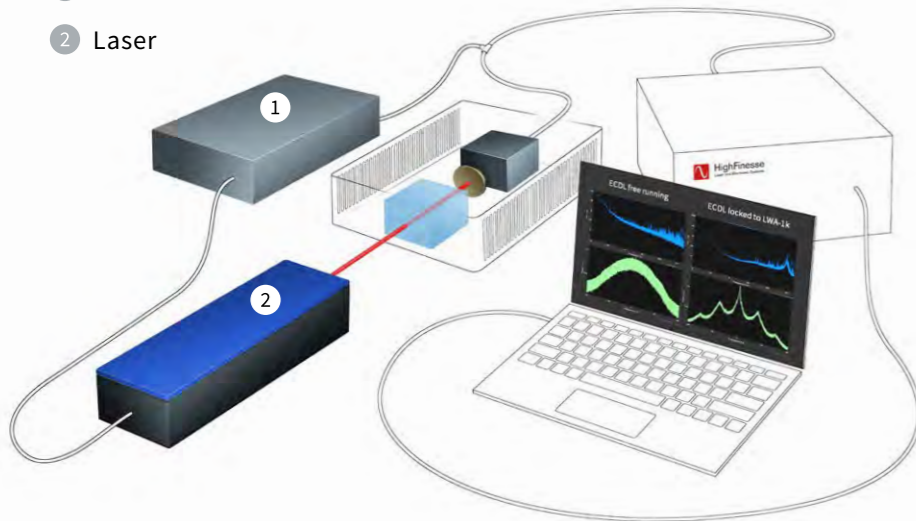


Feedback Controller

Due to the design of the LWAs, the output voltage can be directly used as an error signal for a feedback controller allowing to reduce the frequency noise of the test laser.

Depending on the used feedback controller and the laser system the optical linewidth can be reduced by more than two orders of magnitude offering a vast amount of new opportunities.

- 1 Feedback controller
- 2 Laser



Active laser noise reduction

- Connect the Analyzer output signal (A) as input signal to a fast feedback controller.
- Connect the feedback controller to the laser's fast DC modulation input (e.g. laser diode current). (B)
- Adjust the feedback to minimize the output signal of the Analyzer (e.g. PID parameters, gain)

Typical application

- Laser module quality control
- Laser design optimization
- Metrology and quantum technology
- Linewidth control for spectroscopy
- Modulation surveillance

Product Overview

Technical Data

Wavelength range	
Input power range (@typical wavelength)	
Required input power stability	
Laser type	
Input type	
Maximum frequency stroke (@ f > 10Hz)	

Frequency Noise Specification

Noise floor @typ.input power and wavelength	
Frequency noise bandwidth	
Minimum measurable intrinsic linewidth (lorentzian linewidth)	
Effective linewidth range (optical linewidth) [β-separation method]	
Relative intensity noise limit (lorentzian linewidth)	
Dynamic range	
Effective linewidth range (optical linewidth) [curve fitting method]	
Dynamic range	

Miscellaneous

Interface	
Analog Output	
Cutoff (highpass filter)	
Dimensions	
Weight	

Digitizer Module

Sample rate	
Resolution	
Acquisition time (time series)	
Evaluation time ³⁾	
Communication	
Dimensions	
Weight	

Linewidth Analyzer - 5-2022 - This document provides general information only and may be subject to change at any time without prior notice.

Unit	LWA-1k 780 ¹⁾			LWA-10k VIS ¹⁾			LWA-1k 1550			LWA-10k NIR			LWA-100k NIR																	
	min	typ	max	min	typ	max	min	typ	max	min	typ	max	min	typ	max															
nm	760	780	1064 ²⁾	450	780	1064 ²⁾	1530	1550	1625	1064	1550	1625	1064	1550	1625															
mW	1	10	15	0.5	5	8	0.5	5	8	0.5	5	8	0.5	5	8															
%	±5																													
Laser type CW, single mode																														
	PM-FC/APC			FC/APC			PM-FC/APC			FC/APC			FC/APC																	
MHz	30			40			30			40			100																	
Hz	10	100	1k	10k	100k	>1M	10	100	1k	10k	100k	>1M	10	100	1k	10k	100k	>1M												
Hz/√Hz	200	75	30	30	25	15	500	150	60	60	50	30	80	40	15	10	8	5	200	100	30	20	15	10	1k	200	60	50	40	25
Hz	10 – 10 M ²⁾			10 – 10 M ²⁾			10 – 10 M			10 – 10 M			10 – 10 M																	
Hz	<3 k			<12 k			<350			<2 k			<10 k																	
Hz	<10 k – 20 M			<20 k – 30 M			<1 k – 20 M			<5 k – 30 M			<15 k – 100 M																	
dB/Hz	-150			-			-150			-			-																	
dB	60																													
Hz	<10 k – 10 M			<20 k – 10 M			<1 k – 10 M			<5 k – 10 M			<15 k – 10 M																	
dB	60																													
Interface	USB 2.0 Type B			Ethernet			USB 2.0 Type B			Ethernet			Ethernet																	
Analog Output	BNC ± 7.5 (50 Ω) ± 15 (high impedance) V, single ended																													
Hz	10, 1k, 10k, 100k			10			10, 1k, 10k, 100k			10			10																	
mm	220 × 334 × 96			440 × 340 × 155 mm			220 × 334 × 96			440 × 340 × 155 mm			440 × 340 × 155 mm																	
kg	8.0			12			8.0			12			12																	
Sample rate	62.5 M (max.)																													
bits	16																													
s	1 m – 100 m																													
s	10 m – 1 (typ.)																													
Communication	USB 3.0 Type B																													
mm	210 × 200 × 74																													
kg	2.0																													

1) Frequency noise and lineshape specifications are derived from measurements at 780 nm.

2) From 900 nm to 1064 nm the frequency noise bandwidth is limited to 10 Hz to 100 kHz.

3) Effective linewidth: Combination of intrinsic linewidth and additional broadening mechanisms (thermal, electrical and acoustic noise). Determination by β-separation method (noise density spectrum) or curve fitting procedure (lineshape spectrum).