

Optogenetic Stimulator



Applications:

- optogenetics experiments
- nerve stimulation using laser pulses with user-selected characteristics

Functional Specifications:

- The system is designed for easy integration with standard electrophysiology setups, allowing seamless synchronization with other stimuli and recording devices

Performance Specifications:

- The laser wavelength is 476nm (customer selected wavelengths are available)
- The pulse length and duty cycle are programmable, from 5 microseconds to CW and from 0.1% to 99%, respectively
- The laser output peak power is 275mW
- The laser pulses are delivered via a 50 μ m core fibre with a numerical aperture (NA) of 0.22
- Customer specified fibre terminations are available

Interfaces:

- Computer based graphical user interface (GUI)
- USB communication with computer
- BNC for external synchronisation
- FC PC connector for optical fibre
- ON / OFF switch
- Operating voltage: 240V / 110V

Space envelope:

- 280mm x 140mm x 60mm
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Sample Results

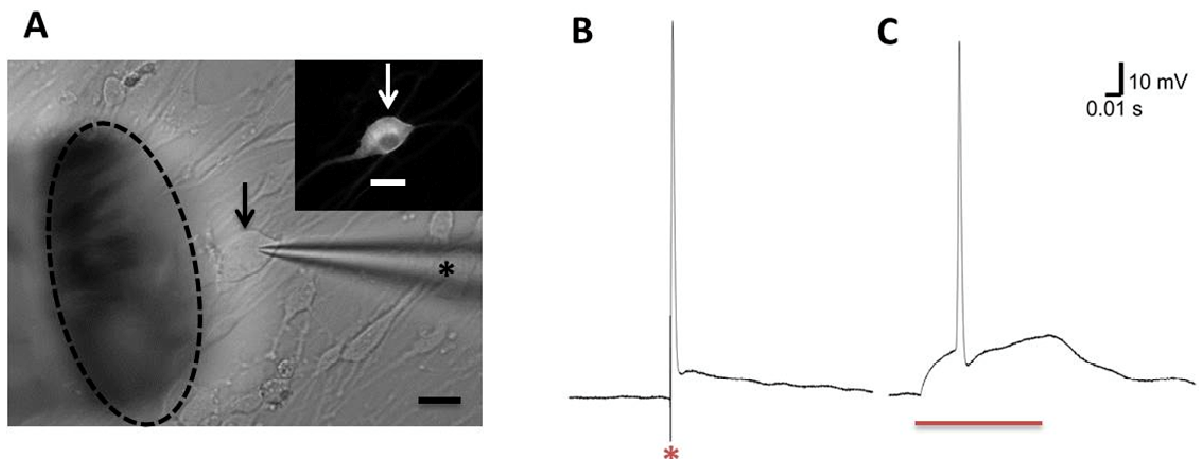


Figure **A** shows the 475 nm system, coupled to a 50/125 μm optical fibre (outlined), being used to excite a cultured primary auditory neuron expressing ChR2(E123A) (black arrow). The recording microelectrode is shown by the black asterisk. **Inset**: Same cell showing YFP expression. Scale bars 20 μm.

B. An action potential evoked by intracellular current injection, with the stimulation artefact denoted by the red asterisk.

C. An action potential evoked by optical stimulation (60ms pulse, denoted by red bar) in the same neuron