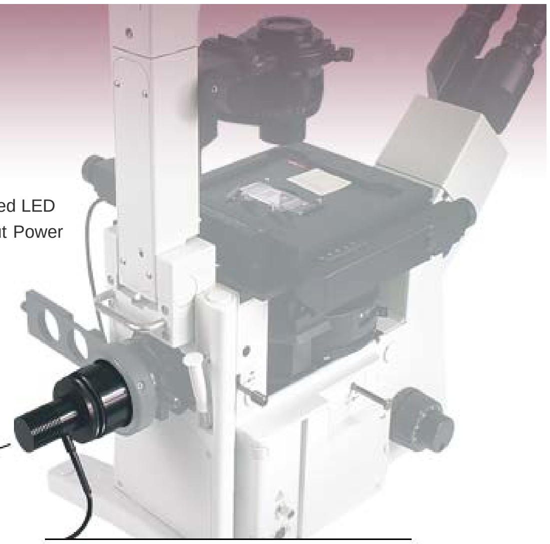
M490L3 - July 07, 2016

Item # M490L3 was discontinued on July 07, 2016. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

- ► UV, Visible, and IR Models Available
- ► Optimized Heat Management Results in Stable Output
- ► Internal SM1 (1.035"-40) Threading
- ► Collimation Adapters Available Separately

M405LP1
405 nm Mounted LED
1500 mW Output Power

M505L3
505 nm Mounted LED
400 mW Output Power



M625L3 with a Collimator Used as a Light Source for a Microscope

Hide Overview

OVERVIEW

Mounted LED Features

- Nominal Wavelengths Ranging from 265 nm to 1550 nm
- Broadband, Warm White (3000 K), and Cold White (6500 K) LEDs Also Available
- Integrated EEPROM Stores LED Operating Parameters
- Thermal Properties Optimized for Stable Output Power
- Internal SM1 (1.035"-40) Threading (6 mm Deep) for Attaching Collimation Adapters or Ø1" Lens Tubes
- Collimation Adapters Available
  - Microscope Adapters for Select Leica, Nikon, Olympus, or Zeiss Microscopes
  - Adjustable Collimation Adapters for Ø1" or Ø2" Optics
  - Mounted LEDs with Fixed-Focus Collimation Adapters for Microscopes are Available
- 4-Pin Female Mating Connector for Custom Power Supplies can be Purchased Separately

Each uncollimated, mounted LED consists of a single LED that has been mounted to the end of a heat sink. Most of the LEDs on this page have a heat sink housing that has the same 1.20" external diameter as an SM1 lens tube. Some of the LEDs offered below generate more heat during operation, and so are mounted to a larger heat sink with a Ø57.0 mm plastic housing for increased heat dissipation and thermal stability (indicated by the green rows in the table to the right). All the heat sinks are equipped with 6 mm deep internal SM1

Legend	
LED Mounted to Ø57.0 mm Housing	LED Mounted to Ø30.5 mm Housing

Item #	Color (Click for Spectrum)[a]	Nominal Wavelength[a,b]	Minimum LED Power Output[a]
M265L3[c]	Deep UV	265 nm	10 mW
M280L3[c]	Deep UV	280 nm	25 mW
M300L4[c]	Deep UV	300 nm	40 mW
M340L4[c]	Deep UV	340 nm	53 mW
M365L2[c]	UV	365 nm	190 mW
M365LP1[c]	UV	365 nm	1150 mW
M375L3[c]	UV	375 nm	387 mW
M385L2[c]	UV	385 nm	270 mW
M385LP1[c]	UV	385 nm	1650 mW
M395L4[c]	UV	395 nm	400 mW
M405L3[c]	UV	405 nm	870 mW
M405LP1[c]	UV	405 nm	1500 mW
M420L3[c]	Violet	420 nm	750 mW
M450LP1	Royal Blue	450 nm	1850 mW
M455L3	Royal Blue	455 nm	900 mW
M470L3	Blue	470 nm	650 mW
M490L3	Blue	490 nm	200 mW
M505L3	Cyan	505 nm	400 mW
M530L3	Green	530 nm	350 mW
M565L3[d]	Lime	565 nm	880 mW
M590L3	Amber	590 nm	160 mW
[d]	Amber	595 nm	445 mW

(1.035"-40) threads for easy integration with other Thorlabs components. The larger heat sinks are also equipped with four 4-40 tapped holes for compatibility with 30 mm cage systems.

The integrated EEPROM chip in each LED stores information about the LED (e.g., current limit, wavelength, and forward voltage) and can be read by Thorlabs' DC2200 and DC4100 LED Controllers. For more information about LED drivers, including the basic LEDD1B driver, see the *LED Drivers* tab.

The spectrum of each LED and associated data file can be viewed by clicking on the links in the table to the right. Multiple windows can be opened simultaneously in order to compare LEDs.

Optimized Thermal Management
These mounted LEDs possess good thermal stability properties, eliminating the issue of degradation of optical output power due to increased LED temperature. For more details, please see the *Stability* tab.

White Light and Broadband LEDs
Our cold white and warm white LEDs feature broad spectra that span several hundred nanometers. The difference in appearance between these two LEDs can be described using the correlated color temperature, which indicates that the LEDs color appearance is similar to a black body radiator at that temperature. In general, warm white LEDs offer a spectrum similar to a tungsten source, while cold white LEDs have a stronger blue component to the spectrum. Cold white LEDs are more suited for fluorescence microscopy applications or cameras with white balancing, because of a higher intensity at most wavelengths compared to warm white LEDs.

The MBB1L3 mounted broadband LED has been designed to have relatively flat spectral emission over a wide wavelength range. Its FWHM bandwidth ranges from 500 nm to 780 nm, while the 10 dB bandwidth ranges between 470 nm and 850 nm. For more information on the spectrum of this broadband source, please see the table to the right.

M595L3			
M617L3	Orange	617 nm	600 mW
M625L3	Red	625 nm	700 mW
M660L4	Deep Red	660 nm	940 mW
M730L4	Far Red	730 nm	515 mW
M780L3	IR	780 nm	200 mW
M780LP1	IR	780 nm	800 mW
M810L3	IR	810 nm	325 mW
M850L3	IR	850 nm	900 mW
M850LP1	IR	850 nm	1400 mW
M880L3	IR	880 nm	300 mW
M940L3	IR	940 nm	800 mW
M970L3	IR	970 nm	35 mW
M1050L2	IR	1050 nm	50 mW
M1200L3	IR	1200 nm	30 mW
M1300L3	IR	1300 nm	25 mW
M1450L3	IR	1450 nm	31 mW
M1550L3	IR	1550 nm	31 mW
MBB1L3[e]	Broadband	470 - 850 nm[f]	70 mW
MWWHL4[d]	Warm White	3000 K[g]	570 mW
MWWHLP1[d]	Warm White	3000 K[g]	2000 mW
MCWHL5[d]	Cold White	6500 K[g]	800 mW
MCWHLP1[d]	Cold White	6500 K[g]	2350 mW

- Due to variations in the manufacturing process and operating parameters such as temperature and current, the actual spectral output of any given LED will vary. Output plots and nominal wavelength specs are only intended to be used as a guideline.
- For LEDs in the visible spectrum, the nominal wavelength indicates the wavelength at which the LED appears brightest to the human eye. The nominal wavelength for visible LEDs may not correspond to the peak wavelength as measured by a spectrometer.
- Our 265 nm to 420 nm LEDs radiate intense UV light during operation. Precautions must be taken to prevent looking directly at the UV light and UV light protective glasses must be worn to avoid eye damage. Exposure of the skin and other body parts to the UV light should be avoided.
- These LEDs are phosphor-converted and may not turn off completely when modulated above 10 kHz at duty cycles below 50%.
- The MBB1L3 LED may not turn off completely when modulated at frequencies above 1 kHz with a duty cycle of 50%, as the broadband emission is produced by optically stimulating emission from phosphor. For modulation at frequencies above 1 kHz, the duty cycle may be reduced. For example, 10 kHz modulation is attainable with a duty cycle of 5%.
- 10 dB Bandwidth
- Correlated Color Temperature

Collimation Adapters
Collimation adapters are available that incorporate an AR-coated aspheric lens for either 350 - 700 nm or 650 - 1050 nm. The collimation adapters available below are compatible with all of the mounted LEDs offered on this page, regardless of the housing style (Ø57.0 mm or Ø30.5 mm housing).

Two types of collimation adapters are offered. The first type, microscope collimation adapters, mate to the epi-illumination ports on select Leica DMI, Nikon Eclipse, Olympus IX/BX, or Zeiss Axioskop microscopes. See below for more details.

The second type, adjustable collimation adapters, can translate a Ø1" (25 mm) or Ø2" (50 mm) lens by up to 11 mm (0.43") or 20 mm (0.79"), respectively. A translating carriage, which can be locked using a 2 mm (5/64") hex key or balldriver, is used to provide collimation adjustment. Each adjustable collimation adapter includes an internal SM2 (2.035"-40) thread adapter so that the LEDs can be easily integrated with Thorlabs' SM2-threaded components, such as our microscope port adapters. These adapters are offered in versions with and without an optic. See the *Collimation* tab for details.

Thorlabs also offers mounted LEDs with pre-attached microscope collimation adapters.

Multi-LED Source
A customizable multi-LED source may be constructed using our mounted LEDs and other Thorlabs items. This source may be configured for integration with Thorlabs' versatile SM1 Lens Tube Systems, 30 mm Cage Systems, and the microscope adapters sold below. Please see the *Multi-LED Source* tab for a detailed item list and instructions.

Thorlabs also offers integrated, user-configurable 4-Wavelength High-Power LED Sources.

Driver Options
Thorlabs offers four LED drivers: LEDD1B, DC2200, DC4100, and DC4104 (the latter two require the DC4100-HUB). See the *LED Drivers* tab for compatibility and driver features. The LEDD1B is capable of providing LED modulation frequencies up to 5 kHz, while DC4100 and DC4104 can modulate the LED at a rate

up to 100 kHz. The DC2200 can provide modulation at up to 250 kHz if driven by an external source. In addition, the DC2200, DC4100, and DC4104 drivers are capable of reading the current limit from the EEPROM chip of the connected LED and automatically adjusting the maximum current setting to protect the LED.

