

# OxxiUS

Simply Light

## Wavelength Combiners



2022

Super Resolution Imaging  
Single Molecule Localization  
STORM  
Optogenetics

Confocal Microscopy  
Light Sheet Microscopy  
FRAP  
Flow Cytometry

The L6Cc and L4Cc are the most compact and flexible all-in-one multicolor laser sources that include up to 7 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 or from third-party manufacturers.

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

The Oxxius combiners are available either in turn-key or OEM versions.

The L6Cc is also available in a high power version, integrating LBX-HPE sources with up to 1.2 Watt per wavelength. It is coupled into a multimode fiber, releasing a homogenized output beam.

## 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 extension module)
- Direct modulation on every source : analog, digital or both combined
- Acousto-optic modulator (AOM) available, delivering a linearized output
- High-efficiency Polarization Maintaining (PM) fiber coupling option
- Electro-mechanical shutter on each output and each DPSS laser.
- USB and Ethernet interfaces
- Fully accessible from  $\mu$ Manager

## Select your sources

375 nm, 70 mW  
405 nm, up to 300 mW  
445 nm, 100 mW  
450 nm, 70 mW  
473 nm, 100 up to 300 mW  
488 nm, up to 200 mW  
505 nm, 70 mW  
515 nm, 150 mW  
520 nm, 70 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, 130 mW  
647 nm, 140 mW  
660 nm, 100 mW  
730 nm, 40 mW  
785 nm, up to 350 mW  
980 nm, 200 mW  
1064 nm, up to 500 mW  
and more...

## Benefits

- Flexible configuration with extension modules
- Extension modules with advanced features : dual outputs, fast-switching mirror, AOTF, ...
- Proven long-term stability
- Comprehensive optical design for easy maintenance
- Field upgradeable
- Graphic User Interface software

# When flexibility matters

## Description

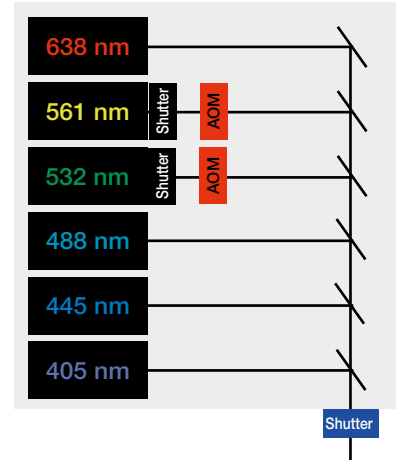
### Technical Simplicity - as per customer request

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

At the end of PM fiber, the delivered power per laser line can be as high as 220 mW. Each DPSS and each output port is fitted with an electro-mechanical shutter in standard. It is thus possible to shut off the beam without having to switch off the lasers.

Clean-up filters are provided in standard for 488 nm and 514 nm sources. The extension modules (MDL) provide some additional functionalities like output port switching, power split or AOTF-based modulation.

The exceptional 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 maintenance and future upgrades.



### Output ports - Delivery options

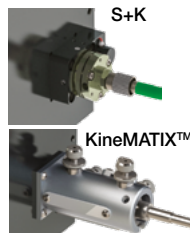
The basic combiners feature one channel or two independent channels.

They can be configured (or upgraded) with the extension modules (MDL) 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 user-friendly KineMATIX™ system with RGVB fiber at a standard 0.12 numerical aperture. The S+K coupler is available with a magnetic repositionable support. The fiber output options are FC/APC or FCP8 connectors or free space collimators on request.



### Modulations and Controls

Each laser is modulated via independent analog and digital inputs.

The LBX/LPX laser sources are directly modulated with infinite extinction ratio.

The LCX DPSS are modulated through an AOM, delivering a linearized power.

If low speed modulation is needed, the OPT-FSTS offers digital modulation up to 200 Hz or OPT-MPA up to 10 Hz with 0-100% control of the output power.

If required, an AOTF is also available.

