

Clock Synchronizer

Subpicosecond Timing Jitter

Applications

- Synchronizing laser to a reference / clock signal
- Synchronizing two laser systems
- RF photocathode systems
- Free-electron laser systems
- Pump-probe experiments
- Sync-pumping of dye laser systems

Features

- Compatible with all TBP laser units
- Adjustable static phase shift
- Timing jitter displayed on LCD
- Covers large clock frequency range
- Also compatible with other laser systems



Options

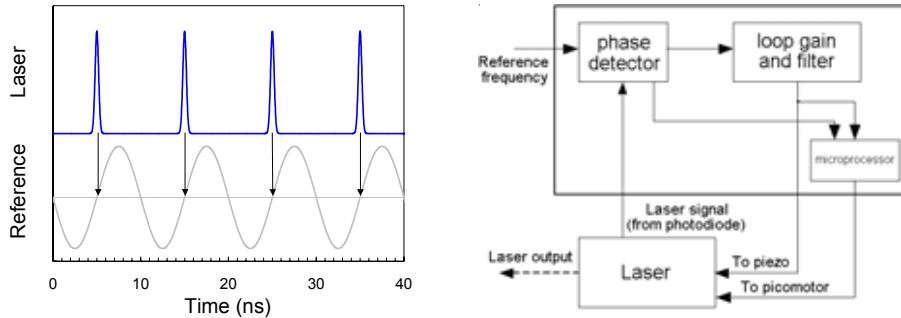
- Built-in reference clock
- RS-232 serial interface
- Extension to >10 GHz repetition rates
- Extension to 40 GHz repetition rates

Typical Performance Parameters

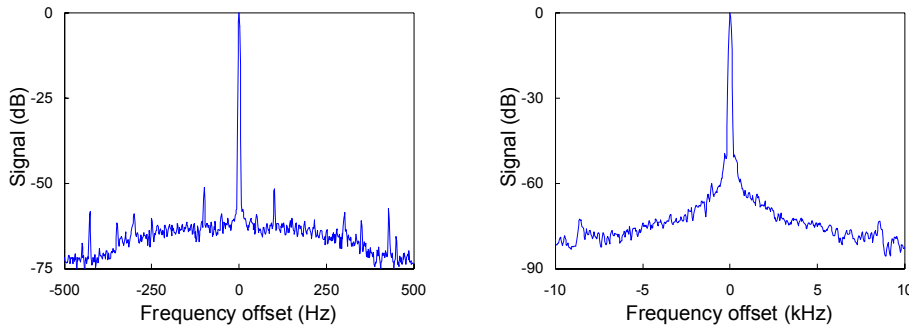
<0.4 ps	timing jitter
20 MHz – 1 GHz	clock frequency range
$-\pi/4$ to $+\pi/4$	adjustable phase range
1 ms	settling time

The Model CLX-1100 Clock Synchronizer uses a phase-locked loop to synchronize the repetition rate of a passively mode-locked laser system to a reference clock signal, by actively adjusting the laser cavity length to control its frequency and phase.

The CLX compensates for small cavity length changes with a short-range, high-speed piezo actuator, and compensates for a larger cavity length mismatch with a motorized translation stage. The system features user-friendly software, a self-calibration routine, and displays a continuous monitoring of relative laser jitter during operation.



Operating principle and block diagram of the CLX-1100 Clock Synchronizer



Phase noise from a Model GLX-200 femtosecond Nd:glass laser system, measured at the 200th harmonic of the laser repetition rate. The integrated phase noise gives a timing jitter of less than 0.2 ps rms.

Specifications CLX-1100

System performance

- timing jitter ¹⁾ 0.4 ps typical
- static phase shift range ²⁾ $-\pi/4$ to $+\pi/4$
- settling time after phase step ²⁾ 1 ms typical

Reference / clock signal requirements

- frequency at the laser repetition rate
- input power @ 50 Ω 5 dBm – 20 dBm (approx. 1Vpp – 6Vpp)

Laser (photodiode) signal requirements

- frequency (repetition rate) 20 MHz – 1 GHz
- input power @ 50 Ω 0 dBm – 20 dBm (approx. 0.6Vpp – 6Vpp)

General

- voltage 100 VAC – 240 VAC
- frequency 50 Hz – 60 Hz
- input power (single phase) 100 VA
- size, weight 260 mm x 130 mm x 260 mm, 3 kg

¹⁾ measured with low noise reference source (SSB noise < -128 dBc / Hz @1 kHz)
²⁾ laser-to-clock phase can be varied by the user (modulation input at the rear of the unit)

All specifications are subject to change without notice.