Particulars Laser – Hardware Manual

Introduction

Particulars lasers are very compact and lightweight since they combine the laser head and driver in the single housing. They were designed for Transient Current Technique, but their applicability is far broader. They offer short pulses (350-4000 ps) with pulses energy corresponding to creation of e-h pairs in silicon equivalent to up to 1000 m.i.p. The lasers can be triggered internally triggers or externally. Internal triggering can be simple with a fixed frequency or a pattern of pulses can be programed with trigger(s) provided independently of the laser/driver pulses.

Connections

USB – communication with PC

TRout (driver) - trigger output connected to the circuitry triggering the laser diode)

TROut (processor) – trigger output connected to the microcontroller independently on driver (see software manuals for details about the usage of laser in this operation mode)

TRin – trigger input for external triggering of the laser pulse. Note that in this mode the switch for selection of the operation mode should be in “Ex. Tr.” (External trigger).

Ex. Tr./Int. Tr. – external / internal triggering of the laser

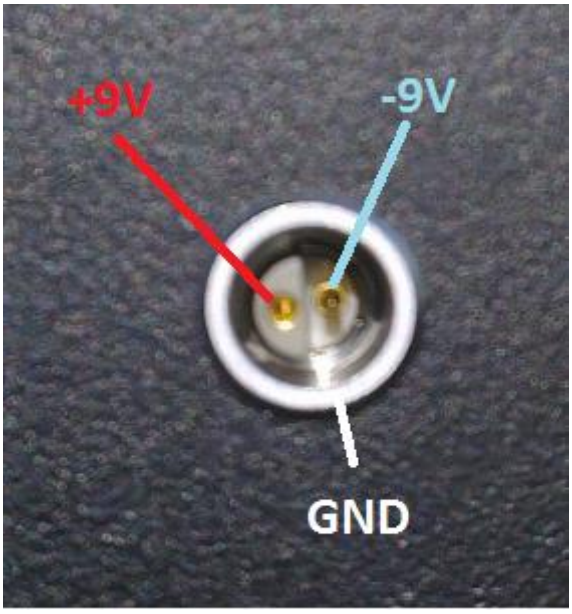
Power – 2 pole lemo connector for power supply

Power Supply

Only Particulars power supply should be used to power the lasers. At the moment they are designed to be operated only at 220V/50 Hz (AC) or110/50 Hz (AC). The version in indicated on the label. Please note that connection to the wrong standard can damage the device.

A two pin LEMO connector is used to deliver the power to the laser through a custom made cable. Some version of the power supply offer also the possibility to bias the amplifier, however for 53 dB amplifier a sub nominal values can only be reached (knob). All power-supplies are equipped with interlock key and a LED to indicate when they are on. **Please note that after the laser was disconnected by an interlock – around 1-2 min should pass before the laser can be successfully connected back to PC.**

The pin assignment of the power cable at the the power supply unit can be found below.

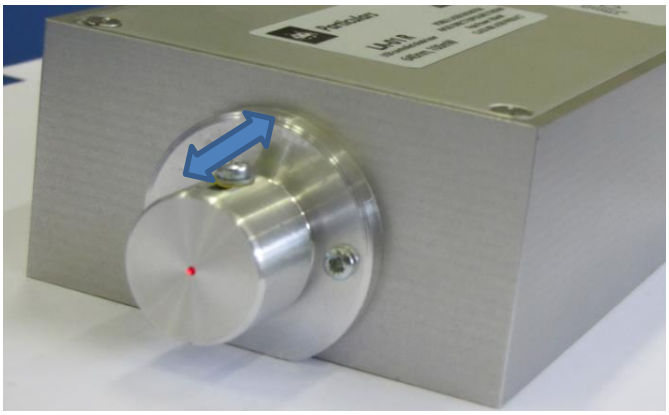


Laser heads

The laser can have two different outputs:

