

Keysight MLC400B

Monolithic Laser Combiner

Laser-Based Illumination System for
Microscopy/Cell Biology

Data Sheet



Overview

Keysight Technologies, Inc. MLC400B monolithic laser combiner is a stable, reliable, and easy-to-use laser-based illumination system that is ideally suited for fluorescence and confocal microscopy research in cellular biology. The MLC400B is permanently aligned before leaving the factory, and never needs realignment, making it a reliable light source at multiple wavelengths, with minimal downtime for maintenance. An acousto-optic tunable filter (AOTF) provides fast switching between different combinations of wavelengths and powers. Additional laser lines can be added to the MLC400B, as research needs change.

Stable, reliable and easy-to-use

Keysight's proprietary complex monolithic optic (CMO) technology bundles multiple beam-combining optics into a single, permanently aligned optical structure. The CMO design reduces the number of exposed beam-combination surfaces that are subject to contamination and require subsequent cleaning. The beam is delivered to the microscope by a single-mode, polarization-maintaining fiber-coupled delivery system via a proprietary fixed mounting system that keeps the beam-steering optics permanently aligned.

Environmental changes that commonly occur in laboratories, such as temperature, airflow, and bench top vibration, do not affect the MLC400B. The beam-combining and beam-steering optics in the MLC400B are fully integrated with the beam delivery architecture to ensure stable, reliable power, day-after-day.

Dual-port output

The MLC400B can be configured with an optional dual-port output for switching between different microscope systems or switching between different illumination paths on the same microscope system. The dual-port option enables experiments such as TIRF/FRAP where continuous switching is required. This dual-port option allows the laser output to be switched from one fiber to another with a rise time of less than 1 ms at a frequency of up to 30 Hz. The switching mechanism in the dual-port option is incorporated into the same alignment-free optical assembly as in the standard beam combiner.

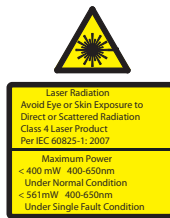
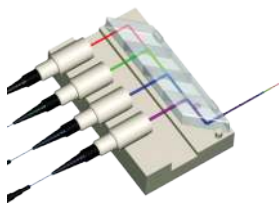
Super resolution imaging

The MLC400B can also be configured for super resolution imaging applications. A selection of extra-high-power laser wavelengths – 647 nm, 561 nm, and 488 nm – can be selected for the excitation wavelength. A switchable neutral density filter option allows repeatable microwatt to sub-microwatt power output for photoactivation.

Microprocessor controller

The MLC400B incorporates a microcontroller that communicates with the AOTF controller and can be used to drive external devices that include a wide array of imaging hardware. Instructional packets that contain a user defined command sequence can be created in the imaging software and downloaded directly to the microcontroller. The MLC400B can be enabled to respond to incoming trigger signals with a predetermined sequence of laser line outputs and output signals that can be directed to specific hardware devices. In bypassing the host computer, the image acquisition rate can be increased and overall cycle time can be reduced.

Features		Benefits						
Monolithic optical assembly		Temporal and environmental alignment stability – you get more consistent results and longer sample lifetime						
Permanent factory alignment		You do not need to deal with maintenance and realignment – you save time						
Protected beam-combination optical surface		Critical dielectric interfaces stay free from most contamination –no more cleaning optics						
Flexible and upgradeable		The system works with you as your research needs change						
Specifications								
Wavelengths		405 nm	445 nm	488 nm	514 nm	561 nm	640 nm	647 nm
Fiber coupled output power	Power level 1	20 mW	12 mW	20 mW	20 mW	20 mW	20 mW	125 mW
	Power level 2			50 mW	40 mW	50 mW	40 mW	
	Power level 3			80 mW		80 mW		
Output polarization extinction		17 dB						
RMS noise (20 Hz-10 MHz)		< 1%						
Power stability		± 2% over 1 hour at 20 °C						
Modulation	Analog	Rise Time: 1.5 µsec		Dynamic Range: 30 dB (1000:1)				
	Digital	Rise Time: 1.5 µsec		Dynamic Range: 50 dB (10000:1)				
Dual output fiber (optional) switching speed		< 1 ms						
Dual output fiber (optional) switching frequency		30 Hz continuous						
Switchable neutral density filter (optional) attenuation		OD 2.5 (316:1)						
Fiber output connector		FC/APC (standard), FC/UPC (optional)						
Mechanical dimensions		33.2" L x 17.3" W x 12" H						
Electronic interface		USB Analog input (Laser power modulation): 0 – 5 V Digital input (Laser power modulation and external trigger): TTL Analog output: 0 –10 V						
Software interface		A software development kit (SDK) is available for interfacing the Keysight MLC to third-party software applications						
Operating temperature		+15 to +30 °C						
Storage temperature		0 to +50 °C						
Warranty		12 months						



The Keysight CMO technology and fiber delivery system are at the heart of the MLC400B.

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