# OFC Engine

## Optical Frequency Comb Clockwork for OEM integrators

MenloSystems




### KEY SPECIFICATIONS

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

### LOW SWaP

- < 3 l Volume
- < 4 kg Weight
- < 25 W Power Consumption

### APPLICATIONS

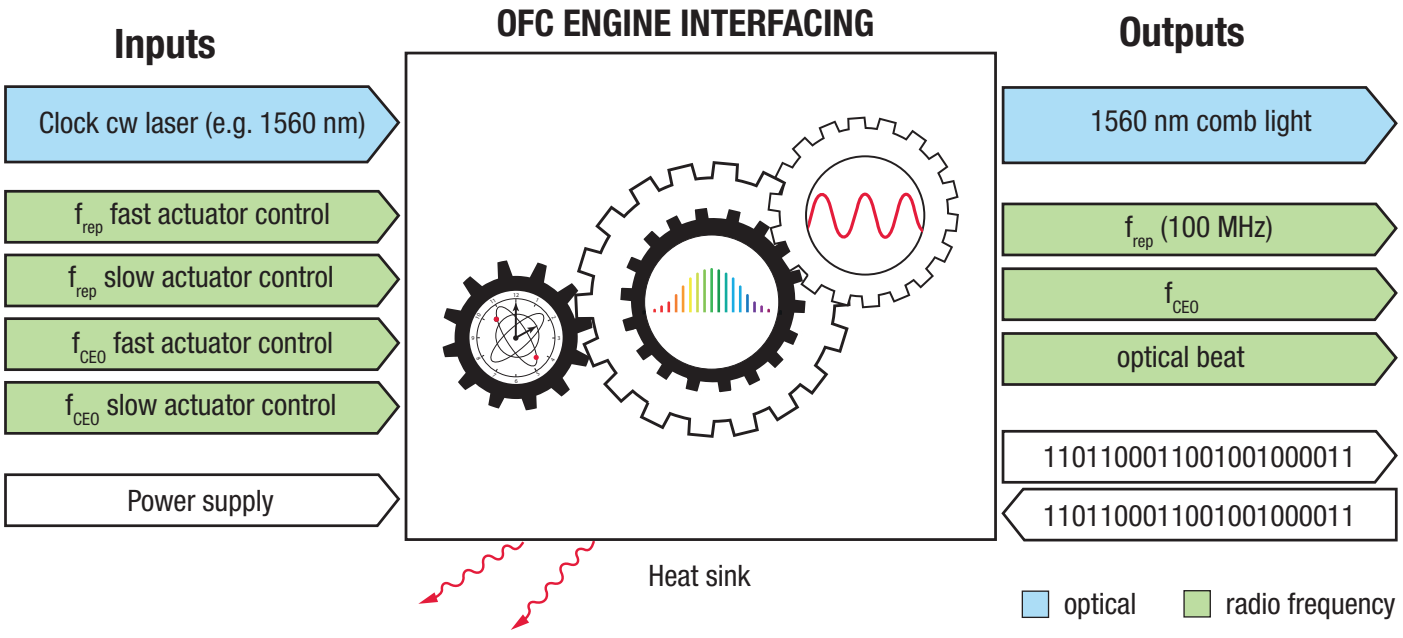
- **Low-SWaP Optical Atomic Clocks**
- Microwave Atomic Clocks Local Oscillators
- Photonic Microwave Local Oscillators
- Mobile Radar

### OPTIONS

- Integrated Second Harmonic Generation Unit
- Customization on Request

**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 Menlos unrivalled figure 9® 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 $f_{rep}$ and $f_{CEO}$. Ready for deployment.




Technology protected by patents US8873601B2, EP2637265B1, JP5615397B2, CN103311780B

# OFC Engine

## Optical Frequency Comb
## Clockwork for OEM integrators

| PROPERTY | VALUE |
|---|---|
| **OPTICAL SPECIFICATIONS (COMB)** | |
| Central Wavelength | 1560 nm |
| Average Power | > 50 mW |
| Spectral Width | > 40 nm (FWHM) |
| Stability* (MDEV) | < 1 x $10^{-15}$ in 1 s, < 1 x $10^{-16}$ in 1000 s |
| Comb Mode Spacing | 100 MHz |
| Comb Mode Spacing Tunability | ± 5 kHz |
| $f_{CEO}$ Tunability | Fully Flexible (> 1 x Free Spectral Range) |
| **LOW SWaP** | |
| Form Factor | < 3 l (274 x 202 x 43 $mm^3$) |
| Weight | < 4 kg |
| Power Consumption | < 25 W |
| **OPTICAL CW INPUT (E.G. FROM CLOCK LASER)** | |
| Wavelength Range | 1540 – 1580 nm (others on request) |
| **RF INTERFACING** | |
| Actuator Control Inputs for $f_{rep}$ and $f_{CEO}$ fast/slow | ± 15 V differential |
| Coarse $f_{rep}$ Actuator Control | Software Setpoint |
| RF Outputs | $f_{rep}$, $f_{CEO}$, $f_{optical\ beat}$ |
| Phase Noise $f_{rep}$ (100 MHz) | < -100 dBc/Hz at 1 Hz Offset<br>< -150 dBc/Hz at 1 kHz Offset |
| Stability $f_{rep}$ (100 MHz) | < 1 x $10^{-13}$ in 1 s |
| Integrated Phase Noise $f_{CEO}$ | < 100 mrad [100 Hz – 2 MHz] |
| **OTHERS** | |
| 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

| | |
|---|---|
| **Product Code** | OFC Engine |

Please call for pricing. Specifications are subject to change without notice. Custom modifications are available, please inquire.



Invisible laser radiation
avoid exposure to beam
Class 3B laser


**Menlo Systems GmbH**
T+49 89 189 166 0
sales@menlosystems.com

**Menlo Systems US**
T+1 303 635 6406
ussales@menlosystems.com

**Menlo Systems Japan**
T+81 907 409 20 21
jpsales@menlosystems.com

**Menlo Systems China**
T+86 21 6071 1678
chinasales@menlosystems.com



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**www.menlosystems.com**