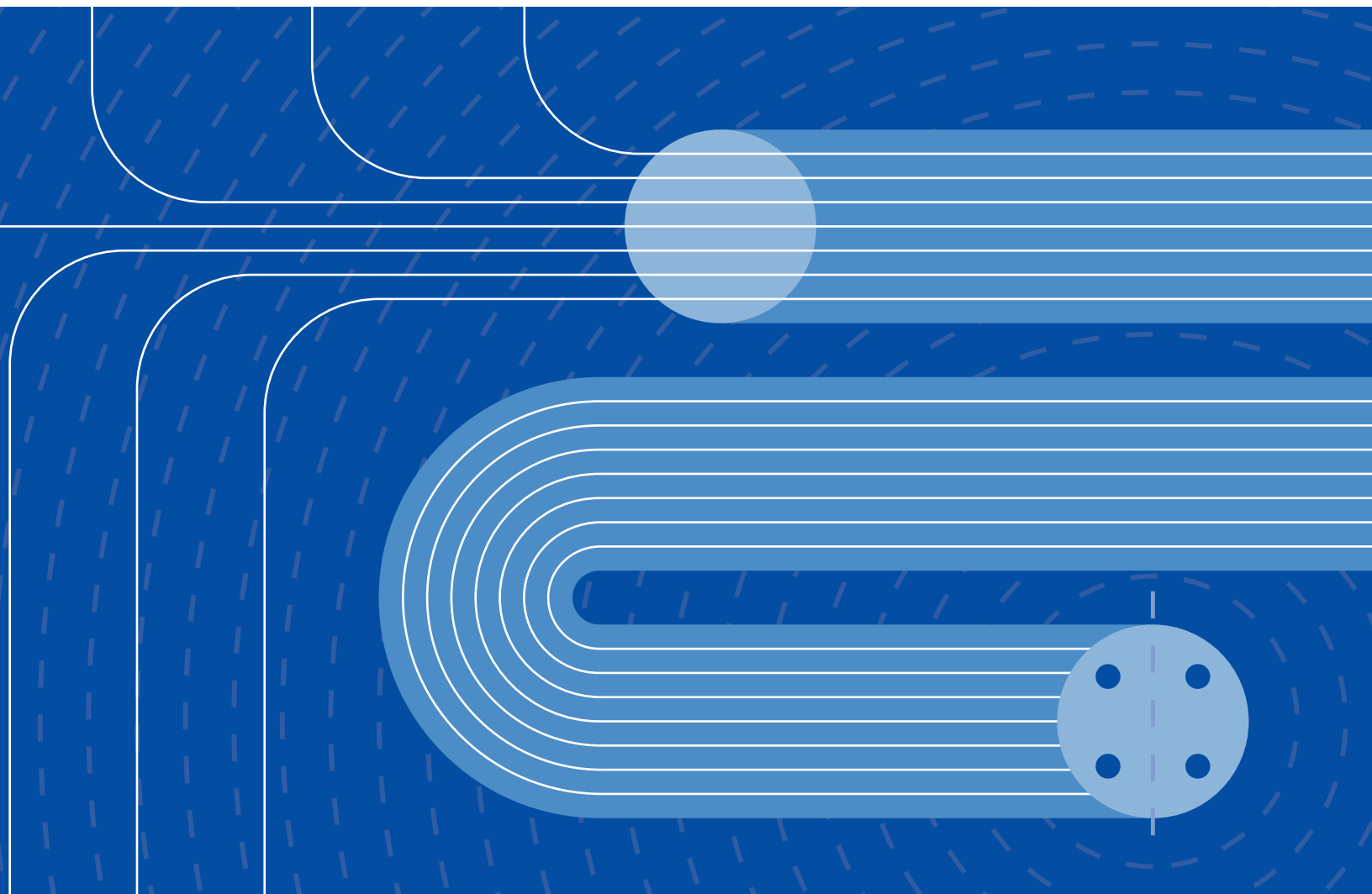


Multicore Fibers

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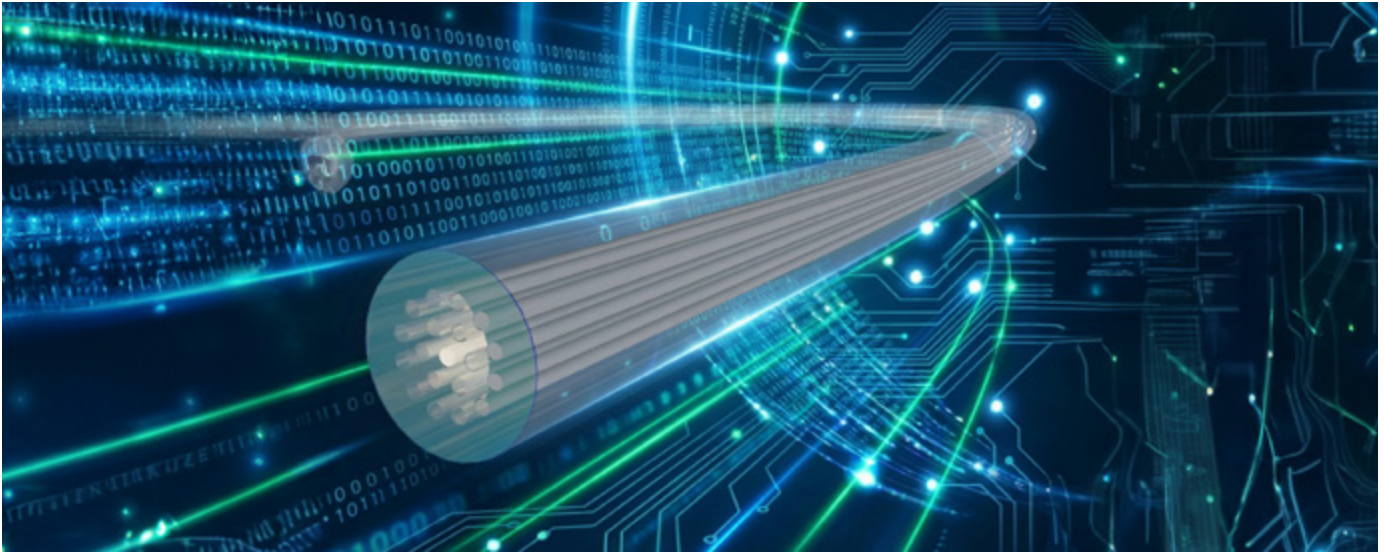
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Introduction

Multicore fiber (MCF) technology represents a significant evolution in optical communication, offering increased data throughput, and enhanced spatial efficiency. As data center demands and high-capacity networks grow, MCFs are emerging as a promising solution to overcome the limitations of traditional single-core fibers. This paper outlines the current state of MCF development, key specifications, industry standards, and projected future trends, along with the initiatives SENKO is undertaking to design connectors and processes that address the challenges of MCF termination and connectorization.

