Gooch & Housego
ENABLING PHOTONIC TECHNOLOGIES

2+1X1 MULTIMODE POWER COMBINER WITH SIGNAL FEEDTHROUGH

Fused Tapered Fiber Bundle

Gooch & Housego proprietary manufacturing techniques allow the precise fusion of multimode pump fibers to a signal feedthrough fiber and a dual clad output fiber.

This provides high coupling efficiency over a wide pump wavelength range.

Available in a standard (2+1)x1 configuration, the combiner can be fabricated from a range of industry standard fibers for ease of splicing to commercially available laser diodes, signal and gain fibers.

Custom variants using non-standard fibers including LMA fibers are available on request.

Please contact the sales team for further information.

Key Features

- 1.5 µm and 1.0 µm signal feedthroughs available
- All fiber construction
- High power design
- High coupling efficiency
- Custom configurations available

Applications

- Cladding pumped fiber lasers
- Cladding pumped fiber amplifiers
- Telecoms
- Medical
- Industrial
- Defense

Optical Specifications[1]

Parameter	Specification
Pump input fiber NA	0.15 or 0.22
Pump input wavelength	780 – 1000 nm
Signal input wavelength	1530 – 1565 nm (1550 nm) or 1030 – 1090 nm (1064 nm)
Pump (MM) transmission efficiency[2]	≥ 90% (typ. 95%)
Signal transmission efficiency[3]	≥ 93% (typ. 97%)
Return loss	≥40 dB
Operating temperature	-5 – +65°C
Storage temperature	-40 – +85°C

1 All specifications are for operation at room temperature.

2 MM transmission efficiencies based on typical system mode fill conditions and 0.5 m pigtails. Reported at 975 nm as standard.

3 Signal (feedthrough) transmission efficiency reported at center wavelength.

Order code

Order codes are comprised of a standard device prefix (e.g. TFB) followed by code letters or numbers which correspond to available options.

Sample: TFB-550212B31 (2+1x1 TFB, 1550 nm signal wavelength, 2 pump inputs 105/125 µm 0.22 NA fiber, 1550nm core DCF output fiber, regular housing, 1 m pigtail lengths).

Order code				①	②	③	④	⑤	⑥	⑦	⑧	⑨
T	F	B	-				2	1				

①②③	**Signal wave length**[1]	1064 nm	1550 nm
	Code	064	550

④	**Configuration (No. of pump inputs)**	2 pump inputs
	Code	2

⑤	**Pump input fiber**	105/125 µm
	Code	1

⑥	**Pump input fiber NA**	0.15	0.22
	Code	1	2

⑦	**DCF output fiber**[2]	1060 nm core. 125 µm/0.45 NA	1550 nm core. 125 µm/0.45 NA
	Code	A	B

⑧	**Housing**[3,4]	Regular ø 3 x 65 mm (max)	Level 1 high power 5 mm^2 x 65 mm (max)
	Code	3	7

⑨	**Pigtail length**[5]	0.5 m	1 m
	Code	0	1

1 Signal wavelengths of 1064 nm or 1550 nm assume the use of Corning Hi1060 or SMF-28 (or equivalent) fibers respectively.

2 Typical mode field diameters are based on 6.2 µm for 1064 nm and 10.5 µm for 1550 nm. Fibers are passive.

3 Maximum housing lengths shown.

4 The 3 mm cylindrical package is recommended for pump powers up to 10 W per port. The high power housing is recommended for pump powers up to 50 W per port. Adequate heat-sinking is required for high power operation. For more information please contact the G&H sales team.

5 Minimum pigtail lengths.

For further information

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Gooch & Housego
ENABLING PHOTONIC TECHNOLOGIES

2+1X1 MULTIMODE POWER COMBINER WITH PM SIGNAL FEEDTHROUGH

Fused Tapered Fiber Bundle

Gooch & Housego proprietary manufacturing techniques allow the precise fusion of multimode pump fibers to a PM signal feedthrough fiber and a PM dual clad output fiber.

This provides high coupling efficiency over a wide pump wavelength range.

Available in a standard (2+1)x1 configuration, the combiner can be fabricated from a range of industry standard fibers for ease of splicing to commercially available laser diodes, signal and gain fibers

Custom variants using non-standard fibers are available on request.

Please contact the sales team for further information.

Key Features

- 1.5 µm & 1.0 µm PM signal fibers available
- All fiber construction
- High power design
- High coupling efficiency
- PM Axis maintained
- Custom configurations available

Applications

- Cladding pumped fiber lasers
- Cladding pumped fiber amplifiers
- Telecoms
- Medical
- Industrial
- Defense

Optical Specifications[1]

Parameter	Specification
Pump Input fiber NA	0.15 or 0.22
Pump input wavelength	780 – 1000 nm
Signal input Wavelength	1530 - 1565 nm (1550 nm) or 1030 – 1090nm (1064 nm)
Pump (MM) transmission efficiency[2]	≥ 90% (typ. 95%)
Signal transmission efficiency[3]	≥ 93% (typ. 97%)
Signal PER (polarization extinction ratio)	≥20 dB
Return loss	≥40 dB
Operating temperature	0 – +65°C
Storage temperature	-40 – +85°C

1 All specifications are for operation at room temperature.

2 MM transmission efficiencies based on typical system mode fill conditions and 0.5 m pigtails. Reported at 975 nm as standard.

