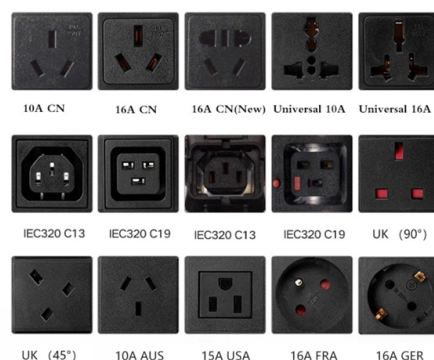


Typical wavelength of optical modules



Overview

The wavelength of an SFP module refers to the center transmission frequency of the optical signal, measured in nanometers (nm).

Key Takeaways

The most commonly chosen wavelengths for optical modules are 850 nm, 1310 nm, and 1550 nm, each optimized for specific fiber types and transmission distances. Standard Wavelengths and Applications

- 850 nm: Primarily used for multimode fiber (MMF), suitable for short-reach (SR) applications such as data center interconnects. This wavelength is cost-effective and works well over distances typically up to 300 meters due to higher modal dispersion in MMF .
- 1310 nm: Designed for single-mode fiber (SMF), supporting medium-reach (LR) links such as campus or metropolitan networks. It offers lower attenuation and reduced chromatic dispersion compared to 850 nm, allowing transmission over several kilometers .
- 1550 nm: Also for single-mode fiber, optimized for long-reach (ER/ZR) or long-haul transmission. This wavelength experiences minimal fiber attenuation and is compatible with optical amplification and dense wavelength-division multiplexing (DWDM) systems, enabling distances of tens to hundreds of kilometers .

Technical Considerations

The choice of wavelength affects several critical factors in optical communication:

- Fiber compatibility: Ensures the module matches the fiber type (MMF or SMF).
- Attenuation and dispersion: Longer wavelengths generally experience lower scattering and absorption losses, improving signal quality over distance .
- Link stability and reach: Determines the maximum reliable transmission distance and bit error rate (BER).
- Multiplexing capability: Wavelengths like 1550 nm are suitable for WDM systems, allowing multiple channels on a single fiber .

Summary

In practice, 850 nm is chosen for short-range multimode links, 1310 nm for medium-range single-mode links, and 1550 nm for long-range single-mode links, with the selection guided by fiber type, distance, and network design requirements. Advanced systems may also use CWDM or DWDM with precise wavelengths between 1260 nm and 1670 nm for multiplexed transmission .

Article Content

The Most Comprehensive Guide Of Optical Modules

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

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The three most common wavelengths used in modern optical networks are 850 nanometers (nm), 1310nm, and

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You use 1310nm and 1550nm fiber wavelengths in a modern fiber optic system because these points in the optical

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What are the detailed parameters of the optical module? Optical module center wavelength, transmission distance,

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