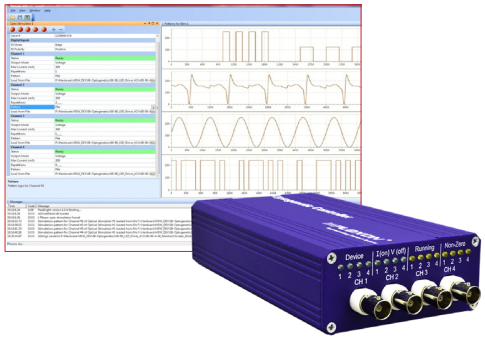
PLEXON
Neurotechnology Research Systems

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 Dual LED Commutator

- Supports up to two PlexBright Compact LED Modules
- Magnetic LED module attachments for easy interchange in tight locations
- Used with animals as small as mice

PlexBright Dual LED + 16 Channel Commutator

- All of the benefits of the PlexBright Dual LED Commutator above
- Simultaneously supports up to 16 channels of neural recording

PlexBright LED Modules

- Industry leading output intensities
- Exceptionally stable, high intensity, precisely controllable light
- Full spectrum of wavelengths
- Two styles: Table-top or Compact (for commutator use)

PlexBright Optical Patch Cables

- Custom drawn, high performance, all glass optical fiber
- Three stimulation tips: Bare Fiber, LC Ferrule or FC Ferrule
- Optional, flexible, stainless steel jacketing for reinforcement

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

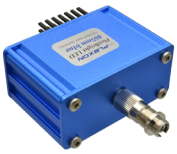
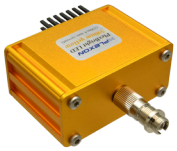
PlexBright Optical Fiber Cleaning Kit

- 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, or - PlexBright Dual LED + 16 Channel Commutator	Both support up to two, specially designed, easily interchangeable Compact LED Modules. The latter commutator also enables up to 16 channels of simultaneous neural recording.
PlexBright LED Module styles	- Table-top, or - Compact	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 either of the PlexBright Commutators.
PlexBright LED Module wavelengths	Royal (450nm), Blue (465nm), Green (525nm), Yellow (590nm), Orange (620nm), Red (630nm), Crimson (660nm), Infrared 1 (850nm), Infrared 2 (940nm)	465, 525 and 620nm are the most frequently ordered wavelengths.
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	As added protection from animals (chewing, etc.), or from researchers (over bending), the especially flexible armored jacketing is available exclusively on PlexBright Optical Patch Cables with an LC or FC Ferrule tip.
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	- Freely Behaving Small Animal (mouse) Experiments - Freely Behaving Rat & Larger Animal Experiments - Head-fixed/Anesthetized Animal Experiments - *In vitro* Experiments	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). Starter Kit details are listed on the *PlexBright Quote Request Forms.*

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

PlexBright LED Modules			Measured Output (Normalized Output)			
Color (Wavelength)	Table-top	Compact (For commutator use)	At the LED Module	At the tip of a 200/230µm, 0.66NA Patch Cable**	At the tip of a 200/230µm, 0.66NA Fiber Stub***	At the tip of a 110/125µm, 0.66NA Fiber Stub****
Royal (450nm)			**44.9mW** (1,081mW/mm²)	**28.1mW** (894mW/mm²)	**22.5mW** (715mW/mm²)	**6.9mW** (724mW/mm²)
Blue (465nm)			**40.2mW** (968mW/mm²)	**24.9mW** (792mW/mm²)	**19.9mW** (634mW/mm²)	**6.1mW** (645mW/mm²)
Green (525nm)			**11.8mW** (284mW/mm²)	**7.8mW** (249mW/mm²)	**6.2mW** (199mW/mm²)	**1.9mW** (201mW/mm²)
Yellow (590nm)			**5.8mW** (140mW/mm²)	**3.2mW** (102mW/mm²)	**2.6mW** (82mW/mm²)	**0.8mW** (83mW/mm²)
Orange (620nm)			**17.5mW** (421mW/mm²)	**11.0mW** (349mW/mm²)	**8.8mW** (279mW/mm²)	**2.7mW** (283mW/mm²)
Red (630nm)			**19.5mW** (470mW/mm²)	**11.8mW** (375mW/mm²)	**9.4mW** (300mW/mm²)	**2.9mW** (304mW/mm²)
Crimson (660nm)			**22.8mW** (549mW/mm²)	**15.1mW** (476mW/mm²)	**12.0mW** (381mW/mm²)	**3.7mW** (386mW/mm²)
Infrared 1 (850nm)			**21.3mW** (513mW/mm²)	**13.2mW** (422mW/mm²)	**10.6mW** (337mW/mm²)	**3.2mW** (342mW/mm²)
Infrafred 2 (940nm)			**21.5mW** (518mW/mm²)	**14.0mW** (445mW/mm²)	**11.2mW** (356mW/mm²)	**3.4mW** (360mW/mm²)

*Intensities may be increased 2x or more when implementing pulsed output patterns with low-duty cycles.
**Measured at the tip of a PlexBright Optical Patch Cable with a 200/230µm fiber 1.0m long.
***Measured at the tip of a PlexBright 200/230µm Fiber Diameter Fiber Stub Implant connected to a PlexBright Optical Patch Cable with a 200/230µm fiber 1.0m long.
****Measured at the tip of a PlexBright 110/125µm Fiber Diameter Fiber Stub Implant connected to a PlexBright Optical Patch Cable with a 200/230µm fiber 1.0m long.