3 Signal (feedthrough) transmission efficiency reported at center wavelength.

Order code

Order codes are comprised of a standard device prefix (e.g. TFB) followed by code letters or numbers which correspond to available options.

Sample: TFB-P50212B31 (2+1x1 TFB, PM 1550nm signal feedthrough, 2 pump 105/125 µm 0.22 NA fiber inputs, 1550 nm core DCF output, regular housing, 1 m pigtails).

Order code				①	②	③	④	⑤	⑥	⑦	⑧	⑨
T	F	B	-	P			2	1				

②③	**Signal wave length**[1]	1064 nm	1550 nm
	Code	64	50
④	**Configuration (No. of pump inputs)**	2 pump inputs	
	Code	2	
⑤	**Pump input fiber**	105/125 µm	
	Code	1	
⑥	**Pump input fiber NA**	0.15	0.22
	Code	1	2
⑦	**DCF output fiber**[2]	1060 nm core. 130 µm/0.45 NA	1550 nm core. 130 µm/0.45 NA
	Code	A	B
⑧	**Housing**[3,4]	Regular ø 3 x 65 mm max	Level 1 high power 5 mm^2 x 65 mm max
	Code	3	7
⑨	**Pigtail length**[5]	0.5 m	1 m
	Code	0	1

1 Signal wavelengths of 1064 nm or 1550 nm assume the use of Nufern PM-980-HP and PM-1550-HP (or equivalent) signal input fiber s respectively.

2 Typical mode field diameters are based on ~7.5 µm for 1064 nm and ~10.5 µm for 1550 nm. Fibers are passive.

3 Maximum housing lengths shown.

4 The 3 mm cylindrical package is recommended for pump powers up to 10 W per port. The high power housing is suitable for pump powers up to 50 W per port. Adequate heat-sinking is required for high power operation. For more information please contact the G&H sales team.

5 Minimum pigtail lengths.

For further information

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Gooch & Housego
ENABLING PHOTONIC TECHNOLOGIES

SIDE-COUPLED MULTIMODE POWER COMBINER WITH PM SIGNAL FEED-THROUGH FOR 2 µm OPERATION

Fused Fiber TFB

Gooch & Housego's side-coupled TFB series power combiners has been expanded to include the 2 µm operating window.

G&H proprietary manufacturing techniques allow the precise fusion of multimode pump fibers to a PM (polarization maintaining) signal feed-through fiber and a PM dual clad output fiber providing high coupling efficiency over a wide pump wavelength range.

Available in a standard (1+1)x1 and (2+1)x1 configuration, the combiner can be fabricated from a range of industry standard fibers for ease of splicing to commercially available laser diodes, signal and gain fibers

Custom options cover large mode area (LMA), large diameter (LDF) and Active signal feed-through fibers and are available on request.

Please contact the sales team for further information.

Key Features

- 1.9 µm – 2.1 µm signal feed-through available
- All fiber construction
- High power design
- High coupling efficiency
- Custom configurations available

Applications

- Cladding pumped fiber lasers
- Cladding pumped fiber amplifiers
- Telecoms
- IR Imaging
- Biomedical
- Industrial
- Defense
- IR Counter measures

Optical Specifications[1]

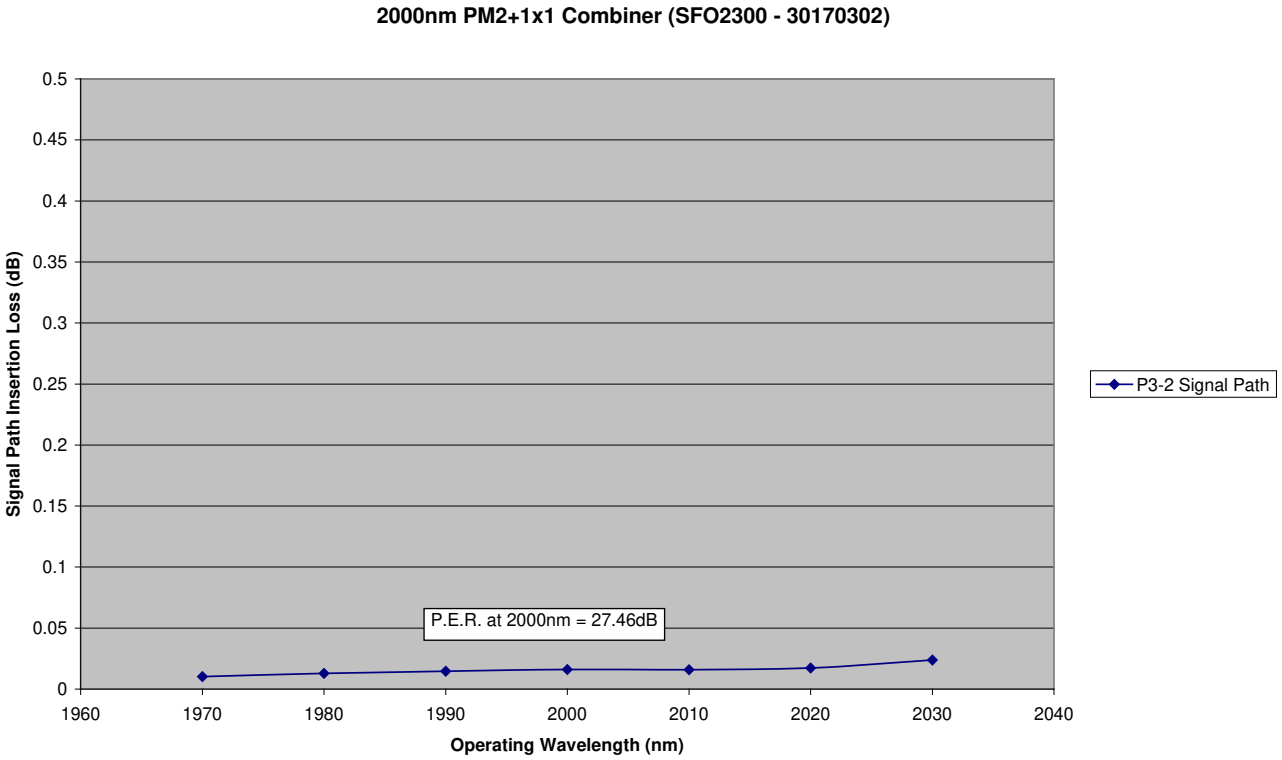
Parameter	Specification	
Feedthrough option	10/130 µm 0.15/0.45 NA	PM1950+10/130 µm
Pump input fiber NA	0.15 or 0.22	0.15 or 0.22
Pump input wavelength	750 – 850 nm	750 – 850 nm
Signal input wavelength	1900 – 2100 nm	1900 – 2100 nm
Pump (MM) transmission efficiency[2]	≥90% (typ. >95%)	≥90% (typ. >95%)
Signal transmission efficiency[3]	≥93% (typ. >97%)	≥90%
Signal PER (polarization extinction ratio)	≥17 dB	≥17 dB
Return loss	≥40 dB	≥40 dB
Operating temperature	-5 – +75°C	-5 – +75°C
Storage temperature	-40 – +85°C	-40 – +85°C

