

## 1550 nm High Pulse Energy Fiber Based Femtosecond Laser



### Applications

- Two-photon integrated circuit testing
- Optical-beam-induced current microscopy
- Bioimaging
- Nonlinear optical studies
- Optical metrology
- Terahertz radiation
- Multiphoton microscopy
- Micro-machining and materials processing

### Features

- Up to 3  $\mu\text{J}$  pulse energy at 1550 nm
- < 0.5 ps pulse widths
- Outstanding beam quality ( $M^2 < 1.2$ )
- Variable repetition rates down to single pulse
- All air-cooled, no chiller required
- Rack mountable controller module
- Turn-key operation and full computer control
- Remote system diagnostics

The Cazadero fiber laser chirped pulse amplification system (FLCPA) represents a unique product platform, offering pulse energies up to 3  $\mu\text{J}$  and pulse widths of less 500 fs at 1550 nm in a robust industrial package. It is the perfect source for two-photon integrated circuit testing, multiphoton microscopy studies, micro-machining and a host of other applications.

The system features a hands-off laser head and a rack mountable controller, which facilitate its incorporation into OEM designs and afford convenient access to high peak power optical pulses. A simple key switch interface provides for manual operation with full remote access through computer control. The system includes the capability of remote data logging, power monitoring and system diagnostics for OEM service support. The rugged, all fiber architecture is designed for 24/7 operation.

The building block of the Cazadero is Calmar's renowned ultrafast fiber seed laser platform, which utilizes the proprietary Mendocino saturable absorber technology developed and perfected over a twenty-year period to deliver reproducible and reliable mode-locking at turn-on. The short pulse is stretched in time to reduce the pulse intensity through the high power amplifier stage and then recompressed to yield low pedestal, high energy output pulses. The pulse repetition rate and pulse energy are user selectable to ensure excellent signal-to-noise for data averaging applications. In addition, the output pulse width can be varied and optimized for every repetition rate to fine tune signal intensities or accommodate a range of processing parameters. An RF synchronization output is also provided as a trigger signal.

The Cazadero is a compact, flexible, fiber based femtosecond laser offering a reliable, cost-effective alternative to solid state laser amplifiers for biomedical, scientific, industrial, and research applications. The system is offered in two versions, the -01C is optimized for higher average power while the -02C is optimized for higher pulse energy. However, if the performance parameters do not quite fit your application requirements, please contact us at [sales@calmarlaser.com](mailto:sales@calmarlaser.com) to discuss a customized option or design.

## Technical Specifications<sup>1</sup>

Model Number	FLCPA-01C	FLCPA-02C
<b>OPTICAL</b>		
Center Wavelength (nm)	1550 ± 4	
Pulse Width <sup>2</sup> (ps)	< 0.5	
Average Power (W)	up to 3	up to 2
Repetition Rate <sup>3</sup> (MHz)	Switchable between 0.67, 1, 2, 4, 6 and 12.5	
Maximum Pulse Energy <sup>4</sup> (μJ)	up to 1.5 μJ @ 2 MHz	up to 3 μJ @ 0.67 MHz
Spectrum Width (FWHM, nm)	10 (typical)	
Power Stability over 8 hours <sup>5</sup> (% , RMS)	< 1.0	
Beam Quality, M <sup>2</sup>	< 1.2	
Beam Diameter at Exit (mm)	3.0 ± 0.3	
Polarization Extinction Ratio (dB)	> 20	
Output/Termination	Free space, collimated	
<b>ELECTRICAL</b>		
Electrical Synchronization (V)	LVCMOS format	
Supply Voltage	85 – 264 VAC at 47 – 63 Hz, autoranging	
Power Consumption (W)	< 300 (150 typical)	
<b>MECHANICAL</b>		
Operating Temperature (°C)	18 - 30	
Storage Temperature (°C)	0 - 50	
Connection between Controller and Head	~ 2 m electrical cables	
Laser Head Dimensions (cm)	47.8(W) x 76.2(D) x 14.4(H)	
Laser Controller Dimensions (cm)	48.2(W) x 54.2(D) x 18.7(H); 19 inch 4U rack mountable	
Laser Head Weight (kg)	27.3	
Laser Controller Weight (kg)	13.6	
Cooling	Air-cooled with low noise fan	
Warm-up time (min)	30 (typical)	
<b>I/O CONTROL</b>		
Communication Interface	RS-232 Serial Port	
Front Panel Control Interface	Power Switch, Laser Key Switch, Emergency Stop Button	

1. Due to our continuous improvement philosophy, all product specifications are subject to change without prior notice. Please contact sales@calmarlaser.com for customized specifications.

2. A sech<sup>2</sup> pulse shape (deconvolution factor of 0.65) is used to determine the pulse width from the second harmonic autocorrelation trace.

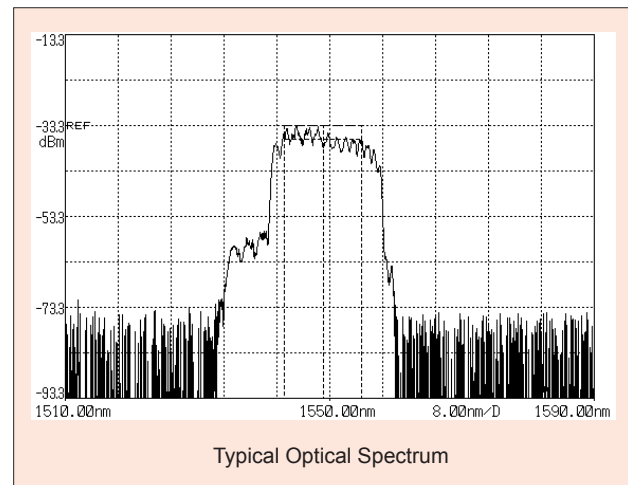
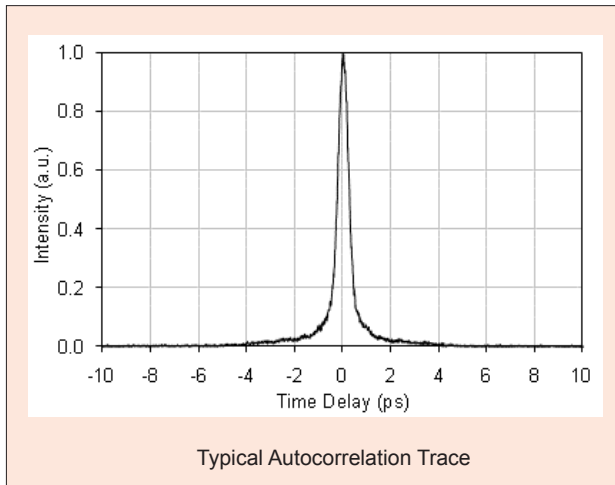
3. Programmable range 0.1 MHz to 12.5 MHz. For other repetition rates, please contact sales@calmarlaser.com.

4. The pulse energy will vary according to the repetition rate, up to the maximum average power.

5. Requires an ambient temperature control of ± 0.5°C, after a 45 minute warm up.



## Optical Characterization



## Mechanical Dimensions