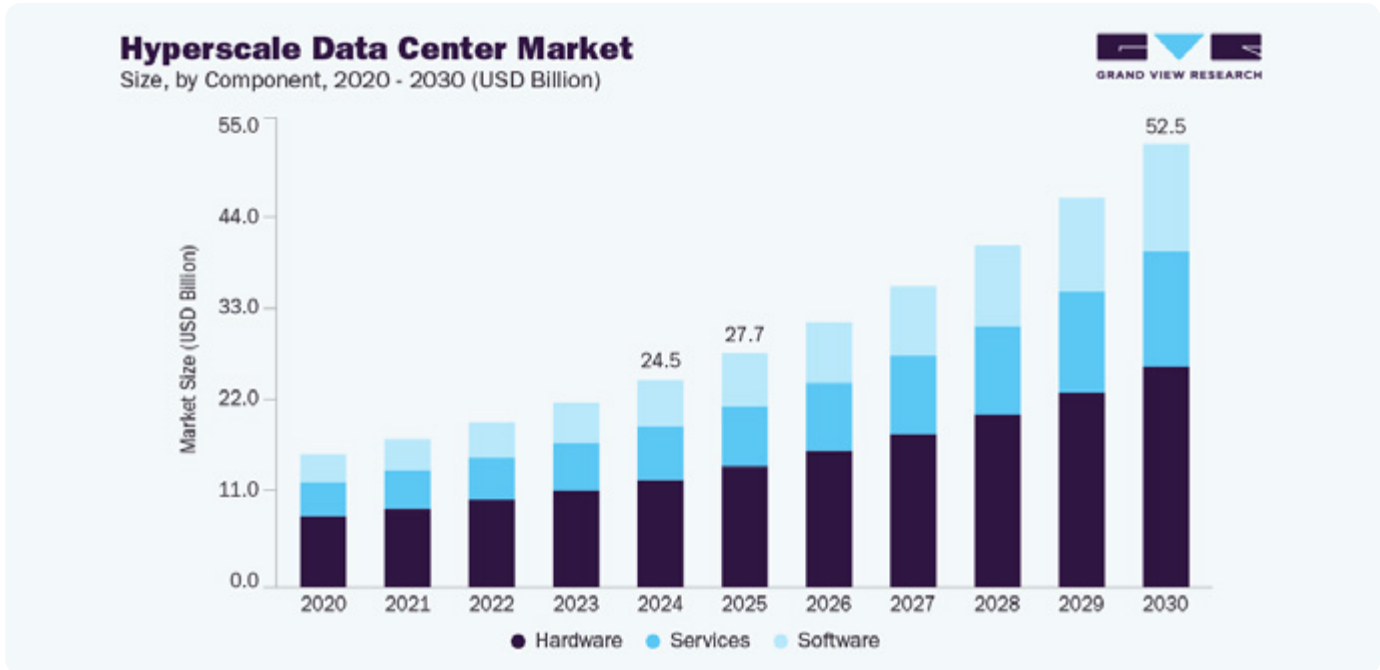


Global data traffic growth trends (cloud, AI, IoT).

DCI design is becoming more challenging as operators strive to balance power, space, and cost while meeting rising bandwidth demands. High-capacity optical equipment increases power use and operational costs, while limited data center space necessitates denser yet efficient platforms. These constraints raise expenses for infrastructure and expansion. Planners must optimize spectral efficiency and port density, reduce energy and space use, and contain costs.

MCF enables transmission of multiple spatial channels through a single fiber, reducing the number of separate fiber runs and active transceiver ports required at each end of the link. This is achieved by incorporating additional fiber cores within the same 125 μm diameter fiber.

Several elements inside an MCF-enabled transceiver such as the Digital Signal Processor (DSP), control electronics, connector design, and packaging, directly influence how much electrical power the module consumes. Their combined effect is that modern, optimized electronics minimize overhead per transmitted bit, allowing the multi-core optical path to deliver large capacity increases without a proportional rise in electrical power and transceiver footprint.



Hyperscale data centers have dramatically increased the demand for high-density fiber connectivity within and between facilities. More fiber links are needed to keep up with the switching fabrics increasing to hundreds of thousands of ports and multi-terabit interconnects. However, continually adding more single-core fibers presents major challenges such as duct space, cable raceways, and installation complexity of costlier and larger cables. Civil work is disruptive, expensive, and slow, while larger cables complicate installation. As a result, simply scaling by adding more fiber is no longer sustainable from a space, cost, energy, and operational perspective, motivating the shift toward Space Division Multiplexing (SDM) solutions such as multi-core fiber to achieve higher capacity without expanding physical footprint.

Due to these challenges, hyperscale data center operators have adopted technologies such as Wavelength Division Multiplexing (WDM) to increase bandwidth without increasing fiber count, while relying on packet-based statistical multiplexing rather than traditional Time Division Multiplexing (TDM) architectures to increase bandwidth without increasing fiber count. With improvements in multi core fiber manufacturing technology geometrical tolerances and MFD are becoming more consistent reducing cross talk between the cores and enabling operators to increasingly combine Space Division Multiplexing SDM and WDM to scale capacity without pulling additional cable. The table below shows the advantages of SDM with MCF vs WDM and TDM.

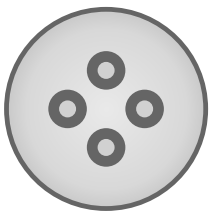
Category	TDM (Time Division Multiplexing / High Baud)	WDM (Wavelength Division Multiplexing)	MCF-Enabled Transceiver (Space Division Multiplexing)
Core Concept and Scaling	Sending data bits sequentially. Scale by increasing symbol/ baud rate.	Sends multiple data streams simultaneously by adding more wavelengths in the same fiber.	Send data down multiple physical cores inside a single strand of fiber.
Key Limitation	High DSP power, heat, signal-integrity limits. More DSP equalization increases latency. Complex operations in managing ultra-high-speed components.	Complex optical system requiring tight filtering, laser stability, wavelength tuning, and monitoring.	Limited fiber manufacturing capacity. Precise coupling and core to core alignment are difficult to achieve and maintain. Standardization is needed for core markers and orientation features to ensure interoperability. The ecosystem and hardware continue to evolve and deployment typically requires specialized splicing equipment.
Transceivers	Simple transceiver design \$	Mature technology but increasing complexity with more wavelengths and filters \$\$	Custom solution \$\$\$
Fiber Network	Uses mature SM & MM fiber and fusion splicing machine \$	Uses mature SM & MM fiber and fusion splicing machine \$	New niche solution requiring specialized splice machine and skilled technician \$\$\$
Power Efficiency*	Very high DSP power at high baud rates. High clock speed generates immense heat. \$\$\$	Higher power per added wavelength. High-density packaging also increases cooling cost \$\$	Lower power per bit (parallel, lower-rate channels) \$
Space Efficiency	Requires a lot of duct and rack space. Limits ability to expand network. \$\$\$\$	Significantly reduced duct and rack space. \$\$	Significantly reduced duct and rack space. \$
Total Cost of Ownership (TCO)	Impossibly expensive for large-scale high-bandwidth deployment. \$\$\$\$	High cost of duct and rack space for large-scale deployment with increasing power and cooling requirement. \$\$\$	Low cost due to high density solution with low power requirement. \$

* NOTE: Relative power/cost depend on rate, reach, modulation, FEC, and packaging; values are indicative only

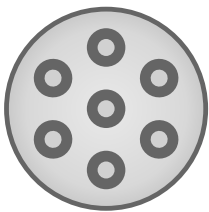
\$ Cheap | \$\$ Moderate | \$\$\$ Expensive | \$\$\$\$ Very Expensive

Multicore Fiber Technology in Space-Division Multiplexing

MCF is an optical fiber that contains multiple independent light-guiding cores - typically arranged symmetrically within a single cladding to enable space-division multiplexing and dramatically increase capacity without enlarging the cable footprint. A 4-core MCF, for example, consists of four single-mode cores positioned at fixed distances around the fiber center, sharing a common cladding (standard 125 μm) and engineered with trench-assisted refractive-index profiles to minimize inter-core crosstalk. The geometry must balance core pitch, mode-field diameter, and cladding diameter to ensure compatibility with standard connectors and splicing tools while maintaining low loss and acceptable mechanical reliability. Today, the primary commercial manufacturers of MCF include Fujikura, Sumitomo Electric, Prysmian Group, Corning, and YOFC. Each manufacturer offering variations optimized for long-haul SDM research, data-center interconnects, or ultra-compact high-density cabling. Their designs typically follow cylindrical symmetry, with core arrangements such as 4-core (square), 7-core (hex + center), and 12-core configurations, enabling scalable capacity increases while maintaining similar mechanical characteristics of standard single-mode fibers.



