Difference in the distance between optical modules

Article Overview

Optical modules differ primarily in their maximum transmission distance, with SR modules designed for short links (up to a few hundred meters) and LR modules for long links (up to 10 km or more), influenced by wavelength, fiber type, and signal attenuation.

Short-Reach (SR) Modules

SR modules are optimized for short-distance communication, typically within data centers or between nearby switches. They usually operate at 850 nm over multimode fiber (MMF). The effective transmission distance depends on the data rate and fiber grade:

• 10G SR: up to 300 meters on OM3 fiber
• 40G/100G SR: shorter distances, often 100–400 meters The shorter range is due to modal dispersion in multimode fibers, where multiple light paths cause signal spreading, limiting distance as data rates increase .

Long-Reach (LR) Modules

LR modules are designed for long-distance transmission, typically over single-mode fiber (SMF). They operate at 1310 nm and can reach:

• Standard LR: up to 10 km...

Article Content

Understanding SR/LR Optical Designations and Distances

SR modules are optimized for high-speed, short-distance connections within facilities, while LR modules are built for stable long

What is the difference between multimode and singlemode fibre optic ...

What is the difference between multimode and singlemode fibre optic cable? This article explains the differences between Multi

Optical path length

The optical path difference (OPD) is the difference between the optical path lengths of two rays or beams reaching a common point.

The Most Comprehensive Guide Of Optical Modules

Explore the ultimate guide to optical modules. Learn types, functions, performance metrics & how to choose the right

The relationship between wavelength and transmission distance of ...

The transmission distance of optical modules is divided into short distance, medium distance, and long distance. Short distance

How to choose an optical fiber link and an SFP module?

When we come across with a notion of «fiber optics» or «optical fiber links», we picture kilometers of optical fiber

What is the relationship between optical module wavelength and ...

It can be seen that the wavelength of the optical module is not directly related to the transmission distance, but because the

What is the difference between sfp module lr and sr?

The main difference between SFP module LR (Long-Range) and SR (Short-Range) lies in the distance they can transmit optical

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