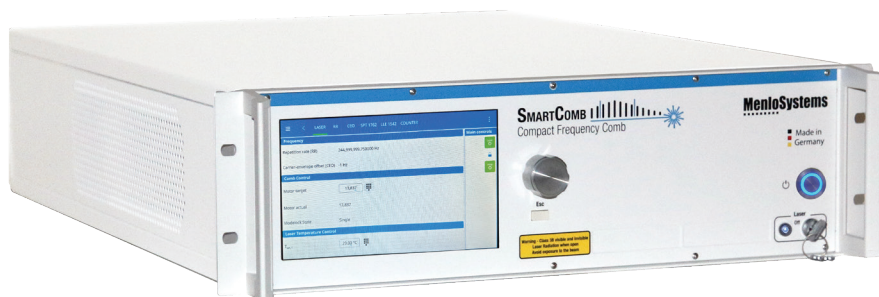


SmartComb-ULN

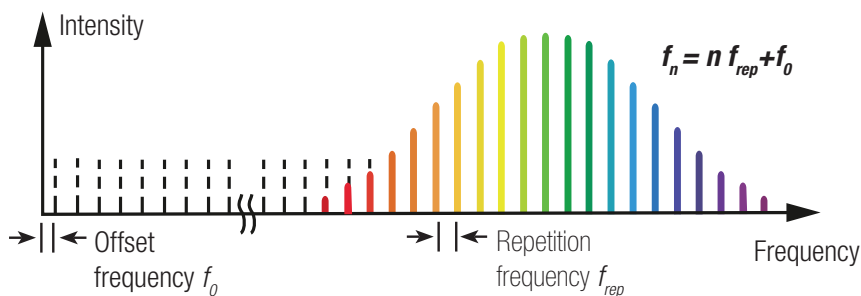
Compact Optical Frequency Comb Precision in Every Pulse



All your comb applications at your fingertips:

Menlo Systems introduces its newest platform for metrology: The SmartComb-ULN, a compact, robust, high-end, and fully-automated Frequency Comb system. This turn-key, all-in-one device, built with Menlo Systems' robust and reliable figure 9® fiber mode-locked oscillator technology, combines the unrivaled performance of our ultra-low-noise (ULN) frequency comb with a compact form factor of only 3 height units (3U) in a 19" rack format.

6 output ports are readily available to either directly interact with your application in the Er-band or seed spectral extensions and amplifiers, enabling experiments in the spectral range from 500 nm to 2100 nm. An input port for an optical lock at 1.5 μm is also included. The SmartComb-ULN ensures that spectral purity and stability are maintained throughout the entire covered spectral domain, making it ideal for use in both mobile and stationary applications, thus providing reliable performance for a wide range of scenarios. Furthermore, the underlying technology has already proven to be suitable for applications in demanding environments such as on-board aircraft and sounding rockets.



The optical comb frequencies f_n are defined by the repetition rate frequency $f_{\text{rep}} = 250 \text{ MHz}$, the carrier envelope offset (CEO) frequency f_0 and an integer number n .

MenloSystems

KEY SPECIFICATIONS

- Comb Mode Spacing 250 MHz*
- Accuracy $< 1 \times 10^{-17}$ ($\tau > 100 \text{ s}$)
- Stability $< 5 \times 10^{-17}$ in 1 s
- Turn-key, Fully Automated, Remotely Controlled, Continuous Operation
- Full Offset Frequency f_0 Tunability

*Others on Request

APPLICATIONS

- Optical Clocks
- Quantum Applications
- High Precision CW Laser Stabilization
- Calibration of CW Lasers
- Length Metrology
- Cold and Trapped Atoms and Ions
- LIDAR
- Low-noise Microwave Generation
- High Resolution Spectroscopy

FEATURES

- Wide Comb Mode Spacing
- High Actuator Bandwidth $> 1 \text{ MHz}$ for Repetition Rate and CEO Frequency
- Fully Fiber-coupled CEO Frequency Generation
- Spectral Purity Transfer: Transfer of Optical Reference Stability to all Comb Modes
- 6 Output Ports
- Optical Measurement Input (1.5 μm)
- Internal 10 MHz OCXO Reference

OPTIONS

- Compatible with all Amplifiers and Spectral Extensions, Delivering Light from 500 nm to 2100 nm
- GPS-based 10 MHz Frequency Reference
- Ultrastable Laser ORS-Mini-based Optical Input for Optical Locking

SmartComb-ULN



Compact Optical Frequency Comb

COMPLETE SOLUTION:

The turn-key, fully hands-off optical setup is integrated into a 19", 3U rack unit and offers unprecedented performance for its compactness. Even the stability of the highest performance optical clocks can be fully transferred via spectral extensions to your application over the spectral range from 500 nm to 2100 nm.

OPTICAL SPECIFICATIONS FOR EACH OUTPUT PORT

PROPERTY	VALUE	
Comb Mode Spacing	250 MHz	
Central Wavelength	1560 nm	
Average Power	>10 mW	
Spectral Width	>25 nm (FWHM)	>50 nm (-10 dB)
Stability* (MDEV)	$<5 \times 10^{-17}$ in 1 s**, $<5 \times 10^{-18}$ in 1000 s**	$<5 \times 10^{-13}$ in 1 s ^Δ
Accuracy	$<1 \times 10^{-17}$ for $\tau > 100$ s**	$<1 \times 10^{-14}$ for $\tau > 100$ s ^Δ
Integrated Phase Noise	<50 mrad [100 Hz – 2 MHz], <90 mrad [1 Hz – 10 MHz]	
Tuning Range of Comb Mode Spacing	>4 MHz	
Tuning Range of CEO Frequency	Fully Flexible	
Optical Outputs	6	
Linewidth	<1 Hz** for all comb lines and all wavelength extensions	

*out-of-loop comb-comb-comparison, **phase lock to optical reference, ^Δphase lock to rf reference

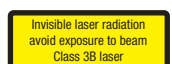
SYSTEM FACTS

Form Factor	19" x 3U
Weight	<25 kg
Operating Voltage	100...115 VAC or 230 VAC, 50...60 Hz
Power Consumption	<100 W
Operating Temperature	25 ± 10 °C
Software	Includes full automation
Software Interfacing	Ethernet

ORDERING INFORMATION

Product Code	SmartComb-ULN
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Please call for pricing. Specifications are subject to change without notice. Custom modifications are available, please inquire.



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