Hide Specs

SPECS

Legend	
LED Mounted to Ø57.0 mm Housing	LED Mounted to Ø30.5 mm Housing

Item #	Color (Click for Spectrum)[a]	Nominal Wavelength[a,b]	LED Power Output (Min)[a]	LED Power Output (Typical)[a]	Maximum Current (CW)	Forward Voltage	Bandwidth (FWHM)	Irradiance (Typical)[c]	Electrical Power	Viewing Angle (Full Angle at Half Max)	Emitter Size	Typical Lifetime[d]
M265L3[e]	Deep UV	265 nm	10 mW	12 mW	350 mA	6.8 V	11 nm	-	2.380 W	130°	1 mm x 1 mm	>1 000 h
M280L3[e]	Deep UV	280 nm	25 mW	30 mW	350 mA	5.9 V	12 nm	3.9 µW/mm²	2.065 W	140°	1 mm x 1 mm	>500 h
M300L4[e]	Deep UV	300 mW	40 mW	47 mW	350 mA	8.0 V	20 nm	0.3 µW/mm²	2.800 W	130°	1 mm x 1 mm	>1 000 h
M340L4[e]	Deep UV	340 nm	53 mW	60 mW	700 mA	4.6 V	11 nm	2.22 µW/mm²	0.322 W	110°	1 mm x 1 mm	>3 000 h
M365L2[e]	UV	365 nm	190 mW	360 mW	700 mA	4.4 V	7.5 nm	8.9 µW/mm²	3.080 W	120°	1 mm x 1 mm	>10 000 h
M365LP1[e]	UV	365 nm	1150 mW	1400 mW	1400 mA	3.75 V	9 nm	17.6 µW/mm²	5.250 W	120°	1.4 mm x 1.4 mm	>10 000 h
M375L3[e]	UV	375 nm	387 mW	470 mW	700 mA	3.8 V	9 nm	14.1 µW/mm²	2.660 W	110°	1 mm x 1 mm	>10 000 h
M385L2[e]	UV	385 nm	270 mW	430 mW	700 mA	4.3 V	10 nm	11.8 µW/mm²	3.010 W	120°	1 mm x 1 mm	>10 000 h
M385LP1[e]	UV	385 nm	1650 mW	1830 mW	1400 mA	3.65 V	12 nm	23.3 µW/mm²	5.110 W	120°	1.4 mm x 1.4 mm	>10 000 h
M395L4[e]	UV	395 nm	400 mW	535 mW	500 mA	4.5 V	16 nm	6.7 µW/mm²	2.250 W	126°	1 mm x 1 mm	>10 000 h
M405L3[e]	UV	405 nm	870 mW	980 mW	1000 mA	3.9 V	20 nm	33.6 µW/mm²	3.900 W	140°	1 mm x 1 mm	>100 000 h
M405LP1[e]	UV	405 nm	1500 mW	1700 mW	1400 mA	3.45 V	12 nm	24.6 µW/mm²	4.830 W	120°	1.4 mm x 1.4 mm	>10 000 h
M420L3[e]	Violet	420 nm	750 mW	820 mW	1000 mA	3.5 V	15 nm	13.1 µW/mm²	3.500 W	125°	1 mm x 1 mm	>10 000 h
M450LP1	Royal Blue	450 nm	1850 mW	2100 mW	2000 mA	3.5 V	18 nm	35.6 µW/mm²	7.000 W	120°	1.5 mm x 1.5 mm	1 000 h
M455L3	Royal Blue	455 nm	900 mW	1020 mW	1000 mA	3.2 V	18 nm	31.2 µW/mm²	3.200 W	80°	1 mm x 1 mm	100 000 h
M470L3	Blue	470 nm	650 mW	710 mW	1000 mA	3.2 V	25 nm	21.9 µW/mm²	3.200 W	80°	1 mm x 1 mm	100 000 h
M490L3	Blue	490 nm	200 mW	250 mW	350 mA	3.5 V	23 nm	15.7 µW/mm²	1.225 W	22°	1 mm x 1 mm	>10 000 h
M505L3	Cyan	505 nm	400 mW	440 mW	1000 mA	3.3 V	30 nm	11.1 µW/mm²	3.300 W	80°	1 mm x 1 mm	100 000 h
M530L3	Green	530 nm	350 mW	370 mW	1000 mA	3.2 V	33 nm	9.5 µW/mm²	3.200 W	80°	1 mm x 1 mm	100 000 h
M565L3[f]	Lime	565 nm	880 mW	979 mW	1000 mA	3.1 V	104 nm	11.7 µW/mm²	3.100 W	125°	1 mm x 1 mm	50 000 h
M590L3	Amber	590 nm	160 mW	170 mW	1000 mA	2.2 V	18 nm	5.3 µW/mm²	2.200 W	80°	1 mm x 1 mm	100 000 h
M595L3[f]	Amber	595 nm	445 mW	502 mW	700 mA	3.05 V	80 nm	6.9 µW/mm²	2.135 W	120°	1 mm x 1 mm	50 000 h
M617L3	Orange	617 nm	600 mW	650 mW	1000 mA	2.2 V	18 nm	15.7 µW/mm²	2.200 W	80°	1 mm x 1 mm	100 000 h
M625L3	Red	625 nm	700 mW	770 mW	1000 mA	2.2 V	18 nm	18.0 µW/mm²	2.200 W	80°	1 mm x 1 mm	100 000 h
M660L4	Deep Red	660 nm	940 mW	1050 mW	1200 mA	2.6 V	20 nm	20.88 µW/mm²	3.120 W	120°	1.5 mm x 1.5	>10 000 h

											mm	
M730L4	Far Red	730 nm	515 mW	595 mW	1000 mA	2.3 V	37 nm	13.2µW/mm²	2.300 W	160°	1 mm x 1 mm	>10 000 h
M780L3	IR	780 nm	200 mW	300 mW	800 mA	2.0 V	28 nm	47.3 µW/mm²	1.600 W	20°	1 mm x 1 mm	>10 000 h
M780LP1	IR	780 nm	800 mW	950 mW	800 mA	7.8 V	30 nm	13.3 µW/mm²	6.240 W	120°	Ø3 mm (3 Emitters)	>10 000 h
M810L3	IR	810 nm	325 mW	375 mW	500 mA	3.6 V	25 nm	61.8 µW/mm²	1.800 W	40°	1 mm x 1 mm	>10 000 h
M850L3	IR	850 nm	900 mW	1100 mW	1000 mA	2.9 V	30 nm	22.9 µW/mm²	2.900 W	90°	1 mm x 1 mm	100 000 h
M850LP1	IR	850 nm	1400 mW	1600 mW	1500 mA	3.85 V	30 nm	19.4 µW/mm²	5.770 W	150°	1 mm x 1 mm	>10 000 h
M880L3	IR	880 nm	300 mW	350 mW	1000 mA	1.7 V	50 nm	5.6 µW/mm2	1.700 W	128°	1 mm x 1 mm	>10 000 h
M940L3	IR	940 nm	800 mW	1000 mW	1000 mA	2.75 V	37 nm	19.1 µW/mm²	2.750 W	90°	1 mm x 1 mm	100 000 h
M970L3	IR	970 nm	35 mW	50 mW	600 mA	1.4 V	50 nm	0.7 µW/mm²	0.840 W	124°	1 mm x 1 mm	>10 000 h
M1050L2	IR	1050 nm	50 mW	70 mW	700 mA	1.5 V	60 nm	1.9 µW/mm²	1.050 W	120°	1 mm x 1 mm	>10 000 h
M1200L3	IR	1200 nm	30 mW	35 mW	700 mA	1.4 V	80 nm	0.7 µW/mm²	0.980 W	134°	1 mm x 1 mm	>10 000 h
M1300L3	IR	1300 nm	25 mW	30 mW	500 mA	1.4 V	80 nm	0.6 µW/mm²	0.700 W	134°	1 mm x 1 mm	>10 000 h
M1450L3	IR	1450 nm	31 mW	36 mW	700 mA	1.15 V	80 nm	0.4 µW/mm²	0.805 W	136°	1 mm x 1 mm	>10 000 h
M1550L3	IR	1550 nm	31 mW	36 mW	700 mA	1.5 V	102 nm	0.5 µW/mm²	1.050 W	136°	1 mm x 1 mm	>10 000 h
MBB1L3[g]	Broadband	470 - 850 nm[h]	70 mW	80 mW	500 mA	3.6 V	280 nm	12.5 µW/mm²	1.800 W	120°	1 mm x 1 mm	10 000 h
MWWHL4[f]	Warm White	3000 K[i]	570 mW	640 mW	1000 mA	3.0 V	N/A	9.4 µW/mm²	3.000 W	120°	1 mm x 1 mm	>50 000 h
MWWHLP1[f]	Warm White	3000 K[i]	2000 mW	2300 mW	700 mA	11.7 V	N/A	37.0 µW/mm²	8.200 W	125°	3.5 mm x 3.5 mm	>100 000 h
MCWHL5[f]	Cold White	6500 K[i]	800 mW	840 mW	1000 mA	3.2 V	N/A	24.8 µW/mm²	3.200 W	80°	1 mm x 1 mm	100 000 h
MCWHLP1[f]	Cold White	6500 K[i]	2350 mW	2700 mW	700 mA	11.7 V	N/A	41.3 µW/mm²	8.200 W	125°	3.5 mm x 3.5 mm	>100 000 h

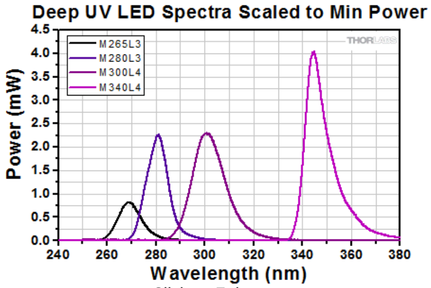
- Due to variations in the manufacturing process and operating parameters such as temperature and current, the actual spectral output of any given LED will vary. Output plots and nominal wavelength specs are only intended to be used as a guideline.
- For LEDs in the visible spectrum, the nominal wavelength indicates the wavelength at which the LED appears brightest to the human eye. The nominal wavelength for visible LEDs may not correspond to the peak wavelength as measured by a spectrograph.
- Irradiance is measured at a distance of 200 mm from the LED.
- Thorlabs defines the lifetime of our LEDs as B_{50}/L_{50}, meaning that 50% of the LEDs with a given item # will fall below 50% of the initial optical power at the end of the specified lifetime. Please see the *Stability* tab for more details.
- Our 265 nm to 420 nm LEDs radiate intense UV light during operation. Precautions must be taken to prevent looking directly at the UV light and UV light protective glasses must be worn to avoid eye damage. Exposure of the skin and other body parts to the UV light should be avoided.
- These LEDs are phosphor-converted and may not turn off completely when modulated above 10 kHz at duty cycles below 50%.
- The MBB1L3 LED may not turn off completely when modulated at frequencies above 1 kHz with a duty cycle of 50%, as the broadband emission is produced by optically stimulating emission from phosphor. For modulation at frequencies above 1 kHz, the duty cycle may be reduced. For example, 10 kHz modulation is attainable with a duty cycle of 5%.
- 10 dB Bandwidth
- Correlated Color Temperature

Hide Relative Power

RELATIVE POWER

Relative Power

The actual spectral output and total output power of any given LED will vary due to variations in the manufacturing process and operating parameters, such as temperature and current. Both a typical and minimum output power are specified to help you select an LED that suits your needs. Each mounted LED will provide at least the minimum specified output power at the maximum current. In order to provide a point of comparison for the relative powers of LEDs with different nominal wavelengths, the spectra in the plots below have been scaled to the minimum output power for each LED. This data is representative, not absolute. An excel file with normalized and scaled spectra for all of the mounted LEDs can be downloaded here.