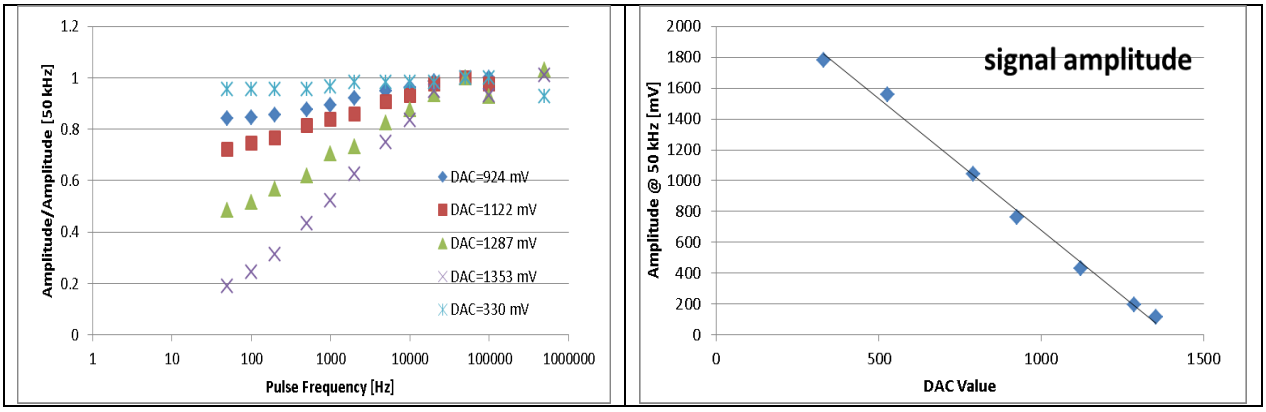
- a focused and collimated head
- a fibre coupled head (single mode) output using standard FC connector

While fibre connection should be used with optical system, focused-collimated head can be used to directly illuminated device. The collimator can be moved for few mm backward and forward in order to achieve desired collimation. Use the screw on top of the head and slide the collimator for desired position.

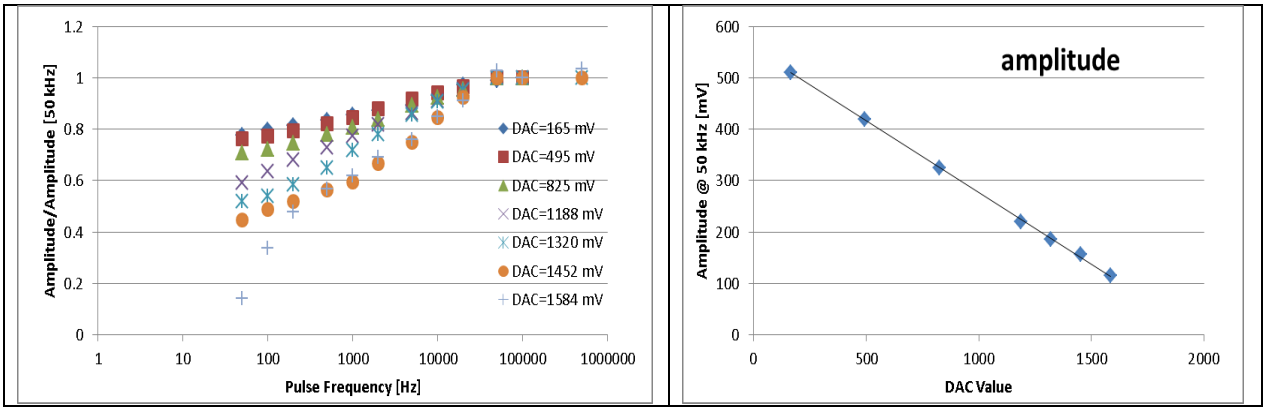


Performance – amplitude and repletion frequency

The output of the laser: duration and pulse power depend on the type of laser diode used. For all diodes the power depends on the DAC setting (see http://www.particulars.si/downloads/Particulars-Procedures-LaserPulse.pdf). For the most typical ones (red – 660 nm and infrared 1064 nm) the power amplitude and dependence of power on repetition rate as measured with a typical fully depleted 300 μm thick p-n silicon diode are shown below:



INFRA-RED 1064 nm fibre coupled diode. Please note that DAC setting vary from diode to diode.



RED 660 nm fibre coupled diode. Please note that DAC setting vary from diode to diode.