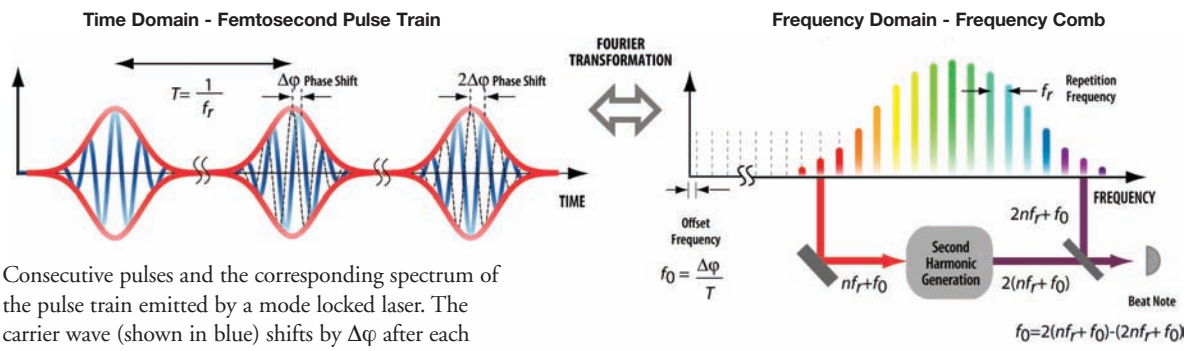
FC1000-250: Yb-Doped Optical Frequency Synthesizer

Femtosecond optical frequency combs have led to a revolution in our ability to measure the frequency of light. This approach vastly enhances and simplifies dimensional metrology and enables new directions in physics.

With the FC1000-250 we introduce our latest model of the Optical Frequency Synthesizer. The FC1000-250 measures optical frequencies with unprecedented accuracy (up to 14 digits) and stability. It is based on a mode-locked Ytterbium-doped oscillator and provides 500,000 precise laser lines with equal spacing of 250 MHz. The output is spectrally broadened to generate an octave-spanning spectrum. The offset frequency beat is generated in a stable, rigid f:2f interferometer. The system is designed and engineered for 24/7 operation.

Applications

- Dimensional Metrology
- Optical Clocks
- High-Resolution Spectroscopy
- Low-Noise Microwave Synthesis
- Absolute Distance Measurements
- Transfer of Ultrastable Timing Signal and Frequency Standards



Consecutive pulses and the corresponding spectrum of the pulse train emitted by a mode locked laser. The carrier wave (shown in blue) shifts by $\Delta\varphi$ after each round trip with respect to the pulse envelope (shown in red). This continuous shift results in a frequency offset $f_0=\Delta\varphi/T$ of the comb.

Stabilization of the offset frequency and the pulse to pulse phase slippage by frequency doubling the infrared part of the comb and observation of the beat with the blue part.

Specifications

Comb Frequency Spacing	250 MHz
Accessible Optical Range	Octave-Spanning Spectrum Centered at 1030 nm
Accuracy*	10^{-14}
Stability*	5×10^{-13} in 1 s
Input Requirements	10 MHz Reference, Power Level +7 dBm

Options

P250 PULSE-YB Yb-Doped Amplifier:
Additional amplifier at 1030 nm provides average output power levels in the 500 mW - 1 W range

BDU-FS, BDU-FC, and BDU-FF Beat Detection Units:
These units generate and measure the beat signal between the frequency comb and an external CW laser. Available for various spectral ranges, these free-space or fiber-coupled units are matched to the laser frequencies of the customer.

SYNCRO-LLE Locking Electronics Unit:
This unit phase locks an external CW laser to the stabilized frequency comb and is field-tested using lasers from major suppliers.

GPS 5-10 10 MHz Frequency Reference:
Provides RF reference input signal for the frequency comb

*Or same as reference, whichever applies first
Note: When beating the comb with an SM-diode laser (output >2 mW) or any other comparable optical signal, a SNR of >30 dB in 100 kHz bandwidth will be achieved.

ITEM #	$	£	€	RMB	DESCRIPTION
FC1000-250	CALL				Ytterbium Optical Frequency Synthesizer

For local and updated pricing, please call Menlo Systems, Inc. in North America 973-300-4490, Menlo Systems GmbH in Europe +49-89-189-166,0 or Thorlabs Japan, Inc. in Asia +81-3-5979-8889, or email sales@menlosystems.com.