4-Core MCF



7-Core MCF

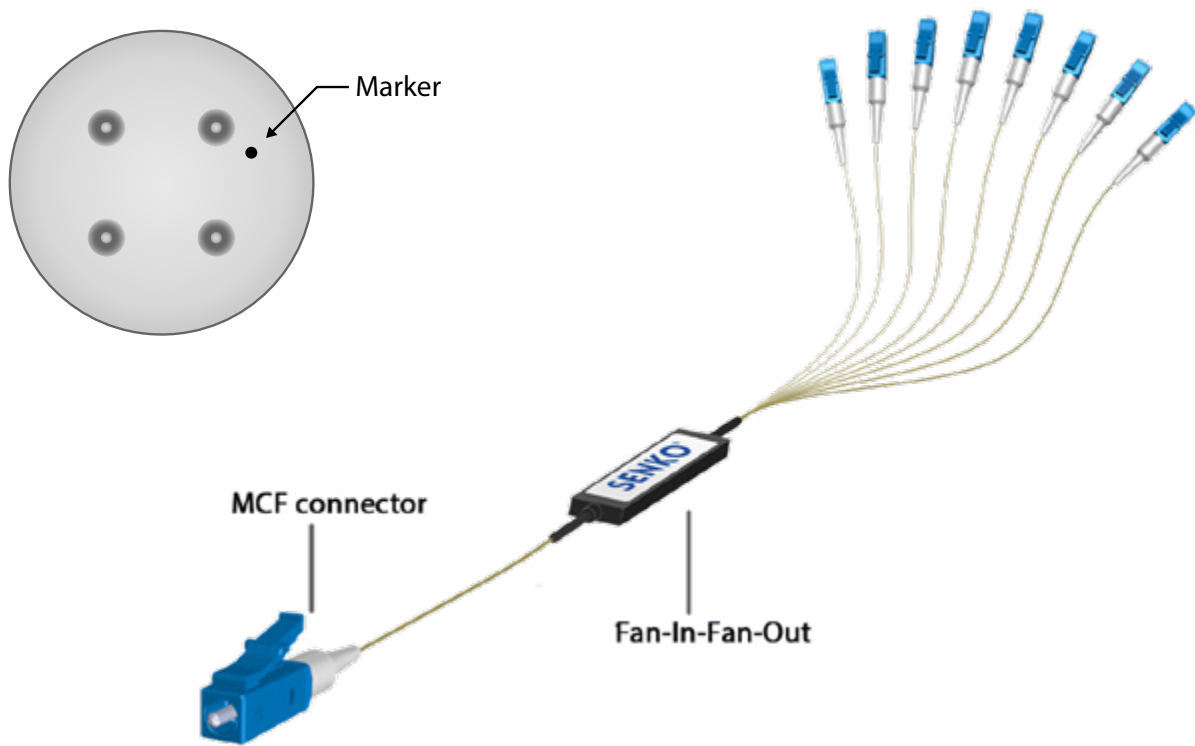
#	Item	4-Core MCF	7-Core MCF
1	Mode Field Diameter	8.0 \pm 0.5 μm	6.0 μm - 6.5 μm
2	Core Pitch (Spacing)	50 μm	35 μm - 42 μm
3	Marker Diameter	Vendor Specific	
4	Marker Position	Asymmetric (Vendor Specific)	
5	Cladding Diameter	125 \pm 1 μm	
6	Coating Diameter	245 \pm 12 μm	
7	Coating/Cladding Concentricity	< 1.0 μm	

A 4 core MCF and a standard G.652.D single-mode fiber share similar base characteristics, such as a core diameter around 8–9 μm and a cladding diameter of 125 μm but differ significantly in structure and inter-core behavior. The 4 core MCF integrates four independent cores within a single cladding, typically with a core pitch of \sim 50 μm , whereas G.652.D fiber has a single central core. Both fibers operate efficiently in the O- and C-bands (around 1310 nm and 1550 nm), and their attenuation per kilometer is comparable - around 0.18–0.22 dB/km at 1550 nm. However, the MCF introduces inter-core crosstalk, usually between –30 and –40 dB per 100km for standard SM designs, which does not exist in single-core G.652.D.

Mechanically, both fibers have similar coating and tensile properties, though the MCF may require slightly larger bending radius or careful handling due to the multiple cores. In essence, the 4 core MCF preserves the

low-loss and mode characteristics of G.652.D while multiplying channel capacity in the same fiber footprint, trading simplicity for spatial division multiplexing capability.

In an MCF, each core must be uniquely identifiable so that splicing, fan-in/fan-out alignment, testing, and transceiver mapping can be performed accurately. As the cores sit inside a single cladding and cannot be color-coded like individual fibers in a cable, manufacturers use several built-in structural and optical features to distinguish them such as core positioning, markers, index-profile variations, and Fan-In/Fan-Out (FIFO) devices.



Many MCFs include a cladding-level marker such as a notch, stripe, or asymmetrical coating feature to define the "zero-degree" rotational orientation. This prevents misalignment when fusing or inserting into FIFO assemblies, ensuring that each core maps to the correct output fiber.

In addition, some MCF designs introduce subtle differences in refractive-index trench profiles around each core. These small variations do not affect performance but allow automated splicing systems to detect core boundaries more accurately. Specialized splicing machines use high-resolution multi-angle cameras and pattern recognition algorithms to automatically identify each core by looking at the cross-section and detecting the symmetric layout.

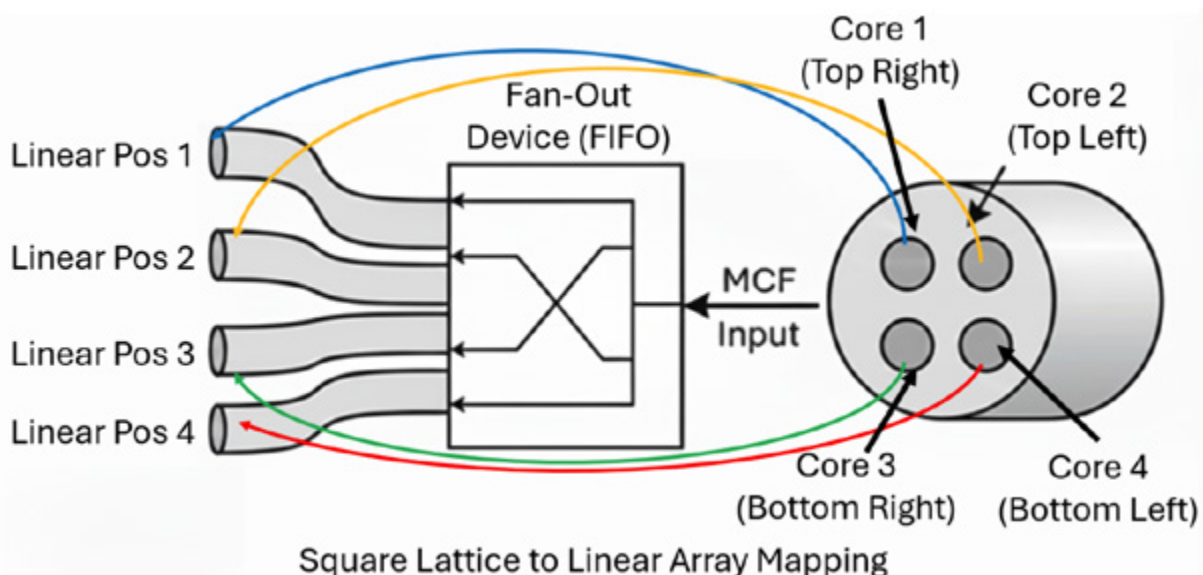
Transceiver Integration and Cable Types

In an MCF transceiver, multiple optical cores share a common physical housing, and in many implementations they can also share DSP subsystems such as common clocking and Forward Error Correction (FEC) engines. This consolidation reduces replicated circuitry, lowering total silicon area and overall power consumption. Instead of multiple modules each containing their own microcontroller, thermal sensors, drivers, and housekeeping logic, an MCF transceiver integrates these functions once and multiplexes them across multiple cores. This reduces Printed Circuit Board (PCB) area and minimizes the number of active control components.

