

**S2011-EC - Mar. 13, 2015**

Item # S2011-EC was discontinued on Mar. 13, 2015. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

- ▶ Wavelengths from 405 nm to 980 nm
- ▶ Collimated and Adjustable-Focus Versions
- ▶ Compact Ø8 mm or Ø11 mm Housing Options
- ▶ 850 nm Single-Wavelength Laser Module



**CPS532**  
 Collimated Laser Module  
 Power Supply Not Included



**CPS635F**  
 Adjustable-Focus Laser Module  
 Power Supply Not Included

**CPS850V**  
 Single-Wavelength Laser Module  
 Power Supply Not Included

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**OVERVIEW**

**Features**

- Collimated or Adjustable-Focus Laser Diode Modules
- Compact Ø8 mm or Ø11 mm Housing Makes these Modules Ideal as Alignment Lasers
- Lasing at Wavelengths from 405 nm to 980 nm (See Table to the Right)
  - Four 635 nm Wavelength Options Provide Alternatives to HeNe Lasers
  - 635 nm Kit Includes the Laser Module, Power Supply, and Mounting Mechanics
- Single-Wavelength VCSEL Collimated Laser Module for 850 nm Available
- Power Supplies are Not Included with Individual Laser Diode Modules (Sold Separately Below)

Thorlabs' Laser Diode Modules are available in either collimated or adjustable-focus varieties and provide output powers ranging from 0.85 mW to 4.5 mW (laser safety Class 2 or 3R depending on the model). Each module has an output beam shape that is either elliptical or round, as indicated in the tables below. These modules, which offer single spatial mode output and a compact cylindrical housing, are ideal for use as alignment lasers in optical systems.

Quick Link Guide
<b>Laser Diode Modules</b>
405 nm - 532 nm
635 nm
635 nm Kit
650 nm - 780 nm
780 nm
808 nm - 980 nm
850 nm VCSEL
<b>Accessories</b>
Mounting Adapters
5 VDC Power Supply



Click to Enlarge  
 CPS980 Module Held in an AD11F SM1-Threaded Adapter and Mounted into a CP90F Quick-Release Cage Plate Within a 30 mm Cage System



Click to Enlarge  
 CPS450 Laser Diode Module Held in a KAD11NT Unthreaded Kinematic Adapter and Mounted into an FMP1 Fixed Optic Mount



Click to Enlarge  
 CPS850 Laser Diode Module Held in an AD11NT Unthreaded Adapter and Mounted into a KM100 Kinematic Mount



Click to Enlarge  
 CPS980S Laser Diode Module Held in an AD8F SM1-Threaded Adapter and Mounted into an LM1XY XY Translation Mount

For single-frequency applications, our collimated 850 nm VCSEL Module produces a single-wavelength output and a round, Gaussian beam shape without clipping the beam. This laser module features a 2 to 3 order of magnitude narrower linewidth than our other laser modules, but this comes at the expense of a lower total power output.

Each module requires a 5 VDC power supply (not included), such as the LDS5 offered below, to operate. Alternatively, a 2.5 mm phono plug is included for customers who wish to wire their own power supply to the laser module. These diode modules have either a 18" (457 mm) or 24" (610 mm) long cable, with a 2.5 mm phono socket for connection to a power supply.

### Mounting Options

The Ø8 mm and Ø11 mm housings are compatible with our line of optomechanical components through the use of various mounting adapters, as shown in the images to the right. Depending on the adapter chosen, these laser modules can be directly mounted into either internally SM1-threaded (1.035"-40) components or mechanics with a Ø1" bore. Further details on each adapter and its compatibility with our line of optomechanics can be found below.

Please note that the knurled knob used for focus adjustment on the CPS635F, CPS650F, and CPS670F laser modules is too large for the mounting adapter bore. This knob can be unthreaded to mount the diode module in the same manner as the collimated versions. Please make sure to loosen the setscrews locking the knob in place before unthreading; not doing so can damage the threading. Alternatively, the module can be mounted by threading the cord and phono plug through the adapter first.

[Hide Laser Safety](#)

## LASER SAFETY

### Laser Safety and Classification

Safe practices and proper usage of safety equipment should be taken into consideration when operating lasers. The eye is susceptible to injury, even from very low levels of laser light. Thorlabs offers a range of laser safety accessories that can be used to reduce the risk of accidents or injuries. Laser emission in the visible and near infrared spectral ranges has the greatest potential for retinal injury, as the cornea and lens are transparent to those wavelengths, and the lens can focus the laser energy onto the retina.