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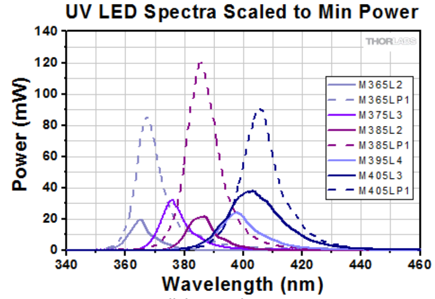

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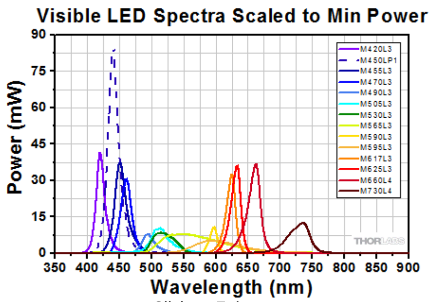

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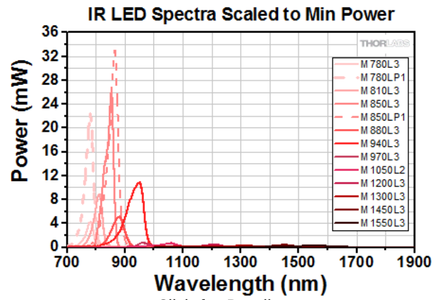

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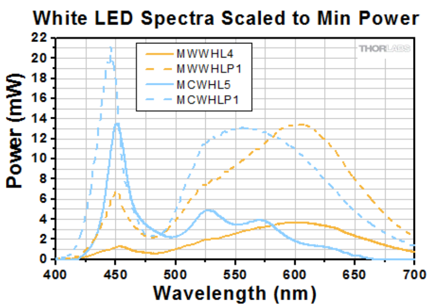

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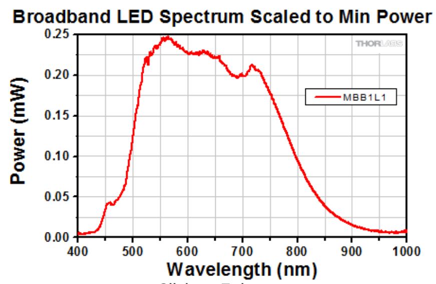

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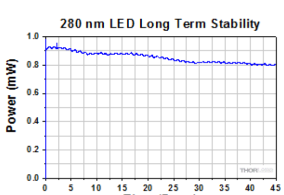
Hide Stability

STABILITY

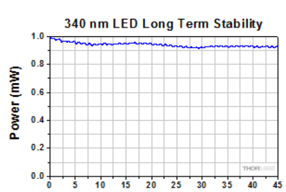
LED Lifetime and Long-Term Power Stability

One characteristic of LEDs is that they naturally exhibit power degradation with time. Often this power degradation is slow, but there are also instances where large, rapid drops in power, or even complete LED failure, occur. LED lifetimes are defined as the time it takes a specified percentage of a type of LED to fall below some power level. The parameters for the lifetime measurement can be written using the notation B_{XX}/L_{YY}, where XX is the percentage of that type of LED that will provide less than YY percent of the specified output power after the lifetime has elapsed. Thorlabs defines the lifetime of our LEDs as B_{50}/L_{50}, meaning that 50% of the LEDs with a given Item # will fall below 50% of the initial optical power at the end of the specified lifetime. For example, if a batch of 100 LEDs is rated for 150 mW of output power, 50 of these LEDs can be expected to produce an output power of ≤75 mW after the specified LED lifetime has elapsed.

The sample plots below show example data from long-term stability testing for our UV LEDs over a 45 day period; the 280 nm LED has a typical lifetime of >500 hours (~20 days), while the M340L3 has a lifetime of >3,000 hours (~125 days). The small power drop experienced by each LED after it is turned on is typical behavior during the first few minutes of operation. It corresponds to the period of time required for the LED to warm up to the point where it is thermally stable. Please note that each graph represents the performance of a single LED; performance of individual LEDs will vary within the stated specfications.



Click to Enlarge
The M280L3 LED has a typical lifetime of >500 hours. In this case, the unit under test had dropped to ~80% of the initial output power after 45 days.



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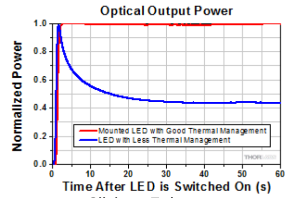
The M340L3 LED has a typical lifetime of >3,000 hours. In this case, the unit under test continued to provide more than 90% of its initial power after 45 days.

Optimized Thermal Management

The thermal dissipation performance of these mounted LEDs has been optimized for stable power output. The heat sink is directly mounted to the LED mount so as to provide optimal thermal contact. By doing so, the degradation of optical output power that can be attributed to increased LED junction temperature is minimized (see the graph to the right).



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Hide Pin Diagram

PIN DIAGRAM

Pin Connection - Male

The diagram to the right shows the male connector of the mounted LED assembly. It is a standard M8 x 1 sensor circular connector. Pins 1 and 2 are the connection to the LED. Pin 3 and 4 are used for the internal EEPROM in these LEDs. If using an LED driver that was not purchased from Thorlabs, be careful that the appropriate connections are made to Pin 1 and Pin 2 and that you do not attempt to drive the LED through the EEPROM pins.

Pin	Specification	Color
1	LED Anode	Brown
2	LED Cathode	White
3	EEPROM GND	Black
4	EEPROM IO	Blue

Hide LED Drivers

LED DRIVERS

Compatible Drivers	LEDD1B	DC2200[a]	DC4100[a,b,c,]	DC4104[a,b,c]
Click Photos to Enlarge				
LED Driver Current Output (Max)	1.2 A	LED1 Terminal: 10.0 A LED2 Terminal: 2.0 A[d]	1.0 A per Channel	1.0 A per Channel
LED Driver Forward Voltage (Max)	12 V	50 V	5 V	5 V
Modulation Frequency Using External Input (Max)	5 kHz	250 kHz[e,f]	100 kHz[f] (Simultaneous Across all Channels)	100 kHz[f] (Independently Controlled Channels)
External Control Interface(s)	Analog (BNC)	USB 2.0 and Analog (BNC)	USB 2.0 and Analog (BNC)	USB 2.0 and Analog (8-Pin)
Main Driver Features	Very Compact Footprint 60 mm x 73 mm x 104 mm (W x H x D)	Touchscreen Interface with Internal and External Options for Pulsed and Modulated LED Operation	4 Channels[b]	4 Channels[b]
EEPROM Compatible: Reads Out LED Data for LED Settings	-	✔	✔	✔
LCD Display	-	✔	✔	✔

- Automatically limits to LED's max current via EEPROM readout.
- The DC4100 and DC4104 can power and control up to four LEDs simultaneously when used with the DC4100-HUB. The LEDs on this page all require the DC4100-HUB when used with the DC4100 or DC4104.
- These LED drivers have a maximum forward voltage rating of 5 V and can provide a maximum current of 1000 mA. As a result, they cannot be used to drive LEDs which have forward voltage ratings greater than 5 V. LEDs with maximum current ratings higher than 1.0 A can be driven using this driver, but will not reach full power.
- The mounted LEDs sold below are compatible with the LED2 Terminal.
- Small Signal Bandwidth: Modulation not exceeding 20% of full scale current. The driver accepts other waveforms, but the maximum frequency will be reduced.
- Several of these LEDs produce light by stimulating emission from phosphor, which limits their modulation frequencies. The M565L3, M595L3, MWWHL3, and MCWHL5 LEDs may not turn off completely when modulated above 10 kHz at duty cycles below 50%. The MBB1L3 LED may not turn off completely when modulated at frequencies above 1 kHz with a duty cycle of 50%. When the MBB1L3 is modulated at frequencies above 1 kHz, the duty cycle may be reduced; for example, 10 kHz modulation is attainable with a duty cycle of 5%.

Note: The DC3100 drivers sold with our Modulated LEDs for FLIM Microscopy kits are not compatible with the LEDs sold on this page.

Hide Collimation

COLLIMATION

Collimating the LED

Thorlabs' extensive catalog of mechanical and optical components provides a variety of configurations that can be used to collimate our mounted LEDs. Some of the applications of the collimated LEDs include custom imaging systems, microscope illuminators, or projectors. Our microscope collimation adapters, available below, feature microscope-compatible outputs and Ø2" aspheric condenser lenses. The adjustable collimation adapters, also available below, are designed to provide collimation with focus adjustment via a Ø1" (Ø25 mm) or Ø2" (Ø50 mm) optic in a translating carriage; the mechanical housings have an M34 x 0.5 internal or M62 x 0.75 internal output thread and include an internally SM2-threaded adapter for integration with standard Thorlabs components. If your setup requires a collimation package with the smallest possible profile, the LEDs can also be integrated with Ø1" collimating optics and SM1-threaded lens tubes. When exchanging the lens in your collimation adapter, please be careful to follow proper optics handling procedures (Optic Handling Tutorial).

Adjustable Collimation Adapter

Thorlabs' adjustable collimation adapters accept an Ø1" (Ø25 mm) or Ø2" (Ø50 mm) collimation optic. Adapter Item #'s with a -A or -B suffix include an aspheric condenser lense coated for 350 - 700 nm or 650 - 1050 nm, respectively. These adapters are also offered without a pre-installed optic so that user-supplied components can be integrated with the LEDs. Several suggestions are presented in the table to the right.