The consolidated control electronics can improve thermal efficiency at the module level. Additionally, architectures such as Co-Packaged Optics (CPO) reduce electrical channel insertion loss by shortening the distance between the switch ASIC and the optical engines, thereby lowering high-speed Serializer/Deserializer power requirements. A single package carrying multiple cores may also exhibit improved surface-to-volume thermal characteristics, potentially reducing reliance on high-power Thermoelectric Cooler (TEC) stabilization inside each optical subassembly. Results may vary depending on the specific system architecture.

MCF transceivers must route multiple spatial channels in parallel while keeping the optical paths, DSP processing, and mapping logic synchronized. As each core acts like an independent spatial lane, the transceiver architecture needs a defined Tx/Rx distribution pattern to map electrical lanes to optical modulators and to the MCF cores.

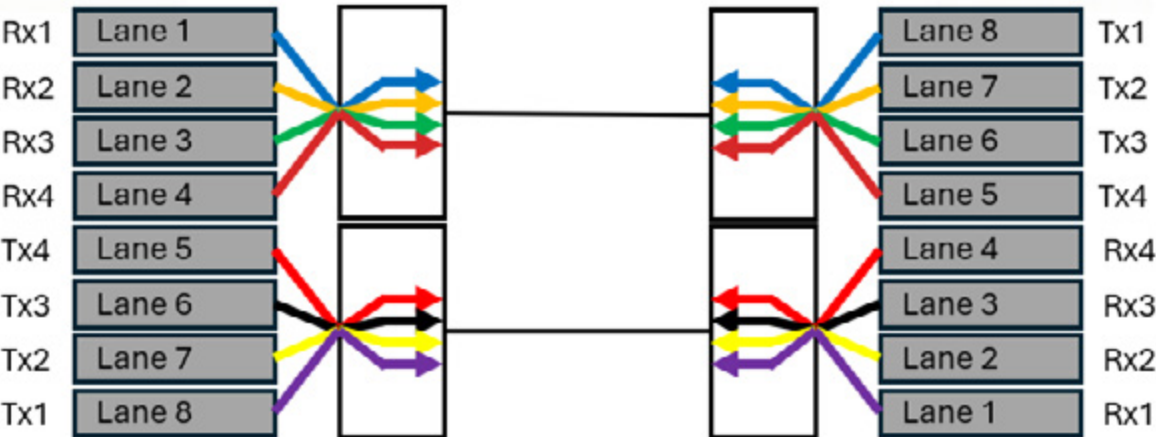
MCF transceivers require precise channel assignments and cable routing strategies. These patterns influence the routing complexity and connector orientation. For example, in a standard 4-Core MCF, the cores are typically arranged in a 2-by-2 square lattice rather than a linear row. As most transceivers (QSFP/SFP) utilize linear fiber arrays, you must use a Fan-Out Device to map the transceiver lanes to the fiber cores MCF.



Unlike standard ribbon fiber, MCF is sensitive to axial rotation. Connectors often have keyed mechanisms to prevent the 2x2 square from rotating and losing alignment. Network operators must ensure the Fan-In and Fan-Out modules are from the same manufacturer to ensure Core 1 maps to Core 1 at the far end. Some of the common mapping patterns are shown below.

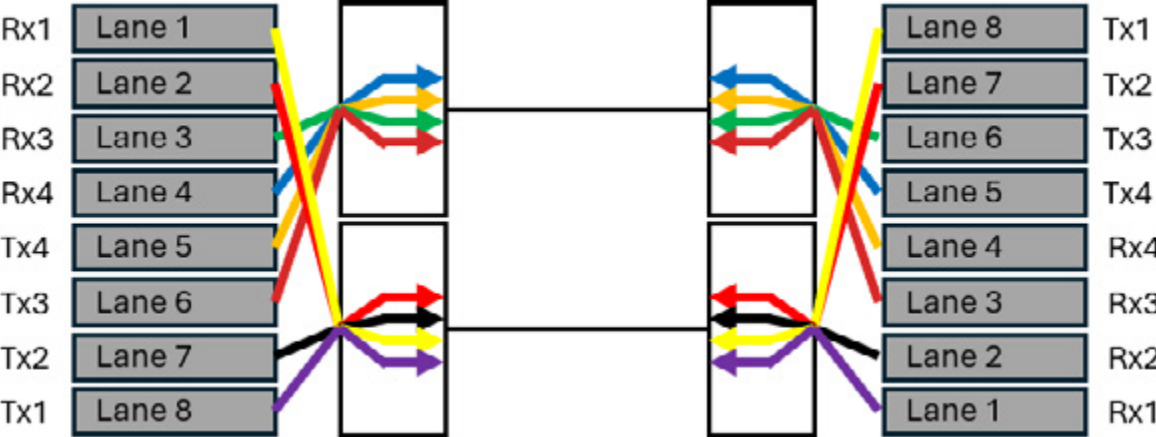
Pattern 1: Straight 1:1 Lane-to-Core Mapping

This mapping pattern is a simple design with minimal DSP overhead that is typically used in QSFP-DD or OSFP packages with spatial lanes mapping directly to MCF cores. As the Transmit (Tx) and Receive (Rx) are grouped on either side of the transceiver, this mapping groups the Tx into one 4-core fiber and the Rx into the other 4-core fiber.



Pattern 2: Paired Mapping

This mapping pattern maps the Tx and Rx as pairs.



Standards Development

MCF development is guided by emerging standards from ITU-T and IEC working groups, with active contributions from industry leaders such as SENKO and the others in IEC, TIA, and APC initiatives.



ITU-T, the International Telecommunication Union's Telecommunication Standardization Sector, sets global frameworks for optical fiber technologies, including space-division multiplexing and weakly-coupled multicore fibers through documents like G Supplement 87.



IEC (International Electrotechnical Commission) focuses on fiber geometry, labeling, and performance requirements under TC 86 and its subcommittees, ensuring interoperability and safety.



TIA (Telecommunications Industry Association) develops infrastructure and installation standards through TR-42 committees, where ITU-T liaison reports on multicore fiber standardization are regularly presented to align global efforts.



