Chiral Photonics

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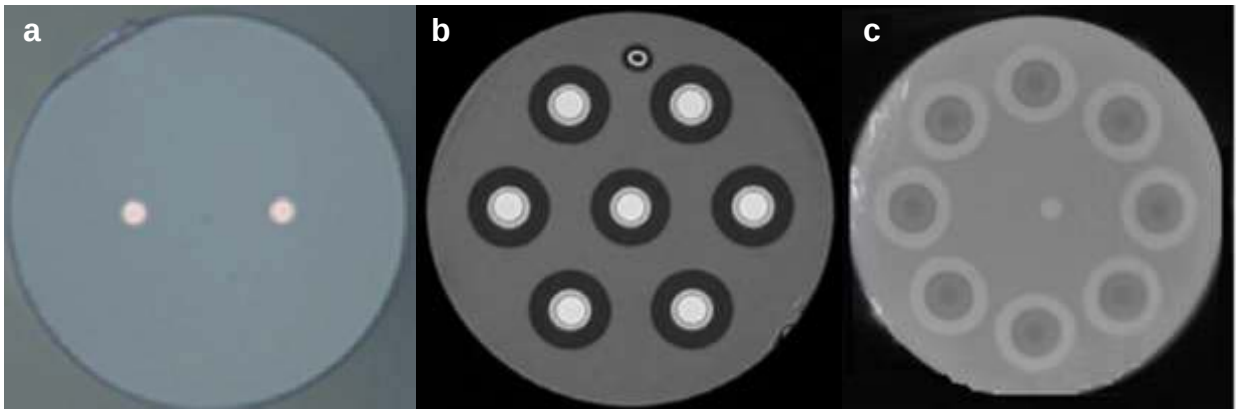
MCFFO - Multicore Fiber Fanout

Multicore fiber (MCF) is increasingly of interest for space division multiplexing, enabling, for example, higher bandwidth and more efficient communications, 3D shape sensing for in-vivo navigation and high density coupling for photonic integrated circuits and interconnects. Due to the tight channel spacing in multicore fiber, addressing each core individually is challenging. Chiral's Multicore Fiber Fanout (MCFFO) enables addressing individual cores of these fibers with high precision and low loss.

Fanouts are typically shipped in spliced pairs to both ends of a MCF length. This configuration enables full testing of insertion loss and crosstalk for each pair. MCF and pigtail lengths can be tailored to your needs. The fanout pigtails, the 7 fibers shown to the left in the exemplary image below, are typically standard singlemode fibers. However, we have fabricated many custom fanouts with pigtail fibers tailored to meet specific customer needs.

To date, Chiral Photonics has supplied fanouts for MCFs with 2 to 22 channels in a variety of configurations. Some exemplary MCF fibers that we have fabricated fanouts for are shown below, along with related citations.



a: Y. Geng, et. al. "High-speed, bi-directional dual-core fiber transmission system for high-density, short-reach optical interconnects," Proc. SPIE 9390, Next-Generation Optical Networks for Data Centers and Short-Reach Links II, 939009 (March 9, 2015).
b: V.I. Kopp, et. al. "Pitch Reducing Optical Fiber Array and multicore fiber for space-division multiplexing," Photonics Society Summer Topical Meeting Series, 2013 IEEE , vol., no., pp.99,100, 8-10 July 2013.
c: T. Hayashi, et. al. "125-µm-Cladding 8-Core Multi-Core Fiber Realizing Ultra-High-Density Cable Suitable for O-Band Short-Reach Optical Interconnects," in Optical Fiber Communication Conference Post Deadline Papers, OSA Technical Digest (online) (Optical Society of America, 2015), paper Th5C.6.

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Multicore fiber is often supplied by the customer and the fanout is matched to the fiber. However, Chiral also stocks different multicore fibers and can supply both the fanouts and MCF, as preferred. Fanouts can also include connectorization and assembly with other components, as desired.

Typical specifications for fanouts are:

- Average insertion loss per channel: 0.5 dB
- Average crosstalk per channel: < -40 dB
- Metal package dimensions: ~ 135 mm length x 3.4 mm OD, with protective boots

Shown below is a typical specification for a pair of MCF fanouts, as is supplied with every pair of fanouts:

Channel number	1	2	3	4	5	6	7
1	-1.0	-48.1	-45.0	-49.0	X	X	X
2		-1.3	X	-53.7	-46.9	X	X
3			-1.2	-46.2	X	-48.7	X
4				-1.3	-53.9	-49.4	-51.8
5					-0.7	X	-45.5
6						-1.1	-46.4
7							-0.8

	Insertion Loss (dB)
	Crosstalk (dB)
X	Channels more than one pitch spacing apart

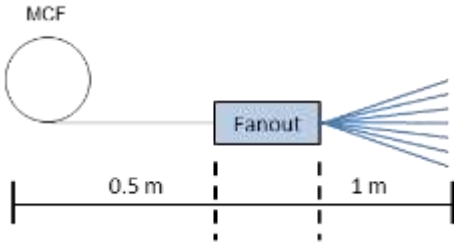
Please contact us to discuss your specific MCF fanout and assembly needs.