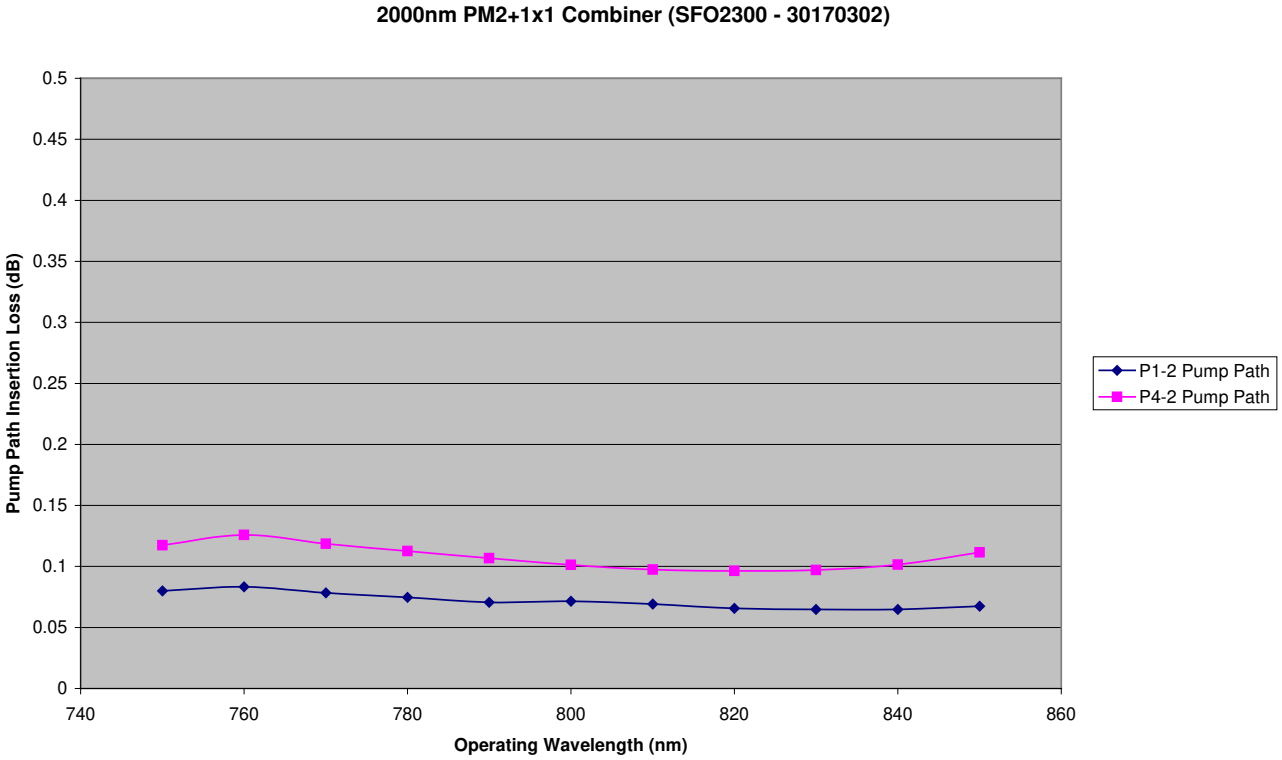
1 All specifications are for operation at room temperature.

2 MM transmission efficiencies based on typical system mode fill conditions and 0.5 m pigtails. Reported at 790 nm as standard.

3 Signal (feed-through) transmission efficiency reported at center wavelength

Typical Optical Performance





Order code

Order codes are comprised of a standard device prefix (e.g. TFB) followed by code letters or numbers which correspond to available options.