The Advanced Photonics Coalition (APC) is driving standards for MCF to support next-generation data center and CPO architectures. These efforts aim to reduce power consumption, improve reliability, and enable greener solutions with up to 75% less fiber material. Building on OIF's 6.4T specifications, APC is defining protocol-independent solutions for Ethernet, Infiniband, and UALink networks, focusing on fiber specifications, high-density fiber arrays, core assignments for terabit-scale links, and automated attachment methods. Workstreams also address connector types, connector performance requirements, transceiver channel mapping, and simplified cable designs to reduce complexity. With a target completion by end of 2026, APC combines technical rigor and sustainability to position MCF as a cornerstone for hyperscale data centers and high-performance computing. SENKO provides a liaison report on APC activities to IEC TC86 during joint WG4/WG6 sessions, ensuring alignment between APC initiatives and international standards.

Together, all these standard organizations form a harmonized ecosystem driving MCF adoption across networks, data centers, and emerging optical applications.

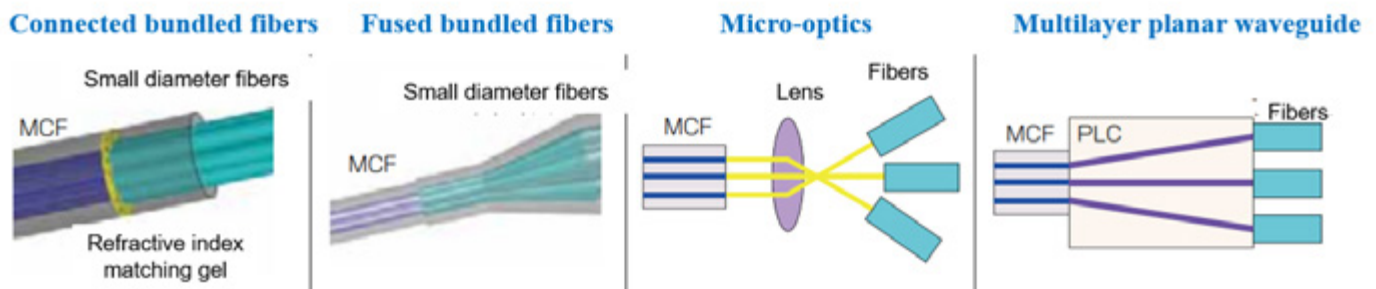
The standardization of multicore fiber itself has advanced significantly in recent years. In 2021, ITU-T Study Group 15 began revising single-mode fiber recommendations such as G.652, G.657, and G.654 to support higher bitrates and WDM systems. At the same time, ITU-T initiated work on SDM technologies to address the growing capacity limitations of conventional single-mode fibers. These early efforts focused on defining multicore and preparing documents to outline fiber parameters, cable design, splicing, and connectorization.

In 2025, standardization for MCF and its connectorization has reached a critical stage. ITU-T's G Supplement 87 provides a global framework for space-division multiplexing fibers, prioritizing weakly-coupled multicore fibers

(WC-MCF) with standard 125 μm cladding and backward compatibility with G.65x single-mode fibers. This ensures that new MCF designs can coexist with existing infrastructure. The supplement introduces mandatory parameters such as core pitch, core position error, and inter-core crosstalk and calls for harmonized test methods under ITU-T G.650.x and IEC standards. These definitions are essential for connector manufacturers like SENKO because connector orientation and ferrule geometry must align with fiber specifications to guarantee interoperability and low optical losses across jumpers and systems.

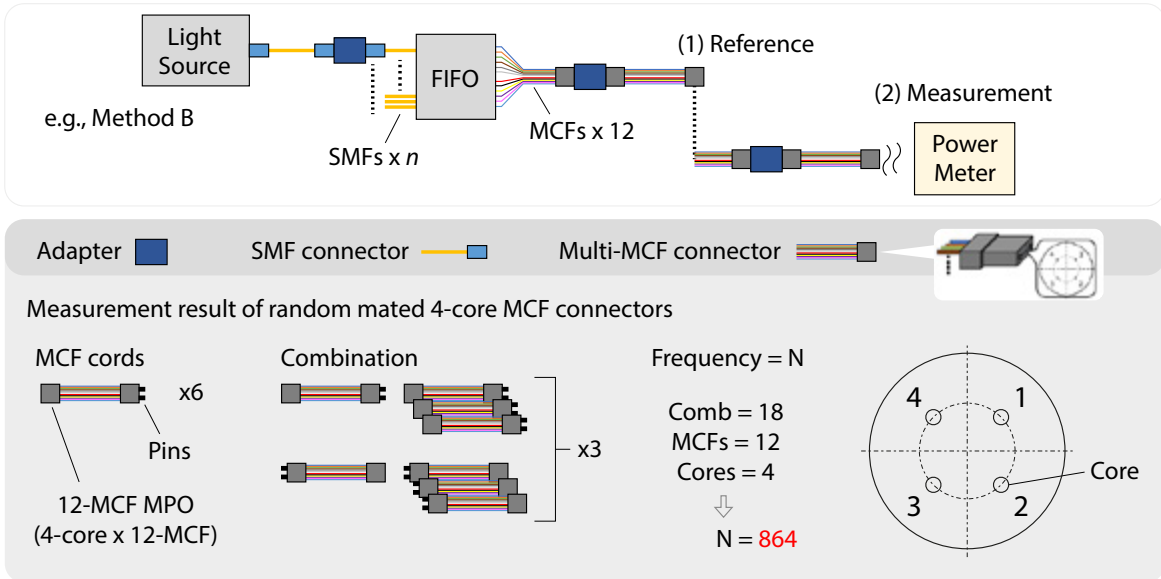
Parallel to ITU-T, IEC TC 86 / SC 86B / WG 6 Standards and specifications for fibre optic interconnecting devices and related components has initiated work on mechanical interfaces for MPO connectors designed for 4-core MCF, including discussions on offset keying to prevent mismatching with legacy MPO designs. Practical applications for WC-MCF in submarine cables and high-density patch cords are driving this effort. Additionally, IEC WG4 introduced a draft procedure for measuring attenuation in random-mated WC-MCF connectors with rectangular ferrules, which is critical for performance validation before connectorization. SENKO's involvement in these discussions ensures that connector standards for LC, MPO, and SN-MT interfaces will support defined core orientation and polarity, avoiding compatibility issues in field deployments.

It also should be understood why FIFO devices were introduced. In the context of MCF, FIFO devices are used to convert multiple cores in a multicore fiber into individual single-mode fibers (fan-out) and combine them back (fan-in). This allows testing and connectivity using existing single-core equipment because most current optical test systems and transceivers are designed for one core at a time. Current optical test equipment is generally limited to single-core measurements, making direct testing of multiple cores impractical in an MCF. FIFO devices convert multicore fibers into individual single-mode fibers for testing, enabling accurate attenuation and crosstalk measurements using existing tools. While FIFO adds complexity and cost, it remains essential until integrated multicore test solutions become widely available.

