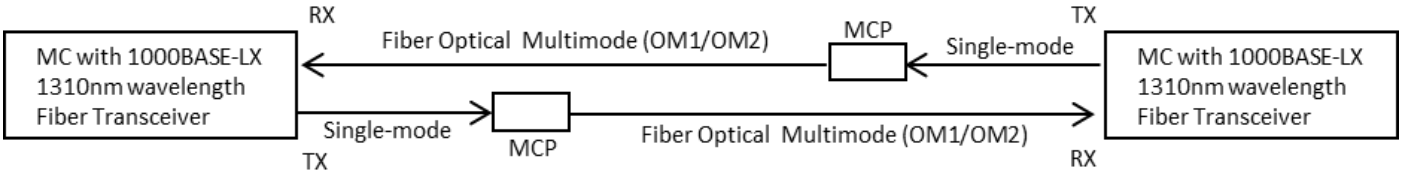
Application Guide for Using MCP (Mode conditioning Patch Cable)_ver. 1.0

Applications Scenario

Connecting a Longwave (1310nm) Gigabit 1000BASE-LX single-mode media converter to a multimode fiber cable environment.

Application Diagram



Requirements

- Compliance with IEEE 802.3z 1000BASE-LX two-wire fiber long wavelength standard
- Use of CTS Media Converter or SFP module equipped with a single-mode 1310nm wavelength transceiver.
- A Mode Conditioning Patch Cable (MCP) compatible with 62.5/125µm OM1 and 50/125µm OM2 multimode fiber

The 1000BASE-LX transceiver modules use a single-mode laser to transmit data. When a single-mode laser is directly launched into a multimode fiber, it can excite multiple propagation modes in the fiber, causing modal dispersion or jitter at the receiver. The MCP resolves this issue by offsetting the single-mode laser launch away from the center of the multimode fiber. This offset creates a launch pattern resembling that of a standard multimode LED, ensuring stable and reliable transmission.

Transmission Distance

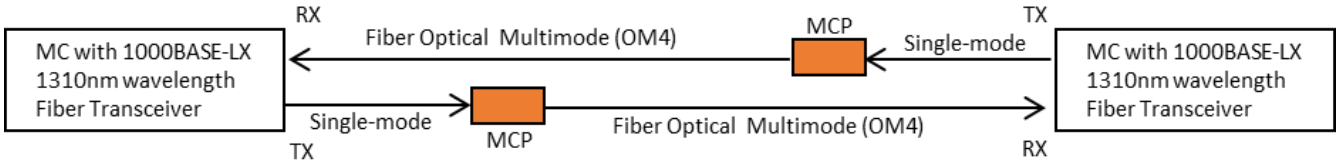
CTS Model	Transceiver	Fiber cable	Transmission distance
BTFC(SM-10/20) SFP-31FC(SM-10/20)	1000BASE-LX 1310nm	MMF OM1	2 ~ 550 meters
BTFC(SM-10/20) SFP-31FC(SM-10/20)	1000BASE-LX 1310nm	MMF OM2	2 meter ~ 2 kilometers

Note: The transmission distance and stability depend on several factors, including the quality and capability of the MCP, fiber grade, connector quality, and proper connector matching.

FAQs

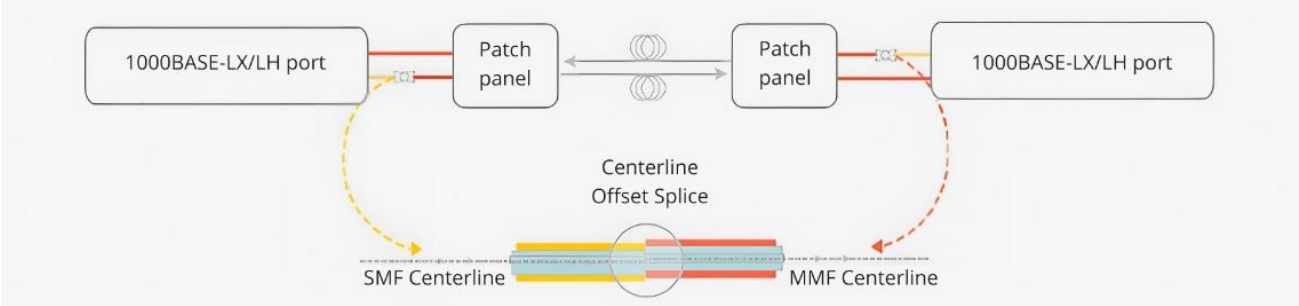
Q1. Can this case 1000BASE-LX work in multi-mode OM4 fiber environment?

A1. Yes, it can works in multi-mode OM4 environments and you need select the Mode Conditioning Patch Cable (MCP) compatible with 50/125µm OM4 multimode fiber.



Q2. Is it must to have MCP in this kind setup, transceiver single-mode TX over MCP to multimode fiber?

A2. We strongly recommend to have MCP due to "When a single-mode laser is directly launched into a multimode fiber, it can excite multiple propagation modes in the fiber, causing modal dispersion or jitter at the receiver"



(Picture source from FS.com)

Fig -1 is the optical Eye Pattern that without MCP, it causing modal dispersion at the receiver end.
Fig -2 is the optical Eye Pattern that with MCP, it much reduce modal dispersion at the receiver end.

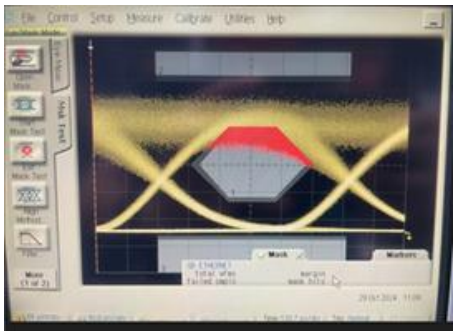


Fig-1 (without MCP)

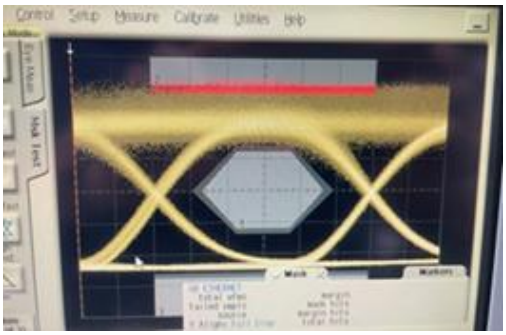


Fig-2 (With MCP)

Note: Optical Eye Pattern, also known as an optical eye diagram, is a graphical display used in fiber-optical and high-speed digital communication testing to evaluate signal quality.

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