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 (RemoteBoxx) brings control elements at hand and the status within sight. The combiner can then be installed at the most convenient place.

The L4Cc and L6Cc are compatible with μManager environment. A standalone control software is also provided as a convenient graphic user interface.



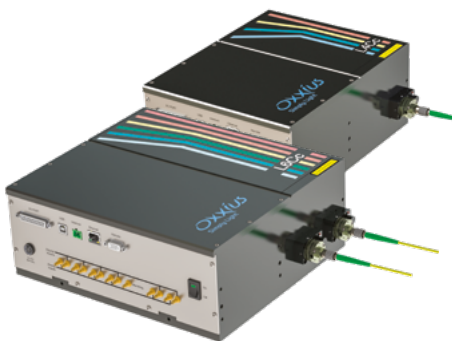
- 1 USB and Ethernet ports
- 2 Digital modulation inputs
- 3 Analog modulation inputs

- 4 Input/Output port
  - analog modulation inputs
  - 8 programmable inputs to drive electro-mechanical shutters, switch mirrors or other options
  - Interlock for microscope

## L4Cc and L6Cc, flexible by design

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

- The platform features up to two independent channels and can provide up to two output ports.
- The combiner is ready for docking with our pre-aligned extension modules.
- Our extension module is the unrivalled solution to seamlessly add new functionalities to Oxxius combiners.
- The largest choice of wavelength 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.



### One or two outputs ports

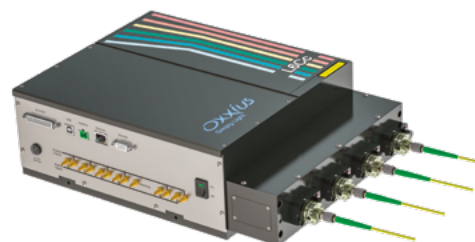
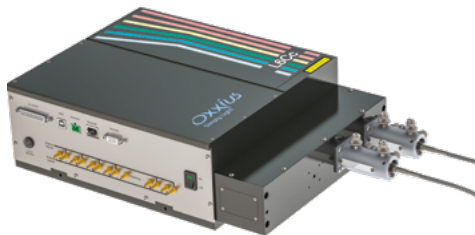
The L4Cc and L6Cc can be set with two independent output ports. Each port will deliver one or several wavelengths. This configuration is recommended for FRAP when additional independent 405 and 488 nm lasers are needed, or when separate UV or NIR lines are required.

### Extension Modules - get more from your combiner

With the extension modules (MDL), the L4Cc and L6Cc are offering advanced functionalities at a reasonable cost.

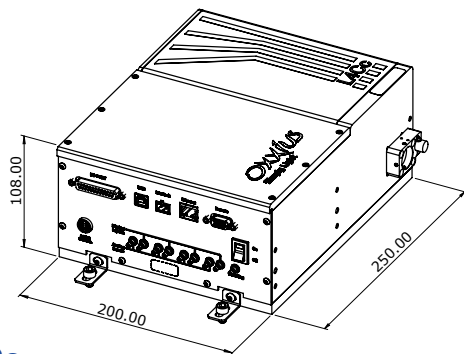
The electronic board embeds in standard the electrical connections and controls for the extension modules. The Modules are also pre-aligned and can be added on site.

Up to two Modules could be stacked to expand furthermore the possibilities.

