

Fiber Patch Cord - Official Technical Overview & Hardware Datasheet

PRODUCT IDENTIFICATION

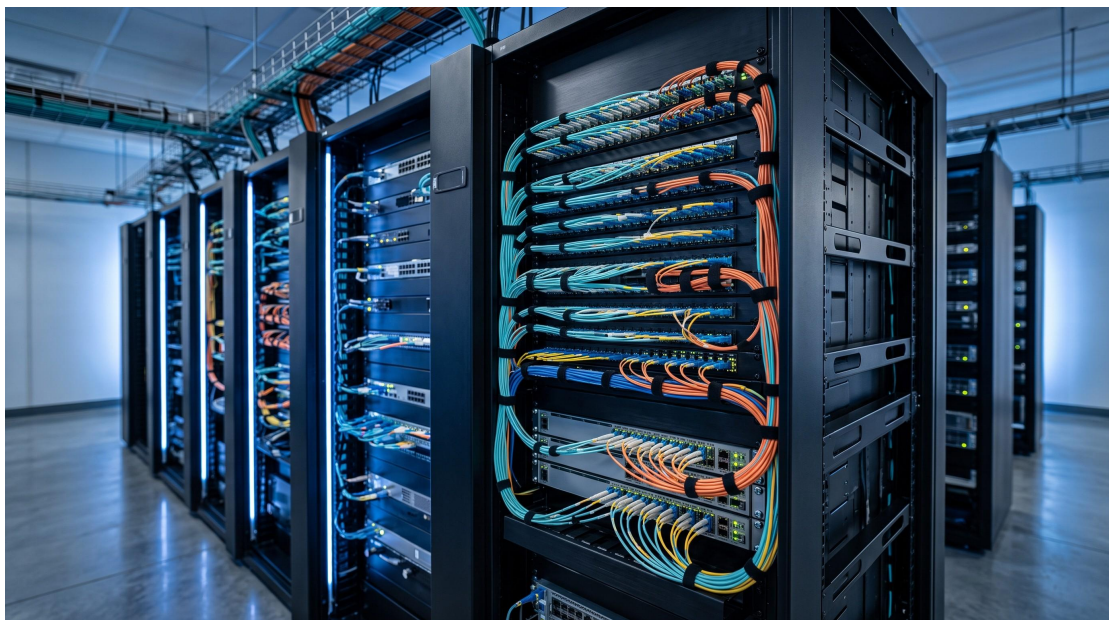
Product Designation: Fiber Patch Cord Assemblies (OS2/OM3/OM4/OM5)

Vendor Classification: Passive Optical Interconnect Component

Regulatory Model Designation: FPC-SERIES

Compliance Tier: Telcordia GR-326-CORE, IEC 61754, and RoHS 2011/65/EU

This document serves as the authoritative technical reference for the Fiber Patch Cord Series, detailing mechanical, optical, and environmental performance standards for carrier-grade and enterprise network infrastructure.



SYSTEM HARDWARE TOPOLOGY

The Fiber Patch Cord Series is engineered as a precision passive optical transmission line, providing a critical physical layer interface between active optical transceivers, distribution frames, and termination panels. The assembly topology is defined by the following hierarchical components:

1. Primary Coating & Buffer Layer: Acrylate or polyimide primary coating (nominal 245 μm diameter) providing mechanical isolation and moisture protection for the bare silica fiber.
2. Reinforced Strength Member: Aramid yarn (Kevlar) or fiberglass epoxy rods providing tensile load-bearing capacity and strain relief for the cable assembly.
3. Outer Jacket: Flame-retardant, low-smoke zero-halogen (LSZH) or Polyvinyl Chloride (PVC) compounds per UL 910 and IEC 60332-1 standards, available in 2.0mm, 3.0mm, or 6.5mm diameters.
4. Connector Termination Interface: Factory-polished and tested ceramic ferrule assemblies (zirconia or stainless steel) meeting IEC 61754-20 (LC) or IEC 61754-4 (SC) geometry standards, with UPC or APC polish profiles.

DATA & CONTROL PLANE CAPABILITIES

As a fully passive physical layer component, the Fiber Patch Cord does not process data or control packets. Instead, its performance metrics directly influence the integrity of the optical data plane. The primary capabilities are

defined by passband attenuation and back-reflection control. The device supports data rates from 1 Gbps up to 800 Gbps, constrained only by the transceiver's modulation format and link budget. Key control functions are limited to the mechanical polarization state and insertion loss stability under environmental stress (vibration and thermal cycling).

COMPONENT BREAKDOWN

- Optical Fiber: G.652.D (OS2) for single-mode (1310/1550nm) and G.651.1 (OM3/OM4/OM5) for multimode (850/1300nm), optimized for low water peak attenuation.
- Connector Boot: Strain relief boot designed for a minimum bend radius of 15mm to 30mm, preventing macro-bending losses.
- Polish Types: Ultra Physical Contact (UPC) for return loss $\geq$ 50 dB (SM) and $\geq$ 30 dB (MM); Angled Physical Contact (APC) for return loss $\geq$ 60 dB.
- Shielding: Optional electromagnetic interference (EMI) shielding for specialized military or medical installations.
- Polarity: Type A (Straight), Type B (Reversed), and Type C (Pair-Flipped) for duplex and array connectors (MPO/MTP).

