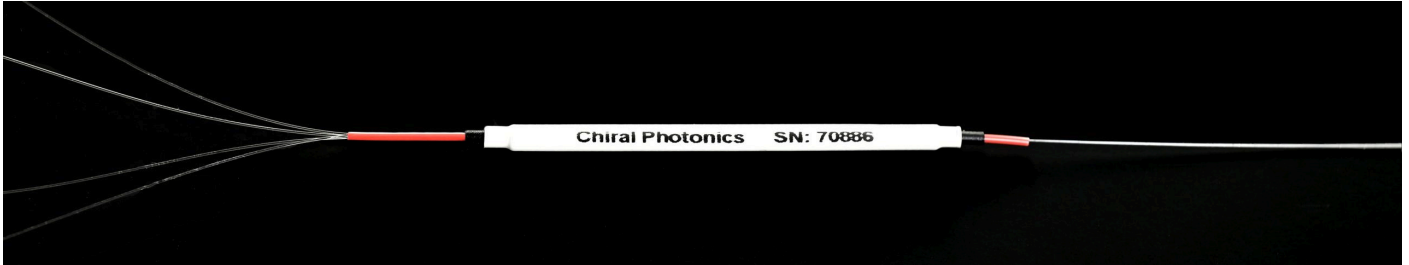


Multicore Fiber Fanout



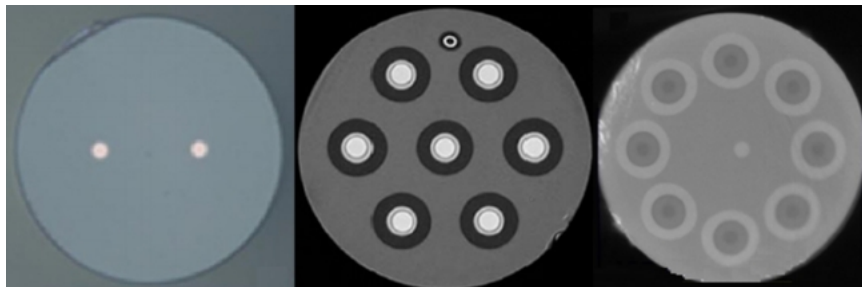
MULTICORE FIBER FANOUT

Multicore fiber (MCF) is increasingly of interest for applications ranging from 3D shape sensing to space division multiplexing to 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. 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 in the example above, are typically standard singlemode fibers. However, we have fabricated many custom fanouts with pigtail fibers tailored to meet specific customer needs.

Fanouts can be fabricated to include connectorization and assembly with other components, as desired.

We carry a number of multicore fibers in stock, in limited supply (see MCF Table below) and can supply both the fanouts and MCF. If preferred, we often work with customer-supplied MCF. To date, we have supplied fanouts for MCF with 2 to 22 channels in a variety of configurations (hexagonal, square, circular and others). Some exemplary MCF fibers for which we have fabricated fanouts are shown below, along with related citations. Please speak to us about your specific fanout needs.

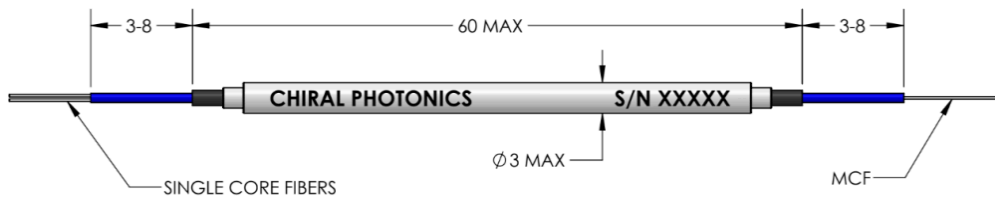


a. Y. Geng, et. al. "High-speed, bi-directional dual-core fiber transmission system for high-density, short-reach optical interconnects," Proc. SPIE 9390, Next-Generation Optical Networks for Data Centers and Short-Reach Links II, 939009 (March 9, 2015).

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, 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.

Schematic of standard 4-channel multicore fiber fanout



Typical fanout specifications:

- Average insertion loss per channel: 0.5 dB
- Average crosstalk per channel: < -40 dB
- Metal cylindrical package: ~155 mm length x 3.4 mm OD, including protective boots

Shown below is a typical report for a pair of 7-channel MCF fanouts, showing the insertion loss for each channel (diagonal shaded in blue), through two fanouts, and core-to-core crosstalk data (cells shaded in yellow). A report containing this information is provided with all fanouts.