Multicore Fiber Options

Multicore (MCF) specifications	MCF-007_2	MCF-007_3	MCF-004_1
Number of Cores:	7	7	4
Operating Wavelength (nm):		1520-1650	1520-1651
Numerical Aperture (nominal):		0.21	0.14-0.17
Mode Field Diameter (µm, @ 1550 nm):	10	5.7-6.5	7.4-8.5
Cladding Diameter (µm, nominal):	125	125	125
Multicore Fiber Lattice:	Hexagonal	Hexagonal	Square
Core-to-Core Spacing (µm):	37	35	50
Coating Diameter (µm, nominal):	220	245	245
Operating Temperature (degrees C):		-55 to +85	-55 to +85
Orientation Marker:	No	No	No
Coating:	Acrylate	Acrylate	Acrylate

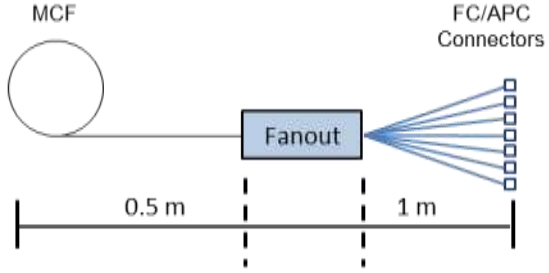
7-channel multicore fiber single fanout

MCFFO-S-7/37-03-1550-SM-01-XX-00-00/00-0.5-CL-00



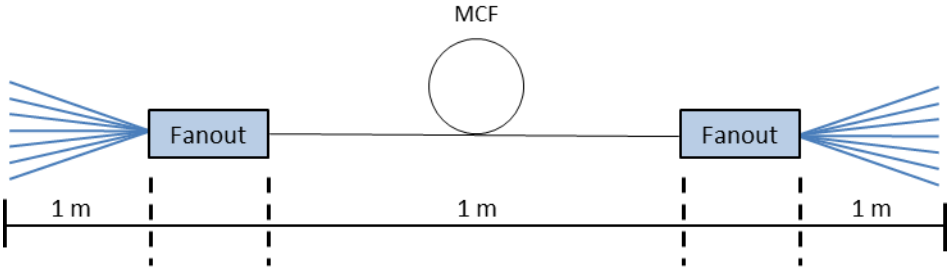
7-channel multicore fiber single fanout with pigtail FC/APC connectors

MCFFO-S-7/37-03-1550-SM-01-FC/APC-00-00/00-0.5-CL-00



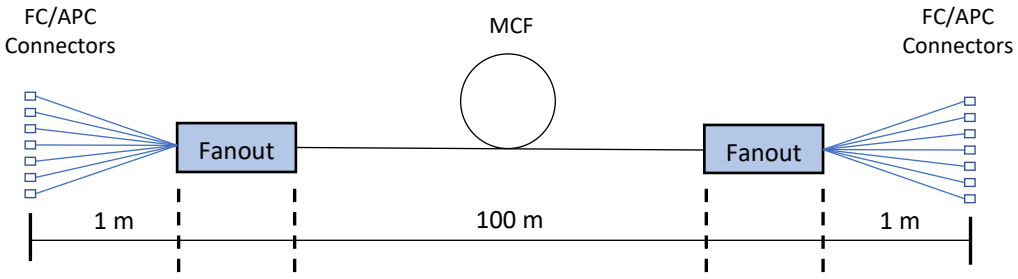
7-channel multicore fiber fanout pair

MCFFO-P-7/37-03-1550-SM-01-XX-00-00/00-01-XX-00



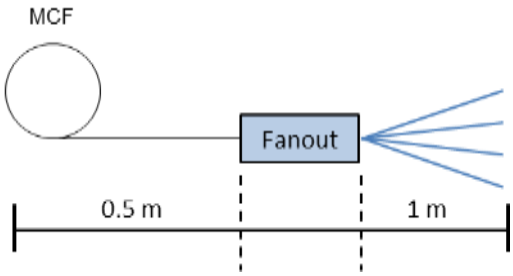
7-channel multicore fiber fanout pair with FC/APC connectors

MCFFO-P-7/37-03-1550-SM-01-FC/APC-00-00/00-01-XX-00



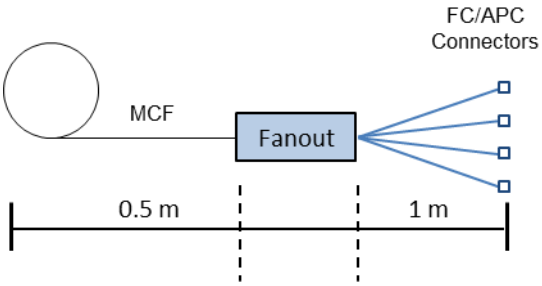
4-channel multicore fiber single fanout

MCFFO-S-4/50-04-1550-SM-01-XX-00-00/00-0.5-CL-00



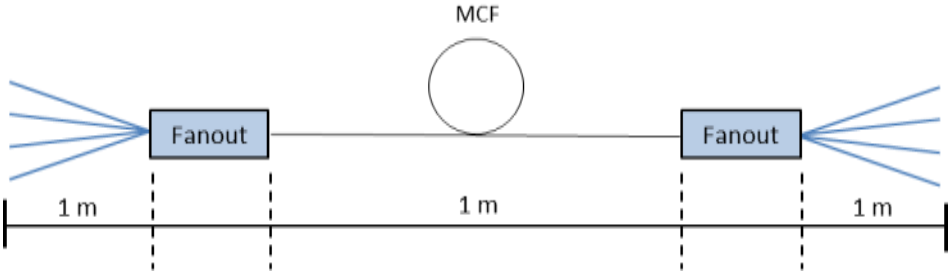
4-channel multicore fiber single fanout with pigtail FC/APC connectors

MCFFO-S-4/50-04-1550-SM-01-FC/APC-00-00/00-0.5-CL-00



4-channel multicore fiber fanout pair

MCFFO-P-4/50-04-1550-SM-01-XX-00-00/00-01-XX-00



4-channel multicore fiber fanout pair with FC/APC connectors

MCFFO-P-4/50-04-1550-SM-01-FC/APC-00-00/00-01-XX-00