Sample: TFB-PY5212A71 (2+1x1 PM tapered fiber bundle, 1950 nm signal, two 105/125 µm 0.22 NA pump inputs, 10/130 µm 0.15/0.45 NA signal feed-through in level 1 high power, 1 m pigtails).

Order code				①	②	③	④	⑤	⑥	⑦	⑧	⑨
T	F	B	-	P				1				

②③	**Signal wave length**[1]	1900 nm	1950 nm	2000 nm	2050 nm
	Code	Y0	Y5	Z0	Z5

④	**Configuration (No. of pump inputs)**	1 pump input	2 pump inputs
	Code	1	2

⑤	**Pump input fiber**	105/125 µm
	Code	1

⑥	**Pump input fiber NA**	0.15	0.22
	Code	1	2

⑦	**Signal feed through fiber**[2]	10/130 µm 0.15/0.45 NA	PM1950+10/130 µm
	Code	A	B

⑧	**Housing**[3]	Regular ø3 x 65 mm (max)	Level 1 high power 5 mm^2 x 65 mm (max)	Level 2 high power 5 mm^2 x 65 mm (max)
	Code	3	7	8

⑨	**Pigtail length**[4]	0.5 m	1 m	2 m
	Code	0	1	2

1 Single-mode feed-through DCF, other DCF including LMA available on request.

2 Other fiber types available, please contact the sales team for further information. Fibers are passive.

3 Maximum housing lengths. Note- Adequate heat-sinking is required for high power operation. High power multimode combiner applications note (PEC 0134) on website or consult sales dept.

4 Minimum pigtail lengths.

For further information

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Gooch & Housego
ENABLING PHOTONIC TECHNOLOGIES

2+1X1 MULTIMODE POWER COMBINER WITH ACTIVE SIGNAL FEED-THROUGH

Fused Fiber Tapered Fiber Bundle

Gooch & Housego proprietary manufacturing techniques allow the precise fusion of multimode pump fibers to a SM signal feed-through fiber with a passive input and an Active SM dual clad output fiber

This provides high coupling efficiency over a wide pump wavelength range.

Inclusion of the splice between the passive and active signal fiber within the combiner housing removes the need for an external splice reducing potential back-scatter to the pump sources.

Available in a standard (2+1)x1 configuration, the combiner can be fabricated from a range of industry standard fibers for ease of splicing to commercially available laser diodes, signal and gain fibers

Custom variants using non-standard fibers are available on request.

Please contact the Sales team for further information.

Key Features

- 1.5 µm & 1.0 µm signal fibers available
- All fiber construction
- High power design
- High coupling efficiency
- Custom configurations available

Applications

- Cladding pumped fiber lasers
- Cladding pumped fiber amplifiers
- Telecoms
- Medical
- Industrial
- Defense

Optical Specifications[1]

Parameter	Specification
Pump input fiber NA	0.15 or 0.22
Pump input wavelength	780 – 1000 nm
Signal input wavelength	1530 – 1565 nm (1550 nm) or 1030 – 1090 nm (1064nm)
Pump (MM) transmission efficiency[2]	≥80% (typ. >90%)
Signal transmission efficiency[3]	≥90% (typ. >95%)
Return loss	≥40 dB
Operating temperature	0 – +65°C
Storage temperature	-40 – +85°C

1 All specifications are for operation at room temperature.

2 MM transmission efficiencies based on typical system mode fill conditions and 0.5 m pigtails. Measurements performed outside of active fiber absorption band, typically reported at 1120 nm.

3 Signal (feed-through) transmission efficiency measured outside of active fiber absorption band, typically reported at 1310 nm.

Order code

Order codes are comprised of a standard device prefix (e.g. TFB) followed by code letters or numbers which correspond to available options.

Sample: TFB-550212X71 (2+1x1 tapered fiber bundle, SM 1550 nm signal feed-through, 2 pump inputs 105/125 µm 0.22 NA fiber, 1550 nm core active DCF output fiber, high power housing, 1 m pigtail lengths).

Order code				①	②	③	④	⑤	⑥	⑦	⑧	⑨
T	F	B	-				2	1		X		

①②③	**Signal wave length**[1]	1064 nm	1550 nm
	Code	064	550

④	**Configuration (No. of pump inputs)**	2 pump inputs
	Code	2

⑤	**Pump input fiber**	105/125 µm
	Code	1

⑥	**Pump input fiber NA**	0.15	0.22
	Code	1	2

⑦	**Active DCF output fiber**[2]	Customer Specific
	Code	X

⑧	**Housing**[3,4]	Regular high power ø 3 x 65 mm max	Level 1 high power 5 mm^2 x 65 mm max
	Code	3	7

⑨	**Pigtail length**[5]	0.5 m	1 m
	Code	0	1

1 Signal wavelengths of 1064 nm or 1550 nm assume using passive single-clad input fiber equivalent to customer specified active DCF.

2 Active DCF specified by customer

3 Maximum housing lengths shown.

4 The 3 mm cylindrical package is recommended for pump powers up to 10 W per port. The high power L1 housing is suitable for pump powers up to 50 W per port. Adequate heat-sinking is required for high power operation. For more information please contact the G&H sales team.

5 Minimum pigtail lengths.

For further information

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Gooch & Housego
ENABLING PHOTONIC TECHNOLOGIES

2+1x1 Multimode Power Combiner with Active PM Signal Feedthrough

Fused Fiber Tapered Fiber Bundle

Gooch & Housego proprietary manufacturing techniques allow the precise fusion of multimode pump fibers to a PM signal feed-through fiber with a passive input and an active PM dual clad output fiber.