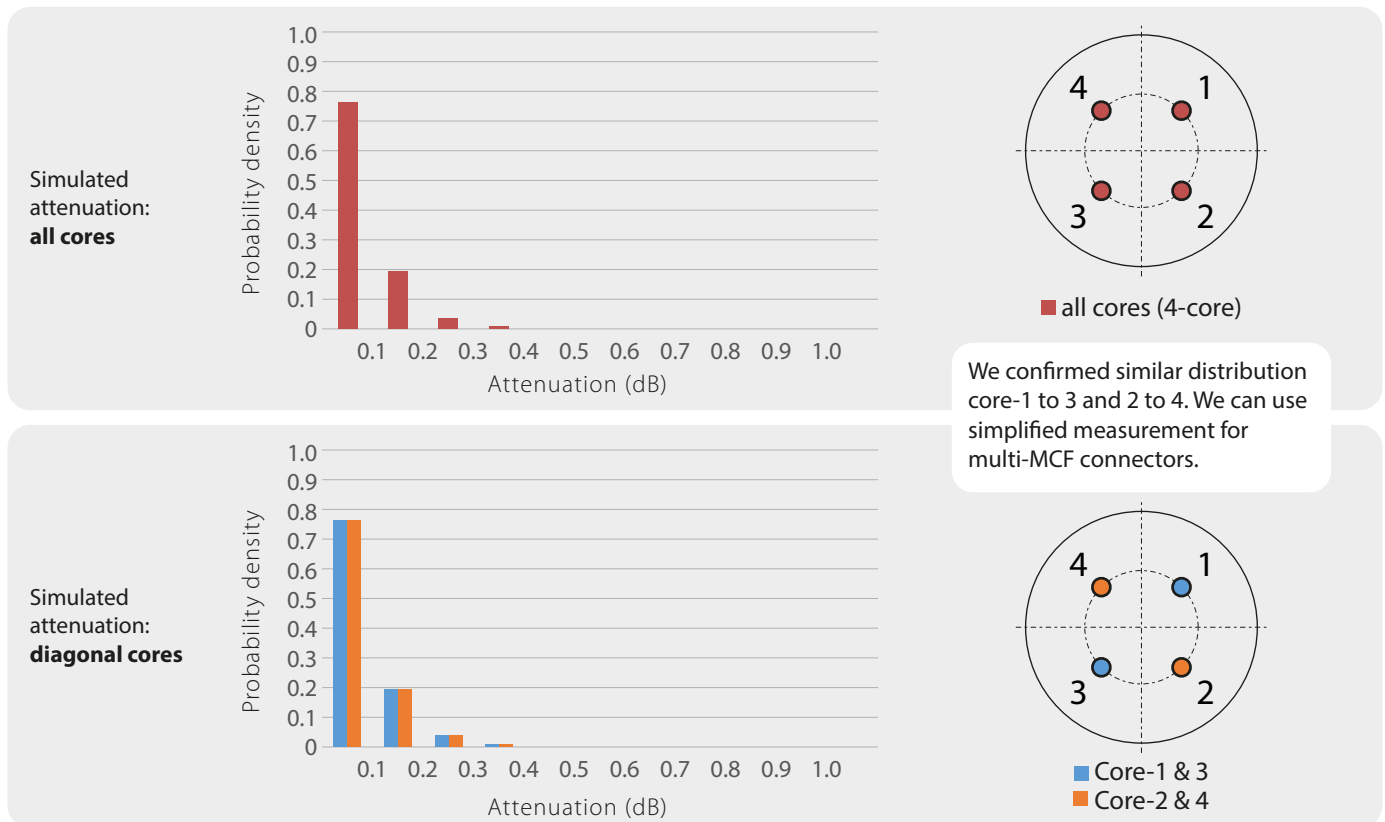


In spring 2025, IEC WG6 received a report from Japanese National Committee (JNC) proposing a simpler way to measure attenuation in multicore fiber connectors. Instead of testing every possible core combination, the method focuses on diagonal pairs such as cores 1 and 3 or 2 and 4. Monte Carlo simulations showed that diagonal measurements give the same statistical distribution as full-core testing, making this approach valid for inspection. This change cuts the number of test points dramatically, for example from 864 to 432 in a 4-core MPO cables, saving time, reducing complexity, and lowering costs. Remarkably, this is the first time jumpers could ship with some cores never individually tested, relying on statistical equivalence rather than exhaustive verification.

Attenuation Measurement of Multi-MCF connector



Simulated Attenuation Using Monte Carlo



These developments highlight the need for consensus among fiber manufacturers on geometry, orientation, and test methods before connectorization begins. Only after these standards stabilize can SENKO confidently design and mass-produce MCF connectors with guaranteed interoperability and jumper compatibility across vendors.

Standardized Measurement of Attenuation and Return Loss in Weakly Coupled Multi-Core Fibre Connectors

The International Electrotechnical Commission (IEC) has recently proposed IEC 61300-3-55, a standard that defines procedures for measuring attenuation and return loss in randomly mated single-mode, weakly coupled four-core multi-fibre connectors with rectangular ferrules. This development addresses a critical need for consistent performance evaluation as multi-core fibre (MCF) technology approaches practical deployment in high-capacity optical networks.

The scope of the standard encompasses connectors with physical contact (PC) and angled physical contact (APC) ferrules, focusing on assemblies where cores are arranged in a square configuration. The measurement methodology emphasizes statistical characterization, requiring determination of both mean attenuation and the 97th percentile value across random mating combinations. These metrics provide a robust basis for assessing connector performance under realistic conditions, where intentional pairing cannot be guaranteed.

Two complementary test methods are introduced.

Method 1, intended for design qualification and dispute resolution, involves exhaustive measurement of all cores across a large sample set. For example, a 4-core connector requires 2112 measurements to capture comprehensive performance data. In contrast,

Method 2 offers a streamlined approach for routine process control, limiting measurements to diagonally positioned cores. This reduces complexity significantly—only 240 measurements are needed for a 4-core connector—while maintaining statistical relevance for quality assurance.

Note that at SENKO for production shipments SENKO requires 100 percent IL and RL testing on each core using Method 1. Method 2 based on diagonal sampling is used exclusively for internal process monitoring and is not accepted for production release.

Return loss measurements can be performed concurrently in accordance with IEC 61300-3-6, ensuring compliance with system-level optical performance requirements. The standard also specifies apparatus and conditions, including fan-in/fan-out devices for core separation, breakout cable assemblies, and preferred source wavelengths of 1310nm, 1550nm, and 1625nm. Measurement resolution must be ≤ 0.01 dB, with equipment stability maintained within ± 0.05 dB or 10% of the attenuation value.

By establishing these procedures, IEC 61300-3-55 provides a foundation for global interoperability and reliability in MCF connector performance. Its adoption will support ongoing standardization efforts within ITU-T SG15 and IEC SC86A, facilitating the transition of weakly coupled MCF technology from research to widespread implementation in next-generation optical networks.

Applications and Use Cases

In 2025, National Institute of Information and Communications Technology (NICT) together with partners successfully implemented a transmission unit using 4 core MCF cables in a real system carrying uncompressed 8K video between buildings. The cable comprised eight separate 4 core MCF strands (i.e. equivalent to 32 conventional single fibers) bundled in a 3 mm outer jacket, enabling high capacity transmission through narrow existing conduits and wiring paths where space was limited.

In the same year, a field trial demonstrated that 4 core MCF can be used in a long-span, unrepeated link. Researchers achieved 106 km transmission using commercial 800 Gb/s OTN transceivers over deployed 4-core MCF cable, delivering a total real time throughput of 256 Tb/s with fully loaded 80 wavelength C+L band channels. This shows that uncoupled MCF supports high capacity backbone links without repeaters.

