We have developed a custom device that we have used to stimulate peripheral nerves optically in anesthetized mice. Because the output of the device uses a standard optical fiber, we think that this device could be useful to others pondering optogenetic work.

* The device is compact, rechargeable battery operated, and controlled either manually or by computer using an analog input (digital to analog output from the computer).
* The essence of the device is a laser LED whose illumination is channeled to an optical fiber by a collimator. For use in stimulating nerves, we attached it to a standard optical fiber patch cable with an FC/PC Connector (e.g.ThorLabs #M82L01). The relationship between input voltage and illuminance output is shown in the file in the Luminance Graph Folder.
* The device is considered a class B laser, so that appropriate safety needs to be associated with its use.
* Our device outputs blue light suitable for activation of channelrhodopsin (473nM), but could be adapted to produce light of different wavelengths.
* The included documentation contains a parts list, a circuit, assembly instructions, directions for obtaining a printed circuit board for the device, and pictures of the device.

**Warning!**

**You are constructing a Class 3B Laser device.**

**Avoid direct eye exposure to beam.**

**Approved safety goggles must be worn whenever the device is in operation.**

**Table of Contents**

Assembly Instructions

Laser Diode driver construction notes – detailed instructions for building the device

Laser Diode box wiring – instructions for internal wiring of the enclosure

Laser diode driver V2A BOM – bill of materials (parts list)

Eagle PCB files

Board – top side – PDF view of top of board

Schematic – PDF of electrical schematic

Laser\_diode\_driver.sch – CadSoft Eagle schematic

Laser\_diode\_driver.brd – CadSoft Eagle board layout

Luminance graph

Laser LED power output graph – A graph of the typical power output vs. voltage input

Photos

Complete set of photos to aid in construction