PlexBright® Optogenetic Stimulation System

The PlexBright® Optogenetic Stimulation System provides an innovative, economical, turnkey approach to effectively performing acute, chronic or in vitro optogenetic stimulation.

PlexBright 4 Channel Optogenetic Controller
- Controls lasers or LEDs
- Includes sophisticated, pattern generating Radiant™ Software
- 8 digital inputs (TTL) and 16 digital outputs

PlexBright LD-1 Single Channel LED Driver
- Economical LED driver
- Selectable constant current output
- Accepts one analog and one TTL input

PlexBright Compatible Commutators
- PlexBright Dual LED Commutator
- PlexBright Dual LED + 16 Channel Commutator for simultaneous neural recording with analog headstages
- Carousel™ Commutator for simultaneous neural recording with digital headstages
- NEW Dual LED + fluid swivel commutator

PlexBright LED Modules
- Industry leading output intensities
- Exceptionally stable, high intensity, precisely controllable light
- Full spectrum of wavelengths
- Three styles: Table-top, Compact (for commutator use), or NEW Head-Mounted
- NEW Near-infrared and Ultraviolet LED modules

PlexBright Optical Patch Cables
- Two fiber options: high performance (.66NA) or high durability (.5NA)
- Three stimulation tips: Bare Fiber, LC Ferrule or FC Ferrule
- Two cable reinforcement options: mono-coil wrap (most flexible) or armored jacketing (most protective)

PlexBright Fiber Stub Implants
- Implantable optical fibers for chronic in vivo stimulation
- Two fiber diameters: 110/125µm and 200/230µm
- A range of standard lengths available for targeting various regions of the brain

PlexBright Light Measurement Kit
- For accurate LED light measurement output readings from the PlexBright Optogenetic Stimulation System's unique, high performance optical fiber

PlexBright Optical Fiber Cleaning Kit
- Extends the life of the fiber connections and tips

Technical Specifications

Features	Specifications and Options	Remarks
Drivers	- PlexBright 4 Channel Controller, or - PlexBright LD-1 Single Channel LED Driver	The PlexBright 4 Channel Controller is a multichannel, pattern generating, software controlled device with an SDK; the LD-1 Single Channel LED Driver is an economical, entry level device.
PlexBright 4 Channel Controller software	Radiant™	Sophisticated, pattern generator capable of controlling up to four PlexBright 4 Channel Controllers for a total of 16 independent channels.
Light sources controlled by the PlexBright 4 Channel Controller	- LEDs, or - Lasers	
Commutators	- PlexBright Dual LED commutator, - PlexBright Dual LED + 16 Channel commutator for use with analog headstages, - Carousel commutator for use with digital headstages -NEW PlexBright Dual LED + fluid swivel commutator	All support up to two specially designed, easily interchangeable, Compact LED Modules. The latter two commutators also enable simultaneous neural recording and are headstage-type specific.
PlexBright LED Module styles	- Table-top - Compact - NEW Head-Mounted	The Table-top style is generally used for head-fixed or in vitro experiments, or when a commutator is not required with a freely behaving animal. The Compact style is used with any of the PlexBright compatible commutators. The NEW Head-Mounted style is miniaturized for placement directly on an animal's head (available in blue, green, lime, and orange).
PlexBright LED Module wavelengths	Royal (450nm), Blue (465nm), Green (525nm), Lime (550nm), Yellow (590nm), Orange (620nm), Red (630nm), Crimson (660nm), Infrared (740-940nm), Ultraviolet (365-405nm)	465, 525, 550 and 620nm are the most frequently ordered wavelengths. The NEW near-infrared LED modules for photothermal inhibition of neural activity and the NEW ultraviolet LED modules for Ca indicator and Light-regulated GABA$_A$ receptor (LiGABAR).
PlexBright Optical Fibers	- High Performance .66NA fiber, or - NEW High Durability .5NA fiber	See LED power ouput tables for measured output of each fiber. at various points throughout the system.
PlexBright Optical Patch Cable tips	- Bare Fiber, - LC Ferrule, or - FC Ferrule	Bare Fiber tips are most often used for anesthetized, head-fixed or in vitro experiments. LC Ferrule tips are best suited for chronic experiments with rats or small animals; while an FC Ferrule tip offers additional strength in chronic experiments for use with rats and stronger animals. Although researchers use both ferrule size tips with rats, the stronger FC Ferrule-tipped cable with stainless steel jacketing is highly recommended.
PlexBright Optical Patch Cable lengths	0.5, 1.0 or 1.5m	
PlexBright Optical Patch Cable reinforcement	- Stainless steel, mono-coil wrap, or - Stainless steel armored jacketing	An added protection from animals (chewing, etc.), or from humans (excessive use or over bending). Mono-coil wrap adds additional protection while maintaining flexibility. The armored jacketing is more robust, offering maximum protection.
PlexBright Fiber Stub Implant lengths	1, 2, 3, 4, 6, 8, 10 or 12mm (available in boxes of 5 with a price break at 25 stubs)	PlexBright Fiber Stub Implants are used with the LC or FC Ferrule-tipped PlexBright Optical Patch Cables when working with freely behaving animals that may be disconnected from the cable from time-to-time.
PlexBright Fiber Stub Ferrule sizes	- LC Ferrule, or - FC Ferrule	FC Ferrules are slightly larger and offer a bit more strength than the LC Ferrules.
PlexBright Fiber Stub diameters	- 110/125μm optical fiber, or - 200/230μm optical fiber	The first number represents the core fiber diameter, while the second gives the total fiber diameter including the cladding. The smaller diameter fiber may be more appropriate when minimal tissue disturbance is of special concern and/or for small animals such as mice, while the larger fiber may be more advantageous if maximum power delivered to the tissue is especially important.
Accessories	- PlexBright Light Measurement Kit - PlexBright Optical Fiber Cleaning Kit - PlexBright Series-Y BNC Cable	The PlexBright Light Measurement Kit ensures accurate output measurements of the custom drawn, high performance PlexBright optical fiber throughout the light path (unlikely to be accurately read without this kit and the contained adaptors). The PlexBright Optical Fiber Cleaning Kit helps maximize light transmission at fiber connections and extends the life of the fiber connections and tips. It is recommended with the purchase of any of our PlexBright LED Modules, Optical Patch Cables and/or Fiber Stub Implants. The PlexBright Series-Y BNC Cable enables the simultaneous operation of two PlexBright LED Modules from a single driver/controller output (channel).
PlexBright Starter Kits		PlexBright Starter Kits offer the initial products to get started and a 10% discount when purchased as a kit. Kits are available in four experimental design set ups and with either driver (the 4 Channel Controller with Radiant Software or the LD-1 Single Channel LED Driver).