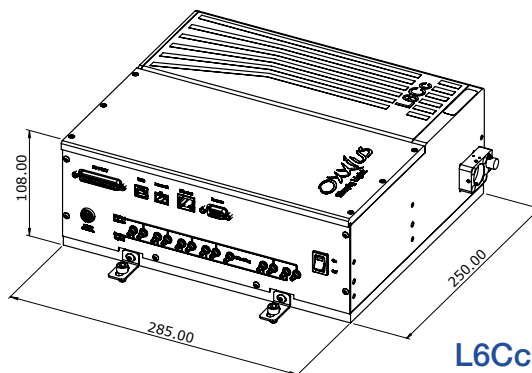


- MDL-MDUAL** - Designed for light sheet microscopy. It provides two outputs with the possibility to balance the output power between each port. The split ratio accuracy is +/-5%.
- MDL-FSTM** - Provides fast switching between two outputs up to 30Hz (< 5 ms switching time)
- MDL-FST3** - Provides fast switching between three outputs up to 30Hz (< 5 ms switching time) - only available with L6Cc
- MDL-FLPM** - Recommended when only one L4Cc or L6Cc is used with two microscopes. This will economically route all lines on the selected output. This is not meant for frequent switching.
- MDL-L+1** - Provides one additional LBX laser, combined on the main channel or fully independent with its own output port.
- MDL-MNDF** - Provides a motorized neutral density filter when low output power is needed
- MDL-AOTF** - AOTF modulator - one output

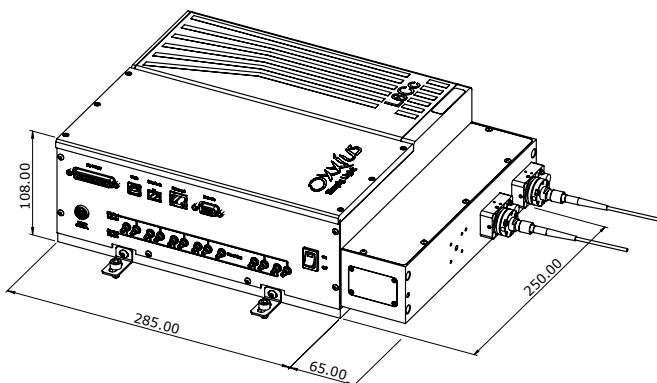
# System Specifications



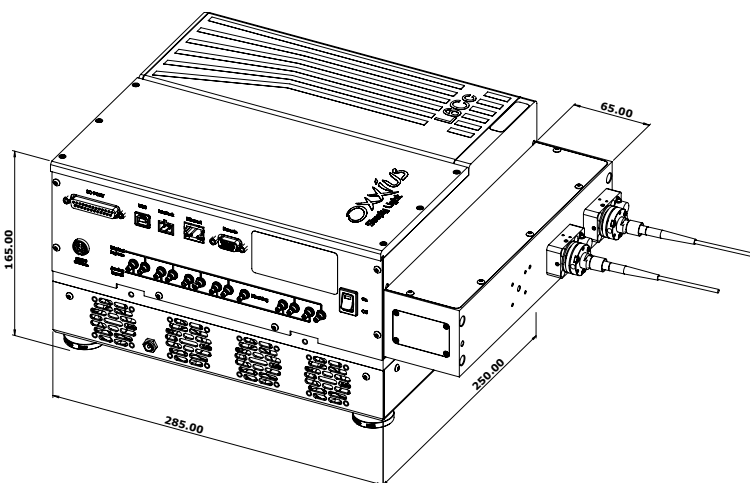
L4Cc



L6Cc




L6Cc with MDL options



L6Cc with ACX-HTSK and MDL

NEW - 4U 19" rack version

	L4Cc	L6Cc
<b>Power stability (baseplate temperature +/-3K)</b>		
Free space	±1% p-to-p	
PM fiber coupled	±2% p-to-p	
<b>Modulation</b>		
Analog (0 - 5V)	DC - 1 MHz	
Digital ( TTL )	≤ 2 ns (LBX) / ≤ 1 μs (LCX with AOM)	
Power extinction ratio	Infinite (LBX) / ≥ 45 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, RS-232, dedicated I/O interface	
Software	Compatible with μManager environment, dedicated Oxixus software 	
Weight	6.8 kg	9.3 kg

## Packing list

- L4cc/L6cc bench including aligned laser sources
- RemoteBoxx— remote control
- Clean up filter, if ordered
- MDL extension modules, if ordered
- Fiber-coupling options, if ordered
- Power supply and country selected power cord
- USB cable
- Tools for maintenance
- Test report and user manual
- Oxixus control software