This provides high coupling efficiency over a wide pump wavelength range.

Inclusion of the splice between the passive and active signal fiber within the combiner housing removes the need for an external splice reducing potential back-scatter to the pump sources.

Available in a standard (2+1)x1 configuration, the combiner can be fabricated from a range of industry standard fibers for ease of splicing to commercially available laser diodes, signal and gain fibers

Custom variants using non-standard fibers are available on request.

Please contact the sales team for further information.

Key Features

- 1.5 µm & 1.0 µm PM signal fibers available
- All fiber construction
- High power design
- High coupling efficiency
- PM axis maintained
- Custom configurations available

Applications

- Cladding pumped fiber lasers
- Cladding pumped fiber amplifiers
- Telecoms
- Medical
- Industrial
- Defense

Optical Specifications[1]

Parameter	Specification
Pump Input fiber NA	0.15 or 0.22
Pump Input wavelength	780 – 1000 nm
Signal input wavelength	1530 – 1565 nm (1550 nm) or 1030 – 1090 nm (1064 nm)
Pump (MM) transmission efficiency[2]	≥ 80% (typ. >90%)
Signal transmission efficiency[3]	≥ 90% (typ. >95%)
Signal PER (polarisation extinction ratio)[3]	≥17 dB (typ. >20 dB)
Return loss	≥40 dB
Operating temperature	0 – +65°C
Storage temperature	-40 – +85°C

1 All specifications are for operation at room temperature.

2 MM Transmission efficiencies based on typical system mode fill conditions and 0.5 m pigtails. Measurements performed outside of active fiber absorption band, typically reported at 1120 nm.

3 Signal (feed-through) transmission efficiency and PER measured outside of active fiber absorption band, typically reported at 1310 nm.

Order code

Order codes are comprised of a standard device prefix (e.g. TFB) followed by code letters or numbers which correspond to available options.

Sample: TFB-P50212X71 (2+1x1 TFB, PM 1550nm signal feedthrough, 2 pump 105/125 µm 0.22 NA fiber inputs, 1550 nm core active DCF output, high power housing, 1 m pigtails).

Order code				①	②	③	④	⑤	⑥	⑦	⑧	⑨
T	F	B	-	P			2	1		X		

②③	**Signal wave length**[1]	1064 nm	1550 nm
	Code	64	50

④	**Configuration (No. of pump inputs)**	2 pump inputs
	Code	2

⑤	**Pump input fiber**	105/125 µm
	Code	1

⑥	**Pump input fiber NA**	0.15	0.22
	Code	1	2

⑦	**Active DCF output fiber**[2]	Customer Specific
	Code	X

⑧	**Housing**[3,4]	Regular high power ø3 mm x 65 mm (max)	Level 1 high power 5 mm^2 x 65 mm max
	Code	3	7

⑨	**Pigtail length**[5]	0.5 m	1 m
	Code	0	1

1 Signal wavelengths of 1064 nm or 1550 nm assume using passive single-clad input fiber equivalent to customer specified active DCF.

2 Active DCF specified by customer

3 Maximum housing lengths shown.

4 The 3 mm cylindrical package is recommended for pump powers up to 10 W per port. The high power L1 housing is suitable for pump powers up to 50 W per port. Adequate heat-sinking is required for high power operation. For more information please contact the G&H sales team.

5 Minimum pigtail lengths.

For further information

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Gooch & Housego
ENABLING PHOTONIC TECHNOLOGIES

MULTIMODE POWER COMBINER WITH SIGNAL FEEDTHROUGH

Tapered Fiber Bundle

Gooch & Housego's tapered fiber bundle series power combiners provide a high efficiency means of combining light from several multimode sources into one fiber.

G&H proprietary manufacturing techniques allow the precise fusion of input fibers around a central signal feedthrough fiber and a dual clad output fiber providing high coupling efficiency over a wide pump wavelength range.

Available in a standard (6+1)x1 configuration, the combiner can be fabricated from a range of industry standard fibers for ease of splicing to commercially available laser diodes and fiber applications.

Custom options cover large mode area (LMA) signal feedthrough fibers, dual clad output fibers and port count/configurations and are available on request.

Please contact the sales team for further information.

Key Features

- 1.5 µm and 1.0 µm Signal feedthroughs available
- All fiber construction
- High power design
- High coupling efficiency
- Custom configurations available

Applications

- Cladding pumped fiber lasers
- Cladding pumped fiber amplifiers
- Telecoms
- Medical
- Industrial
- Defense

Optical Specifications[1]

Parameter	Specification	
Pump input fiber NA	0.15	0.22
Pump input wavelength	900 – 1000 nm	
Signal input wavelength	1550 or 1064 nm	
Pump (MM) transmission efficiency[2]	≥90% (Typ >95%)	≥90%
Signal transmission efficiency[3]	≥80% (Typ >85%)	
Return loss/directivity	>40 dB	

Operating temperature	-5 – +75°C
Storage temperature	-40 – +85°C

1 All specifications are for operation at room temperature.

2 MM Transmission efficiencies based on typical system mode fill conditions and 0.5 m pigtails. Reported at 975 nm as standard.

3 Signal (feedthrough) transmission efficiency reported at center wavelength; specification typical for center wavelength ±15 nm (minimum).