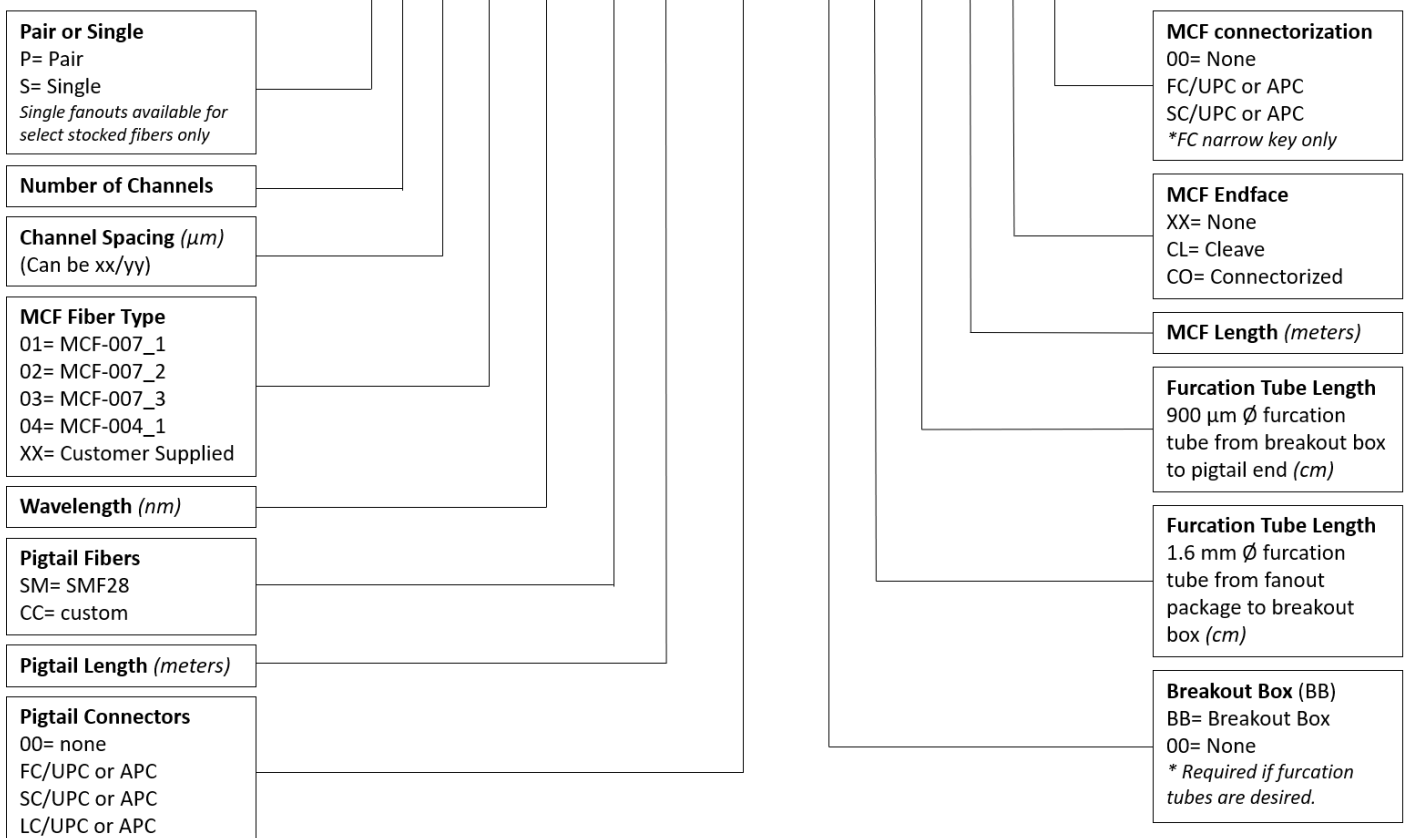
		MCFFO - 2947							
		ch. no.	1	2	3	4	5	6	7
Reference MCFFO	1	-0.9	-35.4	-31.7	-35.4	< -55	< -55	< -55	
	2	-36.1	-0.8	< -55	-38.1	-34.4	< -55	< -55	
	3	-30.8	< -55	-0.7	-33.1	< -55	-31.3	< -55	
	4	-36.0	-38.2	-33.6	-0.3	-31.5	-34.0	-35.4	
	5	< -55	-35.4	< -55	-32.9	-0.9	< -55	-34.0	
	6	< -55	< -55	-32.6	-35.5	< -55	-1.0	-33.5	
	7	< -55	< -55	< -55	-35.9	-33.2	-33.7	-0.8	

Insertion Loss (dB)
 Crosstalk (dB)

Ordering Information

When purchasing a Multicore Fiber Fanout, please use the guide below to determine the best configuration for your application.