Suggested Items for Adjustable Collimation Adapters		
Item #	**Qty.**	**Description**
SPW602[a] or SPW604[a]	1	Spanner Wrench for SM1-Threaded or SM2-Threaded Retaining Rings
ACL2520U-DG6-A[b], ACL2520U-DG6-B[b], ACL2520U[b], or ACL2520U-DG6[b]	1	Ø1" (25 mm) Aspheric Condenser Lens (with or without Diffuser) Use with SM1P Collimation Adapter
ACL5040U-DG6-A[b], ACL50832U[b], ACL5040U-B[b]	1	Ø2" (50 mm) Aspheric Condenser Lens (with or without Diffuser) Use with SM2P Collimation Adapter

- These adapters include a retaining ring that is thicker than our standard retaining ring so that the SPW602 or SPW604 can be used without scratching the highly curved surface of an aspheric condenser lens.
- -A and -B refer to the type of AR coating on the lens. Thorlabs' LEDs with a nominal wavelength between 365 nm and 660 nm would require the -A coating, while the LEDs with a nominal wavelength between 730 nm and 1050 nm would require the -B Coating. IR LEDs that emit past 1050 nm can be collimated using an uncoated condenser lens, such as the ACL2520U. Deep UV LEDs with a wavelength ≤340 nm require a lens fabricated from UV Fused Silica, since many standard varieties of glass do not transmit below 350 nm.

Click to Enlarge
An SM1P25-A Collimation Adapter Installed on a Mounted LED

Installing a new lens in the adjustable collimation adapter is a simple procedure:

1. Turn the adjustment knob to move the optic mounting carriage to the output end of the housing.
2. Use the SPW602 or SPW604 spanner wrench to remove the retaining ring from the housing.
3. Place a Ø1" (Ø25 mm) or Ø2" (Ø50 mm) optic of your choice into the mounting carriage with the curved surface facing the output. For customers concerned with the homogeneity of the beam, the AR-coated aspheric condenser lens with diffuser is a good option.
4. Use the SPW602 or SPW604 spanner wrench to screw the retaining ring into the mounting carriage, securing the optic in place.
5. Screw the externally SM1-threaded end of the collimation adapter onto an LED of your choice as shown in the picture to the left.

SM1-Threaded Collimation Assembly

For cases where a smaller profile than the adjustable collimation adapter is required, a simple LED collimation assembly can be built from the components listed in the table to the lower right.

1. First, install the optic in the adjustable lens tube, which allows one to control the working distance of the lens while collimating the LED. The SM1-threaded (1.035"-40) SM1V05 comes with a locking nut and a retaining ring. For customers concerned with the homogeneity of the beam, the AR-coated aspheric condenser lens with diffuser (ACL2520U-DG6-A or ACL2520U-DG6-B) is a good option. By the end of this step, the lens will rest on top of one retaining ring (SM1RR) and be secured in place by another retaining ring placed on top of it.
   a. Use the spanner wrench (SPW801) to turn the included retaining ring in the adjustable length lens tube so that it is closer to the inside lip of the tube.
   b. Carefully place the lens inside the adjustable length lens tube with the curved side facing away from the male-threaded end of the tube.
   c. Secure the lens in place with another retaining ring (SM1RR) using the spanner wrench. Note: Do not use the SPW602 spanner wrench for this step. The thin SM1RR retaining ring does not provide sufficient clearance to tighten it with the SPW602 without scratching the steeply curved surface of an aspheric condenser lens.

Suggested Items for SM1-Threaded Collimation Assembly		
Item #	**Qty.**	**Description**
SM1RR	2	Ø1" Retaining Ring (One Each Included with SM1V05 & SM1L03)
SPW801	1	Adjustable Spanner Wrench[a]
ACL2520U-A[b], ACL2520U-B[b], ACL2520U-DG6-A[b], ACL2520U-DG6-B[b], ACL2520U[b], or ACL2520U-DG6[b]	1	Aspheric Condenser Lens (with or without Diffuser)
SM1V05[c]	1	Ø1" Rotating Adjustable Length Lens Tube, 1/2" Long
SM1L03	1	Ø1" Lens Tube, 0.30" Long

- While these components are SM1 threaded, we recommend our adjustable spanner wrench due to the steep curvature of the aspheric condenser lens.
- -A and -B refer to the type of AR coating on the lens. Thorlabs' LEDs with a nominal wavelength between 365 nm and 660 nm would require the -A coating, while the LEDs with a nominal wavelength between 730 nm and 1050 nm would require the -B Coating. IR LEDs that emit past 1050 nm can be collimated using an uncoated condenser lens, such as the ACL2520U. Deep UV LEDs with a wavelength ≤340 nm require a lens fabricated from UV Fused Silica, since many standard varieties of glass do not transmit below 350 nm.
- The SM1V10 Adjustable Lens Tube can also be used for this application, however, the translation range of the optic cell will be reduced from 7.6 mm (thread depth of the SM1L03) to 6 mm (thread depth of the LED). If used, the SM1L03 would no longer be needed in the assembly.

2. Thread the male end of the SM1L03 lens tube into the female end of the LED and gently tighten it.
3. Partially thread the male end of the SM1V05 adjustable length lens tube assembly into the female end of the SM1L03-LED assembly.


Click to Enlarge
Setup for Adjustable Length Lens Tube and Lens


Click to Enlarge
Completed Assembly


Click to Enlarge
Setup for Lens Tubes and LED Assembly

Obtaining a Well-Collimated Beam

After installing the chosen mounting adapter on a mounted LED, the distance of the lens from the LED should be adjusted by following the steps below.

A well-collimated beam has minimal divergence and will not converge at any point in the beam path. Be advised that due to the nature of the output from the LED (high emitter surface area), the beam cannot be perfectly collimated. Please refer to the table below for divergence data.

1. Power on the LED and check to see if it is properly collimated. It is easiest to check that the beam is collimated by noting the changes in the beam diameter over a range of about 1" to 2 feet away; change the distance of the lens from the LED and check again. Do this until the least divergent, non-converging, homogenous beam is obtained. The beam should be somewhat circular in diameter, may have a slightly polygonal shape, and should not be a clear image of the LED itself.
2. If you see an image of the LED, this means that the lens is not close enough to the LED. Move the lens closer to the LED until the image blurs and becomes homogenous – this is the point of collimation. Note: If the lens needs to be closer to the LED when using the SM1V05 assembly, use only one retaining ring to secure the lens in the SM1V05 so that the lens will rest on the inside lip of the SM1V05 adjustable length lens tube.


Click to Enlarge
Image of the LED


Click to Enlarge
Uncollimated Beam


Click to Enlarge
Collimated Beam

5. Once the proper collimation position of the lens has been found, lock the position of the lens in place.
   a. For the adjustable collimation adapters, simply tighten the locking screw using a 2 mm (5/64") hex key.
   b. For the SM1V05 assembly described above, loosen it from the SM1L03 lens tube by about ¼ to ½ turn, rotate the external locking nut until it is flush with the edge of the SM1L03 lens tube, and gently tighten both the assembly and the locking nut by ¼ to ½ turn (there should be slight resistance; do not over tighten). This will lock the collimation position in place.

The table below provides examples of how the half viewing angle changes for select LEDs with the addition of a Ø1" aspheric condenser lens.

Item #	Color	Nominal Wavelength[a]	Optimum Lens to Emitter Distance[b]	Half Viewing Angle[c]		
				+1 mm Out of Focus[d]	at Optimum Focusing Distance	-1 mm Out of Focus[d]
M365L2	UV	365 nm	12.7 mm	2.79°	1.32°	3.11°
M385L2	UV	385 nm	12.8 mm	2.68°	1.33°	3.06°
M405L2	UV	405 nm	12.9 mm	2.94°	1.63°	3.06°
M505L3	Cyan	505 nm	13.2 mm	3.52°	2.72°	3.46°
M625L3	Red	625 nm	14.4 mm	3.46°	2.27°	3.13°
M850L3	IR	850 nm	13.8 mm	3.29°	3.10°	3.93°
M940L3	IR	940 nm	13.9 mm	3.42°	2.46°	3.70°
MCWHL5	Cold White	6500 K[e]	13.9 mm	3.41°	2.47°	3.14°

- The specifications listed in the table above are nominal values specified by the LED manufacturer.
- Optimum distance between the respective mounted LED and the ACL2520U lens used to collimate the beam.
- Power loss to $1/e^2$ (13.5%).
- ±1 mm out of focus from Optimum Distance between the respective mounted LED and the ACL2520U lens used to collimate the beam.
- Correlated Color Temperature.

The divergence data was calculated using Zemax.

Creating a Custom Multi-LED Source for Microscope Illumination

Thorlabs offers the items necessary to create your own custom multi-LED light source using two or three of the mounted LEDs offered below. As configured in the following example, the light source is intended to be used with the illumination port of a microscope. However, it may be integrated with other applications using Thorlabs' versatile SM1 Lens Tube and 30 mm Cage Systems. Thorlabs also offers integrated, user-configurable 4-Wavelength LED Sources.

Click to Enlarge
Multi-LED Source Coupled to Microscope Illumination Port

Design & Construction

First, light will be collimated by lenses mounted in lens tubes. Dichroic mirrors mounted in kinematic cage cubes then combine the output from the multiple LEDs. The mounted LEDs may be driven by LEDD1B Compact T-Cube LED Drivers (power supplies are sold separately). The LEDD1B LED Drivers allow each LED's output to be independently modulated and can provide up to 1200 mA of current. Please take care not to drive the LED sources above their max current ratings.

When designing your custom source, select mounted LEDs from below along with dichroic mirror(s) that have cutoff wavelength(s) between the LED wavelengths. The appropriate dichroic mirror(s) will reflect light from side-mounted LEDs and transmit light along the optical axis. Please note that most of these dichroic mirrors are "longpass" filters, meaning they transmit the longer wavelengths and reflect the shorter wavelengths. To superimpose light from three or more LEDs, add each in series (as shown below), starting from the back with longer wavelength LEDs when using longpass filters. Shortpass filters may also used if the longer wavelength is reflected and the shorter wavelength is transmitted. Sample combinations of compatible dichroic mirrors and LEDs are offered in the three tables below.