Order code

Order codes are comprised of a standard device prefix (e.g. TFB) followed by code letters or numbers which correspond to available options.

Sample: TFB-550611B30 (6+1x1 tapered fiber bundle, 1550 nm signal input, 6 pump inputs 105/125 µm 0.15 NA fiber, 1550 nm core DCF output, high power housing, 0.5 m pigtail lengths).

Order code				①	②	③	④	⑤	⑥	⑦	⑧	⑨
T	F	B	-				6	1				

①②③	**Signal wave length**[1]	1064 nm	1550 nm
	Code	064	550

④	**Configuration (No. of pump inputs)**	6 pump inputs
	Code	6

⑤	**Pump input fiber**	105/125 µm
	Code	1

⑥	**Pump input fiber NA**	0.15	0.22
	Code	1	2

⑦	**DCF output fiber**[2]	1060 nm core. 125 µm/0.45 NA	1550 nm core. 125 µm/0.45 NA
	Code	A	B

⑧	**Housing**[3]	Regular ø3 x 55 mm	Level 1 high power 5 mm^2 x 60 mm^3	Level 2 high power 5 mm^2 x 60mm^3
	Code	3	7	8

⑨	**Pigtail length**[4]	0.5 m	1 m	2 m
	Code	0	1	2

1 Signal wavelengths of 1064 nm or 1550 nm assume the use of Corning Hi1060 or SMF-28 (or equivalent) fibers respectively.

2 Typical core diameters are based on ~4 µm for 1064 nm and ~8 µm for 1550 nm. Fibers are passive.

3 Maximum housing lengths. Note- Adequate heat-sinking is required for high power operation. See high power multimode combiner application notes (PEC 0134) on website or consult sales office.

4 Minimum pigtail lengths.

For further information

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Gooch & Housego
ENABLING PHOTONIC TECHNOLOGIES

MULTIMODE POWER COMBINER WITH SIGNAL FEED-THROUGH FOR 2 µm OPERATION

6+1x1 Tapered Fiber Bundle

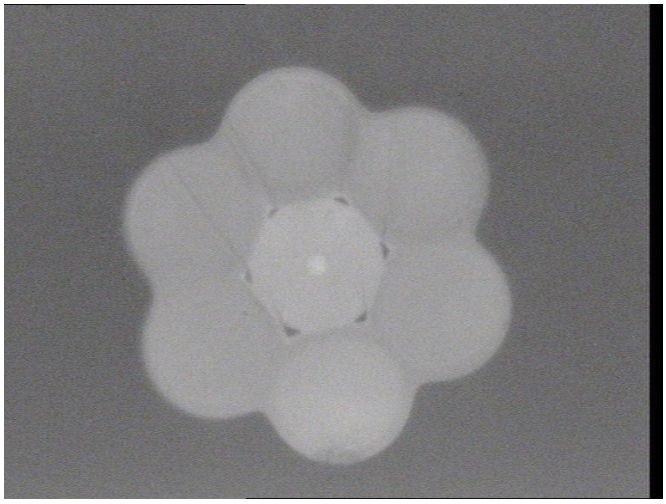
Gooch & Housego combiners provide a high efficiency means of combining light from several multimode sources into one fiber.

G&H proprietary manufacturing techniques allow the precise fusion of input fibers around a central signal feed-through fiber and a dual clad output fiber providing high coupling efficiency over a wide pump wavelength range.

Available in a standard (6+1)x1 configuration, the combiner can be fabricated from a range of industry standard and customized fibers for ease of splicing to commercially available laser diodes and fiber applications.

Custom options cover large mode area (LMA) signal feed-through fibers, dual clad output fibers and port count/configurations and are available on request.

Please contact the sales team for further information.



Key Features

- 1.9 µm to 2.1 µm signal feed-through available
- All fiber construction
- High power design
- High coupling efficiency
- Custom configurations available

Applications

- Cladding pumped fiber lasers
- Cladding pumped fiber amplifiers
- Telecoms
- IR Imaging
- Biomedical
- Industrial
- Defense
- IR Counter measures

Optical Specifications[1]

Parameter	Specification	
Pump input fiber NA	0.15	0.22
Pump input wavelength[2]	750 – 850 nm	
Signal input wavelength	1900 – 2100 nm	
Pump (MM) transmission efficiency[2]	≥90% (Typ.>95%)	≥90% (Typ >95%)
Signal transmission efficiency[3]	≥ 80% (Typ. >90%)	
Return loss/directivity	>40 dB	
Operating temperature	-5 – +75°C	
Storage temperature	-40 – +85°C	

1 All specifications are for operation at room temperature.

2 MM Transmission efficiencies based on typical system mode fill conditions and 0.5 m pigtails. Reported at 790 nm as standard.

3 Signal (feed-through) transmission efficiency reported at center wavelength; specification typical for center wavelength ±15 nm (minimum).

Order code

Order codes are comprised of a standard device prefix (e.g. TFB) followed by code letters or numbers which correspond to available options.

Sample: TFB-Y50611A70 (6+1x1 tapered fiber bundle, 1950 nm signal input, 6 pump inputs 105/125 µm 0.15 NA fiber, 10/125 µm 0.15/0.45 NA output fiber, high power housing, 0.5 m pigtail lengths).

