

Optical Shuffle Boards

Flexible Optical Shuffle Boards for swift integration of fiber optic systems

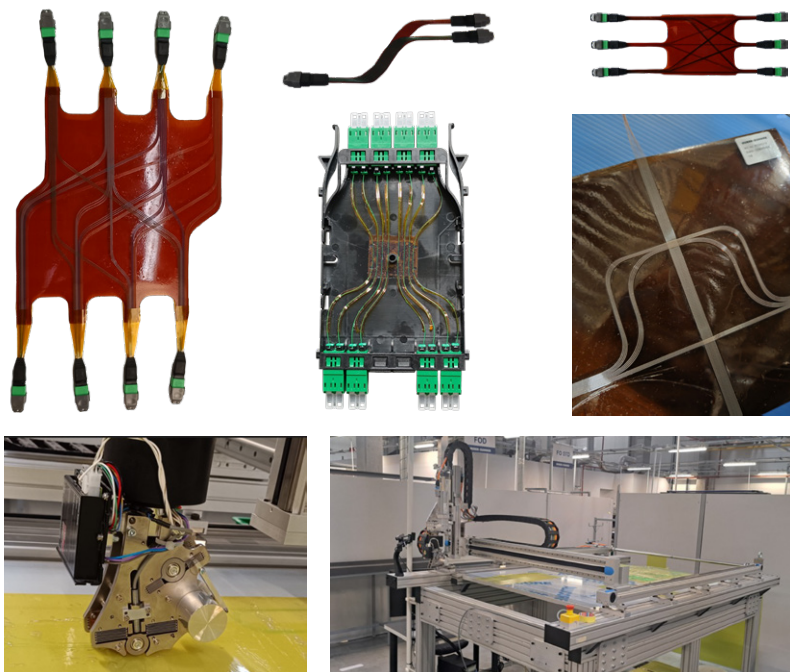
Optical and photonic networks for Aerospace & Defense are rapidly becoming essential to next-generation system architectures. A major obstacle to this evolution is the ability to manage, route, and scale hundreds to thousands of optical fibers within limited mass and volume envelopes where dense connectivity and high-capacity signal handling are critical.

Practical applications such as high-throughput photonic payloads and on-board digital processors require complex fiber distribution which cannot be delivered effectively by conventional fiber management solutions.

HUBER+SUHNER offers Aerospace & Defense-grade flexible optical shuffle boards as a solution: We translate your connectivity requirements into 2- or 3-D surface geometries, minimizing fiber lengths, fiber crossings and overall footprint. Using a proprietary robotic system, individual optical fibers are deposited on suitable flexible substrates and protected with a conformal overcoat. Our robots permit close spacing of fibers, compact routing with tight bending radii, and support scalable automated industrial manufacturing to produce fit-for-purpose solutions.

Our solutions support a broad spectrum of environmental factors and have been fully tested for resilience under harsh conditions.

Made in Europe.



Parameter	Value
Operating T-range [°C]	-55...+125
Permissible relative humidity	85% at 85°C
Min. bend radius [mm]	≥12
Min. fiber pitch [μm]	≥150
Typ. fiber OD [μm]	250
Loss [dB]	0.05 typ.
Typ. termination	MT(12, 24), 1.25 mm ferrules/termini, SC, LC, ST, M29504, ARINC801, EN4869
Thickness [mm]	≥0.6
Max. printable substrate area [m²]	workbench size: 2.26 m² work area for printout: 1.4 m² (1080×1300 mm²)
Fiber type	MM, SM, radhard
Substrate materials	Kapton, FR4, PVC, ABS
Conformal coating material	Silicon, acrylic, perylene

HUBER+SUHNER is certified according to EN(AS) 9100, ISO 9001, ISO 14001, ISO/TS 16949 and IRIS.

Waiver: The facts and figures provided herein are for information only and do not represent any warranty of any kind.

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Environmental testing

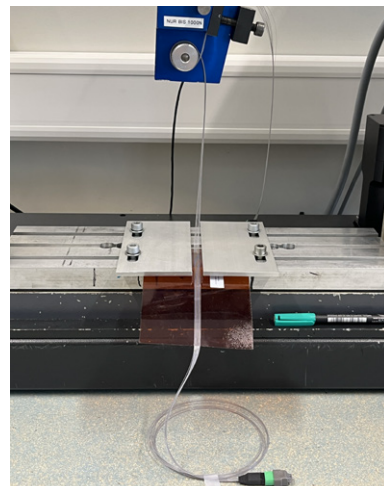
Aerospace & Defense applications require certainty of performance. Hence, we subjected our flexible optical shuffle boards to extensive testing routines to validate our claim.

Temperature cycling tests: samples of straight- and crossed-fiber optical shuffle boards were mounted onto flat and cylindrical surfaces and subjected to static and dynamic thermal loads, as well as to extended durations of humidity (IEC 61300-2-22, IEC 61300-2-19).

Crush testing: samples of flexible optical shuffle boards were subjected to a hydraulic press and locally compressed on both the straight and crossed sections of fiber.

Fiber retention testing: samples of flexible optical shuffle boards were mounted in a tensile strength tester and pulled longitudinally and transversally to the plane of the substrate (test method adapted from ASTM 3330).

The optical characteristics of all channels were monitored during the tests. No degradation of functionality was found. Test reports available on request.



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