MCFFO-P-7/45-02-1550-SM-01-FC/UPC-BB-25/75-01-CL-00



*Jacketing the pigtails necessitates the use of a breakout box.
Other custom configurations, fibers and connectors available upon request.*

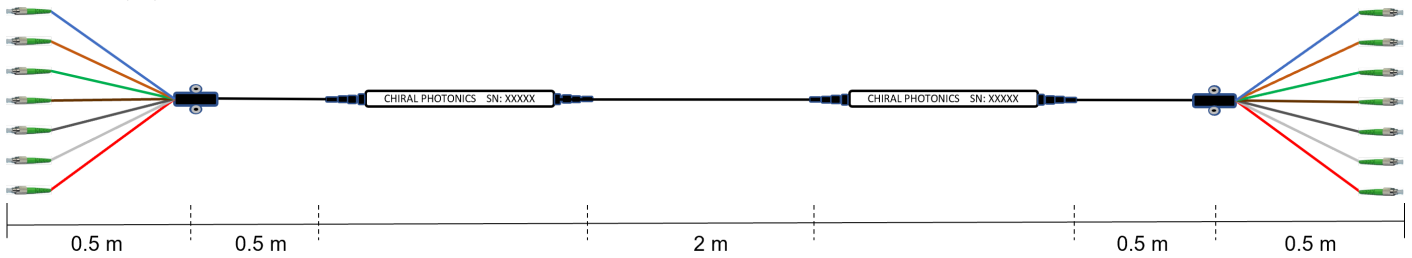
Exemplary Configurations

Fanouts are available as single fanouts or in pairs and can be customized to your specific needs. We can use your MCF or one of the fibers we stock. MCF and pigtail lengths can be adjusted. Jacketing, conectorization and ruggedization options are available to fit your specific needs. Below are examples of options available.

MCFFO-P-7/35-03-1550-SM-01-FC/APC-BB-0.05/0.05-02-XX-00

Multicore fiber fanout, pair, 7 channels

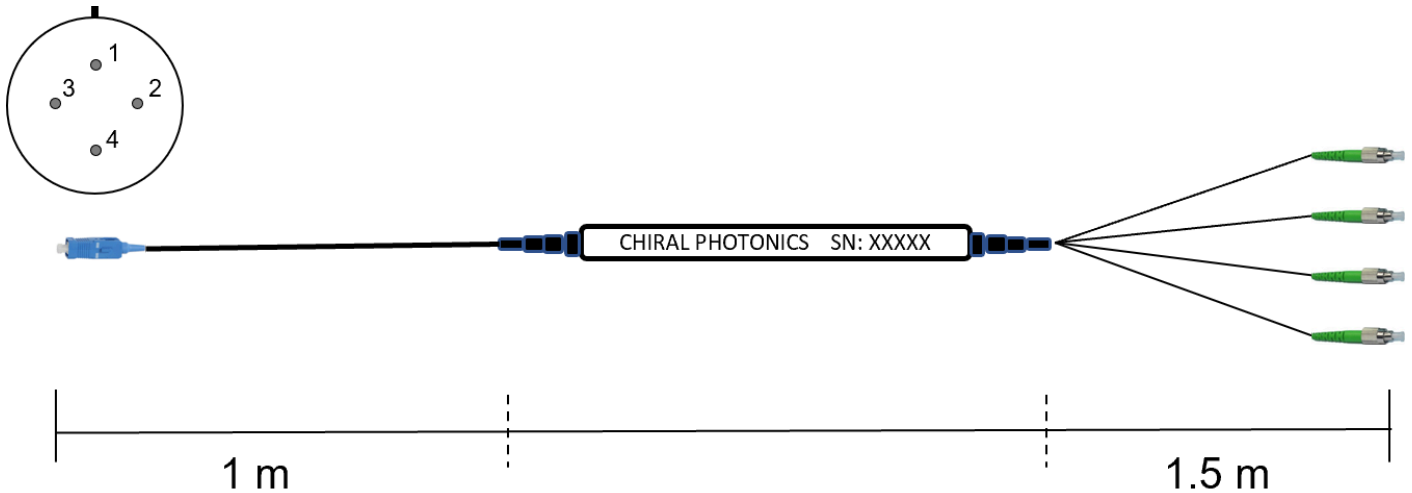
- MCF: MCF-007_03, 7 channels, 35 μm pitch, 2 meters between fanouts, no jacket, no connector
- 1550 nm central wavelength
- Pigtails (14): SMF28 fiber, 1 meter long, breakout box, color-coded jacketing, FC/APC connectors