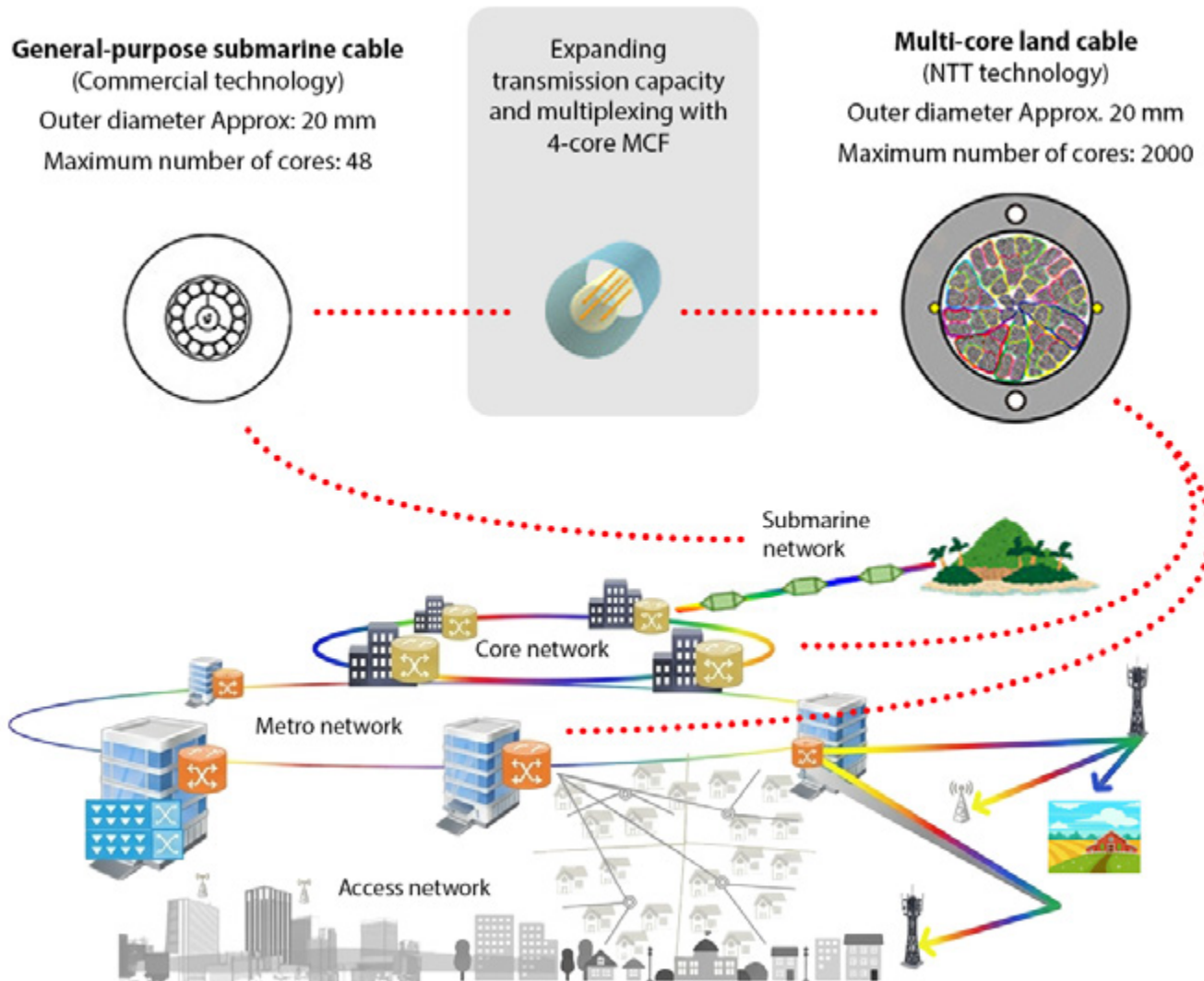
On the supply and infrastructure side, VAFC Global announced in 2025 a US\$ 200 million MoU with a hyperscale data center customer to commercialize MCF cables for large scale deployments. Production is slated to start engineering work in early 2026, signaling a shift from research to volume deployment for hyperscale connectivity.

MCF is also deployed in submarine cables where OFS has developed 4 core “SCUBA 4X” multicore ocean fiber targeting submarine systems, offering four times the bandwidth within the same fiber envelope with attenuation below ~ 0.165 dB/km at 1550 nm and adjacent core crosstalk down to -70 dB/km. Meanwhile, a collaboration between Anritsu and KDDI Research, Inc. demonstrated the first remote monitoring (fault detection / loss profiling) of a submarine-style MCF cable using coherent OTDR. That includes the visualization of inter core crosstalk over long distances which is a major step toward operational maintenance of submarine MCF deployments.

A collaboration between STL and C DOT (India’s telecom R&D agency) announced a successful transmission of Quantum Key Distribution (QKD) over 100 km on a 4 core MCF network. One core carried the quantum signal while the other three carried high-speed classical data simultaneously — proving stable, error-free quantum secured links without the need for separate “dark fiber” for quantum traffic. Optical clock signals can be transmitted over tens of kilometers via deployed MCF networks while simultaneously carrying telecommunication data, demonstrating the feasibility of precision time/frequency transfer over MCF without sacrificing data throughput.

Beyond communications, MCF can also be deployed for sensing applications. A 2023 review of MCF-based interferometric sensors showed that MCF structures enable compact, multi parameter sensors that can detect changes in temperature, strain, curvature, vibration, torsion, and refractive index. The multiple cores allow “vector bending sensing” (i.e. sensing direction-sensitive curvature) and high integration and multiplexing density which has an advantage over classic single core fiber sensors.

MCF is increasingly positioned as enabling infrastructure for NextGen mobile networks. At the 2024 International Microwave Conference (IMC 2024), STL introduced its MCF solution using 4-core and 7 core fibers as enablers for quantum communications and silicon photonics. Given MCF's high spatial multiplexing and compact footprint, it is well suited to dense urban deployments for fronthaul and backhaul fiber connection to small cell sites.



To support the deployment of MCF, Furukawa Electric and Lightera have developed the FITEL S185-ROF splicer to deliver fast, precise rotational alignment of multi-core and hollow core fibers. Its compact design makes it suited for field use. It is designed with three-electrode Ring of Fire® (ROF) arc discharge system instead of the standard two electrode design. This ensures uniform heating and strong, low-loss splices. Enhanced with their new Sequential Triangular Asymmetric Arc Discharging (STA2D) technology, the splicer uses sequential electrode pair firing in a rotational sequence for optimal heat control, effectively splicing anti-resonant hollow core fibers without damaging their internal microstructure of the HCF.

Challenges and Future Outlook

The future of MCF technology is promising, with several trends shaping its evolution:

- **Increased Core Counts:** Moving beyond 4-core designs toward 7-core and 19-core configurations to enable higher spatial multiplexing and dramatically increase bandwidth density.
- **Quantum and AI Integration:** MCF is expected to support advanced applications such as quantum key distribution for secure communications and AI-driven network optimization for dynamic traffic management.
- **Manufacturing Automation:** Connectorization processes will increasingly rely on precision automation systems for alignment and assembly, ensuring scalability and consistency for high-volume production.
- **Global Standardization:** Ongoing efforts by Multiple Standards Groups aim to harmonize specifications across vendors and regions, paving the way for interoperability and widespread adoption.

Multicore fiber optics are poised to redefine the landscape of high-capacity optical communication. With robust specifications, evolving standards, and scalable integration strategies, MCF offers a pathway to future-proof networks. Precision, consistency, and adherence to best practices will be key to successful deployment.

Despite its potential, MCF faces several challenges:

- Crosstalk management between cores.
- Connector and splice reliability under operational stress.
- Volume manufacturing of MCF transceivers.
- Integration with photonic integrated circuits (PICs).

One of the most critical hurdles is alignment precision during connectorization. Unlike single-core fibers, MCF requires rotational alignment to ensure each core is correctly oriented for minimal optical loss. SENKO is actively developing automation solutions for terminating standard connector types with MCF, targeting alignment precision better than 1°, which is essential for maintaining low insertion loss and high return loss across all channels. More details will be available publicly in 2026.

