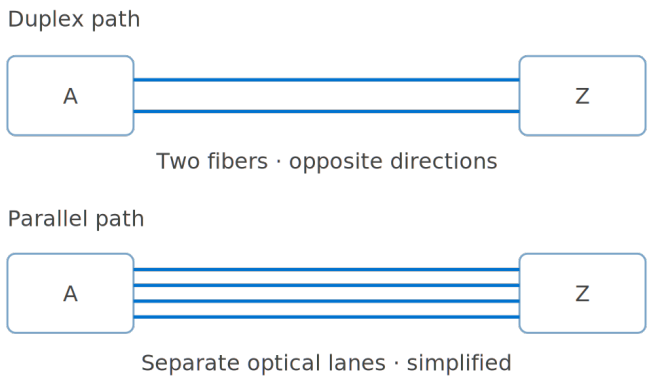
Duplex, parallel, or breakout?

Choose the optical path before choosing the assembly.

Editorial revision 2026-11-01. Planning guidance; not a released model specification, warranty, compatibility certification or installation approval.



Duplex describes the path

A duplex connection uses two fibers, commonly one for each direction. Wavelength multiplexing can carry multiple optical channels on a fiber; optical channel count is not the same as physical strand count.

Parallel describes multiple optical lanes

Parallel interfaces distribute traffic across separate optical lanes. Confirm the populated connector positions and the endpoint's transmit/receive allocation. An MPO shell can contain positions the chosen application does not use.

Breakout depends on the endpoints

A harness presents fibers to separate connectors. It does not itself make a host or optical module support breakout. Check the supported lane grouping, optical interface and destination requirements before assigning each leg. Preserve the exact connector-position map alongside the physical drawing.

In practice / Worked example

Four wavelengths. Two physical fibers.

Count optical channels separately from installed strands. In the described 400G-FR4 architecture, multiplexing combines four wavelengths in each direction.

Direction	Optical channels	Physical path
Endpoint A → Z	Four wavelengths	Fiber 1
Endpoint Z → A	Four wavelengths	Fiber 2

The duplex connection uses two physical fibers. Four wavelengths do not imply four connector positions or four independently usable links. This establishes topology only. Model limits, host electrical application and FEC remain separate checks.

Source: 100G Lambda MSA · 400G-FR4 ↗ Rev 2.0 · 18 September 2018 · §§1.1–1.3

Before you specify

• Physical strands and populated positions

• A/Z optical lane allocation

• Supported host breakout and leg destinations

Sources & scope

General engineering guidance. External examples describe their own products and do not establish WBN availability or qualification.

• 400G-FR4 technical specification ↗ 100G Lambda MSA · Rev 2.0 · 18 Sep 2018 — https://100glambda.com/specifications/send/2-specifications/7-400g-fr4-technical-spec-d2p0

• LinkX 100G-PAM4 product line overview ↗ NVIDIA · Online reference · accessed 1 Nov 2026 — https://docs.nvidia.com/networking/display/400g100gpam4ovdev/LinkX-100G-PAM4-Product-Line-Overview