



K2-1000

High-power dual-comb laser system

1 GHz repetition rate

>2 W per beam

<100 fs pulse duration

Sub-cycle relative timing jitter



Compact solution
for spectroscopy



High-power for
nonlinear studies



Ultra-low RIN and
relative timing noise

DESCRIPTION

K2-1000 is an ideal platform for R&D applications. The system produces a pair of modelocked femtosecond lasers (optical frequency combs) with a slightly different pulse repetition rate. In the time domain, the optical delay is rapidly swept through a range of 1 nanosecond. In the frequency domain, beat notes between each pair of optical comb lines are generated via heterodyne detection. Through a novel shared-cavity architecture, our system is able to achieve ultra-low noise simply in free-running operation.

CUSTOM OPTIONS

- Wavelength options via OPO (inquire)
- Integrated second harmonic
- OEM version (K2-1000-mini line)
- Ultrabroadband configuration

APPLICATIONS

- Time-resolved spectroscopy
- Multi-species gas sensing
- Precision ranging
- THz-TDS

Related publications

Coherently averaged dual-comb spectroscopy with a low-noise and high-power free-running gigahertz dual-comb laser

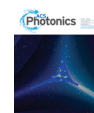
Phillips et al., Optics Express 31, 7103 (2023)

Ultra-low noise spectral broadening of two combs in a single ANDi fiber

Camenzind et al., APL Photonics 10, 036119 (2025)

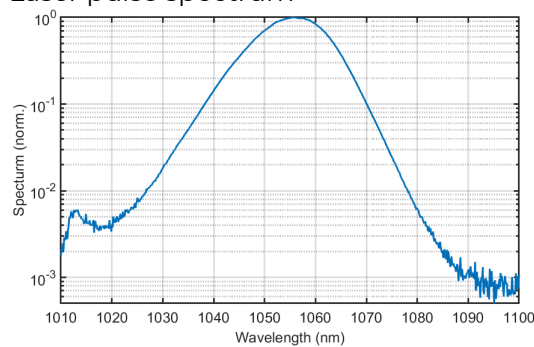
Long-Range and Dead-Zone-Free Dual-Comb Ranging for the Interferometric Tracking of Moving Targets

Camenzind et al., ACS Photonics 12, 1829 (2024)

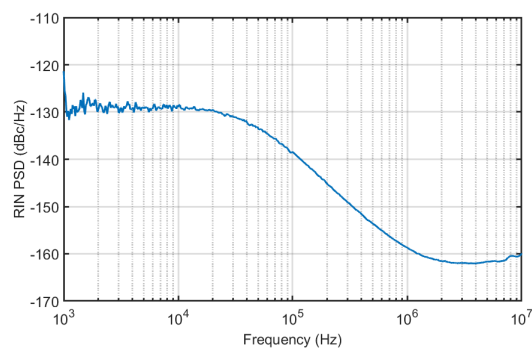


EXAMPLE CHARACTERIZATION

Laser pulse spectrum



Relative intensity noise measurement



LASER SPECIFICATIONS

	Standard	SHG option
Laser wavelength	1050 +/- 10 nm	525 +/- 5 nm
Power per comb	>2 W	> 100 mW
Pulse duration (FWHM)	<100 fs, clean sech ² pulses, < 150 fs for SHG option	
Repetition rate	1 GHz +/- 0.1 GHz	
Pulse energy	> 2 nJ	
Repetition rate difference	tunable +/- 100 kHz	
Relative timing jitter	<10 fs [1 kHz, 100 kHz]	

AVAILABLE OUTPUTS

Optical	Two spatially separated pulse trains
Cross-correlation signal	Trigger signal at the repetition rate difference
Digital signals	Δf_{rep} and f_{rep} values, logging and remote control via K2-Link

AVAILABLE INPUTS

Repetition rate	f_{rep} piezo actuation with integrated high-voltage amplifier (option)
Repetition rate difference	Active Δf_{rep} stabilization and digital control
Pump current	Pump diode current modulation capability for f_{CEO} locking
Power	Power allocation between fundamental and harmonic (if applicable)

PHYSICAL DIMENSIONS

Laser head (L x W x H)	494 x 291 x 179 mm ³
Beam output height	75 mm on (W) side
K2-Link control unit	395 x 436 x 88 mm ³ (19" rack mountable, 2U)

REQUIREMENTS

Operating temperature	15 – 30 °C (Water or air options - hybrid design)
Relative humidity	Non-condensing environment
Rated power	300 W
Electrical requirements	100-120 VAC, 3 A, 50-60 Hz / 200-240 VAC, 1.5 A, 50-60 Hz

Product specifications and descriptions in this document are subject to change without notice.

