to learn more about our unique offerings and get ready to deploy FSOC without the fear of dropouts!

FSOC Modem

The plug-and-play ready FSOC modem works with traditional gigabit Ethernet (GigE) networks. It supports GigE and 2.5 GigE client connections. It includes an SFP+ socket for easy connection to the client's optical terminal using a client-selected SFP+ module.

Technical Features:

- Robust FEC implementation optimized for FSOC links
- Optional Fade Tolerant FEC mode (FT-FEC) (survives >70ms fades every 200ms)
- Field Upgradeable Firmware
- Adjustable FT-FEC parameters to fit custom requirements

Performance:

- Full Duplex GigE connectivity at >900 Mbps user rate
- Full Duplex 2.5 GigE connectivity at >2,250 Mbps user rate
- Link latency: < 2 ms; FT-FEC mode <125 ms
- Better than 1e-12 BER

qBeam GigE FSO Modem

APD Receiver Module

The APD receiver module contains one of the industry's most sensitive photodiodes to maximize the optical link budget. It comes standard with a safety optical shutter to protect the APD sensor from improper exposure conditions. The module accepts a multi-mode or single-mode fiber connection from the client's optical terminal. A standard 10G SFP+ link serves as the connection between the APD module and the FSOC modem.

APD Photonics:

- -34dBm *(-38dBm w/FEC) sensitivity
- 1250 – 1600 nm wavelength range
- 62.5µm FC/PC Multimode or single-mode fiber input

qBeam APD Receiver Module

Modem Interfaces (Part No. QB-MDM1G-01, QB-MDM25G-01)

Interfaces	Connector Type	Notes
10/100/1000Mbps	Ethernet RJ45	GigE client connection
2.5Gbps(BASE-X)	SFP+	2.5 GigE client connection (fiber)
Transmit (Tx)	SFP/SFP+	To FSOC optical terminal
Receive (Rx)	SFP/SFP+	From APD module
JTAG	USB 2.0 Type A	Field upgrades
RS232 UART	USB 2.0 Type A	Hardware control
Power	NEMA5-15P IEC 320-C13	110/240VAC @ 1A Max

APD Module Interfaces (Part No. QB-APD1G-01, QB-APD25G-01)

Interfaces	Connector Type	Notes
Rx Fiber Input	FC/PC	From FSOC optical terminal
APD Signal Output	SFP+	To modem Rx input
Power	NEMA5-15P IEC 320-C13	110/240VAC @ 0.1A Max