#### Safe Practices and Light Safety Accessories

- Thorlabs recommends the use of safety eyewear whenever working with laser beams with non-negligible powers (i.e., > Class 1) since metallic tools such as screwdrivers can accidentally redirect a beam.
- Laser goggles designed for specific wavelengths should be clearly available near laser setups to protect the wearer from unintentional laser reflections.
- Goggles are marked with the wavelength range over which protection is afforded and the minimum optical density within that range.
- Laser Barriers and Blackout Materials can prevent direct or reflected light from leaving the experimental setup area.
- Thorlabs' Enclosure Systems can be used to contain optical setups to isolate or minimize laser hazards.
- A fiber-pigtailed laser should always be turned off before connecting it to or disconnecting it from another fiber, especially when the laser is at power levels above 10 mW.
- All beams should be terminated at the edge of the table, and laboratory doors should be closed whenever a laser is in use.
- Do not place laser beams at eye level.
- Carry out experiments on an optical table such that all laser beams travel horizontally.
- Remove unnecessary reflective items such as reflective jewelry (e.g., rings, watches, etc.) while working near the beam path.
- Be aware that lenses and other optical devices may reflect a portion of the incident beam from the front or rear surface.
- Operate a laser at the minimum power necessary for any operation.
- If possible, reduce the output power of a laser during alignment procedures.
- Use beam shutters and filters to reduce the beam power.
- Post appropriate warning signs or labels near laser setups or rooms.
- Use laser sign lightboxes if operating Class 3R or 4 lasers (i.e., lasers requiring the use of a safety interlock).
- Do not use Laser Viewing Cards in place of a proper Laser Barrier or Beam Trap.



### Laser Classification

Lasers are categorized into different classes according to their ability to cause eye and other damage. The International Electrotechnical Commission (IEC) is a global organization that prepares and publishes international standards for all electrical, electronic, and related technologies. The IEC document 60825-1 outlines the safety of laser products. A description of each class of laser is given below:

Class	Description	Warning Label
1	This class of laser is safe under all conditions of normal use, including use with optical instruments for intrabeam viewing. Lasers in this class do not emit radiation at levels that may cause injury during normal operation, and therefore the maximum permissible exposure (MPE) cannot be exceeded. Class 1 lasers can also include enclosed, high-power lasers where exposure to the radiation is not possible without opening or shutting down the laser.	
1M	Class 1M lasers are safe except when used in conjunction with optical components such as telescopes and microscopes. Lasers belonging to this class emit large-diameter or divergent beams, and the MPE cannot normally be exceeded unless focusing or imaging optics are used to narrow the beam. However, if the beam is refocused, the hazard may be increased and the class may be changed accordingly.	
2	Class 2 lasers, which are limited to 1 mW of visible continuous-wave radiation, are safe because the blink reflex will limit the exposure in the eye to 0.25 seconds. This category only applies to visible radiation (400 - 700 nm).	

2M	Because of the blink reflex, this class of laser is classified as safe as long as the beam is not viewed through optical instruments. This laser class also applies to larger-diameter or diverging laser beams.	
3R	Lasers in this class are considered safe as long as they are handled with restricted beam viewing. The MPE can be exceeded with this class of laser, however, this presents a low risk level to injury. Visible, continuous-wave lasers are limited to 5 mW of output power in this class.	
3B	Class 3B lasers are hazardous to the eye if exposed directly. However, diffuse reflections are not harmful. Safe handling of devices in this class includes wearing protective eyewear where direct viewing of the laser beam may occur. In addition, laser safety signs lightboxes should be used with lasers that require a safety interlock so that the laser cannot be used without the safety light turning on. Class-3B lasers must be equipped with a key switch and a safety interlock.	
4	This class of laser may cause damage to the skin, and also to the eye, even from the viewing of diffuse reflections. These hazards may also apply to indirect or non-specular reflections of the beam, even from apparently matte surfaces. Great care must be taken when handling these lasers. They also represent a fire risk, because they may ignite combustible material. Class 4 lasers must be equipped with a key switch and a safety interlock.	
All class 2 lasers (and higher) must display, in addition to the corresponding sign above, this triangular warning sign		

[Hide 635 nm Laser Diode Module Kit](#)

### 635 nm Laser Diode Module Kit



- Complete Kit Includes 635 nm Laser, Power Supply, and Mounting Mechanics
- 635 nm Laser Provides Adjustable Focus/Collimation
- Kinematic Mount for Tip/Tilt Adjustment

The S2011-EC kit contains all of the components needed to mount and power a 635 nm Laser Diode Module. It includes a 635 nm laser module, a power supply, a KM100T kinematic mount, a TR75/M post, a PH3/M post holder, an AD11F adapter, and a BA2/M base. The kit includes a power supply with a selectable line voltage of 115 or 230 V and a location-specific power cable.

Part Number	Description	Price	Availability
S2011-EC	Adjustable Focus Laser Diode Kit, 635 nm, 4.5 mW, Metric	\$338.00	Lead Time