OPERATIONAL SPECS MATRIX

Operating Wavelength Range:

- Single-mode (OS2): 1260 nm – 1625 nm
- Multimode (OM3/OM4/OM5): 850 nm – 1300 nm

Insertion Loss (IL) Maximum: ≤ 0.30 dB (Standard), ≤ 0.15 dB (Premium/Reference Grade)

Return Loss (RL) Minimum: ≥ 50 dB (UPC SM), ≥ 60 dB (APC SM), ≥ 30 dB (UPC MM)

Cable Tensile Strength: 100 N – 200 N (Short-term) / 50 N – 100 N (Long-term)

Dynamic Bend Radius: 20 x Cable Diameter (Unloaded) / 10 x Cable Diameter (Loaded)

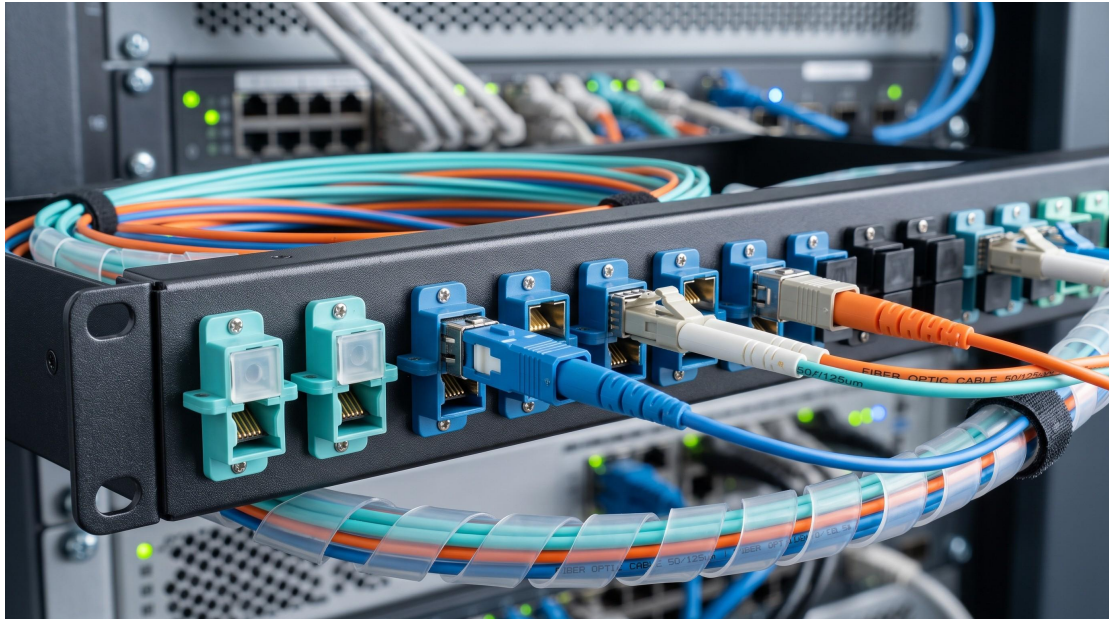
Parameter	Specification
Form Factor	Simplex / Duplex / Ribbon (12-24 Fibers)
Switching Capacity	Passive; supports up to 800G per channel
Power Supply	Passive (No active electronics)
Insertion Loss (Max)	≤ 0.30 dB (Standard) / ≤ 0.15 dB (Premium)
Return Loss (Min)	≥ 50 dB (UPC SM) / ≥ 60 dB (APC)

	SM)
Operating Temperature	-40°C to +85°C (Extended Range)
Connector Types	LC, SC, FC, ST, MPO (MTP)

REGULATORY COMPLIANCE

The Fiber Patch Cord Series is manufactured and tested in accordance with the following global regulatory frameworks:

- Telcordia GR-326-CORE: Generic Requirements for Single-mode Optical Connectors and Jumper Assemblies.
- IEC 61300 Series: Fibre optic interconnecting devices and passive components
 - Basic test and measurement procedures.
- TIA/EIA-568.3-D: Optical Fiber Cabling Components Standard.
- RoHS 2.0 (2011/65/EU): Restriction of Hazardous Substances in Electrical and Electronic Equipment.
- REACH (EC 1907/2006): Registration, Evaluation, Authorization, and Restriction of Chemicals.
- UL 94 V-0: Flammability rating for jacket materials.
- ISO 9001:2015 and TL 9000-H S V6.0: Quality Management and Supply Chain Excellence.



LIFECYCLE ASSURANCE & CERTIFICATION

All patch cords undergo 100% interferometric endpoint geometry inspection, optical insertion loss, and return loss testing. Each assembly is serialized and traceable to raw material batches. The product is designed for a 25-year service life under typical indoor environmental conditions (10°C to 40°C, 10% to 85% non-condensing relative humidity).