

# OxxiUS

Simply Light

## L4Cc & L6Cc

### Wavelength Combiners



Fluorescence Microscopy  
Optogenetics  
Microfluidics  
Cytometry  
Light Sheet Microscopy  
FRAP / TIRF  
Holography  
Lithography

The **L4Cc** and **L6Cc** are the most compact and flexible all-in-one multicolor laser sources that include up to 6 wavelengths, delivered on up to 4 optical fiber outputs. The modular design allows for a large

choice of lasers from 375 up to 1064 nm and with output power up to 500 mW. The sources are Oxxius **LaserBoxx** but third-party sources can also be integrated.

In addition, the extension modules provide the ultimate level of flexibility by integrating fast switching output ports for FRAP, a dual output for light sheet microscopy among other advanced functionalities.

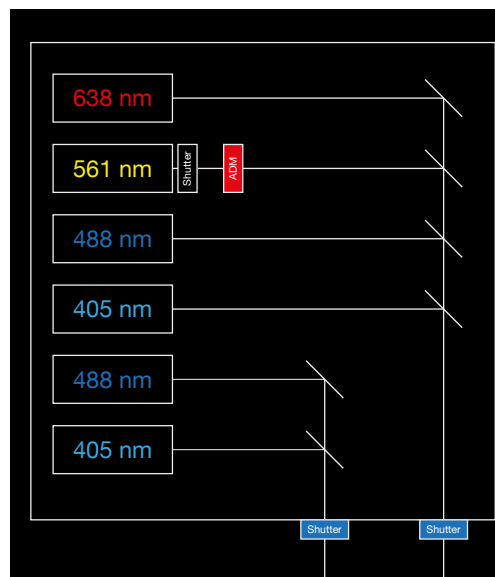
The **L4Cc** and **L6Cc** are field-upgradeable to evolve as per your needs and to preserve your investment.

## Key features

- Up to 4 or 6 combined wavelengths
- Up to 500 mW per wavelength (TEM<sub>00</sub> beam)
- Up to 4 output ports (with an extension module)
- Direct modulation available on each source: analog, digital or both combined
- Accousto-optic modulator (AOM), delivering a linearized output
- High-efficiency Polarization Maintaining (PM) fiber coupling option
- USB and Ethernet interfaces

## Benefits

- Proven long-term stability
- Extension modules with advanced features: dual outputs, fast-switching mirror, AOTF, etc.
- Comprehensive optical design for easy maintenance
- Fully accessible from  $\mu$ Manager
- Field upgradeable



**L6Cc combiner with 2 outputs for FRAP + TIRF illumination**

## Select your sources

- 375 nm, 70 mW
- 395 nm, 120 mW
- 405 nm, up to 300 mW
- 415 nm, 120 mW
- 445 nm, up to 500 mW
- 458 nm, up to 500 mW
- 473 nm, up to 300 mW
- 488 nm, up to 300 mW
- 505 nm, 70 mW
- 515 nm, 150 mW
- 522 nm, up to 100 mW
- 532 nm, up to 500 mW
- 553 nm, up to 200 mW
- 561 nm, up to 300 mW
- 594 nm, up to 100 mW
- 607 nm, up to 200 mW
- 633 nm, 100 mW
- 638 nm, up to 180 mW
- 640 nm, up to 500 mW
- 642 nm, 140 mW
- 647 nm, 140 mW
- 660 nm, 100 mW
- 690 nm, 180 mW
- 730 nm, 40 mW
- 785 nm, up to 350 mW
- 808 nm, 200 mW
- 830 nm, 100 mW
- 915 nm, 200 mW
- 980 nm, 200 mW
- 1064 nm, up to 500 mW
- and more...

## All Built-In & Ready to Go

**L4Cc and L6Cc integrate the largest panel of wavelengths from 375 to 1064 nm, combined over 1 or 2 independent channels. The L4Cc can operate up to 4 sources and 2 AOMs. The L6Cc can operate up to 6 sources and 2 AOMs.**

The combiners turn the beams of several sources into a single geometry. The output can be released either in free space or over one or several optical fibers.

Each DPSS and each output port is fitted with an electro-mechanical shutter in standard.