PlexBright LED Power Output at Various Points Throughout the System Light Path

PlexBright LED Modules	Measured Output[1] (Normalized Output)	Measured Output[1] (Normalized Output/High Performance .66NA Fiber)			Measured Output[1] (Normalized Output/High Durability .5NA fiber)		
Color (Wavelength/Max Current)	At the LED Module	At the tip of a 200/230µm Patch Cable*	At the tip of a 200/230µm Fiber Stub**	At the tip of a 110/125µm Fiber Stub***	At the tip of a 200/230µm Patch Cable^	At the tip of a 200/230µm Fiber stub^^	At the tip of a 110/125µm Fiber Stub^^^
Royal (450nm/300mA)	44.9mW	28.1mW (894mW/mm²)	22.5mW (715mW/mm²)	6.9mW (724mW/mm²)	21.8mW (694mW/mm²)	17.4mW (554mW/mm²)	5.4mW (569mW/mm²)
Blue (465nm/300mA)	40.2mW	24.9mW (792mW/mm²)	19.9mW (634mW/mm²)	6.1mW (645mW/mm²)	19.0mW (605mW/mm²)	15.2mW (484mW/mm²)	4.7mW (495mW/mm²)
Green (525nm/300mA)	11.8mW	7.8mW (249mW/mm²)	6.2mW (199mW/mm²)	1.9mW (201mW/mm²)	5.8mW (185mW/mm²)	4.6mW (146mW/mm²)	2.4mW (253mW/mm²)
Lime (550nm/500mA)	19.8mW	11.5mW (336mW/mm²)	9.2mW (293mW/mm²)	2.8mW (295mW/mm²)	10.1mW (321mW/mm²)	8.1mW (258mW/mm²)	2.5mW (263mW/mm²)
Yellow (590nm/250mA)	5.8mW	3.2mW (102mW/mm²)	2.6mW (82mW/mm²)	0.8mW (83mW/mm²)	3.0mW (95mW/mm²)	2.4mW (76mW/mm²)	0.8mW (84mW/mm²)
Orange (620nm/250mA)	17.5mW	11.0mW (349mW/mm²)	8.8mW (279mW/mm²)	2.7mW (283mW/mm²)	9.2mW (293mW/mm²)	7.4mW (236mW/mm²)	2.3mW (242mW/mm²)
Red (630nm/1000mA)	19.5mW	11.8mW (375mW/mm²)	9.4mW (300mW/mm²)	2.9mW (304mW/mm²)	9.7mW (309mW/mm²)	7.7mW (245mW/mm²)	2.4mW (253mW/mm²)
Crimson (660nm/1000mA)	22.8mW	15.1mW (476mW/mm²)	12.0mW (381mW/mm²)	3.7mW (386mW/mm²)	11.5mW (366mW/mm²)	9.1mW (290mW/mm²)	2.8mW (295mW/mm²)
Infrared 1 (850nm/1000mA)	21.3mW	13.2mW (422mW/mm²)	10.6mW (337mW/mm²	3.2mW (342mW/mm²)	10.7mW (341mW/mm²)	8.6mW (274mW/mm²)	2.6mW (274mW/mm²)
Infrafred 2 (940nm/1000mA)	21.5mW	14.0mW (445mW/mm²)	11.2mW (356mW/mm²)	3.4mW (360mW/mm²)	10.4mW (331mW/mm²)	8.3mW (264mW/mm²)	2.5mW (263mW/mm²)
NIR 1 (740nm/1000mA)	12.3mW	8.5mW (270mW/mm²)	6.8mW (216mW/mm²)	2.1mW (219mW/mm²)	6.5mW (206mW/mm²)	5.2mW (165mW/mm²)	1.6mW (163mW/mm²)
NIR 2 (760nm/1000mA)	14.7mW	11.2mW (356mW/mm²)	8.9mW (285mW/mm²)	2.7mW (288mW/mm²)	7.8mW (250mW/mm²)	6.3mW (200mW/mm²)	1.9mW (198mW/mm²)
