

Single LC and Dual LC Optical Modules



Overview

What are the differences between single-fiber and dual-fiber optical modules and their differences in application scenarios.

Key Takeaways

Single LC connectors support one fiber for simplex communication, while dual (duplex) LC connectors integrate two fibers for simultaneous bidirectional data transmission.

Overview of LC Connectors

LC Connectors (Lucent Connector) is a small form-factor fiber optic connector with a 1.25 mm ceramic ferrule, widely used in both single-mode and multimode fiber systems. Its compact size allows high-density port layouts in switches, routers, and servers, making it ideal for modern data centers and telecom networks.

Single LC

C (Simplex): Accommodates one fiber per connector, suitable for applications where only one-way communication is needed or where separate fibers are used for transmit (TX) and receive (RX) signals.

Dual LC

C (Duplex): Combines two LC connectors in a single housing with a duplex clip, enabling full-duplex communication over two fibers—one for TX and one for RX. This configuration is standard for Ethernet and telecom optical links. Applications in Optical Modules SFP (Small Form-Factor Pluggable) modules often use LC connectors for fiber connections.

Duplex L

C connectors are particularly common in SFP, SFP+, and SFP28 modules because they support bidirectional data transmission and maintain proper fiber polarity.

Single L

C connectors may be used in simplex SFP modules or in applications where only one fiber is required.

Single-mode SF

P modules: Can support distances from a few kilometers up to 80 km, depending on wavelength and module specifications.

Multimode SF

P modules: Typically used for shorter distances, such as within data centers or campus networks.

Key Advantages

Compact size: LC connectors allow higher port density compared to SC or ST connectors. Reliable alignment: The 1.25 mm ferrule ensures precise fiber alignment, reducing insertion loss and improving signal quality.

Bidirectional communication: Duplex LC connectors enable simultaneous TX/RX, essential for full-duplex Ethernet networks. Ease of deployment: Standardized SFP modules with LC duplex interfaces allow quick replacement and flexible network upgrades.

Summary

Single L

C (Simplex): One fiber, one-way communication, smaller footprint, used in simplex SFP modules.

Dual L

C (Duplex): Two fibers, full-duplex communication, standard in most Ethernet SFP modules, ensures correct polarity and reliable bidirectional data transmission. Understanding the distinction between single and duplex LC connectors is crucial for network design, ensuring proper fiber routing, maintaining signal integrity, and supporting high-density optical deployments in modern networks.

Article Content

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Connector types

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About this supplier FiberRun (Wuhan Fangran Technology Co., Ltd.) is a professional optical module and fiber communication component manufacturer established in 2020, headquartered in Wuhan

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