

Semiconductor Laser 630nm  
IPC-2588-L

### SAFETY

When using a laser, safety precautions should be rigidly observed. The laser beam should not be viewed by looking directly into the beam or a regularly reflected beam. Attention is drawn to the Department of Education and Science Administrative Memorandum No. 7/70 on the use of lasers in schools and other educational establishments. Replace the lens cap when the laser is not in use.

### SPECIFICATION

Operating voltage	8 - 12V d.c. from internal 6LR61 (PP3) battery or external smoothed and regulated supply (centre pin is -ve when using external supply)
Operating Current	50mA typical
Modulation type	Analogue or digital
External modulation	50ohm input impedance 1V p-p maximum 100Hz to 1MHz
Internal modulation	1MHz pulse width 0.1 $\mu$ s typical
Power output	1mW Max Class II
Wavelength	630 - 640nm

### BATTERY REPLACEMENT

Access to the battery compartment is gained by removing the drawer located in the underside of the case. An alkaline PP3 (9V) battery should be used and if the laser is to be stored for a long period, the battery should be removed.

### CONTENTS

This kit contains:

- 1 Semiconductor Laser
- 1 Lens cover
- 2 Keys (packed inside battery compartment)

### OPERATION

The laser may be operated in the continuous or modulated modes.

#### CONTINUOUS MODE

Remove the lens cover from the lens housing and switch on the laser with the key switch. The beam can be collimated or focused by loosening the nylon screw on the lens housing and moving the lens tube in or out, finger tighten the nylon screw to lock the lens tube in place.

#### MODULATED MODE (EXTERNAL)

The laser beam intensity can be modulated by applying a digital or analogue signal to the 3.5mm jack socket marked 'EXT.' The modulated beam can be monitored with a suitable photo diode or modulated laser receiver.

#### MODULATED MODE (INTERNAL)

Connect a 3.5mm jack plug into the 3.5mm jack socket marked '1MHz INT.' to turn on the internal modulation. The laser beam will be modulated with 0.1 $\mu$ s pulses at a frequency of approximately 1MHz. These pulses can be monitored on the 3.5mm jack plug connections. This mode may be used to measure the speed of light by:

1. Monitor the pulses from the 3.5mm jack socket on channel 1 of an oscilloscope set at 2V/div a.c. and 0.1 $\mu$ s/div.
2. Monitor the modulated laser beam with a suitable photo diode or modulated laser receiver connected to channel 2 of the oscilloscope, note the position of the pulse.
3. Place a mirror 10 metres or more away and reflect the modulated laser beam off the mirror back to the receiver, use a lens to focus the beam onto the detector, note the position of the pulse. The difference in position of the pulse noted at 2 and this reflected pulse gives the time taken for the laser beam to travel the distance to the mirror and back, if this distance is known the speed of light can be calculated.

#### FURTHER EXPERIMENTS

For further information regarding this semiconductor laser and descriptions of a number of experiments and demonstrations that can be easily performed, access our website at <http://www.ipcel.co.uk>.