NIR 3 (780nm/1000mA)	11.0mW	7.2mW (228mW/mm²)	5.7mW (182mW/mm²)	1.8mW (184mW/mm²)	5.7mW (180mW/mm²)	4.5mW (144mW/mm²)	1.4mW (143mW/mm²)
NIR 4 (810nm/1000mA)	11.7mW	8.4mW (268mW/mm²)	6.7mW (215mW/mm²)	2.1mW (217mW/mm²)	6.1mW (195mW/mm²)	4.9mW (325mW/mm²)	1.5mW (154mW/mm²)
UV 1 (365nm/1000mA)	28.1mW	13.5mW (430mW/mm²)	10.8mW (344mW/mm²)	3.3mW (348mW/mm²)	15.4mW (489mW/mm²)	12.3mW (391mW/mm²)	3.7mW (388mW/mm²)
UV 2 (385nm/1000mA)	42.0mW	26.0mW (829mW/mm²)	20.8mW (663mW/mm²)	6.4mW (672mW/mm²)	23.0mW (732mW/mm²)	18.4mW (586mW/mm²)	5.5mW (581mW/mm²)
UV 3 (405nm/1000mA)	41.8mW	27.2mW (865mW/mm²)	21.7mW (692mW/mm²)	6.7mW (701mW/mm²)	22.5mW (717mW/mm²)	18.0mW (573mW/mm²)	5.4mW (569mW/mm²)

PlexBright Head-Mounted LED Modules	Measured Output[1] (Normalized Output)	Measured Output[1] (Normalized Output/.66NA Fiber)
Color (Wavelength/Max Current)	At the LED Module	At the tip of a 200/230µm Fiber Stub (no patch cable required)
Head-Mounted Blue (465nm/300mA)	62.2mW	21.8mW (693mW/mm²)
Head-Mounted Green (525nm/300mA)	19.1mW	6.7mW (213mW/mm²)
Head-Mounted Lime (550nm/500mA)	33.3mW	11.7mW (371mW/mm²)
Head-Mounted Orange (620nm/250mA)	33.9mW	11.9mW (378mW/mm²)

*Measured at the tip of a PlexBright High Performance (.66NA) Optical Patch Cable with a 200/230µm fiber 1.0m long.
**Measured at the tip of a PlexBright 200/230µm Fiber Stub Implant connected to a PlexBright High Performance (.66NA) Optical Patch Cable with a 200/230µm fiber 1.0m long.
***Measured at the tip of a PlexBright 110/125µm Fiber Stub Implant connected to a PlexBright High Performance (.66NA) Optical Patch Cable with a 200/230µm fiber 1.0m long.
^Measured at the tip of a PlexBright High Durability (.5NA) Optical Patch Cable with a 200/230µm fiber 1.0m long.
^^Measured at the tip of a PlexBright 200/230µm Fiber Stub Implant connected to a PlexBright High Durability (.5NA) Optical Patch Cable with a 200/230µm fiber 1.0m long.
^^^Measured at the tip of a PlexBright 110/125µm Fiber Stub Implant connected to a PlexBright High Durability (.5NA) Optical Patch Cable with a 200/230µm fiber 1.0m long.
[1]Power values are measured using pulsed stimulation (1 msec pulses)

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