Summary

This paper explores the technological advantages and transformative potential of multicore fiber (MCF) optics in advancing high-capacity optical communication networks. MCF stands out for its ability to significantly increase data throughput by enabling multiple transmission channels within a single fiber, which is crucial for addressing the surging demands of data centers and next-generation network infrastructures. The review highlights not only the performance benefits but also the evolving standards and integration strategies that support scalable deployment. As MCF technology continues to evolve with even greater core counts, SENKO remains at the forefront, collaborating with industry leaders to develop innovative solutions that address the emerging challenges of integration, alignment precision, and scalable deployment.

The key obstacles to widespread MCF adoption are, such as managing crosstalk between cores, ensuring connector and splice reliability under operational stress, and enabling high-volume manufacturing of MCF transceivers. One of the most critical technical hurdles of achieving precise rotational alignment during connectorization and mating is addressed through SENKO's new development of advanced connectivity solutions.

These ongoing advancements not only reinforce the promise of MCF for future-proofing network infrastructures but also ensure that the technology remains adaptable to the rapidly changing landscape of optical communications. SENKO's innovative connectorization technologies will be critical steps toward practical and repeatable MCF deployment, paving the way for widespread adoption in hyperscale data centers and co-packaged optics environments.

Biography



Andrei Vankov, is an Application Engineer at SENKO Advanced Components. He received his BS from Thomas Edison State College and his MSEE from Pennsylvania State University. He began his career in 1993 at Sumitomo Electric Lightwave Corp as a Fiber Optic Manufacturing Engineer where he worked on active and passive components using Kaizen methods in Yokohama, Japan. As a Senior Optical Design Engineer in Franklin, MA (founded as Advanced Interconnect) Andrei Vankov developed various passive optical components and packaging integration to meet Telcordia industry standards. He designed optical interconnects, including optical backplanes (MTP, HBMT, PHD, OGI), and a fiber optic SMPTE compatible Broadcast Connector for HD applications. In 2013-2020 Andrei worked at Nokia division Radio Frequency Systems (RFS) where he provided leadership for an LTE RAN launch project team. Andrei holds several US and European Patents in fiber optics interconnect technology.

References

1. Telcordia Technologies. GR-326-CORE Issue 4: Generic Requirements for Single-Mode Optical Connectors and Jumper Assemblies. Released 1 December 2013.
2. Advanced Photonics Coalition resources. Available at: <https://www.advanced-photonics.org/organization-overview>
3. International Telecommunication Union (ITU-T). G Supplement 87 – Standardization framework for optical fibres for Space Division Multiplexing. March 2025. Available at: <https://www.itu.int/rec/T-REC-G.Sup87>
4. International Telecommunication Union (ITU-T). Recommendation database entry for G Suppl. 87. Available at: <https://www.itu.int/itu-t/recommendations/rec.aspx?id=16393&lang=en>
5. International Electrotechnical Commission (IEC). TC 86 Fibre Optics – Scope. Available at: https://www.iec.ch/dyn/www/f?p=103:7:::FSP_ORG_ID:1279
6. IEC SC 86A – Fibres and cables. Available at: <https://standards.iteh.ai/catalog/tc/iec/f9be73cd-3fa8-4b0a-bb56-c277dc93640c/sc-86a>
7. IEC SC 86B – Interconnecting devices and passive components. Available at: https://www.iec.ch/dyn/www/f?p=103:30:::FSP_ORG_ID,FSP_LANG_ID:1401,25
8. Bureau International des Poids et Mesures (BIPM). Working Document – IEC 61300-2-33, IEC 61745. Available at: <https://www.bipm.org/documents/20126/29733267/working-document-wg-public-ID-12659/a4ff3514-9847-388c-a7aa-3aaae53d49dc/>
9. Telecommunications Industry Association (TIA). TR-42 I – Telecommunications Cabling Systems. Available at: <https://tiaonline.org/committee/tr-42-i-telecommunications-cabling-systems/>
10. TIA Subcommittee TR-42.11 – Optical Fiber Systems. Available at: <https://tiaonline.org/subcommittee/tr-42-11-optical-fiber-systems-568/>
11. IEEE 802.3. IEC TC86 Liaison Report for November 2023 IEEE 802.3 Plenary. Available at: <https://www.ieee802.org/3/minutes/nov23/IEC%20TC86%20Liaison%20Report%20for%20November%202023%20IEEE%20802.3%20Plenary.pdf>
12. Senko Advanced Components. SN® Connector Achieves IEC 61754-36 Standardization. May 2025. Available at: <https://www.senko.com/news/senkos-sn-connector-achieves-iec-61754-36-standardization/>
13. Senko Advanced Components. Application Note – MPO Best Practices. Available at: https://www.senko.com/wp-content/uploads/Application-Note_MPO-Best-Practices.pdf
14. Senko Advanced Components. Marvell and Senko Advance AI Infrastructure with Detachable 36-Channel Optical PIC Connector. April 2025. Available at: <https://www.senko.com/news/marvell-and-senko-advance-ai-infrastructure-with-detachable-36-channel-opt-pic-connector/>
15. Senko Advanced Components. Senko and GlobalFoundries Achieve Breakthrough in Detachable Fiber Interface for CPO. September 2025. Available at: <https://www.senko.com/news/senko-and-globalfoundries-achieve-breakthrough-in-detachable-fiber-interface/>
16. Grand View Research. Hyperscale Data Center Market (2025 – 2030)
17. Eoptolink Technology Inc., Ltd. Eoptolink Unveils Industry-First 800G Optical Transceiver for Multicore Fiber at OFC 2025. Available at: <https://www.eoptolink.com/news/358-eoptolink-unveils-industry-first-800g-optical-transceiver-for-multicore-fiber-at-ofc-2026>
18. 43rd European Conference on Optical Communication. Power Consumption in Multi-core Fibre Networks. Available at: https://backend.orbit.dtu.dk/ws/portalfiles/portal/171272267/ECOC_2017_Power_Consumption_in_Multi_core_Fibre_Networks_pp.pdf
19. OFS Fitel, LLC. Uncoupled 4-core Fibre with Ultra-low Loss and Low Inter Core Crosstalk. Available at: <https://www.ofsoptics.com/wp-content/uploads/Uncoupled-4-core-Fibre-with-Ultra-low-Loss-and-Low-Inter-Core-Crosstalk-paper-2020.pdf>
20. Sumitomo Electric Industries, Ltd. Ultra-High-Density MCF Connector Technology. Available at: https://sumitomelectric.com/sites/default/files/2025-08/download_documents/UHD_MCF%20connector_OFC2018_0.pdf
21. NTT Corporation. Lineup of multi-core optical fiber construction, operation, and maintenance technologies that realize four times the capacity with a single optical fiber. Available at: <https://group.ntt/en/newsrelease/2024/11/15/241115a.html>
22. Wuhan National Lab for Optoelectronics (WNLO), Optics Valley Laboratory, Wuhan. Advances in Multicore Fiber Interferometric Sensors. Available at: <https://www.mdpi.com/1424-8220/23/7/3436>
23. Fiber Core. Multicore Fiber Specification. Available at: <https://fibercore.humaneticsgroup.com/products/multicore-fiber/multicore-fiber/sm-4c150080125001>
24. Lightera. Furukawa Electric and Lightera Develop Industry-Leading Technology for Fusion Splicing Multi-core and Hollow Core Fibers. Available at: <https://www.ofsoptics.com/furukawa-electric-and-lightera-develop-industry-leading-technology-for-fusion-splicing-multi-core-and-hollow-core-fibers/>
25. Furukawa Electric Co., Ltd. High-end Fusion splicer S185ROF for LDF splicing. Available at: <https://www.furukawaelectric.com/splicer/en/product/s185rof.html>

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