

## **Fiber-coupled light sources**

The fiber optic networks and sensors are driven by light and hence the need to couple the light sources into the optical fiber. The most common sources used to couple the light into the fibers are the laser diodes and LEDs, while the miniature incandescent lamps are used when broad and smooth spectrum is needed. The incandescent lamps can be used as primary sources from which different spectral bands and profiles can be extracted.



## Connectorized LEDs

These modules use similar coupling principle as our LED pigtailed modules with one extra interface. While they provide slightly less optical power (10%-15% loss) than their pigtailed equivalents, they do provide the flexibility to change or replace fiber-optic patch cord.

Each module is individually aligned to optimize coupling efficiency for a specific fiber type. When ordering, you may indicate the type of fiber you intend to use so that we can test the module with the same fiber and provide information of optical coupling in those very conditions. If not specified, we test with 1 mm plastic optical fiber. Refer to *Table 1* for detailed LED specifications.



Connectorized High brightness single LED

Electrical interface is either a 1 meter long cable with M8-4pin male connector (M8), compatible with our DC LED driver, or a rectangular 2 sockets connector(R2).

**ORDERING CODE :** LEDC1-□\_□□□\_□□

**LED Color code**

See *Table 1*

**Receptacle code**

FC, SMA

**Electrical connector code**

R2, M8



R2 electrical connector



M8 electrical connector

## Connectorized dual LEDs

This package combines the light from two LEDs of different color into a single output fiber. The coupling efficiency can be as high as for our single LED sources. Refer to *Table 1* for details. The LEDs can be driven independently from each other.

Electrical interface is a 1 meter long cable with M8-4pin male connector, compatible with our two channel LED driver.



Connectorized High brightness dual LED

**ORDERING CODE :** LEDC2-□/□\_□□□

**LED Color Codes** \_\_\_\_\_  
see *Table 1* - select two different colors

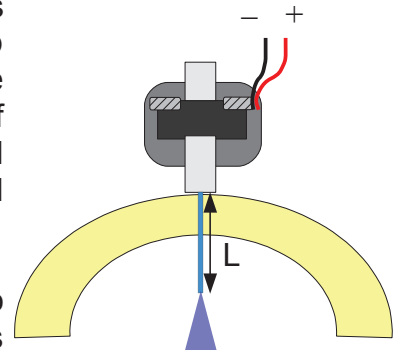
**Receptacle code** \_\_\_\_\_  
FC, SMA

## LED + Fiber-optic cannula

To answer the call for having lightweight optical sources attached to the body of the animal that can be used for deep brain illumination, we have developed an assembly where the LED is the integral part of the fiber-optic cannula. On the back of the LED there is a 1.25mm diameter cylinder that can be gripped by stereotaxic holder. The protruding optical fiber is implanted into the skull.

In order to keep the assembly small and light there is no heatsink. To reduce the heat generation, only medium brightness LEDs are used. Maximum current should be limited to 150mA.

Basic electrical interface is a small cable with 2 free hanging wires. A miniature connector can be added at cable end or directly on the LED.



LED + Fiber-optic cannula schematic



LED + Fiber-optic cannula picture

### ORDERING CODE : LFC-□\_□□□□□-□□□\_□□□

**LED color code** \_\_\_\_\_  
 B (=blue), A (=Amber), other on request

**Fiber-optic code** \_\_\_\_\_  
 See *Table 2* and *Table 3*

Suggestions:  
**MM200-0.53** for glass fiber 200 um core - NA=0.53  
**PF240-0.63** for plastic fiber 240 um core - NA=0.63

**Fiber length "L" (mm)** \_\_\_\_\_  
 See convention on the figure

## LED specifications

Table 1: LED color code and main specifications

LED				FIBER OUTPUT POWER @700mA				
Color	Code	Wavelength	Bandwidth FWHM	MM105-0.22	MM200-0.37	PF240-0.63	MM400-0.37	PF960-0.5
Near UV	385	385 nm	15 nm	0.1mW	0.8 mW	2.0 mW	4.0 mW	20 mW
Royal	Y	455 nm	25 nm	0.15mW	1.25 mW	3.5 mW	6.0 mW	35 mW
Blue	B	470 nm	25 nm	0.20mW	1.80 mW	5.6 mW	8.0 mW	55 mW
Cyan	C	505 nm	30 nm	0.10mW	0.80 mW	2.0 mW	4.0 mW	25 mW
Green	G	525 nm	35 nm	0.10mW	0.80 mW	2.0 mW	4.0 mW	25 mW
Amber	A	590 nm	20 nm	0.05mW	0.40 mW	1.0 mW	2.0 mW	10 mW
Orange	H	615 nm	20 nm	0.18mW	1.6 mW	3.5 mW	7.0 mW	35 mW
Red	R	625 nm	20 nm	0.20mW	1.8 mW	4.0 mW	8.0 mW	40 mW
Infrared	850	850 nm	45 nm	0.25mW	2.0 mW	5 mW	10 mW	40 mW
Infrared	940	940 nm	35 nm	0.25mW	1.5 mW	4 mW	8 mW	40 mW
White	W45	4500 K	250 nm	0.04 lm	0.35 lm	0.8 lm	1.0 lm	10 lm
White	W55	5500 K	250 nm	0.06 lm	0.45 lm	1.2 lm	1.9 lm	14 lm

Table 2: Silica multimode optical fibers

Core	Numerical Aperture	Fiber-optic code
50	0.22	<b>MM50-0.22</b>
100	0.22	<b>MM100-0.22</b>
100	0.37	<b>MM100-0.37</b>
100	0.44	<b>MM100-0.44</b>
200	0.22	<b>MM200-0.22</b>
200	0.37	<b>MM200-0.37</b>
200	0.48	<b>MM200-0.48</b>
200	0.53	<b>MM200-0.53</b>
300	0.22	<b>MM300-0.22</b>
300	0.37	<b>MM300-0.37</b>
300	0.48	<b>MM300-0.48</b>
400	0.22	<b>MM400-0.22</b>
400	0.37	<b>MM400-0.37</b>
400	0.48	<b>MM400-0.48</b>

Table 3: Plastic optical fibers

Core	Numerical Aperture	Fiber-optic code
240	0.63	<b>PF240-0.63</b>
480	0.50	<b>PF480-0.50</b>
960	0.50	<b>PF960-0.50</b>