

Timing-OMO

Timing Optical Master Oscillator



APPLICATIONS

Low-phase noise optical pulses for

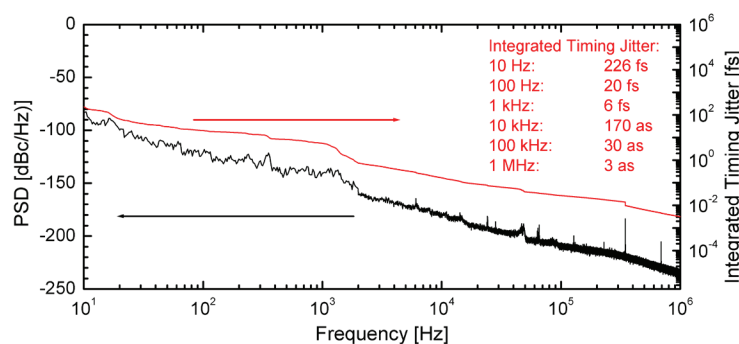
- Timing distribution through fiber links
- PPS synchronization and distribution

The Timing Optical Master Oscillator (Timing-OMO) is the source delivering optical pulses for the timing distribution system. The laser system is based on an optical femtosecond oscillator using an Er-doped fiber in Menlo Systems' figure 9® design. Subsequent amplification of the oscillator output in a Source Distribution Amplifier (SDA) unit provides sufficient optical power for the required client links. The repetition rate of the laser is synchronized to an external Radiofrequency Master Oscillator (RMO), the master timing reference of the facility.

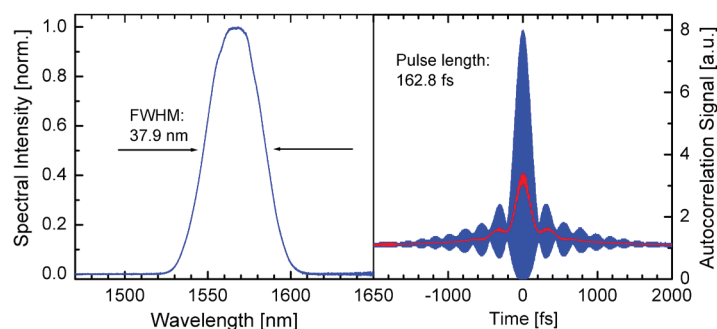
Due to active stabilization and control of each fiber link all output pulses at the backend are almost drift-free and thus a reliable copy of the OMO pulses. The femtosecond oscillator provides an additional optical output for the extension of the timing system to up to 14 independent stabilized fiber links.

MEASUREMENT DATA:

Single side band phase noise PSD of a free-running 100 MHz erbium oscillator, normalized to the fundamental repetition rate:



Optical spectrum and autocorrelation trace of a 100 MHz erbium oscillator after SDA and Splitterbox (SPBox):



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SPECIFICATIONS

Laser architecture		Er-doped fiber laser, PM, figure 9®
Active temperature stabilization	<10 mK	RMS over 8 hours
Repetition rate	50 - 250 MHz	to be specified prior to system order
Tuning range of repetition rate	>210 kHz*	available with stepper motor

OPTICAL OUTPUT

Number of outputs	2	for later system extension to up to 14 links
Output wavelength	1560 nm	
Output wavelength tolerance	±20 nm	factory-set
Optical pulse duration	N/A	output not dispersion compensated, spectral bandwidth supports 100 - 250 fs FWHM
Monitor port output power	~1 mW	fiber coupled (FC/APC), suitable to measure the optical spectrum of the laser by an external OSA
Optical amplitude stability	<0.1 %	RMS, [1 kHz, 10 MHz]
Integrated timing jitter (free-running)	<10 fs	RMS, [1 kHz, 10 MHz]

ELECTRICAL OUTPUTS

RF monitor port	1 GHz	3-dB bandwidth, electrical signal synchronous to laser pulses; SMA connector
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REMOTE CONTROL

Interface on 19" control unit	USB/RS232	documentation of the communication protocol included
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ENVIRONMENTAL REQUIREMENTS

Ambient temperature	20 – 25 °C	
Ambient temperature variation	±1 °C	for full specifications

*Valid for lasers with repetition rate of 100 MHz. Tuning range can be smaller for lower repetition rates.



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