

Optical Frequency Synthesizer FC8004



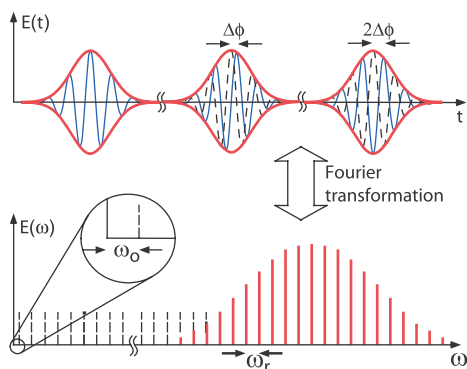
The FC8004 Optical Frequency Synthesizer gives the user access to optical frequency measurement techniques with unprecedented accuracy and flexibility. This novel, extraordinary precise technology can be implemented in applications such as frequency chain generation, optical atomic clocks and ultra high precision spectroscopy. It has been successfully field tested in many laboratories worldwide.

Applications

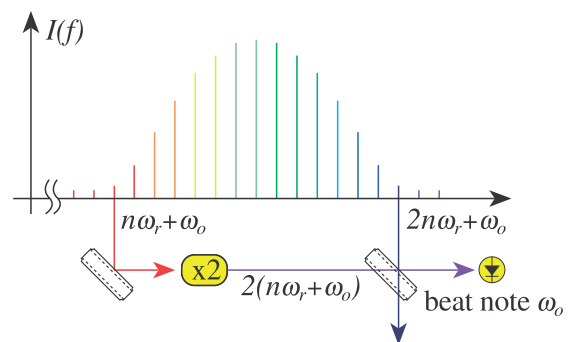
- Measures/generates optical frequencies with unprecedented accuracy (up to 14 digits) and stability.
- Optical Frequency Comb Generation. Provides 500,000 precise laser lines with equal spacing.
- The FC8004 multiplies a radio frequency reference into the optical region.

Operation Principle

The Optical Frequency Synthesizer technology is based on a femtosecond laser frequency comb. It requires the stabilization of two important parameters: Repetition rate ω_r and offset frequency ω_o . From the exact knowledge of these two radio frequencies one can derive the optical frequency of any mode $\omega_n = n \omega_r + \omega_o$.



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

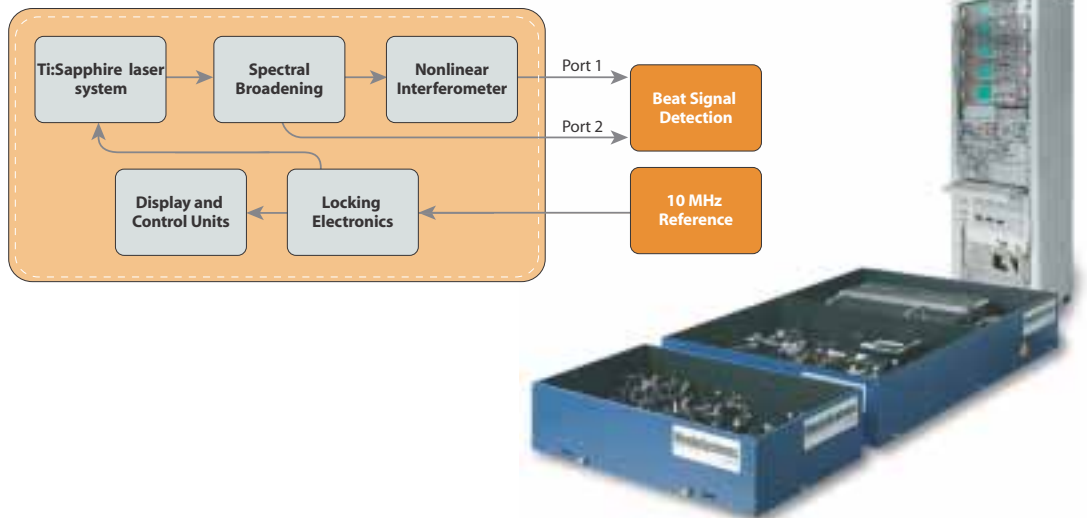
Optical Frequency Synthesizer FC8004

TECHNICAL SPECIFICATIONS

| | |
|---------------------------------|---|
| Comb Frequency Spacing | 200 MHz |
| Accessible Optical Range | Output Port 1: 630-850 nm Output Port 2: 532, 1064 nm |
| Accuracy | 10 ⁻¹⁴ or same as reference, whichever applies first. |
| Stability | 5 x 10 ⁻¹³ in 1 sec. or same as reference, whichever applies first |
| Dimensions | Optical Unit: 850 (l) x 650 (w) x 200 (h) mm Electronic Unit: 600 (l) x 600 (w) x 1600 (h) mm |
| Input Requirements | 10 MHz Reference, Power Level +7 dBm |
| Optional | <ul style="list-style-type: none"> • BDU 08 Laser Beat Detection Unit all optics and electronics for beat detection with external laser • GPS 6-12 Frequency Standard GPS based 10 MHz frequency reference, accuracy in 1 s: 5 x 10⁻¹² |

Note: When beating the comb with an SM-diode laser (output > 2 mW) or any other comparable optical signal an SNR of > 30 dB in 100 kHz bandwidth will be achieved

Schematic Setup



ORDERING INFORMATION

| | | |
|---------------|--|-------------------------|
| FC8004 | Optical Frequency Synthesizer, Ready-to-use, installation and training included | call for pricing |
|---------------|--|-------------------------|



Prices and Specifications are subject to change without notice.
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Contact

Menlo Systems GmbH
Am Klopferspitz 19
D-82152 Martinsried/Munich
Germany
Tel: +49 89 189166 0
Fax: +49 89 189166 111
www.menlosystems.com
sales@menlosystems.com

In the US

Menlo Systems Inc.
Tel: +1 973 300 4490
www.menlosystems.com
ussales@menlosystems.com
Thorlabs, Inc.
Tel: +1 973 579 7227
www.thorlabs.com
sales@thorlabs.com

In Japan & Asia

Thorlabs Japan Inc.
Tel: +81 3 5979 8889
www.thorlabs.com
sales@thorlabs.jp