It is also necessary to select an aspheric condenser lens for each source with AR coatings appropriate for the source. Before assembling the light source, collimate the light from each mounted LED as detailed in the *Collimation* tab. For mounting the aspheric lenses in the SM1V05 Lens Tubes using the included SM1RR retaining rings, we recommend the SPW801 Adjustable Spanner Wrench. A properly collimated LED source should have a resultant beam that is approximately homogenous and not highly divergent at a distance of approximately 2 feet (60 cm). An example of a well-collimated beam is shown on the *Collimation* tab.

After each LED source is collimated, thread the SM1V05 Lens Tubes at the end of each collimated LED assembly into their respective C4W Cage Cube ports using SM1T2 Lens Tube Couplers. Install each dichroic filter in an FFM1 Dichroic Filter Holder, and mount each filter holder onto a B4C Kinematic Cage Cube Platform. Each platform is then installed in the C4W Cage Cubes by partially threading the included screws into the bottom of the cube, and then inserting and rotating the B4C platform into place. Align the platform to the desired position and then firmly tighten the screws. To connect multiple cage cubes and the microscope adapter, use the remaining SM1T2 lens tube couplers along with an SM1L05 0.5" Lens Tube between adjacent cage cubes. Finally, adjust the rotation, tip, and tilt of each B4C platform to align the reflected and transmitted beams so they overlap as closely as possible.

If desired, a multi-LED source may be constructed that employs more than three LEDs. The limiting factors for the number of LEDs that can be practically used are the collimation of the light and the dichroic mirror efficiency over the specified range. Heavier multi-LED sources may be supported with our Ø1" or Ø1.5" Posts.

Click to Enlarge
Three-LED Source Using Components Mounted LEDs and Dichroic Mirrors Detailed in Example Configuration 1

Click to Enlarge
Beam Profile of Source with 3 Mounted LEDs

Parts List					
#	Product Description		Item #	2 LEDs	3 LEDs
				Item Qty.	
1	Microscope Illumination Port Adapter:	Olympus IX or BX	SM1A14	1	1
		Leica DMI	SM1A21		
		Zeiss Axioskop	SM1A23[a]		
		Nikon Eclipse Ti	SM1A26		
2	Mounted LED[b]		-	2	3
-	T-Cube LED Driver, 1200 mA Max Drive Current		LEDD1B[c]	2	3

Click to Enlarge
Two-LED source. This is the same as Example 1, but with the blue LED removed.

-	15 V Power Supply Unit for T-Cube	KPS101[c]	2	3
3	4-Way Mounting 30 mm Cage Cube	C4W	1	2
4	Kinematic Cage Cube Platform for C4W/C6W	B4C	1	2
5	30 mm Cage-Compatible Dichroic Filter Mount	FFM1	1	2
6	Dichroic Filter(s)[d]	-	1	2
7	Externally SM1-Threaded End Cap	SM1CP2	1	2
8	SM1 (1.035"-40) Coupler, External Threads, 0.5" Long	SM1T2	3	5
9	Ø1" SM1 Lens Tube, 1/2" Long External Threads	SM1V05	2	3
-	Aspheric Condenser Lens: AR-Coated 350 - 700 nm	ACL2520U-A[c,e]	2	3
	Aspheric Condenser Lens: AR-Coated 650 - 1050 nm	ACL2520U-B[c,e]		
10	SM1 Lens Tube, 0.3" Thread Depth	SM1L03	2	4
-	Blank Cover Plate with Rubber O-Ring for C4W/C6W	B1C[c]	1	2

- The SM1A23 Zeiss Axioskop Microscope Adapter is shown.
- Mounted LEDs are available below.
- Item not pictured.
- Please see the following tables for suggested compatible LED and dichroic filter combinations, or create your own by taking into account the transmission and reflection wavelength ranges of our Dichroic Filters.
- Lenses are mounted in the SM1V05 Lens Tube in front of each LED. For each lens, select an AR coating corresponding to the emission wavelength of the LED source.

Example Configuration 1	
Mounted LEDs	
#	**Item #**
2a	M625L3
2b	M530L3
2c	M455L3
Dichroic Filter(s)	
#	**Item #**
6a	DMLP605R
6b	DMLP505R

Example Configuration 2	
Mounted LEDs	
#	**Item #**
2a	M625L3
2b	M455L3
2c	M1050L2
Dichroic Filter(s)	
#	**Item #**
6a	DMLP505R
6b	DMSP805R

Example Configuration 3	
Mounted LEDs	
#	**Item #**
2a	M1050L2
2b	MCWHL5
Dichroic Filter(s)	
#	**Item #**
6a	DMLP900R

Hide Ray Data

RAY DATA

Ray data for Zemax is available for some of the bare LEDs incorporated into these high-powered light sources. This data is provided in a zipped folder that can be downloaded by clicking on the red document icons ( ) next to the part numbers in the pricing tables below. Every zipped folder contains an information file and one or more ray files for use with Zemax:

- **Information File:** This document contains a summary of the types of data files included in the zipped folder and some basic information about their use. It includes a table listing each document type and the corresponding filenames.
- **Ray Files:** These are binary files containing ray data for use with Zemax.

For the LEDs marked with an superscript "a" in the table to the right, the following additional pieces of information are also included in the zipped folder:

- **Radiometric Color Spectrum:** This .spc file is also intended for use with Zemax.
- **CAD Files:** A file indicating the geometry of the bare LED. For the dimensions of the high-power mounted LEDs that include the package, please see

Item #	Information File	Available Ray Files	File Size	Click to Download
M365L2	M365_Info.pdf	100,000 Rays and 1 Million Rays	27.4 MB	
M385L2	M385_Info.pdf	1 Million Rays and 5 Million Rays	148 MB	
M405L2	M405_Info.pdf	1 Million Rays	33.1 MB	
M450LP1[a]	LD_CQAR_20150731_info.pdf	100,000 Rays, 500,000 Rays, and 5 Million Rays	123 MB	
M455L3[a,b]	LD_CQ7P_290311_info.pdf	100,000 Rays, 500,000 Rays, and 5 Million Rays	125 MB	
M505L3[a]	LV_CK7P_191212_info.pdf	100,000 Rays, 500,000 Rays, and 5 Million Rays	123 MB	
M850L3[a]	SFH4715S_100413_info.pdf	100,000 Rays, 500,000 Rays, and 5 Million Rays	140 MB	
M940L3[a]	SFH_4725S_110413_info.pdf	100,000 Rays, 500,000 Rays, and 5 Million Rays	140 MB	

- A radiometric color spectrum, bare LED CAD file, and sample Zemax file are also available for these LEDs.
- The ray data files for the M455L3 can be used for the M470L3 as well by manually resetting the source wavelength in Zemax. Wavelength-specific data and files, such as the radiometric color spectrum and sample Zemax files, only apply to the M455L3.
- The ray data files for the M617L3 can be used for the M590L3 and M625L3 as well by manually resetting the source wavelength in Zemax. Wavelength-specific data and files, such as the radiometric color spectrum and sample Zemax files, only apply to the M617L3.

the support drawings provided by Thorlabs.
- **Sample Zemax File:** A sample file containing the recommended settings and placement of the ray files and bare LED CAD model when used with Zemax.

The table to the right summarizes the ray files available for each LED and any other supporting documentation provided.

Hide LED Selection Guide

LED SELECTION GUIDE

Light Emitting Diode (LED) Selection Guide

(Click Representative Photo to Enlarge; Not to Scale)									
Type	**Unmounted LEDs**	**PCB-Mounted LEDs**	**Heatsink-Mounted LEDs**	**Collimated LEDs for Microscopy (Item # Prefix[a])**	**Fiber-Coupled LEDs[b]**	**High-Power LEDs for Microsocopy**	**4-Wavelength LED Source Options[c]**	**Modulated LEDs for FLIM Microscopy**	**LED Arrays**
Wavelength									
245 nm	LED245W (0.07 mW)	-	-	-	-	-	-	-	-
250 nm	LED250J (1 mW Min)	-	-	-	-	-	-	-	-
255 nm	LED255J (1 mW Min)	-	-	-	-	-	-	-	-
260 nm	LED260W (0.3 mW) LED260J (1 mW Min)	-	-	-	-	-	-	-	-
265 nm	LED265W (0.3 mW)	M265D2 (10 mW Min)	M265L3 (10 mW Min)	-	-	-	-	-	-
275 nm	LED275W (0.8 mW) LED275J (1 mW Min)	-	-	-	-	-	-	-	-
280 nm	LED280J (1 mW Min)	M280D2 (25 mW Min)	M280L3 (25 mW Min)	-	M280F2 (323 µW)	-	-	-	-
285 nm	LED285W (0.8 mW)	-	-	-	-	-	-	-	-
290 nm	LED290W (0.8 mW)	-	-	-	-	-	-	-	-
300 nm	LED300W (0.5 mW)	M300D3 (40 mW Min)	M300L4 (40 mW Min)	-	M300F2 (320 µW)	-	-	-	-
315 nm	LED315W (0.6 mW)	-	-	-	-	-	-	-	-
340 nm	LED341W (0.33 mW)	M340D3 (53 mW Min)	M340L4 (53 mW Min)	-	M340F3 (1.06 mW)	-	-	-	-
365 nm	-	M365D1 (190 mW Min) M365D2 (1150 mW Min)	M365L2 (190 mW Min) M365LP1 (1150 mW Min)	M365L2 (60 mW)[d] M365LP1 (350 mW)[d]	M365F1 (4.1 mW) M365FP1 (15.5 mW)	SOLIS-365A(/M) (850 mW)[e]	Available (85 mW)	DC3100-365	LIU365A (31 mW)
375 nm	LED375L (1 mW) LED370E (2.5 mW)	M375D2 (387 mW Min)	M375L3 (387 mW Min)	-	M375F2 (4.23 mW)	-	-	-	-
385 nm	LED385L (5 mW)	M385D1 (270 mW Min) M385D2	M385L2 (270 mW Min) M385LP1	M385L2 (90 mW)[d] M385LP1	M385F1 (10.7 mW) M385FP1	SOLIS-385A(/M) (1300 mW)[e]	Available (95 mW)	-	-