The extension modules (MDL) provide some additional functionalities like output port switching, power split or AOTF-based modulation.

The stability of these combiners is the result of a proven design based on short optical paths in conjunction with the ultra-low heat load of the **LaserBoxx** sources. A straightforward access to the optical components simplifies the maintenance and future upgrades.

The **L4Cc** and **L6Cc** are compatible with  $\mu$ Manager environment. A standalone control software is also provided as a convenient graphic user interface.

## Output ports - Delivery options

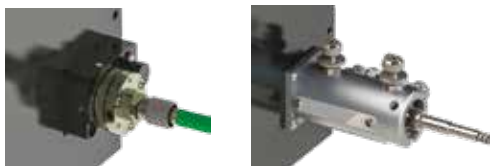
The standard combiners feature one channel or two independent channels.

They can be configured (or upgraded) with the extension modules providing up to 4 ports and additional functionalities. You can choose between free space beam delivery, multimode, single mode or polarization maintaining fibers and any combination of them.

## Fiber coupling

Oxxius offers the compact coupler from Schäfter+Kirchhoff ("S+K") or the KineMATIX<sup>®</sup> system with RGVB fiber at a standard 0.12 numerical aperture. The S+K coupler is available with a magnetic repositionable support.

The standard delivery connections are FC/APC or FCP8.



Various fiber coupling systems are available

## Modulations and Controls

Each laser is modulated via independent analog and digital inputs:

- The diode laser sources are directly modulated with an infinite extinction ratio.
- The DPSS laser sources are modulated through an AOM, delivering a linearized power.
- "MPA" attenuators provide an alternate way of modulating the power for situations where a response time of less than 1ms is enough.

An AOTF is an alternative option to modulate the laser lines. In standard, an electro-mechanical shutter is installed on each DPSS to block the beam without switching the laser off. The shutters are controlled via TTL signals or software commands.



The remote controller brings control elements at hand and status information within sight.



### 1 USB and Ethernet ports

### 2 Digital modulation inputs and analog modulation inputs

### 3 Input/Output port

- Analog modulation inputs
- Programmable inputs to drive electro-mechanical shutters, switch mirrors or other options
- Interlock for shutters

## L4Cc and L6Cc, flexible by design

Oxxius combiner have been designed with a specific emphasis on versatility:

- Extension modules can be installed to provide additional functionalities on the output beams
- The largest choice of wavelengths and power from Oxxius's **LaserBoxx** models or third-party laser sources.
- The electronic board embeds all functionalities as standard.
- A large choice of connectors and collimators is available to interface with most microscope ports.



### 1 or 2 outputs ports

The **L4Cc** and **L6Cc** can be set with two independent output ports. Each port will deliver one or several wavelengths.

### Extension modules (MDL): advanced functionalities for your combiner

#### MDL-MDUAL

- Intended for light sheet microscopy.
- Balances the optical power over two outputs according to a user-selectable ratio
- +/-5% split ratio accuracy

#### MDL-FSTM

Switches the optical power between 2 outputs at a fast pace (<30 ms switching time)

#### MDL-FST3

Switches the optical power between 2 outputs at a fast pace (<30 ms switching time). Only available on the **L6cc**.

#### MDL-FLPM

Allows for switching between 2 outputs (~1 s switching time). Recommended, for example, to power several devices with one combiner.

#### MDL-MNDF

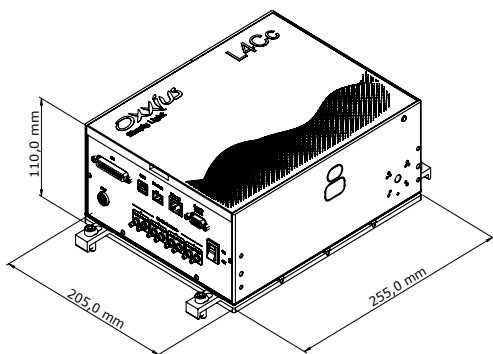
Switchable attenuator of a fixed value.