Order code				①	②	③	④	⑤	⑥	⑦	⑧	⑨
T	F	B	-				6	1				

①②③	Signal wave length[1]	1900 nm	1950 nm	2000 nm	2050 nm
	Code	Y00	Y50	Z00	Z50

④	Configuration (No. of pump inputs)[5]	6 pump inputs
	Code	6

⑤	Pump input fiber	105/125 µm
	Code	1

⑥	Pump input fiber NA	0.15	0.22
	Code	1	2

⑦	DCF output fiber[2]	10/125 µm 0.15/0.45 NA
	Code	A

⑧	Housing[3]	Regular ø 3 x 55 mm	Level 1 high power 5 mm^2 x 60 mm	Level 2 high power 5 mm^2 x 60mm
	Code	3	7	8

⑨	Pigtail length[4]	0.5 m	1 m	2 m
	Code	0	1	2

1 Signal wavelengths assume the use of industry standard single-mode fiber, double clad and LMA available on request.

2 Other fiber types available, please contact the sales team for further information. Fibers are passive.

3 Maximum housing lengths. Note- Adequate heat-sinking is required for high power operation. High power multimode combiner applications note (PEC 0134) on website or consult sales dept.

4 Minimum pigtail lengths.

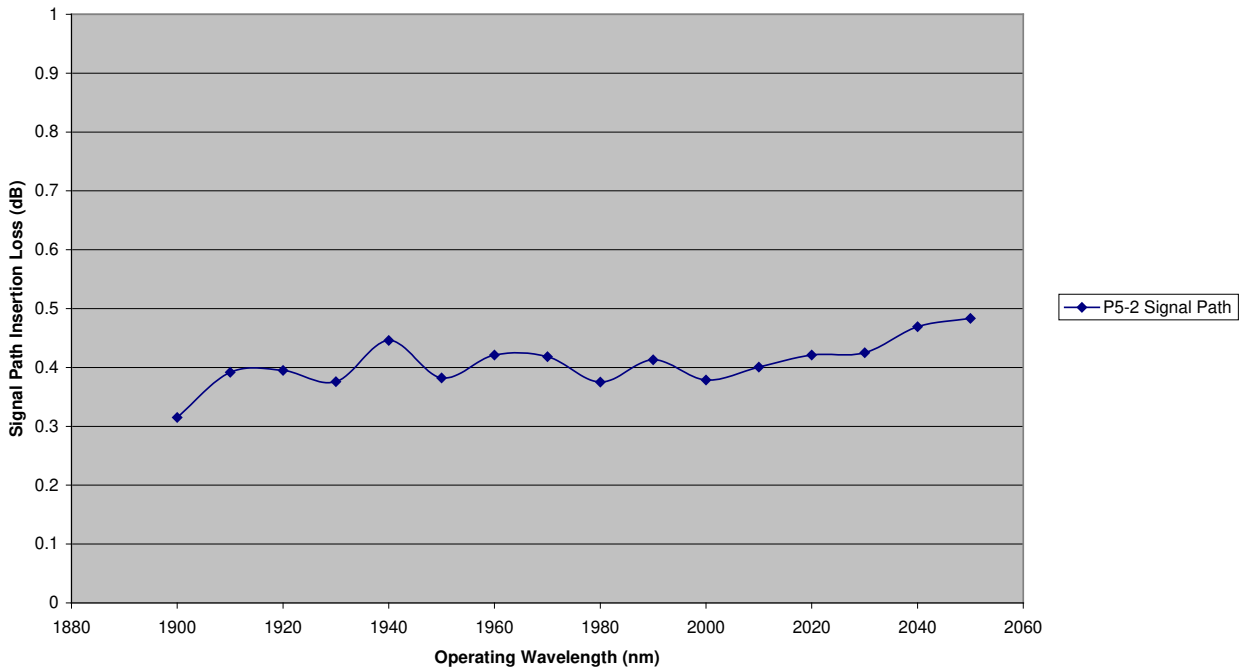
5 Other pump port count available, please contact the sales team for further information.

Other products which may be of interest

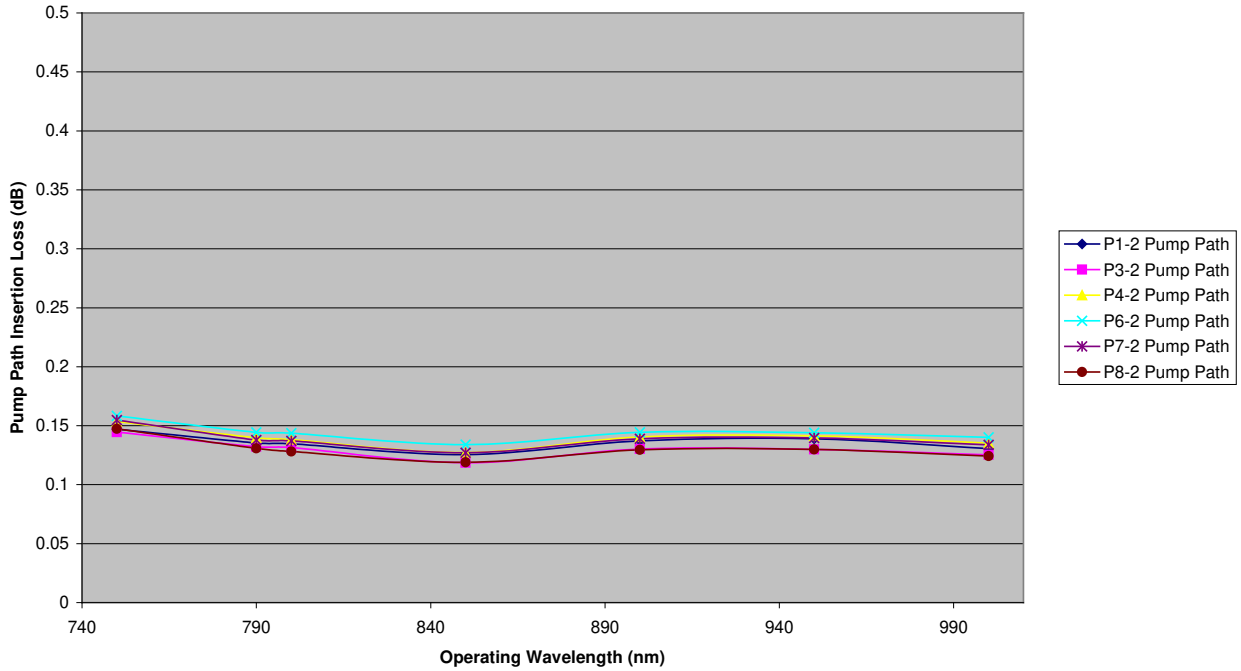
- Fiber-Q™
- High power multimode combiners
- Combiners with all types of signal feedthrough fiber
- Ultra-low ratio tap couplers
- WDMs for combining signals with red pointer lasers
- OCT wideband couplers
- HI REL components

