

Synchrolock-AP

Synchronization Accessory for Mira and Vitara-T Series Ti:S Oscillators

The Synchrolock-AP is used to accurately synchronize two Mira or Vitara lasers together, or to synchronize a Mira or Vitara laser to an external RF source. Operating in the femtosecond or picosecond (Mira only) regime, the Synchrolock-AP allows smooth wavelength tuning while keeping the lasers synchronized.

Three separate actuators operate at different locations inside the laser head to compensate low, medium and high frequencies. The actuators are controlled by feedback electronics while a high-speed photodiode simultaneously monitors the laser repetition-rate.

The Synchrolock-AP uses the 9th harmonic content of the photodiode signal to provide a higher signal-to-noise ratio, which leads to tighter jitter lock. In this way Synchrolock-AP provides extremely low jitter while ensuring long-term stability.



FEATURES & BENEFITS

- The Synchrolock-AP accessory locks the pulse repetition rate of one "Slave" Mira or Vitara-T Series laser to another "Master" Mira or Vitara laser, or to a "Master" external RF source
- Femtosecond (Mira and Vitara-T Series) and/or picosecond (Mira only) operation
- Three cavity length actuators provide jitter stabilization over a broad bandwidth and large dynamic range
- User adjustable delay between locked pulse trains
- Simple fiberoptic coupling of slave output beam to the Synchrolock AP detection system results in minimal losses and ease of use
- Unique feedback locking mechanism locks to the 9th harmonic of the input signal for enhanced signal to noise performance and tighter synchronization between slave and master oscillators

APPLICATIONS

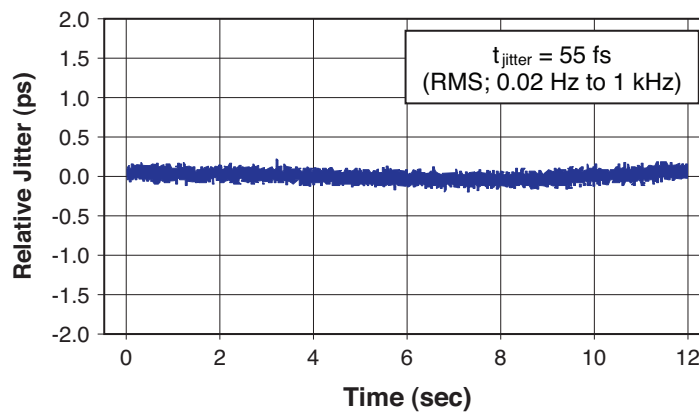
- Applied Physics
 - FEL/Synchrotron Studies

SPECIFICATIONS ^{1,2,3,4,5}	Slave Oscillator Jitter (fs)		
	Mira (femto)	Mira (pico)	Vitara-T Series
Master Oscillator			
Mira (femto)	<250	<250	<250
Mira (pico)	<250	<250	<250
Vitara-T or -S Series	<250	<250	<100
rf Source ^{6,7} (low harmonic content)	<550	<750	<230
rf Source ^{7,8} (high harmonic content)	<300	<500	<200

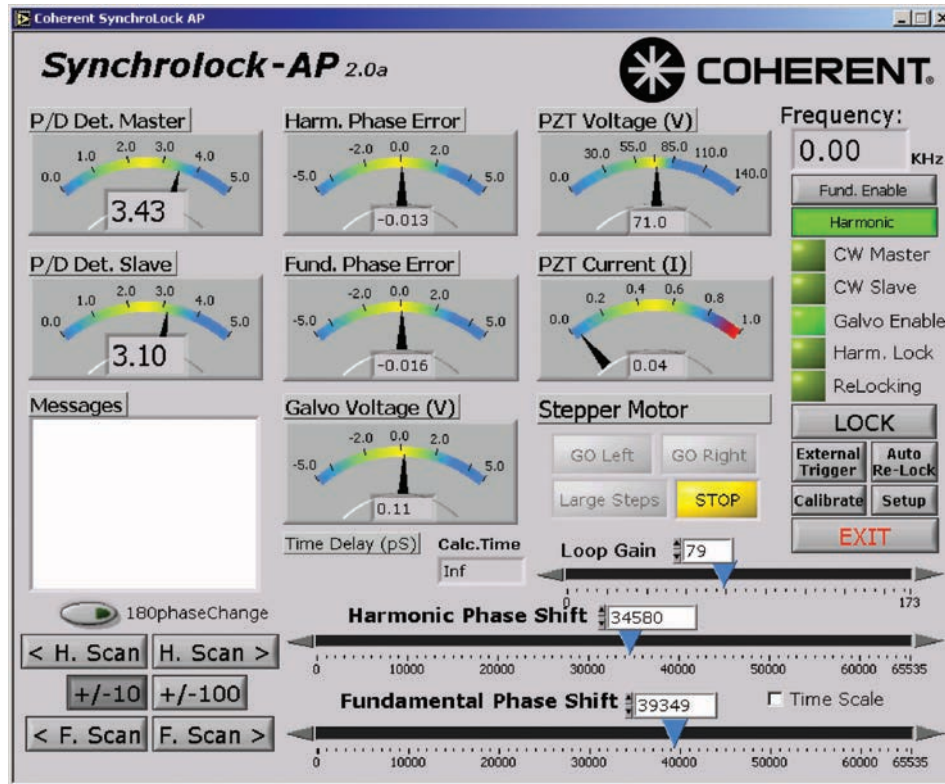
1 Jitter specification is RMS (.02 to 10 kHz) over 1 minute acquisition time assuming Gaussian statistics. Jitter values are in femtoseconds.
 2 Jitter values are measured using the time-averaged cross-correlation between slave and master optical outputs with the Synchrolock-AP operating in harmonic lock.
 3 Specifications are based on use of isolation optical table, solid-state chillers, and Verdi oscillator pumping.
 4 Specifications apply to an oscillator (laser or external) synchronization signal between 70 MHz and 90 MHz.
 5 Mira specifications apply to X-Wave tuning range (700 nm to 980 nm). Specifications cover mixed wavelength systems in the X-Wave range.
 6 Electronic external sync signal (low harmonic content) into optional slow trigger/oscillator board.
 7 Fundamental external electronic sync signal input requirements: 0 to +10 dBm amplitude into 50Ω, <-100 dBc/Hz phase noise at 1 KHz from carrier.
 8 Electronic external sync signal (9th harmonic content >-20 dBm) into "COMB IN" input of the controller.

TYPICAL PERFORMANCE

Example showing relative jitter between pulse trains from two synchronized Mira-900 lasers



GUI for Synchrolock-AP



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Coherent follows a policy of continuous product improvement. Specifications are subject to change without notice. Coherent's scientific and industrial lasers are certified to comply with the Federal Regulations (21 CFR Subchapter J) as administered by the Center for Devices and Radiological Health on all systems ordered for shipment after August 2, 1976.

Coherent offers a limited warranty for all Synchrolock-AP accessories. For full details of this warranty coverage, please refer to the Service section at www.coherent.com or contact your local Sales or Service Representative. MC-XXX-18-0M0618 Copyright ©2018 Coherent, Inc.

