

# OFC Engine

Optical Frequency Comb  
Clockwork for OEM integrators



## Performance meets low-SWaP

Menlo Systems' OFC Engine: A low SWaP (Size, Weight, and Power) clockwork for OEM integrators. The OFC Engine builds on Menlo's decades-long experience with robust and compact frequency combs. Built upon Menlo's unrivalled figure 9<sup>®</sup> fiber mode-locked oscillator technology, the OFC engine combines the high performance required for transportable optical atomic clocks and a low-SWaP design.

With a focus on OEM integrators, it is optimized for flawless integration and volume manufacturing. Integration is as easy as it gets: Driving and mode locking electronics as well as pump modules are included. Interfacing is provided for user-generated phase lock loops to lock  $f_{\text{rep}}$  and  $f_{\text{CEO}}$ . Ready for deployment.

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## KEY SPECIFICATIONS

- Comb Mode Spacing 100 MHz
- 100 MHz Phase Noise  
< -150 dBc/Hz at 1 kHz Offset
- Stability <  $1 \times 10^{-15}$  in 1 s
- 15 - 50 °C Operating Temperature
- Pump Diodes Included

## LOW SWaP

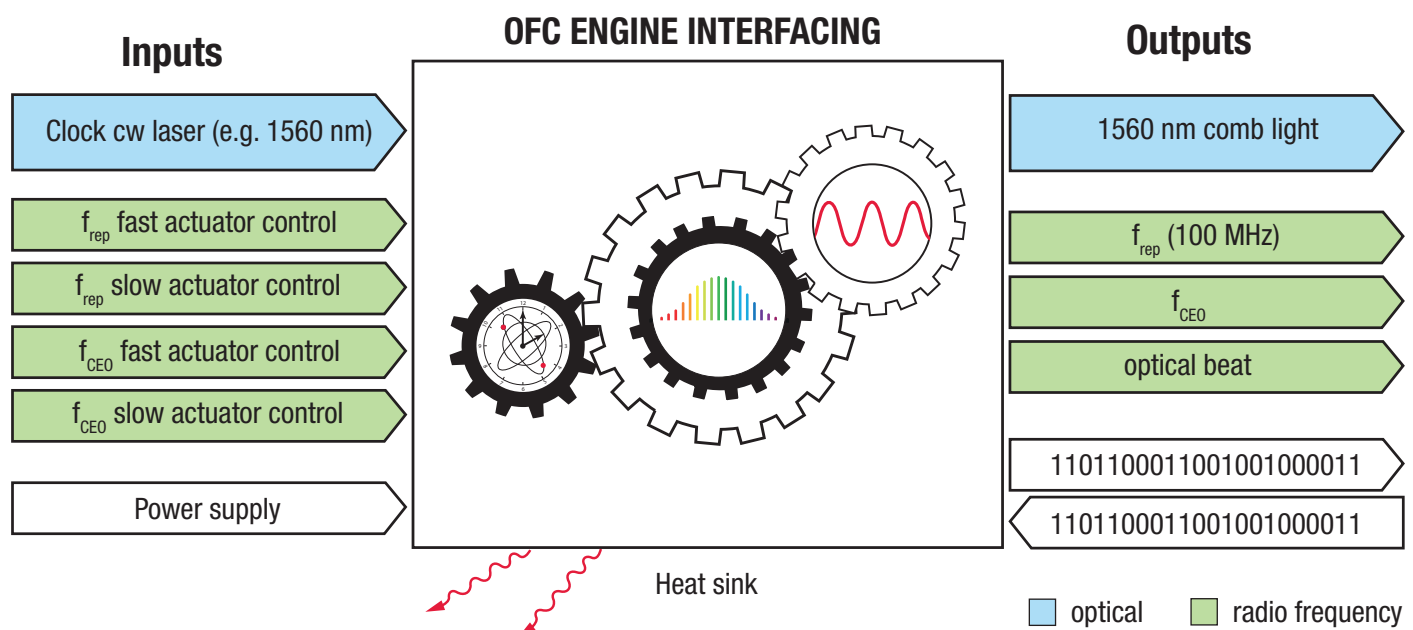
- < 4 l Volume
- < 4 kg Weight
- < 25 W Power Consumption

## APPLICATIONS

- Low-SWaP Optical Atomic Clocks
- Microwave Atomic Clocks Local Oscillators
- Photonic Microwave Local Oscillators
- Mobile Radar

## OPTIONS

- Integrated Second Harmonic Generation Unit
- Customization on Request



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PROPERTY	VALUE
<b>OPTICAL SPECIFICATIONS (COMB)</b>	
Central Wavelength	1560 nm
Average Power	> 50 mW
Spectral Width	> 40 nm (FWHM)
Stability* (MDEV)	$< 1 \times 10^{-15}$ in 1 s, $< 1 \times 10^{-16}$ in 1000 s
Comb Mode Spacing	100 MHz
Comb Mode Spacing Tunability	$\pm 5$ kHz
$f_{\text{CEO}}$ Tunability	Fully Flexible ( $> 1 \times$ Free Spectral Range)
<b>LOW SWaP</b>	
Form Factor	$< 4 \text{ l}$ (204 x 216 x 75 mm <sup>3</sup> )
Weight	$< 4$ kg
Power Consumption	$< 25$ W
<b>OPTICAL CW INPUT (E.G. FROM CLOCK LASER)</b>	
Wavelength Range	1540 – 1580 nm (others on request)
<b>RF INTERFACING</b>	
Actuator Control Inputs for $f_{\text{rep}}$ and $f_{\text{CEO}}$ fast/slow	$\pm 15$ V differential
Coarse $f_{\text{rep}}$ Actuator Control	Software Setpoint
RF Outputs	$f_{\text{rep}}$ , $f_{\text{CEO}}$ , $f_{\text{optical beat}}$
Phase Noise $f_{\text{rep}}$ (100 MHz)	$< -100$ dBc/Hz at 1 Hz Offset $< -150$ dBc/Hz at 1 kHz Offset
Stability $f_{\text{rep}}$ (100 MHz)	$< 1 \times 10^{-13}$ in 1 s
Integrated Phase Noise $f_{\text{CEO}}$	$< 100$ mrad [100 Hz – 2 MHz]
<b>OTHERS</b>	
Operating Temperature	15 - 50 °C
Power Input	24 V DC
Software Communication	CAN

\*out-of-loop comb-comb-comparison, qualified with Menlo Systems phase lock loops

## ORDERING INFORMATION

<b>Product Code</b>	OFC Engine
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Please call for pricing. Specifications are subject to change without notice. Custom modifications are available, please inquire.

**MenloSystems**



Invisible laser radiation  
avoid exposure to beam  
Class 3B laser

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