Typical Optical Performance

ISLA 1950nm 6+1x1 Combiner (SFO2840 - 30172858)



ISLA 1950nm 6+1x1 Combiner (SFO2858 - 30172858)



Gooch & Housego
ENABLING PHOTONIC TECHNOLOGIES

MULTIMODE POWER COMBINER WITH PM SIGNAL FEEDTHROUGH

PM 6+1x1 TFB

The Gooch & Housego tapered fiber bundle(TFB) series power combiners provide a high efficiency means of combining light from several multimode sources into one fiber.

G&H proprietary manufacturing techniques allow the precise fusion of input fibers around a central PM (polarization maintaining) signal feedthrough fiber and a PM dual clad output fiber providing high coupling efficiency over a wide pump wavelength range.

Available in a standard 6+1x1 configuration, the combiner can be fabricated from a range of industry standard fibers for ease of splicing to commercially available laser diodes and fiber applications.

Custom variants using non-standard fibers are available on request.

Please contact the sales team for further information.

Key Features

- 1.5 µm & 1.0 µm PM signal fibers available
- All fiber construction
- High power design
- High coupling efficiency
- PM Axis maintained
- Custom configurations available

Applications

- Cladding pumped fiber lasers
- Cladding pumped fiber amplifiers
- Telecoms
- Medical
- Industrial
- Defense

Optical Specifications[1]

Parameter	Specification	
Pump input fiber NA	0.15	0.22
Pump input wavelength	900 to 1000 nm	
Signal input wavelength	1550 or 1064 nm	
Pump (MM) transmission efficiency[2]	≥90% (Typ >95%)	≥90%
Signal transmission efficiency[3]	≥80% (Typ >85%)	
Signal PER (polarization extinction ratio)	>20 dB	
Return loss/directivity	>40 dB	
Operating temperature	0 – +75°C	
Storage temperature	-40 – +85°C	

1 All specifications are for operation at room temperature.

2 MM Transmission efficiencies based on typical system mode fill conditions and 0.5 m pigtails. Reported at 975 nm as standard.

3 Signal (feedthrough) transmission efficiency reported at center wavelength; specification typical for center wavelength ±15 nm (minimum).

Order code

Order codes are comprised of a standard device prefix (e.g. TFB) followed by code letters or numbers which correspond to available options.

Sample: TFB-P50611B30 (PM 6+1x1 tapered fiber bundle, 1550 nm signal feedthrough, six 105/125 µm 0.15 NA pump inputs, 1550 nm core DCF output, regular housing, 0.5 m pigtails).

Order code				①	②	③	④	⑤	⑥	⑦	⑧	⑨
T	F	B	-	P			6	1				

②③	**Signal wave length**[1]	1064 nm	1550 nm
	Code	64	50

④	**Configuration (No. of pump inputs)**	6 pump inputs
	Code	6

⑤	**Pump input fiber**	105/125 µm
	Code	1

⑥	**Pump input fiber NA**	0.15	0.22
	Code	1	2

⑦	**DCF output fiber**[2]	1060 nm core. 130 µm/0.45 NA	1550 nm core. 130 µm/0.45 NA
	Code	A	B

⑧	**Housing**[3]	Regular ø 3 x 55 mm	Level 1 high power 5 mm^2 x 60 mm^3	Level 2 high power 5 mm^2 x 60mm^3
	Code	3	7	8

⑨	**Pigtail length**[4]	0.5 m	1 m	2 m
	Code	0	1	2

1 Signal wavelengths of 1064 nm or 1550 nm assume the use of Nufern PM-980-HP and PM-1550-HP (or equivalent) signal feedthrough fibers respectively.

2 Typical mode field diameters are based on ~7.5 µm for 1064 nm and ~10.5 µm for 1550 nm. Fibers are passive.

3 Maximum housing lengths. Note- Adequate heat-sinking is required for high power operation. High power multimode combiner application notes (PEC 0134) on website or consult sales office.

4 Minimum pigtail lengths.