		(1650 mW Min)	(1650 mW Min)	(520 mW)[d]	(23.2 mW)				
395 nm	LED395L (6 mW)	M395D3 (400 mW Min)	M395L4 (400 mW Min)	-	M395F3 (6.8 mW)	-	-	-	-
405 nm	LED405L (6 mW)	-	M405L3 (870 mW Min)	M405L3 (440 mW)[d]	M405F1 (3.7 mW)	SOLIS-405A(/M) (1800 mW)[e]	Available (95 mW)	DC3100-405	-
	LED405E (10 mW)	M405D2 (1500 mW Min)	M405LP1 (1500 mW Min)	M405LP1 (450 mW)[d]	M405FP1 (24.3 mW)				
420 nm	-	M420D2 (750 mW Min)	M420L3 (750 mW Min)	-	M420F2 (16.2 mW)	-	Available (290 mW)	-	-
430 nm	LED430L (8 mW)	-	-	-	-	-	-	-	-
445 nm	-	-	-	-	-	SOLIS-445B(/M) (2900 mW)[e]	-	-	-
450 nm	LED450L (7 mW)	M450D3 (1850 mW Min)	M450LP1 (1850 mW Min)	-	-	-	-	-	-
455 nm	-	M455D2 (900 mW Min)	M455L3 (900 mW Min)	M455L3 (360 mW)[d]	M455F1 (11.0 mW)	-	Available (310 mW)	-	-
465 nm	LED465E (20 mW)	-	-	-	-	-	-	-	-
470 nm	LED470L (170 mW)	M470D2 (650 mW Min)	M470L3 (650 mW Min)	M470L3 (250 mW)[d]	M470F3 (17.2 mW)	-	Available (250 mW)	DC3100-470	LIU470A (253 mW)
490 nm	LED490L (3 mW)	M490D2 (200 mW Min)	M490L3 (200 mW Min)	-	M490F2 (2.0 mW)	-	Available (50 mW)	-	-
505 nm	LED505L (4 mW)	M505D2 (400 mW Min)	M505L3 (400 mW Min)	M505L3 (150 mW)[d]	M505F1 (8.0 mW)	-	Available (170 mW)	-	-
525 nm	LED525E (2.6 mW Max)	-	-	-	-	SOLIS-525B(/M) (1650 mW)[e]	-	-	LIU525A (111 mW)
	LED525L (4 mW)								
	LED528EHP (7 mW)								
530 nm	-	M530D2 (350 mW Min)	M530L3 (350 mW Min)	M530L3 (130 mW)[d]	M530F2 (6.8 mW)	-	Available (100 mW)	-	-
555 nm	LED555L (1 mW)	-	-	-	-	-	-	-	-
565 nm	-	M565D2 (880 mW Min)	M565L3 (880 mW Min)		M565F1 (2.0 mW)	-	Available (106 mW)	-	-
570 nm	LED570L (0.35 mW)	-	-	-	-	-	-	-	-
590 nm	LED590L (2 mW)	M590D2 (160 mW Min)	M590L3 (160 mW Min)	M590L3 (60 mW)[d]	M590F2 (1.85 mW)	-	Available (65 mW)	-	LIU590A (109 mW)
	LED591E (2 mW)								
595 nm	-	M595D2 (445 mW Min)	M595L3 (445 mW Min)	-	M595F2 (8.7 mW)	-	-	-	-
600 nm	LED600L (3 mW)	-	-	-	-	-	-	-	-
610 nm	LED610L (8 mW)	-	-	-	-	-	-	-	-
617 nm	-	M617D2 (600 mW Min)	M617L3 (600 mW Min)	M617L3 (230 mW)[d]	M617F2 (10.2 mW)	-	Available (210 mW)	-	-
623 nm	-	-	-	-	-	SOLIS-623A(/M) (2530 mW)[e]	-	-	-

625 nm	LED625L (12 mW)	M625D2 (700 mW Min)	M625L3 (700 mW Min)	M625L3 (270 mW)[d]	M625F1 (13.2 mW)	-	Available (240 mW)	-	-
630 nm	LED630L (16 mW)	-	-	-	-	-	-	DC3100-630	LIU630A (208 mW)
635 nm	LED631E (4 mW) LED635L (170 mW)	-	-	-	-	-	-	-	-
639 nm	LED630E (7.2 mW)	-	-	-	-	-	-	-	-
645 nm	LED645L (16 mW)	-	-	-	-	-	-	-	-
660 nm	LED660L (13 mW)	M660D2 (940 mW Min)	M660L4 (940 mW Min)	M660L4 (400 mW)[d]	M660F1 (14.5 mW)	-	Available (210 mW)	-	-
670 nm	LED670L (12 mW)	-	-	-	-	-	-	-	-
680 nm	LED680L (8 mW)	-	-	-	-	-	-	-	-
730 nm	-	M730D2 (515 mW Min)	M730L4 (515 mW Min)	M730L4 (165 mW)[d]	-	-	-	-	-
740 nm	-	-	-	-	M740F2 (6.0 mW)	-	-	-	-
780 nm	LED780E (18 mW)	M780D2 (200 mW Min) M780D3 (800 mW Min)	M780L3 (200 mW Min) M850LP1 (800 mW Min)	M780L3 (130 mW)[d]	M780F2 (7.5 mW)	-	-	-	LIU780A (315 mW)
810 nm	-	M810D2 (325 mW Min)	M810L3 (325 mW Min)	M810L3 (210 mW)[d]	M810F2 (6.5 mW)	-	-	-	-
850 nm	LED851W (8 mW) LED851L (13 mW)	M850D2 (900 mW Min) M850D3 (1400 mW)	M850L3 (900 mW Min) M850LP1 (1400 mW)	M850L3 (330 mW)[d]	M850F2 (13.4 mW)	SOLIS-850A(/M) (1700 mW)[e]	-	-	LIU850A (322 mW)
870 nm	LED870E (22 mW)	-	-	-	-	-	-	-	-
880 nm	-	M880D2 (300 mW Min)	M880L3 (300 mW Min)	-	M880F2 (3.4 mW)	-	-	-	-
910 nm	LED910E (12 mW)	-	-	-	-	-	-	-	-
940 nm	LED940E (18 mW)	M940D2 (800 mW Min)	M940L3 (800 mW Min)	M940L3 (320 mW)[d]	M940F1 (6.5 mW)	-	-	-	-
970 nm	-	M970D2 (35 mW Min)	M970L3 (35 mW Min)	-	M970F2 (0.3 mW)	-	-	-	-
1050 nm	LED1050E (2.5 mW) LED1050L (4 mW)	M1050D1 (50 mW Min)	M1050L2 (50 mW Min)	-	M1050F1 (1.4 mW)	-	-	-	-
1070 nm	LED1070L (4 mW) LED1070E (7.5 mW)	-	-	-	-	-	-	-	-
1085 nm	LED1085L (5 mW)	-	-	-	-	-	-	-	-
1200 nm	LED1200E (2.5 mW) LED1200L (5 mW)	M1200D2 (30 mW Min)	M1200L3 (30 mW Min)	-	-	-	-	-	-
1300 nm	LED1300E (2 mW) LED1300L	M1300D2 (25 mW Min)	M1300L3 (25 mW Min)	-	-	-	-	-	-

	(3.5 mW)								
1450 nm	LED1450E (2 mW) LED1450L (5 mW)	M1450D2 (31 mW Min)	M1450L3 (31 mW Min)	-	-	-	-	-	-
1550 nm	LED1550E (2 mW) LED1550L (4 mW)	M1550D2 (31 mW Min)	M1550L3 (31 mW Min)	-	-	-	-	-	-
1600 nm	LED1600L (2 mW)	-	-	-	-	-	-	-	-
1650 nm	LED1600P (1.2 mW)	-	-	-	-	-	-	-	-
1750 nm	LED1700P (1.2 mW Quasi-CW, 30 mW Pulsed)	-	-	-	-	-	-	-	-
1850 nm	LED1800P (0.9 mW Quasi-CW, 20 mW Pulsed)	-	-	-	-	-	-	-	-
1950 nm	LED1900P (1.0 mW Quasi-CW, 25 mW Pulsed)	-	-	-	-	-	-	-	-
2050 nm	LED2050P (1.1 mW Quasi-CW, 28 mW Pulsed)	-	-	-	-	-	-	-	-
2350 nm	LED2350P (0.8 mW Quasi-CW, 16 mW Pulsed)	-	-	-	-	-	-	-	-
4200 nm	LED4300P (0.01 mW Quasi-CW, 0.2 mW Pulsed)	-	-	-	-	-	-	-	-
4500 nm	LED4600P (0.006 mW Quasi-CW, 0.12 mW Pulsed)	-	-	-	-	-	-	-	-
572 nm and 625 nm	LEDGR (0.09 mW and 0.19 mW)	-	-	-	-	-	-	-	-
588 nm and 617 nm	LEDRY (0.09 mW and 0.19 mW)	-	-	-	-	-	-	-	-
467.5 nm, 525 nm, and 627.5 nm	LEDRGBE (5.8 mW, 6.2 mW, and 3.1 mW)	-	-	-	-	-	-	-	-
440 - 660 nm (White)	LEDWE-15 (13 mW)	-	-	-	-	-	-	-	-
470 - 850 nm (Broadband)	-	MBB1D1 (70 mW Min)	MBB1L3 (70 mW Min)	-	MBB1F1 (1.2 mW)	-	-	-	-
6500 K (Cold White)	-	MCWHD2 (800 mW Min) MCWHD3 (2350 mW Min)	MCWHL5 (800 mW Min) MCWHLP1 (2350 mW Min)	MCWHL5 (320 mW)[d]	-	SOLIS-1A(/M) (3070 mW)[e]	-	-	-
6200 K (Cold White)	-	-	-	-	MCWHF2 (21.5 mW)	-	-	-	-
4600 - 9000 K (Cold White)	-	-	-	-	-	-	-	-	LIUCWHA (250 mW)
4000 K (Warm White	-	-	-	-	MWWHF2 (16.3 mW)	-	-	-	-
		-	MWWHL4 (570 mW Min)			SOLIS-2A(/M)			

3000 K (Warm White)	-	MWWHD3 (2000 mW Min)	MWWHLP1 (2000 mW Min)	-	-	(2000 mW)[e]	-	-	-

- These Collimated LEDs are compatible with the standard and epi-illumination ports on the following microscopes: Olympus BX/IX (Item # Suffix: -C1), Leica DMI (Item # Suffix: -C2), Zeiss Axioskop (Item # Suffix: -C4), and Nikon Eclipse (Bayonet Mount, Item # Suffix: -C5).
- Typical power when used with MM Fiber with Ø400 µm core, 0.39 NA.
- Our LED4D 4-Wavelength LED Source is available with select combinations of the LEDs at these wavelengths.
- Typical power for LEDs with the Leica DMI collimation package (Item # Suffix: -C2).
- Minimum power for the collimated output of these LEDs. The collimation lens is installed with each LED.