MCFFO-S-4/50-04-1550-SM-1.5-SC/APC-00-00/00-01-CO-SC/UPC

Multicore fiber fanout, single, 4 channels

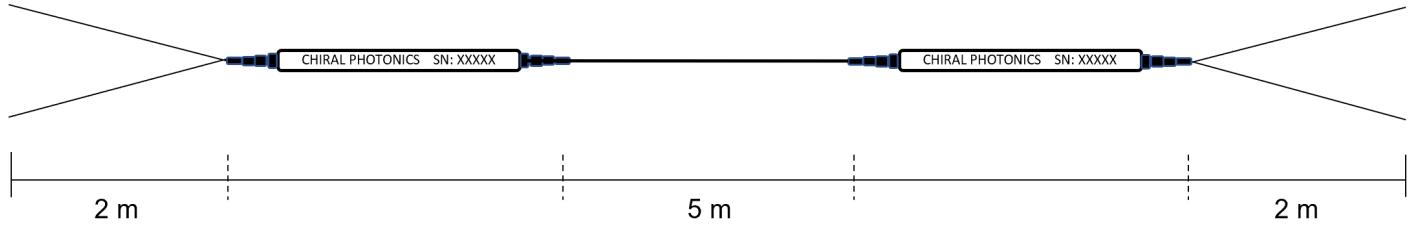
- MCF: MCF-004_1, 4 channels, 50 μm pitch, 1 meter, no jacket, SC/UPC connector
- 1550 nm central wavelength
- Pigtails (4): SMF28 fiber, 1.5 meters long, no jacket, SC/APC connectors



MCFFO-P-2/45-XX-1550-SM-02-00-00/00-05-XX-00:

Multicore fiber fanout, pair, 2 channels

- MCF: customer-supplied, 2 channels, 45 μm pitch, 5 meters between fanouts, no jacket, no connector
- 1550 nm central wavelength
- Pigtails (4): SMF28 fiber, 2 meters long, no jacket, no connectors

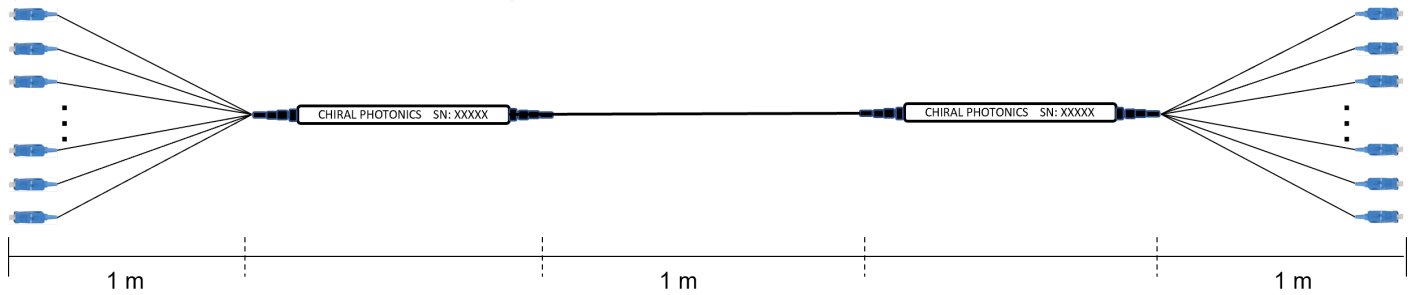


MCFFO-P-19/30-XX-1550-SM-01-LC/APC-00-00/00-01-XX-00:

Multicore fiber fanout, pair, 19 channels

- MCF: Customer supplied, 19 channels, 30 μm pitch, 1 meter between fanouts, unjacketed, unconnectorized
- 1550 nm central wavelength
- Pigtails (38): SMF28 fiber, 1 meter long, no jacket, LC/APC connectors

(Fanouts are available as single fanouts or in pairs)



Multicore Fibers in Stock

	MCF-007_2	MCF-007_3	MCF-004_1	MCF-004_2	MCF-004_4
Number of Cores:	7	7	4	4	4
Operating Wavelength (nm):	–	1520-1650	1520-1650	1520-1650	1310/ 1550
Numerical Aperture (nominal):	–	0.21	0.14-0.17		
Mode Field Diameter (μm , @ 1550 nm):	10	5.7-6.5	7.4-8.5		9.6
Core Diameter (μm):	9	–	–		
Cladding Diameter (μm , nominal):	125	125	125	125	125
Multicore Fiber Lattice:	Hexagonal	Hexagonal	Square	Square	Square
Core-to-Core Spacing (μm):	37	35	50	40	42
Coating Diameter (μm , nominal):	220	245	245	245	190
Operating Temperature (degrees C):	–	-55 to +85	-55 + 85		
Orientation Marker	No	No	No	Yes	Yes
Coating	Acrylate	Acrylate	Acrylate	Acrylate	Acrylate

** blank fields indicate the manufacturer provided no information



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