#### MDL-AOTF

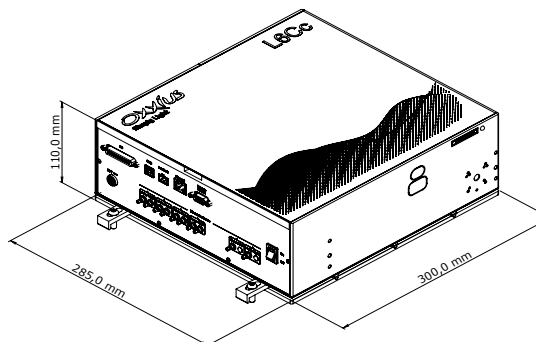
Modulates all the laser lines at once using an Acousto-Optic Tunable Filter - **1 output**



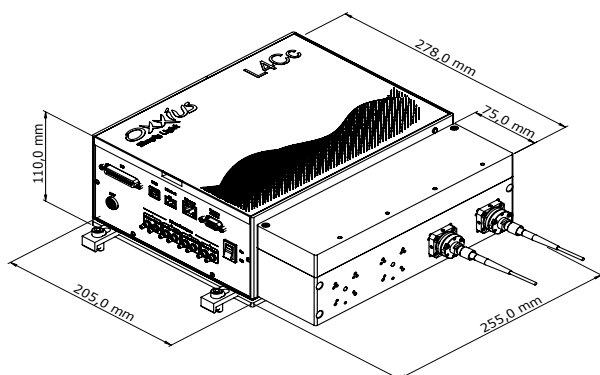
# System Specifications



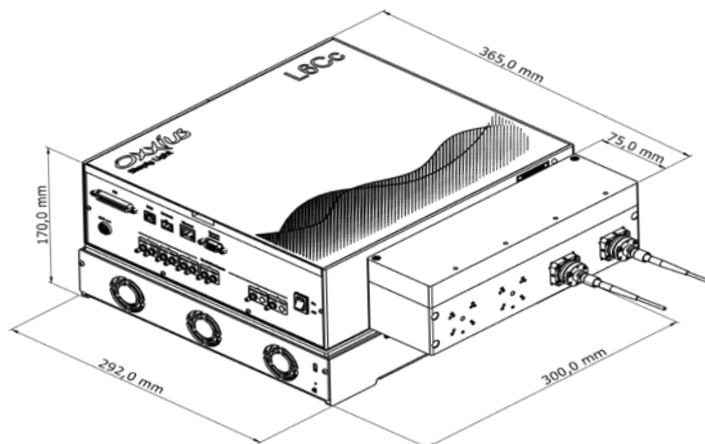
L4Cc




L6Cc



L4Cc with MDL options

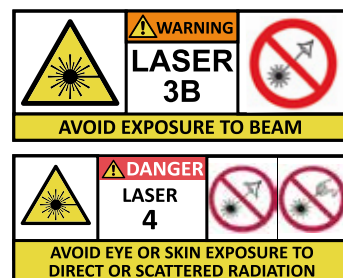


L6Cc with ACX-HTSK and MDL

	L4Cc	L6Cc
<b>Power stability (baseplate temperature +/-3K)</b>		
Free space	±1 % p-to-p	
PM + SM fiber coupled	±2 % p-to-p	
<b>Modulation</b>		
Analog (0 - 5V)	DC - 1 MHz	
Rising time using digital modulation ( TTL)	≤ 2 ns (LBX) / ≤ 300 ns (LCX with AOM)	
Power extinction ratio	Infinite (LBX) / ≥ 40 dB (LCX with AOM)	
<b>System specifications</b>		
Operating temperature	15 - 40 °C (at baseplate)	
Power Consumption	60 W	100 W
Supply voltage, Plug and Play	100 -240 V AC	
Supply voltage, OEM	24 V DC	
Warm-up time	30 minutes	
Communication interfaces	USB, Ethernet, Dedicated electrical interface	
Software	Full access from μManager, dedicated Oxxius software	
Typical weight	7 - 9 kg	10 - 12 kg

## Packing list

- L4Cc/L6Cc bench including aligned laser sources
- Remote control
- MDL extension modules, if ordered
- Heatsink, if ordered
- Fiber-coupling options, if ordered
- Power supply and country selected power cord
- USB cable
- Tools for maintenance
- Test report and user manual
- Oxxius control software





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