Hide Mounted LEDs with EEPROM and Ø57.0 mm Heat Sink

Mounted LEDs with EEPROM and Ø57.0 mm Heat Sink

- Integrated EEPROM for Automated LED Settings
- Lifetime >10 000 Hours (Except M450LP1; See *Specs* and *Stability* Tabs for Details)
- Integrated Large Heat Sink for Optimized Thermal Management
- Output can be Modulated with Suitable Controller (See the *LED Drivers* Tab)
- Compatible with 30 mm Cage System and SM1 Lens Tubes
- Cable Length: 2 m

Click to Enlarge
M385LP1 LED Inserted into CP02 Cage Plate and Mounted Using Ø6 mm Cage Rods

Click to Enlarge
M385LP1 LED with SM1L03 Lens Tube Post Mounted Using an SM1RC/M Slip Ring

Each of these LEDs is mounted to the end of a large heat sink, capable of dissipating the large amount of heat emitted from the diode, that is covered by a Ø57.0 mm vented plastic housing. The heat sink is equipped with internal SM1 (1.035"-40) threads and four 4-40 tapped holes for compatibility with Thorlabs' SM1 lens tubes and 30 mm cage systems, respectively.

Please note that these mounted LEDs with output wavelengths of 365 nm, 385 nm, or 405 nm radiate intense UV light during operation. Precautions must be taken to prevent looking directly at the UV light, and UV light protective glasses must be worn to avoid eye damage. Exposure of the skin and other body parts to the UV light should be avoided. These LEDs are not intended for use in household illumination applications.

Part Number	Description	Price	Availability
M365LP1	**UV (365 nm) Mounted LED, 1400 mA, 1150 mW (Min)**	**$416.67**	**Today**
M385LP1	**UV (385 nm) Mounted LED, 1400 mA, 1650 mW (Min)**	**$416.67**	**Today**
M405LP1	**UV (405 nm) Mounted LED, 1400 mA, 1500 mW (Min)**	**$416.67**	**Today**
M450LP1	**Royal Blue (450 nm) Mounted LED, 2000 mA, 1850 mW (Min)**	**$294.44**	**Today**
M780LP1	**IR (780 nm) Mounted LED, 800 mA, 800 mW (Min)**	**$320.00**	**Today**
M850LP1	**IR (850 nm) Mounted LED, 1500 mA, 1400 mW (Min)**	**$335.00**	**Today**
MWWHLP1	**Warm White Mounted LED, 700 mA, 2000 mW (Min)**	**$300.00**	**Today**
MCWHLP1	**Cold White Mounted LED, 700 mA, 2350 mW (Min)**	**$300.00**	**Today**

Hide Mounted LEDs with EEPROM and Ø30.5 mm Heat Sink

Mounted LEDs with EEPROM and Ø30.5 mm Heat Sink

- Integrated EEPROM for Automated LED Settings
- Long Lifetimes (See *Specs* and *Stability* Tabs for Details)
  - >10,000 Hours for LEDs with a Nominal Wavelength of ≥365 nm
  - >500 Hour Lifetime for LEDs with a Nominal Wavelength of ≤340 nm
- Stable Output Intensity by Optimized Thermal Management
- Output can be Modulated with Suitable Controller (See the *LED Drivers* Tab)
- Compatible with Thorlabs' SM1 Lens Tubes
- Fits Inside a 30 mm Cage System
- Cable Length: 2 m

Click to Enlarge
MWWHL3 LED Mounted in an SM1RC Slip Ring

These LEDs with output powers less than 1000 mW are mounted to the end of a Ø30.5 mm heat sink for heat dissipation and thermal stability. The heat sink is equipped with internal SM1 (1.035"-40) threads for compatibility with Thorlabs' SM1 lens tubes.

Please note that our LEDs with wavelengths from 280 nm to 420 nm radiate intense UV light during operation. Precautions must be taken to prevent looking directly at the UV light, and UV light protective glasses must be worn to avoid eye damage. Exposure of the skin and other body parts to the UV light should be avoided. Mounted LEDs are not intended for use in household illumination applications.

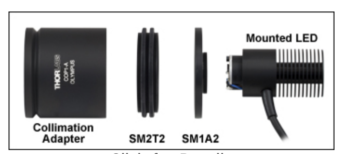
Part Number	Description	Price	Availability
M265L3	**Deep UV (265 nm) Mounted LED, 350 mA, 10 mW (Min)**	**$1,230.00**	**Today**
M280L3	**Deep UV (280 nm) Mounted LED, 350 mA, 25 mW (Min)**	**$1,230.00**	**Today**
M300L4	**Deep UV (300 nm) Mounted LED, 350 mA, 40 mW (Min)**	**$450.31**	**Today**
M340L4	**Deep UV (340 nm) Mounted LED, 700 mA, 53 mW (Min)**	**$283.00**	**Today**

M365L2	UV (365 nm) Mounted LED, 700 mA, 190 mW (Min)	$469.00	Today
M375L3	Customer Inspired!UV (375 nm) Mounted LED, 700 mA, 387 mW (Min)	$247.00	Today
M385L2	UV (385 nm) Mounted LED, 700 mA, 270 mW (Min)	$469.00	Today
M395L4	UV (395 nm) Mounted LED, 500 mA, 400 mW (Min)	$283.00	Today
M405L3	NEW! UV (405 nm) Mounted LED, 1000 mA, 870 mW (Min)	$211.00	Today
M420L3	Violet (420 nm) Mounted LED, 1000 mA, 750 mW, (Min)	$283.00	Today
M455L3	Royal Blue (455 nm) Mounted LED, 1000 mA, 900 mW (Min)	$268.00	Today
M470L3	Blue (470 nm) Mounted LED, 1000 mA, 650 mW (Min)	$268.00	Today
M490L3	Blue (490 nm) Mounted LED, 350 mA, 200 mW (Min)	$268.00	Today
M505L3	Cyan (505 nm) Mounted LED, 1000 mA, 400 mW (Min)	$268.00	Today
M530L3	Green (530 nm) Mounted LED, 1000 mA, 350 mW (Min)	$268.00	Today
M565L3	Lime (565 nm) Mounted LED, 1000 mA, 880 mW (Min)	$211.00	Today
M590L3	Amber (590 nm) Mounted LED, 1000 mA, 160 mW (Min)	$193.00	Today
M595L3	Phosphor-Converted Amber (595 nm) Mounted LED, 700 mA, 445 mW (Min)	$211.00	Today
M617L3	Orange (617 nm) Mounted LED, 1000 mA, 600 mW (Min)	$193.00	Today
M625L3	Red (625 nm) Mounted LED, 1000 mA, 700 mW (Min)	$193.00	Today
M660L4	Deep Red (660 nm) Mounted LED, 1200 mA, 940 mW (Min)	$211.11	Today
M730L4	Far Red (730 nm) Mounted LED, 1000 mA, 515 mW (Min)	$190.00	Today
M780L3	IR (780 nm) Mounted LED, 800 mA, 200 mW (Min)	$211.00	Today
M810L3	IR (810 nm) Mounted LED, 500 mA, 325 mW (Min)	$196.67	Lead Time
M850L3	IR (850 nm) Mounted LED, 1000 mA, 900 mW (Min)	$211.00	Today
M880L3	IR (880 nm) Mounted LED, 1000 mA, 300 mW (Min)	$211.00	Today
M940L3	IR (940 nm) Mounted LED, 1000 mA, 800 mW (Min)	$211.00	Today
M970L3	IR (970 nm) Mounted LED, 600 mA, 35 mW (Min)	$211.00	Lead Time
M1050L2	Customer Inspired!IR (1050 nm) Mounted LED, 700 mA, 50 mW (Min)	$227.00	Today
M1200L3	Customer Inspired!IR (1200 nm) Mounted LED, 700 mA, 30 mW (Min)	$282.00	Lead Time
M1300L3	Customer Inspired!IR (1300 nm) Mounted LED, 500 mA, 25 mW (Min)	$282.00	Lead Time
M1450L3	IR (1450 nm) Mounted LED, 700 mA, 31 mW (Min)	$282.00	Lead Time
M1550L3	Customer Inspired!IR (1550 nm) Mounted LED, 700 mA, 31 mW (Min)	$282.00	Lead Time
MBB1L3	Broadband (470 - 850 nm) Mounted LED, 500 mA, 70 mW (Min)	$494.00	Today
MWWHL4	NEW! Warm White Mounted LED, 1000 mA, 570 mW (Min)	$165.00	Today
MCWHL5	Cold White Mounted LED, 1000 mA, 800 mW (Min)	$193.00	Today

Hide Microscope Collimation Adapters with Ø50 mm Lens

Microscope Collimation Adapters with Ø50 mm Lens

- AR-Coated Aspheric Lens with Low f/# (Approximately 0.8)
- Compatible with Select Leica, Nikon, Olympus, or Zeiss Microscopes
- Easily Adjust Beam Collimation / Focus
- Requires SM2T2 Coupler and SM1A2 Adapter (Each Sold Separately) when Used with the LEDs Above



Click for Details
Installation of a collimation adapter to a mounted LED using the SM2T2 and SM1A2 thread adapters. The same setup can be used to attach the collimation adapter to the LEDs above that use a Ø57.0 mm housing.

Thorlabs offers collimation adapters with Ø50 mm AR-coated aspheric condenser lenses (EFL: 40 mm) for collimating the output from the mounted LEDs sold above. Two AR coating ranges (350 - 700 nm and 650 - 1050 nm) and four different collimator housings are available. Each housing is designed to mate to the illumination port on selected Olympus*, Leica, Nikon, or Zeiss microscopes. Compatible microscopes are listed in the Collimation Adapter Selection Guide table below.

Using an adapter with a substrate or AR coating that does not transmit the wavelength of your LED is not recommended. Deep UV LEDs (M265L3, M280L3, and M340L3) require a lens fabricated from UV Fused Silica, since many standard varieties of glass do not transmit below 350 nm. IR LEDs that emit beyond 1050 nm (M1200L3, M1300L3, M1450L3, and M1550L3) can be collimated using an uncoated condenser lens; the ACL5040U is an uncoated version of the Ø50 mm lenses used in the collimation packages below that has a wavelength range of 380 - 2100 nm. Alternatively, each of the adjustable collimation adapters below accept a user-supplied Ø1" (Ø25 mm) or Ø2" (Ø50 mm) collimation optic and include a thread adapter that converts the internally M34 x 0.5 or M62 x 0.75 threaded output to our SM2 (2.035"-40) thread standard. See the *Collimation* tab above for more information on collimation options.

The LED sources described above can be fitted to the collimators by using an SM2T2 Coupler and SM1A2 Adapter (not included) as shown in the image at right. This assembly can be easily adapted to different LED sources by unscrewing the LED housing.

*Please note that due to the optical design of the transmitted lamphouse port of the BX and IX microscopes, it may be necessary to purchase a separate adapter, which is available from Olympus.

Collimation Adapter Selection Guide						
Compatible Microscopes			Olympus BX & IX[a]	Leica DMI	Zeiss Axioskop	Nikon Eclipse
AR Coating						

Range of Condenser Lens	Lens Focal Length	Lens Item #	 Click to Enlarge	 Click to Enlarge	 Click to Enlarge	 Click to Enlarge
350 - 700 nm	40.0 mm	ACL5040U-A	COP1-A	COP2-A	COP4-A	COP5-A
650 - 1050 nm	40.0 mm	ACL5040U-B	COP1-B	COP2-B	COP4-B	COP5-B

- Please note that due to the optical design of the transmitted lamphouse port of the BX and IX microscopes it may be necessary to purchase a separate adapter which is available from Olympus.

Part Number	Description	Price	Availability
COP1-A	**Collimation Adapter for Olympus BX & IX, AR Coating: 350 - 700 nm**	**$181.00**	**Today**
COP1-B	**Collimation Adapter for Olympus BX & IX, AR Coating: 650 - 1050 nm**	**$211.00**	**Today**
COP2-A	**Collimation Adapter for Leica DMI, AR Coating: 350 - 700 nm**	**$181.00**	**Today**
COP2-B	**Collimation Adapter for Leica DMI, AR Coating: 650 - 1050 nm**	**$211.00**	**Today**
COP4-A	**Collimation Adapter for Zeiss Axioskop, AR Coating: 350 - 700 nm**	**$181.00**	**Today**
COP4-B	**Collimation Adapter for Zeiss Axioskop, AR Coating: 650 - 1050 nm**	**$211.00**	**Today**
COP5-A	**Collimation Adapter for Nikon Eclipse, AR Coating: 350 - 700 nm**	**$214.00**	**Today**
COP5-B	**Collimation Adapter for Nikon Eclipse, AR Coating: 650 - 1050 nm**	**$249.00**	**Today**
SM1A2	**Adapter with External SM1 Threads and Internal SM2 Threads**	**$24.00**	**Today**
SM2T2	**SM2 (2.035"-40) Coupler, External Threads, 1/2" Long**	**$34.00**	**Today**

Hide Adjustable Collimation Adapters for Ø1" (Ø25 mm) or Ø2" (Ø50 mm) Optics

Adjustable Collimation Adapters for Ø1" (Ø25 mm) or Ø2" (Ø50 mm) Optics

- Integrate a Ø1" (Ø25 mm) or Ø2" (Ø50 mm) Collimation Optic with Thorlabs' Mounted LEDs
- Adjust and Set Lens Position via Rotating Ring with Locking Setscrew
- Available With or Without AR-Coated Lens (See Table Below for Details)
- Compatible with Thorlabs' SM2-Threaded Microscope Port Adapters


Click to Enlarge
The SM2P50-B Installed on a M365LP1 Mounted LED

These adapters allow a Ø1" (Ø25 mm) or Ø2" (Ø50 mm) collimation optic to be integrated with the mounted LEDs sold above. The Ø1" and Ø2" collimation adapters can translate the lens by up to 11 mm (0.43") and 20 mm (0.79"), respectively. They are offered in versions without a collimation optic or with a removable AR-coated aspheric condenser lens for 350 - 700 nm or 650 - 1050 nm. All of these adapters attach to the LED housing via external SM1 threads, allowing them to be used with both the Ø30.5 mm and Ø57.0 mm housings.

The collimation lens is mounted in an inner carriage that provides rotating translation along the Z-axis by turning the knurled adjustment ring (engraved with the Item # in the photos to the left) and is locked into position by turning the locking screw on the side of the adjustment ring with a 2 mm (5/64") hex key. Lines, spaced 2 mm apart, are engraved on the housing as a rough guide for how far the carriage has been translated. These collimation adapters use an extra-thick SM1-threaded or SM2-threaded retaining ring designed for holding aspheric condenser lenses. The retaining rings can be tightened or loosened using either an SPW602 (Ø1" versions) or SPW604 (Ø2" versions) spanner wrench.

The input and output apertures of the collimation adapters are threaded for compatibility with various components; please see the table below for details.

Inserting or Removing Optics
To insert or remove an optic in these collimation adapters, use the adjustment ring to translate the inner carriage to the output end of the housing. Remove the included retaining ring using the spanner wrench. If there is a lens installed already, remove it from the carriage. Insert another Ø1" (Ø25 mm) or Ø2" (Ø50 mm) optic into the carriage, and use the retaining ring to secure it.

Using a lens with a substrate or AR coating that does not transmit the wavelength of your LED is not recommended. Deep UV LEDs (wavelengths ≤ 340 nm) require a lens fabricated from UV Fused Silica, since many standard varieties of glass do not transmit below 350 nm. IR LEDs that emit at wavelengths ≥ 1050 nm can be collimated using an uncoated condenser lens, such as the Ø25 mm ACL2520U, which has a wavelength range of 380 - 2100 nm.

Item #	Compatible Optic	Lens Travel Range	Input Threading	Output Threading	Included Lens	AR Coating Range	Lens Focal Length
SM1P[a]	Ø1" (Ø25 mm)	11 mm (0.43")	External SM1 (1.035"-40)	Internal SM2 (2.035"-40)[b]	N/A	N/A	N/A
SM1P25-A					ACL2520U-A	350 - 700 nm	20.1 mm
SM1P25-B					ACL2520U-B	650 - 1050 nm	20.1 mm
SM2P[a]	Ø2" (Ø50 mm)	20 mm (0.79")	External SM1 (1.035"-40)[c]	Internal SM2 (2.035"-40)[d]	N/A	N/A	N/A
SM2P50-A					ACL50832U-A	350 - 700 nm	32.0 mm
SM2P50-B					ACL50832U-B	650 - 1050 nm	32.0 mm

- The SM1P and SM2P do not include a collimation optic, allowing user-supplied optics to be integrated with Thorlabs' mounted LEDs.
- This thread is part of a removable adapter; removing the adapter reveals internal M34 x 0.5 threading. The SM1A38 thread adapter can be used in place of this adapter for SM1 compatibility.
- This thread is part of a removable adapter; removing the adapter reveals external SM2 (2.035"-40) threading.

- This thread is part of a removable adapter; removing the adapter reveals internal M62 x 0.75 threading.

Part Number	Description	Price	Availability
SM1P	**Adjustable Collimation Adapter for Ø1" or Ø25 mm Optic**	**$175.56**	**Lead Time**
SM1P25-A	**Adjustable Collimation Adapter with Ø25 mm Lens, AR Coating: 350 - 700 nm**	**$194.44**	**Lead Time**
SM1P25-B	**Adjustable Collimation Adapter with Ø25 mm Lens, AR Coating: 650 - 1050 nm**	**$194.44**	**Today**
SM2P	**Adjustable Collimation Adapter for Ø2" or Ø50 mm Optic**	**$244.44**	**Today**
SM2P50-A	**Adjustable Collimation Adapter with Ø2" Lens, AR Coating: 350 - 700 nm**	**$266.67**	**Today**
SM2P50-B	**Adjustable Collimation Adapter with Ø2" Lens, AR Coating: 650 - 1050 nm**	**$266.67**	**Today**

Hide Mounted LED Mating Connector

Mounted LED Mating Connector

- Pico (M8) Receptacle
- Female 4-Pin for Front Mounting
- 0.5 m Long, 24 AWG Wires
- M8 x 0.5 Panel Mount Thread
- IP 67 and NEMA 6P Rated

The CON8ML-4 connector can be used to mate mounted LEDs featured on this page to user-supplied power supplies. We also offer a male 4-Pin M8 connector cable (Item # CAB-LEDD1).

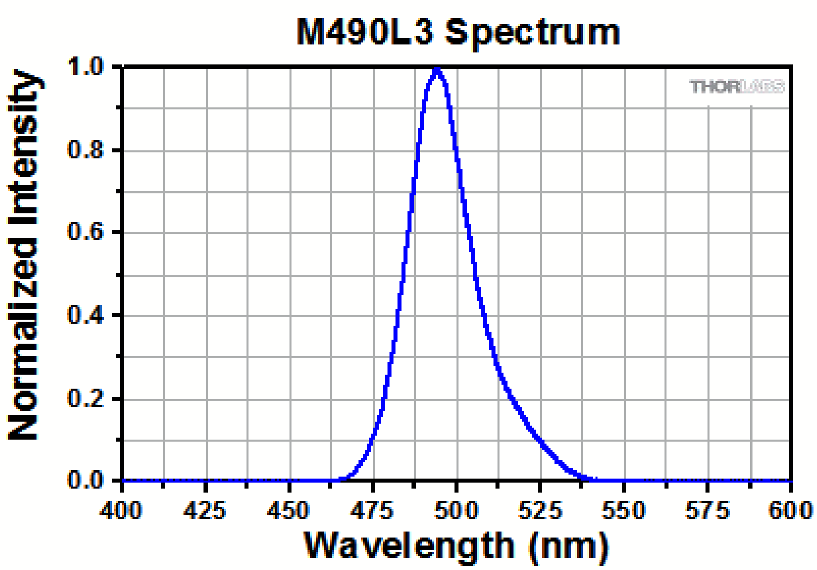
Pin	Color	Specification	
1	Brown	LED Anode	
2	White	LED Cathode	
3	Black	EEPROM GND	
4	Blue	EEPROM IO	

CON8ML-4 Shown Connected to the 4-Pin M8 Plug of Mounted LED

Part Number	Description	Price	Availability
CON8ML-4	**4-Pin Female Mating Connector for Mounted LEDs**	**$30.00**	**Today**

M490L3 - Blue (490 nm) Mounted High-Power LED, 350 mA

Spectrum



Click here to download an Excel file containing the spectral data for a larger wavelength range than shown in the graph above.